



AMENDED 9/7/18
City of St. Helena
Regular City Council Meeting
Tuesday, September 11, 2018 @ 6:00 PM
Vintage Hall Board Room - Second Floor
465 Main Street, St. Helena

PLEASE NOTE: Any person who wishes to speak regarding an item on the agenda or make a comment under the "Oral Communication" portion of the agenda may do so, but please observe the time limit of four minutes.

Page

1. CALL TO ORDER
2. PLEDGE OF ALLEGIANCE
3. ROLL CALL
Mayor: Alan Galbraith, Vice Mayor: Peter White, City Council: Paul Dohring, Geoff Ellsworth and Mary Koberstein
4. PUBLIC FORUM:
Members of the public are entitled to speak on matters of municipal concern not on the agenda during Public Forum. Each person's comments shall be limited to 4 minutes. Each person is entitled to speak on any non-agendized item only once at any meeting. Brief questions by Councilmembers for clarifications may be posed and answered, and Councilmembers may make requests that items be placed on future agendas, but in accordance with state law, no substantive discussion or action may take place unless and until the matter properly appears on the agenda.
5. REPORTS BY STAFF AND CITY COUNCIL, FUTURE AGENDA ITEMS, AND AB 1234 REPORTS:
Reports by staff and/or Councilmembers on items of general interest. Brief questions for clarification may be posed and answered, and Councilmembers may request that items be placed on a future agenda. Except under certain circumstances, the Brown Act prohibits any other discussion or action by the City Council.
6. PRESENTATIONS AND PUBLIC RECOGNITIONS
 - 6.1. Oath of Office for Fire Captain Nicholas Solakian
 - 6.2. Oath of Office for Fire Engineer Martin Macias
 - 6.3. Active Transportation & Sustainability Committee Report Out by Chair Jeff Farmer
 - 6.4. Proclamation - Suicide Prevention Month 2018
[Proclamation](#)
7. STAFF BRIEFING
 - 7.1. HOME Grant Update by Planning Director Noah Housh
[Conventional Home Rehab Flyer](#)
[Mobile Home Flyer](#)

9

11 - 14

8. CONSENT ITEMS

Members of the Council or the public may ask that any items be considered individually for purposes of considering alternative action, for extended discussion, or for public comment. Unless that is done, one motion may be used to adopt all recommended actions. (Roll Call Vote)

- 8.1. Consideration and proposed approval of a resolution approving the delegation of claims administration and authorizing Redwood Empire Municipal Insurance Fund (REMIF) and the third-party administrator on behalf of REMIF to accept or reject claims filed against the City of St. Helena. 15 - 22

CEQA Determination: Not a CEQA project

Prepared By: Kathy Robinson, Human Resources & IT Director

Recommendation:

Adopt resolution approving the delegation of claims administration and authorizing REMIF and the third-party administrator on behalf of REMIF to accept or reject claims filed against the City of St. Helena.

[Staff Report](#)

- 8.2. AMENDED to add the June 25, 2018 Special City Council and SHAPE Committee Joint meeting minutes. 23 - 44

Consideration and proposed approval of Special City Council and SHAPE Committee Joint meeting minutes of June 25, 2018, Regular Meeting Minutes of August 14, 2018, Special Meeting Minutes of August 14, 2018 and Regular Meeting Minutes of August 28, 2018. (Minutes will be provided prior to the meeting-Provided 9/7/18)

[Special City Council - SHAPE Committee Joint Meeting - 25 Jun 2018 - Minutes](#)

[Special Joint City Council and Planning Commission Meeting General Plan Study Session - 14 Aug 2018 - Minutes](#)

[Regular City Council - 14 Aug 2018 - Minutes](#)

[Regular City Council - 28 Aug 2018 - Minutes](#)

- 8.3. Consideration and Proposed Approval of a Resolution of the City Council of the City of St. Helena Authorizing an Agreement for Fire/Emergency Dispatch Services 45 - 71

CEQA Determination: Not a CEQA project

Prepared By: John Sorensen, Fire Chief

Recommendation:

Approve the Agreement with the Department of Forestry and Fire Protection/Cal Fire for the term of July 1, 2018 through June 30, 2021 for a maximum of \$108,241.05.

[Staff Report](#)

- 8.4. Consideration and Proposed Approval of a Resolution 1) Authorizing the City Manager to Execute a Professional Services Agreement with Kosmont Companies to Assist with Implementation of Downtown Economic, City Assets, and Related Housing Strategies in an amount not to exceed \$75,000; and 2) 73 - 91

authorizing a Fiscal Year 2018/19 budget increase of \$75,000 to 101-4300-2130 from General Fund Reserves

CEQA Determination: Not a CEQA project

Prepared By: Mark T. Prestwich, City Manager

Recommendation:

Staff recommends City Council approve a Resolution 1) Authorizing the City Manager to execute a Professional Services Agreement with Kosmont Companies to assist with implementation of a Downtown Economic, City Assets, and Related Housing Strategies in an amount not to exceed \$75,000; and 2) authorizing a Fiscal Year 2018/19 budget increase of \$75,000 to 101-4300-2130 from General Fund Reserves.

[Staff Report](#)

- 8.5. Consideration and proposed approval of a resolution: (1) authorizing the City Manager to execute a Professional Services Agreement with Nor-Cal Overhead for the replacement and installation of roll-up apparatus bay doors at the Firehouse for a not-to-exceed amount of \$135,736.27, and (2) approving a budget increase of \$135,736.27 to 420-4800-2630 93 - 134

CEQA Determination: Not a CEQA project

Prepared By: John Sorensen, Fire Chief

Recommendation:

Staff recommends City Council approve a resolution (1) authorizing the purchase and installation of four roll-up apparatus bay doors by Nor-Cal Overhead for the amount of \$135,736.27, and (2) approving a budget increase of \$135,736.27 to 420-4800-2630.

[Staff Report](#)

- 8.6. Consideration and proposed approval of a resolution approving the Final Map for the Our Town St. Helena (OTSH) Subdivision. (Attachments will be forthcoming Provided 9/7/18) 135 - 203

CEQA Determination: Exempt from CEQA pursuant to Section 15332, which exempts projects characterized as in-fill development when the project is consistent with the general plan and zoning; occurs within city limits on less than five acres; has no valuable habitat; won't cause any significant environmental effects; and can be served by existing public services

Prepared By: Erica Ahmann Smithies, Public Works Director and City Engineer

Recommendation:

It is recommended the City Council:

1. Adopt the attached resolution approving the Final Map for OTSH Brenkle Court Subdivision Final Map; and
2. Authorize the City Manager to execute the attached agreements in keeping with the requirements of Chapter 16.24.

[Staff Report - Pdf](#)

- 9.1. Consideration and proposed approval the Annexation of Territory into the St. Helena Municipal Sewer District No. 1 MSD Annexation No. 134, 1025 and 1045 Pratt Avenue, St Helena, CA. (APN's) 009-142-023-000 and 009-142-024-000. 205 - 211
- CEQA Determination: Exempt from the requirements of CEQA under the "General Rule", Section 15061 (b)(3), in that it can be seen with certainty that the proposed action will have no impact on the environment.
- Prepared By: Chrissy Cook, Administrative Assistant
- Recommendation:
Adopt Resolution Approving the Annexation of Territory to the St. Helena Municipal Sewer District No. 1, MSD Annexation No. 134, 1025 and 1045 Pratt Avenue, St Helena, CA. Napa County Assessor Parcel Number (APN's) 009-142-023-000 and 009-142-024-000.
- [Staff Report](#)
10. NEW BUSINESS
- 10.1. Citywide Classification and Compensation Study Update 213 - 226
- CEQA Determination: Not a CEQA project
- Prepared By: Kathy Robinson, Human Resources & IT Director
- Recommendation:
Receive and file an status update on the Classification and Compensation Study.
- [Staff Report](#)
[Presentation](#)
- 10.2. Review and Prioritization of Draft City of St. Helena Downtown Economic Strategy 227 - 255
- CEQA Determination: This item is purely an informational discussion to gain Council direction and is therefore not a CEQA project. Any formal decisions on individual projects will be subject to a complete analysis and determination under CEQA.
- Prepared By: Mark T. Prestwich, City Manager
- Recommendation:
Review, discuss and provide direction to the City Manager.
- [Staff Report](#)
[Presentation](#)
[Public Comment.Jake Scheideman](#)
- 10.3. Direction to Negotiate a Contract with GHD for the Design of Improvements to the WWTRP, likely to include: Trickling Filter with Bypass Flow and Settling Tank, Tertiary Filtration, Infiltration Storage Pond, Disinfection System Upgrade, WWTRP Electrical System Upgrade, and Reclamation Field Improvements, and Accept the City of St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) Improvements Feasibility Study and Recommendations for the Phase I WWTRP Improvements in Response to San Francisco Bay Regional Water Quality Control Board Order R2-2016-004. 257 - 912

CEQA Determination: Project is exempt from the requirements under Section 15061(b)(3) the “General Rule” in that it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, Section 15262 Acceptance of Feasibility and Planning Studies and Section 15306 Information Collection in that it is purely the recommendation to negotiate a contract and the acceptance of a feasibility study. Any and all future funding and/or construction activities resulting from this action will be separately reviewed for compliance with CEQA and a formal determination made.

Prepared By: Felix Hernandez III, Utilities Operations Manager

Recommendation:

In order to meet the St. Helena Wastewater Treatment and Reclamation Plant – Groundwater Investigation and Cease and Desist Order Revised Compliance Schedule and based on the finding of the 2017-08-01 Final Feasibility Study and in an effort to utilize existing reclamation field acreage, Staff recommends Council provide direction to negotiate a contract with GHD for the design of Alternative 2: Trickling Filter with Bypass Flow and Settling Tank; Configuration 4, Tertiary Filtration, Infiltration Storage Pond, Disinfection System Upgrade, WWTRP Electrical System Upgrade, Reclamation Field Improvements, and accept the City of St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) Improvements Feasibility Study and Recommendations for the Phase I WWTRP Improvements.

[Staff Report - Pdf](#)

11. ITEMS LIKELY TO BE PLACED ON THE NEXT OR FUTURE MEETING AGENDA:

11.1.

<u>September City Council Meetings:</u>	
9/11 (staff reports due 8/24)	
9/17 Next Steps related to the SHAPE Report/City Hall at 6pm at the Fire Training Room	
9/25 (staff reports due 9/7)	
CONSENT:	
9/25 Jingle All the Way St. Helena Staff Briefing	
Fire Out of State Travel	
9/25 setting a public hearing for sewer annexation at 867 and 871 Dowdell Lane	
9/25 setting a public hearing for sewer annexation at 499 Crane Avenue	
9/25 Award RCD contract for Upper York Creek Monitoring – Public Works	
9/25 Award contract to Waterways for Sulphur Creek repair project – Public Works	
9/25 Meadowood Tank Upgrade – Public Works	

<i>PH or NEW BUSINESS:</i>
St. Helena Resolution for Affordable Housing Bond (SB3)
9/25 Raw Water Use Charges - PW
9/25 1st Reading Design Review Ordinance - Planning
9/25 1st Reading Sign Code Ordinance
PH 9/11 Sewer Annexation 1025 and 1045 Pratt Avenue
<u>October City Council Meetings:</u>
10/9 (staff reports due 9/21)
10/23 (staff reports due 10/5)
<i>PROCLAMATIONS AND PUBLIC RECOGNITION:</i>
10/9 Staff Briefing Parks & Recreation Commission Chair Report Out
<i>CONSENT:</i>
Tennis Court Resurfacing Staff Briefing - Rec
10/9 Flood control project conservation easement
10/23 Amended Coop Agreement with Caltrans for Grayson Signal for electricity(Caltrans to attend)
<i>PH or NEW BUSINESS:</i>
10/9 Clover Flat and Recycling Market Update – Upper Valley Disposal & Recycling
Council Update cost allocation, user fee and impact fee
10/23 1st Reading Concept Review Ordinance - Planning
PH 10/9 setting a public hearing for sewer annexation at 499 Crane Avenue
PH 10/9 Award RCD contract for Upper York Creek Monitoring – Public Works

12. ADJOURNMENT

The next Special City Council meeting is scheduled for September 17, 2018, at 6:00 p.m. in the Fire Training Room, 1480 Main Street (Railroad Entrance).

This agenda was posted at City Hall, 1480 Main Street, and at Vintage Hall, 465 Main Street, St. Helena, California on August 31, 2018.



Cindy Tzaopoulos, City Clerk

In Compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please call the City Clerk's Office (707) 967-2792. Notification 72 hours prior to the meeting as required by Section 202 of the Americans with Disabilities Act will enable the City to make reasonable arrangements to ensure accessibility to this meeting

The time limit within which to commence any lawsuit or legal challenge to any quasi-adjudicative decision made by the City of St. Helena is governed by Section 1094.6 of the Code of Civil Procedure, unless a shorter limitation period is specified by any other provision, including without limitation Government Code section 65009 applicable to many land use and zoning decisions, Government Code section 66499.37 applicable to the Subdivision Map Act, and Public Resources Code section 21167 applicable to the California Environmental Quality Act (CEQA). Under Section 1094.6, any lawsuit or legal challenge to any quasi-adjudicative decision made by the City must be filed no later than the 90th day following the date on which such decision becomes final. Any lawsuit or legal challenge, which is not filed within that 90-day period, will be barred. Government Code section 65009 and 66499.37, and Public Resources Code section 21167, impose shorter limitations periods and requirements, including timely service in addition to filing.

If a person wishes to challenge the above actions in court, they may be limited to raising only those issues they or someone else raised at the meeting described in this notice, or in written correspondence delivered to the City of St. Helena, at or prior to the meeting. In addition, judicial challenge may be limited or barred where the interested party has not sought and exhausted all available administrative remedies.

SUPPLEMENTAL MATERIAL RECEIVED AFTER THE POSTING OF THE AGENDA

Any supplemental writings or documents distributed to a majority of the City Council regarding any item on this Agenda, after the posting of the Agenda, will be available for public review in the City Clerk's Office located at 1480 Main Street, St. Helena, California, during normal business hours. In addition, such writings or documents will be made available on the City's web site at <https://sthelena.civicweb.net> and will be available for public review at the respective meeting.

City of St. Helena

PROCLAMATION

Suicide Prevention Month 2018

WHEREAS, The Napa County Suicide Prevention Council, a public/private collaborative of Napa families impacted by suicide and agencies that serve the Napa County Community, strives to save lives and envisions a suicide-free community through education and training, stigma reduction and provision of resources to combat suicide; and

WHEREAS, suicide is the tenth leading cause of death in the United States and the second leading cause of death among individuals 25-34 and the third leading cause of death among individuals 15-24 (Centers for Disease Control); and

WHEREAS, in 2016, California accounted for 9.5 percent (4,288) of the United States 44,695 suicides, resulting in one person in California dying by suicide every two hours (Centers for Disease Control); and

WHEREAS, more than twice as many people die by suicide in California annually than by homicide; and

WHEREAS, suicide cost California a total of \$4,246,494,000 of combined lifetime medical and work loss in 2010, or an average of \$1,085,277 per suicide death (Centers for Disease Control); and

WHEREAS, Napa County has, between 2000 & 2017, averaged more than 14 suicide deaths annually, the greatest number being individuals 45-54 years of age (Napa County Mental Health Division analysis of Napa County Sheriff Coroner's Office data.); and

WHEREAS, The rate of deaths by suicide in Napa County, from 2008 to 2016, was greater than the California suicide rate (Napa County Health Division analysis of Napa County Sheriff Coroner's Office Data, CA DMH Data and CDC National Vital Statistics)

WHEREAS, every Napa County resident can be an ally by learning about the warning signs of suicidal behavior and how to support someone at risk of suicide;

WHEREAS, every Napa County resident can help eliminate stigma associated with suicide and mental illness, by treating individuals with mental illness with respect and compassion;

Now, therefore let it be resolved, that I, Alan Galbraith, Mayor of the City of St. Helena, do hereby proclaim September 2018 as Suicide Prevention Month in St. Helena and urge the citizens of St. Helena to learn more about suicide detection and prevention.

Dated: June 12th, 2018

Alan Galbraith, Mayor
City of St. Helena

City of St. Helena's Home Repair Loans

Does your home need painting?
Do you need a new roof?
Other repairs also available, if
needed!



- 0% interest rate loans
- No monthly payments (30 year deferred)
- No up-front costs
- See reverse for qualifying maximum income limits

Single family conventional homes and townhomes are eligible.

For additional information please
contact Antonio Mejia at
(707) 257-9356 or
amejia@cityofnapa.org
Se habla español



COUNTY OF NAPA ANNUAL INCOME LIMITS

MAXIMUM GROSS ANNUAL INCOME LIMIT	
Persons Per Household	80%
	Median
	Income
1	51,450
2	58,800
3	66,150
4	73,450
5	79,350
6	85,250
7	91,100
8	97,350



DOES YOUR MANUFACTURED HOME NEED A NEW ROOF?



Manufactured Home Roof Repair or Replacement Program

- **0% interest rate home repair loan**
- **NO MONTHLY PAYMENTS - NO UP - FRONT- COSTS**
- **Balance is not due for 30 years or until Title transfers (30 year deferred payment)**
- **Home must be within the city limits of St. Helena and remain owner-occupied**
- **See reverse for Qualifying Maximum Income Limits**
- **New "lifetime" insulated roofs and composition shingle roofs**
- **Other repairs are available , if needed**

For additional information please contact Antonio Mejia, at (707)-257-9356 or amejia@cityofnapa.org;

Or for more information visit the City's webpage:
www.cityofstheleena.org

NAPA COUNTY INCOME LIMITS CHART

MAXIMUM GROSS ANNUAL INCOME LIMIT	
Persons Per Household	80%
	Median
	Income
1	51,450
2	58,800
3	66,150
4	73,450
5	79,350
6	85,250
7	91,100
8	97,350



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: Consent

Subject: Consideration and proposed approval of a resolution approving the delegation of claims administration and authorizing Redwood Empire Municipal Insurance Fund (REMIF) and the third-party administrator on behalf of REMIF to accept or reject claims filed against the City of St. Helena.

CEQA Determination: Not a CEQA project

Prepared By: Kathy Robinson, Human Resources & IT Director

Reviewed By: April Mitts, Finance Director

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

The City Council is being asked to adopt a resolution approving the delegation of claims administration and authorizing Redwood Empire Municipal Insurance Fund (REMIF) and the third party administrator on behalf of REMIF to accept or reject claims filed against the City of St. Helena.

DISCUSSION

Since 1976, the Redwood Empire Municipal Insurance Fund (REMIF), a joint powers authority, has been managing its members' pooled coverage programs, primarily worker's compensation and liability programs. The City of St. Helena is a member city of REMIF with a total of fifteen cities that make up its membership. At the January 26, 2018 REMIF Board of Directors' Meeting, the Board directed the General Manager to enter into a three year agreement with George Hills Co., a third party administrator, to administer the covered liability claims for member cities. As part of this change, the REMIF General Manager is requesting member cities to adopt a resolution granting REMIF and the third party administrator authority to accept or reject a claim.

Government Code 912.6 empowers the City Council to act on a claim filed against the City by rejecting the claim or by paying the claim in total or in part. The Government Code also allows the City Council to delegate to a third party administrator the ability to respond to covered liability claims. The REMIF Memorandum of Coverage for the Liability Program (MOC) is a negotiated agreement amongst the members. The MOC gives REMIF the right to control the negotiation, investigation, defense, appeal or settlement of liability claims for its members. Therefore, the City Clerk and Human Resources & Information Technology Director work closely and collaboratively with REMIF staff in the handling of claims. The addition of George Hills, Co. does not significantly alter the process normally observed by the City of St. Helena. Instead of claims being presented to the City Clerk to forward to REMIF, George Hills, Co. would be authorized to accept or reject the claim while working closely with the City.

This request (Attachment 1. REMIF Board Meeting April 26, 2018) is designed to create consistency in claims handling across all the REMIF members and to expedite the claims process. The change has the added benefit of taking the paperwork burden off of the cities, along with the responsibility of meeting strict deadlines for rejection. It is worthy of noting that adoption of the proposed resolution does not change the City Council's authority. If the City disagreed with REMIF about the disposition of a claim, the City Council retains the authority to pay a claim or litigate a claim. In this case, REMIF would turn the claim over to the City to be paid or litigated at the City's expense.

FISCAL IMPACT

There is no fiscal impact to delegate claims administration to Redwood Empire Municipal Insurance Fund (REMIF) and the third-party administrator on behalf of REMIF. .

RECOMMENDED ACTION

Adopt resolution approving the delegation of claims administration and authorizing REMIF and the third-party administrator on behalf of REMIF to accept or reject claims filed against the City of St. Helena.

ATTACHMENTS

[Attachment 1. Board Request for Delegation April 26 18 Board Mtg](#)

[Attachment 2. Delegation of Claims Administration RESO](#)



414 W. Napa St. • P.O. Box 885 • Sonoma, CA 95476 • 707.938.2388 • Fax: 707.938.0374
 Members: Arcata Cloverdale Cotati Eureka Fort Bragg Fortuna Healdsburg Lakeport
 Eureka Park St. Helena Sebastopol Sonoma Ukiah Willits Windsor

ITEM 15.0

AGENDA ITEM SUMMARY

TITLE: DRAFT RESOLUTION TO DELEGATE CLAIMS ADMINISTRATION

PRESENTED BY: AMY NORTHAM, GENERAL MANAGER

ISSUE

The adoption of a resolution to be used by the members requires ratification by the Board. At this time, the draft resolution is provided for review and comment only. Ratification of the resolution will be sought at the June Board of Directors meeting.

BACKGROUND

At the January 26, 2018 Board of Directors' Meeting, the Board directed the General Manager to enter into a three year agreement with George Hills, a third party administrator, to administer the liability claims.

Government Code 912.6 empowers the City/Town (through their council) to act on a claim filed against the City/Town in one of four ways:

- (1) If the Board (council) finds the claim is not a proper charge against the public entity, it shall reject the claim;
- (2) If the Board (council) finds the claim is a proper charge against the public entity and is for an amount justly due, it shall allow the claim;
- (3) If the Board (council) finds the claim is a proper charge against the public entity but is for an amount greater than is justly due, it shall either reject the claim or allow it in the amount justly due and reject it as to the balance; or
- (4) If legal liability of the public entity or the amount justly due is disputed, the Board (council) may reject the claim or may compromise the claim.

If the member City/Town would like to delegate the handling of the liability claims to REMIF and/or the third party administrator on behalf of REMIF (George Hills), the City/Town would need to adopt a resolution, delegating such authority. The attached resolution is provided as a draft and all suggested changes will be considered.

The draft resolution also outlines that the City/Town will work closely with REMIF and the third party administrator on behalf of REMIF to respond to claims. All decisions will be collaboratively discussed between the City/Town and REMIF or the third party administrator on behalf of REMIF.

In addition, it states that the City/Town will immediately report every claim to REMIF and/or the third party administrator on behalf of REMIF (but in no case longer than 2 business days of claim filing) and the City/Town will provide REMIF and the third party administrator on behalf of REMIF any information/documentation that is needed immediately (but in no case longer than 10 days of claim filing) with information to determine the appropriate claim response.

REMIF Board Meeting date: 04/26/18

FISCAL IMPACT

None

RECOMMENDED ACTION

At this time, this is provided as informational only. Recommendation to approve the resolution will happen at the June of 2018 Board of Directors meeting.

ATTACHMENTS

15.1 DRAFT resolution for delegation of claims administration.

RESOLUTION NO. xxxx-xx

ITEM 15.1

A RESOLUTION OF THE CITY/TOWN COUNCIL OF THE CITY/TOWN OF XXXX APPROVING THE DELEGATION OF CLAIMS ADMINISTRATION AND AUTHORIZING REMIF AND THE THIRD PARTY ADMINISTRATOR ON BEHALF OF REMIF TO ACCEPT OR REJECT CLAIMS FILED AGAINST THE CITY/TOWN

WHEREAS, the City/Town of XXX is a member of the Redwood Empire Municipal Insurance Fund (hereinafter referred to as REMIF), a self-insured joint powers authority;

WHEREAS, REMIF provides, among other things, the City's/Town's liability coverage;

WHEREAS, REMIF has a Memorandum of Liability Coverage that outlines the liability coverage provided to the City/Town and is bound by the By-Laws that, among other things, outline settlement authority;

WHEREAS, REMIF works with a third party administrator to administer the City's/Town's liability claims;

WHEREAS, Government Code 912.6 requires that the City/Town act on a claim filed against the City/Town in one of four ways: (1) If the Board finds the claim is not a proper charge against the public entity, it shall reject the claim; (2) If the Board finds the claim is a proper charge against the public entity and is for an amount justly due, it shall allow the claim; (3) If the Board finds the claim is a proper charge against the public entity but is for an amount greater than is justly due, it shall either reject the claim or allow it in the amount justly due and reject it as to the balance; or (4) If legal liability of the public entity or the amount justly due is disputed, the Board may reject the claim or may compromise the claim.

WHEREAS, the City/Town shall delegate and authorize REMIF and the third party administrator on behalf of REMIF to respond to claims filed against the City/Town as outlined in Government Code section 912.6. The City/Town will work closely with REMIF and the third party administrator on behalf of REMIF to respond to claims. All decisions will be collaboratively discussed between the City/Town and REMIF or the third party administrator on behalf of REMIF.

WHEREAS, whenever it is necessary for the City to reject or provide another form of notice to a claimant, the City/Town hereby delegates to REMIF or the third party administrator on behalf of REMIF that authority, in collaboration with the City/Town.

and

WHEREAS, the City/Town will immediately report every claim to REMIF and/or the third party administrator on behalf of REMIF (but in no case longer than 2 business days of claim filing); the City/Town will provide REMIF and the third party administrator on behalf of REMIF any information/documentation that is needed immediately (but in no case longer than 10 days of claim filing) with information to determine the appropriate claim response.

NOW, THEREFORE, BE IT RESOLVED by the City/Town of XXXX that it does hereby delegate the authority of claims administration and authorizes REMIF and the third party administrator on behalf of REMIF to respond to claims on behalf of the City/Town.

DULY AND REGULARLY ADOPTED this _____ day of April, 2018.

CITY/TOWN

ATTEST

CITY OF ST. HELENA

RESOLUTION NO. 2018-XX

Approving the delegation of claims administration and authorizing Redwood Empire Municipal Insurance Fund (REMIF) and the third-party administrator on behalf of REMIF to accept or reject claims filed against the City of St. Helena

RECITALS

- A. The City of St. Helena is a member of the Redwood Empire Municipal Insurance Fund (hereinafter referred to as REMIF), a self-insured joint powers authority; and
- B. REMIF provides, among other things, the City of St. Helena's liability coverage for those matters covered by the Memorandum of Liability Coverage; and
- C. REMIF has a Memorandum of Liability Coverage that outlines the liability coverage provided to the City of St. Helena and is bound by the Municipal Code that, among other things, outline settlement authority; and
- D. REMIF works with a third-party administrator to administer the City of St. Helena's liability claims that fall under the Memorandum of Liability Coverage; and
- E. Government Code 912.6 requires that the City of St. Helena act on a claim filed against the City of St. Helena in one of four ways: (1) If the Board finds the claim is not a proper charge against the public entity, it shall reject the claim; (2) If the Board finds the claim is a proper charge against the public entity and is for an amount justly due, it shall allow the claim; (3) If the Board finds the claim is a proper charge against the public entity but is for an amount greater than is justly due, it shall either reject the claim or allow it in the amount justly due and reject it as to the balance; or (4) If legal liability of the public entity or the amount justly due is disputed, the Board may reject the claim or may compromise the claim; and
- F. The City of St. Helena shall delegate and authorize REMIF and the third-party administrator on behalf of REMIF to accept and respond to covered claims filed against the City of St. Helena as outlined in Government Code section 912.6. The City of St. Helena will work closely with REMIF and the third party administer on behalf of REMIF to respond to covered claims. All decisions will be collaboratively discussed between the City of St. Helena and REMIF or the third-party administrator on behalf of REMIF. Final authority is outlined in the Memorandum of Liability Coverage, the bylaws and the JPA agreement with REMIF.
- G. Whenever it is necessary for the City to reject or provide another form of notice to a claimant for a covered claim, the City of St. Helena hereby delegates to REMIF

or the third-party administrator on behalf of REMIF that authority, in collaboration with the City of St. Helena; and

- H. The City of St. Helena will immediately report every covered claim to REMIF and/or the third-party administrator on behalf of REMIF (but in no case longer than 2 business days of claim filing); the City of St. Helena will provide REMIF and the third-party administrator on behalf of REMIF any information/documentation that is needed immediately (but in no case longer than 10 days of claim filing) with information to determine the appropriate claim response.
- Institutes

RESOLUTION

NOW, THEREFORE, the City Council of the City of St. Helena resolves as follows:

1. Does hereby delegate the authority of claims administration for covered claims and authorizes REMIF and the third-party administrator on behalf of REMIF to accept and respond to covered claims on behalf of the City of St. Helena.

Approved at a Regular Meeting of the St. Helena City Council on September 11, 2018 by the following vote:

Mayor Galbraith:

Vice Mayor White:

Councilmember Dohring:

Councilmember Koberstein:

Councilmember Ellsworth:

APPROVED:

Alan Galbraith, Mayor

ATTEST:

Cindy Tzafopoulos, City Clerk

MINUTES
City of St. Helena
Special City Council and SHAPE Committee
Joint Meeting
Monday, June 25, 2018 @ 6:00 PM
St. Helena Fire Department, 1480 Main Street, St.
Helena (Entrance on Railroad Avenue)

Present: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Geoff Ellsworth, and Councilmember Mary Koberstein

SHAPE Committee Members:
Chair Mark Smithers, Vice Chair Anna Chouteau
Committee Members Doug Barr, Oliver Caldwell (arrived at 6:05 pm), Pat Dell, Jeff Feeney, Stan Knight, Tim Nieman, Joshua Parke, Susanne Salvestrin and Glenn Smith

Absent: None

1. CALL TO ORDER

2. ROLL CALL

3. PUBLIC COMMENT:

Jack Stuart, Ester Akerslout, Jon Dodge, Stuart Smith, Skip Lane, John Therene, Emily Armstead, Ann Nevero, Lowel Smith and Jean Holston addressed the City Council and SHAPE Committee.

4. NEW BUSINESS:

- 4.1 Review and Discussion of St. Helena Assets Planning Engagement (SHAPE) Committee Final Report, Related Concepts, and Next Steps
Prepared By: Mark T. Prestwich, City Manager

The City Council and SHAPE Committee discussed the Committee's 121 page final report.

It was the consensus of the City Council and Committee that City Hall should remain in its current location with a multi-use structure.

Staff was directed to bring this item back to the City Council in August with a work plan for the next steps.

5. ADJOURNMENT

Special City Council
June 25, 2018

The June 25, 2018 Special City Council meeting minutes were adopted at the September 11, 2018 City Council regular meeting.

Mayor Galbraith adjourned the meeting at 8:08 p.m.

APPROVED:

ATTEST:

Alan Galbraith, Mayor

Cindy Tzaopoulos, City Clerk

MINUTES
City of St. Helena
Special Joint City Council and Planning
Commission Meeting Meeting
Tuesday, August 14, 2018 @ 3:00 PM
Vintage Hall Board Room - Second Floor
465 Main Street, St. Helena

A complete video recording of this meeting, except for closed session, can be found at <https://sthelena.civicweb.net/Portal/> or by calling the City Clerk at (707) 968-2742. The City Council video is the official record of the Council meeting.

Present: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Geoff Ellsworth, and Councilmember Mary Koberstein

Chairperson Lester Hardy, Vice Chair David Knudsen, Commissioners Bobbi Monnette and John Ponte

Absent: None

1 CALL TO ORDER

2 PLEDGE OF ALLEGIANCE

3 PUBLIC FORUM:

No public comment was received.

4 NEW BUSINESS

- a) St Helena 2040 General Plan and EIR Finalization and Status Update

CEQA Determination: Environmental Impact Report

Prepared By: Noah Housh, Planning & Community Improvement Director

Recommendation:

It is recommended the City Council and Planning Commission review the recommended refinements to draft policies and actions, discuss the various issues identified, and provide direction to staff and the consultant regarding the content of the Draft 2040 General Plan Update that will be released for public review in September.

Planning Director Noah Housh reported on this item.

Dyett & Bhatia Consultant Andrew Hill provided a presentation.

The City Council and Planning Commission provided direction.

Special Joint City Council and Planning Commission Meeting
August 14, 2018

Public comment was taken prior to the Montessori letter being discussed.

Vickie Bradshaw and Matthew Heil addressed the City Council and Planning Commission.

Vice Mayor White recused himself prior to the Montessori letter discussion due to being on the Board of Directors for the school. Vice Mayor White left the meeting room at 5:05 pm and didn't return.

5 ADJOURNMENT

The August 14, 2018 Special Joint City Council and Planning Commission meeting minutes were adopted at a City Council regular meeting on September 11, 2018.

Mayor Galbraith adjourned the meeting at 5:19 p.m.

APPROVED:

ATTEST:

Alan Galbraith, Mayor

Cindy Tzaopoulos, City Clerk

MINUTES
City of St. Helena
Regular City Council Meeting
Tuesday, August 14, 2018 @ 6:00 PM
Vintage Hall Board Room - Second Floor
465 Main Street, St. Helena

A complete video recording of this meeting, except for closed session, can be found at <https://sthelena.civicweb.net/Portal/> or by calling the City Clerk at (707) 968-2742. The City Council video is the official record of the Council meeting.

Present: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

Absent: None

- 1. CALL TO ORDER**
- 2. PLEDGE OF ALLEGIANCE**
- 3. ROLL CALL**
- 4. PUBLIC FORUM:**

Anthony Micheli, Tom Belt, Kelly Anderson and Chris Malan addressed the City Council.

- 5. REPORTS BY STAFF AND CITY COUNCIL, FUTURE AGENDA ITEMS, and AB 1234 REPORTS:**

City Manager Mark Prestwich provided a SHAPE Committee report of next steps and a rent stabilization ordinance workshop is planned for August 30, 2018.

Finance Director April Mitts announced the Finance Department is finalizing fiscal year 2017/2018.

Planning Director Noah Housh announced a citywide design guidelines survey will be available soon and provided a Turley Flats update.

Public Works Director Erica Ahmann Smithies announced that the Railroad Avenue ADA curb ramp project is nearly complete. Stormwater clean-up day will be held on September 15, 2018.

Library Director Chris Kreiden provided a Library program update.

Regular City Council
August 14, 2018

Council Member Koberstein provided a rent stabilization ordinance update.

Council Member Ellsworth requested the wine train, fire assessment district, Spanish translation for emergency services and watershed protection be agendized at a future date.

6. PRESENTATIONS AND PUBLIC RECOGNITIONS

- 6.1 ~~Oath of Office for Fire Captain Nicholas Solakian~~
- 6.2 ~~Oath of Office for Fire Engineer Martin Macias~~
- 6.3 Oath of Office for Police Officer Stephanie Lupien

7. STAFF BRIEFING

- 7.1 None

8. CONSENT ITEMS

Members of the Council or the public may ask that any items be considered individually for purposes of considering alternative action, for extended discussion, or for public comment. Unless that is done, one motion may be used to adopt all recommended actions. (Roll Call Vote)

- 8.1 Consideration and proposed adoption of a Resolution 2018-107 authorizing the City Manager to approve Amendment No. 1 to Professional Services Agreement STH Contract: 2017-045 with GEI Consultants for the design, engineering, bid documents and bidding support for the Bell House Valve Replacement Capital Improvement Project W-85 in the amount of \$99,907 for a total amended contract amount of \$523,547

CEQA Determination: CEQA will be completed as part of project design

Prepared By: Tobias Barr, Project Manager

Recommendation:

Adopt the attached Resolution approving Amendment No. 1 to Professional Services Agreement STH Contract: 2017-045 with GEI Consultants for the design, engineering, bid documents and bidding support for the Bell House Valve Replacement Capital Improvement Project W-85 in the amount of \$99,907 for a total amended contract amount of \$523,547.

- 8.2 Consideration and proposed adoption of a resolution 2018-108 authorizing the City Manager to execute a Professional Services Agreement with Larry Walker and Associates in the amount of \$47,838 to provide regulatory assistance for the City of St. Helena Wastewater Treatment and Reclamation Plant for San Francisco Bay Regional Water Quality Control Board Orders R2-2016-0003, R2-2016-004, and 87-090.

CEQA Determination: Not a CEQA project

Prepared By: Felix Hernandez III, Utilities Operations Manager

Regular City Council
August 14, 2018

Recommendation:

Adopt a resolution authorizing the City Manager to execute a Professional Services Agreement with Larry Walker and Associates in the amount of \$47,838 to provide regulatory assistance for the City of St. Helena Wastewater Treatment and Reclamation Plant for San Francisco Bay Regional Water Quality Control Board Orders R2-2016-0003, R2-2016-004, and 87-090.

- 8.3 Consideration and proposed adoption of a Resolution 2018-109 authorizing the City Manager to execute the First Amendment to the Professional Services Agreement with Valley Architects LLP for the final design changes and specifications, bid support, construction support and as-built drawings for Capital Improvement Project C-82 Downtown Restrooms, increasing the total contract amount by \$13,000 for a total not to exceed amount of \$63,450.

CEQA Determination: Exempt

Prepared By: Tobias Barr, Project Manager

Recommendation:

Adopt the attached Resolution authorizing the City Manager to execute the First Amendment to the Professional Services Agreement with Valley Architects LLP for the final design changes and specifications, bid support, construction support and as-built drawings for Capital Improvement Project C-82 Downtown Restrooms, increasing the total contract amount by \$13,000 for a total not to exceed amount of \$63,450.

- 8.4 Consideration and proposed approval of Regular Meeting Minutes of July 24, 2018 (Will be provided prior to the meeting)
- 8.5 Approval of the election of Skip Lane as Chairperson of the Library Board of Trustees to a fourth consecutive term ending July 10, 2019 - Resolution 2018-110

CEQA Determination: Not a CEQA project

Prepared By: Chris Kreiden, Library Director

Recommendation:

Staff recommends that City Council approve Skip Lane as the chairperson of the Library Board of Trustees for another term to be ending on July 10, 2019.

Item 8.6 was removed from consent.

- 8.6 ~~Consideration of approval of a Resolution authorizing the City Manager to execute a Professional Services Agreement with Carollo Engineers, Inc. in the amount of \$383,605 for the Integrated Utility Master Plan.~~
- 8.7 Consideration and Proposed Approval of a Resolution 2018-112 Approving Napa Valley Transportation Authority Joint Powers Agreement Amendment No. 11

CEQA Determination: Not a CEQA project

Regular City Council
August 14, 2018

Prepared By: Cindy Tzaopoulos, City Clerk

Recommendation:

Staff recommends adopting the resolution approving the Napa Valley Transportation Authority Joint Powers Agreement Amendment No. 11.

Vice Mayor Peter White moved to approve Consent items 8.1 through 8.5 and 8.7. The motion was seconded by Councilmember Mary Koberstein and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

NOES: None

ABSENT: None

ABSTAIN: None

RECUSE: None

- 8.6 Consideration of approval of a Resolution 2018-111 authorizing the City Manager to execute a Professional Services Agreement with Carollo Engineers, Inc. in the amount of \$383,605 for the Integrated Utility Master Plan.

CEQA Determination: CEQA will be completed as part of project design

Prepared By: Erica Ahmann Smithies, Public Works Director and City Engineer

Recommendation:

Adopted the attached Resolution authorizing the City Manager to execute a Professional Services Agreement with Carollo Engineers, Inc. in the amount of \$383,605 for the Integrated Utility Master Plan.

Public Works Director Erica Ahmann Smithies reported on this item.

Council Member Ellsworth read a statement.

Citizen, Chris Malan, Bobbi Monnette and Tom Belt addressed the City Council.

Vice Mayor Peter White moved to adopt item 8.6. The motion was seconded by Councilmember Geoff Ellsworth and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

NOES: None

ABSENT: None

ABSTAIN: None

RECUSE: None

Regular City Council
August 14, 2018

9. PUBLIC HEARINGS

9.1 *UPDATED ATTACHMENT 8/10/18

Consideration and proposed approval of a resolution approving an Associate Membership Agreement between the City of St. Helena (the "City") and the California Enterprise Development Authority (the "Authority") and approve the issuance of not to exceed \$5,000,000 of California Enterprise Development Authority Revenue Obligations (the "Obligations") for the benefit of St. Helena Montessori School, Inc., a California nonprofit public benefit corporation (the "Borrower") (Resolutions 2018-113 and 2018-114)

CEQA Determination: Not a CEQA project

Prepared By: April Mitts, Finance Director

Recommendation:

1. Conduct the public hearing with respect to the approval of the issuance of the Obligations by the California Enterprise Development Authority;
2. Adopt the resolution attached hereto as Exhibit A approving an Associate Membership Agreement attached hereto as Exhibit B between the City of St. Helena and the Authority; and
3. Adopt the resolution attached hereto as Exhibit C approving the issuance of the Obligations by the California Enterprise Development Authority

Vice Mayor White recused himself and left the meeting room.

Finance Director April Mitts reported on this item.

Matthew Heil and Tom Belt addressed the City Council.

Councilmember Geoff Ellsworth moved to adopt staff's recommendation. The motion was seconded by Mayor Alan Galbraith and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

NOES: None

ABSENT: None

ABSTAIN: None

RECUSE: Vice Mayor Peter White

10. NEW BUSINESS

10.1 Council discussion and review of the facts concerning the construction of a fence between properties located at 1815 Hillview Place and 1859 Hillview Place

CEQA Determination: Not a CEQA project

Prepared By: Noah Housh, Planning & Community Improvement Director

Regular City Council
August 14, 2018

Recommendation:

It is recommended the City Council review the provided information and discuss the situation as needed.

Vice Mayor White returned to the meeting room and sat at the dais.

Planning Director Noah Housh reported on this item.

Dr. Brown, Joy Brown, Don Gallagher and Mrs. Gallagher addressed the City Council.

The matter was continued for further review of the easement.

10.2 City of St. Helena Fire Marshal Succession Plan

CEQA Determination: Not a CEQA project

Prepared By: Jim Capponi, Fire Marshall

Recommendation:

Informational item only.

Fire Marshall Jim Capponi reported on this item.

No public comment was received.

10.3 City Council review and action on a request from Our Town St. Helena (OTSH) to provide an additional \$80,667 in funding (beyond the \$100,000 previously committed) to facilitate three Very Low Income families being able to own and occupy units in the Brenkle Court self-help affordable housing project and; review and action on a separate request to provide a temporary bridge loan of \$80,000 to relieve a cash flow shortage being experienced by the Brenkle Court project with repayment of these funds expected in early 2019. (Resolution 2018-115)

CEQA Determination: Not a CEQA project

Prepared By: Noah Housh, Planning & Community Improvement Director

Recommendation:

It is recommended the City Council review and approve (by resolution) the request from OTSH for an additional \$80,667 in funding to allow the deed restriction of three of the units in the project to Very Low Income levels; and for a temporary "bridge" loan of \$80,000 with repayment expected in early 2019 and vote.

Planning Director Noah Housh reported on this item.

Mary Stephenson addressed the City Council.

Regular City Council
August 14, 2018

Vice Mayor Peter White moved to adopt staff's recommendation. The motion was seconded by Councilmember Mary Koberstein and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

NOES: None

ABSENT: None

ABSTAIN: None

RECUSE: None

10.4 UPDATED ATTACHMENT 8/10/18
Presentation of CalPERS Actuarial Review Conducted By Bartel Associates, LLC.

CEQA Determination: Not a CEQA project

Prepared By: Mandy Kellogg, Admin Services Mgr

Recommendation:

Review, discuss and provide direction to City Manager.

Finance Director April Mitts reported on this item.

Bartel Associates, LLC Vice President and Actuary Doug Pryor provided a presentation.

It was the consensus of the City Council to move forward with option 3.

Option 3: Additional Lump Sum Contributions

The City could choose to make lump sum payments above the existing required contributions when resources are available to do so. This is defined by CalPERS as Additional Discretionary Payments (ADP) and involves making additional payments either once annually or on a monthly basis during the fiscal year. Additional discretionary payments to the unfunded liability would be applied in the same manner as making additional payments on a mortgage. If the City were to choose to make additional payments based on the 15-year amortization schedule the City would realize the same interest savings as if the unfunded liability had been re-amortized for a 15 year period.

Additional discretionary payments can only be applied against outstanding unfunded liabilities. For instance, if the City were to elect to pay off the unfunded liability in its entirety and the returns over time exceeded CalPERS estimates, CalPERS would not return the excess amounts rather they would go into the City's plan and be available to pay future unfunded liabilities.

No public comment was received.

Regular City Council
August 14, 2018

10.5 Review and Discussion to Approve City Council Ballot Argument In Support Of Measure E Proposing an Increase to the Transient Occupancy Tax (TOT) at the General Municipal Election to be held on Tuesday, November 6, 2018

CEQA Determination: Not a CEQA project

Prepared By: Mark T. Prestwich, City Manager

Recommendation:

Consider and provide direction on the draft City Council ballot argument and/or approve the draft presented or a revised version of the draft.

City Manager Mark Prestwich reported on this item.

No public comment was received.

Vice Mayor Peter White moved to adopt the ballot argument in favor of Measure E as presented. The motion was seconded by Mayor Alan Galbraith and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

NOES: None

ABSENT: None

ABSTAIN: None

RECUSE: None

11. ITEMS LIKELY TO BE PLACED ON THE NEXT OR FUTURE MEETING AGENDA:

11.1	August City Council Meetings:
	8/28 (staff reports due 8/10)
	PROCLAMATIONS AND PUBLIC RECOGNITION:
	CONSENT:
	8/28 Delegate claims processing authority to REMIF - HR
	8/28 Amended Coop Agreement with Caltrans for Grayson Signal for electricity(Caltrans to attend)
	8/28 Jingle All the Way St. Helena Staff Briefing
	PH or NEW BUSINESS:
	8/28 Tennis Court Resurfacing Staff Briefing - Rec
	8/28 Raw Water Use Charges - PW
	8/28 Civic infrastructure plan - Admin
	8/28 LOCC Resolutions - Admin
	8/28 Downtown Vitality next steps – Admin
	8/28 Sewer Annexation Discussion

Regular City Council
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8/28 WWTP Phase I Update
8/28 Bimonthly Goals and Objectives Update - Admin
8/28 Qtrly Finance Report - Fin
8/28 Grant Report – Fin
8/28 changes in our recycling markets - Upper Valley Disposal & Recycling
<u>September City Council Meetings:</u>
9/11 (staff reports due 8/24)
9/25 (staff reports due 9/7)
<i>PROCLAMATIONS AND PUBLIC RECOGNITION:</i>
<i>CONSENT:</i>
St. Helena Resolution for Affordable Housing Bond (SB3) - Mayor
<i>PH or NEW BUSINESS:</i>
9/11 1st Reading Design Review Ordinance - Planning
9/11 1st Reading Concept Review Ordinance - Planning
9/11 Council Update cost allocation, user fee and impact fee
9/11 Class & Comp Update - HR

12. ADJOURNMENT

The regular City Council meeting minutes for August 14, 2018 was adopted at the regular City Council meeting of September 11, 2018.

Mayor Galbraith adjourned the meeting at 8:51 p.m.

APPROVED:

ATTEST:

Alan Galbraith, Mayor

Cindy Tzafopoulos, City Clerk

MINUTES
City of St. Helena
Regular City Council Meeting
Tuesday, August 28, 2018 @ 6:00 PM
Vintage Hall Board Room - Second Floor
465 Main Street, St. Helena

A complete video recording of this meeting, except for closed session, can be found at <https://sthelena.civicweb.net/Portal/> or by calling the City Clerk at (707) 968-2742. The City Council video is the official record of the Council meeting.

Present: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

Absent: None

1. CALL TO ORDER

2. PLEDGE OF ALLEGIANCE

3. ROLL CALL

4. PUBLIC FORUM:

Bryce Howard, Tom Belt and Anthony Michelli addressed the City Council.

5. REPORTS BY STAFF AND CITY COUNCIL, FUTURE AGENDA ITEMS, and AB 1234 REPORTS:

City Attorney Thomas Brown reported that there was no reportable action taken at the August 28, 2018 Special City Council Closed Session meeting.

City Manager Mark Prestwich noted an upcoming workshop will take place on Thursday, August 30, 2018 to discuss the proposed rent stabilization ordinance.

Planning Director Noah Housh provided a Turley Flats update.

Public Works Director Erica Ahmann Smithies provided a sidewalk and ramp project update. Also, encouraged the community to attend the September 15, 2018 coastal clean-up day.

Council Member Ellsworth noted watershed issues and attending the Stonebridge community playground build.

Mayor Galbraith encouraged community attendance at the Performing Arts Center.

Regular City Council
August 28, 2018

He also shared the recent celebration of Steve's Hardware 140th year in business, Stonebridge community playground build and noted the Chamber music in the park has concluded.

6. PRESENTATIONS AND PUBLIC RECOGNITIONS

The Oaths of office will occur at the September 11, 2018 City Council meeting.

6.1 ~~Oath of Office for Fire Captain Nicholas Solakian~~

6.2 ~~Oath of Office for Fire Engineer Martin Macias~~

7. STAFF BRIEFING

7.1 Upper York Creek Update

Public Works Director Erica Ahmann Smithies provided an update.

8. CONSENT ITEMS

Members of the Council or the public may ask that any items be considered individually for purposes of considering alternative action, for extended discussion, or for public comment. Unless that is done, one motion may be used to adopt all recommended actions. (Roll Call Vote)

8.1 Consideration and proposed approval of Regular Meeting Minutes of August 14, 2018 and Special Meeting Minutes of August 14, 2018. (Minutes will be provided prior to the meeting)

The minutes will be considered at the September 11, 2018 City Council meeting.

Item 8.2 was pulled from Consent.

8.2 Adoption of a resolution 2018-115 to approve revisions to the Planning Commission By-Laws, updated in response to City Council direction and identified needs of the Planning Commission.

CEQA Determination: Not a CEQA project

Prepared By: Noah Housh, Planning & Community Improvement Director

Recommendation:

It is recommended by the Planning Commission that the City Council:

1. Find that the update to the Planning Commission By-Laws is not a project under CEQA; and
2. Adopt a resolution to approve the 2018 Planning Commission By-Laws.

Planning Director Noah Housh reported on this item.

Regular City Council
August 28, 2018

No public comment was received

Vice Mayor Peter White moved to approve Consent item 8.2. The motion was seconded by Councilmember Geoff Ellsworth and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth

NOES: None

ABSENT: None

ABSTAIN: None

RECUSE: None

9. PUBLIC HEARINGS

9.1 None

10. NEW BUSINESS

10.1 Quarterly Grant Report for FY 2018 Q4, for the period ending June 30, 2018

CEQA Determination: Not a CEQA project

Prepared By: Mandy Kellogg, Admin Services Mgr

Recommendation:

Receive and file report.

Admin Services Manager Mandy Kellogg reported on this item and provided a presentation.

No public comment was received.

10.2 Fiscal Year 2017/18 4th Quarter Finance Report for transactions posted through August 9, 2018

CEQA Determination: Not a CEQA project

Prepared By: April Mitts, Finance Director

Recommendation:

Receive and file the Q4 FY 2017/18 financial report.

Finance Director April Mitts reported on this item and provided a presentation.

No public comment was received.

10.3 Consideration and discussion of the existing no parking zone on Main Street that affects the residences at 1820, 1830, 1846, 1856, 1862 and 1872 Main Street

Regular City Council
August 28, 2018

CEQA Determination: Exempt from the requirements of CEQA pursuant to Section 15301, Class 1, which exempts the operation, leasing, or minor alteration of existing facilities
Prepared By: Erica Ahmann Smithies, Public Works Director and City Engineer
Recommendation:
Information and possible direction to staff.

Public Works Director Erica Ahmann Smithies reported on this item.

Mike Griffin, Anthony Micheli, John Marshall and Mark Andrade addressed the City Council.

It was the consensus of the City Council to direct staff to research potentially removing a crosswalk, traffic mitigation and/or potential removal of the NVTA bus stop. Staff will report back with the findings.

- 10.4 Consideration and proposed approval of a Resolution 2018-116 Setting a Hearing to Approve the Annexation of Territory into the St Helena Municipal Sewer District No. 1 MSD ANNEXATION NO. 134,1025 and 1045 Pratt Avenue, St Helena, CA. 94574 (APN's) 009-142-023-000 and 009-142-024-000.

CEQA Determination: Exempt from the requirements of CEQA under the "General Rule", Section 15061 (b)(3), in that it can be seen with certainty that the proposed action will have no impact on the environment.
Prepared By: Erica Ahmann Smithies, Public Works Director and City Engineer
Recommendation:
Staff recommends the City Council adopt a Resolution Setting a Hearing to Approve the Annexation of Territory into the St Helena Municipal Sewer District No. 1 MSD ANNEXATION NO. 134, 1025 and 1045 Pratt Avenue, St Helena, CA. 94574 (APN's) 009-142-023-000 and 009-142-024-000.

Public Works Director Erica Ahmann Smithies reported on this item.

Mike Griffin and applicant Mark Andrade addressed the City Council.

Councilmember Paul Dohring moved to adopt resolution as amended setting a hearing to approve the annexation of territory into the St Helena Municipal Sewer District No. 1 MSD ANNEXATION NO. 134,1025 and 1045 Pratt Avenue, St Helena, CA. 94574 (APN's) 009-142-023-000 and 009-142-024-000. The motion was seconded by Vice Mayor Peter White and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff

Regular City Council
August 28, 2018

Ellsworth
NOES: None
ABSENT: None
ABSTAIN: None
RECUSE: None

- 10.5 Consideration of authorizing Safety Exceptions for the Large Truck Ordinance, to entities within the City, through an application process.

CEQA Determination: Not a CEQA project
Prepared By: William Imboden, Chief of Police
Recommendation:
Staff requests direction from the Council on the desire to bring forward a draft Truck Ordinance Safety Exception Waiver process.

Chief of Police William Imboden reported on this item.

Mark Smithers and Anthony Micheli addressed the City Council.

It was the consensus of the City Council to direct staff to bring this item back at future meeting and with options.

- 10.6 City Council consideration of a recommendation from City staff to fund an additional contingency budget of \$30,000 with a loan from the Affordable Housing Trust Fund (AHTF) to Calistoga Affordable Housing (CAH) for the Turley Flats Affordable Housing project at 1105 Pope St. (Resolution 2018-117)

CEQA Determination: This action is exempt from the requirements of CEQA under the "General Rule", Section 15061 (b) (3), in that it can be seen with certainty that no environmental impacts will result from this action; and Section 15273 given that CEQA does not apply to Rates, Tolls, Fares and Charges.

Prepared By: Noah Housh, Planning & Community Improvement Director

Recommendation:

It is recommended by staff that the City Council adopt a resolution to approve:

1. Modifying the Turley Flats RHNA Transfer agreement with the County of Napa to include three RHNA credits in the 2022-2030 housing cycle; and
2. Create an additional contingency budget (in the form of an increased AHTF loan) of up to \$30,000 to the Turley Flats eight unit affordable housing project, to cover any additional unbudgeted costs and ensure the project is completed and occupied in 2018.
3. Authorize the City Manager to draft, finalize and approve the required documents.

Planning Director Noah Housh reported on this item.

Regular City Council
August 28, 2018

No public comment was received.

Vice Mayor Peter White moved to approve staff's recommendation. The motion was seconded by Councilmember Mary Koberstein and on roll call carried by the following vote:

AYES: Mayor Alan Galbraith, Vice Mayor Peter White, Councilmember Paul Dohring, Councilmember Mary Koberstein, and Councilmember Geoff Ellsworth
NOES: None
ABSENT: None
ABSTAIN: None
RECUSE: None

- 10.7 Accepting of the City of St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) Improvements Feasibility Study and Recommendation for the Phase I WWTRP Improvements Project in Response to San Francisco Bay Regional Water Quality Control Board Order R2-2016-004 and Direction to Negotiate a Contract for Design of the Proposed Improvements. (STAFF REPORT FORTHCOMING)

This item was continued to the September 11, 2018 City Council meeting.

- 10.8 Bimonthly Update on City Council Goals and Strategic Objectives

CEQA Determination: Not a CEQA project
Prepared By: Mark T. Prestwich, City Manager
Recommendation:
Receive and file.

City Manager Mark Prestwich reported on this item and provided an update.

- 10.9 City Council to review two proposed resolutions for consideration at the League of California Cities Annual Conference and provide voting direction to the voting delegate and alternate voting delegates

CEQA Determination: Not a CEQA project
Prepared By: Cindy Tzaopoulos, City Clerk
Recommendation:
Staff recommends for Council to discuss and consider the proposed resolutions. Provide direction to the City's voting delegates for participation at the League of California Cities Annual Business Meeting and General Assembly on Friday, September 14, 2018.

Mayor Galbraith reported on this item.

Regular City Council
August 28, 2018

No public comment was received.

It was the consensus of the City Council to support the two proposed resolutions.

11. ITEMS LIKELY TO BE PLACED ON THE NEXT OR FUTURE MEETING AGENDA:

11.1	<u>August City Council Meetings:</u> 8/30 Rent Stabilization Workshop <u>September City Council Meetings:</u> 9/11 (staff reports due 8/24) 9/17 Next Steps related to the SHAPE Report/City Hall 9/25 (staff reports due 9/7)
	<i>PROCLAMATIONS AND PUBLIC RECOGNITION:</i> 9/11 Proclamation Suicide Prevention Awareness Month <i>CONSENT:</i> 9/25 Amended Coop Agreement with Caltrans for Grayson Signal for electricity(Caltrans to attend) 9/25 Jingle All the Way St. Helena Staff Briefing 9/11 OTSH Final Map 9/11 Lyman Bathroom Update Staff Briefing 9/11 Delegate claims processing authority to REMIF - HR 9/25 Sewer Annexation (3999 Crane) 9/11 Affordable Housing 9/11 Fire Bay Door 9/11 Street Closure for Harvest Festival <i>PH or NEW BUSINESS:</i> 9/11 Downtown Vitality next steps – Admin 9/28 Raw Water Use Charges - PW 9/11 1st Reading Design Review Ordinance - Planning 9/25 1st Reading Concept Review Ordinance - Planning 9/11 1st Reading Sign Code Ordinance 9/11 Council Update cost allocation, user fee and impact fee 9/11 Class & Comp Update - HR <u>October City Council Meetings:</u> 10/9 (staff reports due 9/21) 10/23 (staff reports due 10/5) <i>CONSENT:</i> Tennis Court Resurfacing Staff Briefing - Rec

12. ADJOURNMENT

Regular City Council
August 28, 2018

The August 28, 2018 City Council regular meeting minutes were adopted at the September 11, 2018 City Council regular meeting.

Mayor Galbraith adjourned the meeting at Time 8:21 p.m.

APPROVED:

ATTEST:

Alan Galbraith, Mayor

Cindy Tzaopoulos, City Clerk



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: Consent Calendar

Subject: Consideration and Proposed Approval of a Resolution of the City Council of the City of St. Helena Authorizing an Agreement for Fire/Emergency Dispatch Services

CEQA Determination: Not a CEQA project

Prepared By: John Sorensen, Fire Chief

Reviewed By: April Mitts, Finance Director

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

Cal Fire has provided dispatching services to the City of St. Helena's Fire Department for over fifty years. The current agreement between the City and Cal Fire expired on June 30, 2018. A three-year successor agreement is proposed.

DISCUSSION

The current contract between the City and Cal Fire provided for a three-year service term covering the period of July 1, 2015 through June 30, 2018, for the maximum amount of \$104,330. The proposed agreement will provide for a three-year service term covering the period of July 1, 2018 through June 30, 2021, for a maximum amount of \$108,241.05.

The current scope, outlined as follows, will remain identical under the proposed agreement:

"Dispatch Services: provide fire department 9-1-1 emergency dispatch by CAL FIRE Fire/Emergency Command Center (ECC). CAL FIRE will be responsible for fire/emergency dispatching emergency resource units covered under this agreement. The CAL FIRE ECC is staffed with a Battalion Chief, three or more Fire Captains and Communications Operators to provide 24/7 year-round coverage. There is always an officer of Captain rank or higher to serve as the shift supervisor and command officer.

CAL FIRE uses an integrated Computer Aided Dispatch (CAD) system using the latest technology, to direct the closest available resources to all emergency incidents.”

FISCAL IMPACT

The City is billed for actual costs of fire protection services, which generally results in an invoice amount lower than the maximum amount stipulated in the agreement. Fiscal Year FY 17/18 estimated year-end costs are \$28,325.60, FY 16/17 costs were \$19,425.42, and FY 15/16 costs were \$23,609.44 for a total three-year cost of \$71,360.46.

The new three-year agreement provides for a annual increase of approximately 4% based on the previous agreement amount of \$104,330 allowing for a maximum total cost of \$108,241.05, in fiscal year increments as follows:

FY 18/19: \$34,334.99

FY 19/20: \$36,051.74

FY 20/21: \$37,854.32

Funds for FY 18/19 have been included in the adopted FY 18/19 budget.

RECOMMENDED ACTION

Approve the Agreement with the Department of Forestry and Fire Protection/Cal Fire for the term of July 1, 2018 through June 30, 2021 for a maximum of \$108,241.05.

ATTACHMENTS

[SH Fiscal Sheet 2018](#)

[CALFire 2018-2021 Dispatch Agreement](#)

[Exhibit D, Schedule 2018-2021](#)

[Resolution No. 2018- Dept of Forestry and Fire Protection - Cal Fire Agreement](#)

Directions

1. Year 1 PS Fiscal Sheet

- a. Fill in the Fiscal Year, Index, PCA, PRC, and any comments in the upper left hand corner of sheet
- b. Fill in Contract Name, Contract Number, and Page Number on upper right hand corner
- c. Fill in Unit and Unit Chief
- d. Choose the appropriate classification from the drop down box, then add number of positions, the contracted period, and salary months. The other cells will auto-populate with the correct costs.
- e. Add any associated differentials. Choose the number of differentials, retirement code, period and salary months. Each unique classification and the associated differentials will have their own set of rows.
- f. Add overtime, if applicable. Choose a retirement code and add total overtime per classification under total salary (leave salary rate blank). The benefits will compute automatically.
- g. Follow steps a-f for each unique classification

2. Year 1 OE Fiscal Sheet

- a. Choose category of O and E. Add details if applicable
- b. Choose number, months, and rate. The benefits and totals will compute automatically. Some O and E categories generate an automatic rate on the sheet.

Unit: LNU

Grand Total	\$108,241.05
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Contract Name: City of St. Helena

Contract No.: 1CA03946

Page No.: 17

YEAR 1

PS Total	\$30,609.41
OE Total	\$3,725.58

TOTAL	\$34,334.99
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YEAR 2 (+5%)

PS Total	\$32,139.88
OE Total	\$3,911.86

TOTAL	\$36,051.74
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YEAR 3 (+5%)

PS Total	\$33,746.87
OE Total	\$4,107.45

TOTAL	\$37,854.32
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Fiscal Year: 2018					Unit: LNU		Sub Total		\$27,216		Contract Name: City of St. Helena		
Index: 1400							Admin		\$3,394		Yr 2 Increase 0.0%		
PCA: 17302							Total		\$30,609		Yr 2 Subtotal \$0		
PRC: 4142											Contract No.: 1CA03946		
Comments Dispatch Agreement											Page No.: 18		
					Overtime Total:				\$3,044				
This is a Schedule A - 4142 of the Cooperative Agreement, dated July 1, 2018 between "City of St. Helena" and The California Department of Forestry and Fire Protection (CAL FIRE)					CAL FIRE Unit Chief		Shana Jones						
					CAL FIRE Region Chief		Scott Upton						
Number of Positions	Classification/ad-ons (Pick From List)	RET.	Period	Salary Months	Salary Rate	Total Salary	EDWC Rate	EDWC Periods	Total EDWC	Salary Benefits	FFI UI	EDWC Benefits	Total Salary & EDWC
1	Communications Operator, Range A	SAF		3	\$4,766	\$14,298	\$0	0	\$0	\$9,442	\$0	\$0	\$23,740
1	Night-Shift Pay Differential	SAF		3	\$87	\$260			\$0	\$172		\$0	\$432
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
1	Overtime	SAF				\$3,000			\$0	\$44		\$0	\$3,044
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime					\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime					\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
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					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime					\$0			\$0	\$0		\$0	\$0
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					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime					\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime					\$0			\$0	\$0		\$0	\$0

Number of Positions	Classification/ad-ons (Pick From List)	RET.	Period	Salary Months	Salary Rate	Total Salary	EDWC Rate	EDWC Periods	Total EDWC	Salary Benefits	FFI UI	EDWC Benefits	Total Salary & EDWC
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime				\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime				\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
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					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime				\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
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					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime				\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
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					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime				\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0	\$0	0	\$0	\$0	\$0	\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
					\$0	\$0			\$0	\$0		\$0	\$0
	Overtime				\$0	\$0			\$0	\$0		\$0	\$0

Fiscal Year: 2018					Uniform Benefits		\$0		Contract Name:			City of St. Helena
Index: 1400					Sub Total		\$3,313		Contract No.: 1CA03946			
PCA: 17302					Admin		\$413		Page No.: 19			
PRC: 4142					Total		\$3,726					
Comments												
This is a Schedule A - 4142 of the Cooperative Agreement, dated July 1, 2018 between "City of St. Helena" and The California Department of Forestry and Fire Protection (CAL FIRE)												
						1.45%						
Category (Pick from List)	Details	Number	Months	Rate	Sub-Total	Uniform Benefits	Total					
UNIFORM ALLOWANCE FOR COMM OP		1.00	3.00	\$104	\$ 313		\$ 313					
UTILITIES		1.00	12.00	\$150	\$ 1,800		\$ 1,800					
GENERAL EXPENSE		1.00	12.00	\$100	\$ 1,200		\$ 1,200					

COOPERATIVE FIRE PROGRAMS
FIRE PROTECTION REIMBURSEMENT AGREEMENT
 LG-1 REV. 01/2017

AGREEMENT NUMBER **1CA03946**

REGISTRATION NUMBER:

1. This Agreement is entered into between the State Agency and the Local Agency named below:

STATE AGENCY'S NAME

California Department of Forestry and Fire Protection – (CAL FIRE)

LOCAL AGENCY'S NAME

City of St. Helena

2. The term of this Agreement is: July 1, 2018 through June 30, 2021

3. The maximum amount of this Agreement is: \$ 108,241.05
 One-Hundred and Eight Thousand, Two-Hundred and Forty-One Dollars and Five Cents

4. The parties agree to comply with the terms and conditions of the following exhibits which are by this reference made a part of the Agreement.

Exhibit A – Scope of Work – Includes page 2 (contact page) in count for Exhibit A	4	pages
Exhibit B – Budget Detail and Payment Provisions	2	pages
Exhibit C – General Terms and Conditions	7	pages
Exhibit D – Additional Provisions	6	pages
Exhibit E – Description of Other Services	0	pages

IN WITNESS WHEREOF, this Agreement has been executed by the parties hereto.

LOCAL AGENCY

LOCAL AGENCY'S NAME

City of St. Helena

BY (Authorized Signature)



DATE SIGNED(Do not type)

PRINTED NAME AND TITLE OF PERSON SIGNING

Alan Galbraith, Mayor

ADDRESS

1480 Main Street St. Helena, Ca 94574

STATE OF CALIFORNIA

AGENCY NAME

California Department of Forestry and Fire Protection

BY (Authorized Signature)



DATE SIGNED(Do not type)

PRINTED NAME AND TITLE OF PERSON SIGNING

Don Gordon, Assistant Deputy Director, Cooperative Fire Protection, Training & Safety

ADDRESS P.O. Box 944246, Sacramento, CA 94244-2460

**California Department of General
 Services Use Only**

Contractor Name: City of St. Helena
Contract No.: **1CA03946**
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EXHIBIT A
COOPERATIVE FIRE PROGRAMS
FIRE PROTECTION REIMBURSEMENT AGREEMENT

The project representatives during the term of this agreement will be:

CAL FIRE Unit Chief:		Local Agency:	City of St. Helena
Name:	Shana Jones	Name:	Chief Jon Sorenson
Phone:	(707) 967-1400	Phone:	(707) 486-2882
Fax:	(707) 967-1473	Fax:	

All required correspondence shall be sent through U.S. Postal Service by certified mail and directed to:

CAL FIRE Unit Chief:	Shana Jones	Local Agency:	City of St. Helena
Section/Unit:	Sonoma Lake Napa	Section/Unit:	Fire Department
Attention:	Stacie McCambridge	Attention:	Chief Jon Sorenson
Address:	1199 Big Tree Rd. St. Helena, Ca 94574	Address:	1480 Main St. St. Helena, Ca 94574
Phone:	(707) 967-1400	Phone:	(707) 486-2882
Fax:	(707) 967-1473	Fax:	

Send an additional copy of all correspondence to:

CAL FIRE
Cooperative Fire Services
P.O. Box 944246
Sacramento, CA 94244-2460

AUTHORIZATION

As used herein, Director shall mean Director of CAL FIRE. This agreement, its terms and conditions are authorized under the Public Resources Code Sections 4141, 4142, 4143 and 4144, as applicable.

Contractor Name: City of St. Helena
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EXHIBIT A

SCOPE OF WORK

Under Public Resources Code Section 4114 and other provisions of law, STATE maintains fire prevention and fire suppression forces including the necessary equipment, personnel, and facilities required to prevent and extinguish forest fires.

The purpose of this agreement is to provide mutually advantageous fire and emergency services through an effective consolidated organization, wherein the STATE is primarily financially responsible for protecting natural resources from vegetation fires and the LOCAL AGENCY is primarily financially responsible for protecting life and property from fires and other emergencies. The LOCAL AGENCY shall have sole authority to establish the fire protection organization and structure needed to meet the determined level of service. This level of service may be based on the LOCAL AGENCY governing board's established fiscal parameters and assessment of risks and hazards. LOCAL AGENCY personnel providing services under this agreement may include any one or a combination of the following: regular employees, persons temporarily employed and commonly known as volunteers, paid-call firefighters, or others temporarily employed to perform any emergency work or emergency service including, but not limited to fire prevention, fire suppression and emergency medical response.

To comply with the STATE's mandate for full cost recovery of goods and services provided for others, the LOCAL AGENCY shall be responsible for all STATE costs, both direct and indirect, required to execute the terms of this agreement. These costs shall include, but not be limited to: required training and associated post coverage, employee uniform and Personal Protective Equipment (PPE) costs.

1. FIRE PROTECTION SERVICES TO BE PROVIDED BY THE STATE

STATE provides a modern, full service fire protection and emergency incident management agency that provides comprehensive fire protection and other emergency incident response. STATE designs regional fire protection solutions for urban and rural communities by efficiently utilizing all emergency protection resources. Regional solutions provide the most effective method of protecting the citizens of California at local, county and state levels.

Fire protection services to be provided by STATE under this agreement shall include the following: (check boxes below that apply)

☐ 1) Emergency Fire Protection, Medical and Rescue Response: services include commercial, residential, and wildland fire protection, prevention and investigation; hazardous materials incident response; emergency vehicle extrication; hazardous conditions response (flooding, downed power lines, earthquake, terrorist incident, etc.); emergency medical and rescue response; and public service assistance. Also included are management support services that include fire department administration, training and safety, personnel, finance and logistical support.

☐ 2) Basic Life Support Services: emergency medical technician (EMT) level emergency medical response providing first aid, basic life support (BLS), airway management, administration of oxygen, bleeding control, and life support system stabilization until patients are transported to the nearest emergency care facility.

☐ 3) Advanced Life Support Services: paramedic level emergency medical response providing early advanced airway management, intravenous drug therapy, and life support system stabilization until patients are transported to the nearest emergency care facility.

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☒ 4) Dispatch Services: provide fire department 9-1-1 emergency dispatch by CAL FIRE Fire/Emergency Command Center (ECC). CAL FIRE will be responsible for fire/emergency dispatching emergency resource units covered under this agreement. The CAL FIRE ECC is staffed with a Battalion Chief, three or more Fire Captains and Communications Operators to provide 24/7 year-round coverage. There is always an officer of Captain rank or higher to serve as the shift supervisor and command officer. CAL FIRE uses an integrated Computer Aided Dispatch (CAD) system using the latest technology, to direct the closest available resources to all emergency incidents.

☐ 5) Fire Code Inspection, Prevention and Enforcement Services: CAL FIRE has staff Fire Inspectors serving under the direction of the LOCAL AGENCY Fire Marshal to provide services to the area covered by this agreement. Fire Code Enforcement will normally be available five days per week, with emergency or scheduled enforcement inspections available seven days per week. Fire Prevention and Investigation services will be provided by CAL FIRE Prevention Officers trained in arson, commercial, and wildland fire investigation. Officers are available by appointment for site visits and consultations. Officers are trained at CAL FIRE's Peace Officer Standard Training (POST) certified law enforcement training academy and they cooperate effectively with all local, state and federal law enforcement agencies.

☐ 6) Land Use/ Pre-Fire Planning Services – CAL FIRE staff will provide community land use planning, administration of Pre-Fire project work, including community outreach, development of community education programs, project quality control, maintenance of project records and submittal of progress reports, completion of required environmental documentation, acquisition of required permits and completion of other associated administrative duties.

☐ 7) Disaster planning services (listed in Exhibit E, Description of Other Services, attached hereto and made a part of this agreement)

☐ 8) Specific service descriptions and staffing coverage, by station (listed in Exhibit E, Description of Other Services, attached hereto and made a part of this agreement)

☐ 9) Extended Fire Protection Service Availability (Amador)

2. ADMINISTRATION

Under the requirements of California Public Resources Code Section 4114 and other provisions of law, STATE maintains fire prevention and firefighting services as outlined in Exhibit D, Schedule B of this agreement.

- A. Director shall select and employ a Region Chief who shall, under the direction of the Director/Chief Deputy Director, manage all aspects of fire prevention and fire protection services and forestry-related programs.
- B. Director will select and employ a Unit Chief who shall, under the supervision and direction of Director/Region Chief or a lawful representative, have charge of the organization described in Exhibit D, Schedules A, B and C included hereto and made a part of this agreement.
- C. LOCAL AGENCY shall appoint the Unit Chief as the LOCAL AGENCY Fire Chief for all Emergency Fire Protection, Medical and Rescue Response Agreements, pursuant to applicable statutory authority. The Unit Chief may delegate this responsibility to qualified staff.
- D. The Unit Chief may dispatch personnel and equipment listed in Exhibit D, Schedules A, B and C from the assigned station or location under guidelines established by LOCAL

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AGENCY and approved by STATE. Personnel and/or equipment listed in Exhibit D, Schedule B may be dispatched at the sole discretion of STATE.

- E. The Unit Chief shall exercise professional judgment consistent with STATE policy and his or her employment by STATE in authorizing or making any assignments to emergencies and other responses, including assignments made in response to requests for mutual aid.
- F. Except as may be otherwise provided for in this agreement, STATE shall not incur any obligation on the part of LOCAL AGENCY to pay for any labor, materials, supplies or services beyond the total set forth in the respective Exhibit D, Schedules A and C, as to the services to be rendered pursuant to each Schedule.
- G. Nothing herein shall alter or amend or be construed to alter or amend any Collective Bargaining Agreement or Memorandum of Understanding between the State of California and its employees under the State Employer-Employee Relations Act.

3. SUPPRESSION COST RECOVERY

As provided in Health and Safety Code (H&SC) Section 13009, STATE may bring an action for collection of suppression costs of any fire caused by negligence, violation of law, or failure to correct noticed fire safety violations. When using LOCAL AGENCY equipment and personnel under the terms of this agreement, STATE may, at the request of LOCAL AGENCY, bring such an action for collection of costs incurred by LOCAL AGENCY. In such a case LOCAL AGENCY appoints and designates STATE as its agent in said collection proceedings. In the event of recovery, STATE shall deduct fees and litigation costs in a proportional percentage amount based on verifiable and justifiable suppression costs for the fire at issue. These recovery costs are for services provided which are beyond the scope of those covered by the local government administrative fee.

In all such instances, STATE shall give timely notice of the possible application of H&SC Section 13009 to the representative designated by LOCAL AGENCY.

4. MUTUAL AID

When rendering mutual aid or assistance as authorized in H&SC Sections 13050 and 13054, STATE may, at the request of LOCAL AGENCY, demand payment of charges and seek reimbursement of LOCAL AGENCY costs for personnel, equipment and operating expenses as funded herein, under authority given by H&SC Sections 13051 and 13054. STATE, in seeking said reimbursement pursuant to such request of LOCAL AGENCY, shall represent LOCAL AGENCY by following the procedures set forth in H&SC Section 13052. Any recovery of LOCAL AGENCY costs, less expenses, shall be paid or credited to LOCAL AGENCY, as directed by LOCAL AGENCY.

In all such instances, STATE shall give timely notice of the possible application of H&SC Sections 13051 and 13054 to the officer designated by LOCAL AGENCY.

5. PROPERTY PURCHASE AND ACCOUNTING

LOCAL AGENCY shall be responsible for all costs associated with property required by personnel to carry out this agreement. Employee uniform costs will be assessed to the LOCAL AGENCY through the agreement billing process. Personal Protective Equipment (PPE) costs shall be the responsibility of the LOCAL AGENCY. By mutual agreement, PPE meeting the minimum specifications established by the STATE may be purchased directly by the LOCAL AGENCY.

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Alternately, the STATE will supply all PPE and the LOCAL AGENCY will be billed for costs incurred.

All property provided by LOCAL AGENCY and by STATE for the purpose of providing fire protection services shall be marked and accounted for by the Unit Chief in such a manner as to conform to the regulations, if any, established by the parties for the segregation, care, and use of the respective properties.

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EXHIBIT B
BUDGET DETAIL AND PAYMENT PROVISIONS

1. PAYMENT FOR SERVICES

- A. LOCAL AGENCY shall pay STATE actual cost for fire protection services pursuant to this agreement an amount not to exceed that set forth in Exhibit D, Schedule A for each fiscal year. STATE shall prepare an Exhibit D, Schedule A each year, which shall be the basis for payment for the entire fiscal year for which services are provided.
- B. Any other funds designated by LOCAL AGENCY to be expended under the supervision of or for use by a Unit Chief for fire protection services shall be set forth in Exhibit D, Schedule C. This clause shall not limit the right of LOCAL AGENCY to make additional expenditures, whether under Exhibit D, Schedule C or otherwise.
- C. STATE shall invoice LOCAL AGENCY for the cost of fire protection services on a quarterly basis as follows:
 - 1) For actual services rendered by STATE during the period of July 1 through September 30, by an invoice filed with LOCAL AGENCY on or after December 10.
 - 2) For actual services rendered by STATE during the period October 1 through December 31, by an invoice filed with LOCAL AGENCY on or after December 31.
 - 3) For actual services rendered by STATE during the period January 1 through March 31, by an invoice filed with LOCAL AGENCY on or after March 31.
 - 4) For the estimated cost of services during the period April 1 through June 30, by an invoice filed in advance with LOCAL AGENCY on or after March 1.
 - 5) A final statement shall be filed with LOCAL AGENCY by October 1 following the close of the fiscal year, reconciling the payments made by LOCAL AGENCY with the cost of the actual services rendered by STATE and including any other costs as provided herein, giving credit for all payments made by LOCAL AGENCY and claiming the balance due to STATE, if any, or refunding to LOCAL AGENCY the amount of any overpayment.
 - 6) All payments by LOCAL AGENCY shall be made within thirty (30) days of receipt of invoice from STATE, or within thirty (30) days after the filing dates specified above, whichever is later.
 - 7) The STATE reserves the right to adjust the frequency of billing and payment to a monthly cycle with a thirty (30) day written notice to the LOCAL AGENCY when:
 - a. The Director predicts a cash flow shortage, or
 - b. When determined by the Region Chief, after consulting with the Unit Chief and the LOCAL AGENCY Contract Administrator, that the LOCAL AGENCY may not have the financial ability to support the contract at the contract level.
- D. Invoices shall include actual or estimated costs as provided herein of salaries and employee benefits for those personnel employed, charges for operating expenses and equipment and the administrative charge in accordance with Exhibit D, Schedule A. When "contractual rates" are indicated, the rate shall be based on an average salary plus all benefits. "Contractual rates" means an all-inclusive rate established in Exhibit

Contractor Name: City of St. Helena

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D, Schedule A for total costs to STATE, per specified position, for 24-hour fire protection services during the period covered.

- E. STATE shall credit the LOCAL AGENCY, or cover behind at no cost, for the costs of Non-post (e.g. Fire Marshal, Training Officer, etc.) positions and equipment assigned to STATE responsibility fires or other STATE funded emergency incidents. The STATE shall notify the LOCAL AGENCY when this occurs.

2. COST OF OPERATING AND MAINTAINING EQUIPMENT AND PROPERTY

The cost of maintaining, operating, and replacing any and all property and equipment, real or personal, furnished by the parties hereto for fire protection purposes, shall be borne by the party owning or furnishing such property or equipment unless otherwise provided for herein or by separate written agreement.

3. BUDGET CONTINGENCY CLAUSE

- A. If the LOCAL AGENCY's governing authority does not appropriate sufficient funds for the current year or any subsequent years covered under this Agreement, which results in an inability to pay the STATE for the services specified in this Agreement, the LOCAL AGENCY shall promptly notify the STATE and this Agreement will terminate pursuant to the notice periods required herein.
- B. If funding for any fiscal year is reduced or deleted by the LOCAL AGENCY for purposes of this program, the LOCAL AGENCY shall promptly notify the STATE, and the STATE shall have the option to either cancel this Agreement with no liability occurring to the STATE, or offer an agreement amendment to LOCAL AGENCY to reflect the reduced amount, pursuant to the notice terms herein.
- C. If the STATE Budget Act does not appropriate sufficient funds to provide the services for the current year or any subsequent years covered under this Agreement, which results in an inability to provide the services specified in this Agreement to the LOCAL AGENCY, the STATE shall promptly notify the LOCAL AGENCY, and this Agreement will terminate pursuant to the notice periods required herein.
- D. If funding for any fiscal year is reduced or deleted by the STATE Budget Act for purposes of this program, the STATE shall promptly notify the LOCAL AGENCY, and the LOCAL AGENCY shall have the option to either cancel this Agreement with no liability occurring to the LOCAL AGENCY, or offer an agreement amendment to LOCAL AGENCY to reflect the reduced services, pursuant to the notice terms herein.
- E. Notwithstanding the foregoing provisions in paragraphs A and B above, the LOCAL AGENCY shall remain responsible for payment for all services actually rendered by the STATE under this Agreement regardless of LOCAL AGENCY funding being reduced, deleted or not otherwise appropriated for this program. The LOCAL AGENCY shall promptly notify the STATE in writing of any budgetary changes that would impact this Agreement.
- F. LOCAL AGENCY and STATE agree that this Budget Contingency Clause shall not relieve or excuse either party from its obligation(s) to provide timely notice as may be required elsewhere in this Agreement.

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EXHIBIT C
GENERAL TERMS AND CONDITIONS

1. **APPROVAL**: This Agreement is of no force or effect until signed by both parties and approved by the Department of General Services, if required. STATE will not commence performance until such approval has been obtained.
2. **AMENDMENT**: This agreement may be amended by mutual consent of LOCAL AGENCY and STATE. No amendment or variation of the terms of this Agreement shall be valid unless made in writing, signed by the parties and approved as required. No oral understanding or Agreement not incorporated in the Agreement is binding on any of the parties.

If during the term of this agreement LOCAL AGENCY shall desire a reduction in STATE civil service employees assigned to the organization provided for in Exhibit D, Schedule A, LOCAL AGENCY shall provide 120 days written notice of the requested reduction. Notification shall include the following: (1) The total amount of reduction; (2) The firm effective date of the reduction; and (3) The number of employees, by classification, affected by a reduction. If such notice is not provided, LOCAL AGENCY shall reimburse STATE for relocation costs incurred by STATE as a result of the reduction. Personnel reductions resulting solely from an increase in STATE employee salaries or STATE expenses occurring after signing this agreement and set forth in Exhibit D, Schedule A to this agreement shall not be subject to relocation expense reimbursement by LOCAL AGENCY.

If during the term of this agreement costs to LOCAL AGENCY set forth in any Exhibit D, Schedule A to this agreement increase and LOCAL AGENCY, in its sole discretion, determines it cannot meet such increase without reducing services provided by STATE, LOCAL AGENCY shall within one hundred twenty (120) days of receipt of such Schedule notify STATE and designate which adjustments shall be made to bring costs to the necessary level. If such designation is not received by STATE within the period specified, STATE shall reduce services in its sole discretion to permit continued operation within available funds.

3. **ASSIGNMENT**: This Agreement is not assignable by the LOCAL AGENCY either in whole or in part, without the consent of the STATE in the form of a formal written amendment.
4. **EXTENSION OF AGREEMENT**:
 - A. One year prior to the date of expiration of this agreement, LOCAL AGENCY shall give STATE written notice of whether LOCAL AGENCY will extend or enter into a new agreement with STATE for fire protection services and, if so, whether LOCAL AGENCY intends to change the level of fire protection services from that provided by this agreement. If this agreement is executed with less than one year remaining on the term of the agreement, LOCAL AGENCY shall provide this written notice at the time it signs the agreement and the one year notice requirement shall not apply.
 - B. If LOCAL AGENCY fails to provide the notice, as defined above in (A), STATE shall have the option to extend this agreement for a period of up to one year from the original termination date and to continue providing services at the same or reduced level as STATE determines would be appropriate during the extended period of this agreement. Six months prior to the date of expiration of this agreement, or any extension hereof, STATE shall give written notice to LOCAL AGENCY of any extension of this agreement and any change in the level of fire protection services STATE will provide during the extended period of this agreement. Services provided and obligations incurred by STATE during an extended period shall be accepted by LOCAL AGENCY as services and obligations under the terms of this agreement.

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- C. The cost of services provided by STATE during the extended period shall be based upon the amounts that would have been charged LOCAL AGENCY during the fiscal year in which the extended period falls had the agreement been extended pursuant hereto. Payment by LOCAL AGENCY for services rendered by STATE during the extended period shall be as provided in Exhibit B, Section 1, B of this agreement.
5. **AUDIT:** STATE, including the Department of General Services and the Bureau of State Audits, and LOCAL AGENCY agree that their designated representative shall have the right to review and to copy any records and supporting documentation of the other party hereto, pertaining to the performance of this agreement. STATE and LOCAL AGENCY agree to maintain such records for possible audit for a minimum of three (3) years after final payment, unless a longer period of records retention is stipulated, and to allow the auditor(s) of the other party access to such records during normal business hours and to allow interviews of any employees who might reasonably have information related to such records. STATE and LOCAL AGENCY agree to a similar right to audit records and interview staff in any subcontract related to performance of this Agreement. (Gov. Code §8546.7, Pub. Contract Code §10115 et seq., CCR Title 2, Section 1896).
 6. **INDEMNIFICATION:** Each party, to the extent permitted by law, agrees to indemnify, defend and save harmless the other party, its officers, agents and employees from (1) any and all claims for economic losses accruing or resulting to any and all contractors, subcontractors, suppliers, laborers and any other person, firm, or corporation furnishing or supplying work services, materials or supplies to that party and (2) from any and all claims and losses accruing or resulting to any person, firm or corporation who may be injured or damaged by that party, in the performance of any activities of that party under this agreement, except where such injury or damage arose from the sole negligence or willful misconduct attributable to the other party or from acts not within the scope of duties to be performed pursuant to this agreement; and (3) each party shall be responsible for any and all claims that may arise from the behavior and/or performance of its respective employees during and in the course of their employment to this cooperative agreement.
 7. **DISPUTES:** LOCAL AGENCY shall select and appoint a "Contract Administrator" who shall, under the supervision and direction of LOCAL AGENCY, be available for contract resolution or policy intervention with the STATE's Region Chief when, upon determination by the designated STATE representative, the Unit Chief acting as LOCAL AGENCY's Fire Chief under this agreement faces a situation in which a decision to serve the interest of LOCAL AGENCY has the potential to conflict with STATE interest or policy. Any dispute concerning a question of fact arising under the terms of this agreement which is not disposed of within a reasonable period of time by the LOCAL AGENCY and STATE employees normally responsible for the administration of this agreement shall be brought to the attention of the CAL FIRE Director or designee and the Chief Executive Officer (or designated representative) of the LOCAL AGENCY for joint resolution. For purposes of this provision, a "reasonable period of time" shall be ten (10) calendar days or less. STATE and LOCAL AGENCY agree to continue with the responsibilities under this Agreement during any dispute.
 8. **TERMINATION FOR CAUSE/CANCELLATION:**
 - A. If LOCAL AGENCY fails to remit payments in accordance with any part of this agreement, STATE may terminate this agreement and all related services upon 60 days written notice to LOCAL AGENCY. Termination of this agreement does not relieve LOCAL AGENCY from providing STATE full compensation in accordance with terms of this agreement for services actually rendered by STATE pursuant to this agreement.

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- B. This agreement may be cancelled at the option of either STATE or LOCAL AGENCY at any time during its term, with or without cause, on giving one year's written notice to the other party. Either LOCAL AGENCY or STATE electing to cancel this agreement shall give one year's written notice to the other party prior to cancellation.
9. **INDEPENDENT CONTRACTOR:** Unless otherwise provided in this agreement LOCAL AGENCY and the agents and employees of LOCAL AGENCY, in the performance of this Agreement, shall act in an independent capacity and not as officers or employees or agents of the STATE.
10. **NON-DISCRIMINATION CLAUSE:** During the performance of this agreement, LOCAL AGENCY shall be an equal opportunity employer and shall not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, physical disability (including HIV and AIDS) mental disability, medical condition (e.g.cancer), age (over 40), marital status, denial of family care leave, veteran status, sexual orientation, and sexual identity. LOCAL AGENCY shall insure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment. LOCAL AGENCY shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code §12990 (a-f) et seq.) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code Section 12990 (a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations, are incorporated into this Agreement by reference and made a part hereof as if set forth in full. LOCAL AGENCY shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other Agreement.
- In addition, LOCAL AGENCY acknowledges that it has obligations relating to ethics, Equal Employment Opportunity (EEO), the Fire Fighter's Bill of Rights Act (FFBOR), and the Peace Officer's Bill of Rights Act (POBOR). LOCAL AGENCY shall ensure that its employees comply with all the legal obligations relating to these areas. LOCAL AGENCY shall ensure that its employees are provided appropriate training.
11. **TIMELINESS:** Time is of the essence in the performance of this agreement.
12. **COMPENSATION:** The consideration to be paid STATE, as provided herein, shall be in compensation for all of STATE's expenses incurred in the performance hereof, including travel, per Diem, and taxes, unless otherwise expressly so provided.
13. **GOVERNING LAW:** This agreement is governed by and shall be interpreted in accordance with the laws of the State of California.
14. **CHILD SUPPORT COMPLIANCE ACT:** "For any Agreement in excess of \$100,000, the LOCAL AGENCY acknowledges in accordance with Public Contract Code 7110, that:
- A. The LOCAL AGENCY recognizes the importance of child and family support obligations and shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Chapter 8 (commencing with section 5200) of Part 5 of Division 9 of the Family Code; and
- B. The LOCAL AGENCY, to the best of its knowledge is fully complying with the earnings assignment orders of all employees and is providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department."

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15. **UNENFORCEABLE PROVISION:** In the event that any provision of this Agreement is unenforceable or held to be unenforceable, then the parties agree that all other provisions of this Agreement have force and effect and shall not be affected thereby.

16. **COMPLIANCE WITH THE HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA)**

The STATE and LOCAL AGENCY have a responsibility to comply with the provisions of the 1996 Federal Health Insurance Portability and Accountability Act (HIPAA) and the 2001 State Health Insurance Portability and Accountability Implementation Act. HIPAA provisions become applicable once the association and relationships of the health care providers are determined by the LOCAL AGENCY. It is the LOCAL AGENCY'S responsibility to determine their status as a "covered entity" and the relationships of personnel as "health care providers", "health care clearinghouse", "hybrid entities", business associates", or "trading partners". STATE personnel assigned to fill the LOCAL AGENCY'S positions within this Agreement, and their supervisors, may fall under the requirements of HIPAA based on the LOCAL AGENCY'S status. It is the LOCAL AGENCY'S responsibility to identify, notify, train, and provide all necessary policy and procedures to the STATE personnel that fall under HIPAA requirements so that they can comply with the required security and privacy standards of the act.

17. **LIABILITY INSURANCE**

The STATE and LOCAL AGENCY shall each provide proof of insurance in a form acceptable to the other party at no cost one to the other, to cover all services provided and use of local government facilities covered by this agreement. If LOCAL AGENCY is insured and/or self-insured in whole or in part for any losses, LOCAL AGENCY shall provide a completed Certification of Self Insurance (Exhibit D, Schedule E) or certificate of insurance, executed by a duly authorized officer of LOCAL AGENCY. Upon request of LOCAL AGENCY the STATE shall provide a letter from DGS, Office Risk and Insurance Management executed by a duly authorized officer of STATE. If commercially insured in whole or in part, a certificate of such coverage executed by the insurer or its authorized representative shall be provided.

Said commercial insurance or self-insurance coverage of the LOCAL AGENCY shall include the following:

- A. Fire protection and emergency services - Any commercial insurance shall provide at least general liability for \$5,000,000 combined single limit per occurrence.
 - B. Dispatch services – Any commercial insurance shall provide at least general liability for \$1,000,000 combined single limit per occurrence.
 - C. The CAL FIRE, State of California, its officers, agents, employees, and servants are included as additional insured's for purposes of this contract.
 - D. The STATE shall receive thirty (30) days prior written notice of any cancellation or change to the policy at the addresses listed on page 2 of this agreement.
18. **WORKERS COMPENSATION:** (only applies where local government employees/volunteers are supervised by CAL FIRE, as listed in Exhibit D Schedule C. STATE contract employees' workers compensation is included as part of the contract personnel benefit rate).
- A. Workers' Compensation and related benefits for those persons, whose use or employment is contemplated herein, shall be provided in the manner prescribed by California Labor Codes, State Interagency Agreements and other related laws, rules, insurance policies, collective bargaining agreements, and memorandums of understanding.

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- B. The STATE Unit Chief administering the organization provided for in this agreement shall not use, dispatch or direct any non STATE employees, on any work which is deemed to be the responsibility of LOCAL AGENCY, unless and until LOCAL AGENCY provides for Workers' Compensation benefits at no cost to STATE. In the event STATE is held liable, in whole or in part, for the payment of any Worker's Compensation claim or award arising from the injury or death of any such worker, LOCAL AGENCY agrees to compensate STATE for the full amount of such liability.
- C. The STATE /LOCAL AGENCY shall receive proof of Worker's Compensation coverage and shall be notified of any cancellation and change of coverage at the addresses listed in Section 1.

19. **CONFLICT OF INTEREST**: LOCAL AGENCY needs to be aware of the following provisions regarding current or former state employees. If LOCAL AGENCY has any questions on the status of any person rendering services or involved with the Agreement, the STATE must be contacted immediately for clarification.

Current State Employees (Public Contract Code §10410):

- 1) No officer or employee shall engage in any employment, activity or enterprise from which the officer or employee receives compensation or has a financial interest and which is sponsored or funded by any state agency, unless the employment, activity or enterprise is required as a condition of regular state employment.
- 2) No officer or employee shall contract on his or her own behalf as an independent contractor with any state agency to provide goods or services.

Former State Employees (Public Contract Code §10411):

- 1) For the two-year period from the date he or she left state employment, no former state officer or employee may enter into a contract in which he or she engaged in any of the negotiations, transactions, planning, arrangements or any part of the decision-making process relevant to the contract while employed in any capacity by any state agency.
- 2) For the twelve-month period from the date he or she left state employment, no former state officer or employee may enter into a contract with any state agency if he or she was employed by that state agency in a policy-making position in the same general subject area as the proposed contract within the 12-month period prior to his or her leaving state service.

If LOCAL AGENCY violates any provisions of above paragraphs, such action by LOCAL AGENCY shall render this Agreement void. (Public Contract Code §10420)

Members of boards and commissions are exempt from this section if they do not receive payment other than payment of each meeting of the board or commission, payment for preparatory time and payment for per diem. (Public Contract Code §10430 (e))

20. **LABOR CODE/WORKERS' COMPENSATION**: LOCAL AGENCY needs to be aware of the provisions which require every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions, and LOCAL AGENCY affirms to comply with such provisions before commencing the performance of the work of this Agreement. (Labor Code Section 3700)
21. **AMERICANS WITH DISABILITIES ACT**: LOCAL AGENCY assures the State that it complies with the Americans with Disabilities Act (ADA) of 1990, which prohibits discrimination on the

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basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA. (42 U.S.C. 12101 et seq.)

22. **LOCAL AGENCY NAME CHANGE**: An amendment is required to change the LOCAL AGENCY'S name as listed on this Agreement. Upon receipt of legal documentation of the name change the STATE will process the amendment. Payment of invoices presented with a new name cannot be paid prior to approval of said amendment.
23. **RESOLUTION**: A county, city, district, or other local public body must provide the STATE with a copy of a resolution, order, motion, or ordinance of the local governing body which by law has authority to enter into an agreement, authorizing execution of the agreement.
24. **AIR OR WATER POLLUTION VIOLATION**: Under the State laws, the LOCAL AGENCY shall not be: (1) in violation of any order or resolution not subject to review promulgated by the State Air Resources Board or an air pollution control district; (2) subject to cease and desist order not subject to review issued pursuant to Section 13301 of the Water Code for violation of waste discharge requirements or discharge prohibitions; or (3) finally determined to be in violation of provisions of federal law relating to air or water pollution.
25. **AFFIRMATIVE ACTION**. STATE certifies its compliance with applicable federal and State hiring requirements for persons with disabilities, and is deemed by LOCAL AGENCY to be in compliance with the provisions of LOCAL AGENCY'S Affirmative Action Program for Vendors.
26. **DRUG AND ALCOHOL-FREE WORKPLACE**. As a material condition of this Agreement, STATE agrees that it and its employees, while performing service for LOCAL AGENCY, on LOCAL AGENCY property, or while using LOCAL AGENCY equipment, shall comply with STATE's Employee Rules of Conduct as they relate to the possession, use, or consumption of drugs and alcohol.
27. **ZERO TOLERANCE FOR FRAUDULENT CONDUCT IN LOCAL AGENCY SERVICES**. STATE shall comply with any applicable "Zero Tolerance for Fraudulent Conduct in LOCAL AGENCY Services." There shall be "Zero Tolerance" for fraud committed by contractors in the administration of LOCAL AGENCY programs and the provision of LOCAL AGENCY services. Upon proven instances of fraud committed by the STATE in connection with performance under the Agreement, the Agreement may be terminated consistent with the termination for cause/cancellation term, Exhibit C, section 8, subsection B, of Cooperative Fire Programs Fire Protection Reimbursement Agreement, LG-1, between the California Department of Forestry and Fire Protection (CAL FIRE) and the LOCAL AGENCY.
28. **CONFIDENTIAL INFORMATION**. "Confidential information" means information designated by CAL FIRE and/or the LOCAL AGENCY disclosure of which is restricted, prohibited or privileged by State and federal law. Confidential Information includes, but is not limited to, information exempt from disclosure under the California Public Records Act (Government Code Sections 6250 et seq.) Confidential Information includes but is not limited to all records as defined in Government Code section 6252 as well as verbal communication of Confidential Information. Any exchange of Confidential Information between parties shall not constitute a "waiver" of any exemption pursuant to Government Code section 6254.5

CAL FIRE and LOCAL AGENCY personnel allowed access to information designated as Confidential Information shall be limited to those persons with a demonstrable business need for such access. CAL FIRE and LOCAL AGENCY agree to provide a list of authorized personnel in writing as required by Government Code section 6254.5(e). CAL FIRE and the

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LOCAL AGENCY agree to take all necessary measures to protect Confidential Information and shall impose all the requirements of this Agreement on all of their respective officers, employees and agents with regards to access to the Confidential Information. A Party to this Contract who experiences a security breach involving Confidential Information covered by this Contract, agrees to promptly notify the other Party of such breach

29. **ENTIRE AGREEMENT**: This agreement contains the whole agreement between the Parties. It cancels and supersedes any previous agreement for the same or similar services.

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EXHIBIT D
ADDITIONAL PROVISIONS

EXCISE TAX: State of California is exempt from federal excise taxes, and no payment will be made for any taxes levied on employees' wages. STATE will pay any applicable State of California or local sales or use taxes on the services rendered or equipment or parts supplied pursuant to this agreement. The STATE may pay any applicable sales and use tax imposed by another state.

Schedules

The following Schedules are included as part of this agreement (check boxes if they apply):

- ☒ **A. Fiscal Display, PRC 4142 AND/OR PRC 4144** - STATE provided LOCAL AGENCY funded fire protection services. STATE-owned vehicles shall be operated and maintained in accordance with policies of STATE at rates listed in Exhibit D, Schedule A.
- ☐ **B. STATE Funded Resource** - A listing of personnel, crews and major facilities of the STATE overlapping or adjacent to the local agency area that may form a reciprocal part of this agreement.
- ☐ **C. LOCAL AGENCY Provided Local Funded Resources** - A listing of services, personnel, equipment and expenses, which are paid directly by the local agency, but which are under the supervision of the Unit Chief.
- ☐ **D. LOCAL AGENCY Owned STATE Maintained Vehicles** - Vehicle information pertaining to maintenance responsibilities and procedures for local agency-owned vehicles that may be a part of the agreement.

LOCAL AGENCY-owned firefighting vehicles shall meet and be maintained to meet minimum safety standards set forth in Title 49, Code of Federal Regulations; and Titles 8 and 13, California Code of Regulations.

LOCAL AGENCY-owned vehicles that are furnished to the STATE shall be maintained and operated in accordance to LOCAL AGENCY policies. In the event LOCAL AGENCY does not have such policies, LOCAL AGENCY-owned vehicles shall be maintained and operated in accordance with STATE policies. The cost of said vehicle maintenance and operation shall be at actual cost or at rates listed in Exhibit D, Schedule D.

Exhibit D, Schedule D is incorporated into this section if LOCAL AGENCY-owned vehicles listed in Exhibit D, Schedule D are to be operated, maintained, and repaired by STATE.

LOCAL AGENCY assumes full responsibility for all liabilities associated therewith in accordance with California Vehicle Code Sections 17000, 17001 et seq. STATE employees operating LOCAL AGENCY-owned vehicles shall be deemed employees of LOCAL AGENCY, as defined in Vehicle Code Section 17000. Except where LOCAL AGENCY would have no duty to indemnify STATE under Exhibit C, Section 6 for all LOCAL AGENCY-owned vehicles operated or used by employees of STATE under this agreement.

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LOCAL AGENCY employees, who are under the supervision of the Unit Chief and operating STATE-owned motor vehicles, as a part of the duties and in connection with fire protection and other emergency services, shall be deemed employees of STATE, as defined in Vehicle Code Section 17000 for acts or omissions in the use of such vehicles. Except where STATE would have no duty to indemnify LOCAL AGENCY under Exhibit C, Section 6.

- E. Certification of Insurance** - Provider Insurance Certification and/or proof of self-insurance.

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EXHIBIT D, SCHEDULE E

This is Schedule E of Cooperative Agreement originally dated July 1, 2018, by and between the CAL FIRE of the State of California and LOCAL AGENCY

NAME OF LOCAL AGENCY: City of St. Helena

The CAL FIRE, State of California and its officers, agents, employees, and servants are included as additional insured for the purposes of this contract. The State shall receive thirty (30) days prior written notice of any cancellation or change to the policy at the addresses listed in LG1, Page 2.

FISCAL YEAR: 2018/19 to 2020/21

**SELF-INSURANCE CERTIFICATION BY LOCAL AGENCY FOR
TORT LIABILITY**

This is to certify that LOCAL AGENCY has elected to be self-insured under the self-insurance provision provided in Exhibit C, Section 17.

By: _____
Signature Printed Name

Title Date

**SELF-INSURANCE CERTIFICATION BY LOCAL AGENCY
FOR
WORKER'S COMPENSATION BENEFITS**

This is to certify that LOCAL AGENCY has elected to be self-insured for Workers' Compensation benefits which comply with Labor Code Section 3700 as provided in Exhibit C, Section 18.

By: _____
Signature Printed Name

Title Date

**SELF-INSURANCE CERTIFICATION BY LOCAL AGENCY
FOR
LOCAL AGENCY-OWNED VEHICLES**

This is to certify that LOCAL AGENCY has elected to be self-insured for local agency-owned vehicles under the self-insurance provision provided in Exhibit D, Schedule D.

By: _____
Signature Printed Name

Title Date

STHCITY OF ST. HELENA

RESOLUTION NO. 2018-__

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ST. HELENA AUTHORIZING A THREE-YEAR AGREEMENT FOR FIRE/EMERGENCY DISPATCH SERVICES WITH THE DEPARTMENT OF FORESTRY AND FIRE PROTECTION/CAL FIRE FOR A NOT-TO-EXCEED AMOUNT OF \$108,241.05

RECITALS

WHEREAS, The City requires fire/emergency dispatch services; and

WHEREAS, The current agreement for dispatch services expired on June 30, 2018; and

WHEREAS, The Department of Forestry and Fire Protection/Cal Fire has the necessary expertise, experience, and qualifications to perform the functions.

RESOLUTION

NOW, THEREFORE, the City Council of the City of St. Helena resolves as follows:

1. The City Council approves the Agreement with the Department of Forestry and Fire Protection/Cal Fire for the term of July 1, 2018 through June 30, 2021, for a not-to-exceed amount of \$108,241.05; and
2. The City Council authorized the Mayor to execute the agreement on behalf of the City.

Approved at a Regular Meeting of the St. Helena City Council on August 28, 2018, by the following vote:

Mayor Galbraith:

Vice Mayor White:

Councilmember Dohring:

Councilmember Koberstein:

Councilmember Ellsworth:

APPROVED:

ATTEST:

Alan Galbraith, Mayor

Cindy Tzaopoulos, City Clerk



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: Consent

Subject: Consideration and Proposed Approval of a Resolution 1) Authorizing the City Manager to Execute a Professional Services Agreement with Kosmont Companies to Assist with Implementation of Downtown Economic, City Assets, and Related Housing Strategies in an amount not to exceed \$75,000; and 2) authorizing a Fiscal Year 2018/19 budget increase of \$75,000 to 101-4300-2130 from General Fund Reserves

CEQA Determination: Not a CEQA project

Prepared By: Mark T. Prestwich, City Manager

Reviewed By: April Mitts, Finance Director

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

On November 3, 2017, the City issued a Request for Proposals (RFP) for Municipal Financial and Real Estate Advisory Services. The intent of this RFP was to seek proposals from qualified consultants to provide municipal financial and real estate advisory services on an on-call basis. On December 12, 2017, the City Council selected Kosmont Companies to provide financial and real estate advisory services to assist with the St. Helena Assets Planning Engagement (SHAPE) Committee work related to City buildings/assets and authorized an agreement for \$45,000. Kosmont Companies provided assistance to the SHAPE Committee and general real estate/municipal finance advisory services to the City during the first six months of 2018 (the SHAPE Committee presented their Final Report to the City Council on June 12, 2018). Additionally, on March 27, 2018, the City entered into a \$25,000 agreement with Kosmont Companies to prepare an Economic and Demographic Profile and Downtown Retail Market Analysis to evaluate the downtown's retail viability. The resulting report was shared and discussed with the City Council on July 24, 2018 along with numerous recommendations to improve the downtown's vitality. The City Council subsequently directed the City

Manager to develop a Downtown Economic Strategy and identify next steps/recommendations related to the SHAPE Committee report.

DISCUSSION

To assist the City with the implementation of its Downtown Economic Strategy and prioritization/next steps related to the improvement/disposition of City assets, staff is recommending the City enter into a new agreement with Kosmont Companies. The proposed funding of \$75,000 is intended to assist the City with initial implementation of retail strategies, asset strategies, housing strategies, and as-needed real estate municipal financial advisory services.

FISCAL IMPACT

The City recently received notice that it will receive approximately \$300,000 of unanticipated property tax revenue from the State of California related to the reconciliation of its Education Revenue Augmentation Fund. Staff recommends appropriating \$75,000 from General Fund Reserve for this agreement, as the Reserve account is anticipated to increase by at least \$300,000 at the close of the fiscal year.

RECOMMENDED ACTION

Staff recommends City Council approve a Resolution 1) Authorizing the City Manager to execute a Professional Services Agreement with Kosmont Companies to assist with implementation of a Downtown Economic, City Assets, and Related Housing Strategies in an amount not to exceed \$75,000; and 2) authorizing a Fiscal Year 2018/19 budget increase of \$75,000 to 101-4300-2130 from General Fund Reserves.

ATTACHMENTS

[Attachment 1 - PSA Kosmont Implementation Services 091118](#)

[Attachment 2 - Resolution - Kosmont](#)

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT, made and entered into on September 11, 2018 by and between the City of St. Helena, located in the County of Napa, State of California (City), and Kosmont & Associates, Inc., doing business as Kosmont Companies (Consultant).

RECITALS:

A. City desires to employ Consultant to furnish professional services in connection with the project described as Initial Implementation Services for Downtown Economic Strategy, Asset Strategy, Housing Strategy, and As-Needed Real Estate and Municipal Financial Advisory Services.

B. Consultant has represented that Consultant has the necessary expertise, experience, and qualifications to perform the required duties.

NOW, THEREFORE, in consideration of the mutual premises, covenants, and conditions herein contained, the parties agree as follows:

SECTION 1 – BASIC SERVICES

Consultant agrees to perform the services set forth in **Exhibit A, “Scope of Services”** and made part of this Agreement.

SECTION 2 – ADDITIONAL SERVICES

Consultant shall not be compensated for any services rendered in connection with its performance of this Agreement that are in addition to or outside of those set forth in this Agreement or **Exhibit A, “Scope of Services”**, unless such additional services and compensation are authorized in advance and in writing by the City Council or City Manager of the City.

SECTION 3 – TIME FOR COMPLETION

The time for completion of services shall be as identified in **Exhibit A, “Scope of Services”**.

SECTION 4 – COMPENSATION AND METHOD OF PAYMENT

A. Subject to any limitations set forth in this Agreement, City agrees to pay consultant the amount specified in Attachment A, “Compensation” attached hereto and made a part hereof. Total compensation shall not exceed \$75,000.00 unless additional compensation is approved in accordance with Section 2.

B. Consultant shall furnish to City an original invoice for all work performed and expenses incurred during the preceding month. The invoice shall detail charges by the following categories if applicable: labor (by sub-category), travel, materials, equipment, supplies, subconsultant contracts, and miscellaneous expenses. Each original invoice furnished shall

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Kosmont Implementation Services 091118

include the expenses incurred during the preceding month, the cumulative Agreement amount, and the amount remaining on the Agreement. City shall independently review each invoice submitted to determine whether the work performed and expenses incurred are in compliance with the provisions of this Agreement. If no charges or expenses are disputed, the invoice shall be approved, and City will use its best efforts to cause Consultant to be paid within 30 days of receipt of invoice. If the City disputes any charges or expenses, the City will return the original invoice to Consultant for correction and resubmission. If the City reasonably determines, in its sole judgment, that the invoiced charges and expenses exceed the value of the services performed to date and that it is probable that the Agreement will not be completed satisfactorily within the contract price, City may retain all or a portion of the invoiced charges and expenses. Within thirty (30) days of satisfactory completion of the project, City shall pay the retained amount, if any, to Consultant.

C. Payment to the Consultant for work performed pursuant to this Agreement shall not be deemed to waive any defects in work performed by Consultant.

SECTION 5 – STANDARD OF PERFORMANCE

Consultant represents and warrants that it has the qualifications, experience and facilities necessary to properly perform the services required under this Agreement in a thorough, competent and professional manner. Consultant shall at all times faithfully, competently and to the best of its ability, experience and talent, perform all services described herein. In meeting its obligations under this Agreement, Consultant shall employ, at a minimum, generally accepted standards and practices utilized by persons engaged in providing services similar to those required of Consultant under this Agreement.

SECTION 6 – INSPECTION AND FINAL ACCEPTANCE

City may inspect and accept or reject any of Consultant's work under this Agreement, either during performance or when completed. City shall reject or finally accept Consultant's work within sixty (60) days after submitted to City, unless the parties mutually agree to extend such deadline. City shall reject work by a timely written explanation, otherwise Consultant's work shall be deemed to have been accepted. City's acceptance shall be conclusive as to such work except with respect to latent defects and fraud. Acceptance of any of Consultant's work by City shall not constitute a waiver of any of the provisions of this Agreement including, but not limited to, the sections pertaining to indemnification and insurance.

SECTION 7 – INSURANCE REQUIRED

Consultant shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Consultant, its agents, representatives, or employees, as indicated:

- A. Minimum Scope of Insurance. Coverage shall be at least as broad as:
 - 1. Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001).

2. Insurance Services Office form number CA 0001 (Ed. 1/87) covering Automobile Liability, code 1 (any auto).
3. Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.

B. Minimum Limits of Insurance. Consultant shall maintain limits no less than:

1. General Liability: \$2,000,000 per occurrence for bodily injury, and property damage including operations, products and completed operations, as applicable. If Commercial General Liability Insurance or other form with a General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: \$2,000,000 per accident for bodily injury and property damage.
3. Employer's Liability: \$1,000,000 per accident for bodily injury or disease.

C. Professional Liability Insurance. When Consultant under this Agreement is duly licensed under California Business and Professions Code as an architect, landscape architect, environmental engineer or other professional engineer, or land surveyor ("design professional"), Consultant shall maintain at least \$2,000,000 of professional liability insurance.

D. Excess Limits. If Consultant maintains higher limits than the minimums shown above, City requires and shall be entitled to coverage for the higher limits maintained by Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City.

E. Primary Coverage. For any claims related to this contract the Consultants insurance coverage shall be primary insurance as respects to City, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, or volunteers shall be excess of Consultants insurance and shall not contribute with it.

F. Deductibles and Self-Insured Retentions. Any deductibles or self-insured retentions of \$25,000 or greater must be declared to and approved by the City.

G. Other Insurance Provisions. The commercial general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

1. The City, its agent, officers, officials, employees, and volunteers are to be covered as additional insured as respects: liability arising out of work or operations performed by the Consultant or Consultant's subconsultants; or automobile owned, leased, hired or borrowed by the Consultant.
2. For any claims related to Consultant's conduct while performing the work of this project, the Consultant's insurance coverage shall be primary insurance as respects the City, its agents, officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the City, its agents, officers, officials, employees or volunteers shall be excess of the Consultant's insurance and shall not contribute with it.

3. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be cancelled by either party, except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the City.
4. Coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under Subsection (b) of Section 2782 of the Civil Code.

H. Waiver of Subrogation. Consultant's commercial general liability, automobile liability, workers' compensation, and employer's liability policies shall be endorsed with a waiver of subrogation. The insurance company, in its endorsement, agrees to waive all rights of subrogation against the City, its agents, officers, officials, employees and volunteers for losses paid under the terms of this policy which arises from the work performed by the named insured for the City.

I. The Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A: VII, unless otherwise acceptable to the City.

J. Verification of Coverage. Consultant shall furnish the City with original certificates and amendatory endorsements effecting coverage required by this clause. The endorsements should be on forms provided by the City or on forms that conform to City requirements. All certificates and endorsements are to be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications at any time.

SECTION 8 – INDEMNIFICATION

A. To the fullest extent allowed by law (including without limitation California Civil Code Sections 2782 and 2782.8), as may be applicable, Consultant shall indemnify and hold harmless City, its agents, officers, officials, employees, and volunteers from any and all claims, demands, suits, loss, damages, injury, and/or liability (including any and all costs and expenses in connection therewith) (collectively, "Liabilities"), incurred by reason of any negligent or otherwise wrongful act or omission of Consultant, its officers, agents, employees and subcontractors, or any of them, under or in connection with this Agreement; and Consultant agrees at its own cost, expense and risk to defend any and all claims, actions, suits, or other legal proceedings brought or instituted against City, its agents, officers, officials, employees and volunteers, or any of them, arising out of such negligent or otherwise wrongful act or omission, and to pay and satisfy any resulting judgments.

B. When Consultant under this Agreement is duly licensed under California Business and Professions Code as an architect, landscape architect, professional engineer, or land surveyor ("design professional"), the provisions of this section regarding Consultant's duty to defend and indemnify apply only to claims that arise out of or relate to the negligence, recklessness, or willful misconduct of the design professional.

C. If any action or proceeding is brought against Indemnitees by reason of any of the matters against which Consultant has agreed to indemnify Indemnitees as provided above,

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Kosmont Implementation Services 091118

Consultant, upon notice from City, shall defend Indemnitees at Consultant's expense by counsel acceptable to City, such acceptance not to be unreasonably withheld. Indemnitees need not have first paid for any of the matters to which Indemnitees are entitled to Indemnification in order to be so indemnified. The insurance required to be maintained by Consultant shall ensure Consultant's obligations under this section, but the limits of such insurance shall not limit the liability of Consultant hereunder. The provisions of this section shall survive the expiration or earlier termination of this Agreement.

D. The provisions of this section do not apply to claims to the extent occurring as a result of the City's sole negligence, active negligence, or willful acts or misconduct.

E. Duty to Cooperate. Each party shall notify the other party immediately in writing of any claim or damage related to activities or services performed under this Agreement. The parties shall cooperate with each other in the investigation and disposition of all Liabilities arising out of the activities or services under this Agreement.

SECTION 9 – INDEPENDENT CONTRACTOR STATUS

A. Consultant is and shall at all times remain a wholly independent contractor and not an officer, employee or agent of City. Consultant shall have no authority to bind City in any manner or to incur an obligation, debt or liability of any kind on behalf of or against City, whether by contract or otherwise, unless such authority is expressly conferred under this Agreement or is otherwise expressly conferred in writing by City.

B. The personnel performing the services under this Agreement on behalf of Consultant shall at all times be under Consultant's exclusive direction and control. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall have control over the conduct of Consultant or any of Consultant's officers, employees or agents, except as set forth in this Agreement. Consultant shall not at any time or in any manner represent that Consultant or any of Consultant's officers, employees or agents are in any manner officials, officers, employees or agents of City.

C. Neither Consultant, nor any of Consultant's officers, employees or agents, shall obtain any rights to retirement, health care or any other benefits which may otherwise accrue to City's employees. Consultant expressly waives any claim Consultant may have to any such rights.

SECTION 10 – CONFLICTS OF INTEREST AND ANTI-FRAUD AND ANTI-CORRUPTION POLICIES

A. Consultant covenants that neither it, nor any officer or principal of its firm, has or shall acquire any interest, directly or indirectly, which would conflict in any manner with the interests of City or which would in any way hinder Consultant's performance of services under this Agreement. Consultant further covenants that in the performance of this Agreement, no person having any such interest shall be employed by it as an officer, employee, agent, or subcontractor without the express written consent of the City Manager. Consultant agrees to at all times avoid conflicts with the interests of City in the performance of this Agreement.

B. City understands and acknowledges that Consultant is, as of the date of execution of this Agreement, independently involved in the performance of non-related services for other governmental agencies and private parties. Consultant is aware of any stated position of City relative to such projects. Any future position of City on such projects shall not be considered a conflict of interest for purposes of this section.

C. Consultant understands and acknowledges City maintains an anti-fraud and anti-corruption policy to protect the City, its operations, and its employees from and against financial risks, operational breaches, and unethical, fraudulent and corrupt activities. Consultant represents and warrants that Consultant, its subcontractor(s) / subconsultant(s) and their respective employees providing services pursuant to the Agreement are (1) in good standing; (2) have not been previously investigated, convicted, or debarred for fraudulent or corrupt activities; (3) will not participate in fraudulent or corrupt activities, and (4) will take steps to ensure that its employees and subcontractor(s) / subconsultant(s) employees do not participate in any fraudulent or corrupt activities. Consultant acknowledges and agrees further that it has a duty to and will report to City any information or incident(s) about possible fraudulent or corrupt activities Consultant may discover, and will cooperate in any fraud or corruption investigation conducted, with respect to Consultant's service provided pursuant to this Agreement.

SECTION 11 – OWNERSHIP OF DOCUMENTS

A. All original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents prepared, developed or discovered by Consultant in the course of providing any services pursuant to this Agreement shall become the sole property of City and may be used, reused or otherwise disposed of by City without the permission of the Consultant. When requested by City, but no later than three years after project completion, Consultant shall deliver to City all such original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents.

B. All copyrights, patents, trade secrets, or other intellectual property rights associated with any ideas, concepts, techniques, inventions, processes, improvements, developments, works of authorship, or other products developed or created by Consultant during the course of providing services (collectively the "Work Product") shall belong exclusively to City. The Work Product shall be considered a "work made for hire" within the meaning of Title 17 of the United States Code. Without reservation, limitation, or condition, Consultant hereby assigns, at the time of creation of the Work Products, without any requirement of further consideration, exclusively and perpetually, any and all right, title, and interest Consultant may have in the Work Product throughout the world, including without limitation any copyrights, patents, trade secrets, or other intellectual property rights, all rights of reproduction, all rights to create derivative works, and the right to secure registrations, renewals, reissues, and extensions thereof.

SECTION 12 – CONFIDENTIAL INFORMATION; RELEASE OF INFORMATION

A. All information gained or work product produced by Consultant in performance of this Agreement shall be considered confidential, unless such information is in the public domain or already known to Consultant. Consultant shall not release or disclose any such information or

work product to persons or entities other than City without prior written authorization from the City Manager, except as may be required by law.

B. Consultant, its officers, employees, agents or subcontractors, shall not, without prior written authorization from the City Manager or unless requested by the City Attorney of City, voluntarily provide declarations, letters of support, testimony at depositions, response to interrogatories or other information concerning the work performed under this Agreement. Response to a subpoena or court order shall not be considered “voluntary” provided consultant gives City notice of such court order or subpoena.

C. If Consultant, or any officer, employee, agent or subcontractor of Consultant, provides any information or work product in violation of this Agreement, then City shall have the right to reimbursement and indemnity from Consultant for any damages, costs and fees, including attorneys’ fees, caused by or incurred as a result of Consultant’s conduct.

D. Consultant shall promptly notify City should Consultant, its officers, employees, agents or subcontractors be served with any summons, complaint, subpoena, notice of deposition, request for documents, interrogatories, request for admissions or other discovery request, court order or subpoena from any party regarding this Agreement and the work performed thereunder. City retains the right, but has no obligation, to represent Consultant or be present at any deposition, hearing or similar proceeding. Consultant agrees to cooperate fully with City and to provide City with the opportunity to review any response to discovery requests provided by Consultant. However, this right to review any such response does not imply or mean the right by City to control, direct, or rewrite such response.

SECTION 13 – SUSPENSION OF WORK

City may, at any time, by ten (10) days written notice suspend further performance by Consultant. All suspensions shall extend the time schedule for performance in a mutually satisfactory manner and Consultant shall be paid for services performed and reimbursable expenses incurred prior to the suspension date.

SECTION 14 – COMPLIANCE WITH LAW

Consultant shall keep itself informed of and comply with all applicable federal, state and local laws, statutes, codes, ordinances, regulations and rules in effect during the term of this Agreement. Consultant shall obtain any and all licenses, permits and authorizations necessary to perform the services set forth in this Agreement. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall be liable, at law or in equity, as a result of any failure of Consultant to comply with this section.

SECTION 15 – COMPLIANCE WITH CIVIL RIGHTS

During the performance of this contract, Consultant agrees as follows:

A. Equal Employment Opportunity. In connection with the execution of this Agreement, Consultant shall not discriminate against any employee or applicant for employment because of race, religion, color, ancestry, age, sexual orientation, gender, gender identity and gender expression as protected categories specifically and expressively in that category, physical

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handicap, medical condition, marital status, sex, or national origin. Such actions shall include, but not be limited to, the following: employment, promotion, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rate of pay or other forms of compensation; and selection for training including apprenticeship.

B. Nondiscrimination Civil Rights Act of 1964. Consultant will comply with all federal regulations relative to nondiscrimination to federally-assisted programs.

C. Solicitations for Subcontractors including Procurement of Materials and Equipment. In all solicitations, either by competitive bidding or negotiations, made by Consultant for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subcontractor, supplier, or lessor shall be notified by Consultant of Consultant's obligations under this Agreement and the regulations relative to nondiscrimination.

SECTION 16 – RECORDS

A. Records of Consultant's direct labor costs, payroll costs, and reimbursable expenses pertaining to this project covered by this Agreement will be kept on a generally recognized accounting basis and made available to City if and when required for a period of up to 3 years from the date of Consultant's final invoice.

B. Consultant's records and design calculations will be available for examination and audit if and as required. The cost of any reproductions shall be paid by City.

SECTION 17 – COOPERATION BY CITY

All public information, data, reports, records, and maps as are existing and available to City as public records, and which are necessary for carrying out the work as outlined in the Exhibit A, "Scope of Services", shall be furnished to Consultant in every reasonable way to facilitate, without undue delay, the work to be performed under this Agreement.

SECTION 18 – NOTICES

All notices required or permitted to be given under this Agreement shall be in writing and shall be personally delivered, or sent by facsimile or first class mail, addressed as follows:

To City: City Manager
 1480 Main Street
 St. Helena, California 94574

To Consultant:

Kosmont Companies
Attn: Larry J. Kosmont
213-507-9000
1601N. Sepulveda Blvd. #382
Manhattan Beach, CA 90266

Notice shall be deemed effective on the date personally delivered or transmitted by facsimile, or, if mailed, three (3) days after deposit in the custody of the U.S. Postal Service.

SECTION 19 – TERMINATION

A. City may terminate this Agreement, with or without cause, at any time by giving ten (10) days written notice of termination to Consultant. If such notice is given, Consultant shall cease immediately all work in progress.

B. If either Consultant or City fail to perform any material obligation under this Agreement, then, in addition to any other remedies, either Consultant, or City may terminate this Agreement immediately upon written notice.

C. Upon termination of this Agreement by either Consultant or City, all property belonging to City which is in Consultant's possession shall be delivered to City. Consultant shall furnish to City a final invoice for work performed and expenses incurred by Consultant, prepared as set forth in this Agreement.

SECTION 20 – ATTORNEYS' FEES

If litigation or other proceeding is required to enforce or interpret any provision of this Agreement, the prevailing party in such litigation or other proceeding shall be entitled to an award of reasonable attorneys' fees, costs and expenses, in addition to any other relief to which it may be entitled. In addition, any legal fees, costs and expenses incurred to enforce the provisions of this Agreement shall be reimbursed to the prevailing party.

SECTION 21 – ENTIRE AGREEMENT

This Agreement, including the attached Exhibits, is the entire, complete, final and exclusive expression of the parties with respect to the matters addressed therein and supersedes all other agreements or understandings, whether oral or written, or entered into between Consultant and City prior to the execution of this Agreement. No statements, representations or other agreements, whether oral or written, made by any party which are not embodied herein shall be valid and binding unless in writing duly executed by the parties or their authorized representatives.

SECTION 22 – SUCCESSORS AND ASSIGNS

This Agreement shall be binding on the heirs, executors, administrators, successors and assigns of the parties. However, this Agreement shall not be assigned by Consultant without written consent of the City.

SECTION 23 – CONTINUITY OF PERSONNEL

Consultant shall make every reasonable effort to maintain the stability and continuity of Consultant's staff assigned to perform the services required under this Agreement. Consultant

shall notify City of any changes in Consultant's staff assigned to perform the services required under this Agreement, prior to any such performance.

SECTION 24 – DEFAULT

In the event that Consultant is in default under the terms of this Agreement, the City shall not have any obligation or duty to continue compensating Consultant for any work performed after the date of default and may terminate this Agreement immediately by written notice to Consultant.

SECTION 25 – WAIVER

Waiver by any party to this Agreement of any term, condition, or covenant of this Agreement shall not constitute a waiver of any other term, condition, or covenant. Waiver by any party of any breach of the provisions of this Agreement shall not constitute a waiver of any other provision, or a waiver of any subsequent breach or violation of any provision of this Agreement. Acceptance by City of any work or services by Consultant shall not constitute a waiver of any of the provisions of this Agreement.

SECTION 26 – LAW TO GOVERN; VENUE

This Agreement shall be interpreted, construed and governed according to the laws of the State of California. In the event of litigation between the parties, venue in state trial courts shall lie exclusively in the County of Napa. In the event of litigation in a U.S. District Court, venue shall lie exclusively in the Northern District of California, in San Francisco.

SECTION 27 – SEVERABILITY

If any term, condition or covenant of this Agreement is declared or determined by any court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions of this Agreement shall not be affected thereby and the Agreement shall be read and construed without the invalid, void or unenforceable provision(s).

SECTION 28 – SPECIAL PROVISIONS

This Agreement is subject to the following special provisions: none.

IN WITNESS WHEREOF, the parties hereto have accepted, made, and executed this Agreement upon the terms, conditions, and provisions above stated, the day and year first above written.

Consultant:

City:

By: _____

By: _____

Name: _____

Name: Mark T. Prestwich

Title: _____

Title: City Manager

Approved as to Form:

By: _____

Name: Thomas B. Brown

Title: City Attorney



Exhibit A

Memorandum

To: Mark Prestwich, City Manager, City of St. Helena

From: Ken K. Hira, Executive Vice President, Kosmont Companies
Thomas Jirovsky, Senior Consultant, Kosmont Companies

Date: August 22, 2018

Subject: **Scope for Initial Implementation Services**

I. BACKGROUND

Kosmont Companies ("Consultant" or "Kosmont") has recently completed its preliminary analysis for the asset strategy for the City of St. Helena ("Client" or "City") SHAPE Committee, as well as the Downtown Retail Market Analysis ("Analysis"). City desires to continue to work with Kosmont on implementation. To provide initial implementation and other advisory services, Kosmont has prepared this Scope of Services and an initial budget for City consideration and authorization.

II. SCOPE OF SERVICES

Task 1: Downtown Retail Implementation

1. Consultant will provide technical expertise to City to develop potential comprehensive zoning and use permit process changes in accordance with Analysis recommendations
2. Work with Chamber and downtown merchants on consumer marketing strategies (i.e., social media) and quality commercial business attraction
3. Target key retailers/businesses for location in downtown (e.g., through retail industry group participation)
4. Assist City with implementation of various Analysis recommendations, as appropriate
5. Assist with management of City online portal of available commercial property and investment opportunities.

Task 2: Asset Strategy Implementation

1. Consultant will utilize the SHAPE Committee final report in asset strategy implementation
2. Assist City in further understanding various cost/benefit and financing factors related to a new City Hall, Community Center, Library and commercial development locations

3. Participate in community workshops to provide real estate expertise, as needed
4. Assist City in issuing and evaluating developer Request for Qualifications / Proposals (RFQ/P's) for targeted opportunity sites, as appropriate
5. Assist with evaluation of options to monetize City assets.

Task 3: Housing Strategies

1. Since the City faces a shortage of housing that is affordable to the workforce, Consultant will utilize research tools / new legislation passed by the State of California to determine if they can benefit St Helena's circumstance
2. Assist City in vetting feasibility of proposed housing and mixed-use projects

Task 4: As-Needed Economic Development Services

Consultant will be available for other research, analysis and marketing in support of the synthesis of the above tasks and other various real estate and economic development needs of the City.

III. SCHEDULE

Consultant is prepared to commence work upon City's authorization.

IV. BUDGET

While many specific tasks are yet to be defined, Kosmont suggests an initial budget authorization of \$75,000 to cover next steps of implementation services. The professional services (hourly) fees will be billed at Consultant's public sector billing rates as shown on Attachment A. This budget contemplates four (4) in person meetings. Because overnight travel is required for almost all meetings, Kosmont anticipates material travel expenses will be required, which is included in the budget. Budget may be increased by City if needed at any point in time.

Thank you.

ATTACHMENT A

Kosmont Companies 2018 Public Agency Fee Schedule

Professional Services

President & CEO	\$345.00/hour
Executive Vice President	\$325.00/hour
Partner/Senior Vice President/Senior Consultant	\$305.00/hour
Vice President/Associate	\$195.00/hour
Project Analyst/Project Research	\$165.00/hour
Assistant Project Analyst/Assistant Project Manager	\$125.00/hour
GIS Mapping/Graphics Service	\$ 95.00/hour
Clerical Support	\$ 60.00/hour

• Additional Expenses

In addition to professional services (labor fees):

- 1) An **administrative fee** for in-house copy, fax, phone and postage costs will be charged, which will be computed at four percent (4.0 %) of monthly Kosmont Companies professional service fees incurred; **plus**
- 2) **Out-of-pocket expenditures**, such as travel and mileage, professional printing, and delivery charges for messenger and overnight packages will be charged at cost.
- 3) If Kosmont retains **Third Party Vendor(s)** for Client (with Client's advance approval), fees and cost will be billed to Client at 1.1X (times) fees and costs.
- 4) Consultant's **attendance or participation at any public meeting** requested by Client will be billed at the professional services (hourly) fees as shown on this Attachment A.

• Charges for Court/Deposition/Expert Witness-Related Appearances

Court-related (non-preparation) activities, such as court appearances, depositions, mediation, arbitration, dispute resolution and other expert witness activities, will be charged at a court rate of 1.5 times scheduled rates, with a 4-hour minimum.

Rates shall remain in effect until December 31, 2018.

CITY OF ST. HELENA

RESOLUTION No. 2018-

Resolution of the Council of the City of St. Helena (1) Authorizing the City Manager to Execute a Professional Services Agreement with Kosmont Companies to Assist with Implementation of Downtown Economic, City Assets, and Related Housing Strategies for a Total Not-to-Exceed Amount of \$75,000 and (2) Authorizing a Fiscal Year 2018/19 Budget Increase of \$75,000 to 101-4300-2130 from General Fund Reserves

RECITALS

- A. On November 3, 2017, the City issued a Request for Proposal (RFP) for Municipal Financial and Real Estate Advisory Services; and
- B. The intent of this RFP was to see proposals from qualified consultants to provide municipal financial and real estate advisory services on an on-call basis; and
- C. On December 12, 2017, the City Council selected Kosmont Companies to provide financial and real estate advisory services to assist with the St. Helena Assets Planning Engagement (SHAPE) Committee work related to City buildings/assets and authorized an agreement for \$45,000; and
- D. On March 27, 2018, the City entered into a \$25,000 agreement with Kosmont Companies to prepare an Economic and Demographic Profile and Downtown Retail Market Analysis to evaluate the downtown's retail viability; and
- E. The Economic and Demographic Profile and Downtown Retail Market Analysis report was shared and discussed with the City Council on July 24, 2018, along with numerous recommendations to improve the downtown's vitality; and
- F. The City Council directed the City Manager to develop a Downtown Strategy and identify next steps/recommendations related to the SHAPE Committee report and the Downtown Market Analysis report; and

- G. Kosmont Companies has represented they have the necessary expertise, experience, and qualifications to continue to assist the City; and
- H. For these reasons, staff is recommending authorizing the City Manager to execute a Professional Services Agreement with Kosmont Companies for a total not-to-exceed amount of \$75,000 to assist with implementation of downtown economic, city assets, and related housing strategies.

RESOLUTION

The City Council of the City of St. Helena hereby resolves as follows:

1. The City Council authorizes the City Manager to execute Professional Services Agreement with Kosmont Companies assist with implementation of downtown economic, city assets, and related housing strategies for a total not to exceed amount of \$75,000; and
2. The City Council authorizes a Fiscal Year 2018/19 budget increase of \$75,000 to 101-4300-2130 from General Fund Reserves.

Approved at a Regular Meeting of the St. Helena City Council on September 11, 2018, by the following vote:

Mayor Galbraith: _____
Vice Mayor White: _____
Councilmember Koberstein: _____
Councilmember Dohring: _____
Councilmember Ellsworth: _____

APPROVED: ATTEST:

Alan Galbraith, Mayor

Cindy Tzaopoulos, City Clerk



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: Consent

Subject: Consideration and proposed approval of a resolution: (1) authorizing the City Manager to execute a Professional Services Agreement with Nor-Cal Overhead for the replacement and installation of roll-up apparatus bay doors at the Firehouse for a not-to-exceed amount of \$135,736.27, and (2) approving a budget increase of \$135,736.27 to 420-4800-2630

CEQA Determination: Not a CEQA project

Prepared By: John Sorensen, Fire Chief

Reviewed By: April Mitts, Finance Director

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

The roll-up doors that provide access for the Fire Department's emergency apparatus are approximately 20 years old and need to be replaced as they have exceeded their average lifespan by a number of years. In their current state, they provide ample access for unwanted pests and malfunction on a regular basis. This creates the looming hazard of delays to our emergency responders as a malfunctioning door could impede the ability to get the appropriate equipment out of the apparatus bay in a timely manner.

On July 19, 2018, the City of St. Helena issued an Request for Proposals (RFP), seeking proposals from qualified professionals to replace the current Fire Department Bay Doors. Prospective firms were required to provide team qualification, proposed work plans, proposed schedule, and other related items as part of the submittal per RFP Section V.

DISCUSSION

At the close of the RFP on August 10, 2018, one qualified proposal was received:

Nor-Cal Overhead

- 4 Doors and necessary parts cost: \$89,276.00
- Labor for complete installation at Prevailing Wage rates: \$37,600.00
- Scissor lift equipment rental cost: \$1,495.00
- Applicable taxes: \$7,365.27

Grand Total: \$135,736.27

FISCAL IMPACT

Funds for the replacement of the bay doors is available from the proceeds of the 1996 General Obligation Bond issued for the construction and maintenance of the current fire station. The available balance in Fund 420 is \$145,963.

RECOMMENDED ACTION

Staff recommends City Council approve a resolution (1) authorizing the purchase and installation of four roll-up apparatus bay doors by Nor-Cal Overhead for the amount of \$135,736.27, and (2) approving a budget increase of \$135,736.27 to 420-4800-2630.

ATTACHMENTS

[Resolution No. 2018- Nor-Cal Overhead](#)

[PSA - Nor-Cal Overhead](#)

[Estimate, Insurance - Nor-Cal](#)

[SHFD - RFP](#)

STHCITY OF ST. HELENA

RESOLUTION NO. 2018-__

Authoring the City Manager to Execute a Professional Services Agreement with Nor-Cal Overhead for the Replacement and Installation of Roll-up Apparatus Bay Doors at the Firehouse for a Not-to-exceed Amount of \$135,736.27 and Authorizing a Budget Increase of \$135,736.27 to 420-4800-2630.

RECITALS

WHEREAS, On July 19, 2018, the City of St. Helena issued a Request for Proposal (RFP) for the replacement and installation of roll-up apparatus bay doors at the Firehouse; and

WHEREAS, On August 10, 2018, at the close of the RFP, the City received one qualified proposal from Nor-Cal Overhead; and

WHEREAS, Nor-Cal Overhead has represented they have the necessary expertise, experience, and qualifications to complete this project; and

WHEREAS, City and Consultant desire to enter into an agreement to replace and install roll-up apparatus bay doors at the Firehouse in an amount not-to-exceed \$135,736.27; and

WHEREAS, Funds for this project are available in Fund 420 from proceeds of the 1996 General Obligation Bonds issued for the construction and maintenance of the Fire Station.

RESOLUTION

NOW, THEREFORE, the City Council of the City of St. Helena resolves as follows:

1. Authorize the City Manager to execute a Professional Services Agreement with Nor-Cal Overhead for for a total not-to-exceed amount of \$135,736.27; and
2. Authorize a budget increase of \$135,736.27 to 420-4800-2630.

Approved at a Regular Meeting of the St. Helena City Council on September 11, 2018,
by the following vote:

Mayor Galbraith:

Vice Mayor White:

Councilmember Dohring:

Councilmember Koberstein:

Councilmember Ellsworth:

APPROVED:

ATTEST:

Alan Galbraith, Mayor

Cindy Tzaopoulos, City Clerk

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT, made and entered into on September 11, 2018, by and between the City of St. Helena, located in the County of Napa, State of California (City), and Nor-Cal Overhead (Consultant).

RECITALS:

A. City desires to employ Consultant to furnish professional services in connection with the project described as Fire Department Bay Doors.

B. Consultant has represented that Consultant has the necessary expertise, experience, and qualifications to perform the required duties.

NOW, THEREFORE, in consideration of the mutual premises, covenants, and conditions herein contained, the parties agree as follows:

SECTION 1 – BASIC SERVICES

Consultant agrees to perform the services set forth in **Exhibit A, “Scope of Services”** and made part of this Agreement.

SECTION 2 – ADDITIONAL SERVICES

Consultant shall not be compensated for any services rendered in connection with its performance of this Agreement that are in addition to or outside of those set forth in this Agreement or **Exhibit A, “Scope of Services”**, unless such additional services and compensation are authorized in advance and in writing by the City Council or City Manager of the City.

SECTION 3 – TIME FOR COMPLETION

The time for completion of services shall be as identified in **Exhibit A, “Scope of Services”**.

SECTION 4 – COMPENSATION AND METHOD OF PAYMENT

A. Subject to any limitations set forth in this Agreement, City agrees to pay consultant the amount specified in Exhibit B, “Compensation” attached hereto and made a part hereof. Total compensation shall not exceed \$135,736.27, unless additional compensation is approved in accordance with Section 2.

B. Consultant shall furnish to City an original invoice for all work performed and expenses incurred during the preceding month. The invoice shall detail charges by the following categories if applicable: labor (by sub-category), travel, materials, equipment, supplies, subconsultant contracts, and miscellaneous expenses. Each original invoice furnished shall include the expenses incurred during the preceding month, the cumulative Agreement amount, and the amount remaining on the Agreement. City shall independently review each invoice

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Nor-Cal Overhead - Fire Department Bay Doors

submitted to determine whether the work performed and expenses incurred are in compliance with the provisions of this Agreement. If no charges or expenses are disputed, the invoice shall be approved, and City will use its best efforts to cause Consultant to be paid within 30 days of receipt of invoice. If the City disputes any charges or expenses, the City will return the original invoice to Consultant for correction and resubmission. If the City reasonably determines, in its sole judgment, that the invoiced charges and expenses exceed the value of the services performed to date and that it is probable that the Agreement will not be completed satisfactorily within the contract price, City may retain all or a portion of the invoiced charges and expenses. Within thirty (30) days of satisfactory completion of the project, City shall pay the retained amount, if any, to Consultant.

C. Payment to the Consultant for work performed pursuant to this Agreement shall not be deemed to waive any defects in work performed by Consultant.

SECTION 5 – STANDARD OF PERFORMANCE

Consultant represents and warrants that it has the qualifications, experience and facilities necessary to properly perform the services required under this Agreement in a thorough, competent and professional manner. Consultant shall at all times faithfully, competently and to the best of its ability, experience and talent, perform all services described herein. In meeting its obligations under this Agreement, Consultant shall employ, at a minimum, generally accepted standards and practices utilized by persons engaged in providing services similar to those required of Consultant under this Agreement.

SECTION 6 – INSPECTION AND FINAL ACCEPTANCE

City may inspect and accept or reject any of Consultant's work under this Agreement, either during performance or when completed. City shall reject or finally accept Consultant's work within sixty (60) days after submitted to City, unless the parties mutually agree to extend such deadline. City shall reject work by a timely written explanation, otherwise Consultant's work shall be deemed to have been accepted. City's acceptance shall be conclusive as to such work except with respect to latent defects and fraud. Acceptance of any of Consultant's work by City shall not constitute a waiver of any of the provisions of this Agreement including, but not limited to, the sections pertaining to indemnification and insurance.

SECTION 7 – INSURANCE REQUIRED

Consultant shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Consultant, its agents, representatives, or employees, as indicated:

- A. Minimum Scope of Insurance. Coverage shall be at least as broad as:
 1. Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001).
 2. Insurance Services Office form number CA 0001 (Ed. 1/87) covering Automobile Liability, code 1 (any auto).

3. Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.

B. Minimum Limits of Insurance. Consultant shall maintain limits no less than:

1. General Liability: \$2,000,000 per occurrence for bodily injury, personal injury and property damage including operations, products and completed operations, as applicable. If Commercial General Liability Insurance or other form with a General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: \$2,000,000 per accident for bodily injury and property damage.
3. Employer's Liability: \$2,000,000 per accident for bodily injury or disease.

C. Professional Liability Insurance. When Consultant under this Agreement is duly licensed under California Business and Professions Code as an architect, landscape architect, environmental engineer or other professional engineer, or land surveyor ("design professional"), Consultant shall maintain at least \$2,000,000 of professional liability insurance.

D. Excess Limits. If Consultant maintains higher limits than the minimums shown above, City requires and shall be entitled to coverage for the higher limits maintained by Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City.

E. Primary Coverage. For any claims related to this contract the Consultants insurance coverage shall be primary insurance as respects to City, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, or volunteers shall be excess of Consultants insurance and shall not contribute with it.

F. Deductibles and Self-Insured Retentions. Any deductibles or self-insured retentions of \$25,000 or greater must be declared to and approved by the City.

G. Other Insurance Provisions. The commercial general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

1. The City, its agent, officers, officials, employees, and volunteers are to be covered as additional insured as respects: liability arising out of work or operations performed by the Consultant or Consultant's subconsultants; or automobile owned, leased, hired or borrowed by the Consultant.
2. For any claims related to Consultant's conduct while performing the work of this project, the Consultant's insurance coverage shall be primary insurance as respects the City, its agents, officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the City, its agents, officers, officials, employees or volunteers shall be excess of the Consultant's insurance and shall not contribute with it.
3. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be cancelled by either party, except after thirty (30) days prior

written notice by certified mail, return receipt requested, has been given to the City.

4. Coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under Subsection (b) of Section 2782 of the Civil Code.

H. Waiver of Subrogation. Consultant's commercial general liability, automobile liability, workers' compensation, and employer's liability policies shall be endorsed with a waiver of subrogation. The insurance company, in its endorsement, agrees to waive all rights of subrogation against the City, its agents, officers, officials, employees and volunteers for losses paid under the terms of this policy which arises from the work performed by the named insured for the City.

I. The Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A: VII, unless otherwise acceptable to the City.

J. Verification of Coverage. Consultant shall furnish the City with original certificates and amendatory endorsements effecting coverage required by this clause. The endorsements should be on forms provided by the City or on forms that conform to City requirements. All certificates and endorsements are to be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications at any time.

SECTION 8 – INDEMNIFICATION

A. To the fullest extent allowed by law (including without limitation California Civil Code Sections 2782 and 2782.8), as may be applicable, Consultant shall indemnify and hold harmless City, its agents, officers, officials, employees, and volunteers from any and all claims, demands, suits, loss, damages, injury, and/or liability (including any and all costs and expenses in connection therewith) (collectively, "Liabilities"), incurred by reason of any negligent or otherwise wrongful act or omission of Consultant, its officers, agents, employees and subcontractors, or any of them, under or in connection with this Agreement; and Consultant agrees at its own cost, expense and risk to defend any and all claims, actions, suits, or other legal proceedings brought or instituted against City, its agents, officers, officials, employees and volunteers, or any of them, arising out of such negligent or otherwise wrongful act or omission, and to pay and satisfy any resulting judgments.

B. When Consultant under this Agreement is duly licensed under California Business and Professions Code as an architect, landscape architect, professional engineer, or land surveyor ("design professional"), the provisions of this section regarding Consultant's duty to defend and indemnify apply only to claims that arise out of or relate to the negligence, recklessness, or willful misconduct of the design professional.

C. If any action or proceeding is brought against Indemnitees by reason of any of the matters against which Consultant has agreed to indemnify Indemnitees as provided above, Consultant, upon notice from City, shall defend Indemnitees at Consultant's expense by counsel acceptable to City, such acceptance not to be unreasonably withheld. Indemnitees need not have

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first paid for any of the matters to which Indemnitees are entitled to Indemnification in order to be so indemnified. The insurance required to be maintained by Consultant shall ensure Consultant's obligations under this section, but the limits of such insurance shall not limit the liability of Consultant hereunder. The provisions of this section shall survive the expiration or earlier termination of this Agreement.

D. The provisions of this section do not apply to claims to the extent occurring as a result of the City's sole negligence, active negligence, or willful acts or misconduct.

E. Duty to Cooperate. Each party shall notify the other party immediately in writing of any claim or damage related to activities or services performed under this Agreement. The parties shall cooperate with each other in the investigation and disposition of all Liabilities arising out of the activities or services under this Agreement.

SECTION 9 – INDEPENDENT CONTRACTOR STATUS

A. Consultant is and shall at all times remain a wholly independent contractor and not an officer, employee or agent of City. Consultant shall have no authority to bind City in any manner or to incur an obligation, debt or liability of any kind on behalf of or against City, whether by contract or otherwise, unless such authority is expressly conferred under this Agreement or is otherwise expressly conferred in writing by City.

B. The personnel performing the services under this Agreement on behalf of Consultant shall at all times be under Consultant's exclusive direction and control. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall have control over the conduct of Consultant or any of Consultant's officers, employees or agents, except as set forth in this Agreement. Consultant shall not at any time or in any manner represent that Consultant or any of Consultant's officers, employees or agents are in any manner officials, officers, employees or agents of City.

C. Neither Consultant, nor any of Consultant's officers, employees or agents, shall obtain any rights to retirement, health care or any other benefits which may otherwise accrue to City's employees. Consultant expressly waives any claim Consultant may have to any such rights.

SECTION 10 – CONFLICTS OF INTEREST AND ANTI-FRAUD AND ANTI-CORRUPTION POLICIES

A. Consultant covenants that neither it, nor any officer or principal of its firm, has or shall acquire any interest, directly or indirectly, which would conflict in any manner with the interests of City or which would in any way hinder Consultant's performance of services under this Agreement. Consultant further covenants that in the performance of this Agreement, no person having any such interest shall be employed by it as an officer, employee, agent, or subcontractor without the express written consent of the City Manager. Consultant agrees to at all times avoid conflicts with the interests of City in the performance of this Agreement.

B. City understands and acknowledges that Consultant is, as of the date of execution of this Agreement, independently involved in the performance of non-related services for other governmental agencies and private parties. Consultant is aware of any stated position of City

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relative to such projects. Any future position of City on such projects shall not be considered a conflict of interest for purposes of this section.

C. Consultant understands and acknowledges City maintains an anti-fraud and anti-corruption policy to protect the City, its operations, and its employees from and against financial risks, operational breaches, and unethical, fraudulent and corrupt activities. Consultant represents and warrants that Consultant, its subcontractor(s) / subconsultant(s) and their respective employees providing services pursuant to the Agreement are (1) in good standing; (2) have not been previously investigated, convicted, or debarred for fraudulent or corrupt activities; (3) will not participate in fraudulent or corrupt activities, and (4) will take steps to ensure that its employees and subcontractor(s) / subconsultant(s) employees do not participate in any fraudulent or corrupt activities. Consultant acknowledges and agrees further that it has a duty to and will report to City any information or incident(s) about possible fraudulent or corrupt activities Consultant may discover, and will cooperate in any fraud or corruption investigation conducted, with respect to Consultant's service provided pursuant to this Agreement.

SECTION 11 – OWNERSHIP OF DOCUMENTS

A. All original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents prepared, developed or discovered by Consultant in the course of providing any services pursuant to this Agreement shall become the sole property of City and may be used, reused or otherwise disposed of by City without the permission of the Consultant. When requested by City, but no later than three years after project completion, Consultant shall deliver to City all such original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents.

B. All copyrights, patents, trade secrets, or other intellectual property rights associated with any ideas, concepts, techniques, inventions, processes, improvements, developments, works of authorship, or other products developed or created by Consultant during the course of providing services (collectively the "Work Product") shall belong exclusively to City. The Work Product shall be considered a "work made for hire" within the meaning of Title 17 of the United States Code. Without reservation, limitation, or condition, Consultant hereby assigns, at the time of creation of the Work Products, without any requirement of further consideration, exclusively and perpetually, any and all right, title, and interest Consultant may have in the Work Product throughout the world, including without limitation any copyrights, patents, trade secrets, or other intellectual property rights, all rights of reproduction, all rights to create derivative works, and the right to secure registrations, renewals, reissues, and extensions thereof.

SECTION 12 – CONFIDENTIAL INFORMATION; RELEASE OF INFORMATION

A. All information gained or work product produced by Consultant in performance of this Agreement shall be considered confidential, unless such information is in the public domain or already known to Consultant. Consultant shall not release or disclose any such information or work product to persons or entities other than City without prior written authorization from the City Manager, except as may be required by law.

B. Consultant, its officers, employees, agents or subcontractors, shall not, without prior written authorization from the City Manager or unless requested by the City Attorney of City, voluntarily provide declarations, letters of support, testimony at depositions, response to interrogatories or other information concerning the work performed under this Agreement. Response to a subpoena or court order shall not be considered “voluntary” provided consultant gives City notice of such court order or subpoena.

C. If Consultant, or any officer, employee, agent or subcontractor of Consultant, provides any information or work product in violation of this Agreement, then City shall have the right to reimbursement and indemnity from Consultant for any damages, costs and fees, including attorneys’ fees, caused by or incurred as a result of Consultant’s conduct.

D. Consultant shall promptly notify City should Consultant, its officers, employees, agents or subcontractors be served with any summons, complaint, subpoena, notice of deposition, request for documents, interrogatories, request for admissions or other discovery request, court order or subpoena from any party regarding this Agreement and the work performed thereunder. City retains the right, but has no obligation, to represent Consultant or be present at any deposition, hearing or similar proceeding. Consultant agrees to cooperate fully with City and to provide City with the opportunity to review any response to discovery requests provided by Consultant. However, this right to review any such response does not imply or mean the right by City to control, direct, or rewrite such response.

SECTION 13 – SUSPENSION OF WORK

City may, at any time, by ten (10) days written notice suspend further performance by Consultant. All suspensions shall extend the time schedule for performance in a mutually satisfactory manner and Consultant shall be paid for services performed and reimbursable expenses incurred prior to the suspension date.

SECTION 14 – COMPLIANCE WITH LAW

Consultant shall keep itself informed of and comply with all applicable federal, state and local laws, statutes, codes, ordinances, regulations and rules in effect during the term of this Agreement. Consultant shall obtain any and all licenses, permits and authorizations necessary to perform the services set forth in this Agreement. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall be liable, at law or in equity, as a result of any failure of Consultant to comply with this section.

SECTION 15 – COMPLIANCE WITH CIVIL RIGHTS

During the performance of this contract, Consultant agrees as follows:

A. Equal Employment Opportunity. In connection with the execution of this Agreement, Consultant shall not discriminate against any employee or applicant for employment because of race, religion, color, ancestry, age, sexual orientation, gender, gender identity and gender expression as protected categories specifically and expressively in that category, physical handicap, medical condition, marital status, sex, or national origin. Such actions shall include, but not be limited to, the following: employment, promotion, upgrading, demotion, or transfer;

recruitment or recruitment advertising; layoff or termination; rate of pay or other forms of compensation; and selection for training including apprenticeship.

B. Nondiscrimination Civil Rights Act of 1964. Consultant will comply with all federal regulations relative to nondiscrimination to federally-assisted programs.

C. Solicitations for Subcontractors including Procurement of Materials and Equipment. In all solicitations, either by competitive bidding or negotiations, made by Consultant for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subcontractor, supplier, or lessor shall be notified by Consultant of Consultant's obligations under this Agreement and the regulations relative to nondiscrimination.

SECTION 16 – RECORDS

A. Records of Consultant's direct labor costs, payroll costs, and reimbursable expenses pertaining to this project covered by this Agreement will be kept on a generally recognized accounting basis and made available to City if and when required for a period of up to 3 years from the date of Consultant's final invoice.

B. Consultant's records and design calculations will be available for examination and audit if and as required. The cost of any reproductions shall be paid by City.

SECTION 17 – COOPERATION BY CITY

All public information, data, reports, records, and maps as are existing and available to City as public records, and which are necessary for carrying out the work as outlined in the Exhibit A, "Scope of Services", shall be furnished to Consultant in every reasonable way to facilitate, without undue delay, the work to be performed under this Agreement.

SECTION 18 – NOTICES

All notices required or permitted to be given under this Agreement shall be in writing and shall be personally delivered, or sent by facsimile or first class mail, addressed as follows:

To City: City Manager
 1480 Main Street
 St. Helena, California 94574

To Consultant:
 Nor-Cal Overhead
 2145 Elkins Way Ste. E
 Brentwood, CA 94513

Notice shall be deemed effective on the date personally delivered or transmitted by facsimile, or, if mailed, three (3) days after deposit in the custody of the U.S. Postal Service.

SECTION 19 – TERMINATION

A. City may terminate this Agreement, with or without cause, at any time by giving ten (10) days written notice of termination to Consultant. If such notice is given, Consultant shall cease immediately all work in progress.

B. If either Consultant or City fail to perform any material obligation under this Agreement, then, in addition to any other remedies, either Consultant, or City may terminate this Agreement immediately upon written notice.

C. Upon termination of this Agreement by either Consultant or City, all property belonging to City which is in Consultant's possession shall be delivered to City. Consultant shall furnish to City a final invoice for work performed and expenses incurred by Consultant, prepared as set forth in this Agreement.

SECTION 20 – ATTORNEYS' FEES

If litigation or other proceeding is required to enforce or interpret any provision of this Agreement, the prevailing party in such litigation or other proceeding shall be entitled to an award of reasonable attorneys' fees, costs and expenses, in addition to any other relief to which it may be entitled. In addition, any legal fees, costs and expenses incurred to enforce the provisions of this Agreement shall be reimbursed to the prevailing party.

SECTION 21 – ENTIRE AGREEMENT

This Agreement, including the attached Exhibits, is the entire, complete, final and exclusive expression of the parties with respect to the matters addressed therein and supersedes all other agreements or understandings, whether oral or written, or entered into between Consultant and City prior to the execution of this Agreement. No statements, representations or other agreements, whether oral or written, made by any party which are not embodied herein shall be valid and binding unless in writing duly executed by the parties or their authorized representatives.

SECTION 22 – SUCCESSORS AND ASSIGNS

This Agreement shall be binding on the heirs, executors, administrators, successors and assigns of the parties. However, this Agreement shall not be assigned by Consultant without written consent of the City.

SECTION 23 – CONTINUITY OF PERSONNEL

Consultant shall make every reasonable effort to maintain the stability and continuity of Consultant's staff assigned to perform the services required under this Agreement. Consultant shall notify City of any changes in Consultant's staff assigned to perform the services required under this Agreement, prior to any such performance.

after the date of default and may terminate this Agreement immediately by written notice to Consultant.

SECTION 25 – WAIVER

Waiver by any party to this Agreement of any term, condition, or covenant of this Agreement shall not constitute a waiver of any other term, condition, or covenant. Waiver by any party of any breach of the provisions of this Agreement shall not constitute a waiver of any other provision, or a waiver of any subsequent breach or violation of any provision of this Agreement. Acceptance by City of any work or services by Consultant shall not constitute a waiver of any of the provisions of this Agreement.

SECTION 26 – LAW TO GOVERN; VENUE

This Agreement shall be interpreted, construed and governed according to the laws of the State of California. In the event of litigation between the parties, venue in state trial courts shall lie exclusively in the County of Napa. In the event of litigation in a U.S. District Court, venue shall lie exclusively in the Northern District of California, in San Francisco.

SECTION 27 – SEVERABILITY

If any term, condition or covenant of this Agreement is declared or determined by any court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions of this Agreement shall not be affected thereby and the Agreement shall be read and construed without the invalid, void or unenforceable provision(s).

SECTION 28 – SPECIAL PROVISIONS

This Agreement is subject to the following special provisions: none.

IN WITNESS WHEREOF, the parties hereto have accepted, made, and executed this Agreement upon the terms, conditions, and provisions above stated, the day and year first above written.

Consultant:

 By: _____
 Name: Bill McElmury
 Title: President

City:
 By: _____
 Name: Mark T. Prestwich
 Title: City Manager

Approved as to Form:

By: _____
 Name: Thomas B. Brown

Name: Thomas B. Brown
Title: City Attorney

Exhibit A
“Scope of Services”

Exhibit B
“Compensation”



Nor-Cal Overhead Inc.
 2145 Elkins Way Ste. E
 Brentwood, CA 94513
 (866)363-4821
www.norcaloverhead.com

Estimate

ADDRESS

St. Helena Fire Dept.
 1480 Main St
 St. Helena, CA

SHIP TO

St. Helena Fire Dept.
 1480 Main St
 St. Helena, CA

ESTIMATE #	DATE	EXPIRATION DATE
15568	04/30/2018	09/24/2018

SALES REP

Jennifer Peters

DESCRIPTION	QTY	RATE	AMOUNT
Raynor Full View Commercial Sectional Alumaview AV200 Size: 14'2" x 14'0" Insulated, clear tempered glass (7 sections, 4 rows). Overall glazing thickness of 1/2" thick. Track: 15" radius Springs: 100K high cycle springs Dual shaft, double end stiles Powder coated finish - RAL to be determined Motor Operated - Control Hoist 2.0 3/4HP, 115v, 1-phase Includes wireless safety sensing edge & safety photo eyes	4	22,319.00	89,276.00T
Labor for Complete Installation - at Prevailing Wage Rates ***Includes (1) site inspection upon awarded project to validate size of opening(s) prior to ordering materials. ***Labor rate includes pick up and delivery of new materials, as well as removal and disposal of existing doors. ***Quoted labor rate is for Monday - Friday, standard business hours. (6am - 4pm) ***Quoted labor rate is for installation of front (4) doors.	160	235.00	37,600.00
Scissor Lift Equipment Rental - for duration of project	1	1,495.00	1,495.00

www.norcaloverhead.com
 CA Lic#843196 | CA Lic#843196

DESCRIPTION	QTY	RATE	AMOUNT
***Pricing through Sept 24th 2018. Subject to change if doors ordered after this date. ***All conduit & wiring to operators & control panels/key stations by others ***Price subject to physical site inspection. Please be advised that if during site inspection, additional materials are needed to ensure proper installation, those will be added to quote as needed for customer's review and approval before proceeding ***Nor-Cal Overhead, Inc's vehicles, necessary equipment & trailers will need access while on site where work will be performed for entire length of project.			

Terms & Conditions:

Any alterations to size requirements, models, and/or designs, as stated above may result in additional charges as well as additional labor hours. Labor prices reflect installation ready job sites. A 10% non-refundable deposit for materials is required to place order. Payment in full is due upon job completion.

SUBTOTAL

128,371.00

TAX (8.25%)

7,365.27

TOTAL

\$135,736.27

Accepted By

Accepted Date

Cindy Tzafopoulos

From: Jennifer Peters <j.peters@norcaloverhead.com>
Sent: Friday, August 10, 2018 3:36 PM
To: Cindy Tzafopoulos
Subject: Re: Contract
Attachments: Certificate.pdf

Cindy,

Please see COI attached.

References:

Vantage V6 Data Center
Santa Clara, CA
DPR Construction / Everett Rosette everettr@dpr.com / 650-474-1450
Rolling Door Contract Amount: \$132,900
Completed Dec 2017

City of Mountain View
Mountain View, CA
Hollis Burnett Hollis.Burnett@mountainview.gov / 650-280-4401
Continued Business - We are contracted with them for their service work and new installs for their fire depts, police station, library, etc.

Marshall Squares Apartments
San Jose, CA
Fairfield Residential / Ryan Duarte rduarte@ffres.com / 858.457.2123
Rolling Door Contract: \$89,340
Completed March 2018

Let me know if you need anything else.

Thanks!

Jennifer Peters



2145 Elkins Way Suite E
Brentwood, CA 94513
(925) 420-3092 Direct



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
8/10/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Clinton Polley Insurance Group, Inc. 12150 Tributary Point Dr #200 Gold River CA 95670	CONTACT NAME: Clinton Polley Insurance Group, Inc.	
	PHONE (A/C, No, Ext): 916-984-3000	FAX (A/C, No): 916-984-3100
E-MAIL ADDRESS: certificates@clintonpolley.com		
INSURED Nor Cal Overhead 2145 Elkins Way, Ste E Brentwood CA 94513	INSURER(S) AFFORDING COVERAGE	
	INSURER A: Everest National Insurance Co	
	INSURER B: Ohio Security Insurance Co.	
	INSURER C: National Union Fire Ins. Co.	
	INSURER D: Colony Insurance Company	
	INSURER E:	
INSURER F:		

COVERAGES		CERTIFICATE NUMBER: 825259458		REVISION NUMBER:		
THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.						
INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
D	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☒ PRO-JECT ☐ LOC OTHER:	Y Y	103GL002201400	1/30/2018	1/30/2019	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 50,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COM/PROP AGG \$ 2,000,000 \$
B	AUTOMOBILE LIABILITY ☒ ANY AUTO ☐ ALL OWNED AUTOS ☒ HIRED AUTOS ☐ SCHEDULED AUTOS ☒ NON-OWNED AUTOS	Y Y	BAS56238150	11/14/2017	11/14/2018	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
C	☐ UMBRELLA LIAB ☒ EXCESS LIAB ☐ OCCUR ☒ CLAIMS-MADE DED RETENTIONS	Y Y	EBU035886202	2/1/2018	1/30/2019	EACH OCCURRENCE \$ 4,000,000 AGGREGATE \$ 4,000,000 \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N/A	7600015720171	11/2/2017	11/2/2018	☒ PER STATUTE ☐ OTHER E L EACH ACCIDENT \$ 1,000,000 E L DISEASE - EA EMPLOYEE \$ 1,000,000 E L DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
 The City of St. Helena, its officers, officials, employees are named as additional insured with respect to General and Auto Liability. Coverage is offered on a primary, non-contributory basis. A waiver of subrogation is granted to the aforementioned with respect to General and Auto Liability as well as Workers Compensation. All applicable endorsements are attached.

CERTIFICATE HOLDER City of St. Helena 1480 Main Street St. Helena CA 94574	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
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ACORD 25 (2014/01)

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Policy Number: 103GL002201400

COMMERCIAL GENERAL LIABILITY
CG 20 01 04 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**PRIMARY AND NONCONTRIBUTORY –
OTHER INSURANCE CONDITION**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

The following is added to the **Other Insurance** Condition and supersedes any provision to the contrary:

Primary And Noncontributory Insurance

This insurance is primary to and will not seek contribution from any other insurance available to an additional insured under your policy provided that:

- (1) The additional insured is a Named Insured under such other insurance; and

- (2) You have agreed in writing in a contract or agreement that this insurance would be primary and would not seek contribution from any other insurance available to the additional insured.

Policy Number: 103GL002201400

**COMMERCIAL GENERAL LIABILITY
CG 20 10 04 13****THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.****ADDITIONAL INSURED - OWNERS, LESSEES OR
CONTRACTORS - SCHEDULED PERSON OR
ORGANIZATION**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART**SCHEDULE**

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) Of Covered Operations
All persons or organizations as required by written contract with the Named Insured	As designated in written contract with the Named Insured
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf,

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

- C.** With respect to the insurance afforded to these additional insureds, the following is added to **Section III – Limits Of Insurance:**

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or

2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

Policy Number: 103GL002201400

**COMMERCIAL GENERAL LIABILITY
CG 20 37 04 13**

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED – OWNERS, LESSEES OR
CONTRACTORS – COMPLETED OPERATIONS**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location And Description Of Completed Operations
All persons or organizations as required by written contract with the Named Insured	As designated in written contract with the Named Insured for commercial projects only
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the Schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following is added to Section III – Limits Of Insurance:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

Policy Number: 103GL002201400

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**TRANSFER OF RIGHTS OF RECOVERY
AGAINST OTHERS TO US**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

The following is added to Paragraph 8. **Transfer Of Rights Of Recovery Against Others To Us** of Section IV – **Conditions**:

We waive any rights of recovery we may have against any person or organization because of payments we make for injury or damage resulting from your ongoing operations or "your work" done under a contract with that person or organization and included in the "products-completed operations hazard" if:

- a. you agreed to such waiver;
- b. the waiver is included as part of a written contract or lease; and
- c. such written contract or lease was executed prior to any loss to which this insurance applies.

ALL OTHER TERMS AND CONDITIONS OF THE POLICY REMAIN UNCHANGED.

**COMMERCIAL AUTO
CA 88 10 01 13**

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

BUSINESS AUTO COVERAGE ENHANCEMENT ENDORSEMENT

This endorsement modifies insurance provided under the following:

BUSINESS AUTO COVERAGE FORM

With respect to coverage afforded by this endorsement, the provisions of the policy apply unless modified by the endorsement.

COVERAGE INDEX

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SECTION II - LIABILITY COVERAGE is amended as follows:

1. BROAD FORM INSURED

SECTION II - LIABILITY COVERAGE, paragraph A.1. - WHO IS AN INSURED is amended to include the following as an insured:

d. Any legally incorporated entity of which you own more than 50 percent of the voting stock during the policy period. However, "insured" does not include any organization that:

- (1) Is a partnership or joint venture; or
- (2) Is an insured under any other automobile policy; or
- (3) Has exhausted its Limit of Insurance under any other automobile policy.

Paragraph d. (2) of this provision does not apply to a policy written to apply specifically in excess of this policy.

e. Any organization you newly acquire or form, other than a partnership or joint venture, of which you own more than 50 percent of the voting stock. This automatic coverage is afforded only for 180 days from the date of acquisition or formation. However, coverage under this provision does not apply:

- (1) If there is similar insurance or a self-insured retention plan available to that organization;

- (2) If the Limits of Insurance of any other insurance policy have been exhausted; or
- (3) To "bodily injury" or "property damage" that occurred before you acquired or formed the organization.

2. EMPLOYEES AS INSURED

SECTION II - LIABILITY COVERAGE, paragraph A.1. - WHO IS AN INSURED is amended to include the following as an insured:

- f. Any "employee" of yours while using a covered "auto" you do not own, hire or borrow, but only for acts within the scope of their employment by you. Insurance provided by this endorsement is excess over any other insurance available to any "employee".
- g. An "employee" of yours while operating an "auto" hired or borrowed under a written contract or agreement in that "employee's" name, with your permission, while performing duties related to the conduct of your business and within the scope of their employment. Insurance provided by this endorsement is excess over any other insurance available to the "employee".

3. ADDITIONAL INSURED BY CONTRACT, AGREEMENT OR PERMIT

SECTION II - LIABILITY COVERAGE, paragraph A.1. - WHO IS AN INSURED is amended to include the following as an insured:

- h. Any person or organization with respect to the operation, maintenance or use of a covered "auto", provided that you and such person or organization have agreed in a written contract, agreement, or permit issued to you by governmental or public authority, to add such person, or organization, or governmental or public authority to this policy as an "insured".

However, such person or organization is an "insured":

- (1) Only with respect to the operation, maintenance or use of a covered "auto";
- (2) Only for "bodily injury" or "property damage" caused by an "accident" which takes place after you executed the written contract or agreement, or the permit has been issued to you; and
- (3) Only for the duration of that contract, agreement or permit

4. SUPPLEMENTARY PAYMENTS

SECTION II - LIABILITY COVERAGE, Coverage Extensions, 2.a. Supplementary Payments, paragraphs (2) and (4) are replaced by the following:

- (2) Up to \$3,000 for cost of bail bonds (including bonds for related traffic violations) required because of an "accident" we cover. We do not have to furnish these bonds.
- (4) All reasonable expenses incurred by the insured at our request, including actual loss of earnings up to \$500 a day because of time off from work.

5. AMENDED FELLOW EMPLOYEE EXCLUSION

In those jurisdictions where, by law, fellow employees are not entitled to the protection afforded to the employer by the workers compensation exclusivity rule, or similar protection, the following provision is added:

SECTION II - LIABILITY, exclusion B.5. FELLOW EMPLOYEE does not apply if the "bodily injury" results from the use of a covered "auto" you own or hire.

SECTION III - PHYSICAL DAMAGE COVERAGE is amended as follows:

6. HIRED AUTO PHYSICAL DAMAGE

Paragraph A.4. Coverage Extensions of SECTION III - PHYSICAL DAMAGE COVERAGE, is amended by adding the following:

If hired "autos" are covered "autos" for Liability Coverage, and if Comprehensive, Specified Causes of Loss or Collision coverage are provided under the Business Auto Coverage Form for any "auto" you own, then the Physical Damage coverages provided are extended to "autos":

- a. You hire, rent or borrow; or

- b. Your "employee" hires or rents under a written contract or agreement in that "employee's" name, but only if the damage occurs while the vehicle is being used in the conduct of your business,

subject to the following limit and deductible:

- A. The most we will pay for "loss" in any one "accident" or "loss" is the smallest of:
- (1) \$50,000; or
 - (2) The actual cash value of the damaged or stolen property as of the time of the "loss"; or
 - (3) The cost of repairing or replacing the damaged or stolen property with other property of like kind and quality, minus a deductible.
- B. The deductible will be equal to the largest deductible applicable to any owned "auto" for that coverage.
- C. Subject to the limit, deductible and excess provisions described in this provision, we will provide coverage equal to the broadest coverage applicable to any covered "auto" you own.
- D. Subject to a maximum of \$1,000 per "accident", we will also cover the actual loss of use of the hired "auto" if it results from an "accident", you are legally liable and the lessor incurs an actual financial loss.
- E. This coverage extension does not apply to:
- (1) Any "auto" that is hired, rented or borrowed with a driver; or
 - (2) Any "auto" that is hired, rented or borrowed from your "employee".

For the purposes of this provision, SECTION V - DEFINITIONS is amended by adding the following:

"Total loss" means a "loss" in which the cost of repairs plus the salvage value exceeds the actual cash value.

7. TOWING AND LABOR

SECTION III - PHYSICAL DAMAGE COVERAGE, paragraph A.2. Towing, is amended by the addition of the following:

We will pay towing and labor costs incurred, up to the limits shown below, each time a covered "auto" classified and rated as a private passenger type, "light truck" or "medium truck" is disabled:

- a. For private passenger type vehicles, we will pay up to \$50 per disablement.
- b. For "light trucks", we will pay up to \$50 per disablement. "Light trucks" are trucks that have a gross vehicle weight (GVW) of 10,000 pounds or less.
- c. For "medium trucks", we will pay up to \$150 per disablement. "Medium trucks" are trucks that have a gross vehicle weight (GVW) of 10,001 - 20,000 pounds.

However, the labor must be performed at the place of disablement.

8. PHYSICAL DAMAGE - ADDITIONAL TRANSPORTATION EXPENSE COVERAGE

Paragraph A.4.a., Coverage Extension of SECTION III - PHYSICAL DAMAGE COVERAGE, is amended to provide a limit of \$50 per day and a maximum limit of \$1,500

9. RENTAL REIMBURSEMENT

SECTION III - PHYSICAL DAMAGE COVERAGE, A. COVERAGE, is amended by adding the following:

- a. We will pay up to \$75 per day for rental reimbursement expenses incurred by you for the rental of an "auto" because of "accident" or "loss", to an "auto" for which we also pay a "loss" under Comprehensive, Specified Causes of Loss or Collision Coverages. We will pay only for those expenses incurred after the first 24 hours following the "accident" or "loss" to the covered "auto."
- b. Rental Reimbursement will be based on the rental of a comparable vehicle, which in many cases may be substantially less than \$75 per day, and will only be allowed for the period of time it should take to repair or replace the vehicle with reasonable speed and similar quality, up to a maximum of 30 days.
- c. We will also pay up to \$500 for reasonable and necessary expenses incurred by you to remove and replace your tools and equipment from the covered "auto".
- d. This coverage does not apply unless you have a business necessity that other "autos" available for your use and operation cannot fill.
- e. If "loss" results from the total theft of a covered "auto" of the private passenger type, we will pay under this coverage only that amount of your rental reimbursement expenses which is not already provided under Paragraph 4. Coverage Extension.
- f. No deductible applies to this coverage.

For the purposes of this endorsement provision, materials and equipment do not include "personal effects" as defined in provision 11.

10. EXTRA EXPENSE - BROADENED COVERAGE

Under SECTION III - PHYSICAL DAMAGE COVERAGE, A. COVERAGE, we will pay for the expense of returning a stolen covered "auto" to you. The maximum amount we will pay is \$1,000.

11. PERSONAL EFFECTS COVERAGE

- A. SECTION III - PHYSICAL DAMAGE COVERAGE, A. COVERAGE, is amended by adding the following:

If you have purchased Comprehensive Coverage on this policy for an "auto" you own and that "auto" is stolen, we will pay, without application of a deductible, up to \$600 for "personal effects" stolen with the "auto."

The insurance provided under this provision is excess over any other collectible insurance.

- B. SECTION V - DEFINITIONS is amended by adding the following:

For the purposes of this provision, "personal effects" mean tangible property that is worn or carried by an insured." "Personal effects" does not include tools, equipment, jewelry, money or securities.

12. ACCIDENTAL AIRBAG DEPLOYMENT

SECTION III - PHYSICAL DAMAGE COVERAGE, B. EXCLUSIONS is amended by adding the following:

If you have purchased Comprehensive or Collision Coverage under this policy, the exclusion for "loss" relating to mechanical breakdown does not apply to the accidental discharge of an airbag.

Any insurance we provide shall be excess over any other collectible insurance or reimbursement by manufacturer's warranty. However, we agree to pay any deductible applicable to the other coverage or warranty.

13. AUDIO, VISUAL AND DATA ELECTRONIC EQUIPMENT COVERAGE

SECTION III - PHYSICAL DAMAGE COVERAGE, B. EXCLUSIONS, exception paragraph a. to exclusions 4.c. and 4.d. is deleted and replaced with the following:

Exclusion 4.c. and 4.d. do not apply to:

- a. Electronic equipment that receives or transmits audio, visual or data signals, whether or not designed solely for the reproduction of sound, if the equipment is permanently installed in the covered "auto" at the time of the "loss" and such equipment is designed to be solely operated by use of the power from the "auto's" electrical system, in or upon the covered "auto" and physical damage coverages are provided for the covered "auto"; or

If the "loss" occurs solely to audio, visual or data electronic equipment or accessories used with this equipment, then our obligation to pay for, repair, return or replace damaged or stolen property will be reduced by a \$100 deductible.

14. LOAN / LEASE GAP COVERAGE

- A. Paragraph C., LIMIT OF INSURANCE of SECTION III - PHYSICAL DAMAGE COVERAGE is amended by adding the following:

The most we will pay for a "total loss" to a covered "auto" owned by or leased to you in any one "accident" is the greater of the:

1. Balance due under the terms of the loan or lease to which the damaged covered "auto" is subject at the time of the "loss" less the amount of:
 - a. Overdue payments and financial penalties associated with those payments as of the date of the "loss",
 - b. Financial penalties imposed under a lease due to high mileage, excessive use or abnormal wear and tear,
 - c. Costs for extended warranties, Credit Life Insurance, Health, Accident or Disability Insurance purchased with the loan or lease,
 - d. Transfer or rollover balances from previous loans or leases,
 - e. Final payment due under a "Balloon Loan",
 - f. The dollar amount of any unrepaired damage which occurred prior to the "total loss" of a covered "auto",
 - g. Security deposits not refunded by a lessor,
 - h. All refunds payable or paid to you as a result of the early termination of a lease agreement or as a result of the early termination of any warranty or extended service agreement on a covered "auto",
 - i. Any amount representing taxes,
 - j. Loan or lease termination fees; or
2. The actual cash value of the damage or stolen property as of the time of the "loss".

An adjustment for depreciation and physical condition will be made in determining the actual cash value at the time of the "loss". This adjustment is not applicable in Texas.

- B. ADDITIONAL CONDITIONS

This coverage applies only to the original loan for which the covered "auto" that incurred the loss serves as collateral, or lease written on the covered "auto" that incurred the loss.

- C. SECTION V - DEFINITIONS is changed by adding the following:

As used in this endorsement provision, the following definitions apply:

"Total loss" means a "loss" in which the cost of repairs plus the salvage value exceeds the actual cash value.

A "balloon loan" is one with periodic payments that are insufficient to repay the balance over the term of the loan, thereby requiring a large final payment.

15. GLASS REPAIR - WAIVER OF DEDUCTIBLE

Paragraph D. Deductible of SECTION III - PHYSICAL DAMAGE COVERAGE is amended by the addition of the following:

No deductible applies to glass damage if the glass is repaired rather than replaced.

16. PARKED AUTO COLLISION COVERAGE (WAIVER OF DEDUCTIBLE)

Paragraph D. Deductible of SECTION III - PHYSICAL DAMAGE COVERAGE is amended by the addition of the following:

The deductible does not apply to "loss" caused by collision to such covered "auto" of the private passenger type or light weight truck with a gross vehicle weight of 10,000 lbs. or less as defined by the manufacturer as maximum loaded weight the "auto" is designed to carry while it is:

- a. In the charge of an "insured";
- b. Legally parked; and
- c. Unoccupied.

The "loss" must be reported to the police authorities within 24 hours of known damage.

The total amount of the damage to the covered "auto" must exceed the deductible shown in the Declarations.

This provision does not apply to any "loss" if the covered "auto" is in the charge of any person or organization engaged in the automobile business.

17. TWO OR MORE DEDUCTIBLES

Under SECTION III PHYSICAL DAMAGE COVERAGE, if two or more company policies or coverage forms apply to the same accident, the following applies to paragraph D. Deductible:

- a. If the applicable Business Auto deductible is the smaller (or smallest) deductible it will be waived; or
- b. If the applicable Business Auto deductible is not the smaller (or smallest) deductible it will be reduced by the amount of the smaller (or smallest) deductible; or
- c. If the loss involves two or more Business Auto coverage forms or policies the smaller (or smallest) deductible will be waived.

For the purpose of this endorsement company means any company that is part of the Liberty Mutual Group.

SECTION IV - BUSINESS AUTO CONDITIONS is amended as follows:

18. UNINTENTIONAL FAILURE TO DISCLOSE HAZARDS

SECTION IV- BUSINESS AUTO CONDITIONS, Paragraph B.2. is amended by adding the following:

If you unintentionally fail to disclose any hazards, exposures or material facts existing as of the inception date or renewal date of the Business Auto Coverage Form, the coverage afforded by this policy will not be prejudiced.

However, you must report the undisclosed hazard of exposure as soon as practicable after its discovery, and we have the right to collect additional premium for any such hazard or exposure.

19. AMENDED DUTIES IN THE EVENT OF ACCIDENT, CLAIM, SUIT, OR LOSS

SECTION IV - BUSINESS AUTO CONDITIONS, paragraph A.2.a. is replaced in its entirety by the following:

- a. In the event of "accident", claim, "suit" or "loss", you must promptly notify us when it is known to:
 1. You, if you are an individual;
 2. A partner, if you are a partnership;
 3. Member, if you are a limited liability company;
 4. An executive officer or the "employee" designated by the Named Insured to give such notice, if you are a corporation.

To the extent possible, notice to us should include:

- (1) How, when and where the "accident" or "loss" took place;
- (2) The "insureds" name and address; and
- (3) The names and addresses of any injured persons and witnesses.

20. WAIVER OF TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US

SECTION IV - BUSINESS AUTO CONDITIONS, paragraph A.5., Transfer of Rights of Recovery Against Others to Us, is amended by the addition of the following:

If the person or organization has waived those rights before an "accident" or "loss", our rights are waived also.

21. HIRED AUTO COVERAGE TERRITORY

SECTION IV - BUSINESS AUTO CONDITIONS, paragraph B.7., Policy Period, Coverage Territory, is amended by the addition of the following:

- f. For "autos" hired 30 days or less, the coverage territory is anywhere in the world, provided that the insured's responsibility to pay for damages is determined in a "suit", on the merits, in the United States, the territories and possessions of the United States of America, Puerto Rico or Canada or in a settlement we agree to.

This extension of coverage does not apply to an "auto" hired, leased, rented or borrowed with a driver.

SECTION V - DEFINITIONS is amended as follows:

22. BODILY INJURY REDEFINED

Under SECTION V - DEFINITIONS, definition C. is replaced by the following:

"Bodily injury" means physical injury, sickness or disease sustained by a person, including mental anguish, mental injury, shock, fright or death resulting from any of these at any time.

COMMON POLICY CONDITIONS

23. EXTENDED CANCELLATION CONDITION

COMMON POLICY CONDITIONS, paragraph A. - CANCELLATION condition applies except as follows:

If we cancel for any reason other than nonpayment of premium, we will mail to the first Named Insured written notice of cancellation at least 60 days before the effective date of cancellation. This provision does not apply in those states which require more than 60 days prior notice of cancellation.

WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE POLICY

WC 04 03 06

**WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT -
CALIFORNIA**

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

You must maintain payroll records accurately segregating the remuneration of your employees while engaged in the work described in the Schedule.

The additional premium for this endorsement shall be 2% of the California workers' compensation premium otherwise due on such remuneration.

SCHEDULE**PERSON OR ORGANIZATION****JOB DESCRIPTION**

ANY PERSON OR ORGANIZATION FOR WHOM THE
NAMED INSURED HAS AGREED BY WRITTEN
CONTRACT TO FURNISH THIS WAIVER

BLANKET WAIVER OF SUBROGATION

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective: 11/02/2017

Policy No. 7600015720171

Endorsement No. 001

Insured: Nor Cal Overhead, Inc

Premium \$ INCL.

Insurance Company: Everest National Insurance Company

Countersigned By: _____

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From the WCIRB's California Workers' Compensation Insurance Forms Manual - 1999.



CITY OF ST. HELENA
FIRE DEPARTMENT

REQUEST FOR PROPOSALS FOR PROFESSIONAL SERVICES

Fire Department Bay Doors

DATE ISSUED: Thursday, July 19, 2018

DATE DUE: Friday, August 10, 2018, 4PM

CONTACT: John Sorensen, Fire Chief
Chief170@cityofsthelena.org
(707) 302-2420

ALL RESPONSES MUST BE MAILED OR HAND-DELIVERED TO:

CITY OF ST. HELENA
OFFICE OF THE CITY CLERK
ATTENTION: CINDY TZAFPOULOS
1480 MAIN STREET
ST. HELENA, CA 94574

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I. INTRODUCTION

The City of St. Helena, California is located in the center of the world-famous wine growing Napa Valley, 65 miles north of San Francisco.

The area was settled in 1834 as part of General Vallejo's land grant. The City of St. Helena was incorporated as a City on March 24, 1876 and reincorporated on May 14, 1889.

The City, from its inception, has served as a rural agricultural center. Over the years, with the growth and development of the wine industry, St Helena has become an important business and banking center for the wine industry. The City also receives many visitors as a result of the wine industry and the area's scenic qualities. The City's goal is to maintain a small-town atmosphere and to provide quality services to its citizens.

The official population of the City of St. Helena as of 2017 is 6,033 (CA Department of Finance). St. Helena is a full-service city and encompasses an area of four square miles. The City's General Fund Budget is approximately \$11.1 million.

II. SOLICITATION

The City of St. Helena is seeking proposals from qualified professionals to replace the current Fire Department Bay Doors. Prospective firms will be required to provide team qualification, proposed work plans, proposed schedule, and other related items as part of the proposal submittal (Section V). The deadline for submitting proposals is 4:00PM on Friday, August 10, 2018.

III. SCOPE OF WORK

The City of St. Helena is requesting proposals from qualified professionals to replace the Fire Department Bay Doors at the existing fire station, located at 1480 Main Street, St. Helena. Firms interested in completing the project related to the Fire Department Bay Doors should submit proposals.

1. PRODUCTS:

1.1 MANUFACTURERS:

- A. Acceptable Manufacturer: Raynor, which is located at: 1101 East River Rd. P. O. Box 448 Dixon, IL 61021-0448; Toll Free Tel: 800-4-RAYNOR; Tel: 815-288-1431; Fax: 888-598-4790; Email: (thegarage@raynor.com) Web: www.raynor.com.

1.2 SECTIONAL RAIL AND STYLE ALUMINUM DOORS:

- A. AlumaView as manufactured by Raynor Garage Doors.
 - 1. Doors:
 - a. Operation
 - 1) Provide doors designed for electric motor operation.
 - b. Jamb Construction:
 - 1) Steel jambs with self-tapping fasteners.
 - 2) Wood jambs with lag screw fasteners.
 - 3) Masonry jambs with anchor bolt fasteners.
 - c. Structural Performance Requirements:
 - 1) Wind Loads: Uniform pressure of 20 psf.
 - 2. Sections:

- a. AlumaView AV200:
 - 1) Material: 2 inches (51mm) thick, 6063-T6 aluminum allow stiles and rails joined together with 5/16-inch (8mm) diameter screws. Aluminum panels 0.05 inch (1.3mm) thick or glazing (when specified) fill the spaces between stiles and rails. Combined dimension of two adjoining intermediate meeting rails 3-13/16 inches (97mm). Bottom rail height 5-1/4 inches (133mm). Top rail height 3-1/4 inches (83mm) or 5-1/4 inches (133mm) as determined by overall door width. End stiles 3-3/8 inches (86mm) or 6-1/2 inches (165 mm) wide as determined by overall door width. Center stiles 3-5/8 inches (92 mm) wide.
 - 2) Finish: Aluminum frame extrusions and filler panels finish coated.
 - a) ArmorBrite Powder coat finish.
 - 1) Color: TBD
 - a. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail.
 - 1) Bulb-type joint seal between sections.
 - 2) Blade seal on top section to prevent airflow above header.
 - b. Trussing: Doors designed to withstand specified wind load. Deflection of door in horizontal position to be maximum of 1/120th of door width.
- 3. Windows: Provide door sections with windows in lieu of 0.05 inch (1.3mm) aluminum filler panels. Locations to comply with door elevation drawings.
- 4. Non-Impact Rated Glazing: Provide as follows:
 - a. 1/2 inch (12.69mm) insulated clear tempered glass consisting of two panes of 1/8 inch (3.2mm) tempered insulated glass.
- 5. Mounting: Sections mounted in door opening using:
 - a. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25mm) on each side of door opening.
- 6. Track:
 - a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weather seal.
 - b. Configuration Type:
 - 1) Configuration Type: Normal Headroom.
 - c. Track Size:
 - 1) Size: 3 inches (76mm).
 - d. Mounting:
 - 1) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inches (59mm by 102mm by 2.5mm) on 2 inch track and 3-1/2 inches by 5 inches by 1/8 inches (89mm by 127mm by 3.2mm) on 3 inch track.
 - 2) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size less than 2-5/16 inches by 4 inches by 3/32 inch (59mm by 102mm by 2.5mm) on 2 inch track and 3-1/2 inches by 5 inches by 1/8 inches (89mm by 127mm by 3.2mm) on 3 inch track.
- e. Finish:
 - 1) Galvanized

7. Counterbalance:
 - a. Counterbalance System: Provided with aircraft-type, galvanized steel lifting cables with minimum safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a continuous ball-bearing cross-header shaft.
 - 1) Spring Cycle Requirements: High Cycle: 100,000 cycles.
8. Hardware:
 - a. Hinges and Brackets: Fabricated from galvanized steel.
 - b. Track Rollers: 3 inches (76.2mm) diameter consistent with track size, with hardened steel ball bearings.
 - c. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
 - 1) For bracket mounted doors, provide climate seal or vinyl seal with aluminum retainer.
 - 2) For angle mounted doors provide angle clip-on-seal.
 - d. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder night latch and steel bar engaging track.
 - e. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by owner.
9. AlumaView Limited Warranty: Raynor warrants the door sections against defects in material and workmanship for five years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for three years from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with the manufacturer's full standard limited warranty documentation.
- B. ControlHoist as manufactured by Raynor Garage Doors:
 1. Model:
 - a. Raynor ControlHoist Optima:
 - 4) Motor Horsepower Rating: Continuous 3/4 HP.
 - 5) Electrical Requirements: 115 volt single phase.
 - 6) All conduit and wiring to operators & wall controls by electrician.

2. EXECUTION

2.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared. Verify that site conditions are acceptable for installation of doors, operators, controls and accessories. Ensure that openings are square, flush, and plumb.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

2.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

2.3 INSTALLATION

- A. General: Install door, track and operating equipment complete with all necessary accessories and hardware according to shop drawings, manufacturer's instructions.

- B. Lubricate bearings and sliding parts, and adjust doors for proper operation, balance, clearance and similar requirements.

2.4 PROTECTION

- C. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove and legally dispose of construction debris from project site.
- D. Remove temporary coverings and protection of adjacent work areas. Repair or replace installed products damaged prior to or during installation.
- E. Lubricate bearings and sliding parts, assure weather tight fit around door perimeter and adjust doors for proper operation, balance, clearance and similar requirements. Protect installed products until completion of project.
- F. Touch-up, repair or replace damaged products before Substantial Completion.

IV. SCHEDULE

Responses to the RFP must be submitted to the City of St. Helena as outlined in this section.

Responses are due no later than
FRIDAY, AUGUST 10, 2018 AT 4:00 PM
 Responses received after this date and time will not be considered.

PROPOSED SCHEDULE FOR THE REVIEW AND SELECTION PROCESS AND DESIRED TIMELINES FOR DELIVERABLES

MILESTONE	DATE	TIME
Release RFP	July 20, 2018	11:00AM
Question submittal deadline	July 27, 2018	4:00PM
Questions posted on City website (cityofsthenana.org/rfps)	August 1, 2018	5:00PM
Proposal due date	August 10, 2018	4:00PM
Review and scoring of submittals	August 20, 2018	9:00AM
Award of contract	August 28, 2018	6:00PM

The schedule may be modified and/or extended if necessary.

V. PROPOSAL REQUIREMENTS AND FORMAT

If interested in this RFP, please notify Alec Vidler by email at avidler@cityofsthenana.org so you may be added to the notification list for addendums. Failure to notify Mr. Vidler could result in missing important and required information and could result in disqualification.

All submittals must follow the format described in this section. Respondents are encouraged to submit clear and concise responses to the RFP. The City of St. Helena

reserves the right to include or exclude any part of the submittals in the final agreement with the selected consultant.

Four (4) bound copies of the submittal, one (1) unbound, reproducible copy, and one CD (or other digital medium) containing a PDF copy must be submitted. Each submittal shall contain no more than 20 double-sided 8½" x 11" pages (not counting dividers, exhibits, and any relevant appendices). Font shall be no less than 10pt. All pages shall be numbered. Drawings provided with the submittal shall not exceed 11" x 17."

To be considered for selection, submittals must arrive at the location shown below by the date and time specified in Section IV. Proposers who mail packages should allow ample delivery time to ensure timely arrival.

Submittals shall be placed in a clearly marked envelope, titled Fire Department Bay Doors and hand-delivered or mailed to:

City of St. Helena
Office of the City Clerk
Attention: Cindy Tzafopoulos
1480 Main Street
St. Helena, CA 94574

It is the sole responsibility of the Proposer to ensure timely delivery. Late proposals shall not be considered. Proposals will not be accepted at any other location other than the address specified above. Faxed or emailed proposals will not be accepted.

Submittals must include the following components in the order listed below:

- Part 1: Cover Letter/Executive Summary (5 points)
- Part 2: Experience and Qualifications of Company (30 points)
- Part 3: Commitment to Project Budget & Detailed Work Plan (30 points)
- Part 4: Delivery Schedule and Timeline (30 points)
- Part 5: Reference Review (5 points) Total Possible: 100 points

PART 1 | COVER LETTER/EXECUTIVE SUMMARY (5 POINTS)

In no more than three (3) pages, the Cover Letter and Executive Summary shall include:

1. The names of the key members of the consultant team.
2. The mailing address, telephone number, and the name of the main point of contact for the consultant team.
3. A summary of the organization's experience and qualifications.
4. An acknowledgement of receiving any addendum(s) to the RFP document sent out by the City.

PART 2 | EXPERIENCE AND QUALIFICATIONS OF TEAM MEMBERS (30 POINTS)

Provide detail relating to the experience and qualifications of the members of the team, including an organizational chart showing all key personnel who will be assigned to this project. Submit brief resumes demonstrating the training, experience, and other qualifications of the key personnel who will be assigned to this project.

Organization should further document expertise by including the information regarding the following:

1. Experience of proposed organization working together as a team on similar scope and type of projects.
2. Understanding of operations, activities, needs, and maintenance of Fire Department Bay Doors.
3. Any other information that would assist the review team in understanding the team's capacity to efficiently and effectively complete the project.

PART 3 | COMMITMENT TO PROJECT BUDGET (30 POINTS)

Organizations shall provide a total base fee for the project. Each responding organization shall include an acknowledgement that it can effectively complete this project within the budget indicated. Each respondent should clearly explain in this section the methods and process it will use to insure the project is within budget and that the City will be getting the best value within the budgeted amount.

PART 4 | DELIVERY SCHEDULE AND TIMELINE (30 POINTS)

Discuss in this section the steps the team proposes to use. Clearly outline the delivery schedule and timeline of each component of the project. Specific dates should be used assuming an award to this RFP and an executed agreement in August 2018. The organization shall be prepared to begin work within two (2) weeks of the Notice to Proceed. Completion of this assessment in a timely fashion will be a factor in scoring this section. Firms whom can commit to an accelerated completion schedule may be given additional deference in the selection process. Indicate in the proposed scheduling the necessary involvement and various decision points required of the City. A Gantt chart or schematic representation of the delivery timeline with pertinent milestones and events is required in this section.

PART 5 | REFERENCE REVIEW (5 POINTS)

The review team will conduct a background reference review of each respondent. Please include the following information for three (3) projects that the proposed company worked on together:

- Name of the project/study
- Location of the project
- Name, title, and contact information for the client
- Project budget
- Date of completion of the project

VI. PROPOSAL TERMS AND CONDITIONS

1. EXAMINATION OF PROPOSAL MATERIALS

The submission of a proposal shall be deemed a representation and warranty by the proponent that it has investigated all aspects of the RFP, that it is aware of the applicable facts pertaining to the RFP process and its procedures and requirements, and that it has read and understands the RFP. No request for modification of the provisions of the proposal shall be considered after its submission on the grounds the proponent was not fully informed as to any fact or condition.

2. ADDENDA INTERPRETATIONS

If it becomes necessary to revise any part of this RFP, a written addendum will be provided to each firm that requested to be added to the notification list, and said addenda will be uploaded to the City website. The City of St. Helena is not bound by any oral

representations, clarifications, or changes made in the RFP by the City or its agents, unless such clarifications or change is provided in written addendum from the City of St. Helena.

3. DESIGNATED CONTACT

For the purposes of this RFP, the City's designated Project Manager is Alec Vidler, Admin. Assistant/Fire Department. Any questions concerning the scope of work and the selection process shall be directed to Mr. Vidler, at avidler@cityofsthenana.org. Any and all questions and responses concerning this RFP will only be accepted in writing, via email. All questions must be received by July 23, 2018 by 4:00PM.

Responses to questions will be posted on the City's website, cityofsthenana.org/rfps, and will become part of the RFP. It is the organization's responsibility to check the website for updates.

4. PUBLIC RECORDS

This RFP document and all submittals in response thereto are public records. Prospective companies are cautioned not to include any material into the proposal that is strictly proprietary in nature.

5. PROPOSAL COSTS

All costs associated with the preparation of RFP submittals shall be borne by the respondent. This RFP does not constitute any form of offer to contract.

6. RESERVATION OF RIGHTS

The City reserves the right, for any reason, to accept or reject any one or more proposals; to negotiate the terms and specifications of the proposal; to modify any part of the RFP; or issue a new RFP.

7. PRODUCT OWNERSHIP

Any documents resulting from the contract will be the property of the City.

8. PROFESSIONAL SERVICES AGREEMENT

All Proposers must identify in their proposal any terms and conditions of the sample Professional Service Agreement (Exhibit C) that they wish to negotiate. Insurance is required as outlined in Section 7 of the sample agreement.

9. CAUSES FOR DISQUALIFICATION

Any of the following may be considered cause to disqualify a proponent without further consideration:

- Evidence of collusion among proponents;
- Any attempt to improperly influence any member of the evaluation panel;
- A proponent's default in any operation of a professional services agreement which resulted in termination of that agreement; and/or
- Existence of any lawsuit, unresolved contractual claim, or dispute between proponent and the City.



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: Consent Item

Subject: Consideration and proposed adoption of a resolution to approve the Final Map for the Our Town St. Helena (OTSH) Brenkle Court Subdivision.

CEQA Determination: Exempt from CEQA pursuant to Section 15332, which exempts projects characterized as in-fill development when the project is consistent with the general plan and zoning; occurs within city limits on less than five acres; has no valuable habitat; won't cause any significant environmental effects; and can be served by existing public services

Prepared By: Erica Ahmann Smithies, Public Works Director and City Engineer

Reviewed By: Noah Housh, Planning & Community Improvement Director

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

On November 15, 2016, the Planning Commission approved Tentative Map PL16-022 and associated Conditions of Approval for the Brenkle Ct Tentative Map, to allow the subdivision of the existing (approximately) 1/2 acre parcel into nine lots for the development of eight attached single family homes, located at 684 McCorkle Avenue. This Project site is located on the north side of McCorkle Avenue, approximately 700-feet east of Allison Avenue. On December 13, 2016, City Council concurred with the Tentative Parcel Map approval.

The Final Map (Exhibit A to Attachment 1) has been reviewed for compliance with Title 16 of the St Helena Municipal Code and the California Subdivision Map Act. The City Engineer has determined that the Final Map and the location and configuration of the lots created by this Final Map substantially comply with the previously approved Tentative Map approved on November 15, 2016.

DISCUSSION

Per St. Helena Municipal Code (SHMC) Section 16.20.080 the City Council has the authority to approve Final Maps. OTSH has requested City Council approval and recordation of the Final Map prior to the completion of all public infrastructure required to serve the parcels, to address timing and funding challenges related to the need to have the lots legally created (through the recordation of the map) in order to apply for funding for the home loans. Typically, all public improvements are completed prior to approval and recordation of a Final Map, or a developer bonds for the improvements to ensure that all necessary public infrastructure is (or will be) installed to serve the newly created parcels. In the rare instances where a Final Map is approved and allowed to record prior to completion of these improvements (or a bond to ensure their completion is obtained), a Subdivision Improvement Agreement can be used as an alternative mechanism to ensure completion of the public improvements after the map has been approved/recorded. In the case of the Brenkle Ct. subdivision, all but a few of the required frontage improvements have been completed as of the drafting of this report requesting Final Map approval.

A check in the amount of \$14,914 (in lieu of a bond) has been provided to the City from OTSH as security to ensure the remaining (required) public improvements are constructed, as permitted in SHMC 16.32.320. In addition, OTSH has provided a draft Subdivision Agreement as a means to document how their commitment to constructing these improvements is to be met (as further required by the Chapter 16.24 of the SHMC) and they have provided staff with a copy of their draft Conditions, Covenants, and Restrictions, both of which are attached for Council review. All other applicable Tentative Map and Final Map conditions of approval have been satisfied.

FISCAL IMPACT

There are no direct fiscal impacts to the City anticipated to result from the approval of the Final Map. If OTSH fails to complete the needed public improvements, City staff would utilize the \$14,914 provided to fund their completion.

RECOMMENDED ACTION

It is recommended the City Council:

1. Adopt the attached resolution approving the Final Map for OTSH Brenkle Court Subdivision Final Map; and
2. Authorize the City Manager to execute the attached agreements in keeping with the requirements of Chapter 16.24.

ATTACHMENTS

[OTSH FM 8-28-2018](#)

[OTSHBrenkleCourtCCResoFINAL](#)

[Exhibit A OTSH Subdivision Improvement Agreement](#)

[Exhibit B OTSHBrenkleCourtCCRsRevFINAL9.4.18](#)

OWNER’S STATEMENT

WE, THE UNDERSIGNED, AND DO HEREBY CERTIFY THAT WE ARE THE ONLY ENTITIES HAVING ANY RECORD TITLE INTEREST IN THE REAL PROPERTY INCLUDED WITHIN THE FINAL MAP SHOWN HEREON ENTITLED "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA" CONSISTING OF 2 SHEETS INCLUDING THIS ONE, THAT WE DO HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF SAID MAP; WE HEREBY IRREVOCABLY OFFER FOR DEDICATION IN FEE, SUBJECT TO IMPROVEMENTS, FOR PUBLIC STREET PURPOSES THAT CERTAIN PARCEL OF LAND DESIGNATED ON SAID MAP AS "PARCEL X"; THAT WE DO HEREBY IRREVOCABLY OFFER FOR PUBLIC ACCESS AND UTILITY PURPOSES THAT STRIP OF LAND SHOWN AS "14.5' PA&UE" (PUBLIC ACCESS AND UTILITY EASEMENT), FOR EMERGENCY VEHICLE ACCESS PURPOSES THAT STRIP OF LAND SHOWN AS "14.5' EVAE" (EMERGENCY VEHICLE ACCESS EASEMENT), FOR PUBLIC SANITARY SEWER PURPOSES THAT STRIP OF LAND SHOWN AS "14.5' SSE" (SANITARY SEWER EASEMENT), FOR PUBLIC STORM DRAIN PURPOSES THAT STRIP OF LAND SHOWN AS "14.5' SDE" (STORM DRAIN EASEMENT), FOR PUBLIC WATER LINE PURPOSES THAT STRIP OF LAND SHOWN AS "14.5' WLE" (WATER LINE EASEMENT).

THE OFFER OF DEDICATION FOR PUBLIC STREET PURPOSES AND PUBLIC UTILITY PURPOSES ARE HEREBY EXPRESSLY DEEMED TO INCLUDE ALL PUBLIC FACILITIES LOCATED OVER, ON OR UNDER SAID EASEMENT.

WE HEREBY RESERVE FOR OURSELVES OUR HEIRS AND ASSIGNS THAT CERTAIN PRIVATE STORM DRAIN EASEMENT FOR THE USE AND BENEFIT OF THE PRESENT OR FUTURE OWNERS AS DELINEATED ON THIS MAP.

SAID EASEMENTS SHALL NOT BE MAINTAINED BY THE CITY OF ST. HELENA. SAID EASEMENT SHALL BE MAINTAINED IN ACCORDANCE WITH THE DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS ENCUMBERING THIS REAL PROPERTY.

IN WITNESS WHEREOF, THE UNDERSIGNED HAVE CAUSED THESE PRESENTS TO BE EXECUTED THIS ____ DAY OF _____, 20____.

AS OWNER: OUR TOWN ST. HELENA, A CALIFORNIA NONPROFIT BENEFIT CORPORATION

NAME: _____

TITLE: _____

TRUSTEE’S STATEMENT

THE FIRST AMERICAN TITLE INSURANCE COMPANY, A NEBRASKA CORPORATION, AS TRUSTEE UNDER THOSE CERTAIN DEEDS OF TRUST;

BENEFICIARY	DOCUMENT #	RECORDED DATE
1) COUNTY OF NAPA	2016-0022388	SEPTEMBER 8, 2016

DOES HEREBY CONSENT TO, AND JOIN IN THE EXECUTION OF THE FOREGOING CERTIFICATE AND RECORDATION OF THE "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA", AND JOINS IN ALL OFFERS OF DEDICATION.

IN WITNESS WHEREOF, THE UNDERSIGNED HAS CAUSED THESE PRESENTS TO BE EXECUTED THIS ____ DAY OF _____, 20____.

FIRST AMERICAN TITLE INSURANCE COMPANY

ITS: _____ DATE: _____

TRUSTEE’S STATEMENT

THE FIRST AMERICAN TITLE INSURANCE COMPANY OF NAPA, AS TRUSTEE UNDER THOSE CERTAIN DEEDS OF TRUST;

BENEFICIARY	DOCUMENT #	RECORDED DATE
1) RURAL COMMUNITY ASSISTANCE CORPORATION	2017-0009257	APRIL 21, 2017

DOES HEREBY CONSENT TO, AND JOIN IN THE EXECUTION OF THE FOREGOING CERTIFICATE AND RECORDATION OF THE "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA", AND JOINS IN ALL OFFERS OF DEDICATION.

IN WITNESS WHEREOF, THE UNDERSIGNED HAS CAUSED THESE PRESENTS TO BE EXECUTED THIS ____ DAY OF _____, 20____.

FIRST AMERICAN TITLE INSURANCE COMPANY

ITS: _____ DATE: _____

SURVEYOR’S STATEMENT

I, JON M. WEBB, DO HEREBY CERTIFY THAT THE SUBDIVISION SHOWN ON THE MAP ENTITLED "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA" IS BASED UPON A FIELD SURVEY BY ME OR UNDER MY DIRECTION IN JUNE, 2017, IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCE AT THE REQUEST OF OUR TOWN ST. HELENA ON _____, 20____, THAT SAID SURVEY IS TRUE AND COMPLETE AS SHOWN, THAT THE MONUMENTS SHOWN ON SAID MAP ARE OF THE CHARACTER AND OCCUPY THE POSITIONS INDICATED, OR THAT THEY WILL BE SET AT SUCH POSITIONS ONE YEAR FROM THE DATE OF FILING OF THIS MAP, AND THAT SAID MONUMENTS ARE OR WILL BE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED, AND THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE CONDITIONALLY APPROVED TENTATIVE MAP.

FOR NEW ALBION SURVEYS INC. dba ALBION SURVEYS,

SIGNED: _____ DATE _____
JON M. WEBB



CITY ENGINEER’S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS MAP ENTITLED "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA", THAT SAID MAP IS SUBSTANTIALLY THE SAME AS IT APPEARS ON THE TENTATIVE MAP, AND ANY APPROVED ALTERATIONS THEREOF, THAT ALL OF THE PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL LOCAL ORDINANCES APPLICABLE AT THE TIME OF APPROVAL OF THE TENTATIVE MAP HAVE BEEN COMPLIED WITH AND THAT THE FINAL MAP COMPLIES WITH THE SUBDIVISION MAP ACT.

ERICA L. AHMANN SMITHIES, RCE 65468 DATE _____
DIRECTOR OF PUBLIC WORKS AND CITY ENGINEER
CITY OF ST. HELENA
STATE OF CALIFORNIA

I HEREBY STATE THAT THIS FINAL MAP WAS EXAMINED BY ME OR UNDER MY DIRECTION AND THAT I AM SATISFIED THAT SAID MAP IS TECHNICALLY CORRECT.

RICK MOSHIER, RCE 30696 DATE _____

MAYOR AND CITY CLERK’S STATEMENT

WE, ALAN GALBRAITH, MAYOR, AND CINDY BLACK, CITY CLERK, RESPECTIVELY, OF THE CITY OF ST. HELENA, STATE OF CALIFORNIA, DO HEREBY CERTIFY THAT ON THE ____ DAY OF _____, 20____, THE MAP ENTITLED "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA" WAS FILED WITH THE CITY COUNCIL FOR APPROVAL AS REQUIRED BY LAW. THAT BY RESOLUTION DULY ADOPTED AT A MEETING HELD ON THE ____ DAY OF _____, 20____, SAID COUNCIL APPROVED THE SAID MAP AND ACCEPTED ON BEHALF OF THE PUBLIC, SUBJECT TO IMPROVEMENT CONSISTENT WITH THE OFFERS OF DEDICATION THOSE CERTAIN PARCELS OF LAND DESIGNATED ON SAID MAP AS "PARCEL X", "PA&UE", "EVAE", "SSE" AND "SDE" ETC.

IN WITNESS WHEREOF, WE HAVE HEREUNTO SET OUR HAND THIS ____ DAY OF _____, 20____.

ALAN GALBRAITH, MAYOR, CITY OF ST. HELENA, STATE OF CALIFORNIA

CINDY TZAFOPULOS, CITY CLERK, CITY OF ST. HELENA, STATE OF CALIFORNIA

PLANNING COMMISSION STATEMENT

I HEREBY CERTIFY THAT THE CITY OF ST. HELENA PLANNING COMMISSION HAS APPROVED THE TENTATIVE MAP OF THE SUBDIVISION UPON WHICH THIS FINAL MAP IS BASED.

DATE _____
SECRETARY
CITY OF ST. HELENA
PLANNING COMMISSION

COUNTY TAX COLLECTOR AND REDEMPTION OFFICER STATEMENT

I HEREBY CERTIFY THAT, ACCORDING TO THE RECORDS IN MY OFFICE, THERE ARE NO LIENS FOR UNPAID STATE, COUNTY, MUNICIPAL, OR LOCAL TAXES OR SPECIAL ASSESSMENTS COLLECTED AS TAXES (EXCEPT TAXES OR SPECIAL ASSESSMENTS NOT YET PAYABLE) AGAINST ANY PART OF THE LAND INCLUDED IN THE WITHIN SUBDIVISION, AND THAT SECURITY IN THE AMOUNT OF \$_____ HAS BEEN FILED WITH THE COUNTY TAX COLLECTOR AND REDEMPTION OFFICER TO GUARANTEE THE PAYMENT OF ALL TAXES AND ASSESSMENTS COLLECTED AS TAXES, WHICH ARE NOW A LIEN AGAINST THE PROPERTY IN THE WITHIN SUBDIVISION, BUT WHICH ARE NOT YET PAYABLE.

TAMIE R FRASIER
COUNTY TAX COLLECTOR AND REDEMPTION OFFICER
NAPA COUNTY, CALIFORNIA

DEPUTY

COUNTY RECORDER’S STATEMENT

THE MAP ENTITLED "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA" IS HEREBY ACCEPTED FOR RECORDATION SHOWING CLEAR TITLE AS PER LETTER OF TITLE MADE BY PLACER TITLE COMPANY DATED THE ____ DAY OF _____, 2018, AND AFTER EXAMINING THE SAME I DEEM THAT SAID MAP COMPLIES WITH THE PROVISIONS OF CHAPTER 670 OF THE STATUTES AND SUBDIVISION REGULATIONS ACCEPTED PURSUANT THERETO.

FILED AT THE REQUEST OF PLACER TITLE COMPANY DATED THE ____ DAY OF _____, 2018, IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF NAPA, STATE OF CALIFORNIA, AT _____ A.M./P.M. IN BOOK _____ OF MAPS AT PAGES _____.

FEE PAID: _____

JOHN TUTEUR, COUNTY RECORDER
NAPA COUNTY, CALIFORNIA

DEPUTY COUNTY RECORDER

FINAL MAP
OF THE LANDS OF
OUR TOWN ST. HELENA
A CALIFORNIA NONPROFIT
BENEFIT CORPORATION

AS DESCRIBED IN DOC. NO. 2016-0009572,
OF OFFICIAL RECORDS OF NAPA COUNTY

IN THE CITY OF ST. HELENA,
COUNTY OF NAPA, STATE OF CALIFORNIA

CONSISTING OF 9 LOTS, 1 COMMON AREA
& 1 PARCEL DEDICATION

PLANNING DEPARTMENT FILE NO. PL17-061

BY
ALBION SURVEYS
ST. HELENA, CALIFORNIA



NAPA COUNTY APN 009-502-007
AUGUST 28, 2018

SHEET 1 OF 3
C3D PRJ. 3386
3386-01 FM.dwg

TRUSTEE’S STATEMENT

PLACER TITLE COMPANY, A CALIFORNIA CORPORATION, AS TRUSTEE UNDER THOSE CERTAIN DEEDS OF TRUST;

BENEFICIARY DOCUMENT # RECORDED DATE
1) CITY OF ST. HELENA 2018-0016472 AUGUST 22, 2018

DOES HEREBY CONSENT TO, AND JOIN IN THE EXECUTION OF THE FOREGOING CERTIFICATE AND RECORDATION OF THE "FINAL MAP OF THE LANDS OF OUR TOWN ST. HELENA", AND JOINS IN ALL OFFERS OF DEDICATION.

IN WITNESS WHEREOF, THE UNDERSIGNED HAS CAUSED THESE PRESENTS TO BE EXECUTED THIS DAY OF , 20

PLACER TITLE COMPANY

ITS: DATE:

OWNER’S ACKNOWLEDGEMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY, OR VALIDITY OF THAT DOCUMENT.

STATE OF)
) SS.
COUNTY OF)

ON , BEFORE ME, , NOTARY PUBLIC, PERSONALLY APPEARED [] WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) [IS]ARE] SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT [HE][SHE][THEY] EXECUTED THE SAME IN [HIS][HER][THEIR] AUTHORIZED CAPACITY((IES)), AND THAT BY [HIS][HER][THEIR] SIGNATURE[(S)] ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT. I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND :

SIGNATURE (SIGN & PRINT NAME)
COMMISSION NO. EXPIRES
COUNTY OF MY PRINCIPLE PLACE OF BUSINESS.

TRUSTEE’S ACKNOWLEDGEMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY, OR VALIDITY OF THAT DOCUMENT.

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) SS.
COUNTY OF)

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WITNESS MY HAND :

SIGNATURE (SIGN & PRINT NAME)
COMMISSION NO. EXPIRES
COUNTY OF MY PRINCIPLE PLACE OF BUSINESS.

FINAL MAP
OF THE LANDS OF
OUR TOWN ST. HELENA
A CALIFORNIA NONPROFIT
BENEFIT CORPORATION

AS DESCRIBED IN DOC. NO. 2016-0009572,
OF OFFICIAL RECORDS OF NAPA COUNTY
IN THE CITY OF ST. HELENA,
COUNTY OF NAPA, STATE OF CALIFORNIA
CONSISTING OF 9 LOTS, 1 COMMON AREA
& 1 PARCEL DEDICATION
PLANNING DEPARTMENT FILE NO. PL17-061

BY
ALBION SURVEYS
ST. HELENA, CALIFORNIA



NAPA COUNTY APN 009-502-007
AUGUST 28, 2018

SHEET 2 OF 3
C3D PRJ. 3386
3386-01 FM.dwg

BASIS OF BEARINGS

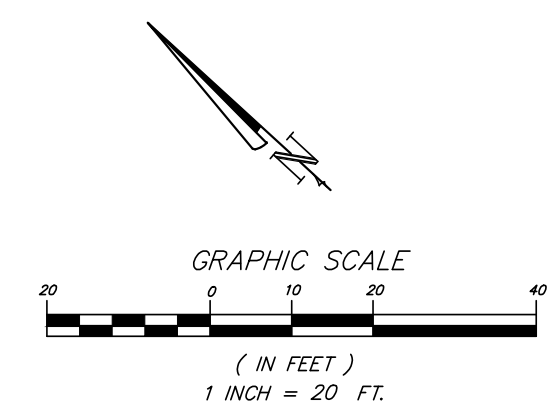
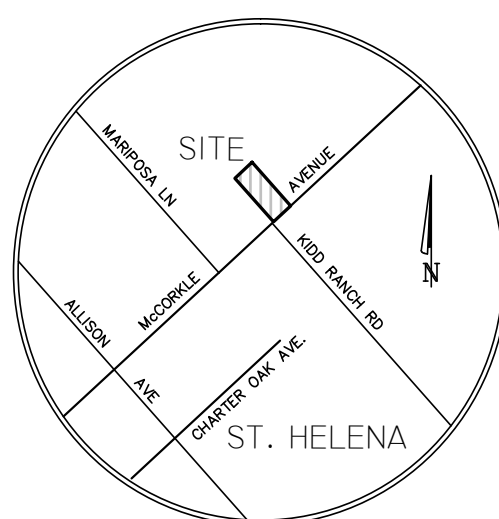
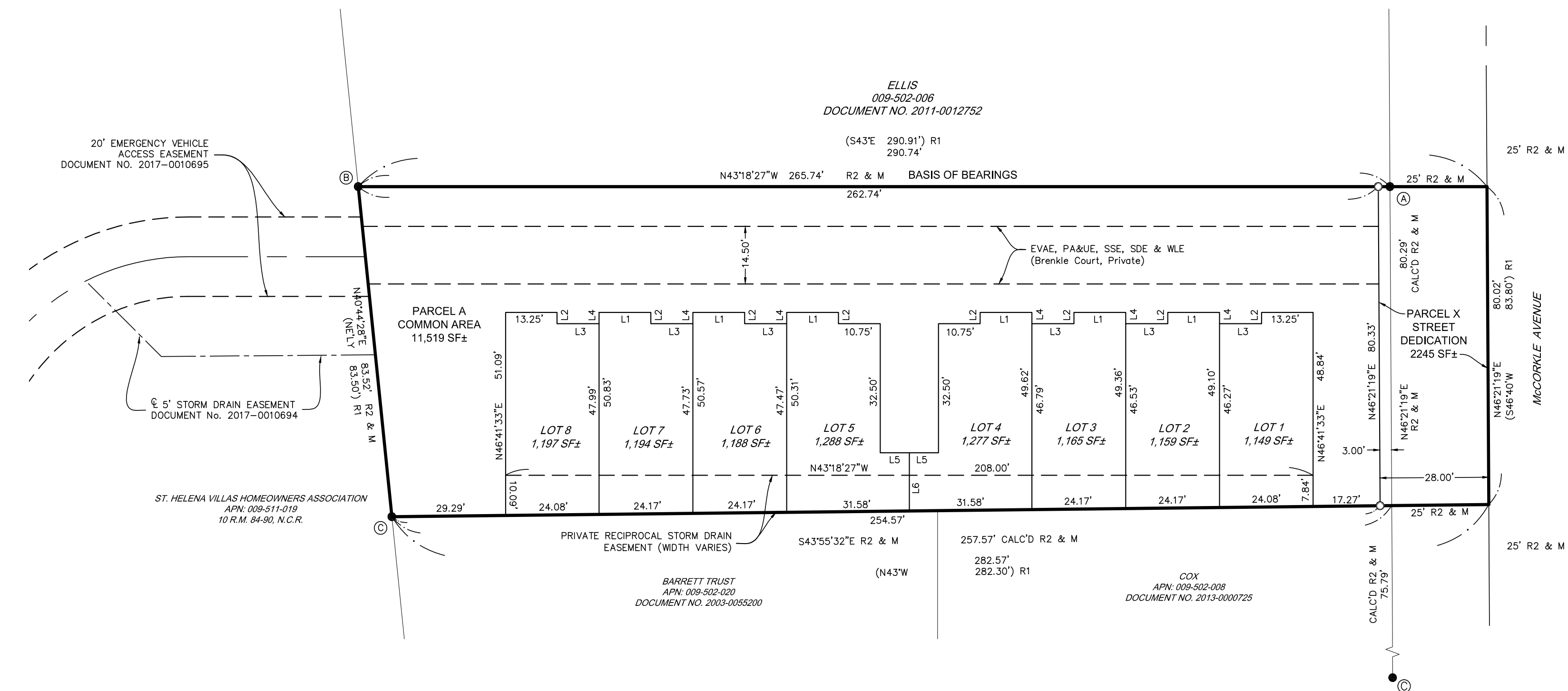
THE BEARING N43°18'27"W BETWEEN FOUND MONUMENTS ON THE NORTHEASTERLY LINE OF THE LANDS OF "OUR TOWN ST. HELENA" AS WERE SHOWN ON MAP NO. 4546 FILED IN BOOK 19 OF PARCEL MAPS AT PAGES 22-23 IN THE OFFICE OF THE RECORDER OF THE COUNTY OF NAPA, WAS USED AS THE BASIS OF BEARINGS OF THIS MAP AND SURVEY. ALL DISTANCES ARE SHOWN IN GROUND LEVEL FEET AND DECIMALS THEREOF.

MONUMENTS FOUND BY THIS SURVEY

- Ⓐ 1/2" IP, NO TAG, R3 (3/4" IP L.S. 3801) R2
- Ⓑ 3/4" IP, L.S. 3801, R3
- Ⓒ 1/2" IP, L.S. 5111 R3

REFERENCES

- R1 INST. No. 2016-0009572, N.C.R.
- R2 MAP No. 4546 19 P.M. 22-23, N.C.R.
- R3 MAP No. 2721 19 R.S. 62, N.C.R.



LEGEND

- SET 3/4" IRON PIPE AND TAG "LS 6709"
- FOUND MONUMENT AS NOTED
- CALC'D
- EVAE
- M
- N.C.R.
- PA&UE
- R#
- SSE
- SDE
- WLE
- SURVEYED TRACT BOUNDARY
- EXISTING OR FORMER PARCEL LINE
- LOT BOUNDARY BY THIS MAP
- EASEMENT LINE

LINE TABLE	
LINE	LENGTH
L1	13.33'
L2	2.83'
L3	10.83'
L4	2.83'
L5	7.50'
L6	14.63'

NOTES

- 1.) ALL LINES FOR LOTS 1-8 SHOWN ON MAP AND IN LINE TABLE ARE PARALLEL WITH OR PERPENDICULAR TO A LINE BEARING N43°18'27"W, UNLESS NOTED OTHERWISE.

FINAL MAP
OF THE LANDS OF
OUR TOWN ST. HELENA
A CALIFORNIA NONPROFIT
BENEFIT CORPORATION
AS DESCRIBED IN DOC. NO. 2016-0009572,
OF OFFICIAL RECORDS OF NAPA COUNTY
IN THE CITY OF ST. HELENA,
COUNTY OF NAPA, STATE OF CALIFORNIA
CONSISTING OF 9 LOTS, 1 COMMON AREA
& 1 PARCEL DEDICATION
PLANNING DEPARTMENT FILE NO. PL17-061

BY
ALBION SURVEYS
ST. HELENA, CALIFORNIA



NAPA COUNTY APN 009-502-007
AUGUST 28, 2018

SHEET 3 OF 3
C3D PRJ. 3386
3386-01 FM.dwg

CITY OF ST. HELENA

RESOLUTION No. 2018-

Resolution of the Council of the City of St. Helena approving the Final Map and Conditions, Covenants and Restrictions for the Our Town St. Helena Brenkle Court Subdivision and authorizing the City Manager to execute the Subdivision Improvement Agreement

RECITALS

- A. On May 12, 2015, the City Council agreed to sell 684 McCorkle to Our Town St Helena (OTSH) for \$1.00 to facilitate the development of the 8-unit Brenkle Court self-help affordable housing project (Resolution 2015-51); and
- B. On May 2, 2016, OTSH submitted applications for Tentative Subdivision Map, Demolition Permit and Design Review approval in order to demolish a dilapidated single-family home and accessory structures to allow construction of eight new, affordable, attached townhomes on the property located at 684 McCorkle Avenue in the HR: High Density Residential district, and
- C. On November 15, 2016, the Planning Commission of the City of St. Helena considered the project, staff report, and all testimony, written and spoken, at a duly noticed public hearing and approved the Demolition Permit and Design Review for the Brenkle Court project and recommended that the City Council approve the applicant's request for a tentative subdivision map, grant the applicant's request for a waiver from the City's water neutrality requirements, and approve the applicant's request for an alternative frontage improvement; and
- D. On December 13, 2016, City Council of the City of St. Helena considered the project, staff report, and all testimony, written and spoken, at a duly noticed public hearing and approved the Tentative Map, requested water neutrality waiver and the alternative frontage improvement; and
- E. A draft Subdivision Improvement Agreement has been reviewed by the City Attorney and a check in lieu of a bond in the amount totaling \$14,914 has been provided to the City of St Helena for the construction costs of the remaining required public improvements to allow recordation, if approved by the City Council.

RESOLUTION

The City Council of the City of St. Helena hereby resolves as follows:

1. Finds that the Project is exempt from the California Environmental Quality Act ("CEQA") pursuant to Section 15332, which exempts projects characterized as

in-fill development when the project is consistent with the general plan and zoning; occurs within city limits on less than five acres; has no valuable habitat; won't cause any significant environmental effects; and can be served by existing public services; and

2. The location and configuration of lots to be created by the Final Map substantially comply with the previously approved Tentative Map; and
3. The Final Parcel Map for the OTSH Brenkle Court Subdivision located at 684 McCorkle Avenue, a copy of which is hereby attached as Exhibit A and made part of this Resolution, is hereby approved; and
4. The Conditions, Covenants and Restrictions (CC&Rs) governing the Brenkle Court subdivision, a copy of which is also attached as Exhibit B, and made part of this resolution, is similarly hereby approved; and
5. The City Manager is directed to execute the Subdivision Improvement Agreement and the City Clerk is directed to transmit the Final Map and all supporting documents to the County Recorder of the County of Napa for recording.

Approved at a Regular Meeting of the St. Helena City Council on September 11, 2018, by the following vote:

Mayor Galbraith:	_____
Vice Mayor White:	_____
Councilmember Ellsworth:	_____
Councilmember Dohring:	_____
Councilmember Koberstein:	_____

APPROVED:

ATTEST:

Alan Galbraith, Mayor

Cindy Tzaopoulos, City Clerk

RECORDING REQUESTED BY

CITY OF ST. HELENA

WHEN RECORDED MAIL TO

Name	City of St. Helena
Street	
Address	1480 Main St.
City &	
State	St. Helena, Ca94599

SPACE ABOVE RECORDER'S USE ONLY
Recording Fees Exempted per Government Code Section 6103

SUBDIVISION IMPROVEMENT AGREEMENT

This Subdivision Improvement Agreement ("Agreement") is made and entered into this ___ day of ___, 2018 by and between the CITY OF ST. HELENA, a Municipal Corporation, ("City") and Our Town St Helena (OTSH) a California nonprofit public benefit corporation, "Subdivider").

RECITALS

A. Subdivider is the owner and developer of that certain tract of land situated in the City of St. Helena (City), County of Napa, California, located at 684 McCorkle Avenue, Napa County Assessor's Parcel No. 009-502-007-000, and more particularly described in Exhibit A attached hereto and incorporated herein by this reference ("Brenkle Court").

B. The City approved a Tentative Subdivision Map (the "Tentative Map"), with conditions and mitigation measures per the City of St Helena's Tentative Subdivision Map, Demolition Permit and Design Review Approval (No. PL16-022) on November 15, 2016 by the Planning Commission and on file with the City ("Conditions of Approval) for the Subdivider's project known as the Brenkle Court (the "Subdivision"). Subdivider proposes to perform certain works of improvement thereon or otherwise satisfy certain elements of the Conditions of Approval (including the Mitigation Monitoring and Reporting Program) as hereinafter set forth;

C. City desires to assure that the proposed improvements will be done in a workmanlike manner and in accordance with the laws now in force and effect in the City, particularly Chapter 16.32 of the St. Helena Municipal Code regarding subdivision improvements, the terms and conditions of which are incorporated herein by reference. Subdivider declares that it is familiar with the regulations contained in such ordinance and in the Subdivision Map Act (Government Code Section 66410-66499.37); and

D. A Map of the Subdivision, consisting of three sheets labeled Final Map of the Lands of Our Town St. Helena, prepared by Albion Surveys, in accordance with the provisions of the St. Helena Subdivision Ordinance has been filed by Subdivider with City (and, as filed, is referred to herein as the "Map"). The Map can only be approved by the City Council subject to Subdivider entering into this Agreement with the City.

Now therefore, for good and valuable consideration, including the City's approval of the Map, the parties hereto mutually covenant and agree as set forth herein.

AGREEMENT

1. **Construction of Improvements.** Subdivider shall, at its own cost and expense, furnish all labor and materials required to fully construct or install the monumentation and the improvements (collectively the "**Improvements**") within and without the Subdivision shown and delineated upon the Map and as required in the Conditions of Approval approving the Tentative Map, which includes Mitigation Monitoring and Reporting Program. A copy of the Conditions of Approval is on file in the City's Planning Department. Subdivider shall do all work in a good workmanlike manner and complete the Improvements in accordance with all currently approved plans, standards, ordinances, subdivision regulations, policies and specifications and according to the plans and specifications approved by the City, prepared by Stillwater Civil Design for Brenkle Court or with any changes required or ordered by the City Engineer which in the Engineer's opinion are necessary to complete the work.

2. **Compliance/Access to Work/Inspection.** In constructing the Improvements, Subdivider shall comply with all conditions and requirements set forth in the Conditions of Approval approving the Tentative Map, any environmental documentation, including a Negative Declaration, Environmental Impact Report and Mitigation Monitoring Plan, if applicable, design and construction standards of the City, and all ordinances, rules and regulations of the City as they currently exist. The City shall inspect all Improvements for compliance with the Improvement plans, subdivision regulations, City Standard Specifications, and Conditions of Approval.

Subdivider shall allow City's duly authorized representatives access to the work at all reasonable times and furnish it with reasonable facilities for ascertaining that the methods, materials, and workmanship so as to comply with the requirements and intent of the approved Improvement plans. Subdivider is required to give at least forty-eight 48 hours advance notice of the date upon which the work is commenced and the date upon which the work is to be completed.

Subdivider, subject to the Conditions of Approval, shall: a) provide any and all rights of way and easements which may be necessary for the Subdivision and the Improvements; b) obtain all necessary permits and licenses for the construction of the Improvements; c) give all necessary legally required notices; and d) pay all fees and taxes required by law.

3. **Ownership of Improvements.** All Improvements constructed or installed pursuant to this Agreement expressly including, but not limited to, water and sewer lines, but excluding gas, electrical, telephone, private water wells, private irrigation, solar, satellite, fiber optic, cable television, and any telecommunication facilities that are to be public facilities and/or otherwise are for public use within the public streets/easements, shall become the sole exclusive property of the City of St. Helena, without payment therefore except for any reimbursement required by law and/or agreement, upon acceptance of those Improvements by the City.

4. Time of Completion. All of the Improvements shall be completed by Subdivider within twelve (12) months from the recording of the Map, unless an extension is granted by the City Council pursuant to Section 16.32.300 of the St. Helena Municipal Code and/or otherwise as may be provided by State law. Except as may be provided by State law and/or by applicable City ordinance, any extension may be conditioned upon an increase in security, as identified and defined in Section 5, below, and inspection fees related to the Improvements to reflect current costs and compliance with the St. Helena Municipal Code.

5. Improvements Security. This Agreement shall be secured by:

(a) A performance bond or other form of security permitted under Section 6 in the sum of _____ (the Estimated Cost calculated pursuant to Section 16.32.320C for the Improvements);

(b) A labor and materials bond or other permitted security in the sum of _____ guaranteeing payment of Subdivider's contractor, subcontractors and other persons furnishing labor, materials or equipment for the construction or installation of the Improvements;

(c) Cash deposit of \$14,914, as established by Section 16.32.320D, to be used at the discretion of City to correct deficiencies and conditions that may arise during and after construction of the Subdivision.

6. Form of Security. The form of the security required under Section 5 shall be one of the following:

(a) A bond or bonds meeting the requirements of Government Code Section 66499 through 66499.4 secured by one or more corporate sureties approved by the City Attorney;

(b) A deposit either with the City or a responsible escrow agent or trust company, at the option of the City, of money or negotiable bonds of the kind approved for securing deposits of public money; or

(c) An instrument of credit from one or more financial institutions subject to regulation by the State or Federal Government and pledging that the funds necessary to carry out this Agreement are on deposit and guaranteed for payment.

7. Liability for Personal Injuries. City shall not be liable to the Subdivider or to any other person, firm, or corporation whatsoever for any injury or damage that may result to any person or property by or from any cause whatsoever in, on, or about the Subdivision or any part thereof prior to the City's acceptance of the Improvements, in whole or in part.

8. Release and Indemnification. In no case does the City assume any responsibility for the construction or supervision of the Improvements or the time of completion, and all liability for damage or injury to persons or property, prior to the time of acceptance, in whole or in part, shall be borne by Subdivider. Subdivider agrees to indemnify the City for any such liability or claims thereof including any reasonable attorney's fees and costs incurred by the City in connection with this Agreement, the construction of the Improvements and/or the defense of any third party claims relating to this Agreement and/or the construction of the Improvements.

Subdivider shall pay all reasonable attorney's fees that City may incur because of any legal action or other proceeding arising from the Subdivision or improvements. .

9. Liability of Subdivider. Subdivider agrees that the use for any purpose and by any person of any and all of the Improvements shall be at the sole and exclusive risk of Subdivider at all times prior to acceptance by the City of the completed Improvements; provided, that acceptance by City shall in no way eliminate or lessen any of Subdivider's obligations or undertakings contained in this Agreement. The issuance of any occupancy permits by the City for dwellings located in the Subdivision shall not be construed in any manner to constitute an acceptance and approval of any and all of the Improvements.

10. Insurance: Without limiting Subdivider's indemnification provided herein, Subdivider shall take out and maintain at all times during the life of this contract the following policies of insurance with insurers (if other than the State Compensation Fund) with a current A.M. Best's rating of no less than A:VII, or its equivalent, against injury to persons or damage to property which may arise from or in connection with the performance of work hereunder by Subdivider, its agents, employees or subcontractors:

Minimum Scope of Insurance. Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001). This insurance must include coverage for contractual liability assumed by the Contractor under Paragraph G-04.
2. Insurance Services Office form number CA 0001 (Ed. 1/87) covering Automobile Liability, code 1 (any auto).
3. Workers' Compensation and Employer's Liability Insurance is required by Section 3700 of the California Labor Code.

Minimum Limits of Insurance. Subdivider shall maintain limits no less than:

1. General Liability: \$2,000,000.00 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: \$2,000,000.00 per accident for bodily injury and property damage.
3. Worker's Compensation statutory limits and Employer's Liability: \$1,000,000.00 per accident for bodily injury or disease.

Deductibles and Self-Insured Retentions. Any deductibles or self-insured retentions must be declared to and approved by the City. At the option of the City, either: The insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City of St. Helena, its

agents, officers, officials, employees and volunteers; or the Subdivider shall provide a financial guarantee satisfactory to the City guaranteeing payment of losses and related investigations, claim administration and defense expenses.

The general liability AND automobile liability policies are to contain, or be endorsed to contain, the following provisions:

1. The City, its agents, officers, officials, employees and volunteers are to be named as additional insured's with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of the Subdivider; and with respect to liability arising out of work or operations performed by or on behalf of the Subdivider including materials, parts or equipment furnished in connection with such work or operations coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under Section 2782(b) of the Civil Code. General liability coverage can be provided in the form of an endorsement to the Subdivider's insurance, or as a separate owner's policy.
2. For any claims related to this project, the Subdivider's insurance coverage shall be primary insurance as respects the City, its agents, officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City, its agents, officers, officials, employees or volunteers shall be excess of the Subdivider's insurance and shall not contribute with it.
3. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be canceled or reduced by either party, except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the City. In the cancellation box (in the lower right hand corner of the ACORD form), the words "endeavor to" and "but failure to do so....agents or representatives" needs to be crossed out.

Waiver of Subrogation. The workers' compensation and General Liability policies are to be endorsed with a waiver of subrogation. The insurance company, in its endorsement, agrees to waive all rights of subrogation against the City, its agents, officers, officials, employees and volunteers for losses paid under the terms of the policy which arises from the work performed by the named insured for the City.

Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII.

Verification of Coverage. Prior to City's execution of Agreement, Subdivider shall provide properly executed Certificates of Insurance and Endorsements, signed by a person authorized by the insurer to bind coverage on its behalf, evidencing the insurance required herein on forms approved by the City. The amount of any policy deductible or self-insured retention over \$100,000.00 shall be included. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications at any time.

Subcontractors. Subdivider shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

In the event the City has agreed to allow the general contractor to provide the required insurance, Subdivider shall provide City with a letter naming such contractor. Work on the project may then only continue as long as that general contractor is engaged as the general contractor on the job. No other general contractor may be substituted unless and until a letter naming the new general contractor is provided to City along with the necessary evidence of all required insurance.

11. Extensions and Security. Any extensions of time granted by the City for completion of the Improvements shall not relieve or affect the security given to secure Subdivider's performance under this Agreement.

12. Payment of Fees. The Subdivider shall pay the City prior to commencement of construction of the Improvements all applicable fees in the amount required by the City.

13. Warranty. The Subdivider hereby warrants that the construction of the Improvements hereunder will not adversely affect any portion of any adjacent property. Subdivider shall replace, or have replaced, or repair, or have repaired, as the case may be, all pipes and monuments shown on the Map which are destroyed or damaged by Subdivider. The Subdivider shall replace or have replaced, repair, or have repaired, as the case may be, or pay to the owner, the entire cost of replacement or repairs, of any and all property damaged or destroyed by reason of any work done hereunder, whether such property be owned by the United States or any agency thereof, or the State of California, or any agency or political subdivision thereof, or by the City or any public or private corporation, or by any person whomsoever, or by any combination of such owners. Any such repair or replacement shall be to the satisfaction, and subject to the approval of the City Engineer.

14. Approval and Modifications. The Improvements shall be subject to approval and acceptance by the City Engineer and to inspection at all times by City officials. The City shall have the right to modify the plans and specifications for the Improvements if, in its discretion, the City deems modifications desirable for public health or safety provided that (a) the costs (as estimated by the City Engineer) for Subdivider to implement all such modifications (in the aggregate) shall not exceed 25 percent (25%) of the Estimated Cost and/or not otherwise make the affordable housing component of the Subdivision economically impractical and/or infeasible, and (b) Subdivider complies with all state and Federal requirements regardless of costs.

Pursuant to section 16.32.280 of the St. Helena Municipal Code: A. When all improvement deficiencies have been corrected and as-built improvement plans filed, those subdivision improvements which will be dedicated to the city may be considered for acceptance; B. If the offers of dedication on the final or parcel maps have been rejected, the city council (for subdivision for which a final map is required) or the planning commission (for subdivision for which a parcel map is required) shall accept the improved dedications and the city council's resolution of acceptance or the planning commission's certificate of acceptance shall be filed with the Napa County Recorder; C. If the offers of dedication on the final or parcel map have

been accepted subject to improvement, the public works director shall file a notice of completion with the county recorder; and D. Acceptance of improvements shall imply only that the improvements have been completed satisfactorily and that they have been accepted for public use.

15. Repair or Reconstruction of Defective Work. Upon acceptance of the Improvements by City, Subdivider shall provide warranty security in an amount equal to 10% of the Estimated Cost (less the remainder of the cash bond which shall be retained for the one-year warranty period) to guarantee the Improvements against any defective work or labor done or defective materials used for a period of one year after acceptance of the Improvements. If, within this period, any structure or part of any structure furnished and/or installed or constructed, or caused to be installed or constructed by Subdivider as part of the Improvements, or any of the work done under this Agreement, fails to fulfill any of the requirements of this Agreement or the specifications referred to herein ("Non-Conforming Work"), Subdivider shall, within five (5) business days following receipt of notice from the City (as provided in Section 16) describing the Non-Conforming Work and without any cost to City, repair or replace the Non-Conforming Work. Should Subdivider fail to act promptly or in accordance with this requirement, or should the exigencies of the case require repairs or replacements to be made before Subdivider can be notified, City may, at its option, invoke the warranty security or perform the necessary repairs or replacements itself and Subdivider or its guarantor shall pay to City the actual cost of such repairs; provided that if City invokes the warranty security or performs the repairs due to Subdivider's failure to act (as opposed to the exigencies of the situation), City shall be entitled to recover an additional fifteen percent (15%) of the cost of such repairs.

16. Subdivider not Agent of City/City Not Agent of Subdivider. Neither Subdivider nor any of the Subdivider's agents or contractors are, or shall be considered to be agents of, City in connection with the performance of Subdivider's obligations under this Agreement. Neither City, nor any of City's agents or contractors, are or shall be considered to be agents of Subdivider in connection with the performance of City's obligations under this Agreement.

17. Notice of Breach and Default. If Subdivider (a) refuses or fails to commence, perform and complete construction of the Improvements, or any severable part thereof within the time specified in Section 4 above, or any extension thereof, or (b) is adjudged a bankrupt, makes a general assignment for the benefit of Subdivider's creditors, has a receiver appointed, or otherwise becomes insolvent, or (c) violates any of the provisions of this Agreement, then the City Engineer or City Council may serve written notice of breach upon Subdivider and Subdivider's surety. The failure of the City Engineer or City Council to serve the notice of breach shall not be construed as a waiver of any breach by Subdivider nor provide a defense nor exoneration to the Subdivider's surety.

18. Breach of Agreement: Performance by Surety or City. In the event any notice of breach is given to Subdivider and Subdivider's surety in accordance with Section 16 above, Subdivider's surety shall have the duty to take over and complete the Improvements; provided, however, that if neither Subdivider nor the surety, within five (5) business days after receipt by it of such notice of breach, does not give City written notice of its intention to complete the

Improvements in accordance with this Agreement, and does not commence performance thereof within five (5) business days after notice to City of such election, City may take over the construction of the Improvements and prosecute the same to completion, by contract or by any other method City may deem advisable, for the account and at the expense of Subdivider, and Subdivider's surety shall be liable to City for any excess cost or damages occasioned City thereby. If Subdivider has posted a cash deposit or letter of credit as security, City may dedicate the proceeds to the cost of completing the work and any excess cost of damages occasioned thereby.

19. Notices. All notices herein required shall be in writing, and delivered in person or sent by registered mail, postage prepaid. Each notice shall be deemed delivered upon actual receipt or upon refusal of delivery. Notices required to be given to City shall be addressed as follows:

City Engineer
1480 Main Street
St. Helena, California 94574

Notices required to be given to Subdivider shall be addressed as follows:

Mary Stephenson or
John Sales
Our Town St Helena
P.O. Box 94
St Helena, California 94574

Notices required to be given to a surety or the issuer of a letter of credit shall be addressed to the address shown on the bond or letter of credit. Any party or the surety or issuer of a letter of credit may change such address by notice in writing to the other party and thereafter notices shall be addressed and transmitted to the new address.

20. Sale or Disposition of Subdivision: Government Code sections 66499 (b) and 66499.7 shall control.

21. Assignment. Any assignment of this Agreement must be approved by the City Council, which approval shall not be unreasonably withheld; provided that Subdivider may assign this Agreement to an affiliate of Subdivider without obtaining such approval. This Agreement shall run with the land and all assignees, heirs, and successors in interest shall be bound by the terms of this Agreement.

22. Attorney Fees, Costs and Venue. In the event that either party breaches or repudiates this agreement, the party aggrieved shall be entitled to recover from the other party the amount of damages suffered on account of such breach, as well as any costs, expenses and reasonable attorney fees as a result of the breach or in enforcing rights under this agreement. This provision shall be in addition to any provisions regarding attorney's fees set forth in the bonds securing this Agreement. This Agreement shall be construed and interpreted according to California law, and

any action to enforce the terms of this Agreement or for the breach thereof shall be brought and tried in the County of Napa.

23. Utility Deposits - Statement. Subdivider shall file with the City Clerk, prior to the commencement of any work to be performed within the area delineated on the Map, a written statement signed by Subdivider and each public utility corporation involved to the effect that Subdivider has made all deposits legally required by such public utility corporation for the connection of any and all utilities to be supplied by such public utility corporation within the Subdivision.

24. Superintendence and Inspection by Subdivider. Subdivider shall give personal superintendence to the work on the Improvements, or have a competent foreperson or superintendent, satisfactory to the City Engineer, on the work at all times during progress, with authority to act for Subdivider. The inspection services performed by the City Engineer are solely for the benefit of the City. The Subdivider shall furnish its own inspection service for all work performed under this Agreement, and City shall not be responsible for any defective work or materials which could have been discovered by Subdivider's thorough independent inspection.

25. Financial Responsibility. Subdivider agrees to be financially responsible for all required City services provided to the Subdivision's lots prior to acceptance by City.

26. Exoneration of Surety: Government Code section 66499.7 shall control.

27. Reference: Any reference to a department manager shall include his or her duly authorized deputy or representative.

28. Recordation: Upon request by City, Subdivider agrees to execute and acknowledge a memorandum of this Agreement for recordation with the County Recorder. By recordation of this Agreement or a memorandum hereof, it is parties' intent to provide notice to future purchasers that the obligations and benefits set forth shall run with the land. At its option City may record the Agreement or memorandum or may require Subdivider, at Subdivider's cost, to record such Agreement or memorandum and may withhold City permits until proof of recordation is provided to City.

29. Time of Essence: Time is of the essence.

30. Severability: The provisions of this are severable. If a court of competent jurisdiction holds any portion invalid, the remainder of this Agreement shall remain in full force and effect.

31. Entire Agreement: This Agreement constitutes the entire agreement with respect to the subject matter hereof and all modifications, amendments or waivers under this Agreement must be in writing and signed by the authorized representatives of the parties.



IN WITNESS WHEREOF, the parties have executed this agreement on the day and year first above written.

Our Town St Helena

By: Mary Stephenson
Mary Stephenson, OTSH Board President

CITY OF ST. HELENA, A MUNICIPAL CORPORATION

By: _____
Mark T. Prestwich, City Manager

ATTEST:

Cindy Tzafopolous, City Clerk

APPROVED AS TO FORM:

Thomas Brown, City Attorney

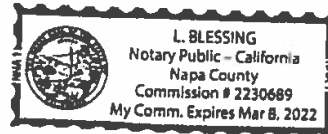


STATE OF CALIFORNIA)
) ss.
 COUNTY OF NAPA)

On Aug 30 2018, before me, L. Blessing, Notary Public personally appeared Mary Stephenson, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity, and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature [Signature]



STATE OF CALIFORNIA)
) ss.
 COUNTY OF NAPA)

On _____, before me, _____, the City Clerk of the City of St. Helena, personally appeared, _____, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her authorized capacity, and that by his/her signature on the instrument the person or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

 City Clerk



EXHIBIT A

(Legal Description of Brenkle Court Property)

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF SAINT
HELENA, COUNTY OF NAPA, STATE OF CALIFORNIA, AND IS DESCRIBED AS
FOLLOWS:

COMMENCING at the iron stake on the old "Logan" line distant thereon 46° 40' East 691.40 feet from a street monument at the Intersection Allison Avenue and McCorkle Avenue; running thence North 43° West along the northeasterly line of land conveyed to Edward L. McAuley by Deed of record in Book 103 of Deeds at page 271, said Napa County Records. 282.30 feet to the northwesterly line of the lands conveyed to C.J. McClain by Deed of record in Book 106 of Deeds at page 395, said Napa County Records; thence northeasterly along last mentioned line 83.50 feet; thence South 43° East 290.91 feet to said old line of Logan; thence along last mentioned line South 46° 40' West 83.00 feet to the Point of Commencement.

APN 099-502-007



Brenkle Court CC&Rs

FINAL ~~05/7/18~~ ~~w/ minor changes for BRE~~ 9/2/18

OUR TOWN ST. HELENA

Declaration for Brenkle Court

684 McCorkle Street, St. Helena CA
Lots 1 through 8 and Parcel A

Conditions, Covenants & Restrictions

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DECLARATION FOR PROJECT

Brenkle Court – 684 McCorkle

LOTS 1 THROUGH 8 and Parcel A

This DECLARATION is made this ____ OF ____, 2018 by OUR TOWN ST HELENA, a California non-profit corporation, hereinafter referred to as "Declarant."

ARTICLE 1 PREAMBLE

1.1 Declaration. This DECLARATION is made with reference to the facts set forth in this Article.

1.2 Declarant is the owner in fee simple of that certain real Property situated in the City of St. Helena, County of Napa, State of California, more particularly described as follows:

Lots 1 through 8 and Parcel A, inclusive as shown on the map entitled "____," filed _____, in Book ____ of Maps, at pages _____, in the office Of the County Recorder of said Napa County.

It is the desire and intention of Declarant to subdivide and develop all of the real property referred to in Paragraph 1.2 above, as a planned unit development, to provide for the preservation of the values and amenities in the development of said land and to create and maintain thereon common community facilities. To this objective, Declarant desires and intends to impose on said real property mutual beneficial restrictions, easements, assessments and liens under a general plan or scheme of improvement for the benefit of all of the subject lots and Common Areas and the future owners of said Lots and Common Areas.

ARTICLE 2 DEFINITIONS

Unless the context otherwise specifies or requires, the terms defined in Article II shall for all Purposes of this Declaration, have the meanings herein specified.

2.1 Architectural Committee Rules. The term "Architectural Committee Rules" shall mean rules adopted by the Architectural Committee pursuant to Article IX.

2.2 Articles. The term 'Articles' shall mean the Articles of Incorporation of 684 McCORKLE – BRENKLE COURT, LOTS 1 THROUGH 8 and Parcel A HOMEOWNERS ASSOCIATION, which are or shall be titled in the Office of the Secretary of State of the State of California.

2.3 Association. The term "association shall mean BRENKLE COURT HOMEOWNERS ASSOCIATION, the nonprofit mutual benefit corporation described in Article VI, including its successors and assigns.

2.4 Beneficiary. The term "Beneficiary" shall mean a mortgagee under a mortgage as well as a beneficiary under a deed of trust.

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2.5 Board. The term "Board" shall mean the Board of Directors of the Association.

2.6 By-Laws. The term "By-Laws" shall mean the By-Laws of the Association, which are or shall be adopted by the Board.

2.7 City. The term "City" shall mean the City of St. Helena, California

2.8 Committee. The term "Committee" shall mean special committees such as the Architectural Committee or an Election Committee.

2.9 Common Area. The term "Common Area" shall mean that area designated Parcel A "Common Area for Parcels 1 through 8," as shown on the Map. Said Common Areas shall be owned by Association for the use and enjoyment of the Owners and shall be conveyed to the Association for the benefit of the Association prior to or at the time of the conveyance of the first Lot shown on the subdivision Map to a member of the public. Common Areas shall include all facilities and improvements located within the property designated as Common Areas, including driveways, walkways, paths, uncovered parking areas, sewers, open spaces, planted and landscaped areas, streets and roads within the subject property, electrical, water, gas and telephone utility facilities, fire hydrants and all other improvements which may be located in the parcel so designated.

2.10 Declarant. The term "Declarant" shall mean OUR TOWN ST HELENA, a California non-profit corporation. For any successor or assign of "Declarant" to be deemed a Declarant under the terms hereof, Declarant shall record in the County in which subject property is located a certificate so designating said successor or assignee as Declarant.

2.11 Declaration. The term "Declaration" shall mean the within DECLARATION FOR BRENKLE COURT – 684 McCORKLE, and as said Declaration may from time to time be amended.

2.12 Improvements. The term "Improvements" shall include buildings, roads, driveways, parking areas, fences, screening walls, retaining walls, decks, hedges, windbreaks, plantings, planted trees and shrubs, poles, signs and all other structures or landscaping improvements of every type and kind.

2.13 Lot. The term "Lot" shall mean the subdivided residential lots, whether improved or unimproved, designated as Lots 1 through 8, inclusive, in the Subdivision Map, and all easements appurtenant thereto. The term "Parcel" on the map where it refers to "Common Area for Parcel A shall mean "Common Area for Lots 1 through 8."

2.14 Manager. The term "Manager" shall mean the person or corporation appointed as such pursuant to Subsection 6.9.3.

2.15 Member. The term "Member" shall mean a person who is a Member of the Association pursuant to Section 6.2.

2.16 Operating Fund. The term "Operating Fund" shall mean the fund created for the receipts and disbursements of the Association pursuant to Section 7.1.

2.17 Owner. The term "Owner" shall mean the record owner, whether one or more persons or entities, including Declarant, of the record fee simple title to any Lot situated in the Project, including

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contract sellers and purchasers under contracts of sale, but excluding those having such interest merely as security for the performance of an obligation.

2.18 Parking Area. The term "Parking Area" shall mean uncovered portion of the Common Area, which has been established and designated for the parking of a single vehicle as shown on the Subdivision Map.

2.19 Party Wall. The term "Party Wall" shall mean any wall of a Residence located on a property line dividing any Lot which wall is commonly used by any such Lots and the adjoining Lots. Section 4.3 of this Declaration shall govern the rights and responsibilities regarding such Party Walls.

2.20 Project. The term "Project" shall mean all Residential Areas and Common Areas as defined herein.

2.21 Quorum. A quorum of Members shall constitute more than 50% of the Owners as defined herein.

2.22 Residence. The term "Residence" shall mean a building or buildings used for residential purposes.

2.23 Residential Area. The term "Residential Area" shall mean Lots 1 through 8 and Parcel A, inclusive, as shown on the Subdivision Map.

2.24 Residential Use. The term "Residential Use" shall mean occupation and use of a Residence in conformity with this Declaration and the requirements imposed by applicable zoning laws or other state or municipal rules and regulations.

2.25 Rules. The term "Rules" shall mean the rules adopted by the Board of Association, as they may from time to time be in effect pursuant to the provisions of Section 6.9.

2.26 Subdivision Map. The term "Subdivision Map" shall mean that certain Subdivision Map entitled "Final Map of 684 McCorkle – Brenkle Court," recorded in the Office of the County Recorder of Napa County, California on the _____, 2018, in Book _____ of Maps at Pages _____, inclusive.

2.27 Subject Property. The term "Subject Property" shall include Lots 1 – 8 shown on the Subdivision Map.

ARTICLE 3 PROPERTY SUBJECT TO DECLARATION

3.1 The Project. All of that certain real property located in the City of St. Helena, County of Napa, State of California, described as the Project in paragraph 2.20 herein shall be subject to this Declaration and shall constitute the Project. Declarant hereby declares that all of said real property is held and shall be held, conveyed, hypothecated, encumbered, used, occupied and improved subject to this Declaration, all of which are declared and agreed to be in furtherance of a plan for the subdivision, improvement and sale of said real property and are established and agreed upon for the purpose of enhancing and perfecting the value, desirability and attractiveness of said real property and every part thereof. This Declaration shall run with said real property and shall be binding upon and inure to the benefit

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of Declarant, the Association, and each Owner of a Lot in the Project and each successor in interest of such Owner. Each and all of the covenants, conditions, restrictions, limitations, easements, uses and obligations contained herein shall be deemed to be and shall be construed as equitable servitudes enforceable by any of the Owners of any Lot against other Owners or occupants of the Subject Property, or any portion thereof.

3.2 Land Classification. All land within the Project shall be divided into the following land classifications:

3.2.1 Residential Area, being all of the property contained within Lots 1 through 8, inclusive as shown on the Subdivision Map.

3.2.2 Common Area, Being all of the property contained in Parcel A as shown on the Subdivision Map.

3.3 Annexation. No annexation to the Project shall be permitted without the vote or written assent of not less than 66-2/3% of the total votes residing in Members other than Declarant.

ARTICLE 4 PROPERTY RIGHTS – RESIDENTIAL AREA

4.1 Residential Area: Permitted Uses and Limitations. Lots within the Residential Area shall be for the exclusive use and benefit of the Owners thereof, subject, however, to all of the following limitations and restrictions.

4.1.1 Residential Use. Each Lot within the Residential Area shall be improved and used exclusively for residential purposes. With the exception of a home business that have been issued an annual permit by the City of St. Helena, no gainful occupation, profession, trade or other nonresidential use shall be conducted on any Lot or in any building.

4.1.2 Rentals. Owners shall not lease or rent their properties to third parties at any time.

4.1.3 Animals. No animals of any kind shall be maintained, bred or kept on any Lot or in the Common Area except that dogs, cats or other customary household pets in a reasonable number and size may be kept; provided, however, that they are not kept, bred or maintained for any commercial purposes, and provided further, that the Rules may limit or restrict the keeping of such pets. For the purpose of this Section, a reasonable number of pets shall be deemed to be a limit of two (2) and reasonable size shall be limited to fifty (50) pounds, unless otherwise determined by the Board. The Board shall specifically have the right to prohibit the maintenance of any pet, which, in the opinion of the Board, after notice and hearing, constitutes a nuisance to any other Owner. All dogs must be kept on a leash in the common areas and on the public street.

4.1.4 Structures for Animals. No structure for the care, housing or confinement of any house or yard pet shall be maintained so as to be visible from neighboring property.

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4.1.5 Satellite Dishes and Antennas. Satellite Dishes shall be permitted with the approval of the Board. Board shall designate where on the property it is acceptable to place the dish or Board can delegate that responsibility to the Arch committee. No antenna for transmission or reception for television signals or any other form of electromagnetic radiation shall be erected, used or maintained outdoors, whether attached to a building or structure or otherwise.

4.1.6 Utility Service. No lines, wires or other devices for the communication or transmission of electric current or power, including telephone, television and radio signals, shall be constructed, placed or maintained anywhere in or upon any Lot unless the same shall be contained in conduits or cables constructed, placed and maintained underground or concealed in, under or on buildings or other approved structures. Nothing herein shall be deemed to forbid the erection and use of temporary power or telephone services incident to the construction of approved buildings.

4.1.7 Improvements, Alterations and Repairs. No improvement, repair, excavation or other work, which in any way alters the appearance of any Lot or the improvements located thereon from its natural or improved state existing on the date such Lot was first conveyed in fee by Declarant to an Owner shall be done without the prior approval of the Architectural Committee given pursuant to the terms of Article IX hereof, except as specifically authorized herein. All repairs, maintenance and care of the exterior surfaces of residences shall be undertaken by the Association as provided in Article VI of this Declaration.

4.1.8 Temporary Occupancy. No trailer, tent, shack, barn, garage, basement or any incomplete building or temporary building or structure of any kind shall be used at any time as a Residence, either temporary or permanent. Temporary buildings or structures used during the construction or improvement of a Residence shall be expressly approved by the Architectural Committee and shall be removed immediately after the completion of construction.

4.1.9 Trailers, Boats and Motor Vehicles. No boat, mobile home, recreational motor home, trailer of any kind, truck camper larger than a half (1/2) ton pick-up truck, dilapidated motor vehicle or permanent tent or similar structure shall be kept, placed, maintained, constructed, reconstructed or repaired upon any Lot or the Common Area within the Project in such a manner as will be visible from neighboring property or adjacent streets; provided, however, that the provision of this subsection shall not apply to emergency vehicle repairs or temporary construction shelters or facilities maintained during, and used exclusively in connection with any work or improvement approved by the Architectural Committee. No commercial vehicles of any nature shall be parked or stored on any Lot or on the streets of the Project, except for commercial vehicles providing services to the Owners of Lots or the Association, and in that event, only for the duration necessary to provide such services.

4.1.10 Nuisances. No rubbish or debris of any kind shall be placed or permitted to accumulate on or adjacent to any Lot on the Project Common Area, and no odors shall be permitted to arise there from, so as to render any Lot or portion thereof unsanitary, unsightly, harmful or detrimental to any of the property in the vicinity thereof or to the occupants thereof. No nuisance shall be permitted to exist or operate upon any Lot so as to be harmful or detrimental to any property in the vicinity thereof or to its occupants. Without limiting any of the foregoing, no exterior speakers, horns, whistles, bells or other sound devices, except security devices used exclusively for security.

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4.1.11 Trash Containers and Collection. All garbage and trash shall be placed and kept in covered containers in a type and style approved by the Board. Trash containers will be kept in the designated place in the garage of each lot. Trash containers will be put out for pick up on the designated trash pick up day by the Lot owner and returned to the garage within 24 hours. In no event shall such containers be maintained outside in the front or back of the home or so as to be visible from neighboring property. The Board can delegate responsibility for monitoring trash container placement to the Architecture Committee.

4.1.12 Clothes Drying Facilities. No outside clothes lines or other outside clothes drying or airing facilities shall be maintained on any lot unless the Architectural Committee finds such facilities to be adequately concealed so as not to be seen from any adjacent properties.

4.1.13 Fences. Except as otherwise provided in this section 4.1.13, no fences, hedges or walls shall be erected or maintained on any Lot, other than are initially installed by Declarant, unless first approved by the Architectural Committee.

4.1.14 Fires. There shall be no exterior fires whatsoever except barbecue fires contained within receptacles designed for such purpose.

4.1.15 Mailboxes. There shall be no exterior newspaper tubes or free standing mailboxes except as may have been initially installed by Declarant or thereafter approved by the Architectural Committee.

4.1.16 Basketball Standards. No basketball standards or fixed sports apparatus shall be attached to any residence or be erected on any Lot.

4.1.17 Porch Areas. No owner shall permit the storage of any automobile or motorcycle parts, freezers, refrigerators or any other large appliance or anything that will show from the street, on front or back porches attached to the Residence included within his Lot.

4.1.18 Parking. There shall be no parking along any driveway or street in the Project except as may otherwise be authorized and approved by the Association in its "rules" provided for herein. Each homeowner will have two parking spaces: one in their garage and one designated parallel parking space along the east side of the driveway. Cars, motorcycles, vans, trailers, campers or any other vehicles may not be parked in the front yard, at the front entrance, in the driveway or across the sidewalk at any time. Guests may park in the three designated Guest Parking spaces or on the street. Owners with more than two vehicles should make arrangements to park or store their other vehicles elsewhere and should not park additional vehicles for extended periods of time on McCorkle or the surrounding streets. St Helena City Codes states that vehicles parked on public streets for more than 72 hours can be towed at the owner's expense.

4.1.19 Mineral Exploration. No property within the Residential Area shall be used in any manner to explore for or to remove any water, oil or other hydrocarbons, minerals of any kind, gravel, earth or any earth substance or other mineral.

4.1.20 Machinery and Equipment. No machinery or equipment of any kind shall be placed, operated or maintained upon or adjacent to any Lot within the residential Area except such

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machinery or equipment as is usual and customary in connection with the use, maintenance or construction of a Residence or appurtenant structures in the Project.

4.1.21 Diseases and Insects. No Owner shall permit any thing or condition to exist upon his Lot which shall induce, breed, or harbor infectious plant disease or noxious insects.

4.1.22 Restrictions and Further Subdivision. No Lot shall be further subdivided nor shall less than all of any such Lot be conveyed by an Owner thereof. No easement or other interest in a Lot shall be given without the prior written approval of the Architectural Committee.

4.1.23 Signs. No signs whatsoever (including without limitation, commercial, political and similar signs) which are visible from neighboring property shall be erected or maintained in any Lot except:

- Such signs as may be required by legal proceedings;
- Residential Identification signs, subject to the approval of Architectural Committee as to suitability;
- During the time of construction of any Residence or other improvement by Declarant, job identification signs; and
- Not more than one "for sale" sign per Lot having a reasonable maximum face area pursuant to the Rules of the Association, the Architectural Committee or as otherwise permitted by California Civil Code §712.

4.1.24 Authority for Entry of Lot. The Association or its agents may enter any Lot, whenever such entry is necessary, in the Board's sole discretion, in connection with the performance of any maintenance, repair, construction, or replacement for which the Association is responsible or which it is authorized to perform, including without limitation the authorization provided in Section 9. Although under no obligation to do so, the Board, in its complete and sole discretion, may enter or may authorize the Association's agents to enter any Lot to effect emergency repairs where such repairs are necessary for safety reasons or to prevent or discontinue damage to the entered Lot, any other Lot or the Common Area. The cost of performing any such emergency repairs shall be charged to the Owner as a Reimbursement Assessment. Such entry shall be made with as little inconvenience to the Residents as practicable and only upon reasonable advance written notice of not less than twenty-four (24) hours, except in emergency situations.

4.2 Construction and Alteration of Improvements. No construction or alteration of improvements may be undertaken on a Residence without prior approval of the Architectural Committee pursuant to Article 10 of this Declaration. Each Lot Owner, however, shall be permitted to landscape or make other structural improvements in the Patio Garden of each Lot without securing prior or final approval of the architectural Committee; provided, however, that any such structural improvements do not obstruct any views from any other Lots and provided that any such - landscaping or structural improvements do not interfere in any manner with any drainage and/or utility easements created or to be created by Declarant as provided in Subsection 5.3 of this Declaration. The foregoing shall not be interpreted to absolve a Lot Owner of the duty to obtain any applicable City permits.

4.3 Party Walls and Fences: General Rules of Law to Apply. Each wall which is built as part of the original construction of the residences in the Project and placed on the dividing line between the Lots shall constitute a party wall, and, to the extent not inconsistent with the provisions of this Section, the

Brenkle Court – 864 McCorkle CC&Rs – FINAL ~~095-0210~~-18

general rules of law regarding party walls and liability for property damage due to negligence or willful acts or omissions shall apply thereto. The cost of reasonable repair and maintenance of the party wall or any fence constructed on the dividing line between any Lots shall be shared by the Owners who make use of the wall or fence in proportion to such use. If a party wall or fence is destroyed or damaged by fire or other casualty, any Owner who has used the wall may restore it, and if the other Owners thereafter make use of the wall or fence, they shall contribute to the cost of restoration thereof in proportion to such use without prejudice; subject, however, to the right of any such Owners to call for a larger contribution from the others under any rule of law regarding liability for negligent or willful acts or omissions. Notwithstanding any other provision of this section, an Owner who by his negligent or willful act causes the party wall to be exposed to the elements shall bear the whole cost of furnishing the necessary protection against such elements. The right of any Owner to contribution from any other Owner under this section shall be appurtenant to the land and shall pass to such Owner's successors in title.

4.4 Owners' Easements.

4.4.1 Easement to Common Area. Every Owner shall have a non-exclusive right and easement of use and enjoyment in and to the Common Area which shall be appurtenant to and shall pass with the title to every Lot, as more particularly stated in Section 5.3.1.

4.4.2 Reciprocal Appurtenant Easements. Some Lots may be served by utilities, which are located on or under another Lot or Lots. There is hereby created appurtenant easements for the use and benefit of the respective Lots served, as dominant tenements, on, under and across the Lots burdened thereby, and servient tenements for ingress and egress for pedestrians and vehicles, utility, telephone, sewer and drainage pipes, water and sprinkler systems, lines, conduits and culverts, and utility meters. The specific location of each such utility easement shall be determined by the physical location of the improvement thereon and hereunder installed, constructed and completed at the time of the first conveyance of each respective servient tenement. All of such telephone lines, pipes, conduits and culverts and sprinkler systems shall be cared for, repaired and maintained by the Association or the respective utility as provided in Article VI.

4.4.3 Easements for Party Walls and Encroachments. Whenever two Residences are located adjacent to each other with two separate walls, defined as a Party Wall in this Declaration, or whenever Residences are located adjacent to the Common Area, such Residences are hereby granted exclusive appurtenant easements for encroachments for overhanging eaves or roofs as originally constructed and for encroachments due to settlement or shifting of structures for cause whatsoever, and for utility meters, lines, wires, pipes and conduits, over and on the adjoining Lot or Common Area, as servient tenement, with the contiguous Lot as dominant tenement.

4.5 Repair and Reconstruction.

4.5.1 If any improvements on a Lot are damaged or destroyed by fire or any other calamity, and said damage is limited to the interior of a Residence, the insurance proceeds shall be paid to the Owner of said Dwelling Unit, or the mortgagees thereof, as their respective interests may appear, and such Owner or mortgagee shall use said proceeds to rebuild or repair the damage. In the event that the Insurance proceeds are insufficient to complete such rebuilding or repair, the Owner shall pay in advance such additional sums as may be necessary to complete such rebuilding or repair. In the event said Owner does not commence such building or repair within 60 days of

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the time of the damage, the Association may bring suit for an injunction to compel the Owner to perform said rebuilding or repair.

4.5.2 If any improvements on a Lot are damaged and destroyed and such damage or destruction extends to the exterior of any Dwelling Unit or to the improvements on two or more Lots, the insurance proceeds shall be paid to the Association. The Association shall thereupon contract for the repair or rebuilding of the damaged improvements. In the event the insurance proceeds are insufficient to pay all costs of repairing the damage improvements, the Association shall complete said repairing or rebuilding and levy a reimbursement assessment equally against all Lot Owners whose residences are wholly or partially situated within, or constitute a structural component of the damaged building(s).

Notwithstanding the provisions stated above, in the event the cost of repairing or rebuilding exceeds the amount of available insurance proceeds by TWENTY THOUSAND DOLLARS (\$20,000.00), then such insurance proceeds shall be paid to a bank or trust company designated by the Board. Said funds shall be held for the benefit of all Lot Owners and their mortgagees, as their respective interests shall appear, pursuant to an insurance trust agreement consistent with the provisions of this Declaration approved and executed by the Association. The Association shall obtain bids from three (3) or more responsible contractors to restore the Project, including all damaged Lots and all damaged Common Area to its condition immediately prior to such damage or destruction and shall, as soon as possible, call a special meeting of the association Members to consider such bids. At such special meeting the Members shall discuss each bid, and, by a vote of not less than sixty percent (60%) of each class of members, may vote to reject all bids from Consideration. If such bids are not rejected, the Members shall then vote on the three bids as to which to accept, with the winning bid to be that bid which receives a majority of the votes cast. If no one bid wins a majority on the first vote, then that bid which receives the least number of votes shall be removed from consideration. A second vote shall then be taken to choose between the two remaining bids, with the bid, which receives the largest number of votes to be deemed the bid accepted by the Association.

In the event a bid is accepted, the Association shall levy a special assessment equally against all Lot Owners to make up the deficiency between the total insurance proceeds and the contract price for such repair or rebuilding. All insurance proceeds, including any subject to liens of mortgagees or beneficiaries of deeds of trust, shall be used for such rebuilding or repair. If any bid shall be accepted to repair or rebuild, the contractor shall provide a completion bond naming the Association and each Lot Owner as Beneficiaries.

ARTICLE 5 PROPERTY RIGHTS: COMMON AREA

5.1 Common Area Ownership. The Common Area, identified as Parcel A and including any easement for Emergency Vehicle Access and drainage issued by the St. Helena Villas HOA, shall be conveyed to and owned by the Association and the Association shall accept the conveyance of the Common Area transferred to it pursuant to this section. Declarant shall transfer and convey to the Association and the Association shall accept Declarant's freehold estate in the Common Area as defined in paragraph 2.9 herein and as shown on the Subdivision Map. Said real property shall be transferred to the Association prior to or concurrently with the transfer by Declarant of title of any Lot to a member of the public. Such real property shall be transferred by Declaration to Association free and clear of all liens, restrictions and encumbrances, except for the following:

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- This Declaration;
- The lien of real property taxes and assessments not delinquent;
- Such easements and rights of way on, over or under all or any part thereof as may be Reserved to Declarant or granted to any Owner for the use thereof in accordance with this Declaration;
- Such easements and rights of way on, over, under or across all or any part thereof as may be reserved to Declarant or granted to or for the benefit of the United States of America, the State of California, the County and/or City in which the project is located or any other political subdivision or public organization, or any public utility entity, for the purpose of constructing, erecting, operating and maintaining facilities and improvements thereon, therein or there under at that time or at any time in the future, including:
 - (i) roads, streets, walks, driveways, parkways and park areas;
 - (ii) poles, wires and conduits for transmission of electricity, providing telephone service and cable television service to the Project and for the necessary attachments in connection therewith, and
 - (iii) public and private sewers, sewage disposal systems, storm water drains, land drains and pipes, water systems, sprinkling systems, water heating and gas lines or pipes and any and all equipment in connection therewith.

In particular, the ownership of the Common Area shall be subject to any dedication stated in the Subdivision map for the Project of an easement for public use for installation, maintenance and operation of facilities for public utilities over all of the Common Area. Such public utilities easement shall inure and run to all franchised utility companies and to the City in which the Project is located and shall include the right of ingress and egress over the Common Area by vehicles of the City and such utility companies to properly install, maintain, repair, replace and otherwise service such utility facilities. The grant of said public utility easement shall not be interpreted to imply any obligation or responsibility of any such utility company or the City for maintenance or operation of any of the Common Area or the facilities located thereon or the repair, replacement or reconstruction thereof except as occasioned by such utility companies or City of the utility facilities for which they are responsible. The City shall not be responsible for repairs, maintenance or replacement of the sewer or heater systems within the Project, responsibility for which shall rest solely with the Association. Except for lawful and proper fences, structures and facilities placed upon the Common Area by utility companies, the Common Area subject to the public utility easement shall be kept open and free from buildings and structures. The City furthermore is granted an easement across the Common Area for ingress and egress for use by emergency vehicles of the City.

- Any easements and rights of way on, over or under all or any part thereof as may be reserved to Declarant or granted to any Owner for access, ingress or egress to and from any Lot and the Common Area;
- The obligation imposed, directly or indirectly by virtue of any statute, law, ordinance, resolution or regulation of the United States of America, the State of California, the County and/or City in which the project is located or any other political subdivision or public organization having jurisdiction over such property by virtue of any organization or body politically created pursuant to any such statute, law, ordinance or regulation; and

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- Other lien, encumbrance or defect of title of any kind whatsoever (other than of the type which would at anytime or from time to time create a lien upon such property to secure an obligation to pay more) which would not materially and actually prejudice Owners in their use and enjoyment of their Lots and of the-Common Area.

5.2 Common Area: Permitted Uses, Construction and Alteration of Improvements. The Common Area shall be held, maintained and used to meet the common interests of the members of the Association, their families and guests as provided by this Declaration.

5.2.1 Limitation on Construction and Storage. No person other than the Association or its duly authorized agents shall construct, reconstruct, refinish, alter or maintain any improvement upon, shall make or create any excavation or fill upon or shall destroy or remove any tree, shrub or other vegetation upon any Common Area. The storage of any item by any homeowner in the Common Area is strictly forbidden.

5.2.2 Maintenance by Association. The Association shall at any time, and from time to time, as to any Common Area conveyed or transferred to it or under its jurisdiction:

5.2.3 Maintain, reconstruct, replace or refinish any improvement or portion thereof upon such area in accordance with the original design, finish or standard of construction of such improvement when such Common Area was conveyed by Declarant to the Association and which was approved by the government entity having jurisdiction;

5.2.4 Construct, reconstruct, maintain, replace or refinish any road improvement or surface upon any portion of such area used as a private road, street, walk or parking area when necessary;

5.2.5 Replace injured or diseased trees, other vegetation in any such area and plant trees, shrubs and ground cover to the extent that the Board deems necessary for the conservation of water and soil and for aesthetic purposes and maintain all undeveloped or open areas in a dust-free, fire-safe and weed-free condition;

5.2.6 Place and maintain upon any such area such signs as the Board may deem appropriate for the proper identification, use and regulation thereof, including a direction sign indicating the location and number of residences not fronting any public streets.

5.2.7 Damage or Destruction of Common Area. In the event of any damage or destruction to the Common Area or any of the improvements or facilities located thereon, the Association shall immediately undertake to repair and reconstruct any such damage or destruction substantially in accordance with the original design or standard of construction of the damaged or destroyed Common Area, improvement or facility. The Association shall utilize all available insurance proceeds to accomplish such improvement or facility. The Association shall utilize all available insurance proceeds to accomplish such repair or reconstruction. In the event said proceeds are insufficient to cover all of the costs for such repair or reconstruction, and if the cost of any such repair or reconstruction does not exceed the amount of available insurance proceeds by more than SEVENTY-FIVE THOUSAND DOLLARS (\$75,000.00), the Board shall levy a special assessment equally against all Owners to cover the insufficiency between the insurance proceeds and the costs. Said special assessment and any other special assessment imposed

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pursuant to this section are due and payable by all Owners in such installments and during such period as the board shall designate. Any such special assessment shall be a charge and a continuing lien upon each Lot owned by an Owner against whom said assessment is made, which lien shall be enforced pursuant to Section 7.6 hereof. In the event the cost of any such repair or reconstruction exceeds the amount of the available insurance proceeds by more than SEVENTY-FIVE THOUSAND DOLLARS (\$75,000.00), the Board shall pay the insurance proceeds to a bank or trust company as may be approved by the Board, which proceeds shall be held for the benefit of the Owners and their mortgagees, as their respective interests may appear, and pursuant to an insurance trust agreement consistent with the provisions of this Declaration, approved and executed by the Board. The Board shall then, utilizing such engineering and design consultants as they deem necessary, prepare a report evaluating the extent of reconstruction or repair of such damage or destruction which is reasonably possible solely utilizing the aggregate sum of the total available insurance proceeds and the SEVENTY-FIVE THOUSAND DOLLARS (\$75,000.00) obtained by special assessment. As soon as possible, but no later than sixty (60) days after the occurrence of the damage or destruction, the Board shall present the report to the Lot Owners and notify all mortgagees of the findings of said report and call a special meeting of the Owners. At such special meeting the Owners shall determine by a majority vote whether to utilize solely the available insurance proceeds and special assessment funds of not more than SEVENTY-FIVE THOUSAND DOLLARS (\$75,000.00) to reconstruct the damage or destruction in accordance with the recommendations of the report of the Board or whether to impose an additional special assessment of not more than SEVENTY-FIVE THOUSAND DOLLARS (\$75,000.00) for an aggregate special assessment of not more than ONE HUNDRED FIFTY THOUSAND DOLLARS (\$150,000.00) to reconstruct the destroyed or damaged facilities beyond the recommendations of the report of the Board. Said determination to impose an additional special assessment shall be decided by a vote of at least sixty percent (60%) of each class of Members. Any such additional special assessment shall be a lien on the Lot against which said assessment is levied and enforced pursuant to the terms of Section 7.6.

5.3 Owners' Easements of Enjoyment in Common Area.

5.3.1 Every Owner shall have a non-exclusive right and easement of use and enjoyment in and to the common area, including easements for ingress and egress to said Owner's Lot for pedestrians, vehicles, utility lines, pipes, wires and conduits which shall be appurtenant to and shall pass with the title to every Lot, subject to the following provisions:

5.3.1.1 The Board, after giving notice of and an opportunity to be heard to an Owner, shall have the right to suspend the voting rights and right to use the Common Area by an Owner and guests pursuant to Section 6.11 of this Declaration.

5.3.1.2 The right of every Owner to enjoy free and unobstructed passage between every such Owner's Residence and all publicly dedicated streets bordering the Project shall be subject to any restrictions imposed, by any municipal, state or federal government;

5.3.1.3 The Association shall have the right to dedicate or transfer all or any part of the Common Area to any public agency, authority, or utility, or to any assessment, maintenance of other special district, for such purposes and subject to such conditions as may be agreed to by the Owners. Except for property offered for dedication prior to the

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conveyance thereof to the Association, no such dedication or transfer shall be effective unless an instrument signed by seventy-five percent (75%) of each class of Members entitled to vote agreeing to such dedication or transfer has been recorded.

5.3.1.4 That portion of the Common Area designated as "parking" on the Subdivision Map contains eleven parking spaces. Each Lot will be assigned one designated parking space and there will be three parking spaces designated as guest parking. These spaces shall be used exclusively by the Owners guests, invitees or agents of the Owners for temporary periods only, subject to all of the vehicular restrictions and conditions contained elsewhere in the within Declaration.

5.3.1.5 There shall be no obstruction and no gate shall be installed of any part of the Common Area and nothing shall be stored, kept or parked in the Common Area except in the areas designated as Parking Areas on the Map without the prior written consent of the Board. Each Owner shall avoid any damage to the Common Area and shall be responsible for repairing any damage or injury to the Common Area caused by him.

5.3.1.6 Nothing shall be done or kept in the Common Area which will increase the rate of insurance on any of the Common Area without the prior written consent of the Board. No Owner shall permit anything to be done or kept in the Common Area which will result in the cancellation of insurance of the Common Area or which would be in violation of any governmental statute, ordinance, rules, or regulations.

5.3.1.7 Each lot adjacent to the Common Areas is hereby declared to have an easement over an adjoining Lots and the Common Area for the purpose of accommodating any encroachment due to engineering errors, errors in original construction, settlement or shifting of the building, any other similar cause or any encroachment due to building or Balcony overhang or projection. There shall be valid easements for the maintenance of said encroachments so long as they shall exist, and the rights and obligations of Owners shall not be altered in anyway by said encroachment, settling or shifting, provided, however, that in no event shall a valid easement for encroachment be created in favor of an Owner or Owners if said encroachment occurred due to the willful misconduct of said Owner or Owners. In the event a structure on any Lot is partially or totally destroyed, and then repaired or rebuilt, the Owners of each Lot agree that minor encroachments over adjoining Lots shall be permitted, and that there shall be valid easements for the maintenance of said encroachments so long as they shall exist.

5.3.2 There is hereby reserved to Declarant, the Association or their duly authorized agents and representatives such easements as are necessary to perform the duties and obligations of the Association as are set forth in this Declaration, or in the By-Laws, the Articles, the Association Rules or the Architectural Committee Rules.

5.3.3 Each of the easements provided for in this Declaration shall be deemed to be established upon the recordation of this Declaration and shall henceforth be deemed to be covenants running with the land for the use and benefit of the Lots and the Common Area, as the case may be, superior to all other encumbrances applied against or in favor of any portion of the properties which are the subject of this Declaration. In furtherance of the easements provided for

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in this Declaration, the individual grant deeds to Lots may set forth said easements. [See Exhibit A. for the following easements with St Helena Villas Homeowners Association recorded 5/9/17: Easement Agreement for Emergency Vehicle Access and Easement Agreement for Drainage.]

5.3.4 Notwithstanding anything herein expressly or implied to the contrary, this Declaration shall be subject to all easements heretofore or hereafter granted by Declarant for the installation and maintenance of utilities and drainage facilities that are necessary for the development of the project.

5.3.5 The Owner of each Lot shall have an Common Area Easement as is necessary across the Common Areas for the internal and external wiring, its use, repair and maintenance for the Lot. Subject to the consent of the Board, the Owner of each Lot shall have reasonable access to the Common Area for the purpose of maintaining the internal and external telephone, and cablevision DELEGATION OF RIGHT OF USE: Any owner shall delegate his rights of enjoyment in the Common Area and in the privileges of the Association to the members of his family who reside upon the Subject Property, to contract purchasers from such Owner and to his guests, subject, however, to the provisions of this Declaration and to the Articles, By-Laws and Rules of the Association. The rights and privileges of such persons are subject to suspension for the same reasons and in the same manner as this Declaration provides regarding the suspension of the rights and privileges of Owners in the Project.

5.4 Delegation of Right of Use. Any owner shall delegate his rights of enjoyment in the Common Area and in the privileges of the Association to the members of his family who reside upon the Subject Property, to contract purchasers from such Owner and to his guests, subject, however, to the provisions of this Declaration and to the Articles, By-Laws and Rules of the Association. The rights and privileges of such persons are subject to suspension for the same reasons and in the same manner as this Declaration provides regarding the suspension of the rights and privileges of Owners in the Project.

5.5 Restriction of Severability of Common Area. The interest of each Lot Owner of the use and benefit of the Common Area owned by the Association shall be appurtenant to the Lot owned by said Owner and shall not be sold, conveyed or otherwise transferred by said Lot Owner separately from the Ownership interest in said Lot. Any sale, transfer or conveyance of such Lot shall operate to transfer the appurtenant right to use said Common Area without the requirement of express reference thereto, and the transfer shall thereupon be permitted the use and benefit of said Common Area and the facilities located thereon. There shall be no judicial partition of the Common Area or any part thereof, and each Owner, whether by deed, gift, devise or operation of law, for their own benefit and for the benefit of all other Owners specifically waives and abandons all rights, interest and causes of action for a judicial partition of any ownership interest in the Common Area of the Project and does further covenant that no action for such judicial partition shall be instituted, prosecuted or reduced to judgment.

5.6 Exclusive Common Area. The Owner of any Lot having designated on the Map or in this Declaration an area, as "exclusive common area" shall have an exclusive easement for the use, maintenance and repair of that area.

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ARTICLE 6 THE ASSOCIATION

6.1 The Organization and Membership. The Association is a nonprofit mutual benefit corporation charged with the duties and empowered with the rights set forth herein and in the Articles, and this Declaration, the Articles and the By-Laws shall govern its affairs.

6.2 Successor Associations. In the event that the Association as a corporate entity is dissolved, a nonprofit, unincorporated association shall forthwith and without further action or notice be formed to succeed to all the rights and duties of the Association hereunder. The affairs of such unincorporated Association shall be governed by the laws of the State of California and, to the extent not inconsistent herewith, by this Declaration and the By-Laws of the Association as if they were created for the purpose of governing the affairs of an unincorporated association.

6.3 Membership.

6.3.1 Classes of Members. The Association shall have two (2) classes of Members: Class A Members and Class B Members.

6.3.2 Class A Members. Each owner of a Lot, with the exception of Declarant, by virtue of being an Owner shall be a Class A Member of the Association, or, in the event of its dissolution, a Class A Member of the unincorporated association succeeding to the Association, as provided for in Section 3.1 of the Bylaws of Brenkle Court Townhomes Association. The membership shall be appurtenant to and may not be separate from the ownership of any Lot, which is subject to assessment by the Association. Upon termination of Lot Ownership, Membership in the Association shall also terminate. Ownership of a Lot shall be the sole qualification for Association membership. The membership of an Owner shall not be transferred, pledged or alienated in any way except upon transfer of title to the Owner's Lot and then only to the transferee of title to such Lot. Any attempt to make a prohibited transfer is void. Declarant shall become a Class A member upon the occurrence of the events specified in Subsection 6.3.1.

6.3.3 Member's Rights and Duties. The rights, duties, privileges and obligations of all Members of the Association, or of the succeeding unincorporated association, shall be those set forth in, and shall be exercised and imposed in accordance with, the provisions of this Declaration, the By-Laws and the Rules of the Association.

6.3.4 Class A Members. Class A Members shall have one (1) vote for each Lot owned. When more than one person owns a single Lot, All Owners shall be Members of the Association. However, the vote for each Lot must be cast as an undivided unit and fractional votes shall not be allowed.

6.3.5 Class B Member. The sole Class B Member shall be Declarant, Our Town St. Helena. The Class B Member shall be entitled to three (3) votes for each Lot in the Project to which it holds title. The Class B Membership will terminate when all lots are sold.

6.4 Assessments and Dues. Any assessments levied by the Association on its Members shall be levied in accordance with and pursuant to the provisions of Article VII of this Declaration and shall be enforced pursuant to the provisions of Section 7.5 of this Declaration.

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6.5 Project Roles.

6.5.1 Rulemaking Power. Subject to the provisions of this Declaration, the Board may from time to time enact and amend such Rules as the Board feels are necessary for the management of the Project. Any Rules which relate to the management, operation and control of the Association and/or the Common Areas or common interest shall become effective and binding on all Owners only after adoption by Owners representing fifty-one percent (51%) of each class of members at a meeting duly called for that purpose, or by the written consent of the same percentage of Owners appended to a copy of the proposed Rules. Such Rules may concern, but need not be limited to matters pertaining to use of the Common Areas, signs, collection and disposal of refuse, minimum standards of maintenance of property, parking and traffic restrictions, limitations on maintenance of landscaping or other improvements on any property which obstructs the vision of motorists or which create a hazard for vehicular or pedestrian traffic, and any other subject or matter within the jurisdiction of the Association as provided in this Declaration. Any rule which purports to restrict or abridge, whether directly or indirectly, the right of an Owner to sell his Lot must include uniform, objective standards for invoking the restrictions upon sale, none of which shall be based upon the race, color, religion, creed, national origin, marital status, sex or ancestry of the vendee. Said rules may restrict and govern the use of Common Areas by any Member or his family or guest of such Member.

6.5.2 Distribution of Rules. A copy of said Rules, as they may from time to time be adopted, amended or repealed shall be mailed or otherwise delivered to each Member. No Rules may be adopted which materially affect the rights, preferences or privileges of any Owner as specifically set forth herein. Where the provisions of this Declaration and any Rule adopted by the Association are in conflict, the provisions of this Declaration shall be deemed to prevail.

6.5.3 Amendment of Rules. Any Rules adopted by the Board may be amended from time to time by the Board by majority vote thereof; provided however, that any vote which requires a fifty-one percent (51%) vote. Rules shall be distributed to the Owners either by mail or by personal delivery. Any duly adopted amendment to the Rules shall become effective thirty (30) days from the date of adoption thereof by the Board, and ratification thereof by the Members if so required, or at such later date as the Board may deem appropriate upon its adoption of said am Rules.

6.6 Breach of Rules. The Association is not empowered to cause a forfeiture or abridgment of an owner's right to the full use and enjoyment of his Lot or the Common Areas except on a temporary basis. On account of his failure to comply with the Bylaws, this Declaration or the Rules except by judgment of a court or a decision arising out of the arbitration or on account of a foreclosure or sale under a power of sale for failure to pay assessments duly levied by the Association. In the event of a breach of any Rule or of any of the Restrictions contained in this Declaration by an Owner, his family guests, or invitees, except for acts of those not subject to the Owner's control, the Board, for and on behalf of all other Lot Owners, shall enforce the obligations of each Owner to obey such Rules or restrictions in any manner provided by law or in equity, including, but not limited to, appropriate hiring of legal counsel, the pursuing of legal action or suspension of the Owner's right to use the common facilities of the Project or temporary suspension of the Owner's voting rights; provided, however, that such temporary suspension may not be for a period in excess of thirty (30) days, after notice and hearing as herein provided, for an infraction of such Rules. In addition to the other remedies herein set forth, the Board, by majority vote, may levy a fine against such Owner based on the Fine Schedule included in Exhibit B, after appropriate notice and hearing

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as herein provided, ~~in an amount not to exceed one hundred dollars (\$100.00) for each such violation.~~ Such fines shall not constitute a lien on such Owner's Lot.

No penalty provided for herein shall be imposed without prior notice and hearing. The Board shall send written notice to the Owner specifying the nature of the infraction, the proposed penalty and giving fifteen (15) days' notice of the time and place of a hearing. At the hearing the Owner may introduce evidence and present his reasons as to why no penalty or a different penalty should be imposed. In the event that the Board determines that said infraction has occurred and that penalty shall be imposed, the determination of the Board shall be final. In the event legal counsel is retained or legal action is instituted by the Board pursuant to this paragraph, any settlement prior to judgment or any judgment rendered in any such action shall include costs of collection, court costs and reasonable attorney's fees. The Board may suspend voting rights without a hearing only for failure to pay assessments.

6.7 Liability of Members of the Board. No member of the Board shall be personally liable to any Association Member or to any other person, including Declarant, for any error or omission of the Association, its representatives and employees, or of the architectural Committee, provided that such Board member has, upon the basis of such information as may be possessed by him, acted in good faith.

6.8 Enforcement of Bonded Obligations. If any of the Common Area Improvements within the Development have not been completed when the California Real Estate Commissioner issues a final subdivision public report for the Development, and if the Association is the obliged under a bond or other arrangement ("bond") to secure performance of a commitment of Declarant to complete such Common Area Improvements, then the Board shall consider and vote on the question of action by the Association to enforce the obligations under the bond with respect to any Improvements for which a notice of completion has not been filed within sixty (60) days after the completion date specified for that Improvement in the "planned construction statement" appended to the bond. However, if the Association has given an extension in writing for the completion of any Common Area improvement, the Board shall consider and vote on the action to enforce the obligations under the bond only if a notice of completion has not been filed within thirty (30) days after the expiration of the extension.

6.8.1 Member's Rights to Call Meeting Regarding Enforcement of Bonds. If the Board fails to consider and vote on the action to enforce the obligations under the bond or decides not to initiate action to enforce the obligations under the bond, then on the petition in writing to the Board signed by at least two Members representing not less than twenty-five percent (25%) of the Total Voting Power of the Association other than Declarant, the Board shall call a special membership meeting for the purpose of voting to override the decision of the Board not to initiate action or to compel the Board to take action to enforce the obligations under the bond. The meeting shall be called by the Board by fixing a date not less than thirty-five (35) days nor more than forty-five (45) days after receipt by the Board of said petition. Notice of the meeting shall be given to all Owners entitled to vote in the manner provided in the Bylaws for notices of special membership meetings. At the meeting, the vote in person or by proxy of a majority of the Owners entitled to vote (other than Declarant) in favor of taking action to enforce the obligations under the bond shall be deemed to be the decision of the Association and the Board shall then implement the Owners' decision by initiating and pursuing appropriate action in the name of the Association.

6.8.2 There shall be a vote by Members of the Association other than Declarant at the special meeting called for the purpose set forth in Subsection 6.8 above.

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6.8.3 A vote of a majority of the voting power of the Association residing in Members other than Declarant to take action to enforce the obligations under the Bond shall be deemed to be the decision of the Association and the Board shall thereafter implement this decision by initiating and pursuing appropriate action in the name of the Association.

6.9 Annexation of Property to the Project. Annexation of additional property to the project shall be permitted only upon the vote or written assent of not less than 66-2/3% of the total votes residing in Association Members other than Declarant.

6.10 Mortgage of Association Property. The Board shall have the power and authority to mortgage, pledge, encumber, or otherwise hypothecate the real and personal property of the Association for money borrowed or debts incurred by the Association.

ARTICLE 7 FUNDS AND ASSESSMENTS

7.1 Estimate of Expenses and Assessments. All funds of the Association shall be budgeted, allocated, assessed and collected for current maintenance and operation of the project, contingencies, deferred maintenance and replacement of capital improvements and shall be designated for those specific purposes. Said funds shall be held in trust by the Association for the use and benefit of its individual members and shall be used after and applied solely for the specific purpose for which they have been designated.

7.1.1 The Board shall estimate the expenses prior to the first day of the month following the closing of the first sale of a Lot by Declarant and annually thereafter and assess said charges to each Lot Owner, including Declarant, by dividing said estimate by the number of Lots contained in the Project and multiplying the resulting quotient by the number of Lots owned by each Lot Owner.

7.1.2 From and after January 1 of the year immediately following the conveyance of the first Lot to an Owner, the annual Regular Assessment may be increased in any subsequent year by not more than twenty percent (20%) above the ~~regular~~maximum assessment for the previous year by vote of the Board. Any increase in the maximum amount of the Regular Assessment prospectively for any period in excess of said twenty-percent (20%) shall require the vote of a majority of a quorum of the members of the Association including Declarant.

7.1.3 Notice of Increase in Assessments: The Board shall notify the Members by first-class mail of any increase in the Assessments of the Association. Such notice shall be provided not less than thirty (30) or more than sixty (60) days prior to the date on which such increased Assessment is due and payable.

7.2 Budgets, Financial Statements and Assessments. The Board shall regularly prepared and distributed financial information as specified in the Brenkle Court HOA Bylaws to the Members.

7.3 Association Funds. The assessments collected by the Association shall be properly deposited into two separate accounts with a bank selected by the Board. The accounts shall be clearly designated as 684 McCorkle – Brenkle Court Lots 1 through 8 and Parcel A Reserve Account – OPERATIONS and the 684 McCorkle – Brenkle Court Lots 1 through 8 and Parcel A Reserve Account – CAPITAL IMPROVEMENTS. The assessments collected by the Association shall be held in trust by the

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Association for and on behalf of each Lot Owner and shall be used solely for the operation, care and maintenance of the Project as provided in this Declaration. The Board shall allocate a portion of said funds as collected for the annual maintenance and operation of the Project and another portion of said funds as collected as reserves for contingencies, replacement and deferred maintenance of the capital improvements of the Project and another portion of said funds as collected as reserves for contingencies, replacement and deferred maintenance of the capital improvements of the Project, as specified in the annual budget. Said funds shall be deposited, as allocated, into the appropriate accounts and said accounts shall be separately maintained by the Association. Upon sale or transfer of any Lot by an Owner, the Owner's interest in the trust funds shall be deemed automatically transferred to the successor transferee of such Owner. In the event that Board retains a professional management service, the Board may delegate the authority to deposit or withdraw funds from the Current Operations Account to responsible representatives of the professional management agent so retained. Said professional management agent may additionally be authorized to establish a common trustee account for deposit of assessments as collected. Any funds deposited in such a common trustee account shall be allocated as previously specified herein.

7.3.1 Reserve Account. The Association shall pay out of the Reserve Account only those costs that are attributable to the maintenance, repair or replacement of capital improvements for which reserves have been collected and held. However, the Board may authorize the temporary transfer of money from the Reserve Account to the Current Operation Account to meet short-term cash flow requirements or other expenses. The transferred funds shall be restored to the Reserve Account of the date of the initial transfer, except that the Board may, upon making a finding supported by documentation that a delay would be in the best interests of the Association, delay such restoration until the time which the Board reasonably determines to be necessary. The Board shall exercise prudent fiscal management in delaying restoration of these funds and in restoring the expended funds to the Reserve Account, and shall, if necessary, within three years levy a Special Assessment to recover the full amount of the expended funds within the time limits set forth herein. ~~Such a Special Assessment shall not be subject to the limitations set forth in sections 7.2.5 and 7.2.6 of this Declaration.~~ Withdrawal of funds from the Association's Reserve Account shall require signatures of either:

- Two members of the Board; or
- One member of the Board and an officer of the Association who is not also a member of the governing body.

7.4 Failure to Fix Maintenance Assessments. The omission by the Board to fix the maintenance assessments hereunder before the expiration of any year, for that or the next year, shall not be deemed either a waiver or modification in any respect of the provisions of this Declaration or a release of the Owner from the obligation to pay the assessments or any installment thereof for that or any subsequent year, but the assessment fixed for the preceding year shall continue until a new assessment is fixed.

7.5 Property Exempt from Assessments. The following property subject to this Declaration shall be exempt from the assessments, charges and liens created herein:

- All properties subject to any easement or other interests dedicated and accepted by the City of St. Helena or other local public authority and devoted to public use; and
- All Common Areas.

7.6 Quarterly Review. The Board shall do the following not less frequently than quarterly:

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- Cause a current reconciliation of the Association's operating accounts to be made and review the same.
- Cause a current reconciliation of the Association's reserve accounts to be made and review the same.
- Review the current year's actual reserve revenues and expenses compared to the current year's budget.
- Review the most current account statements prepared by the financial institution where the Association has its operating and reserve accounts.
- Review an income and expense statement for the Association's operation and reserve accounts.

7.7 Additional Review. The Board shall, at least once every three years, cause a study of the Association's Reserve Account requirements to be conducted if the current replacement value of the major components for which the Association is responsible is equal to or greater than one-half of the gross budget of the Association for any fiscal year. The Board may appoint a manager to conduct this study. The Board shall review this study annually and shall consider and implement necessary adjustments to the Board's analysis of the Reserve Account requirements as a result of the review. The study required hereunder shall include, at a minimum, the following:

- Identification of the major components which the Association is obligated to repair, replace, restore or maintain and which, as of the date of the study, have a remaining useful life of less than 30 years;
- Identification of the probable remaining useful life of the components identified above as of the date of the study;
- An estimate of the cost of repair, replacement, restoration or maintenance of each major component identified above during and at the end of its useful life;
- An estimate of the total annual contribution necessary to defray the cost to repair, replace, restore, or maintain each major component during and at the end of its useful life, after subtracting total reserve funds as of the date of the study;
- As used above, the term "Reserve Account requirements" means the estimated funds, which the Board has determined are required to be available at a specified point in time to repair, replace or restore those major components which the Association is obligated to maintain.

ARTICLE 8 CAPITAL IMPROVEMENTS

8.1 Petition: Association Approval.

8.1.1 A majority of the Owners may petition the Association for the construction, installation or acquisition of a capital improvement on the Common Area. Such petition shall be in writing and be in such form and shall contain such information as the Board may require, including, without limitation, preliminary plans and cost estimates. The Board may, on its own motion, move for the construction, installation or acquisition of a capital improvement, in which case such motion shall be treated as if it were a petition duly submitted by an Owner.

8.1.2 The Board shall approve the petition if it determines that the proposed capital improvement is desirable for the beneficial use and enjoyment of the Common Areas by the Lot owners.

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8.1.3 Upon the approval of such petition by the Board and two-thirds (2/3) of each class of Members, the Board shall obtain firm bids on the total cost of constructing, installing or acquiring the proposed capital improvement. The lowest acceptable bid or bids shall be deemed the estimated total cost of such capital improvements.

8.2 Owner Approval. Aggregate expenditures for capital improvements to the Common Area in any fiscal year shall not exceed five percent (5%) of the budgeted gross expenses of the Association for that fiscal year without the vote or written assent of a majority of the voting power of the Association residing in Members other than Declarant.

8.3 Construction of Improvement. After the levy of the capital improvement assessment pursuant to Section 7.5, and at such time and upon such terms and conditions as the Association may deem appropriate, but not exceeding the estimated total cost of such capital improvements determined pursuant to Subsection 8.1.3 above, the Board shall cause to be constructed, installed or acquired, or contract for the construction, installation or acquisition of, the proposed capital improvements. The Board shall establish a capital improvements account in a bank selected by the Board in which the capital improvements assessment shall be deposited, separate and apart from all other funds collected by the Association.

8.4 Costs of Improvements. If for any reason the construction, installation or acquisition of the proposed capital improvement, is not approved by the Board or the Owner, the expenses for the actual costs incurred by the Association with respect to the proposed capital improvement shall be paid proportionately by the petitioning Owners. The Board may levy a special assessment against said Owners for the purpose of paying such expense. In the event that such proposed capital improvement was proposed by the Board, the actual costs incurred therefore shall be levied against all Owners in the same proportion as regular assessments. Any such assessments shall be subject to the limitations set forth in Article 7.

ARTICLE 9 MAINTENANCE OF PROPERTY

9.1 Association Responsibilities. The Association shall have the following maintenance responsibilities:

9.1.1 Common Area. The Association shall maintain, repair, and replace the common Area and all facilities, Improvements and landscaping thereon, including without limitation the private drives, cluster mailboxes, and utility facilities (except for those utility facilities which are maintained by public or private utility companies or agencies), and all other real and personal property that may be acquired by the Association, keeping such property in good condition and repair.

9.1.2 Association Maintenance of Residences. The Association shall maintain, paint, strain and, when necessary, replace:

- a) The exterior surfaces, siding and trim of the Residences, including the underlying structural components to which such surfaces are attached, but excluding any other structural elements of the walls, floor, or foundation of the Residence.

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b) The roof structure and covering of the Residences, including the underlying sheathing to which the roof coverings are attached but excluding any other structural elements of the walls, floor, or foundation of the Residence.

c) Those exterior light fixture of the Lots which are connected to a Common Area power supply or which the Board, in its discretions, has elected to maintain, repair and replace because such fixtures provide lighting for the Development.

d) The gutters, downspouts, and fences of the Residences, but excluding the fences of the Residences on the dividing line between Lots.

9.1.3 Front Yard Maintenance. The Association shall maintain the front yard landscaping located on individual Lots and within the landscape and access easement except those areas within the Residence’s private patios, including the maintenance and repair of irrigation sprinklers, the street trees and planter strips, and shall be responsible for the landscape irrigation supply for the Lo’s front yard.

9.1.4 Access and Maintenance Easement. The Association shall maintain the landscaping and Improvements within the “Private Access and Maintenance Easement” as more particularly described in attached Exhibit B and depicted in attached Exhibit C.

9.1.5 Scheduled Maintenance. The Association painting obligation pursuant to this Section shall be pursuant to the Association’s maintenance plan or schedule consistent with it’s currently adopted reserve study. The Association shall have no responsibility to pay for or reimburse any Owner for any painting work which the Owner request or undertakes at any time different from the Association’s overall maintenance plan or schedule.

9.1.6 Cluster Mailboxes. The Association shall maintain, repair and replace the cluster mailboxes to the extent they are not maintained by another entity.

9.1.7 Street Lighting. The Association shall maintain all street lighting within the Development which is not maintained by the City.

9.1.8 Utility Connection. Utility lines and connections, including without limitation, electrical, cable television, telephone, telecommunications and gas line, which are located on, under or over the Common Area, shall be maintained, repaired and replaced by the Association or by the utility company providing such service. Water, sewer and storm drain lines and connections located within the Common Area shall be maintained, repaired and replaced by the Association.

9.1.9 Association Maintenance of Boundary Fence. The Association shall maintain repair and replace the six foot (6’) wooden fence along the boundary of the Development and located on Common Area Parcel A consistent with the maintenance plan or schedule in the Associations currently adopted reserve study.

9.1.10 Association Inspections.

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a) Common Area Inspections. The Association shall regularly inspect, maintain and repair the landscaping, irrigation and drainage systems serving or within and any Improvements constructed upon the Common Area. The Association shall employ the services of a professional landscape architect, maintenance contractor, reserve study analyst or other such professional person to assist the Association in performing such inspections. The inspector shall provide written reports of their inspections to the Association and, if requested by the Declarant. Declarant shall be invited to attend any such inspections. The written reports shall identify any items of maintenance or repair which either require current action by the Association or will need further review and analysis. Such written reports shall specifically include a review of all irrigation and drainage systems within the common Area. The Board shall report the contents of such written reports to Declarant (if not already provided by the inspector directly) if so requested by Declarant and to the Members of the Association at the next meeting of the Members following receipt of such written reports or as soon thereafter as reasonably practical and shall include such written reports in the minutes of the next regularly scheduled Board meeting. The Board shall promptly cause all matters identified as requiring attention to be maintained, repair, or otherwise pursued in accordance with prudent business and its practices and the recommendations of the inspectors and shall keep a record of all such matters in the Board's minutes.

b) Lot Access. As part of the inspection of Common Area, should an Association inspection require access over any Lot, there is hereby created a nonexclusive easement in favor of the Association, and its officers, agents, employees and independent contractors to conduct such inspections and to provide such inspections and to provide such maintenance, repair and replacement. Any damage to any structure, landscaping or other improvements caused by the Association, or any of its officers, agents, employees or independent contractors, while performing such maintenance, repair or replacement work shall be repaired by the Association at its sole cost and expense.

9.1.12 Compliance with Warranties. The Association shall have the duty to execute all necessary documents to effectuate any warranties offered by Declarant as to the Common Area or any property maintained by the Association.

9.1.13 Owner's Responsibility for Consequential Damage. An Owner is responsible for the cost of repair of those portions of the Owner's Lot and Residence, including fixtures and personal property, which are required to be maintained by the Owner, even if the cause of the damage originates from a source maintained by the Association, unless the cause is the gross negligence of the Association or its agents. As an example, water damage to a Residence that is caused by an Association maintained irrigation system is the responsibility of the Owner even though the repair of the irrigation system is the responsibility of the Association.

9.1.14 Other Association Property. The Association shall maintain, repair and replace all other real and personal property that may be acquired by the Association, keeping such property in good condition and repair.

9.2. Owners' Responsibilities.

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9.2.1 Owner Maintenance of Lots. Except to the extent that specific maintenance, repair or replacement responsibilities with respect to the Lots are expressly and clearly made the responsibility of the Association by this Declaration, each Owner shall be responsible for the maintenance, repair and replacement of his or her Lot, the Residence, and all other improvements thereon. Each Owner's responsibility shall include, without limitation, the maintenance, repair and replacement of:

- a) The components and structural elements of the walls, floor and foundation of the Residence
- b) Except as provided in 9.1.7, the exterior light fixtures on the Owner's Lot.
- c) The entire back yard and patio area of the Residence
- d) Heating and air conditioning equipment.
- e) Except for painting, the window panes, frames and hardware and doors and door frames
- f) Window and door screens.
- g) Those portions of the sewer, water, electrical, cable, internet and other utility lines located within the Lot, except for those which are maintained by public or private utility companies or agencies.
- h) All personal property, appliances and fixtures located within the Lot or Residence

9.2.2 Wood-Destroying Pests and Organisms. Where any maintenance or repair of a Lot, including the Residence and other Improvements thereon, is made necessary by the presence of wood-destroying pests or organisms, the Association shall be solely responsible for such maintenance or repair, including the cost thereof, notwithstanding the fact that such maintenance or repair might otherwise be the responsibility of the Owner pursuant to this Section. The Association's maintenance responsibilities pursuant to the subsection expressly alter the maintenance scheme for wood-destroying pests described in California Civil Code Section 4775(a).

9.2.3 Owner Maintenance of Party Walls. Each Owner shall maintain, repair and replace all party walls in accordance with the following provisions:

- a) General Rules of Law to Apply. Each wall and fence which is built as a part of the original construction of the Residence within the Development and placed on the dividing line between the Lots or dividing the patio areas from each other and the Common Area shall constitute a party wall. The general rules of law regarding party walls and liability for property damage due to negligence or willful acts or omissions shall apply thereto.
- b) Sharing Repair and Maintenance. The cost of maintenance and repair of a party wall shall be equally shared by the Owners who make use of the wall without prejudice, however, to the right of any such Owners to call for a large Association's overall

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contribution from the others under any rule of law regarding liability for negligent or willful acts or omissions. The Owner of each affected portion of the property upon which a party wall or fence is located shall have a reciprocal non-exclusive easement to the property immediately adjacent to the interior fence for the limited purpose of maintaining the party wall or fence.

c) Weatherproofing. Notwithstanding any other provision of this Section, an Owner who by his or her negligent or willful act causes a party wall to be exposed to the elements shall bear the whole cost of furnishing the necessary protection against such elements.

9.2.4 Owner Responsibility for Unscheduled Painting. An Owner shall be responsible for the cost of any painting work which the Owner requests or undertakes at any time different from the Association's overall maintenance plan or schedule, as provided in Section 9.1.5 above.

9.2.5 Owner Responsibility for Consequential Damage. Except as provided by Article 9 of this Declaration an Owner is responsible for the cost of repair of those portions of the Owner's Lot and Residence, including fixtures and personal property, which are required to be maintained by the Owner, even if the cause of the damage originates from a source maintained by the Association, unless the cause is the gross negligence of the Association or its agents. As an example, water damage to the interior of a Residence that is caused by a leak in the roof is the responsibility of the Owner even though the repair of the roof is the responsibility of the Association.

9.2.6 Utility Connections. Utility lines and connections, including without limitation, water, sewer, electrical, cable, internet, telephone and gas lines, which are located on, under, or over any Lot and which provide service to the Residence or other Improvements located upon such Lot, shall be maintained, repaired and replaced by the Owner of such Lot or by the utility company providing such service.

9.2.7 Owner's Maintenance Obligation. By accepting a deed to a Lot, each Owner acknowledges and agrees that, in addition to the obligations set forth in the Declaration, each Owner is required to comply with all the maintenance obligations and schedules set forth by the Board.

9.3 Compliance With Architectural Provisions. An Owner's right and responsibility for maintaining, repairing or replacing any portions of his or her Lot, including landscaping, shall be subject to any applicable provisions of the Governing Documents relating to landscaping and architectural control, including Article 10.

9.4 Owner Failure to Maintain. The Board shall have the absolute discretion to determine whether any maintenance, repair or replacement which is the responsibility of an Owner is necessary to preserve the appearance and value of the property comprising the Development, or any portion thereof, and may notify an Owner of the work the Board deems necessary. Subject to the authority of the Board to authorize immediate emergency repairs as specified in Section 9.6 in the event an Owner fails to perform such work within ten (10) days after notification by the Board to the Owner, the Board may, after written notice in the Owner and the right of a hearing before the Board, cause such work to be done and charge the cost thereof to the Owner as a Reimbursement Assessment.

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9.5 Owner Liability. In the event the need for any maintenance, repair or replacement by the Association is caused by the willful or negligent act or omission of an Owner, members of any Owner's household, or an Owner's guests, invitees, or household pets, the cost of such maintenance, repair, or replacement, including the cost of materials, labor, supplies, and services shall be charged to, and paid by, such Owner in the form of a Reimbursement Assessment.

9.6 Authority for Entry of Lot. The Association or its agents may enter any Lot, whenever such entry is necessary, in the Board's sole discretion, in connection with the performance of any maintenance, repair, construction, or replacement for which the Association is responsible or which it is authorized to perform, including without limitation the authorization provided in Section 9.4. Although under no obligation to do so, the Board, in its complete and sole discretion, may enter or may authorize the Association's agents to enter any Lot to effect emergency repairs where such repairs are necessary for safety reasons or to prevent or discontinue damage to the entered Lot, any other Lot or the Common Area. The cost of performing any such emergency repairs shall be charged to, and paid by, such Owner in the form of a Reimbursement Assessment.

9.7 Mold Contamination.

9.7.1 Association Maintenance Obligations. In order to reduce the presence of molds, fungi, spores, pollens, other botanical substance, or other allergens (collectively, "mold") within the Development, the Association shall adopt and implement a mold inspection and prevention program which shall include the following steps:

- a) Inspect the Common Area not less frequently than annually to check for water pooling or moisture collection and for the presence of mold;
- b) If any water pooling, moisture collection, or mold is detected, immediately take appropriate corrective action to repair the Common Area and remove the mold;
- c) Periodically inspect the irrigation system to ensure proper water use and to correct any leaks, misdirected, or excessive watering;
- d) Periodically inspect the ground surface around the foundations of the Residences to ensure that now water is pooling near the foundations; maintain rain gutters and roof drainage systems in a clean and proper operating condition at all times; and
- e) Take such other prudent steps as may be appropriate to prevent mold and eliminate any existing mold in the Common Area

9.8 Owner Maintenance Obligations. In order to reduce the presence of molds, fungi, spores, pollens, other botanical substances, or other allergens (collectively, "Mold") within the Development, each Owner shall adopt and implement a mold inspection and prevention program which shall include the following steps:

- a) Inspect the Residence not less frequently than quarterly to check for water leaks, moisture collection, or other breaches of the watertight integrity of the Residence and for the presence of mold;

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- b) If any water leaks, moisture collection, or mold is detected, immediately take appropriate corrective actions to repair and remove the mold;
- c) Maintain proper ventilation and humidity level (particularly in bathrooms and kitchens) within the Residence to reduce the risk of mold;
- d) Periodically inspect the water fixtures and refrigerator condensation pans for the presence of mold;
- e) Replace the HVAC filters semiannually or as recommended by the manufacturer; and
- f) Take such other prudent steps as may be appropriate to prevent mold and eliminate any existing mold in the Residence.

9.9 Cooperative Maintenance Obligation. To the extent necessary or desirable to accomplish the Association's maintenance and repair obligations hereunder, individual Owners shall cooperate with the Association and its agents and maintenance personnel in the prosecution of its work.

9.10 Association Liability. The Association shall not be responsible or liable for any maintenance, repair, or replacement of a Lot or any improvement thereon, except to the extent that the need for such maintenance, repair, or replacement results from the negligence or fault of the Association, in its employees, contractors or agents.

9.11 Board Discretion. Except as provided in 9.1 above, the Board shall have the discretion to determine the manner, method, extent and timing of the performance of any and all maintenance, repair and replacement obligation imposed upon the Association by this Article.

9.12 Inspection of Property Maintained by Association. For all property and improvements required to be maintained by the Association pursuant to Section 9.1 above, the Board shall cause the inspection of the condition of such property and improvements as provided in this Section. Inspections shall be conducted at least once every three (3) years, in conjunction with the inspection require for the reserve study conducted pursuant to Section 9.3 of the Bylaws.

ARTICLE 10 ARCHITECTURAL COMMITTEE

10.1 Organization. There shall be an Architectural Committee consisting of three (3) persons. There shall also be one alternate committee member who may be designated by the Committee to act as substitute on the Committee in the event of absence or disability of any committee members. The designation of members, the terms of office, the committee's duties, and their meeting dates shall be designated in the Brenkle Court HOA Bylaws.

10.2 Architectural Committee Rules. The Architectural Committee may, from time to time and in its sole discretion, adopt, amend and repeal, by unanimous vote, rules and regulations to be known as Architectural Committee Rules. Said rules shall interpret and implement the provisions hereof by setting forth the standards and procedures for Architectural Committee review and guidelines for architectural design, placement of buildings, landscaping in the Common Areas, color schemes, exterior finishes and

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material, and similar features which are recommended for use in the Project; provided, however, that said rules shall not be in derogation of the minimum standards required by this Declaration.

10.3 Application for Approval of Improvements. Any Owner, except Declarant and his designated agents, proposing to perform any work of any kind whatever which requires the prior approval of the Architectural Committee pursuant to Subsection 4.2, or any other Section of this Declaration shall apply to such committee for approval by notifying the Architectural Committee of the nature of the proposed work in writing and furnishing such information as the Committee may require.

10.4 The basis for approval of improvements and the procedures for executing work and the inspection and approval of work, shall be designated in the Brenkle Court HOA Bylaws. The Architectural Committee shall grant the requested approval only if:

- The Owner shall have complied with the provisions of Section 10.7 below;
- The Architectural Committee shall find that the plans and specifications conform to this Declaration and to the Architectural Committee Rules in effect at the time such plans were submitted to such Committee; and
- The members of the Architectural Committee, in their sole discretion, determine that the proposed improvements would be consistent with the standards of the Project and the purposes of this Declaration as to the quality of workmanship and materials, as to harmony of exterior design with the existing structures and as to location with respect to topography and finished grade elevations.

10.5 Proceeding With Work. Upon receipt of approval from the Architectural Committee pursuant to Section 10.4 above, the Owner shall, as soon as practical, [but not before obtaining any permits required by the City for the work](#), satisfy all conditions hereof and diligently proceed with the commencement and completion of all construction, reconstruction, refinishing, alterations and excavations pursuant to said approval, said commencement to be, in all cases, within one year from the date of such approval. If the Owner shall fail to comply with this paragraph, any approval given pursuant to Section 10.4, above, shall be deemed revoked unless the Architectural Committee, upon written request of the Owner made prior the expiration of said one-year period, extends the time for such commencement. No such extension shall be granted except upon a finding by the Architectural Committee that there has been no change in the circumstances upon which the original was granted.

10.6 Failure to Complete Work. The Owner shall in any event complete the construction, reconstruction, refinishing or alteration of any such improvement within one (1) year after commencing construction thereof, except and for so long as such completion is rendered impossible or would result in hardship to the Owners due to strikes, fires, national emergencies, natural calamities or other supervening forces beyond the control of the Owner or his agents. If Owner fails to comply with this paragraph, the Architectural Committee shall notify the Board of such failure, and the Board shall proceed in accordance with the provisions of Section 10.9 below as though the failure to complete the improvement was a non-compliance with approved plans.

10.7 Inspection of Work. Inspection of work and correction of defects therein shall proceed as follows:

- The Completion of any construction, reconstruction, alteration or refinishing of the exterior of any improvements, or upon the Completion of any other work for which approved plans are

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required under this Article, the Owner shall give written notice thereof to the Architectural Committee.

- Within sixty (60) days thereafter the Architectural Committee, or its duly authorized representative, may inspect such improvement to determine whether it was constructed, reconstructed, altered or refinished to substantial compliance with the approved plans. If the Architectural Committee finds that such construction, reconstruction, alteration or refinishing was not done in substantial compliance with the approved plans, it shall notify the Owner in writing of such non-compliance within such sixty (60) day period, specifying particulars of non-compliance, and shall require the Owner to remedy such non-compliance.
- If the Owner shall have failed to remedy such non-compliance upon the expiration of thirty (30) days from the date of such notification, the Architectural Committee shall notify the Board in writing of such failure. The Board shall then set a date on which a hearing before the Board shall be held regarding the alleged non-compliance. The hearing date shall be not more than thirty (30) or less than fifteen (15) days after notice of the non-compliance is given to the Board by the Architectural Committee. Notice of the hearing date shall be given at least ten (10) days in advance thereof by the Board to the Owner, to the Architectural Committee and, in the discretion of the Board, to any other interested party.
- At the hearing, the Owner, the Architectural Committee and, in the Board's discretion, any other interested person may present information relevant to the question of the alleged non-compliance. After considering all such information the Board shall determine whether there is a non-compliance and, if so, the nature thereof and the estimated cost of correcting or removing the same. If a non-compliance exists, the Board shall require the Owner to remedy or remove the same within a period of not more than forty-five (45) days from the date of the Board ruling. If the Owner does not comply with the Board ruling within such period or within any extension of such period as the Board, in its discretion, may grant, the Board, at its option, may seek an order of a competent court requiring the removal of the non-complying improvement and the Owner shall reimburse the Association for all expenses incurred in connection therewith upon demand. If such expenses are not promptly repaid by the Owner to the Association, the Board shall levy a reimbursement charge against such Owner pursuant to Section 7.3 hereof; provided however, such reimbursement charge shall not become a lien on Owner's Lot.
- If for any reason the Architectural Committee fails to notify the Owner of any non-compliance within sixty (60) days after receipt of said notice of completion from the Owner, the improvement shall be 9.11 Liability. Neither the Architectural Committee nor any member thereof shall be liable to the Association or to any Owner for any damage, loss or prejudice suffered or claimed on account of:
 - the approval or disapproval of any plans, drawings and specifications, whether or not defective;
 - the construction or performance of any work, whether or not pursuant to approved plans, drawings, and specifications;
 - the development of any property within the Project; or
 - the execution and filing of an estoppel certificate pursuant to Section 10.12, whether or not the facts therein are correct; provided, however, that such member has acted in good faith on the basis of such information as may be possessed by him.

Without in any way limiting the generality of the foregoing, the Architectural Committee, or any member thereof, may, but is not required to, consult with or hear the views of the Association or any Owner with

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respect to any plans, drawings, specifications or any other proposal submitted to the Architectural Committee.

10.8 Non-Applicability to Declarant. The provisions of this Article shall not apply to any Lot owned by Declarant prior to his first conveyance of a Lot to a member of the public.

ARTICLE 11 INSURANCE

11.1 Association Insurance. The Association shall obtain and maintain the following insurance which will include additional insured as required by lenders:

11.1.1 Hazard & Property Coverage. A master special forms policy insuring all improvements, equipment and fixtures in the Development in the amount designated by the Board, as the reasonable replacement cost thereof with policy limits of not less than 100% of the insurance value. Such policy shall insure the Lots as such Lots were originally built. Such policy may include remodeling, upgrades or improvements made to the Lots if such coverage is available at a reasonable cost as determined by the Board. Such coverage does not include the Members' personal property.

11.1.2 General Liability. A comprehensive commercial liability policy insuring the Association, its agents, the Members and resident, against liability incident to the ownership or use of the Common Area or any other Association owned or maintained real or personal property. The amount of general liability insurance that the Association shall carry shall not be less than the minimum amounts required by Civil Code sections 5800 and 5805.

11.1.3 Workers' Compensation. Workers' compensation insurance to the extent required by law (or such greater amount as the Board deems necessary).

11.1.4 Director and Officers: Officers and Directors liability insurance in at least the minimum amounts required by Civil Code Section 5800.

11.1.5 Fidelity bonds or insurance covering officers, directors, and employees that have access to any Association funds.

11.1.6 Such other insurance as the Board in its discretion considers necessary or advisable

11.1.7 The Association may, but is not required to, obtain earthquake insurance and/or establish an earthquake reserve account. The Association, directors and manager shall not be liable for the failure to obtain or maintain earthquake insurance or an earthquake reserve fund. The Board may periodically submit to the members the question of whether or not to obtain earthquake insurance, which may be submitted in the form of a vote to increase Assessment to cover the cost. The cost of the deductible(s) due to an earthquake loss to the Common Area shall be borne equally by all Members and/or paid from the reserve funds, if any. The cost of any other funding shortfall due to an earthquake loss shall be the responsibility of the affected Members.

11.2 Amount, Term and Coverage. The amount, term and coverage of any policy required under Section 11.1 shall be no less than that which is customary for similar policies on similar projects in the area.

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11.3 Representation for Claims. The Board is appointed attorney-in-fact by each Member to negotiate and agree on the value and extent of any loss under any policy carried under Section 11.1. The Board is granted full right and authority to compromise and settle any claims or enforce any claim by legal action or otherwise and to execute releases in favor of any insured.

11.4 Trustee. All insurance proceeds payable under Section 11.1 and subject to the rights of Mortgagees may, in the discretion of the Board of Directors be paid to a trustee to be held and expended for the benefit of the Owners, Mortgagees and others, as their respective interests shall appear. Such trustee shall be a commercial bank or financial institution in the County that agrees in writing to accept such trust.

11.5 Costs Part of Claim. Costs incurred by the Association in submitting, processing, administering and managing claims (include, with out limitation, claims appraisals, and other claims dispute resolutions), repairs, and reconstruction, including, without limitation, management fees, attorneys' fees, construction manage fees, consultant fees, and appraiser fees shall be included in the claim and deemed a part of the claim.

11.6 Members' Required Insurance.

11.6.1 Every Member is required to carry Comprehensive Personal Liability Insurance. Each Member should consult his or her insurance agent as to the most appropriate insurance. Unless otherwise determined by the Board, the amount of each Member's liability coverage shall be no less than \$500,000.

11.6.2 Insurance provided by the Association is a "wall-in" insurance policy, which does not cover many risks and liabilities Members and resident may incur. For example, if a Resident caused a fire which damaged an adjacent Lot, the Association's master policy may not restore areas of the adjacent lot which have been upgraded, will not pay for the personal property of the Residents of the adjacent Lot, and will not pay for or defend the Member against the neighbor's claim for damages. The Association's policies do not pay for personal property and living expenses during repairs. The Association's policy may not cover improvements or upgrades made to a Lot, and any improvements made by a Member to his Lot may be separately insured by the Member, but the insurance is to be limited to the type and nature of coverage commonly known as "Improvements Insurance." It is very important that each Member consult with his insurance agent in obtaining the insurance required above. All insurance that is individually carried must contain a waiver of subrogation rights by the carrier as to the Association.

11.6.3 The Association may require evidence of Member or Resident compliance with this section, but shall not be required to do so. The Association shall have no liability for failure to confirm the Members or Residents have procured such insurance.

11.7 Additional Endorsements. To the extent not included in the basic policy coverage, the following endorsements should be included, as deemed appropriate by the Board: building ordinance, demotions, increased cost of construction and contingent liability form the operation of building loss, inflation guard coverage, "agreed amount" endorsement, replacement cost endorsement; and primary coverage endorsement.

11.8 Provisions and Limitations. It is acknowledged that terms of insurance coverage do not always coincide with defined areas of Member and Association ownership, or responsibilities to maintain, repair or replace. Notice is hereby given to any insurer issuing policies in accordance with these Declaration requirements, that the Association's fire and hazard insurance shall be construed to provide the coverage of all improvements (whether Lot or Common Area) wherever located. Should there be a conflict

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or inconsistency between the coverage provided in the policy and those definitions or the responsibilities required by the Declaration, the more comprehensive of the two shall be applied.

11.9 Association Insurance Deductible. The Board has discretion to determine both the size of the deductible and the allocation of responsibility to pay the deductible for any insurance claim. In the event a deductible policy has not been adopted by the Board, or the Board does not, in its discretion, allocate the deductible in a different manner, the deductible shall be paid by the Owners of the Lot where the point of origin of the physical damage occurs or the Owners responsible for the Common Area damage. Responsibility for earthquake deductible is addressed in Section 1.1. In the event the Member is obligated under this Section 11.9 to pay any insurance deductible, but fails to do so, the Board may assess the cost of such deductible against the responsible Member and his or her Lot as a Reimbursement Assessment.

11.10 Review of Policies. The Board shall periodically (and not less than once every three (3) years) review all insurance policies maintained by the Association to determine the adequacy of the coverage and adjust the policies accordingly.

11.11 Coverage Not Available. If any insurance policy or endorsement required by this Section is not available, or is economically unfeasible, then the Association shall obtain alternate insurance, which provides, as nearly as reasonably possible, such coverage.

11.12 Copies of Policies. Copies of all insurance policies shall be retained by the Association and shall, upon written request, be available for inspection by Owners at any reasonable time.

ARTICLE 12 LIMITATION OF RESTRICTIONS ON DECLARANT

12.1 Limitations of Restrictions. Declarant is undertaking the work of constructing upon Lots, Residences and incidental improvements within the Project. The completion of that work and the sale and other disposal of Lots are essential to the establishment and welfare of said property as a residential community. In order that said work may be completed and said property be established as a fully occupied residential community as rapidly as possible, nothing in this Declaration shall be understood or construed to:

12.1.1 Prevent Declarant, its contractors, or subcontractors, from doing on the Subject Property or any Lot thereof, whatever is reasonably necessary or advisable in connection with the completion of said work; or

12.1.2 Prevent Declarant or its representatives from erecting, constructing and maintaining on any part or parts of the project, such structures as may be reasonably necessary for the conduct of its business of completing said work and establishing said property as a residential community and disposing of the same in parcels by sale or otherwise; or Prevent Declarant from conducting on any part of the Project, its business of completing said work and of establishing said property as a residential community and of disposing of said property in parcels or Lots by sale or otherwise; or

12.1.3 Prevent Declarant from maintaining such sign or signs on any of the subject property as may be necessary for the sale or disposition thereof.

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12.1.4 Prevent Declarant from maintaining model homes, sale offices, storage facilities or related such facilities on any unsold Lots within the Project necessary or reasonable, in the opinion of Declarant, for sale or disposition of said Lots. Declarant shall be entitled to reasonable use of the Common Areas and Common Area facilities for undertaking its sale of said Lots; provided, however, Declarant shall not pay a rental fee to the Association for the use of any Common Area.

12.1.5 Prevent Declarant from changing the exterior appearance, landscaping and any other matter directly or indirectly connected with the Project in the manner deemed desirable by Declarant; provided, however, that Declarant has or shall obtain governmental consents where required by law, including where appropriate the consent of the Department of Real Estate.

12.1.6 The limitation on restriction contained in paragraphs 10.1 through 10.1.6 contained herein shall expire three (3) years from the recording of this Declaration.

12.2 Title Rights. The rights of Declarant under this Declaration to all or part of Declarant's interest in the project properties may be assigned to any successor(s) by an express assignment incorporated in a recorded deed, as the case may be, transferring such interest to such successor. This Declaration shall not limit the right of Declarant at any time prior to acquisition of title by a purchaser from Declarant to establish on any part of the Project additional licenses, reservation and rights-of-way to itself, to utility companies or to others as, from time to time, may be reasonably necessary to the proper development and disposal of the Project properties.

ARTICLE 13 RIGHTS OF TRUST DEED BENEFICIARIES

13.1 General. Institutional mortgagees of first mortgages and institutional beneficiaries under first deeds of trust on Lots in the Project, referred to as "Beneficiaries" in this Article, shall be entitled to the rights and privileges set forth in this Article.

13.2 Exemption from Rights of First Refusal. Any Beneficiary who comes into possession of a Lot pursuant to the remedies provided in the mortgage or deed of trust for foreclosure of the mortgage or deed of trust, or by assignment in lieu of foreclosure, shall be exempt from any right of first refusal, which might be contained in or added to this Declaration.

13.3 Non-Liability for Unpaid Assessments. Any Beneficiary who comes into possession of a Lot pursuant to the remedies provided in the mortgage or deed of trust by foreclosure of the mortgage or deed of trust, except upon a voluntary conveyance to the Beneficiary, shall take the property free of any claims for unpaid assessments or charges against the mortgaged Lot which accrue prior to the time such Beneficiary comes into possession of the Lot, except for claims for a pro rata share of such assessment or charges to all units including the mortgaged Lot.

13.4 Mortgagees' Approval. Unless at least sixty-six and two-thirds percent (66-2/3%) of the Beneficiaries, based upon one (1) vote for each first mortgage or first deed of trust owned and sixty-six and two-thirds percent (66-2/3%) of the Lot Owners other than Declarant have given their prior written approval, the Association shall not be entitled to be exempt from any right of first refusal which might be contained in or added to this Declaration.

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13.4.1 By act or omission seek to abandon, partition, subdivide, encumber, sell or transfer any real estate or improvements thereon which are owned, directly or indirectly, by the Association for the benefit of the Lots and the Owner thereof. The granting of easements for public utilities or other public purposes consistent with the intended use of such property by the Association and the Lot Owners shall not be deemed a transfer within the meaning of this clause.

13.4.2 Change the method of determining the obligations, assessments, dues or other charges, which may be levied against a Lot Owner.

13.4.3 By act or omission change, waive or abandon any scheme of regulations, or enforcement hereof, pertaining to the architectural design or exterior appearance of Lots, the exterior maintenance of Lots, the maintenance of party walls or common fences and driveways or the upkeep of lawns, plantings or other landscaping in the common Area.

13.4.4 Fail to maintain fire and extended coverage insurance on insurable common property owned by the Association on a current replacement cost basis in an amount not less than one hundred percent (100%) of the insurable value based on current replacement cost.

13.4.5 Use hazard insurance proceeds for losses to any common property and improvements owned by the Association other than for the repair, replacement or reconstruction of such property and improvements.

13.5 Payment of Taxes and Insurance. Beneficiaries of Lots may, jointly or singly, pay taxes or other public assessments which are in default and which may or have become a charge against any common property and may pay overdue premiums on hazard insurance policies, or secure new hazard insurance coverage on the lapse of a policy, for such property and Beneficiaries making such payments shall be owed immediate reimbursement therefore from the Association. Entitlement to such reimbursement shall be reflected in an agreement in favor of all beneficiaries, which is duly executed by the Association.

13.6 Insurance Proceeds and Condemnation Awards. No provision of this Declaration or the Articles shall give a Lot Owner or any other party priority over any rights of a Beneficiary pursuant to its mortgage or deed of trust in the case of any distribution to Lot Owners of insurance proceeds or condemnation awards for losses to or a taking of common property of the Project owned by the Association or otherwise.

13.7 Association Assessments. Association assessments shall at all times include an adequate reserve fund for maintenance, repairs and replacement of Common Area that must be replaced on a periodic basis. Such assessments shall be payable in regular installments rather than by special assessments; provided, however, that this provision shall not in any way limit the Board's power to impose special assessments or any other assessment as provided in this Declaration.

13.8 Notice of Default. Beneficiaries who have submitted a request in writing to the Association for such shall be entitled to written notification from the Association of any default by the mortgagor or trustor of any Lot in the performance of such mortgagor's or trustor's obligations under this Declaration and By-Laws which is not cured within thirty (30) days.

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13.9 Management Agreements. Any agreement for professional management of the Project or any contract providing for services of Declarant shall provide that the management contract may be terminated by either party without payment of a termination fee upon thirty (30) days written notice thereof. The term of any such contract shall not exceed one (1) year, renewable by agreement of the parties for successive one (1) year periods.

13.10 Books or Records. Each first Beneficiary shall have the right to examine the books and records of the Association for the Project. Upon request, each first Beneficiary shall be entitled to receive an annual financial statement of the Association within ninety (90) days following the end of any fiscal year and written notice of all meetings of the Association and be permitted to designate a representative to attend all such meetings.

13.11 Notices to Beneficiary. The Association shall provide to any Beneficiary who so requests in writing written notice of

(i) any action to abandon or terminate the Project;

(ii) any action to amend materially the provisions of this Declaration, the Articles or the By-Laws; or

(iii) the effectuation of any decision by the Association to terminate any professional management and assume self-management of the Project.

13.12 Notice Regarding Substantial Damage or Destruction, Condemnation or Eminent Domain. In the event of a substantial damage to or destruction of any Lot or portion of the Common Area or if any Lot or any portion of the Common Area is made the subject matter of any condemnation or eminent domain proceeding or is otherwise sought to be acquired by a condemning authority, each Beneficiary who requests such notice shall be provided timely notice of any such damage, destruction or proceedings.

13.13 Mortgage Protection. A breach of any of the conditions contained in this Declaration does not defeat nor render invalid the lien of any mortgage or deed of trust made in good faith and for value as to total in the Project; provided, however, that said conditions shall be binding upon and effective against any of a Lot which Lot is acquired by foreclosure, trustee's sale or otherwise.

ARTICLE 14 MISCELLANEOUS PROVISIONS

14.1 Amendment. After the conveyance of the first Lot, this Declaration may be amended or revoked in any respect upon compliance with the following provisions.

14.1.1 By the vote or written consent of the record Owners constituting not less than seventy-five percent (75%) of both classes of Members of the Association. In the event only one class of Members exists at the time of the proposed amendment, said amendment shall require (1) the vote or written consent of a bare majority of the total votes of Members and (2) the vote or written consent of a majority of the votes of the Association members other than Declarant. The percentage of the voting power necessary to amend a specific clause or provision shall not be less than the percentage of affirmative votes prescribed for action to be under that clause. Said

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amendment shall take effect upon recordation in the Office of the Recorder of the County of an instrument duly certified and executed by the President and Secretary of the Association. Notwithstanding anything to the contrary herein contained, no such amendment shall affect the rights of the holder of any deed of trust or mortgage recorded prior to the recordation of such amendment.

14.1.2 Additions, Approvals by City for Amendments to Particular Provisions. The provisions of this Declaration which relate to a City condition of approval for the Subdivision Map, may not be amended without the prior written consent of the City. Any such attempted amendments shall be deemed void.

14.1.3 Right of Amendment if Requested by Governmental Mortgage Agency or Federally Chartered Lending Institutions. Anything in this Article to the contrary notwithstanding, Declarant and the Association reserve the right to amend all or any part of this Declaration to such an extent and with such language as may be requested by Governmental Mortgage Agencies which require such an amendment as a condition precedent to such agency's approval of this Declaration, or by any federally chartered lending institution as a condition precedent to lending funds upon the security of any Lot. Any such amendment shall be effectuated by the Recordation, by Declarant or the Association, of Certification of Amendment duly signed by or on behalf of the authorized agents, or authorized officers of Declarant or the Board, as applicable, with their signatures acknowledged, specifying the Governmental Mortgage Agency, or the federally chartered lending institution requesting the amendment and setting forth the amendatory language request by such agency or institution. Recordation of such a Certificate shall be deemed conclusive proof of the agency's or institution's request for such an amendment, and such Certificate, when Recorded, shall be binding upon all of the Lots and Common Area comprising the Development and all persons having an interest therein.

14.1.4 Right of Amendment if Requested by City. Anything in this Article to the contrary notwithstanding, Declarant and the Association reserve the right to amend all or any part of this Declaration to such an extent and with such language as may be requested by the City to reflect a modification of the development permits which requires a conforming amendment to this Declaration. The Association shall Record any amendment requested by the City within sixty (60) days of receipt of a request from the City. Any such amendment shall be effectuated by the Recordation of a Certificate of Amendment duly signed by or on behalf of the authorized agents, or authorized officers of Declarant, or the Association as applicable, with their signatures acknowledged, specifying the City requested the amendment and setting forth the amendatory language requested by the City. Recordation of such a Certificate shall be deemed conclusive proof of the City's request for such an amendment, and such Certificate, when Recorded, shall be binding upon all the real property comprising the Development and all persons having an interest therein.

14.1.5 Right of Amendment by Board. The Board may, without the approval of the Members, amend any part of this Declaration to the limited extent necessary to comply with a change in applicable federal, state or local legislation, and to correct typographical errors.

14.2 Duration. The provision of this Declaration, including the covenants, conditions and restrictions contained herein shall continue to be effective for a period of fifty-five (55) years from the date

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of recordation and shall be automatically extended for successive periods of ten (10) years or until a majority vote of the Owners of all lots of the project shall determine that they shall terminate.

14.3 Enforcement and Non-Waiver.

14.3.1 Right of Enforcement. Except as otherwise provided herein, Declarant, the Association or any Owner or Owners shall have the right to enforce any and all of the covenants, conditions and restrictions now or hereafter imposed by this Declaration upon the Owners or upon any property in the Project; provided, however, Declarant's right hereunder shall expire when it is no longer an Owner. The City has the right, but not the obligation, to enforce any covenants that relate to a City condition of approval for the Subdivision Map.

14.3.2 Emergency Situations. Notwithstanding any other provisions of the Governing Documents, under circumstances involving conduct that constitutes an emergency situation, the Association may undertake immediate corrective action. The following shall constitute emergency situations: (i) an immediate and unreasonable infringement of or threat to the safety or peaceful enjoyment of Residents of the Development, (ii) a traffic or fire hazard, or (iii) a threat of material damage to or destruction of the Development or any portion thereof. Hearings with respect to such corrective action shall be held following the corrective action in accordance with California Civil Code Section 5855, and no disciplinary action may be taken without compliance with California Civil Code Section 5855(c).

14.3.3 Remedies Cumulative. Each remedy provided by this Declaration is cumulative and not exclusive.

14.3.4 Non-waiver. The failure to enforce the provision of any covenant, condition or restriction contained in this Declaration shall not constitute a waiver of any right to enforce any such provision or any other provision of said Declaration.

14.4 Condemnation of Common Areas. If at any time all or any portion of any Common Area, or any interest therein, is taken for any public quasi-public use, under any statute, by right of eminent domain or by private purchase in lieu of eminent domain, the entire award in condemnation, to the extent such award is not apportioned among the Owners by court judgment or by agreement between the condemning authority and each of the affected Owners in the Project, shall be paid to the holder or holders of the fee title to such area as their interests may appear according to the fair market values of the Lots at the time of destruction, and determined by independent appraisal. Said appraisal shall be made by a qualified real estate appraiser with an MAI certificate or the equivalent, which appraiser shall be selected by the Board. Any such award to the Association shall be deposited into the operating fund of the Association. No Owner shall be entitled to participate as a party, or otherwise, in any proceedings relating to such condemnation, such right of participation being herein reverted exclusively to the Association, or other holder of the fee title which shall, in its name alone, represent the interests of all Lot Owners to the extent such Lot Owners have any interest.

14.5 Obligations of Owners. No Owner may avoid the burdens or obligations imposed on him by this Declaration through nonuse of any Common Area or the facilities located thereon or by abandonment of his Lot. Upon the conveyance, sale, assignment or other transfer of a Lot to a new Owner, the transferring Owner shall not be liable for any assessments levied with respect to such Lot after the date of such transfer, and no person, after the termination of his status as an Owner and prior to his again

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becoming an Owner, shall incur any of the obligations or enjoy any of the benefits of any Owner under this Declaration

14.6 Construction and Severability; Singular and Plural; Titles.

14.6.1 Restrictions Construed Together. All of the covenants, conditions and restrictions of this Declaration shall be liberally construed together to promote and effectuate the Fundamental concepts of the Project as set forth in the Preamble of this Declaration.

14.6.2 Restrictions Severable. Notwithstanding the provision of subparagraph (a) above, the covenant, conditions and restrictions of this Declaration shall be deemed independent and severable, and the invalidity or partial invalidity of any provision or portion thereof shall not affect the validity or enforceability of any other provision.

14.6.3 Singular Includes Plural. The singular shall include the plural and the plural the singular unless the context requires the contrary, and the masculine, feminine or neuter shall each include the masculine, feminine or neuter, as the context requires.

14.6.4 Captions. All captions or titles used in this Declaration are intended solely for convenience of reference and shall not affect that which is set forth in any of the terms or provision of said Declaration.

IN WITNESS WHEREOF, Declarant has executed this Declaration the day and year first above written:

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EXHIBIT A.

Easement 0010696 granted by St Helena Villas Homeowners Association and recorded May 9, 2017

EASEMENT AGREEMENT FOR EMERGENCY VEHICLE ACCESS

This Easement Agreement for Emergency Vehicle Access (“EVA Easement”) is made and entered into this 4th day of May, 2017 by Our Town St. Helena, a California nonprofit corporation, hereinafter referred to as “Grantee,” and the St. Helena Villas Homeowners Association referred to as “Grantor,” on the terms and conditions set forth herein.

RECITALS

- A. Grantor is the owner of certain real property located at the east end of Granada Court, in St. Helena, California, being a portion of the Common Area as shown on the Map entitled “Final Map of St. Helena Villas, a Condominium” filed July 9, 1974 in Book 10 of Maps at Pages 84 through 90, in the Office of the County Recorder for Napa County California and, the Common Area parcel being referenced by Napa County Assessor as Parcel No. 009-511-019.

- B. Grantee is the owner of certain real property located at 684 McCorkle Street in St. Helena, California and described in the Grant Deed conveyed to Our Town St. Helena recorded April 25, 2018 as Series Number 2016 0009572 of Official Records of Napa County, referenced by Napa County Assessor as Parcel No. 009-502-007-000 (hereinafter “Benefitted Parcel”).

- C. Grantor desires to grant an easement over a portion of Grantor’s Property, (“Easement Area”), that portion being more particularly described in **Exhibit A** and depicted in **Exhibit B** both of which are attached hereto and incorporated herein by reference, for the express and limited purpose of providing emergency access, by emergency response vehicles only, to and from the Benefitted Parcel over the Grantor’s Property.

GRANT OF EASEMENT

1. Grant of Easement. Subject to the conditions and limitations below, Grantor grants, conveys and confirms a non-exclusive, non-public easement for emergency vehicle access and required maintenance, over and upon the Easement Area. This grant of Easement is hereby expressly limited by the following:

- a. This Easement is granted for emergency vehicle access only and for no other purpose.

- b. Grantee shall, as a specific condition of this Easement and the companion Storm Drain easement , at Grantees’ sole expense, resurface approximately 8,710 sq. ft. of the parking area leading up to the Emergency Vehicle Access (“EVA”) gate

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on the south edge of the Easement Area to the east end of the Granada Court street as illustrated in EXHIBIT C.

- c. The resurfaced area from the gate to the end of Granada Court must be capable of supporting the loads of St Helena Fire Department vehicles and other emergency service vehicles up to 40-ton weight.
- d. Grantee and Grantor shall, as a specific condition of the Easement, maintain the Easement Area on their respective sides of the EVA gate free from any and all obstructions and shall take affirmative steps to remove any and all obstructions from the Easement Area.
- e. Grantee shall, at Grantees' sole expense, install and maintain, repair, and replace the EVA gate, the gate locking mechanism and the signage upon both the SH Villas side and the Brenkle Court side of the EVA gate reading "Emergency Exit - No Parking – Tow Away".
- f. Consistent with the non-exclusive nature of the Easement, Grantor reserves the right to place additional improvements within the Easement Area, provided that such additional improvements do not obstruct authorized use of the Easement Area by emergency response vehicles.
- g. It is agreed by both parties that Grantee will have no ongoing responsibility to maintain, repave or repair the repaved parking area upon completion of the initial resurfacing. Grantee will have no ongoing liability in connection with said area for damage or injury except for injury or damage related to or arising from the use of the Easement for the Benefitted Parcel.
- h. Grantee and its successors and assigns agree to indemnify, defend, and hold Grantor free and harmless from any claims, demands, losses, costs, expenses, obligations, liabilities, or damages, including interest, penalties, attorneys' fees, and costs, that Grantor may incur as a result of authorized use of the Easement Area by emergency response vehicles for the Benefitted Parcel.

2. Termination. This Easement is terminable by affidavit of the then-acting St. Helena Fire Department Chief stating that the Easement is no longer required for emergency vehicle access.

3. No Public Rights. Nothing contained herein shall be, or shall be deemed to be, a gift or dedication of any portion of the Easement Area to the general public for the benefit of the general public or for any public purpose whatsoever. It is intention that the provisions set forth herein shall be strictly limited to and for the purposes expressed herein. Grantor shall be permitted, from time to time, to take whatever reasonable action it may deem necessary to prevent any portion of the Easement Area encumbered by the Easement from being dedicated or taken for public use or profit so long as such action does not interfere with Grantee's use of the easement.

4. Indemnification. Grantee shall indemnify, defend, protect and hold harmless Grantor, its successors and assigns, for, from and against any and all liabilities, claims, damages, expenses

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(including, without limitation, reasonable attorneys' fees and reasonable attorneys' fees on an appeal), judgments, proceedings and causes of action of any kind whatsoever resulting from the exercise of the rights granted herein and/or the use of the Easement Area.

5. Binding Effect. This Agreement constitutes the entire agreement between the parties hereto, and as such it supersedes any and all prior agreements between the parties, whether they were verbal or written. This Agreement shall be binding upon the parties' respective heirs, successors and assigns, and shall run with and be an appurtenance on the lands of both parties. This Agreement may not be amended unless such an amendment is reduced to writing and signed by all Parties, or their respective successors. If legal action is required to enforce or construe the terms of this Agreement, the prevailing party thereto shall be entitled to reasonable attorney's fees and costs incurred therein.

6. Attorney's Fees. If either party institutes a legal proceeding, including, but not limited to litigation, arbitration or mediation, to enforce any of the terms of this Agreement, whether plead as contract, tort, or other cause of action, the prevailing party in such proceeding will be entitled to recover all costs and expenses, including reasonable attorneys' fees, incurred in the action.

7. Governing Law. The Easement herein granted shall be governed by the laws of the State of California. This Easement shall be recorded in Napa County, California.

8. Entire Agreement. This Agreement and the exhibits attached hereto embody the entire agreement between the parties in connection with this Easement.

9. Modifications and Amendments. This Agreement may not be modified or supplemented, amended, nor may any obligations hereunder be waived, except by written instrument signed by both parties and recorded in the official records of Napa County, California.

4.10. Severability. If any term or provision of this Agreement is determined to be illegal, unenforceable, or invalid, in whole or in part, for any reason, such illegal, unenforceable or invalid provisions or part thereof shall be stricken from this Agreement, and such provision shall not affect the legality, enforceability or validity of the remainder of this Agreement.

Easement 0010694 granted by St Helena Villas Homeowners Association and recorded May 9, 2017

EASEMENT AGREEMENT FOR DRAINAGE PIPE

This easement agreement ("Agreement") is made and entered into this 4th day of May, 2017 by Our Town St. Helena, a California nonprofit corporation, hereinafter referred to as "Grantee," and the St. Helena Villas Homeowners Association, hereinafter referred to as "Grantor," on the terms and conditions set forth herein.

RECITALS

A. Grantor is the owner of certain real property located at the east end of Granada Court, in St. Helena, California being a portion of the Common Area as shown on the Map entitled "Final Map of St. Helena Villas, a Condominium" filed July 9, 1974 in Book 10 of Maps at Pages 84

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through 90, in the Office of the County Recorder for Napa County California and referenced by Napa County Assessor as Parcel No. 009-511-019 ("Grantor's Property")

B. Grantee is the owner of certain real property located at 684 McCorkle Avenue in St. Helena, California and described in the Grant Deed conveyed to Our Town St. Helena recorded April 25, 2018 as Series Number 2016 0009572 of Official Records of Napa County and referenced by Napa County Assessor as Parcel No. 009-502-007-000 (hereinafter "Benefitted Parcel").

GRANT OF EASEMENT

1. Grant of Easement. St. Helena Villas hereby grants to Our Town St. Helena a non-exclusive appurtenant easement for the installation, maintenance, repair, and replacement of an underground drainage pipe running from Grantee's property for connection to the existing storm drain presently located under a portion of Grantor's Property. The easement is granted for all purposes reasonably related thereto.

a. This easement is approximately 5 feet in width, and approximately 76 feet in length running from the northerly boundary of Grantee's property to the existing storm drain. The specific location of the easement is more particularly described in Exhibit A and depicted in Exhibit B, both of which are attached hereto and incorporated herein by reference.

b. The express and limited purpose of the easement is to permit Grantee to install and maintain an underground drainage pipe that will provide Grantee with underground access to and use of the storm drain located on Grantor's Property so that surface water collected on Grantee's property may flow underground to the storm drain on Grantor's Property. Grantee will maintain and repair the underground drainage pipe serving only the Benefitted Parcel at its sole expense. Grantor will maintain, repair, and replace any drainage pipe serving both the Benefitted Parcel and Grantor's Property and the expense of such maintenance, repair, and replacement will be shared equally between Grantor and Grantee in proportion to the number of living units on Grantor's parcel and Grantee's parcel.

c. The Grantee and its successors or assigns are prohibited from discharging, releasing, spilling, or allowing or suffering any discharge, release, or spill, of any toxic or hazardous materials into the pipe leading to the storm drain and will be liable for all costs incurred by Grantor associated with any discharge, release, or spill originating on the Benefitted Parcel. The Grantee will indemnify and defend Grantor from any actions, claims, damages, costs, or penalties resulting from any discharge, release, or spill of hazardous or toxic materials from the Benefitted Parcel into the storm drain. Hazardous and toxic materials or substances shall include all substances declared toxic, hazardous, or injurious to health by any city, county, state, or federal agency, regulation, law, or ordinance.

d. Grantee shall, as a specific condition of this Easement and the companion EVA easement, at Grantee's sole expense, resurface approximately 8,710 sq. ft. of the parking area leading up to the Emergency Vehicle Access ("EVA") gate on the south edge of the Easement Area to the east end of the Granada Court street as illustrated in EXHIBIT C. The resurfaced area from the gate to the end of Granada Court must be capable of supporting the loads of St Helena Fire Department vehicles and other emergency service vehicles up to 40-ton weight.

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e. It is agreed by both parties that Grantee will have no ongoing responsibility to maintain, repave, or repair the repaved parking area upon completion of the initial resurfacing. Grantee will have no ongoing liability in connection with said area for damage or injury except injury or damage arising from the drainage pipes serving only the Benefitted Parcel.

2. No Public Rights. Nothing contained herein shall be, or shall be deemed to be, a gift or dedication of any portion of the Easement Area to the general public for the benefit of the general public or for any public purpose whatsoever. It is intention that the provisions set forth herein shall be strictly limited to and for the purposes expressed herein. Grantor shall be permitted, from time to time, to take whatever reasonable action it may deem necessary to prevent any portion of the Easement Area encumbered by the Easement from being dedicated or taken for public use or profit.

3. Indemnification. Grantees shall indemnify, defend, protect, and hold harmless Grantor, its successors and assigns, for, from and against any and all liabilities, claims, damages, expenses (including reasonable attorneys' fees and costs), judgments, proceedings, and causes of action of any kind whatsoever resulting from the exercise of the rights granted herein and/or the use of the Easement Area, except for accident, loss, damage, injury, death and claims for property damage caused by the negligence or intentional misconduct of the Grantor, its agents or employees.

4. Binding Effect. This Agreement constitutes the entire agreement between the parties hereto, and as such it supersedes any and all prior agreements between the parties, whether they were verbal or written. This Agreement shall be binding upon the parties' respective heirs, successors and assigns, and shall run with and be an appurtenance on the lands of both parties. This Agreement may not be amended unless such an amendment is reduced to writing and signed by all Parties, or their respective successors. If legal action is required to enforce or construe the terms of this Agreement, the prevailing party thereto shall be entitled to reasonable attorney's fees and costs incurred therein.

5. Attorney's Fees. If either party institutes a legal proceeding, including, but not limited to litigation, arbitration or mediation, to enforce any of the terms of this Agreement, whether plead as contract, tort, or other cause of action, the prevailing party in such proceeding will be entitled to recover all costs and expenses, including reasonable attorneys' fees, incurred in the action.

6. Governing Law. The Easement herein granted shall be governed by the laws of the State of California. This Easement shall be recorded in Napa County, California.

7. Entire Agreement. This Agreement and the exhibits attached hereto embody the entire agreement between the parties in connection with this Easement.

8. Modifications and Amendments. This Agreement may not be modified or supplemented, amended, nor may any obligations hereunder be waived, except by written instrument signed by both parties and recorded in the official records of Napa County, California.

9. Severability. If any term or provision of this Agreement is determined to be illegal, unenforceable, or invalid, in whole or in part, for any reason, such illegal, unenforceable or invalid provisions or part thereof shall be stricken from this Agreement, and such provision shall not affect the legality, enforceability or validity of the remainder of this Agreement.

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EXHIBIT B

Brenkle Court Homeowners Association Fine Schedule

Any infraction of the covenants and conditions and restrictions or the rules and regulations of the Brenkle Court Homeowners Association are subject to the following penalties

<u>1st Violation</u>	<u>Warning</u>
<u>2nd Violation</u>	<u>\$50</u>
<u>3rd Violation</u>	<u>\$100</u>
<u>Additional Violations</u>	<u>\$200</u>
<u>Safety Violations</u>	<u>Warning and/or fine up to \$300 and 24 hours to remedy situation</u>
<u>Continuing Violations</u>	<u>Dialing fines until cured</u>
<u>Suspension</u>	<u>Common area privileges may also be suspended</u>
<u>Assessment</u>	<u>Special assessment may be levied to reimburse HOA expenses</u>



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: Public Hearing

Subject: Consideration and proposed approval the Annexation of Territory into the St. Helena Municipal Sewer District No. 1 MSD Annexation No. 134, 1025 and 1045 Pratt Avenue, St Helena, CA. (APN's) 009-142-023-000 and 009-142-024-000.

CEQA Determination: Exempt from the requirements of CEQA under the "General Rule", Section 15061 (b)(3), in that it can be seen with certainty that the proposed action will have no impact on the environment.

Prepared By: Chrissy Cook, Administrative Assistant

Reviewed By: April Mitts, Finance Director

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

Mark Andrade owner of 1025 and 1045 Pratt Avenue, St Helena, CA. Napa County Assessor Parcel Number (APN's) 009-142-023-000 and 009-142-024-000, has applied to be annexed into the St. Helena Municipal Sewer District No. 1. A location map for the property is shown in Attachment 1. City Council approval of the connection is the formal administrative process to change the property's tax rate area code from septic to sanitary sewer for tax purposes.

DISCUSSION

The properties are currently on a septic system and on August 28th, 2018 the City Council ordered the annexation and set today's hearing to annex the territory into the St Helena Municipal Sewer District No. 1, MSD Annexation No. 134. The sewer impact fee has been paid and is calculated on the livable area currently on file with the Napa County Assessor's office. At the time of connection to the City sewer, the existing septic system will be destroyed in accordance with Napa County Department of Environmental Management guidelines.

On August 28, 2018, in accordance with Health & Safety Code §§ 4641 et seq., the City Council approved via consent to provide notice for this public hearing regarding the proposed annexation. The purpose of the public hearing is to hear from persons interested in the proposed annexation, and consider approval of this resolution to approve the annexation. This resolution for annexation requires at least four affirmative votes. (Health & Saf. Code §§ 4645-47.)

If the City Council approves this resolution, City staff will then process the annexation with Napa County and the State Board of Equalization to change the tax rate area code for the property and record the resolution. Staff will work with the Applicant to obtain required encroachment and sewer connection permits.

FISCAL IMPACT

The Applicant is responsible to construct the sewer lateral and connect to the house; and pay annexation, connection, and impact fees.

RECOMMENDED ACTION

Adopt Resolution Approving the Annexation of Territory to the St. Helena Municipal Sewer District No. 1, MSD Annexation No. 134, 1025 and 1045 Pratt Avenue, St Helena, CA. Napa County Assessor Parcel Number (APN's) 009-142-023-000 and 009-142-024-000.

ATTACHMENTS

[Map and Description](#)

[Application](#)

[RESO](#)

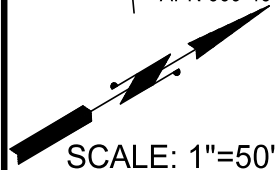
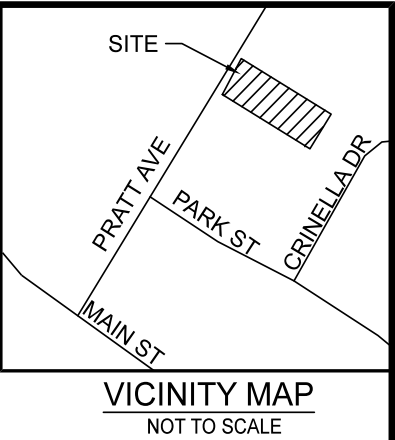
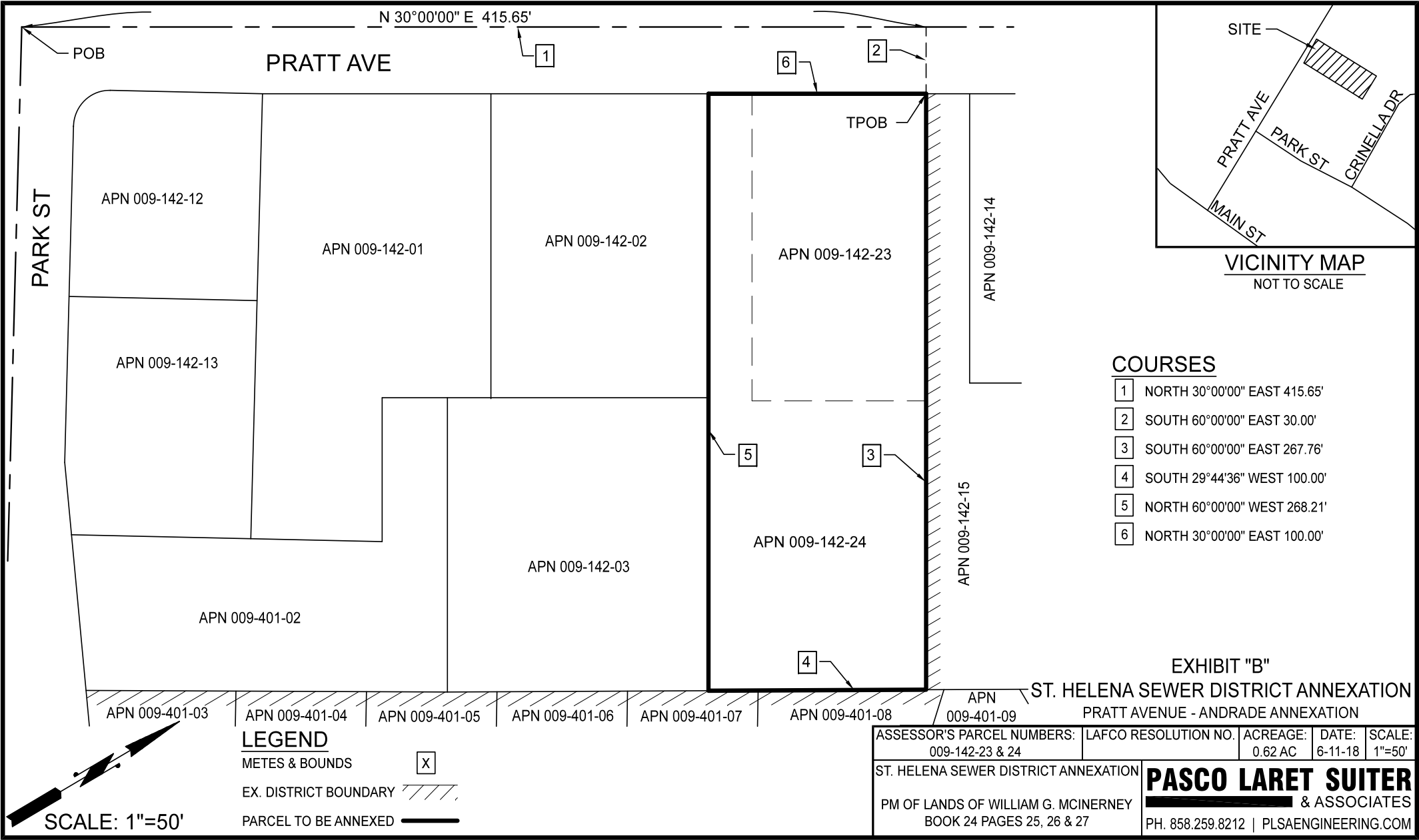


EXHIBIT "A"

"PRATT AVENUE-ANDRADE ANNEXATION"

GEOGRAPHICAL DESCRIPTION

APN: 009-142-023 & 024

ANNEXATION NO _____

ALL THAT CERTAIN PROPERTY, SITUATED IN THAT PORTION OF LOTS ONE AND TWO AS SHOWN ON THE MAP ENTITLED PARCEL MAP OF THE LANDS OF WILLIAM G. MCINERNEY, FILED DECEMBER 29, 2003 AT BOOK 24 OF PARCEL MAPS AT PAGES 25 – 27, NAPA COUNTY RECORDS, OFFICIAL RECORDS, DESCRIBED AS FOLLOWS:

COMMENCING AT THE CENTERLINE INTERSECTION OF PRATT AVENUE AND PARK STREET AS SHOWN ON SAID BOOK 24 OF PARCEL MAPS AT PAGES 25 – 27 AND BOOK 17 OF RECORD OF SURVEYS AT PAGE 13; THENCE ALONG THE FOLLOWING NUMBERED COURSES:

1. THENCE NORTH 30°00'00" EAST 415.65 FEET ALONG THE CENTERLINE OF SAID PRATT AVENUE TO A POINT OF INTERSECTION WITH THE NORTHERLY PROLONGATION OF THE NORTHERLY LINE OF SAID LOT 1;
2. THENCE SOUTH 60°00'00" EAST 30.00 FEET ALONG SAID PROLONGATION TO THE **TRUE POINT OF BEGINNING**
3. THENCE SOUTH 60°00'00" EAST 267.76 FEET;
4. THENCE SOUTH 29°44'36" WEST 100.00 FEET;
5. THENCE NORTH 60°00'00" WEST 268.21 FEET;
6. THENCE NORTH 30°00'00" EAST 100.00 FEET, TO THE **TRUE POINT OF BEGINNING**

CONTAINING 0.615 ACRES OF LAND MORE OR LESS

FOR ASSESMENT PURPOSES ONLY. THIS DESCRIPTION OF LAND IS NOT A LEGAL PROPERTY DESCRIPTION AS DEFINED IN THE SUBDIVISION MAP ACT AND MAY NOT BE USED AS THE BASIS FOR AN OFFER FOR SALE OF THE LAND DESCRIBED.



CITY OF ST. HELENA

DEPARTMENT OF PUBLIC WORKS

1572 RAILROAD AVENUE, ST. HELENA, CA 94574

707-968-2658

Application for Sewer Annexation

APPLICANT INFORMATION			
Applicant(s) Name MARK ANDRADE		Phone 408/472 1948	
Applicant(s) Street Address 401 E ARQUES AVE	City SUNNYVALE	State CA	Zip 94085
Property Owner Name MARK ANDRADE		Phone	
PROPERTY INFORMATION			
Property Address seeking sewer annexation 1045 PRATT AVE		City ST HELENA	State CA
Assessor's Parcel No (APN) 009-142-024		Dwelling Square Footage 3423	Existing Land Use EMPTY LOT
Subsequent Development Plans, if any, and Timing			
REQUIRED SIGNATURE			
I hereby certify that this application and all other documents submitted are true and correct to the best of my knowledge and belief. I also certify that I am the owner of the above property and have full legal rights to the property.			
Property Owner Signature <i>Mark Andrade</i>		Date 4/18/18	
**** FOR OFFICE USE ONLY ****			
Application Received By C Cook		Date Application Received 4/18/18	
Present Zoning		General Plan Designation	
Application Checklist		Date Completed	
St. Helena Application for Sewer Annexation		Sewer Connection Application Fee (St. Helena)	
Statement of Boundary Change Application: BOE		Annexation Process (St. Helena)	
Fees submitted		Connection Fee Inspection (St. Helena)	
Staff Report/Resolution Drafted		Sewer Impact Fee (St. Helena)	
City Council Approved		State Board of Equalization (BOE) Fee	
Legal Description and Map		Napa County Mapping Flat Fee	
Confirm Tax Area Rate		Total Due at Application	
Submission to BOE		Sewer Impact Fee: \$ _____ * X _____ (Habitable SF)	
Submission to Napa County Auditor		(17/18) *PER SF \$51 SFR \$74 MFR \$49 Office \$66 Industrial \$99 Com/Retail \$98 Lodging	
Submission to Napa County Assessor's office		Total Collected with Application	
Napa County Tax Rate Area Change Received		Date Payment Received	
Grading Permits Approved		Fees to other agencies:	
Encroachment Permits Approved		State Board of Equalization Fee (Check # _____)	
Finance Notified		Napa County Mapping Flat Fee (Check # _____)	
Date Service Began		\$162.00	

used
6/14/18

Updated 2/2018

CITY OF ST. HELENA RESOLUTION NO. 2018

**APPROVE THE ANNEXATION OF TERRITORY INTO THE ST.
HELENA MUNICIPAL SEWER DISTRICT NO. 1**

MSD ANNEXATION NO. 134

**1025 & 1045 Pratt Avenue, St Helena, CA
(APN's) 009-142-023-000 & 009-142-024-000**

RECITALS

- A. The property at 1025 & 1045 Pratt Avenue, St Helena, CA (APN's) 009-142-023-000 & 009-142-024-000 will benefit from annexation into the St. Helena Municipal Sewer District No. 1; and
- B. The owner of 1025 & 1045 Pratt Avenue, St Helena, CA (APN's) 009-142-023-000 & 009-142-024-000 have requested annexation into the St. Helena Municipal Sewer District No. 1; and
- C. The legal description and boundary for the territory to be annexed is described in the attached Exhibit A – Annexation Description; and
- D. A public hearing regarding this proposed annexation was ordered on August 28th, 2018, and duly noticed and held on September 11th, 2018 at a regular meeting of the City Council of the City of St. Helena; and
- E. All annexation fees have been paid.
- F. The City has complied with all laws applicable to these annexation proceedings, including without limitation Health & Safety Code sections 4641 et seq.

RESOLUTION

NOW, THEREFORE, the City Council of the City of St. Helena resolves as follows:

- 1. The territory described in the attached Exhibit A – Annexation Description, commonly known as 1025 & 1045 Pratt Avenue, St Helena, CA., Napa County Assessor Parcel Number (APN's) 009-142-023-000 & 009-142-024-000 are hereby ordered annexed; and
- 2. The City Clerk shall cause a certified copy of this Resolution to be recorded with the official records of the County of Napa, pursuant to section 4647 of the Health & Safety Code.

Approved at a Regular Meeting of the St. Helena City Council on September 11th, 2018 by the following.

Mayor Galbraith: _____
Vice Mayor White: _____
Councilmember Ellsworth: _____
Councilmember Dohring: _____
Councilmember Koberstein: _____

APPROVED:

ATTEST:

Alan Galbraith
Mayor

Cindy Tzaopoulos
City Clerk



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: **New Business**

Subject: **Citywide Classification and Compensation Study Update**

CEQA **Not a CEQA project**
Determination:

Prepared By: Kathy Robinson, Human Resources & IT Director

Reviewed By: Mark T. Prestwich, City Manager

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

On June 12, 2018, the City Council approved Resolution 2018-74 authorizing a professional services agreement with Ralph Andersen & Associates to conduct a classification and compensation study, and organizational review of the Public Works Department.

DISCUSSION

On June 26, 2018, Doug Johnson, Vice President of Ralph Andersen & Associates, conducted two all-hands meeting with staff to review the forthcoming study and answer questions. At those meetings, employees received a Job Analysis Questionnaire (JAQ) requesting detailed information regarding job duties, knowledge, skills and abilities for their respective positions. Completion of the JAQ is the first step in the process to ensure that employees are in the appropriate classification.

In August, all completed JAQs were sent to Ralph Andersen & Associates for review. After JAQs were reviewed by the consultant, individual employees were scheduled to convene September 11 and 12, as well as to discuss organizational structures of particular departments and/or divisions. Matching labor markets that most closely represent the City of St. Helena will follow the completion of JAQs and employee interviews.

Mr. Johnson will provide an oral status report to the City Council on the project.

FISCAL IMPACT

Not applicable.

RECOMMENDED ACTION

Receive and file an status update on the Classification and Compensation Study.

City of St. Helena Classification & Compensation Study Update

Doug Johnson, Vice President
Ralph Andersen & Associates

Overview of Process

- Classification Study
 - Employee Questionnaires
 - Employee Interviews
 - Draft Recommendations
 - Employee/Management Review of Drafts
 - Finalization
- Compensation Study
 - Compensation Survey
 - Draft Compensation Findings & Recommendations
 - Implementation Costing
 - Finalization

9/11/2018

Market Selection

(2)

Why Surveys Are Done

- Anticipate and understand what labor market is doing
- Create a data-driven framework for allocating resources to wages and benefits
- Provide defensibility for compensating employees
- Optimize the City's ability to recruit and retain employees
- Labor bargaining is data-driven

Public and Private employers do the same things; just a difference in accessibility of data

Survey Objectives

- Survey data should reflect the real world labor market that the City competes with
- Survey employers should not be used that would require relocation (i.e. Southern California market)
- Survey agencies should reflect similar mission, funding sources, and operating environments
- Survey agencies will not cover all City jobs, particularly unique jobs that are not readily found in the competing labor market; benchmarking and internal relationships are an appropriate alternative

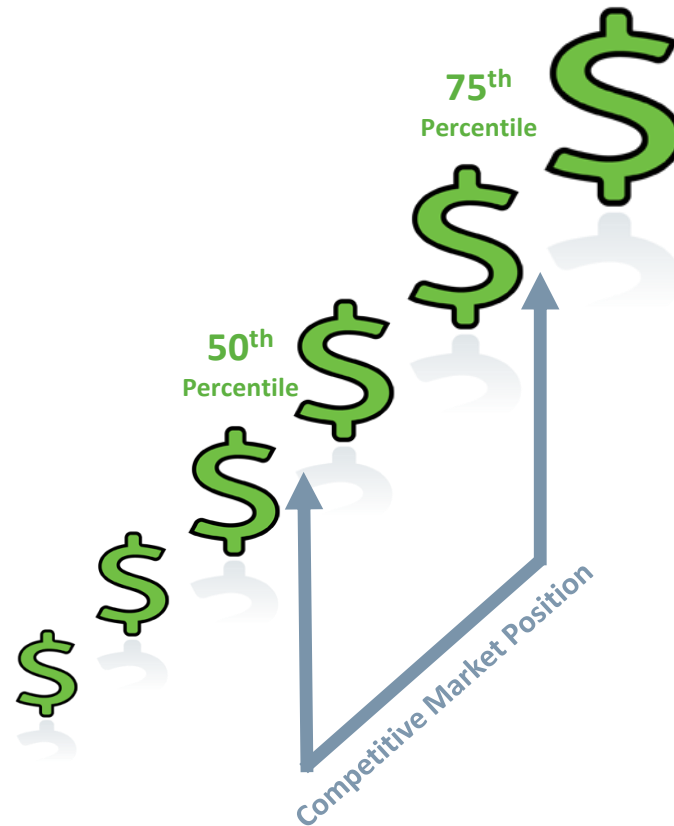
9/11/2018

Market Selection

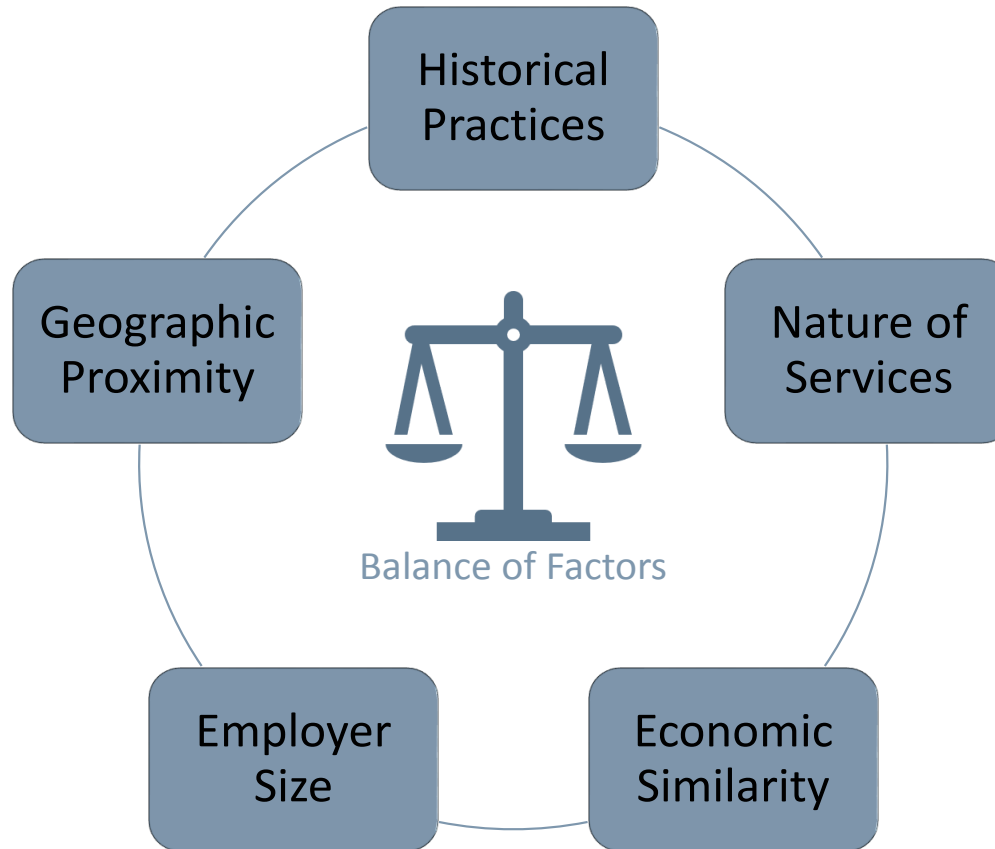
(4)

Market Position

- Establishes competitive position
- Historical practices is an important consideration; change in practice requires explanation
- \$ or % differences between percentiles depends on the array of data; can be very small if data is tightly arrayed
- Recruitment and retention goals/needs

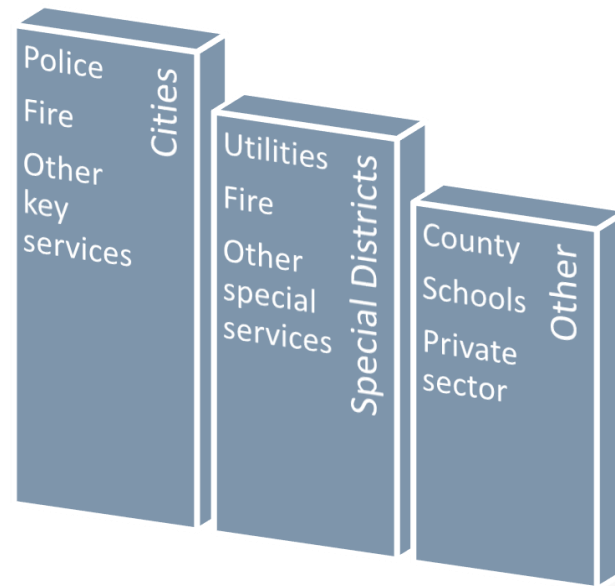


Labor Market Selection Criteria



Nature of Services

- Primary market should focus on cities unless specialized services or market isolation requires other public agencies
- Key services such as police and fire may be a factor to the degree cities do not provide such services
- Selection of 10-12 survey agencies will allow for instances where no comparable job is found



Geographic Proximity

- Reasonable commuting distance
- Surrounding counties or other regional measure
- Depends on number of comparable employers found
 - Services
 - Size
 - Economic similarity



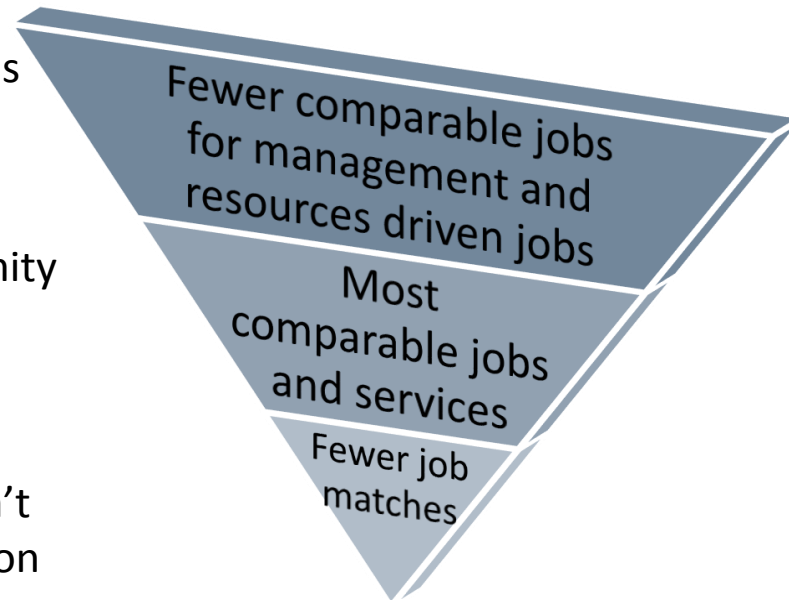
9/11/2018

Market Selection

8

Employer Size

- Population, expenditures, FTEs
- Avoid small employers with insufficient jobs
- Geographic region and proximity may require using larger employers
- Daytime population impacts (tourism, business parks) won't be evident in census population but typically shows in revenues and expenditures
- Size impacts with respect to job matching can be analyzed as part of job comparability assessment



9/11/2018

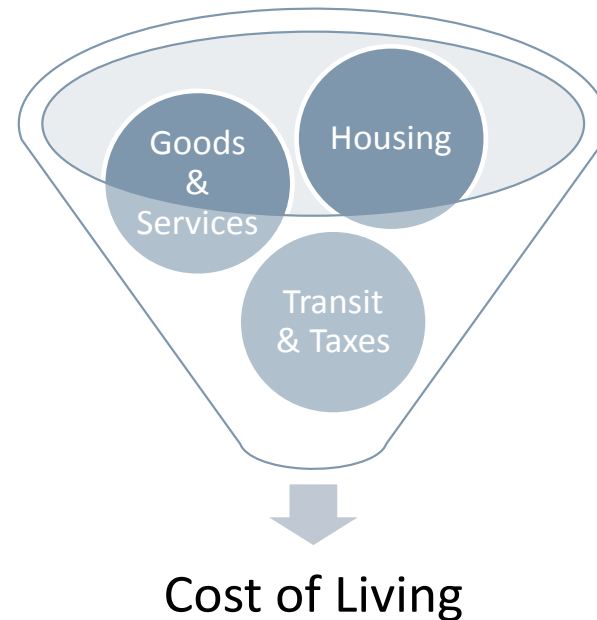
Market Selection

9

Economic Similarity

- **Cost of Living Index** – relative differences in the costs for goods, services, housing, utilities, taxes
- **Relative Wage Index** – relative differences in the wages paid for similar jobs
- Indexes published by the Economic Research Institute (ERI)
- Objective
 - Establish a balance in agencies
 - Avoid extreme differences
 - Understand market conditions

Economic similarity is more important the further away a potential survey agency is

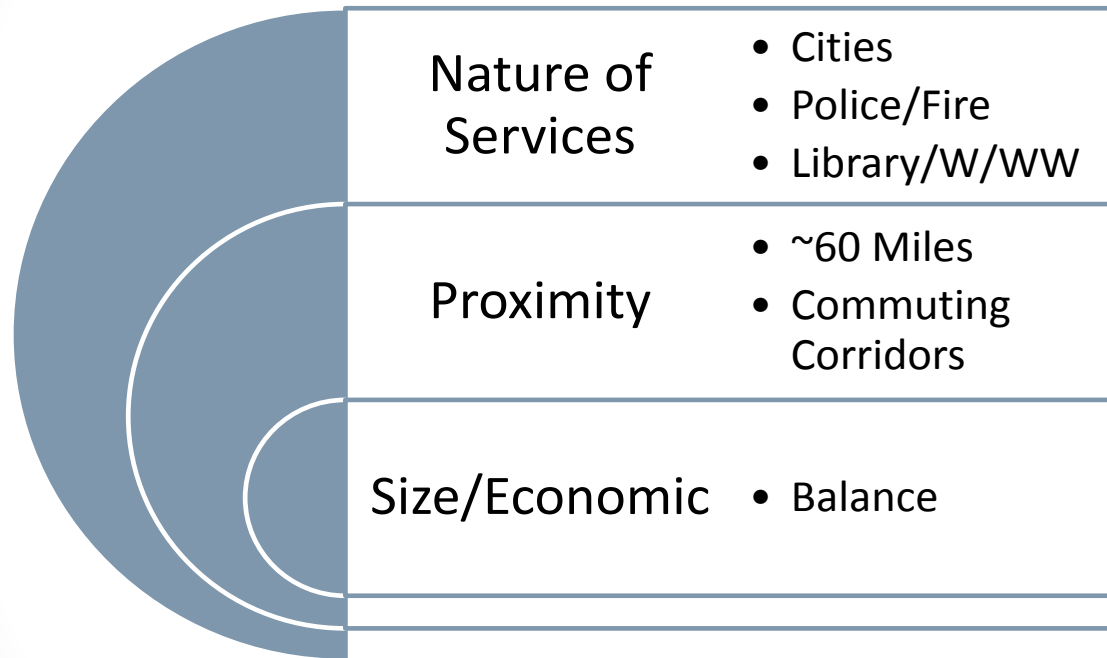


9/11/2018

Market Selection

[10]

Target Selection Criteria



No perfect market; balance of selection factors

Preliminary Survey Agencies

Agency	Population Served	Driving Distance	Total Revenues	Total Expenditures	ERI COL	ERI Wage	County	Police	Fire	Library	W/ WW
St. Helena	6,118	0	\$18.9 Mil	\$20.1 Mil	100.0	100.0	Napa	X	X	X	X
Calistoga	5,334	5	\$15.9 Mil	\$19.6 Mil	100.0	100.0	Napa	X	X		X
Napa	80,403	22	\$186.0 Mil	\$196.0 Mil	86.2	100.1	Napa	X	X		X
Windsor	28,060	25	\$21.2 Mil	\$21.6 Mil	80.9	100.6	Sonoma				X
Healdsburg	12,061	30	\$36.2 Mil	\$77.8 Mil	90.6	98.8	Sonoma	X	X		X
Cotati	7,716	32	\$10.4 Mil	\$12.8 Mil	64.7	99.0	Sonoma	X			
Sonoma	11,390	35	\$20.5 Mil	\$23.3 Mil	83.7	99.0	Solano				
Benicia	27,499	50	\$58.6 Mil	\$53.9 Mil	74.9	101.8	Solano	X	X	X	X
San Rafael	60,651	56	\$100.8 Mil	\$103.4 Mil	100.1	110.3	Marin	X	X	X	
Albany	19,053	57	\$28.1 Mil	\$31.9 Mil	100.7	105.4	Alameda	X	X		
San Anselmo	13,000	58	\$18.8 Mil	\$18.1 Mil	106.0	110.0	Marin			X	
Larkspur	12,351	60	\$20.7 Mil	\$21.7 Mil	106.8	110.1	Marin		X	X	
Mill Valley	14,963	62	\$38.0 Mil	\$40.2 Mil	110.5	110.1	Marin	X	X	X	X
Napa County	25,575	22	\$370.2 Mil	\$365.2 Mil	86.2	100.1	Napa	X		X	X
Median/Count	14,963	35	\$28.1 Mil	\$31.9 Mil	90.6	100.6		9	8	6	7

Data Sources:

Population - CA Dept of Finance; 2018

Revenues/Expenditures - CA State Controller; 2017

Distance - Google Maps

Cost of Living/Wage Index - Economic Research Institute; July 2018

9/11/2018

Market Selection

(12)



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: New Business

Subject: Review and Prioritization of Draft City of St. Helena Downtown Economic Strategy

CEQA Determination: This item is purely an informational discussion to gain Council direction and is therefore not a CEQA project. Any formal decisions on individual projects will be subject to a complete analysis and determination under CEQA.

Prepared By: Mark T. Prestwich, City Manager

Reviewed By: April Mitts, Finance Director

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

In late 2017, the City Council held a strategic planning workshop to discuss three-year organizational goals and 12-month strategic objectives. "Ensure the Long-Term Economic Sustainability while Safeguarding St. Helena's Unique Culture and Quality of Life" emerged as a key goal, along with a desire to revitalize downtown to improve its resilience.

The City Council also commissioned the preparation of an Economic and Demographic Profile, and a Downtown Retail Market Analysis to evaluate the downtown's retail vitality. This analysis was prepared by Kosmont Companies and presented to the City Council on July 24, 2018, including several recommendations to address concerns with the downtown. Direction was subsequently provided to the City Manager to prepare a plan and recommended next steps.

DISCUSSION

The Draft City of St. Helena Downtown Economic Strategy (attached) organizes strategies to enhance the competitiveness of downtown business and help support the City's economic base. The plan is intentionally crafted with an appreciation for the

historic and cultural resources that contribute to St. Helena's special character and quality of life, while maintaining a local serving perspective.

The Draft Strategy organizes the various initiatives into Place, Process and People. Implementation of the plan will result in public infrastructure improvements to enhance the pedestrian experience, create a responsive and predictable development review process, and cultivate and reinforce the historic downtown's reputation as a distinctive destination.

It is recommended the City Council review and discuss the various strategies, and provide feedback on prioritizing implementation of the initiatives into immediate (within 6 months), near-term (6-12 months) and longer-term (12+ months) categories.

FISCAL IMPACT

It is likely several initiatives will require new appropriations of City resources. Some initiatives do not require funding while others already have dedicated funding. It is also possible the City may be able to secure grant funding or use other available funding (e.g. Measure T resources) to offset costs.

RECOMMENDED ACTION

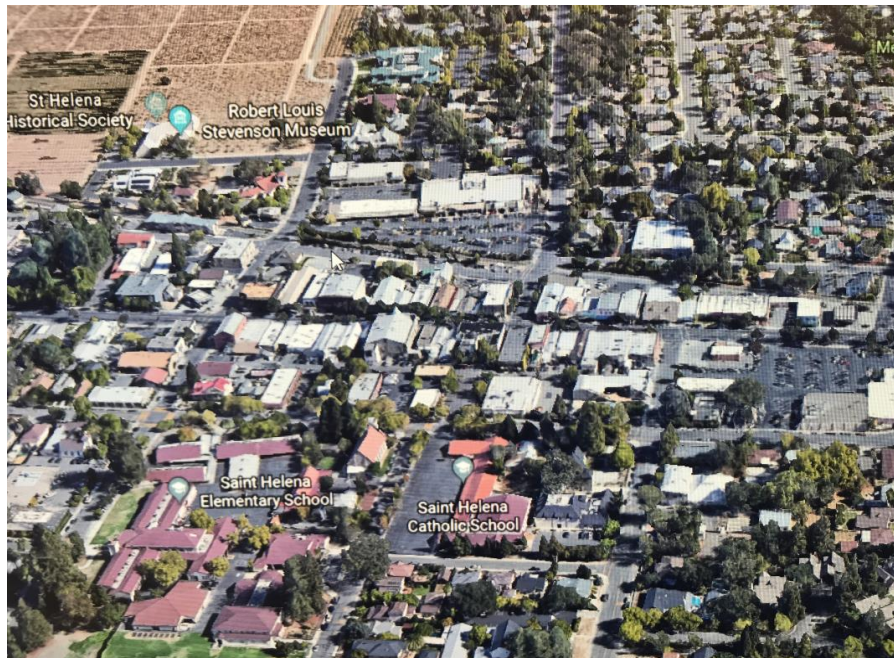
Review, discuss and provide direction to the City Manager.

ATTACHMENTS

[Draft Econ Plan - Final](#)

DRAFT

Downtown Economic Strategy



September 2018

City of St. Helena
www.cityofstheleena.org

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Acknowledgements & Credits

City Council

Alan Galbraith, Mayor

Peter White, Vice Mayor

Paul Dohring, Council Member

Geoff Ellsworth, Council Member

Mary Koberstein, Council Member

City Administration

Mark Prestwich, City Manager

Noah Housh, Planning & Community Improvement Director

Erica Ahmann Smithies, PE, Public Works Director/City Engineer

April Mitts, Finance Director

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EXECUTIVE SUMMARY

In late 2017, the City Council held a strategic planning workshop to discuss three-year goals and 12-month strategic objectives for the City. “Ensure the Long-Term Economic Sustainability while Safeguarding St. Helena’s Unique Culture and Quality of Life” emerged as a key goal, along with a desire to revitalize downtown to improve its resilience.

The City Council also commissioned the preparation of an Economic and Demographic Profile, and a Downtown Retail Market Analysis to evaluate the downtown’s retail viability. This analysis was prepared by Kosmont Companies and presented to the City Council on July 24, 2018, including several recommendations to address concerns with its downtown. Key findings of the study included:

- Downtown’s 8% vacancy rate is significantly higher than adjacent markets (2.6%);
- Retail lease rates are at an all time high historically and higher than those for the Napa County submarket, and all of the neighboring submarkets;
- Most local serving merchants cannot achieve the needed sales volume exclusively from resident households to remain profitable;
- The City has an unpredictable decision-making process and does not have a business-friendly reputation (e.g. difficult entitlement and permitting rules);
- Very few retail uses are allowed by right and permits run with the land, meaning tenants cannot relocate without high cost/risk; and
- The City is a net job importer, with approximately 3,000 workers employed in the City but living outside City limits.

Direction was subsequently provided to the City Manager to prepare a plan and recommended next steps.

The resulting plan organizes and prioritizes strategies to enhance the competitiveness of downtown businesses and help support the City’s economic base. The plan is intentionally crafted with an appreciation for the historic and cultural resources that contribute to St. Helena’s special character and quality of life, while maintaining a local serving perspective.

Implementation of the plan will result in public infrastructure improvements to enhance the pedestrian experience, create a responsive and predictable development review process, and cultivate and reinforce the historic downtown’s reputation as a distinctive destination. A summary of the strategy is highlighted on the next page.

STRATEGY AT A GLANCE

PLACE

INVEST IN PUBLIC INFRASTRUCTURE IMPROVEMENTS TO ENHANCE THE PEDESTRIAN EXPERIENCE

- ✓ Complete Downtown Sidewalk and Streetscape Improvement Project
- ✓ Pursue Pedestrian Alley Beautification
- ✓ Launch Downtown Facade and Tenant Improvement Program
- ✓ Complete Downtown Restroom Project
- ✓ Develop Wayfinding Signage Program with Local History
- ✓ Complete Parking Study to Identify Possible Improvements
- ✓ Evaluate Potential Streetscape Improvements to Money Way, Railroad Avenue, and Oak Avenue
- ✓ Rebuild on City Hall Parcel

PROCESS

CREATE A RESPONSIVE AND PREDICTABLE DEVELOPMENT REVIEW PROCESS FOR BUSINESS INVESTMENT

- ✓ Improve Business Certainty by Identifying Community Supported Uses Permitted by Right in the Central Business and Service Commercial Zoning Districts
- ✓ Streamline the Permit Process by Discontinuing Discretionary Review for Certain Permit Types
- ✓ Allow for Temporary Pop-Up Retail Uses

PEOPLE

CULTIVATE AND REINFORCE HISTORIC DOWNTOWN'S REPUTATION AS A DISTINCTIVE DESTINATION

- ✓ Re-Imagine Under-Utilized Properties/Promote In-Fill Housing
- ✓ Enhance Community Event Programming in Partnership with the Chamber of Commerce
- ✓ Refresh Branding and Reputation of Downtown
- ✓ Fund Online Marketing Portal for Vacant Commercial Space & Priority Investment Opportunities
- ✓ Provide Technical Assistance to Businesses/Landlords on Experiential, Destination, and Omnichannel Retail Strategies
- ✓ Explore Possible Wine Train Pilot Project
- ✓ Hotel Considerations
- ✓ Develop a City Parklets Program Policy and Permit Process
- ✓ Maintain a Safe, Clean and Comfortable Downtown Environment

COMMUNITY PROFILE

The City of St. Helena is located in the center of the world-famous wine growing Napa Valley, 65 miles north of San Francisco. The St. Helena area was once home to the Wappo people, a Yukian-speaking group who were the area's earliest inhabitants. Their village was located where Sulphur Creek meets the Napa River. General Vallejo's 1834 land grant led to the community's modern-era development. The City of St. Helena was incorporated as a City on March 24, 1876 and reincorporated on May 14, 1889.

The City from its inception has served as a rural agricultural center. Over the years, with the growth and development of the wine industry, the City became an important business and banking center. The City also receives many visitors as a result of the wine industry and the area's scenic qualities. In 1998, three blocks of St. Helena's downtown commercial district were placed on the National Register of Historic Places and designated a Historic Commercial District. The main goal of the City is to maintain a small-town atmosphere and to provide quality services to its citizens.

Today, the population of the City of St. Helena is 6,118. St. Helena is a full-service City and encompasses an area of four square miles. The City's General Fund Fiscal Year (FY) 2018-19 budget is \$14.3 million with a total operating budget of \$30.5 million. The assessed valuation of the City for FY 2018-19 is \$2.5 billion.

The City of St. Helena is a General Law City and operates under the Council-City Manager form of government. The City Council is the governing body and has the power to make and enforce all laws and set policy related to municipal affairs. The City Manager is responsible for carrying out the policies of the City Council and for the proper and efficient management of municipal activities. The City Manager directs and manages the various departments and municipal services through appointed Department Directors who directly supervise and administer the various City programs, services, and activities.

ST. HELENA ECONOMIC PROFILE

The economic profile of the City of St. Helena has changed greatly in the past few years. The City experienced significant financial challenges with the deep national recession a decade ago, and continued to experience revenue challenges through 2016. Challenges persist for the City's downtown commercial core.

While St. Helena enjoys the highest per capita sales tax revenue of all cities in Napa and Sonoma counties, sales tax revenues in its downtown have declined 15% in the past three years and are well below 2006 levels. The City's recent downtown retail analysis study determined the downtown retail vacancy rate is approximately 8%, which is significantly higher than the vacancy rate of the Napa County submarket (2.6%), and many neighboring submarkets. Asking lease rates in St. Helena are at an all time high historically and higher than those for the Napa County submarket, and all neighboring submarkets.

Contributing to this challenge is the fact that St. Helena has more local jobs than people in the labor force, which requires large numbers of commuters to fill local jobs. Interviews with local employers identified challenges with attracting employees. This is not a surprise given the City experiences a net inflow of approximately 3,000 workers for its estimated 5,700 available jobs.

However, several recent factors have contributed to a more positive financial outlook looking forward. The passage of Measure T, a 25-year ½ cent countywide sales tax, which took effect July 1, 2018, will provide an estimated \$1.2 million annually in additional resources for street maintenance and repair work. Additionally, the passage of Measure D in November 2016, a ½ cent sales tax, has provided an important boost to the City's General Fund and will facilitate the City's ability to improve service levels, reinvest in deteriorating infrastructure, and improve emergency reserve levels.

According to a May 2018 report by the California Employment Development Department, the Napa County unemployment rate has dropped to 2.5%, the lowest figure in 19 years. The statewide unemployment rate is 3.7%, down from a high of 12.2% during the peak of the recession in 2010.

PLACE

INVEST IN PUBLIC INFRASTRUCTURE IMPROVEMENTS TO ENHANCE THE PEDESTRIAN EXPERIENCE

Downtown St. Helena is firmly established as a distinctive and attractive shopping district. However, this nationally recognized treasure is experiencing a need for public investment in sidewalks and associated streetscape improvements. The following investments/strategies are intended to fundamentally enhance public infrastructure, the pedestrian experience, and foster economic vitality through improved placemaking.

A. COMPLETE DOWNTOWN SIDEWALK & STREETScape IMPROVEMENT PROJECT

In 2017, the City of St. Helena was awarded \$1.2 million in federal funds to upgrade its downtown sidewalks. The grant requires a City match of \$400,000, for a total project cost of \$1.6 million. In addition to funding improved sidewalks, the grant will fund wheelchair accessible curb ramps, sidewalk bulb-outs to reduce the distance for pedestrians crossing Main Street, and other streetscape improvements. Design and public engagement is expected to begin in early 2019, and should include consultation with downtown businesses to identify construction strategies and City assistance to mitigate business impacts. Construction is planned for Spring 2021.

B. PURSUE PEDESTRIAN ALLEY BEAUTIFICATION

The City of St. Helena is home to several pedestrian alleys such as Telegraph Alley (currently under-utilized). Enhancing the surface and built environment of these historic corridors present opportunities to improve the pedestrian “experience” of navigating St. Helena’s National Historic Commercial District. It is recommended the City expand the scope of work of the City’s sidewalk project/streetscape project to include options related to beautifying the City’s historic pedestrian alleys/corridors.

C. LAUNCH DOWNTOWN FAÇADE AND TENANT IMPROVEMENT PROGRAM

The appearance of the City’s downtown has a significant influence on its economic success. By improving its physical appearance, the downtown will have a much greater potential for attracting and retaining businesses. To encourage private investment in high-quality improvements that enhance the appearance of retail, commercial and professional buildings and properties (including side and rear facades, and interior tenant improvements), it is recommended the City develop and launch a Downtown Façade and Tenant Improvement Program with dedicated annual funding.

The proposed program will provide a one-time matching reimbursement for eligible façade and tenant improvements up to an established cap. Eligible expenses would include building improvements, signage, lighting, landscaping, exterior painting or surface treatment, decorative awnings, window and/or door replacements or modifications, storefront/interior enhancements, streetscape, outdoor patios and decks, ADA or seismic upgrading, and architectural features. In an effort to accelerate occupancy of existing vacant buildings in the downtown, it is recommended the City fund architectural design services for any downtown space that has been vacant for at least 90 days up to an established cap (excluding formula retail). It is also critical the City ensures general maintenance work (e.g. encroachment permit processing for a painting job) is able to be accomplished expeditiously.

D. COMPLETE DOWNTOWN RESTROOM PROJECT

On April 24, 2018, the City of St. Helena City Council approved the Downtown Restroom Project, authorizing staff to seek construction bids. The project will result in the construction of two unisex restrooms with an adjacent combined water fountain and water filling station. The building will be constructed between the Telegraph Alley sidewalk and public parking lot at 1301 Money Way. Construction is anticipated to begin in fall 2018 and be completed by spring 2019. This facility will serve City residents, downtown businesses, and visitors that have long expressed a need for a public restroom facility in the central business district.

E. DEVELOP WAYFINDING SIGNAGE PROGRAM WITH LOCAL HISTORY

Wayfinding or directional signage assists residents and visitors with locating various community destinations. A wayfinding system also projects a consistent image for the City, reduces visual clutter and promotes walking, bicycling, and use of mass transit. Some cities have also used wayfinding signage to share and document their history. Integrating a wayfinding system with the City's sidewalk and streetscape improvement program will enhance the pedestrian experience.

F. COMPLETE PARKING STUDY TO IDENTIFY POSSIBLE IMPROVEMENTS

The City Council has authorized funding and allocated resources to complete a Parking Study in conjunction with the General Plan. This parking study will evaluate parking availability, and options to improve parking for locals and visitors. This will include an evaluation of parking zones, possible parking expansion opportunities, and alternatives such as shuttles/valet service.

G. EVALUATE POTENTIAL STREETScape IMPROVEMENTS TO MONEY WAY, RAILROAD AVENUE AND OAK AVENUE

As planning efforts begin with the downtown sidewalk project, it is recommended a landscape architect also evaluate Money Way, Railroad Avenue and Oak Avenue to identify potential streetscape improvements that can enhance the downtown experience.

H. REBUILD ON CITY HALL PARCEL

The St. Helena Assets Planning Engagement (SHAPE) Committee Final Report recommends rebuilding on the City Hall parcel rather than rehabilitation of the deteriorating existing asset. The prospect of near-term rebuilding on the parcel creates the opportunity to enhance the new structure's integration with Lyman Park and its ability to serve as an engaging mixed-use community asset anchoring the northern end of the downtown. Discussions of what type of structure is rebuilt on site will begin in September 2018 when the City Council begins to further analyze options presented by the SHAPE Committee.

PROCESS

CREATE A RESPONSIVE AND PREDICTABLE DEVELOPMENT REVIEW PROCESS FOR BUSINESS INVESTMENT

Today's retailers are facing new competition including bulk discount centers and online retail. These macro changes in the retail industry, along with regional competition, costly lease options, expensive and limited housing options, and challenges in attracting employees, are all contributing factors to the significant number of downtown vacancies.

As companies plan their investments, the cost, predictability, and timing of tenant improvement projects and permits become key factors in their decision making. The City's unpredictable development review and permitting process increases project risk, which impacts business willingness to invest in or upgrade commercial space.

By creating a responsive and predictable development review process, and allowing retailers to quickly and creatively respond to market dynamics, the City of St. Helena will increase the probability of business investment, reduce vacancy rates, and contribute to downtown's economic vitality.

A. IMPROVE BUSINESS CERTAINTY BY IDENTIFYING COMMUNITY SUPPORTED USES THAT ARE PERMITTED BY RIGHT IN THE CENTRAL BUSINESS & SERVICE COMMERCIAL ZONING DISTRICTS

Project applicants regularly find challenges with the existing Zoning Code, including conflicting requirements, antiquated policies and a general lack of consistent regulations. Several of these issues and concerns relate to uses that are permitted by right versus those that require a use permit in the Central Business (CB) and Service Commercial (SC) zoning districts.

For example, numerous retail uses are individually listed when they could be combined under a "General Retail" category, including formula retail businesses. Similarly, multiple office uses are listed when they could be easily classified under a broader "Office Use" category, both of which could be by-right in certain districts.

While there is a necessary balance to strike, improving City standards and business certainty by a well-managed identification of acceptable prescriptive rights will address concerns expressed by business interests. It is recommended the Kosmont Companies assist the City with this effort, including identifying the successful mix of local and visitor serving retail strategies used by other vibrant downtowns to aid in developing additional opportunities.

B. STREAMLINE THE PERMIT PROCESS BY DISCONTINUING DISCRETIONARY REVIEW FOR CERTAIN PERMIT TYPES

Currently, several permit activities require applicants to secure Planning Commission approval. In contrast, other communities identify community supported standards and streamline approval

via staff level review. This process expedites the applicant's permit process and reduces staff time associated with preparation of staff reports. Discontinuing discretionary review for signs, awnings and other uses is recommended as a streamlining opportunity. It is also critical to identify process improvements to City procedures to ensure minor activities such as repainting a building may be done quickly.

C. ALLOW FOR TEMPORARY POP-UP RETAIL USES

Pop-up stores are temporary retail spaces selling many kinds of merchandise. These stores and other use types, which come in a variety of shapes, sizes and locations, are attractive marketing strategies for retailers interested in introducing new products, building brand awareness and creating enthusiasm without a significant expenditure of resources. Pop-ups can last for an hour, day or for a set period of time. Establishing an efficient permit process for pop-up uses will encourage additional retail investment in downtown, capitalize on the emerging retail trends, and provide a means of mitigating the impacts of vacant buildings.

PEOPLE

CULTIVATE AND REINFORCE HISTORIC DOWNTOWN'S REPUTATION AS A DISTINCTIVE DESTINATION

While downtown St. Helena is a distinctive destination offering historical assets, culture, and participation in civic activities, businesses report a steady erosion of pedestrian traffic is impacting their success. The planned public infrastructure improvements, in concert with a strategy to create a responsive and predictable development approval process for business investment, positions the City to leverage these changes and refresh the branding and reputation of downtown. Additionally, there are numerous opportunities to creatively cultivate customers to enhance the probability of success for the City's merchants.

A. RE-IMAGINE UNDER-UTILIZED PROPERTIES / PROMOTE IN-FILL HOUSING

As noted in the City's June 2018 "White Paper" informational study, housing production has not kept pace with demand and is no longer aligned with the income levels of local employees. Identifying opportunities and increasing housing production in the immediate downtown via use of incentives (e.g. density bonuses, expedited review, relaxed parking requirements, etc.) was identified as a key housing strategy in the White Paper. In addition to helping to provide needed workforce housing, this strategy would have dual benefit of contributing new local customers to help sustain downtown businesses. It is therefore recommended the City accelerate efforts to develop an In-Fill Housing/Mixed-Use Incentive Program to attract housing and mixed-use investment in the downtown.

B. ENHANCE COMMUNITY EVENT PROGRAMMING IN PARTNERSHIP WITH CHAMBER OF COMMERCE

Consistent with the Kosmont Retail Market Analysis, it is recommended the City work in partnership with the St. Helena Chamber of Commerce to develop and produce additional recurring community event programming. In addition to their impact on local business, events and festivals present a platform for community energy and cultural development by offering opportunities to connect, support and participate. Research suggests that participant-based events may yield greater expenditure per person than spectator-based events.

C. REFRESH BRANDING AND REPUTATION OF DOWNTOWN

The St. Helena Chamber of Commerce currently utilizes the brand "St. Helena's Main Street". Given the infrastructure and regulatory process changes that will be coming soon to downtown St. Helena, it is recommended the City and Chamber of Commerce work together to expeditiously identify branding strategies to reacquaint the business community, prospective retailers, and visitors with improvements to our distinctive downtown and permitting process.

D. FUND ONLINE MARKETING PORTAL FOR VACANT COMMERCIAL SPACE & PRIORITY INVESTMENT OPPORTUNITIES

There are emerging online portals available to promote the availability of vacant commercial space to prospective businesses. Scores of California cities are connecting with real estate professionals and investors interested in commercial space. These tools allow agencies to reach beyond their regional footprint to attract business. Establishing and maintaining an active online presence will allow the City to affordably promote local investment opportunities to a wide audience. An online platform also creates efficiencies by use of filtering tools to narrow the focus to preferred opportunities and will provide the City with analytics to improve our focus. It is anticipated the Kosmont Companies will serve as the City's representative for real estate inquiries.

E. PROVIDE TECHNICAL BUSINESS ASSISTANCE TO BUSINESSES/LANDLORDS ON EXPERIENTIAL, DESTINATION, & OMNICHANNEL RETAIL STRATEGIES

Online retail competition is contributing to transformational changes and pressure in the retail sector. Retailers that embrace integrated retail strategies are experiencing improved customer retention. An "omnichannel" retail strategy is one that integrates the different methods of customer shopping (e.g. in a physical store, online, by phone, etc.). A 2013 study by the Aberdeen Group, Inc. determined that companies with strong omnichannel engagement strategies retain an average of 89% of their customers, compared with 33% for companies with weak omnichannel strategies. To support local retailers, it is recommended the City utilize Kosmont Companies to provide up to three business workshops and technical assistance on experiential, destination, and integrated retail strategies to improve the competitiveness of St. Helena's retailers.

F. EXPLORE POSSIBLE WINE TRAIN PILOT PROJECT

One of the recommendations in the Downtown Retail Analysis included consideration of allowing the Napa Valley Wine Train to drop off customers to expand downtown commerce, while reducing vehicle traffic and the need for parking. This strategy presents an opportunity to confront the dual challenge of dealing with increasing vehicle traffic but declining numbers of Main Street shoppers. In order to test the impact on Main Street business and the community, it is recommended the City explore a 24-month pilot project with the Wine Train to evaluate the impacts of such a policy, with an analysis of impacts report provided to the City Council after the initial 18 months of the pilot.

G. HOTEL CONSIDERATIONS

The Downtown Retail Market Analysis suggested the City consider allowing a high-end hotel development near Main Street to help downtown merchants. The City owns two parcels within

reasonable walking distance of the downtown business district (on Railroad Avenue and Adams Street). If desired by the City Council, either parcel may be suitable as a future hotel site. The SHAPE Committee discussed how a hotel could be placed in discreet areas of these parcels (particularly the Adams Street parcel), while still reserving space for the community. As with in-fill housing opportunities, a walkable hotel site presents the opportunity to help sustain downtown businesses that today already rely on a mix of local and visitor shoppers.

Additionally, it is recommended the City initiate a discussion with its existing downtown hotels to explore opportunities to grow or improve their business.

H. DEVELOP A CITY PARKLETS PROGRAM POLICY AND PERMIT PROCESS

Parklets provide an economical solution to the desire and/or need to provide space and amenities for public recreation or seating for businesses. They are generally extensions from the sidewalk, occupying the width of a parking space. In most cities, parklets are entirely funded by private individuals and/or private businesses. It is recommended the City develop a City Parklets Program Policy and permit process to facilitate consideration of desired parklets.

I. MAINTAIN A SAFE, CLEAN & COMFORTABLE DOWNTOWN ENVIRONMENT

Maintaining a safe, clean and comfortable environment contributes to a positive pedestrian experience. With the planned addition of new downtown amenities, it is critical the City's Public Works Department develop a staffing and maintenance strategy to ensure the City's infrastructure is optimally maintained. The City is currently evaluating the organizational structure of the Public Works Department to consider modifications that will ensure a dedicated staff focus on street cleanliness to improve the shopping experience in our downtown.



DRAFT Downtown Economic Strategy

By: Mark Prestwich, City Manager

September 11, 2018 City Council Meeting



TODAY'S GOALS

1. Review, Discuss & Refine Draft Downtown Economic Strategy
2. Prioritize Draft Strategies



STRATEGY AT A GLANCE

PLACE – Invest in Public Infrastructure Improvements to Enhance the Pedestrian Experience

PROCESS – Create a Responsive and Predictable Development Review Process for Business Investment

PEOPLE – Cultivate and Reinforce Historic Downtown's Reputation as a Distinctive Destination



PLACE

- ✓ Complete Downtown Sidewalk & Streetscape Improvement Project
- ✓ Pursue Pedestrian Alley Beautification
- ✓ Launch Downtown Facade and Tenant Improvement Program



PLACE (continued)

- ✓ Complete Wayfinding Signage Program with Local History
- ✓ Complete Parking Study to Identify Possible Improvements
- ✓ Evaluate Potential Streetscape Improvements to Money Way, Railroad Avenue, and Oak Avenue
- ✓ Rebuild on City Hall Parcel



PROCESS

- ✓ Improve Business Certainty by Identifying Community Supported Uses Permitted by Right in the Central Business and Service Commercial Zoning Districts
- ✓ Streamline the Permit Process by Discontinuing Discretionary Review for Certain Permit Types
- ✓ Allow for Temporary Pop-Up Retail Uses



PEOPLE

- ✓ Reimagine Under-Utilized Properties/Promote In-Fill Housing
- ✓ Enhance Community Event Programming in Partnership with the Chamber of Commerce
- ✓ Refresh Branding and Reputation of Downtown
- ✓ Fund Online Marketing Portal for Vacant Commercial Space & Priority Investment Opportunities



PEOPLE (continued)

- ✓ Provide Technical Assistance to Businesses/Landlords on Experiential, Destination, and Omnichannel Retail Strategies
- ✓ Explore Possible Wine Trail Pilot Project
- ✓ Hotel Considerations
- ✓ Develop a City Parklets Program Policy and Permit Process
- ✓ Maintain a Safe, Clean, and Comfortable Downtown Environment



PRIORITIZATION

- Immediate (Complete within 6 months)
- Near-Term (Complete within 12 months)
- Longer-Term (12+ months)



THANK YOU!

Questions?

To St Helena City Council members,

9/11/18

I truly appreciate the Downtown Economic Strategy report that the City Manager prepared for the City Council. It focuses on many important issues facing our city and suggests some good solutions to some of our long-standing issues. However, it does not address what is truly required if we are to have a successful downtown business district. The real issue here is; our local population is shrinking and the tourists that this city has scorned for so long are now our true customer.

We cannot escape this new demographic and economic reality. We are in a second home environment, and as old-time residents phase out, this trend cannot be combated. If we are to survive, business owners must adapt to this dynamic and we are doing our best. Foot traffic is down in our downtown and visitors are not stopping to eat or shop in our "Heart of the Napa Valley." Traffic on the highway does not equal foot traffic, as most of this through traffic is enroute to destinations who have marketed to them and give them a better experience. These other destinations have invested huge resources and decades of work into attracting these visitors. St Helena has spent zero. Our neighbors are reaping the rewards of that investment. If you listen to the vocal old guard, stopping all additions and changes, we will be left to a Main Street without character or tenants. A dead downtown.

Most of our local business owners on Main Street have put their heart and soul into their businesses. They are scared and looking down the road for new places to get a better return on their investment. Many are too old to start over and as foot traffic continues to decline, their stores will close down upon their retirement, if not before. The economics are not there to induce investment and risk from successor buyers. The issue is compounded, and perhaps demise accelerated, by the lack of affordable housing in town or even in Napa for store employees.

The economics of downtown must be radically rethought. We need customers not just passing through but those who are here for more than a few hours and who will walk our downtown, including in the early evening. This will not happen without major new hotel projects. While the recommended actions are appreciated and needed, they will not change our shrinking local population and the shifting demographic.

I also think that disembarking passengers from the Wine Train is a long overdue necessity. For 30 years it's been embarrassing to explain why we don't welcome them to our downtown and it is time to stop this foolish attitude regarding the wine train and its passengers. They need to be welcomed with open arms.

Some of you have long accepted this harsh reality. The rest of the Council has been in deep denial as to what is required for a vibrant downtown. Some of you have voted against anything promoting tourism or development. You cannot continue to vote against projects and ideas that will lead to a vibrant St Helena for years to come. If you continue to waver in your commitment, any new development will be too late to revitalize this downtown – the the centerpiece of your community.

Sincerely,

Jake Scheideman
St Helena Cyclery



Report to the City Council
Council Meeting of September 11, 2018

Agenda Section: New Business

Subject: Direction to Negotiate a Contract with GHD for the Design of Improvements to the WWTRP, likely to include: Trickling Filter with Bypass Flow and Settling Tank, Tertiary Filtration, Infiltration Storage Pond, Disinfection System Upgrade, WWTRP Electrical System Upgrade, and Reclamation Field Improvements, and Accept the City of St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) Improvements Feasibility Study and Recommendations for the Phase I WWTRP Improvements in Response to San Francisco Bay Regional Water Quality Control Board Order R2-2016-004.

CEQA Determination: Project is exempt from the requirements under Section 15061(b)(3) the "General Rule" in that it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, Section 15262 Acceptance of Feasibility and Planning Studies and Section 15306 Information Collection in that it is purely the recommendation to negotiate a contract and the acceptance of a feasibility study. Any and all future funding and/or construction activities resulting from this action will be separately reviewed for compliance with CEQA and a formal determination made.

Prepared By: Felix Hernandez III, Utilities Operations Manager

Reviewed By: Erica Ahmann Smithies, Public Works Director and City Engineer

Approved By: Mark T. Prestwich, City Manager

BACKGROUND

The City of St. Helena (City), in Napa County, owns and operates a Wastewater Treatment and Reclamation Plant (WWTRP). The WWTRP was constructed in 1967

and consists of a series of five ponds that provides secondary level treatment, followed by either direct discharge to the Napa River or irrigation disposal on City-owned land that is located adjacent to the WWTRP. The WWTRP utilizes Type I and Type 2 Advanced Integrated Pond Systems (AIPS) which include pond anaerobic digesters for waste contact and treatment (Pond 1A), followed by natural aerobic and facultative pond treatment processes (Pond 1B), algal production and maturation (Ponds 2 and 3), equalization (Pond 4), and storage (Pond 5). The final effluent is chlorinated and dechlorinated prior to disposal.

The WWTRP and its discharge are permitted through the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). The City has a Water Reclamation Requirements (WRR) Order No. 87-090 to regulate effluent discharge to land, and a recently updated National Pollutant Discharge Elimination System (NPDES) Permit Order No. R2-2016-0003 to regulate discharge to the Napa River. The 2016 NPDES permit contains more stringent effluent limits for biological oxygen demand (BOD) and total suspended solids (TSS), which the WWTRP anticipates that it would have difficulty meeting based on historical testing. As a result, the SFBRWQCB issued a Cease and Desist Order (CDO) No. R2-2016-0004 to the City, which mandated the WWTRP to comply with the specified interim BOD and TSS effluent limits, and to perform a Feasibility Study to evaluate and/or identify modifications to the WWTRP that would meet the new effluent limits. The SFBRWQCB issued a Compliance Schedule on January 11, 2018 outlining a schedule for compliance with the CDO. The City entered into a Contract to have GHD prepare the Feasibility Study on May 9, 2016. The Feasibility Study was prepared by GHD and a Final Draft Feasibility Study was delivered to the SFBRWQCB on June 1, 2018 as required by the Compliance Schedule. The SFBRWQCB accepted the Feasibility Study in a letter dated July 31, 2018 and agrees with the City's approach to the Phase I WWTRP Improvements Project. A copy of the letter is attached for reference.

DISCUSSION

The Feasibility Study prepared by GHD in response to CDO No. R2-2016-0004 was developed to further evaluate various alternatives the City has studied that would allow the WWTRP to meet the new BOD and TSS limits. The two alternatives evaluated for the WWTRP Phase 1 Upgrade by GHD for providing secondary treatment that would meet the new permit effluent limits are: (1) constructed wetlands with an infiltration pond, or (2) a trickling filter system with infiltration pond. Additionally, staff is recommending four additional projects be implemented as part of the Phase I Upgrades: (1) Tertiary Filtration; (2) WWTRP Electrical Upgrades; (3) Infiltration Pond; and (4) Disinfection System. A summary of each project is presented below. Please note that strategies to fund "unbudgeted projects" are discussed in the fiscal impact section of this report. Below is a summary of each proposed project to be included with the WWTRP Phase 1 Upgrades with the estimated costs. The estimated costs include design, construction, and 30% contingency.

WWTRP Phase 1 Upgrades - S-52

Attachment 1: Table 1 Summary of Alternatives Comparison provides a summary of the main points of comparison between the two alternatives evaluated in the Feasibility Study. For Alternative 2 – Trickling Filter with Bypass Flow and Settling Tank, capital costs are estimated to range from \$8.14M (located in irrigation fields) to \$11.7M (located in Pond 4) depending on the selected layout. Staff's recommendation is Alternative 2, Configuration 4 layout located in the irrigation fields. A summary of Alternative 2 can be found in *Attachment 2: 2017-08-01 Final Feasibility Study_rev2-small (Attachment 2)* on page ES-ii and details can be found beginning on page 43. Configuration 4 information can be found on page 62.

The Feasibility Study provides detailed evaluation of each alternative, describes the process for each alternative, and provides feasibility study level cost estimates for each alternative. The tables summarizing the costs for the alternatives evaluated can be found in *Attachment 2*. Specific costs associated with Alternative 2, Configuration 4 can be found on page 70, Table 30. The estimated cost for Alternative 2, Configuration 4 is \$8.14M.

Tertiary Filtration

Tertiary Filtration is currently an unbudgeted project. Due to regulatory requirements this filtration is required to provide additional treatment and allow the City to provide tertiary treated water as an option for future disposal and use. A summary of the tertiary filtration is found in *Attachment 2*, page ES-iv and details on begin on page 72. Although this is not a budgeted project, Wastewater Impact fees can be used to pay for up to 100% of the costs. The current balance in the Wastewater Impact Fee fund available for this project is \$700,000. The estimated costs for this system is \$1.5M.

WWTRP Electrical Upgrades

The WWTRP Electrical Upgrades is currently an unbudgeted project. The electrical upgrades are considered key improvements to maintain the reliability of the WWTRP and operations. The estimated cost for the electrical upgrades is \$1.1M.

Infiltration Pond

The Infiltration Pond is currently an unbudgeted project. Having an infiltration pond will allow the City to discharge a portion of the effluent to the ground. Under this alternative effluent would be stored in a small unlined shallow storage pond for gradual disposal using infiltration. A summary of the Infiltration Pond is found in *Attachment 2*, page ES-v and details on begin on page 99. The adopted FY 2018/19 CIP list includes \$1.4M dedicated to Reclamation Field Improvements (S-53). Funds for the Infiltration Pond can be taken from the allocated \$1.4M. The estimated costs for the Infiltration Pond is \$543,900.

Disinfection System

The Disinfection System is currently an unbudgeted project. Near-term improvements to the disinfection system are recommended to reduce staff labor associated with adjusting the sodium hypochlorite dose, maximize the disinfection chemical strength,

and to optimize the disinfection system controls. A summary of the Disinfection System is found in *Attachment 2*, page ES-viii and details on begin on page 111. The estimated costs for this system is \$849,100.

The next step in the process is for City staff to receive expert assistance to provide design services for the WWTRP Phase I Upgrades project. GHD has been worked with City staff to develop the Feasibility Study, has a working relationship with the SFBRWQB staff, and is a full service firm with all necessary disciplines to complete the design of the selected alternative.

Pursuant to St Helena Municipal Code Sections 3.04.320-340, professional services shall be procured through negotiated contract with firms who have demonstrated an adequate level of experience, competence, staffing, and other professional qualifications necessary for more than a satisfactory performance of the services required. Based on prior work that GHD has provided for the City, and their unique skills and knowledge of the City's WWTRP, staff believes that GHD has demonstrated the level of experience, competence, staffing, and other professional qualifications necessary for exceptional performance of the services required and described in the scope of work provided, and recommends that a Professional Services Agreement with GHD be procured through a negotiated contract. In addition, due to the timing of the work based on the Compliance Schedule and sensitivity of the Cease and Desist Order issued by the San Francisco Bay Regional Water Quality Control Board, staff believes that it is in the best interest of the City to have GHD continue the work developed for the Feasibility Study and provide the design services for the Phase I WWTRP Improvements Project.

FISCAL IMPACT

The total costs for Project S-52 WWTRP Phase 1 Upgrades listed above is estimated to be \$12M which is inclusive of the remaining design costs of \$1.4M. Funds for design costs are available in the adopted 18/19 Capital Improvement Program for Phase I upgrades, electrical upgrades, infiltration pond, and the disinfection system. Wastewater Impact Fee Funds can be used for 100% of the design of the tertiary filtration. Construction costs are in the preliminary phase at the feasibility level totaling \$14.1 million for all projects combined inclusive of the projects listed above as well as the Reclamation Field Improvements (S-53), Facilities Automation (S-62), New Well at WWTRP (S-66), and WWTRP Phase 2 Upgrades (S18-80). As the project designs progress and construction costs are refined, staff will bring refined costs projections back to Council along with funding strategies including, but not limited to, grants, loans, cash, and Impact Fees. Staff has initiated the process of applying for loan funding from the United States Department of Agriculture's (USDA) Water and Waste Disposal Loan and Grant Program which provides loans with terms up to 40 years, at a current interest rate of 3.875%.

RECOMMENDED ACTION

In order to meet the St. Helena Wastewater Treatment and Reclamation Plant – Groundwater Investigation and Cease and Desist Order Revised Compliance Schedule and based on the finding of the 2017-08-01 Final Feasibility Study and in an effort to utilize existing reclamation field acreage, Staff recommends Council provide direction to negotiate a contract with GHD for the design of Alternative 2: Trickling Filter with Bypass Flow and Settling Tank; Configuration 4, Tertiary Filtration, Infiltration Storage Pond, Disinfection System Upgrade, WWTRP Electrical System Upgrade, Reclamation Field Improvements, and accept the City of St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) Improvements Feasibility Study and Recommendations for the Phase I WWTRP Improvements.

ATTACHMENTS

[Attachment: 1 Table 1 Summary of Alternatives Comparison](#)

[Attachment: 2 2018-08-01 Final Feasibility Study_rev2-small](#)

[Attachment: 3 San Francisco Bay Regional Water Quality Control Board Letter Dated July 31, 2018](#)

[Attachment: 4 St. Helena Schedule Update 01-11-18](#)

[Attachment: 5 WWTRP Phase 1 Budget Detail](#)

Table 1 Summary of Alternatives Comparison

Criteria	Alternative 1 – Constructed Wetlands	Alternative 2 – Trickling Filter with Bypass Flow and Settling Tank
Estimated Design and Construction Costs	\$7.49 million	\$8.14 million
Estimated O&M Costs	\$45,000 - \$72,000/year	\$65,000 - \$78,000/year
Effectiveness	Effective - Constructed wetlands can be sturdy, effective systems if carefully designed, constructed, operated and maintained. However, small changes in hydrology or vegetation can have fairly significant effects on a wetland and its treatment effectiveness.	Highly Effective - Trickling filters are a proven, widely adopted technology. Performance dependent on consistent level of hydraulic and organic loading.
Reliability	Reliable – With two parallel trains for redundancy, the constructed wetland would be able to accommodate peak flows and would allow operators to remove one train for maintenance when necessary. Flows will enter the wetlands via gravity.	Reliable – Relatively simple operation. Reliability will be tightly linked to operation of pumping equipment delivering influent to and effluent from the trickling filter system.
Ease of Operation	Easy to Moderate – Constructed wetland systems require minimal effort to maintain and operate. There is very little mechanical equipment involved, and O&M typically includes monthly inspection and maintenance.	Easy to Moderate – trickling filters are commonly used at WWTPs for small-to medium-size communities. Mechanical equipment to maintain includes pumps, valves, rotary distributor and drive, and control systems.
Implementation Schedule	Planting establishment requires timeframe of up to two years. Can be implemented within CDO timeframe.	Can be implemented within CDO timeframe.
Overall Feasibility	Data from previous projects of similar size and locations indicate that effluent quality would be able to meet the requirements of the new NPDES permit. However, the installation of constructed wetlands would require an extensive amount of land (35 acres), which would decrease the land for irrigation.	The installation and operation of trickling filters for use in the PETRO process is highly feasible and is compatible with the current plant's level of staffing and space availability. When operated in accordance with design, system is anticipated to consistently meet the 2016 NPDES effluent limits for TSS and BOD and will enhance ammonia removal. However, denitrification may be needed to remove elevated nitrate levels in the effluent.

Table 1 Summary of Alternatives Comparison



City of St. Helena

Wastewater Treatment and Reclamation Plant Improvements Feasibility Study

August 2018

WASTEWATER TREATMENT AND RECLAMATION
PLANT IMPROVEMENTS
FEASIBILITY STUDY
CITY OF ST. HELENA
ST. HELENA, CALIFORNIA

Project No. 1110776

Prepared for:



Ms. Erica Ahmann Smithies, P.E.
Public Works Director/City Engineer
City of St. Helena
1480 Main Street
St. Helena, CA 94574

Reviewed by:



Alex Culick, P.E.
Principal



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August 2018



Statement of Limitations

This report: has been prepared by GHD for the City of St. Helena and may only be used and relied on by the City of St. Helena for the purpose agreed between GHD and the City of St. Helena.

GHD otherwise disclaims responsibility to any person other than the City of St. Helena arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by the City of St. Helena and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has prepared the preliminary cost estimate set out in this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD.

A preliminary cost opinion of the probable construction costs for the proposed improvements is provided in this section.

The preliminary cost opinion is based on a Class 4 estimate as defined by the Association for the Advancement of Cost Engineering (AACE) with the level of accuracy for the cost estimate from -30% to +50% of the actual cost of construction. The Class 4 estimate conforms to AACE International Recommended Practice No. 18R-97 "Cost Estimating Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries."

To date, only preliminary conceptual sketches and limited design detail have been performed. Actual construction prices, costs, and other variables may be different as a result of the final design requirements to those used to prepare the preliminary cost opinion. Therefore, the quantities and costs in the preliminary cost opinion herein are subject to change.

The preliminary cost evaluation is based on 2018 U.S. Dollars (Engineering News Record Construction Cost Index Annual Average 11012.77) and contains the following items:

1. Project Direct Costs:
 - i) Sitework (grading, excavation, berms, demo, etc.)
 - ii) Civil infrastructure (yard piping, trenching, shoring, etc.)
 - iii) Mechanical equipment (including valves, pumps, etc.)

- iv) Structural (concrete structures, pads, vaults)
- v) Electrical and instrumentation (typically 15%-20% of equipment costs)

2. Project Indirect Costs:

- i) Geotechnical Investigations (borings, potholing, engineering, etc.)
- ii) Mobilization (5%)
- iii) Bonds (3%)
- iv) Engineering design services (20%)
- v) Construction phase services, including construction management, inspection, and engineering (10%)
- vi) Contractor overhead and profit (15%)
- vii) Contingency (30%)

The following are not included in the preliminary cost opinion:

1. Property/easement Acquisition
2. Permitting
3. Environmental Remediation, if any.

The Cost Estimate has been prepared for the purpose of evaluating alternatives and preparing budgets and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.

Executive Summary

The City of St. Helena (City), in Napa County, owns and operates a Wastewater Treatment and Reclamation Plant (WWTRP). The WWTRP was constructed in 1967 and consists of a series of five ponds that provides secondary level treatment, followed by either direct discharge to the Napa River or irrigation disposal on City-owned land that is located adjacent to the WWTRP. The WWTRP utilizes Type I and Type 2 Advanced Integrated Pond Systems (AIPS) which include pond anaerobic digesters for waste contact and treatment (Pond 1A), followed by natural aerobic and facultative pond treatment processes (Pond 1B), algal production and maturation (Ponds 2 and 3), equalization (Pond 4), and storage (Pond 5). The final effluent is chlorinated and dechlorinated prior to disposal.

The WWTRP and its discharge are permitted through the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). The City has a Water Reclamation Requirements (WRR) Order No. 87-090 (Appendix A) to regulate effluent discharge to land, and a recently updated National Pollutant Discharge Elimination System (NPDES) Permit Order No. R2-2016-0003 (Appendix B) to regulate discharge to the Napa River. The 2016 NPDES permit contains more stringent effluent limits for biological oxygen demand (BOD) and total suspended solids (TSS), which the WWTRP anticipates that it would have difficulty meeting based on historical testing. As a result, the SFBRWQCB issued a Cease and Desist Order (CDO) No. R2-2016-0004 (Appendix C) to the City, which mandated the WWTRP to comply with the specified interim BOD and TSS effluent limits, and to perform a Feasibility Study to evaluate and/or identify modifications to the WWTRP that would meet the new effluent limits.

Goals and Objectives

This Feasibility Study was developed to further evaluate various alternatives the City has studied that would allow the WWTRP to meet the new BOD and TSS limits. Under the new permit, the average monthly concentrations of BOD and TSS effluent limits are reduced to 15 milligrams per liter (mg/L). Per the CDO, the WWTRP shall achieve full compliance with the 2016 permit effluent limits by February 28, 2021.

The WWTRP is currently permitted for an average dry weather flow (ADWF) treatment capacity of 0.5 million gallons per day (MGD) and can treat a peak wet weather flow (PWWF) of nearly 3 MGD. Work previously completed for the City and summarized in the 2006 WWTRP Design Memo indicated that the WWTRP is projected to have a future design ADWF of 0.65 MGD and an average wet weather flow of 1.22 MGD. Based on the future expected flows the proposed improvements to the WWTRP will include modifications to accommodate both existing and future flows and loads.

The overall objective of the Feasibility Study is to identify low-cost technical solutions that maximize value for rate payers and recommend a preferred treatment and disposal system that can meet the long-term needs of the City. The scope includes the consideration of the range of costs and implementation and operational issues associated with the proposed options. The recommendations will provide the City with the information they need to select a preferred wastewater treatment and disposal system option for implementation.

Summary of Findings

Two alternatives were evaluated for providing secondary treatment that would meet the permit effluent limits: 1) constructed wetlands with infiltration pond or 2) a trickling filter system with

infiltration pond. In addition, tertiary filtration is recommended following each alternative to provide additional treatment.

1. **Constructed Wetlands:** The constructed wetlands would require 22 acres of land to provide sufficient treatment capacity to meet the effluent discharge limits. A water balance was conducted to determine if the WWTRF had sufficient land to accommodate the 22 acres of wetlands. The WWTRF currently has 70 available acres for irrigation disposal, therefore, the irrigation would decrease to approximately 50 acres if wetlands were added. The results of the water balance indicated that 50 acres is not sufficient to dispose of the effluent during existing or future flows, especially during dry and normal flow years during the winter when discharge to fields is limited because the crops need less water and discharge the Napa River is not possible due to low flows. In addition, wetlands take approximately 2 to 4 years to become established and perform reliable treatment. Additional disposal capacity may be created using a shallow infiltration pond (e.g. 6 to 12 inches high), in which water will infiltrate into the soil over 24 hours. This infiltration pond would be vegetated and could still be used as part of the irrigation disposal area during the summer months.
2. **Trickling Filter:** Two trickling filters with clarification are recommended in order to meet the effluent permit limits. The structures would take up significantly less space than the constructed wetlands and could be placed in the footprint of Pond 4 or in the irrigation fields. It is recommended that the trickling filters be placed in the irrigation fields as the more cost effective option.

A water balance was also conducted for the trickling filter scenario, which assumes that 70 acres are available for irrigation disposal. There is still insufficient disposal capacity for all flow conditions. Additional disposal capacity may be created using a shallow infiltration pond as discussed above to create additional disposal capacity.

3. **Tertiary Filtration:** Tertiary filtration is recommended following either secondary treatment process. For the wetlands, the tertiary filters would provide a final polishing step before disinfection. The tertiary filters would also be designed to provide California Title 22 tertiary water, which the WWTRP could use for reclaimed water use.

For the trickling filters, tertiary filtration with denitrification is recommended. The trickling filter process would nitrify the wastewater, which increases the nitrates in the effluent. Since the effluent is primarily disposed of on the irrigation fields, there is a potential for elevated levels of nitrates in the groundwater compared to background levels. According to groundwater nutrient modelling by Larry Associates (LWA), this may occur during dry years at higher effluent nitrate loading concentrations (35 and 45 mg/L). It is recommended that a denitrifying sand filter be installed following the trickling filters in order to remove the excess nitrates from the effluent, prior to disposal to the ground.

Recommendations

The Feasibility Study prepared by GHD in response to Cease and Desist Order (CDO) No. R2-2016-0004 was developed to further evaluate various alternatives the City has studied that would allow the WWTRP to meet the new BOD and TSS limits. The two alternatives evaluated for providing secondary treatment that would meet the new permit effluent limits are: 1) constructed wetlands with an infiltration pond or 2) a trickling filter system with infiltration pond. Based on regulatory requirements tertiary filtration is required following each alternative to provide additional treatment for disposal and to allow the City to provide tertiary treated water as an option for future

disposal and use. In addition the existing disinfection system is required to be upgraded to meet regulatory requirements, and recommendations for disinfection upgrades are included in the Feasibility Study.

The information in the Feasibility Study will be presented to the City Council for consideration and selection of a preferred secondary treatment alternative. The selected alternative will be included as a final recommendation in the Feasibility Study for submittal to the SFBRWQCB for approval for design and construction.

A summary of the key items in the Feasibility Study is included below.

Alternatives Analysis Description

Based on the previous studies completed to-date referenced in the Feasibility Study and preliminary work included in the appendix, only two alternatives were ultimately considered to be evaluated to meet the new NPDES permit requirements and discussed in the Feasibility Study:

4. **Alternative 1: Constructed Wetlands.** Under this option, the existing AIPS would continue to provide primary treatment, and the constructed wetlands would be built in a portion of the adjacent irrigation field. The existing headworks, disinfection, and discharge processes would not be altered, and the existing ponds would remain in operation. The constructed wetlands would provide secondary treatment to remove additional BOD and TSS and meet the new NPDES requirements of 15 mg/L BOD and TSS on a monthly average basis. Effluent from the wetlands would be disinfected and either discharged to the Napa River or stored in Pond 5 for spray irrigation or future discharge to the river. For this option, GHD recommends a surface area of approximately 22 acres of constructed wetlands to meet the new discharge limits of the NPDES permit. This would cost approximately \$7.5M for engineering design and construction, and approximately \$45,000 to \$72,000 annually for operation and maintenance of the constructed wetlands.

Wetlands offer effective treatment in a passive manner, minimizing mechanical equipment, energy, and skilled operator requirements. Wetland systems also provide a valuable addition to the “green space” in a community, and include the incorporation of wildlife habitat and public recreational opportunities.

However, approximately all 70 acres of turf area adjacent to the treatment plant is required for irrigation disposal; therefore, if the wetlands are constructed, the irrigation area would decrease to approximately 50 acres, which is insufficient to handle irrigation requirements under future flows. An infiltration pond would be needed to create additional disposal capacity. Furthermore, the start-up period for the wetland to reach optimum performance may take several growing seasons, and up to 2 years, to establish vegetation and equilibrium. Therefore, the wetland may not produce effluent that meets the new NPDES permit limits until late 2022.

5. **Alternative 2: Trickling Filter.** For this option, GHD recommends a hybrid treatment design that continues to use the existing AIPS ponds followed by new trickling filters and clarifiers in order to achieve enhanced biological degradation and polishing of the final effluent for meeting the new NPDES permit limits. The design originates from the patented Pond Enhanced Treatment and Operations (PETRO) process, which combines a fermentation pond (e.g., Ponds 1A and 1B), oxidation pond (e.g., Pond 2), a trickling filter, and a settling tank. Based on the performance of other municipal sewage wastewater treatments plants

with integrated pond systems with PETRO trickling filters, it is anticipated that the proposed design can achieve a BOD and TSS of less than 15 mg/L and nearly complete nitrification.

The construction of the PETRO process trickling filter and sedimentation basin system could either be installed within the footprint of existing Pond 4 or in the irrigation disposal field to the south of the AIPS. Two trickling filters would be operated in parallel and operated in a single-stage trickling filter configuration. The trickling filters would be followed by two clarifiers, also known as humus tanks (HTs), or a settling pond, for settling out of solids and sludge sloughed off of the trickling filter media. Clarified effluent would then be conveyed to the existing chlorine contact basin (CCB) for disinfection prior to discharge while settled sludge in a HT would be pumped back to the Ponds 1A and/or 1B; settled sludge in a settling pond would be allowed to accumulate in a settling pond until removal becomes necessary although a return system could also be designed. Capital costs are estimated to range from \$8.1M (located in irrigation fields) to \$11.7M (located in Pond 4) depending on the selected layout. It is recommended that the trickling filters be located in irrigation fields due to the lower costs. Annual maintenance is expected to range between \$65,000 and \$78,000 per year. This option can meet the effluent limit requirements, and allow the WWTRP to achieve compliance with 2016 NPDES permit as early as July 2021.

6. **Tertiary Filtration:** It is anticipated that the trickling filter effluent will contain elevated levels of nitrates, due to nitrification that occurs during the treatment process. Since the majority of the effluent is discharged to land, the effluent could impact the groundwater quality and increase nitrate levels in the groundwater compared to background levels. It is recommended that a denitrifying sand filter be installed downstream of the trickling filter system in order to remove the nitrates from the effluent. While it is anticipated that the secondary treatment process would produce effluent that meets the current discharge limits, the tertiary filter would still be beneficial as a final polishing step during seasonal spikes in water quality and for future load. The tertiary filter would also be designed to produce California Title 22 recycled water, which could be reused onsite or offsite at nearby facilities. The estimated costs for a denitrifying sand filter system are \$1.5M for 1.5 MGD max month capacity and \$2.2M for 3.0 MGD peak wet weather flow capacity.

Tertiary filtration is also recommended downstream of the wetlands as a final polishing step before disinfection, however, denitrification may not be required.

Water Management Strategy

Two water balance models were developed to determine the amount of storage and the amount of land necessary to accommodate spray irrigation under current and future flows: (1) a baseline water balance to evaluate the current storage and irrigation requirements, and (2) a wetland water balance to evaluate the effects of constructed wetlands. The baseline water balance is also assumed to reflect the water balance for the Trickling Filter Alternative (Alternative 2) because the trickling filter system does not have a large footprint (approximately 1 acre).

The overall conclusion is that there is an issue with storage and wintertime disposal. Under existing wastewater flows in both normal and wet precipitation years, the City has not taken advantage of discharging to the river when possible. Additionally, the existing Pond 5 and irrigation area is insufficient to accommodate the flows under certain current and all future conditions. Key recommendations include optimizing discharge to the Napa River when possible and fully planting and utilizing 70 acres of irrigation fields for disposal. Regardless of the chosen alternative, GHD

recommends the City to consider the following recommendations above and more for their water management strategy:

- Discharge to the river to the maximum extent permissible after effluent is treated and disinfected through Pond 4.
- Water surface elevations in Pond 5 should be monitored during the winter months, and water should be discharged to the river to the maximum extent permissible while also maintaining storage for irrigation during the summer months.
- Evaluate the existing irrigation area to verify that there is proper grading to minimize runoff, and replant with alfalfa.
- Consider disposal through an unlined or partially lined (“leaky”) wetland or storage pond.
- Modify the existing irrigation field to allow for additional spray irrigation.
- Consider off-site recycled water use in order to handle excess water that cannot be discharged, stored, or reused in the spray irrigation fields.
- Request the SFBRWQCB to decrease the dilution ratio down from 50:1.

Infiltration Disposal

Based on discussions with the SFBRWQCB, the City is investigating the possibility of discharging a portion of the effluent to the ground. Under this alternative effluent would be stored in a small unlined shallow storage pond for gradual disposal using infiltration. Percolation tests conducted in 2017 indicate that the preliminary design infiltration rate across the irrigation fields is 1×10^{-5} cm/second (0.34 inches/day). As calculated in the water balance, additional storage capacity is required for every existing and future flow scenario to dispose of the effluent. If infiltration only is used to dispose of the excess effluent, then almost 140 acres of irrigation area would be required to meet future flow conditions.

If 6 to 18-inches of storage depth is used with infiltration, then only 3 to 8 acres of the existing irrigation area would be required to dispose of the excess effluent during occasional existing and future flow conditions. Constructing a small shallow infiltration storage pond in the existing irrigation area would allow the WWTRP to increase its effluent storage capacity significantly while using up only a small fraction of the available irrigation field area as an infiltration area as required. The area would be minimally graded and would serve the dual purpose for disposal through the existing spray irrigation system and infiltration. This alternative’s feasibility was investigated as a part of the LWA Groundwater Modeling Study and is considered to be feasible with minimal impact to the groundwater. The estimated cost for an infiltration pond is approximately \$544,000.

Groundwater Modeling Study

Based on requirements from the SFBRWQCB, the City developed a Groundwater Monitoring Plan and conducted groundwater modelling to determine the effects of effluent nitrate loading on the irrigation fields and groundwater. LWA prepared the Groundwater Monitoring Plan which included the installation of seven new monitoring wells around the perimeter of the irrigation fields. The wells are located in the shallow upper aquifer.

LWA conducted five monthly sampling events in the monitoring wells from November 2017 to April 2018 for various constituents (including dissolved oxygen, total coliform, biochemical oxygen demand, total dissolved solids, total suspended solids, chloride, nitrogen, ammonia, and nitrate). The water quality sampling results appear to indicate that the groundwater is minimally impacted by

the effluent discharge to the irrigation fields and has reasonable water quality, except for total coliform detections in multiple monitoring wells.

Groundwater elevation data collected from the monitoring wells and modelling indicated that the groundwater in the irrigation fields moves slowly to the east and southeast. Models were also developed to estimate the nitrate concentrations in the groundwater based on various effluent nitrate loading rates (20, 35 and 45 mg/L) and flows (dry and normal years).

The results indicated that during a normal year, effluent nitrate concentrations applied to the irrigation fields up to 45 mg/L of nitrate would result in potential groundwater nitrate concentrations of less than 10 mg/L. During a dry year, effluent nitrate concentrations applied to the irrigation fields at 20 mg/L of nitrate would result in potential groundwater nitrate concentrations of less than 10 mg/L. During a dry year, effluent nitrate concentrations applied to the irrigation fields at 35 or 45 mg/L of nitrate would typically be below 10 mg/L, but could potentially result in groundwater nitrate concentrations up to 23 mg/L.

Based on the modelling results, the effluent nutrient loading to the irrigation fields will typically have minimal impact on the groundwater nitrate levels. However, it is possible that groundwater nitrate concentrations may exceed 10 mg/L at higher effluent nitrate concentrations during dry years, in which case, the denitrifying sand filter should be utilized to decrease nitrate concentrations in the effluent.

Solids Management Analysis

For Ponds 1A and 1B, it is estimated that approximately 1,800 and 2,560 dry tons of solids will be generated in Pond 1A and Pond 1B after 14 and 20 years of accumulation, respectively. In order to more effectively manage the solids disposal at the WWTRP, alternatives were developed for recommendations to remove the solids from Ponds 1A and 1B on a more frequent basis and prior to any negative effects to treatment capacity:

- Alternative 1: Pumping or Dredging. Pumping the solids works best when the solids concentration is below 6 percent. With these methods, removing solids from Pond 1A and Pond 1B is approximately \$3.4M every 20 years, or \$171,200 per year.
- Alternative 2: Drain Pond and Dewater in Place (previously done in 2011). With this method, Pond 1A or Pond 1B would be drained, and then the sludge would be dewatered to a minimum of 50% solids content, and hauling the dewatered sludge to the local landfill. The estimated cost to remove the solids with this method every 20 years is approximately \$449,400.

Alternative 2 (draining and dewatering the pond) is recommended as the most cost-effective method to manage the solids in Pond 1A and 1B. Additionally, solids levels in the ponds are recommended to be monitored and recorded every 12 months to verify the depth using a Sludge Judge monitoring device.

For the trickling filter alternative, the sloughed biofilm which can be managed in 2 ways:

- Convey the sludge to HTs where it can settle into a concentrated sludge. The sludge would be recirculated to Pond 1A and 1B. The costs to remove the additional volume of solids associated with the recirculation every 20 years is estimated to be approximately \$30,000.
- Convey the sludge to a settling pond where it is stored. Sludge would be removed from the pond every 4 years. The costs to remove the solids from the settling pond every 4 years is estimated to be approximately \$77,500.

Evaluation of Recycled Water Potential

The CDO requires the assessment of each alternative to produce recycled water or explain the additional efforts required to produce recycled water. For either alternative evaluated, the most likely reuse options would include crop irrigation and landscape irrigation including schools and parks. Given these likely uses, it is assumed disinfected tertiary level treatment would be required.

Implementing a recycled water program would require additional infrastructure for tertiary treatment processes, installation of recycled water pumps and distribution lines, irrigation system laterals and controls, as well as acquisition and development for off-site facilities. However, a tertiary level of treatment is not be required to meet the new discharge limits under the SFBWQCB's 2016 Order because advanced secondary treatment would be able to achieve those limits.

Conceptual costs for a limited recycled water system intended to serve a few vineyard owners within the western city limits would cost approximately \$6.9M; a full-scale recycled water system would cost approximately \$47M. Based on the costs, it is unlikely that new infrastructure to deliver recycled water to customers in the City would be cost-effective compared to the currently employed discharge scenarios. Ultimately, the demand for recycled water in and surrounding St. Helena would need to be evaluated to verify if either a limited- or full-scale program is feasible.

Ability to Produce Recycled Water

Recycled water must meet the requirements under California Code of Regulations, Title 22, Division 4, Chapter 3 Water Recycling Criteria (Title 22 regulations). These regulations stipulate the level of treatment required for various end uses of recycled water in addition to system redundancy and reliability. The City WWTRP produces Disinfected Secondary Treated Wastewater that meets the needs of the City disposal options for river disposal or crop irrigation. Previous studies reviewed the potential to generate tertiary treated effluent suitable for irrigation of parks and agricultural irrigation within City limits.

St. Helena staff has recently reached out to local vineyards to gauge interest in the potential use of recycled water, but to-date the City has received little interest in response. In addition, City staff contacted the Napa County Farm Bureau for further information regarding existing or perceived need for recycled water within the City. The Farm Bureau did not have definitive information regarding potential users, but did indicate that there is a need for agricultural irrigation and potentially a source for frost protection water on the west side of St. Helena. Further efforts to evaluate the level of interest among neighboring vineyards or other agricultural enterprises are recommended so that the viability of this discharge option can be determined using numbers reflective of actual demand and backed by potential user commitments.

Because there is not specific information for potential users, the assessment of recycled water potential in the Feasibility Study relies on hypothetical demands that consider both a full-scale recycled water system for users of recycled water inside the city limits, as well as a limited-scale system intended to serve a few vineyard owners within the western city limits in accordance with the Farm Bureau's suggestion that there may be a demand in that area. Significant additional costs would be required to provide the additional filtration, storage, conveyance and infrastructure necessary to meet regulatory requirements and distribute the effluent. The costs for the required infrastructure to produce and distribute recycled water have been developed and are detailed in the Feasibility Study and are not considered feasible at this time.

Disinfection System

Data reported by the WWTRP staff have indicated that there have been inconsistent Total Coliform results for the chlorine contact effluent, occasionally leading to Total Coliform permit violations. In order to determine the origin of the inconsistent Total Coliform results and to evaluate the chlorination system, a disinfection study was conducted to verify the measurements and disinfection processes that are occurring at the WWTRP. The results from sampling and testing conducted in 2017 indicated that almost complete nitrification was occurring through the pond treatment system, disinfection was achieved at various dose levels, and that low levels of chlorine residuals were remaining in Pond 5. Other issues with the disinfection system include frequently broken chemical feed lines and the high labor associated with manually adjusting the chlorine doses.

Near-term improvements to the disinfection system are recommended to reduce staff labor associated with adjusting the sodium hypochlorite dose, maximize the disinfection chemical strength, and to optimize the disinfection system controls. Suggested improvements include moving the equipment and chemicals closer to the chlorine contact tank to enable more localized control over the dosing levels and provide better access to the supplies. Automatic dosing of the sodium hypochlorite and ascorbic acid is also recommended in order to reduce operator labor time and provide more accurate dosing levels since the sodium hypochlorite dose would be continuously adjusted throughout the day to meet variations in the wastewater quality. The chemical feed lines should also be replaced with piping that meets secondary containment and leak detection requirements. The estimated costs for the disinfection system improvements are approximately \$850,000.

Funding Options

Funding programs that can be sources for the Wastewater Improvement Project include: State Water Board's Clean Water State Revolving Fund (CWSRF) Program, I-Bank, and USDA Rural Development. Additionally, Enterprise Revenue Borrowing and Assessment Bonds may be considered by the City to help finance recommended capital improvements for the project.

Next Steps

The City Council will consider and determine which secondary treatment option to implement. The selected secondary treatment option will be included in a revised Feasibility Study as part of the proposed project. Based on acceptance of the proposed project by the SFBRWQCB from this Feasibility Study, the City will then proceed to prepare and submit a Draft Workplan and schedule for implementation of the preferred option, including a plan and schedule for funding the project, as specified per the CDO requirements.

Additional water quality data may be required to complete an antidegradation analysis to show that disposal through infiltration is in compliance with the Basin Plan.

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Appendices

Appendix A – SFBRWQCB Water Reclamation Requirements Order No. 87-090
Appendix B – SFBRWQCB Order No. R2-2016-0003, NPDES No. CA0038016
Appendix C – SFBRWQCB Cease and Desist Order No. R2-2016-0004
Appendix D – City of St. Helena WWTP – Alternatives Feasibility Technical Memorandum
Appendix E – Conceptual Wetland Sizing Calculations
Appendix F – Conceptual PETRO Process Trickling Filter and Sedimentation Basin Sizing Calculations
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Appendix H – Solids Management Calculations
Appendix I – St. Helena Disinfection Study Technical Memorandum (August 2017)
Appendix J – Initial Infiltration Assessment (October 2017)
Appendix K – St. Helena WWTRP: Groundwater Investigation / Fate and Transport Modeling Report (June 2018)

1. Introduction

The City of St. Helena (City) owns and operates a Wastewater Treatment and Reclamation Plant (WWTRP), located at 1 Chaix/Thomann Lane in St. Helena, Napa County. The WWTRP and its discharge are permitted through the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). The City has a current Water Reclamation Requirements (WRR) Order No. 87-090 to regulate effluent discharge to land and a National Pollutant Discharge Elimination System (NPDES) Permit Order No. R2-2016-0003 to regulate discharge to the Napa River. The NPDES permit was renewed in March 2016. A copy of these permits may be found in Appendices A and B.

The WWTRP was constructed in 1967 and consists of a series of five ponds that provides secondary level treatment, followed by either direct discharge to the Napa River or irrigation disposal on City owned grass fields, redwood/willow trees, and mosquito fish ponds. Figure 1 shows the location of the WWTRP and its service area. The WWTRP utilizes Type I and Type 2 Advanced Integrated Pond Systems (AIPS) which include pond anaerobic digesters for waste contact and treatment, followed by natural aerobic and facultative pond treatment processes and storage. The final effluent is chlorinated and dechlorinated prior to disposal. The WWTRP has a design average dry weather flow of 0.5 million gallons per day (MGD) and a peak wet weather flow (PWWF) of nearly 3 MGD. In 2015, the WWTRP discharged approximately 85 million gallons (MG) of reclaimed water for irrigation. No discharge was sent to the Napa River in 2015. Figure 2 shows the existing WWTRP and pond system. Figure 3 shows the existing process flow diagram.

The 2016 NPDES permit contains more stringent effluent limits for biological oxygen demand (BOD) and total suspended solids (TSS), which the WWTRP anticipates that it would have difficulty meeting based on historical testing. As a result, the SFBRWQCB also issued a Cease and Desist Order (CDO) No. R2-2016-0004 to the City containing interim BOD and TSS effluent limits, required report submittals, and a schedule for the City to make modifications to the WWTRP in order to meet the new effluent limits. As a first step, the CDO requires the submittal of a Draft Feasibility Study by September 1, 2016. A copy of the CDO is included in Appendix C.

The City is working towards complying with the CDO to improve performance at the WWTRP. The following section describes the initial steps required and the purpose and scope of this *Draft Feasibility Study*.

1.1 Purpose of this Report

The SFBRWQCB's CDO requires the City to complete a Feasibility Study that analyzes various options to meet the NPDES permit effluent limits promulgated in the 2016 Order. Specifically, the CDO requires that the Feasibility Study analyze each of the options described in the 2015 *Wastewater Facilities Evaluation Update* (Bennett, 2015), herein referred to as the 2015 Facilities Evaluation, and include other options that would assist the plant in achieving compliance with the new discharge limits.

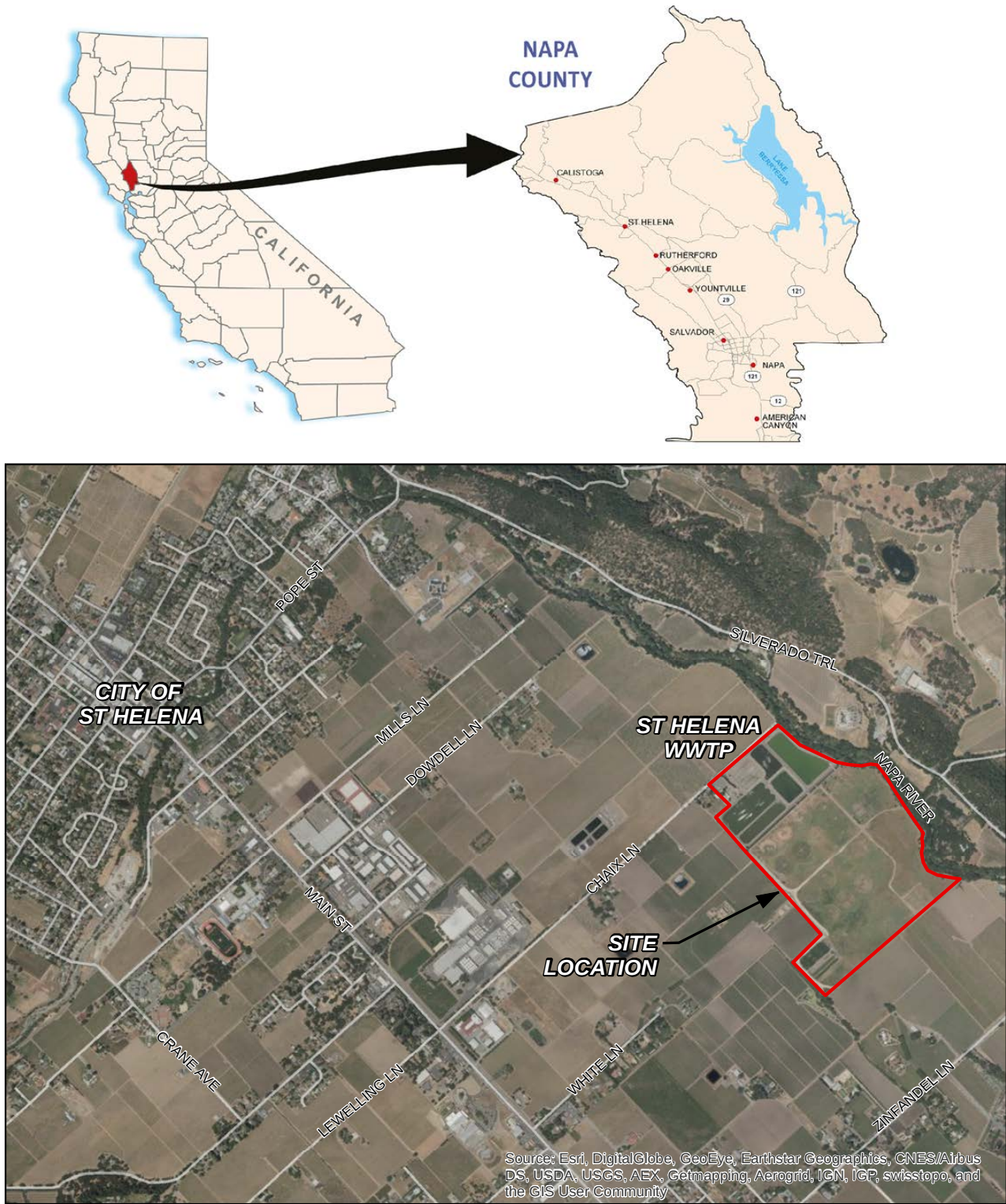
For each option considered, the Feasibility Study must evaluate:

1. the anticipated effectiveness and reliability of the treatment;
2. the amount of time it will take to implement;
3. the ability to produce recycled water (recycled water uses to be considered shall include those that offset local potable water use or provide environmental enhancement, including

but not limited to turf and vineyard irrigation) or the additional efforts required to produce such recycled water; and

4. the costs.

To that end, the overall objective of the study is to identify low-cost technical solutions that maximize value for rate payers and recommend a preferred treatment and disposal system that can meet the long-term needs of the City. The scope includes the consideration of the range of costs and implementation and operational issues associated with candidate options. This provides the City with the information they need to select a preferred wastewater treatment and disposal system option for implementation.



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Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet



City of St Helena
WWTP Feasibility Study

Job Number 11110776
Revision A
Date 25 Jul 2016

Vicinity Map

Figure 1

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City of St. Helena
WWTRP Improvements Draft Feasibility Study

Job Number 11110776
Revision
Date Aug 2016

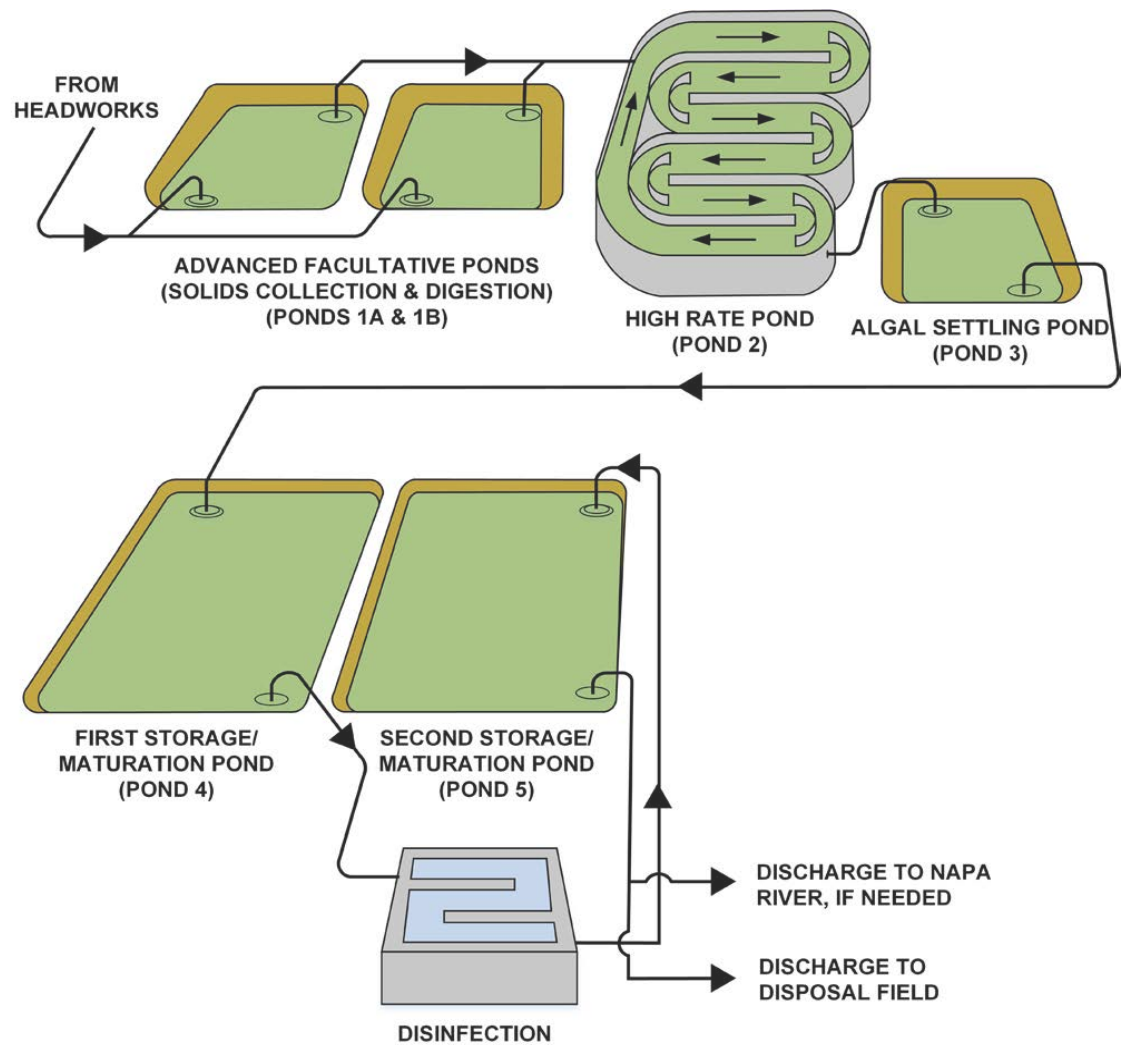
Facility Layout

Figure 2

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City of St. Helena
WWTRP Improvements Draft Feasibility Study

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Existing System Process
Flow Diagram

Figure 3

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2. Background

This chapter provides an overview of the existing facilities, including a background on the existing treatment system, a summary of the current permitted wastewater requirements for the WWTRP, and a discussion of compliance issues in meeting those requirements. The requirements applicable to potential recycled water discharge are also discussed in this section.

2.1 Existing Facilities

The WWTRP was constructed in 1967 and consists of a series of five ponds that provides secondary level treatment, followed by either direct discharge to the Napa River or irrigation disposal on City owned grass fields, redwood/willow trees, and mosquito fish ponds. The service area for the City encompasses 920 acres, serving a population of 5,900 residents (City of St. Helena, 2015). Approximately 89% of customers are residential and 11% are commercial.

The WWTRP utilizes Type I and Type 2 AIPS which include pond anaerobic digesters for waste contact and treatment, followed by natural aerobic and facultative pond treatment processes and storage.

Process units at the WWTRP include:

- Headworks
- Pond 1A – Type 1 AIPS primary inlet anaerobic digester
- Pond 1 B – Type 2 AIPS
- Pond 2 – Type 1 AIPS High-Rate Algal Production (HRAP)
- Pond 3 – Type 1 AIPS Algal Settling and Maturation
- Pond 4 – Maturation and Flow Equalization
- Disinfection Facilities – Chlorine Contact Basin and De-Chlorination
- Pond 5 – Secondary Treated Water Storage and Flow Equalization
- Disposal – Reclamation and River Discharge

The WWTRP has a design average dry weather flow (ADWF) of 0.5 MGD and a PWWF of nearly 3 MGD. Figure 2 shows the existing WWTRP and pond system. Figure 3 shows the existing process flow diagram

The 2015 Facilities Evaluation noted that the total WWTRP capacity was sufficient when operated under design conditions. The plant's capacity exceeds the 0.65 MGD design flows under anticipated load conditions (500 mg/L BOD average and 700 mg/L BOD sustained peak). At 500 mg/L BOD influent loading, the WWTRP capacity is 1.2 MGD; at 700 mg/L influent loading, the WWTRP capacity is 0.88 MGD.

The following subsection describes each of the process units and Table 1 provides a summary of the pond treatment units.

2.1.1 Headworks

The WWTRP headworks facility is located underneath the operations building. The headworks system includes an in-channel comminutor (grinder), flow meter, and pump station. The headworks

receive sanitary sewer waste from the City's collection system and pumps raw wastewater to an influent flow splitter structure between Ponds 1A and 1B. All influent waste (including solids) is conveyed to the pond system for treatment.

2.1.2 Pond 1A

Pond 1A is a primary waste receiving pond, which is the first pond in a Type 1 AIPS treatment train. Pond 1A includes two main processes for reduction of influent waste constituents. The first step is an anaerobic flow contact "fermenter" where suspended solids (SS) are encouraged to settle-out and dissolved waste constituents pass through an up-flow sludge blanket for treatment. The second portion of Pond 1A consists of a more traditional stratified lagoon-type treatment system, where natural biological processes including algae growth in the upper strata consume waste constituents via aerobic respiration. The upper 1 to 2 feet of the entire pond must remain aerobic in order to oxidize volatile organic byproducts (such as methane and other foul odors) which are generated in the deeper anaerobic zones before reaching the surface. Pond 1A was originally designed to operate with little or no mechanical aeration, due to re-circulation of oxygen-rich water from Pond 2 across the top of Pond 1A.

In 2011, Pond 1A was drained to perform solids removal. Pond 1A had been in continuous service since its original construction in 1967 until 2007 without solids removal. As such, the effective treatment volume of Pond 1A was greatly reduced, to less than half the design hydraulic retention time (HRT), due to accumulated solids throughout the pond. Once drained of water contents, Pond 1A had nearly 5-feet of remaining un-compacted wet sludge which required drying and subsequent removal in 2012.

The natural clay liner in Pond 1A was damaged during the solids removal activities, and Pond 1A leaked during initial filling in early 2014. As a result, Pond 1A was repaired and improved during 2014 as follows:

- Submerged redwood baffle walls were removed from pond bottom
- A service sump and suction withdrawal pipe was constructed at the southeast corner of the pond for draining and/or wet solids removal
- Pond bottom (and liner) were re-constructed at new design grades with a sloping pond bottom toward a service sump at the southeast corner
- An aerator service headwall was constructed on the south pond berm for removal/placement of floating aerators
- New inlet pipe risers constructed with diffuser type openings at 3-feet above pond bottom

The new bottom elevations in Pond 1A were constructed an average of 1.7-feet below original pond bottom elevations. This change increased the overall volume of Pond 1A and subsequent HRT. In addition, the anaerobic fermenter (inlet) effective volume was increased by; removing the four rows of submerged baffle walls, deepening the pond bottom, and constructing diffuser type openings on inlet riser pipes nearer the bottom of the fermenter cell than the original design. All of these improvements increased the capacity of the fermenter cell and the overall pond.

Based on established fermenter cell (up-flow anaerobic contact sludge blanket) design criteria detailed by Oswald Green and Swanson International Engineering (original design engineers for Type 1 and Type 2 AIPS treatment systems), Pond 1A now has treatment capacity in excess of 0.65 MGD ADWF when operated as a Type 1 AIPS primary pond. This assumes that accumulated solids outside the fermenter cell are maintained at acceptable levels (less than 3-feet deep), while

mechanical aeration and mixing are minimized to encourage pond stratification throughout the water column. In order to achieve these conditions, recirculation of highly oxygenated water from Pond 2 across the top of Pond 1A during daylight hours was recommended to minimize surface mechanical aeration requirements

According to the Bennet report, Pond 1A has a total capacity of 0.70 MGD and 0.50 MGD when loaded at 500 mg/L and 700 mg/L BOD, respectively.

2.1.3 Pond 1B

Pond 1B is a primary waste receiving pond, but is constructed as a Type 2 AIPS treatment pond. A Type 2 AIPS pond includes three main processes for reduction of influent waste constituents. Pond 1B is segmented into three distinct cells by submerged berms. The first cell is an anaerobic flow contact “fermenter” where SS are encouraged to settle-out and dissolved waste constituents pass through an up-flow sludge blanket for treatment. The second cell of Pond 1B is a mechanically aerated (partial mix) facultative pond, where natural biological processes consume waste constituents via aerobic respiration. The third cell includes a quiescent settling zone, where SS are encouraged to settle to the lower strata for anaerobic decomposition. The upper 1 to 2 feet of the entire pond must remain aerobic in order to oxidize volatile organic byproducts (such as methane and other foul odors) which are generated in the deeper anaerobic zones before reaching the surface.

During 2006 and 2007, verbal communication and site visits between City WWTRP operations staff and consultants at Swanson International Engineering (original design engineers for Pond 1B) indicated that Pond 1B was capable of handling higher design flows than were being sent to the pond at that time. Prior to that date, improper surface aerator placement was disturbing the anaerobic fermenter cell (inlet) sludge blanket and the pond was not achieving design BOD removals above 0.25 MGD ADWF. By relocating the surface aerators to their current location, and maintaining a quiescent up-flow anaerobic sludge blanket at the pond inlet, Pond 1B has been able to consistently treat flows in excess of 0.35 MGD ADWF and beyond for the past six years.

In fact, Pond 1B has been the sole primary treatment pond for all WWTRP flows since 2007 when Pond 1A was taken out of service for solids removal. It has only been in the last few years that Pond 1B has shown signs of reduced treatment capacity (reduction in BOD removal), which is due to a higher rate of solids accumulation in Pond 1B. Pond 1B has been in continuous service since its construction in 1996 without solids removal.

For the purposes of this evaluation and future facility planning, Pond 1B will achieve design BOD removal/reduction up to an ADWF rate of 0.35 MGD when solids accumulation is maintained at acceptable levels (no more than 2 to 3 feet in third settling cell). Effluent from Pond 1B is currently transferred into Pond 2 for additional BOD removal via algal growth.

According to the 2015 Facilities Evaluation, Pond 1B has a total capacity of 0.50 MGD and 0.38 MGD when loaded at 500 mg/L and 700 mg/L BOD, respectively.

2.1.4 Pond 2

Pond 2 is a HRAP pond, which is the second pond in a Type 1 AIPS treatment train. The purpose of Pond 2 is to encourage the growth of algae using nutrients and waste constituents carried over from the primary waste receiving pond. The design of Pond 2 is a shallow (3 foot operational depth) “racetrack” layout with a very slow-moving induced current around the flow path. Mixing equipment in Pond 2 is intended to keep all velocities at a minimum, in order to avoid shear forces which can

break-apart large algae growth mass. Under design conditions, Pond 2 will maintain dissolved oxygen levels well above saturation in water, due to an abundance of algal photosynthesis and algae mass growth.

In a Type 1 AIPS system, a portion of the oxygen-rich water from Pond 2 is re-circulated across the top of the primary waste receiving pond (Pond 1A) for algae seeding and to maintain dissolved oxygen in the upper strata of the primary pond.

2.1.5 Pond 3

Pond 3 is a maturation and algae settling pond, which is the third pond in a Type 1 AIPS treatment train. Pond 3 provides a similar function as a clarifier in that it is designed to remove high algae content generated in Pond 2 via settling. Remaining algae in the treatment system effluent contributes to the TSS load and total BOD load.

In Pond 3, large mature algae floc sink into the deeper pond strata where they are starved of sunlight subsequently die-off. Effluent from Pond 3 (under ideal conditions) should meet quality requirements to be directed immediately to disinfection and disposal facilities.

2.1.6 Pond 4

Pond 4 is a maturation and flow equalization pond. Treated water from the upstream units is collected in Pond 4 for additional hydraulic residence time and exposure to typical lagoon treatment conditions. Pond 4 has no mechanical aeration, and relies on natural stratification, surface area oxygen transfer, and algae photosynthesis for further reduction of waste constituents. The water level in Pond 4 can be drawn-down for disposal as necessary for operational flexibility or to improve hydraulic grade through the upstream treatment train units (such as during wet weather flow conditions).

2.1.7 Disinfection Facilities

The disinfection facilities at the WWTRP include a small operations/storage building, chemical injection system, chlorine contact basin (CCB), disposal pumps, flow metering, and de-chlorination system. Current system operation includes use of sodium hypochlorite for disinfection and manual adjustment of de-chlorination chemicals when discharging to the Napa River. Disposal pumps can be directed to convey disinfected effluent to Pond 5, the irrigation reuse fields, or to the Napa River as necessary.

2.1.8 Pond 5

Pond 5 is a large flow equalization basin which stores treated, disinfected effluent (when necessary) prior to disposal. Pond 5 provides operational flexibility for treatment staff to meet variable disposal conditions and requirements, due to weather or other operation and maintenance (O&M) needs.

2.1.9 Disposal

Current disposal methods include two options based on permit and weather conditions. The primary disposal method is to discharge secondary treated effluent to the Napa River during the allowable wet weather period of November 1 through May 31, while maintaining a river to wastewater dilution flow ratio of at least 50 to 1. The final effluent is chlorinated and dechlorinated prior to discharge to the river. When these conditions cannot be met, wastewater is stored in the on-site storage ponds and/or used for irrigation at the City's disposal fields directly to the southeast of the WWTRP.

Irrigation disposal is operated under the provisions of the WRR. Final effluent disposed of through the irrigation fields is chlorinated prior to discharge.

Table 1 Existing Pond Treatment Process Units

Process Unit	Description	Existing Pond Area, Acres	Existing Pond Depth, feet ^a	Existing Pond Volume, MG ^b
Pond 1A	Type 1 AIPS Primary Inlet Anaerobic Digester	2.9	9.0	8.5
Pond 1B	Type 2 AIPS – - Stage 1 = anaerobic fermenter - Stage 2 = facultative with mechanical aeration - Stage 3 = settling	2.1	17.5 (Stage 1) 14.5 (Stage 2) 17.5 (Stage 3)	7.5
Pond 2	Type 1 AIPS High-Rate Algal Production (HRAP)	5.1	3.0	4.9
Pond 3	Type 1 AIPS Algal Settling and Maturation	2.5	8.0	6.3
Pond 4	Maturation and Flow Equalization	3.0	11.5	9.8
Pond 5	Flow Equalization Storage	6.7	13.0	24.6

^a Per 2006 *WWTRP Upgrades and Water Recycling Project Design Memorandum* (West Yost Associates, 2006).

^b Per 2015 Facilities Evaluation.

2.2 Summary of NPDES, WRR, and CDO Discharge Requirements

Discharge limits for the St. Helena WWTRP depend on the final discharge location of the treated effluent. Currently, the plant is permitted to discharge to the Napa River; but discharges to this receiving water are subject to the NPDES effluent limitations. As stated earlier, the limits in the previous permit (R2-2010-0105 effective through February 29, 2016) were made more stringent in the current permit (R2-2016-003 effective through February 28, 2021). As the WWTRP was not anticipated to be able to achieve the effluent limits under the new permit, the SFBRWQCB issued interim limits under the CDO (R2-2016-0004) which are equivalent to those in the previous permit. Discharge of treated effluent to the irrigated reclamation fields are subject to effluent limits in the WWR (Order 87-090).

The effluent limits for the previous NPDES permit (effective through February 29, 2016), current NPDES permit (effective through February 28, 2021), and WRR are summarized in Tables 2, 3, and 5, respectively. Interim effluent limits from the CDO are included in Table 4.

Historically, St. Helena has had difficulty achieving the effluent limits under both the NPDES permit and WRR. Design criteria for any future treatment option will require compliance with the current NPDES permit. If a recycled water program is to be implemented additional water quality requirements will govern level of treatment at the St. Helena WWTRP (see Section 2.3).

Table 2 NPDES Permit R2-2010-0105 Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
BOD ₅	mg/L	30	45	-	-	-
TSS	mg/L	30	45	-	-	-
Oil and Grease	mg/L	10	-	20	-	-
pH	s.u.	-	-	-	6.5	8.5
Chlorine, Total Residual	mg/L	-	-	-	-	0.0
Copper	µg/L	14	-	24	-	-
Cyanide	µg/L	15	-	30	-	-
Bis(2-ethylhexyl) phthalate	µg/L	3.0	-	6.0	-	-
Total Ammonia	mg/L as N	16	-	39	-	-
Dioxin-TEQ	µg/L	1.3×10^{-8}	-	2.6×10^{-8}	-	-

Additional effluent discharge requirements in the NPDES permit include:

- BOD and TSS - 85 Percent Removal: The concentration-based average monthly percent removal of BOD and TSS shall not be less than 85 percent.
- Total Coliform Bacteria: Treated wastewater shall meet the following limits of bacteriological quality:
 1. The five-sample moving median value for the most probable number (MPN) of total coliform bacteria shall not exceed 23 MPN/100 mL; and
 2. No single sample shall exceed 240 MPN/100 mL.
- Whole Effluent Acute Toxicity - survival of organisms in undiluted combined effluent shall be:
 1. A three-sample median value of not less than 90 percent survival, and
 2. Any single sample not less than 70 percent survival.

Table 3 NPDES Permit R2-2016-0003 Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Maximum daily	Instantaneous Minimum	Instantaneous Maximum
BOD ₅	mg/L	15	25	-	-	-
TSS	mg/L	15	20	-	-	-
Oil and Grease	mg/L	10	-	20	-	-
pH	s.u.	-	-	-	6.5	8.5
Chlorine, Total Residual	mg/L	-	-	-	-	0.0
Copper	µg/L	8.3	-	17	-	-
Cyanide	µg/L	15	-	30	-	-
Total Ammonia	mg/L as N	16	-	39	-	-

Table 4 CDO Order R2-2016-0004 Interim Effluent Limits

Parameter	Units	Average Monthly	Average Weekly
BOD	mg/L	30	45
TSS	mg/L	30	45

Table 5 WRR 87-090 Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Maximum daily	Instantaneous Minimum	Instantaneous Maximum
BOD	mg/L	-	-	-	-	40
Dissolved Oxygen	mg/L	-	-	-	-	1.0
Dissolved Sulfides	mg/L	-	-	-	-	0.1

Additional effluent discharge requirements in the WRR permit include:

- Total Coliform Bacteria:
 - The median number of total coliform organisms shall not exceed 23 MPN/100 ml as determined from the bacteriological results of the last seven days from which analyses have been completed
 - The number of total coliform organisms shall not exceed 240 MPN/100 ml in any two consecutive samples

The current NPDES effluent discharge limits for BOD, TSS, and copper decreased compared to the previous limits (shown as bolded and italicized in Table 3). All other discharge requirements in the NPDES permit remain the same. No changes were made to the WRR effluent limits. The interim discharge effluent limits from the CDO will remain in effect until February 28, 2021, at which point full compliance with the NPDES permit is required.

3. Flow and Loading

The information presented in this chapter defines the flow and wastewater characteristics the City must consider in developing treatment solutions allowing for continual surface water discharge under the new NPDES permit.

3.1 Existing and Future Flows

The 2006 WWTRP Design Memo analyzed plant flows using ten years' of recorded data from 1995-2004. Historical flows were analyzed and flows were projected for the year 2030. The projected flows were reassessed by the City in the *Wastewater Treatment & Reclamation Plant/ Collection System Facilities Status and Planning* (Department of Public Works, 2014). The City found that the projections in the 2006 WWTRP Design Memo were overly conservative in projecting an ADWF of 0.84 MGD in 2030.

The ADWF evaluated in 2014 was 0.42 MGD which was slightly less than that calculated for 2005 as was the average wet weather flow (AWWF) of 0.77 MGD (based on a nine-year data set from 2005-2014). The City's report suggested an ADWF of 0.65 MGD as more appropriate and this value was adopted by the SFBRWQCB in the 2016 Order. The ADWF of 0.65 MGD more nearly reflected the "low-growth" projection in the 2006 WWTRP Design Memo; therefore, the low-growth projected values from the 2006 WWTRP Design Memo are adopted (with slight modification in rounding) in this Feasibility Study as recommended design values and are summarized in Table 6.

The average day maximum month (ADMM) flow was calculated based on data from 2004 to 2015 and may be used for sizing of process units as an alternative to the AWWF; the design peak flow listed in the current permit is nearly 3 MGD, which represents the sustained peak month wet weather flow. A more detailed analysis of flow should be conducted during the design stage.

The flows listed in the 2016 NPDES Permit are 0.5 MGD and 2.8 MGD, for permitted ADWF and design PWWF, respectively.

Table 6 Recommended Design Flows

Flow Type	2005 (MGD)	Projected (low growth rate; MGD)	Recommended for Design (MGD)
Average Dry Weather Flow	0.48	0.68	0.65
Estimated Minimum Dry Weather Flow	0.23	0.2	0.2
Peak-Hour Dry Weather Flow	0.84	1.19	1.2
Dry Weather Peaking Factor	1.75	1.75	1.75
Average Wet Weather Flow	1.02	1.22	1.22
Peak Hour Wet Weather Flow	5.75	5.75	5.75
Average Day Max Month ^a	-	-	1.46
Design Peak Flow ^b	-	-	3.02

^a Average Day Max Month 2004-2015.

^b This is the recommended design capacity for new treatment units from the 2006 WWTRP Design Memo, based on analysis of influent SCADA data and meets sustained peak month wet weather flow (3 MGD).

3.2 Existing and Future Loads

The wastewater characteristics for influent entering the WWTRP as well as the characteristics of the effluent from the individual ponds comprising the WWTRP were examined to provide basic water quality parameters for use in the alternatives analysis (Chapter 5). Wastewater influent and individual pond effluent water qualities are discussed in separate subsections.

3.2.1 Influent Wastewater Characteristics

The 2006 WWTRP Design Memo analyzed plant BOD, TSS, and ammonia loading data from 2003 and 2004. The loading data were used to calculate average daily loading, sustained peak loading, and maximum daily loading and corresponding peaking factors. Using these loadings, per capita loading rates were estimated; these are summarized in Table 7. Assuming a growth rate of 1.5%, loadings were projected for the year 2030. The results are summarized in Table 8.

Table 7 Estimated Per Capita Loading Rates (2006 WWTRP Design Memo)

	BOD (lb/day)	TSS (lb/day)	Ammonia (lb/day)
Average Daily Loading	0.31	0.20	0.06
Sustained Peak Loading Peaking Factor	1.26	1.67	1.25
Maximum Day Loading Peaking Factor	1.58	2.92	1.5

Table 8 Recommended Loading (2006 WWTRP Design Memo)

	BOD (lb/day)	TSS (lb/day)	Ammonia (lb/day)
Average Daily Loading			
2005	1,890	1,220	370
2030	2,600	1,680	500
Sustained Peak Loading			
2005	2,380	2,040	460
2030	3,280	2,810	630
Maximum Day Loading			
2005	2,980	3,560	560
2030	4,110	4,910	750

The loadings estimated in the 2006 WWTRP Design Memo were updated to reflect current and future projected population growth as reported in the 2015 Draft General Plan (City of St. Helena, 2015). The per capita loading rates and peaking factors from the 2006 WWTRP Design Memo were reported as the report noted that land use changes through the planning horizon would not likely result in a change to wastewater quality characteristics. Table 9 presents the results of the updated projected loadings which are generally less than those estimated in 2006 under a higher projected population growth rate.

Table 9 Updated Recommended Loading (Based on 2015 Draft General Plan)

	BOD (lb/day)	TSS (lb/day)	Ammonia (lb/day)
Average Daily Loading			
2015	1,829	1,180	354
2040	1,953	1,260	378
Sustained Peak Loading			
2015	2,305	1,971	443
2040	2,461	2,104	473
Maximum Day Loading			
2015	2,890	3,446	531
2040	3,086	3,679	567

The 2015 Facilities Evaluation recommended a design BOD load strength of 700 mg/L which is between the previous design influent BOD concentration of 500 mg/L and assumed peak strengths of 1,000 mg/L. At the recommended ADWF of 0.65 MGD, the recommended design load strength of 700 mg/L translates to a BOD load of 3,795 lb/day which exceeds the projected maximum day loading shown in Table 9 for 2040. At ADWF, the original design concentration of 500 mg/L translates to a loading of 2,710 lb/day and is between the updated values for projected sustained peak and maximum day loading in Table 9. As a result, the original design BOD load strength of 500 mg/L and peak strength of 700 mg/L is sufficiently conservative for the purposes of this Feasibility Study.

3.2.2 Wastewater Characteristics Internal To WWTRP

Data made available for 2014 and 2015 from ponds 1A, 1B, 2, 3, and 4 were reviewed to compute simple averages that could be used to characterize outflow from the individual storage ponds (Table 10). These data will be used for design criteria assumptions in the alternatives analyses. Note that the average values for BOD5, TSS, and ammonia (as N) are each above their respective effluent limits in the 2016 NPDES permit of 15, 15, and 16 mg/L (monthly average basis).

Table 10 2014-2015 Sampling Analytical Results

Location (Effluent)	Flow MGD	pH	Temp °C	DO mg/L	TDS mg/L	BOD5 mg/L	TSS mg/L	NH ₃ -N mg/L
Pond 1A	0.57	6.7	17.3	4.3	362	89	99	22
Pond 1B	0.33	6.6	18.7	2.1	485	114	243	42
Pond 2	1.02	7.0	16.4	5.2	413	89	63	29
Pond 3	1.77	7.0	18.9	2.1	448	84	56	28
Pond 4	1.65	6.9	17.0	3.9	1,071	61	46	21

Additional sampling was conducted at the WWTRP in June 2016 (Table 11). The combined effluents of Ponds 1A and 1B were sampled as were the effluents of Ponds 2, and 3. Influent to the plant was also sampled and analyzed to get a sense of treatment efficiency exhibited by the plant. Generally, the concentrations of the parameters analyzed were lower in the 2016 sampling event compared to the 2014-2015 results. BOD and TSS were still well above the new permit limits, but ammonia was treated to a level that would meet the new permit effluent limits. BOD and TSS show

a 90% reduction from the influent to the effluent of Pond 3. Similarly, ammonia exhibited a 92% treatment efficiency.

Table 11 2016 Additional Sampling Analytical Results

Location (Effluent)	BOD5 mg/L	SBOD mg/L	COD mg/L	SCOD mg/L	TSS mg/L	TKN mg/L	STKN mg/L	TP mg/L	Ortho-P mg/L	Alkalinity (as CaCO ₃) mg/L
Influent	484	170	930	352	366	95	80	11.7	7.8	282
Pond 1A/1B	87	19	183	57	70	24	14	7.7	6.1	228
Pond 2	74	-	-	-	98	-	-	-	-	161
Pond 3	50	15	120	52	37	9	4	7.8	6.9	168

3.2.3 Effluent Water Quality at High Plant Inflow

Plant influent flow data available from 2007 to 2015 were obtained and compared to effluent concentrations of TSS and BOD to assess the water quality in the plant effluent during high flow events (i.e., during storm events). The relationship between flow and BOD and TSS concentrations would help determine whether flows must be equalized and stored on site until conditions permit its eventual treatment prior to discharge, or whether the high flows could be bypassed and blended with effluent from downstream treatment processes proposed under the alternatives in this Feasibility Study and still meet the discharge requirements. Figure 4 shows all influent data collected on days which also had an effluent sampling event. There appears to be an inverse relationship between flow rate and concentration as expected through dilution when high volumes of water enter the wastewater collection system through infiltration and inflow during storm events.

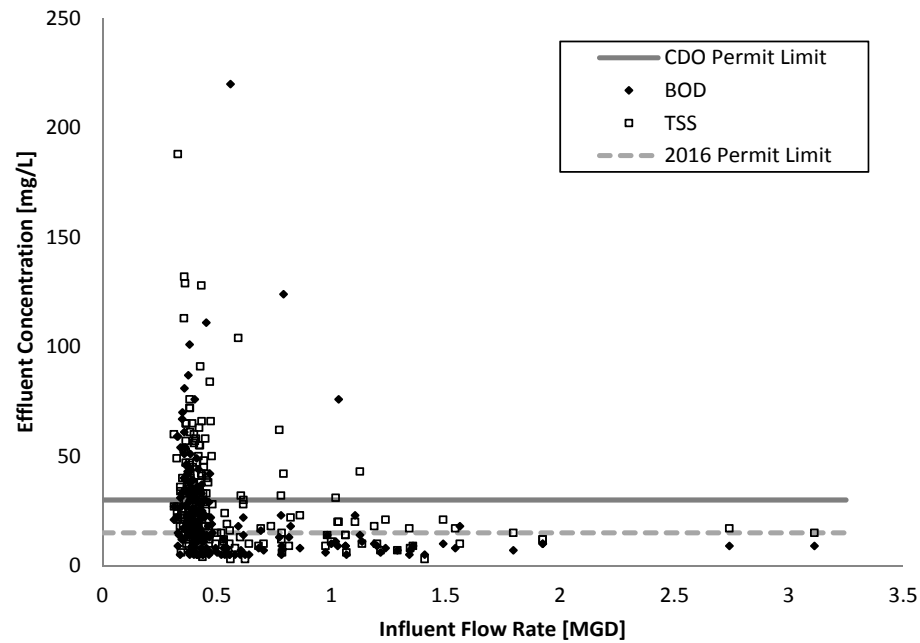


Figure 4 – Effluent BOD and TSS Concentrations versus Influent Flow Rate

Focusing on data where plant inflows exceeded 1.5 MGD in a period up to five days prior to the effluent sample collection data, the trend is again evident, although more so for BOD than TSS (Table 12 and Figure 5). Only 3 of 22 samples analyzed for BOD exceeded the new NPDES permit limit (monthly average basis) during these high flow conditions; whereas, 11 of 23 samples analyzed for TSS exceeded the new NPDES permit limit (monthly average basis). Nonetheless, these data indicate that during average high flow events, combining the treated flow with bypassed excess flows, which tend to be lower in BOD and TSS, is likely to help meet the new NPDES permit limits. However, because peak events will occur with higher concentrations of BOD and TSS as demonstrated in Table 12, provisions for detention or additional treatment of those peak flows would be needed under those conditions. The need for additional equalization and/or treatment capacity will be addressed during the design phase.

Table 12 2016 Historical Sampling Analytical Results

Date	Influent Flow on Sample Date, MGD	Highest Influent Flow Within Preceding 5 Days, MGD	Location	Effluent Flow	BOD, mg/L	TSS, mg/L
1/28/2008	1.489	2.24	E-001R	3.108	10	<u>21</u>
2/6/2008	1.028	2.01	E-001R	3.19	9	<u>20</u>
2/25/2008	1.289	1.81	E-001R	3.093	7	<u>7</u>
1/26/2010	1.924	2.45	E-001R	1.709	10	12
4/15/2010	0.975	1.78	E-001R	2.64	6	9
12/24/2010	1.032	1.89	E-001R	1.93	76	<u>20</u>
12/29/2010	1.796	1.89	E-001D	1.83	7	15
12/30/2010	1.341	1.89	E-001D	1.823	5	<u>17</u>
12/31/2010	1.188	1.89	E-001D	1.82	10	<u>18</u>
2/23/2011	0.863	1.68	E-001R	2.697	8	<u>23</u>
3/24/2011	3.112	3.11	E-001D	8.059	9	15
3/25/2011	2.740	3.11	E-001D	5.169	9	<u>17</u>
3/29/2011	1.542	3.11	E-001D	4.982	8	<u>17</u>
3/30/2011	1.345	2.95	E-001D	3.093	7	8
3/31/2011	1.215	2.95	E-001D	0.944	6	7
3/19/2012	1.125	2.54	E-001R	1.56	14	43
12/10/2012	0.736	1.54	E-001R	2.278		<u>18</u>
12/27/2012	1.408	2.95	E-001D	5.339	5	3
12/28/2012	1.200	2.95	E-001D	4.001	9	10
12/29/2012	1.000	2.20	E-001D	0.929	10	11
12/21/2014	1.104	2.00	E-001D	4.402	<u>23</u>	20
12/22/2014	0.982	1.80	E-001D	1.219	14	14
2/8/2015	1.562	1.56	E-001R	2.905	<u>18</u>	10

Date	Influent Flow on Sample Date, MGD	Highest Influent Flow Within Preceding 5 Days, MGD	Location	Effluent Flow	BOD, mg/L	TSS, mg/L
Summary						
Total Number of Results with Influent Flow >1.5 MGD in Preceding 5 Days and Effluent Sample Data Available					22	23
2016 NPDES Permit Limit					15	15
Number of 2016 NPDES Permit Exceedances - Shown in <u><i>underlined italics</i></u>					3	11
2010 NPDES Permit Limit					30	30
Number of 2010 NPDES Permit Exceedances - Shown in Bold					1	1
Average Concentration (mg/L)					12.7	15.4

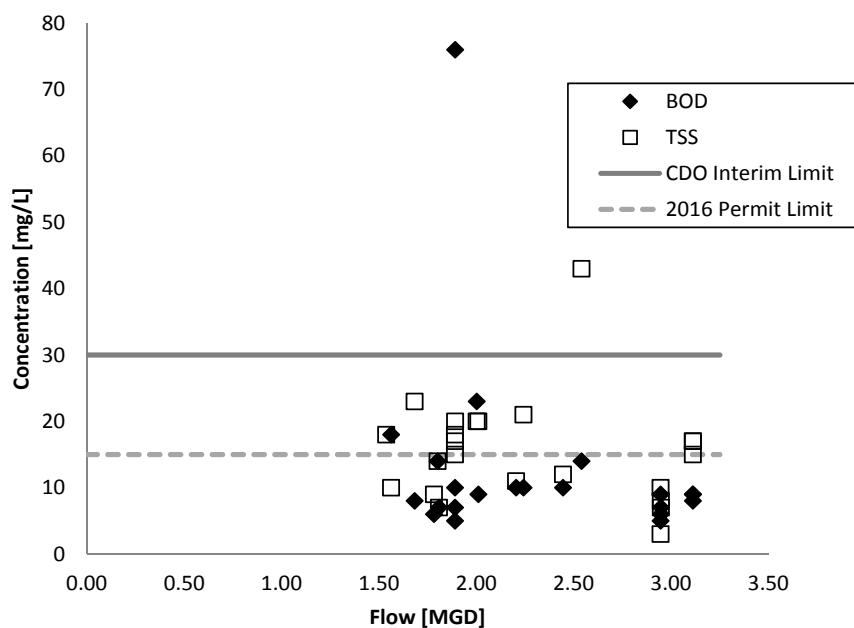


Figure 5 – Effluent BOD and TSS Concentrations versus Influent Flow Rate at Flows Exceeding 1.5 MGD

3.3 Discharge Violations

No discharges to the Napa River were made in 2013 or 2015; therefore, no effluent violations were reported. In 2014, effluent violations included a total coliform exceedance of the 23 MPN/100 mL limit, and dilution ratio violations.

There were no reclamation limit violations for discharge to the spray fields under WRR Order No. 87-090 in 2015. However, in 2014, the BOD5 limit was exceeded in seven of ten months of reclaimed water discharge and total coliform exceedances occurred in one month. Also in 2013, total coliform exceedances were observed in two months and BOD5 exceedances in five months.

The Plant is currently designed to provide secondary treatment. According to the SFBRWQCB's CDO, plant effluent monitoring data from January 2010 through August 2015 show many instances when the Plant's discharge would not comply with the 2016 NPDES Permit's new BOD and TSS effluent limits. Of 66 monthly results, 40 exceed the new monthly BOD limit and 58 exceed the new monthly TSS limit. Because samples were collected roughly weekly, individual results can be compared to the weekly average effluent limits. Of 162 results, 47 exceed the new weekly BOD limit and 95 exceed the new weekly TSS limits.

The 2016 NPDES permit contains more stringent effluent limits for BOD and TSS, which the WWTRP anticipates that it would have difficulty meeting based on historical testing. As a result, the SFBRWQCB also issued a CDO No. R2-2016-0004 to the City containing interim BOD and TSS effluent limits, required report submittals, and a schedule for the City to make modifications to the WWTRP in order to meet the new effluent limits. As a first step, the CDO requires the submittal of a Feasibility Study. A Draft Feasibility Study was submitted on August 30, 2016. The SFBRWQCB has required groundwater monitoring studies to be conducted since then as part of the compliance schedule. Therefore, the Final Feasibility Study that includes the SFBRWQCB's review comments deadline has been extended to August 2018. A copy of the CDO is included in Appendix C.

3.4 Recycled Water Quality Criteria

The WWTRP does not currently produce recycled water for distribution; however, this section presents the Title 22 requirements for water quality of recycled water. Specifically, the requirements for disinfected tertiary recycled water are presented since that level of treatment would be most applicable to the potential uses of recycled water identified in the 2006 *WWTRP Upgrades and Water Recycling Project Design Memorandum* (West Yost Associates, 2006), herein referred to as the 2006 WWTRP Design Memo. For disinfected tertiary water the following water quality parameters listed in Table 13 must be met:

Table 13 Disinfected Tertiary Requirements

Parameter	Requirement
Filtration	Oxidized wastewater must be: (1) Coagulated and passed through filter media at a rate ≤ 5 gallons per minute per square foot (gpm/ft²) of surface area in mono, dual, or mixed media gravity, upflow or pressure filtration systems, or ≤ 2 gpm/ft² in travelling bridge automatic backwash filters; and, Turbidity must not exceed: • 2 NTU over 24-hour period • 5 NTU more than 5% of the time within 24-hour period • 10 NTU at any time; or Passed through microfiltration, ultrafiltration, nanofiltration, or reverse osmosis and turbidity of the filtered effluent must not exceed: • 0.2 NTU more than 5% of the time within a 24-hour period • 0.5 NTU at any time.
Disinfection	Disinfection following filtration that provides a CT = 450 mg-min/liter with a modal contact time of ≥ 90 min contact time at design PDWF, or, Disinfection following filtration must provide 99.999% inactivation/removal of plaque forming units of F-specific bacteriophage MS2 or poliovirus in the wastewater. A virus that is at least as resistant to disinfection as poliovirus may be used for purposes of the demonstration.
Total Coliform	Total Coliform Concentration must be: • ≤ 2.2 MPN/ 100 mL median over 7 day period • ≤ 23 MPN/ 100 mL in ≤ 1 sample over 30 day period • ≤ 240 MPN/ 100 mL in any sample

These requirements are included as a reference to demonstrate the level of treatment that would be required under a recycled water program. The potential for recycled water to be implemented under the alternatives discussed in this Feasibility Study is discussed in Chapter 6.

4. Summary of Previous Alternatives

As part of the process of developing feasible wastewater treatment options for the WWTRP, a detailed review of background information, previous reports, literature, regulatory references, and data relating to improving the wastewater treatment and disposal facilities was conducted.

Existing background data serves to support the technical analysis of wastewater treatment and disposal alternatives. By building upon valuable work that has been previously completed, project resources can be focused on evaluating alternatives and developing a preferred alternative that may be implemented by the City. The Feasibility Study will serve as a document that brings together useful information developed in the past with new research and analysis.

A number of studies have evaluated the options for improving the current wastewater treatment system. Thus, there are many valuable resources this analysis builds upon. A summary of the previous studies reviewed and used to support the development of this Feasibility Study was developed in the *City of St. Helena WWTP – Alternatives Feasibility Technical Memorandum* (TM; GHD, 2015). This section summarizes the findings of the TM which is attached as Appendix D. Appendices to the TM are not included since they are included as they are included as Appendices A, B, and C of this Feasibility Study.

Only the alternatives most likely to meet the new NPDES permit requirements were retained in the alternatives screening developed in the TM. These recommended alternatives are analyzed further in the Chapter 5 of the Feasibility Study.

For a summary of the previous alternatives developed in previous studies, please refer to the TM in Appendix D. Table 14 presents an overview of the alternatives screening from the TM.

Table 14 Previous Alternatives Feasibility Screening Summary

Alternative	Feasible	Meets NPDES Discharge Limits
Deepen Fermentation Cell in Pond 1A	Yes	No
Convert Entire System to Activated Sludge Treatment	No	Yes
Convert Pond 2 to Type 2 AIPS	Yes	No
Convert Pond 3 to Aerated Treatment Unit	Yes	Unlikely
Cover Pond 3	Yes	No
Convert Pond 4 to Rock Filter	Yes	No
<i>Convert Pond 4 to Constructed Wetlands</i>	Yes	Yes
DAF System	No	Yes
Solids Management	Yes	No
Split Pond 3 into Two Ponds in Series	Yes	No
Disinfection System Improvements and Automation	Yes	No
Recycled Water	No	Yes
<i>Rock Filter with Bypass Flow</i>	Yes	Yes

Note: **Bold, italicized** font indicates an alternative which passes through the alternatives screening.

The two recommended alternatives, (1) Conversion of Pond 4 to constructed wetlands and (2) the rock filter with bypass flow, are evaluated in Chapter 5.

5. Alternative Analysis

5.1 Alternative 1 – Constructed Wetlands

5.1.1 Description of Alternative 1

Constructed wetlands provide additional treatment through a series of physical, chemical, and biological mechanisms. Constructed wetlands are typically fully vegetated, although they may have some open water, and operate within a depth range of one to five feet of slow moving water. Slow moving water promotes settling of fine materials that may not settle in the previous treatment ponds.

Under this option, Ponds 1A, 1B, 2 and 3 of the AIPS would provide primary treatment, and the constructed wetland would be constructed in the adjacent irrigation field. Pond 4 can also be converted into a wetland in order to maintain more irrigation area. The constructed wetland can provide secondary treatment to remove additional BOD and TSS to meet the new NPDES requirements. The existing headworks, disinfection, and discharge processes would not be altered, and the existing Ponds 1A, 1B, 2 and 3 can remain in place. Tertiary treatment with nutrient removal may be necessary prior to discharge in the future, and the proposed constructed wetlands system can be modified when necessary to provide recycled water that meets the requirements outlined in Section 2.4.

There are two types of constructed wetlands: free water surface (FWS) systems, and vegetated submerged bed (VSB) systems. FWS wetlands (Figure 6) are characterized by a water surface exposed to the atmosphere, and closely resemble natural wetlands in appearance because they contain aquatic plants that are rooted in a soil layer on the bottom of the wetland, and water flows through the leaves and stems of plants. VSB systems (Figure 7) do not resemble natural wetlands because they have no standing water. They contain a bed of media (crushed rock, gravel, sand or soil) planted with aquatic plants. The wastewater stays beneath the surface of the media, flows in contact with the roots and rhizomes of the plants, and is not visible to wildlife.

Each type of constructed wetlands has their advantages, but FWS systems are typically more economical for design flows over 1 MGD because the cost of media for VSB systems would add significantly to project costs. Because the design peak flow for this WWTRP is 3.02 MGD, this alternative focuses only on FWS systems.

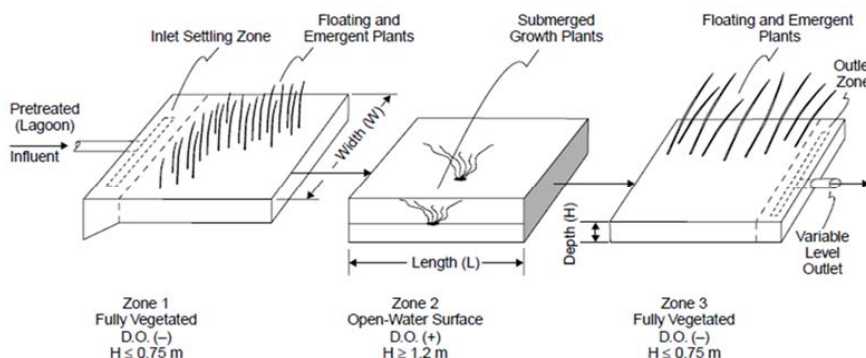


Figure 6 – Elements of a FWS Constructed Wetland (EPA Manual on Constructed Wetlands Treatment of Municipal Wastewaters, September 2000)

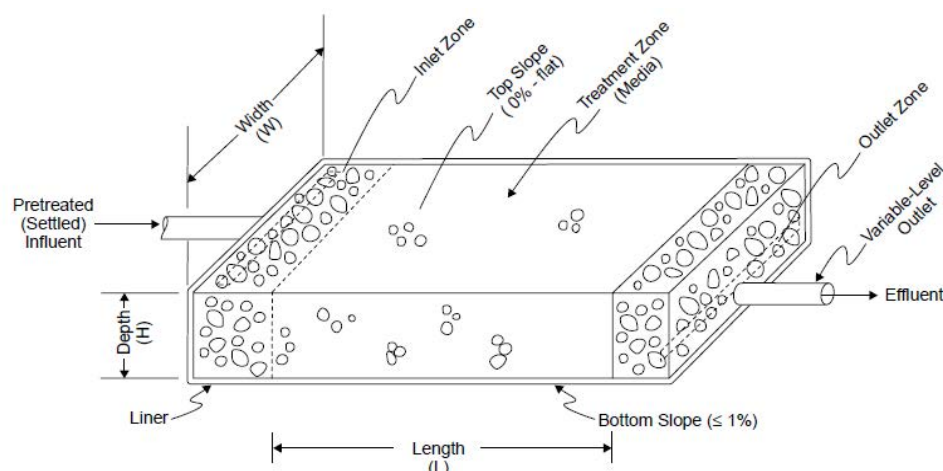


Figure 7 – Elements of a Vegetated Submerged Bed (VSB) System (EPA, 2000)

5.1.2 Conceptual Design of Free Water Surface Constructed Wetlands

Criteria for Sizing

The average day max design wastewater flow of 1.46 MGD was used to size the FWS system. To minimize impacts on the existing irrigation field, Pond 4 can be converted into a wetland, such that effluent from Pond 3 will flow directly into a FWS constructed wetland system (converted from Pond 4), as shown in the process flow diagram in Figure 8. Consequently, the BOD and TSS levels used to size the FWS system for this layout are based on the concentrations from the Pond 3 effluent measured in samples collected during the June 2016 sampling event.

If Pond 4 remains in place, then the wetlands will be constructed in a portion of the adjacent irrigation field. This layout would minimize disruption to the existing treatment process. With this layout, Pond 4 becomes a transitional zone between Pond 3 and the constructed wetlands. As a result, the current hydraulic retention time designed for Pond 4 will not be maintained, and BOD and TSS levels from Pond 4 are expected to be similar to the Pond 3 effluent levels. Therefore, BOD and TSS levels used to size the FWS system for this layout will also be based on the concentrations from the Pond 3 effluent measured in samples collected during the June 2016 sampling event.

Effluent from the wetlands would be disinfected and either discharged to the Napa River or stored in Pond 5 where it would ultimately be applied to the existing disposal field. Tertiary treatment may be added in the future to provide for recycled water needs.

Wetlands Sizing

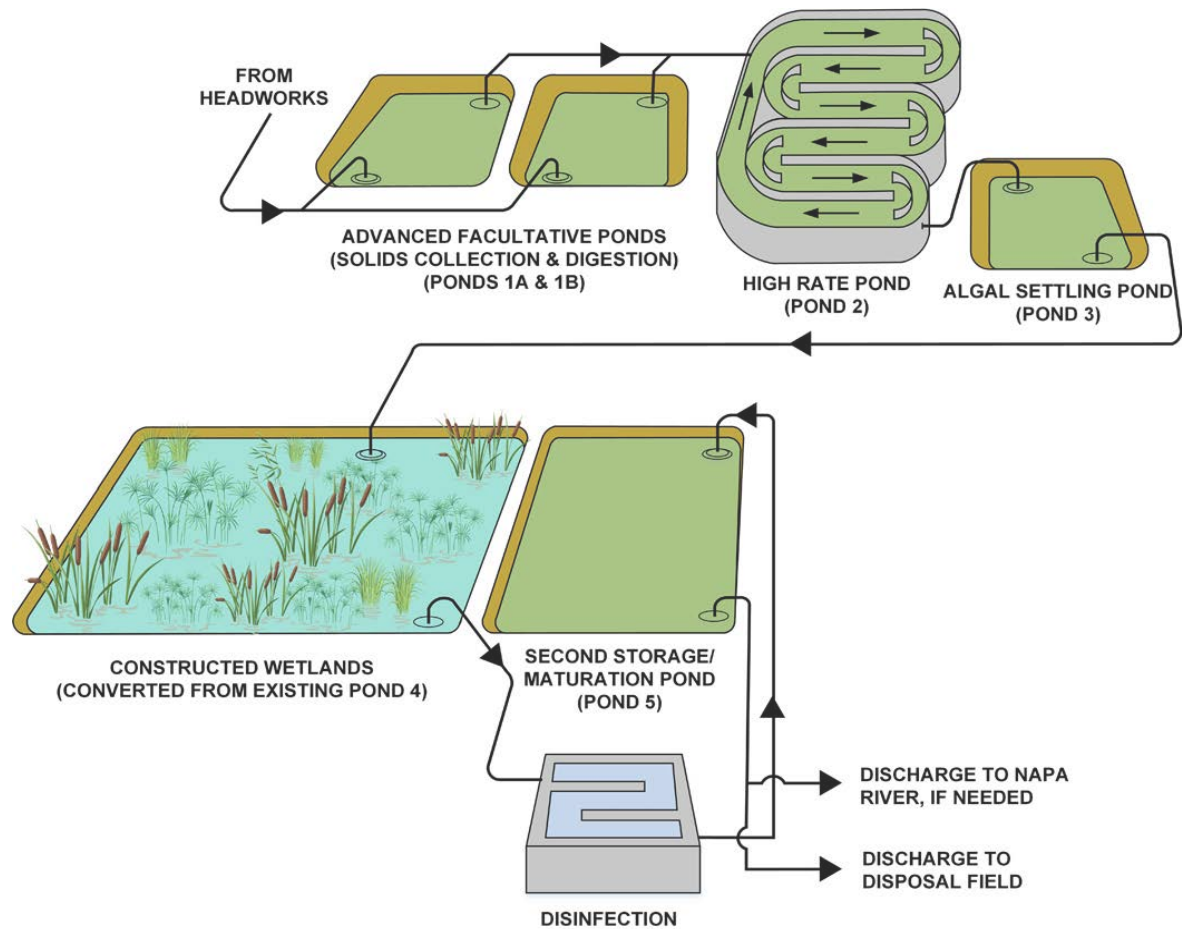
There are two types of models used to size a constructed wetland and predict the effluent quality: (1) the volumetric models as developed by Reed et al. (1995) and Crites and Tchobanoglous (1998), and (2) the areal loading models developed by Kadlec and Knight (1996). The EPA design manual on *Constructed Wetlands Treatment of Municipal Wastewaters* published in September

2000 refers to the areal loading model and provides specific areal loading rates to design FWS systems to accommodate BOD and TSS effluent concentrations less than 20 mg/L.

Note that because these two models were developed from different sets of data, the models do not produce similar results. The volumetric model requires knowledge of the water depth in the system, which may be difficult to control during construction of large systems and is likely to change over the long term. As for the Areal Loading model, water depth is not a factor in the design calculations, but the FWS database used for the development of the model includes a large number of lightly loaded polishing wetland systems with low-valued rate constants (K) that might in turn result in unnecessarily large wetland system designs.

For this alternative, BOD and TSS removal were the two main parameters focused for the sizing of the wetlands. A summary of the surface area requirements for each of the models is provided in Table 15. Detailed calculations on the wetlands sizing and performance expectations are provided in Appendix E and summarized in the following sections.

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Alternative 1 Process Flow
Diagram - Convert Pond 4

Figure 8

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Table 15 Wetland Sizing Models and Surface Area Requirements

Type of Constructed Wetland Sizing Model	Surface Area Requirement, acres
Volumetric Model (Reed et al, 1995)	16
Volumetric Model (Crites et al, 1995)	16
Areal Model (Kadlec and Knight, 1996)	50
Areal Model (EPA, 2000)	22

There is a high degree of uncertainty in sizing wetlands because of the complex biological, physical, and chemical reactions that occur. As shown in the table above, the calculated wetland size differs significantly depending on the type of model used. Based on these calculations, the constructed wetlands need to be between 16 acres to 50 acres in order to produce an effluent that meets the new BOD and TSS concentrations. However, previous studies indicated that the areal model typically yields unnecessarily large wetland system designs. Additionally, given the consistency in results from the volumetric model developed by Reed (1995) and Crites (1995), GHD recommends a surface area requirement of 16 to 22 acres of constructed wetlands to meet the new discharge limits of the NPDES permit. For the purpose of this Feasibility Study, a wetland size of 20 acres was used to develop the cost.

To minimize short-circuiting and to provide operational and maintenance flexibility, at least two parallel treatment trains of a minimum of three cells each are recommended. The wetland cells would be constructed with three distinct zones (see Figure 9). The first cells in each train should normally each get 50% of the flow and may have a deeper inlet area directly adjacent to the inlet structure to handle any discrete solids settling which might occur at this location. Multiple cells allow for redistribution of the primary cell effluent in the subsequent cell, which reduces short-circuiting. Under normal conditions, all 20 acres of the wetland would be operated. Whenever maintenance is required, wetland cell(s) can be removed from service by transferring its influent to an adjacent cell such that it can be taken off-line.

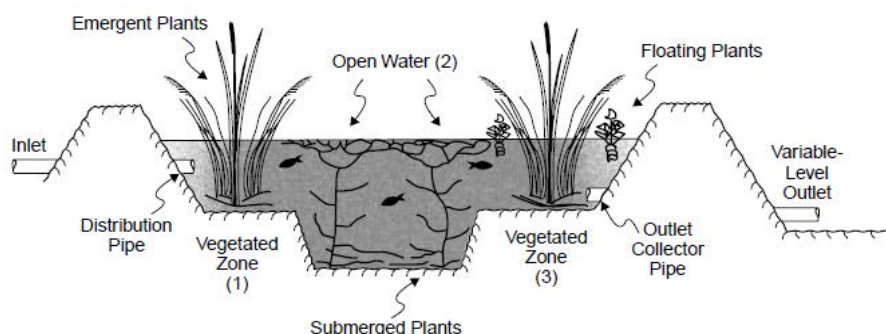


Figure 9 – Profile of a Three Zone FWS Constructed Wetland Cell (EPA, 2000)

The existing Pond 4 only has a total area of 130,680 ft² (4 acres) and therefore cannot accommodate the size of the proposed FWS wetland system (20± acres) unless additional land from the irrigation field is used for constructing the wetlands. Approximately 70 acres of turf area is currently adjacent to the treatment plant for irrigation, and therefore if the wetlands are constructed, the irrigation area would decrease to approximately 50 acres. Additional disposal capacity can be created using an infiltration pond, as discussed in Section 9. Figure 10 shows a conceptual layout

that can accommodate the size of the proposed FWS wetland system utilizing the area of the irrigation fields. The size and configuration of the constructed wetlands will be refined during detailed design if this alternative is selected for the project.

5.1.3 Performance Expectations, Effectiveness and Reliability

Properly maintained and operated FWS wetland systems reliably remove BOD and TSS. Nitrogen, phosphorus, trace organics, and pathogens have also been reportedly removed from wastewaters that enter FWS systems, but are dependent on temperature, soil interaction and detention time. Metals are also removed and a reduction in fecal coliforms of about one log can be expected. This section discusses the expected treatment and performance of constructed wetlands, operations, ability to produce recycled water, as well as advantages and disadvantages of this alternative.

BOD and TSS Removal in Constructed Wetlands

The removal of settleable organics is very rapid in FWS systems due to the quiescent conditions. Close to 50% of the applied BOD is removed within the first few feet of the treatment slope. This settled BOD then undergoes aerobic or anaerobic decomposition in colloidal and dissolved forms, and continues to be removed as the wastewater is exposed to the attached microbial growth in the system.

The principal removal mechanisms for TSS are flocculation, sedimentation, and filtration in the FWS system. Most of the settleable solids are removed within 50 to 100 feet of the inlet. Optimal removal of TSS requires a full stand of vegetation to facilitate sedimentation and filtration and to prevent the regrowth of algae.

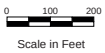
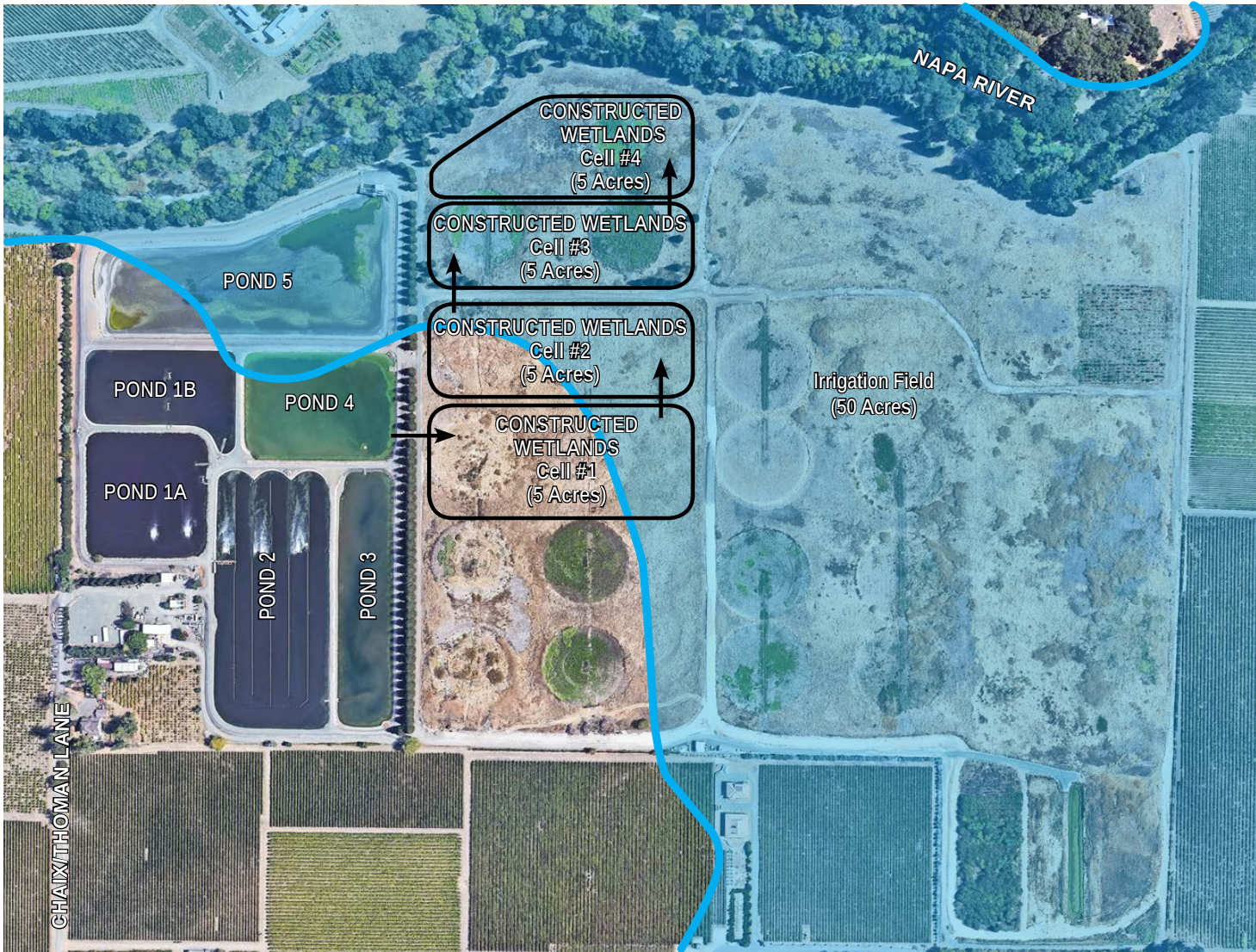
Table 16 below illustrates an example of the percent removal of select wastewater constituents based on a FWS constructed wetlands in Arcata, California. Similar percent removal of wastewater constituents can be expected for the constructed wetlands alternative. With the current AIPS and the calculated wetland area, the proposed FWS constructed wetlands are anticipated to meet the discharge standards of 15 mg/L BOD and TSS on a monthly average basis.

Table 16 Wastewater Constituents for FWS Constructed Wetlands in Arcata, California (Crites et al., 2014)

Constituent	Influent (mg/L)	Effluent (mg/L)	Percent Removal (%)
BOD	26	12	54
TSS	30	14	53
Ammonia	12.8	10	22

Nitrification and Denitrification in Constructed Wetlands

Although plant uptake only accounts for approximately 10% of the nitrogen removal, nitrogen removal in wetlands can be achieved through nitrification and denitrification. Newly constructed systems with incomplete plant cover will not have significant nitrifying organisms, and therefore one to two growing seasons may be necessary to develop sufficient vegetation to support microbial nitrification to convert ammonium to nitrate. Denitrification requires adequate organic matter to convert nitrate to nitrogen gas. If nitrified wastewater is applied to a FWS wetland, then the nitrate will be denitrified within a few days of detention, and nitrogen removal is generally rapid and complete.



LEGEND

100 Year Flood Zone

Note: Total Area of Constructed Wetlands
Required = 20 Acres



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Alternative 1 Layout
Constructed Wetlands

Figure 10

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Ease of Operations

Constructed wetland systems require minimal effort to maintain and operate. Monthly or weekly inspection of weirs and weekly sampling typically are required at the effluent end, and periodic sampling between multiple cells is recommended. Maintenance of constructed wetlands generally is limited to the control of unwanted aquatic plants and control of disease vectors, especially mosquitoes. Harvesting of plants generally is not required, but annual removal or thinning of vegetation or replanting of vegetation may be needed to maintain flow patterns and treatment functions. Effective vector control can be achieved by appropriately applying integrated pest management practices, such as introducing mosquito fish or providing habitat for mosquito-eating birds and bats. Bimonthly monitoring of mosquito larvae and pupae and applications of larvicides may be required on an as-needed basis. Sediment accumulation typically is not a problem in a well-designed and properly operated constructed wetland, thus partial dredging is required only rarely.

Ability to Produce Recycled Water

This Feasibility Study did not analyze the specific tertiary treatment processes required to attain recycled water standards, but the following paragraph provides a general overview of how the existing AIPS with constructed wetlands can be adapted with tertiary treatment to provide recycled water.

If the City intends to meet recycled water permit requirements for tertiary treated effluent, additional treatment will be required after the FWS system. Modifications can be made to include tertiary treatment after the constructed wetlands as shown in Figure 8. To do so, a secondary effluent pump station will need to be constructed in order to transfer the secondary effluent from the constructed wetlands into the tertiary treatment system. Tertiary treatment may include a flocculation system, filtration system, and a UV disinfection system. A tertiary pumping station may also be required to pump the treated water into a tertiary storage tank. For water that is used in the agricultural spray irrigation system, the secondary effluent in the wetlands will bypass the tertiary treatment system, be chlorinated and dechlorinated and then go directly to the fields. Further discussion on recycled water and associated distribution facilities is provided in Chapter 7.

Solids Management Practices for Constructed Wetlands

Wetland systems produce no residual biosolids or sludges requiring subsequent treatment and disposal. However, plant litter in the wetlands decomposes over time and leaves a sediment residue that does accumulate at a rate of ≤ 0.04 in. or 1 mm/year (Crites, 2014). When this accumulated sediment and the accumulated refractory solids from the wastewater TSS begin to interfere with the design treatment volume or hydraulics in the wetland, then removal will be necessary. It is estimated that the need for solids removal in the wetlands might arise every 50 to 75 years, depending on the wastewater characteristics and the types of plants used in the system. If maintenance is required, wetland cell(s) can be removed from service by transferring its influent to an adjacent cell such that it can be taken off-line for sludge removal.

Advantages and Disadvantages

Constructed wetlands are capable of producing effluent compliant with the new NPDES effluent limits. Some advantages and disadvantages of FWS constructed wetlands are listed in Table 17.

Table 17 Advantages and Disadvantages of FWS Constructed Wetlands

Advantages	Disadvantages
FWS wetlands offer effective treatment in a passive manner, minimizing mechanical equipment, energy, and skilled operator requirements.	The land area required for FWS wetlands can be large, especially if nitrogen or phosphorus removal is required. An infiltration pond is needed for additional disposal capacity.
FWS wetlands may be less expensive to construct, and are less costly to operate and maintain than conventional mechanical treatment systems.	The removal of BOD, COD, and nitrogen are biological processes and essentially continuously renewable. The phosphorus, metals, and some persistent organics removed by the system are bound in the wetland sediments and accumulate over time.
Year-round operation for secondary treatment is possible in all but the coldest climates. Year-round operation for advanced or tertiary treatment is possible in warm to moderately temperate climates.	The bulk water in most constructed FWS wetland systems is essentially anoxic, limiting the potential for rapid biological nitrification of ammonia. Increasing the wetland size and, therefore, the detention time, may compensate for this, but may not be cost effective. Alternate methods for nitrification in combination with a FWS wetland have performed successfully.
Wetland systems provide a valuable addition to the "green space" in a community, and include the incorporation of wildlife habitat and public recreational opportunities.	Mosquitoes and other insect vectors can be a problem.
Wetland systems produce no residual biosolids or sludges requiring subsequent treatment and disposal.	FWS constructed wetlands can remove fecal coliforms by at least one log from typical municipal wastewaters. This may not be sufficient to meet discharge limits in all locations and supplemental disinfection may be required. The situation is further complicated because birds and other wildlife in the wetland produce fecal coliforms.
The removal of BOD, TSS, COD, metals, and persistent organics in municipal wastewaters can be very effective with a reasonable detention time. The removal of nitrogen and phosphorus can also be effective with a significantly longer detention time.	Start-up period for the wetland to reach optimum performance may take several growing seasons to establish vegetation and equilibrium. The wetlands may not be fully functional until after the CDO term runs out in 2021.

Source: EPA Wastewater Technology Fact Sheet: Free Water Surface Wetlands, September 2000 <https://www3.epa.gov/npdes/pubs/free_water_surface_wetlands.pdf>

5.1.4 Construction

Wetland Construction

The basic civil engineering aspects of wetland design and construction typically include earthen berms for lateral water containment, vegetation, and some type of seepage control for the bottom of the wetland cell (Figure 9).

Berms for wetland cells are typically built with 3:1 interior side slopes and with a minimum of two feet of freeboard above the average water surface in a FWS wetland. The external berms should be at least 10-foot wide at the top to permit access by service vehicles, and each wetland cell should contain an access ramp for maintenance equipment.

Depending on soil conditions, impermeable membrane liners are typically used for FWS systems in order to prevent loss of water from infiltration and contamination of groundwater below the wetland site. Both 40-mil polyvinyl chloride (PVC) and high-density polyethylene (HDPE) are recommended. Puncture of the liner must be prevented during placement and subsequent construction activity.

If the wetland system is to meet its performance expectations, it is critical for the water to flow uniformly over the entire surface area provided for treatment. Uniform distribution is typically accomplished with perforated manifold pipes for both inlets and outlets. An alternative to manifolds for inlet and outlet structures is the use of multiple weir or drop boxes, in which several boxes must be installed along the width of the cell to ensure uniform distribution. Note that severe short-circuiting of flow can result from improper grading or non-uniform subgrade compaction.

In terms of vegetation, wetland plants can be harvested from local drainage ditches. If the lead time is sufficient, it is also possible to establish an on-site nursery so seedlings or clumps are available on schedule for planting. The use of seeds and hydroseeding are not recommended because of marginal success in previous projects.

Wetland Construction in the 100-year Floodplain

The proposed wetlands will replace a portion of the existing spray irrigation field, which is partially situated in the 100-year and 500-year floodplain (Zone AE and Zone X of the FEMA FIRM map, respectively). As a result, the berms for the wetland cells will need to extend above the 100-year flood elevation. If the City decides to pursue state and/or federal funding for this project, then additional consultations may be necessary to obtain approvals from the U.S. Fish and Wildlife, U.S. Army Corps of Engineers, and the SFBWQCB.

Sequence of Construction Operations

It is important to minimize disturbance to the existing treatment process during construction. Although there have been discharge violations in the past, the existing AIPS system (including Pond 4) is recommended to remain in place to provide treatment for the longest extent possible to minimize discharge violations. Based on the treatment plant's historical loading data, effluent from Pond 3 typically exceeds the CDO limits and therefore should not be discharged or used as reclamation water for spray irrigation; however, an estimated 15% reduction in BOD and TSS concentrations are observed after the wastewater leaves Pond 4. Therefore, if Pond 4 is taken off-line before the constructed wetlands are constructed or have reached their optimum performance, the City faces higher risks in violating the interim effluent discharge and reclamation limits.

During construction of the wetlands, wastewater flow must be diverted. If Pond 4 is converted into a wetland, flow would be routed directly from Pond 3 to the Chlorine Contact Basin using temporary pumping facilities. Additional measures would also be needed to further treat the Pond 3 effluent

prior to discharge. For instance, a temporary, packaged treatment plant including aeration and filtration or clarification could be rented to treat the Pond 3 effluent to NPDES permit levels. Another option is to modify Pond 5 so that it would perform the same functions as Pond 4 so that Pond 4 can be taken out of service and converted into a constructed wetlands. Because Pond 5 is currently used for storage, wetland construction will need to occur during the summer months in order to ensure availability of Pond 5. However, the modifications performed in Ponds 4 and 5 may interrupt the biological, chemical and physical reactions, which may result in effluent that does not meet the permit levels. Furthermore, operators have indicated that discharging to Napa River is not typically feasible because the flow fluctuations vary too much over a 24-hour period. As a result, it is recommended that the City request a variance from the SFBRWQCB to relax the WRR limits during construction.

If Pond 4 is not converted to a wetland, then the wetlands can be constructed in the irrigation field with minimal disruption to the existing treatment process which may be a preferable option. Bypass from Pond 3 to Pond 5 would only be necessary when Pond 4 is ready to connect to the wetlands. Isolation valves would be necessary between Pond 4, Pond 5, and the discharge to the wetlands to control the distribution of the flows.

The construction measures described above would be detailed in the design phase, but for this Feasibility Study, a preliminary cost for the temporary packaged treatment system is included in Section 5.1.6.

5.1.5 Operations and Maintenance

Although constructed wetland systems require minimal effort to maintain and operate, these wetlands must be managed in order to perform well. An O&M manual should be prepared to provide a schedule for routine cleaning of the distribution system and monitoring of the system. Typical operations and maintenance tasks for operating and maintaining the wetland system will include:

- Checking water level to ensure that water is moving through all parts of the wetland;
- Removal of buildup of debris and stagnant areas;
- Inspection of water control structures;
- Removal of invasive vegetation species;
- Control of mosquitoes, muskrats and other burrowing animals; and
- Monitoring system performance, including water levels and acceptable ranges of fluctuation.

5.1.6 Estimated Construction and Operational Cost

The major items in the capital costs of FWS constructed wetlands include land costs, site investigations, clearing and grubbing, excavation and earthwork, liners, plants, inlet and outlet structures, a pump station for conveying flow to Pond 5, transfer structures for bypassing flows around an offline wetland to the pump station, distribution systems, pump station electrical and controls, and associated engineering and contractor's overhead and profit. A preliminary cost estimate for this alternative is provided in Table 18 below.

Table 18 Estimated Cost for a Constructed Wetland

Item	Unit	Cost	Quantity	Total
General Requirements				
Temporary Wastewater Bypass and Treatment	MO	\$ 89,114	9	\$ 802,000
Civil				
Clearing and Grubbing	AC	\$ 4,915	20	\$ 98,300
Earthwork (Constructing berms, access ramps, finished grade)	AC	\$ 28,316	20	\$ 566,300
Liners	AC	\$ 52,420	20	\$ 1,048,400
Vegetation establishment	AC	\$ 17,108	20	\$ 342,200
Pump Station	LS	-	1	\$ 200,000
Piping	LS	-	1	\$ 350,000
Structural				
Transfer Structures	EA	\$ 100,000	3	\$ 300,000
Inlet and Outlet Structures	LS	\$ 6,143	56	\$ 344,000
Subtotal				\$ 4,051,200
Geotechnical Investigations (soil borings)	LS	-	1	\$ 75,000
Mobilization		5%		\$ 202,600
Bonds		3%		\$ 121,500
Engineering Design Services		20%		\$ 810,200
Construction services and start-up		10%		\$ 405,100
Contractor's Overhead and Profit		15%		\$ 607,700
Contingency		30%		\$ 1,215,400
TOTAL (Rounded)				\$ 7,448,700

Unit costs were obtained from the *Natural Wastewater Treatment Systems, Second Edition* (Crites et al., 2014), which were based on actual construction costs of FWS systems. The costs provided in Crites et al., 2014 were reported in 1997 dollars (ENR CCI 5826), and therefore were adjusted to 2018 dollars (ENR CCI 11012.77) in Table 18. Unit costs for vegetation establishment were obtained from *Wetland and Riparian Woodland Restoration Costs* (Zenner et al., 2003), and were also adjusted to 2018 dollars.

The annual operation and maintenance cost is estimated to range from \$45,000 to \$72,000 per year for this system. The costs are based on two EPA references: *Wastewater Technology Fact Sheet Free Water Surface Wetlands* (2000) and *Manual Constructed Wetlands Treatment of Municipal Wastewaters* (2000), in which costs were determined from specific case studies of wetlands. Typical operation and maintenance activities include hydraulic and water depth control, inlet/outlet structure cleaning, grass mowing on berms, inspection of berm integrity, wetland vegetation / management, mosquito and vector control (if necessary), routine monitoring, pump servicing, public access and environmental education.

5.1.7 Implementation Schedule

Start-up procedures for the constructed wetlands are simple and involve opening the inlet gate(s) or valve(s) and setting the desired wetland water level at the adjustable outlet or weirs. Under ideal conditions, start-up of a constructed wetland system would not commence until at least 6 weeks

after planting of the vegetation, such that the new plants can acclimate and grow. If start-up occurs immediately after planting, the operations risk damage to the new plants and may delay achievement of expected performance.

If start-up is defined as the initial period before the system reaches optimum performance, then the start-up period for a wetland system might require, in the best case, two years and, in the worst case, three to four years. This is because the system will not attain optimum performance levels until the vegetation is fully developed and at equilibrium, and wetland vegetation requires two to four growing seasons to become well established. Additionally, a new wetland system has minimal vegetation and minimal substrate for attached growth organisms; as a result, removal of BOD and TSS may be poor if algae develops in any exposed open water.

Because the interim discharge effluent limits from the CDO will only remain in effect until February 28, 2021, it is crucial to have a well-developed FWS system by the beginning of 2021. However, there would not be sufficient time to obtain optimum performance by 2021, and the SFBRWQCB has expressed flexibility in the schedule if wetlands are the selected secondary treatment alternative. Table 19 below provides an implementation, including design and construction phases that is most feasible moving forward. Assuming two growing seasons are necessary for the constructed wetland to reach optimum performance, the project will not reach fruition until the beginning of 2023.

Table 19 Implementation Schedule for Constructed Wetlands

Task	Targeted Completion Date
Completion of Final Feasibility Study	August 2018
Completion of Facility Master Plan/ Workplan	November 2018
Complete Funding Application/ Engineering Report	June 2019
Begin Detailed Design/ Permitting	July 2019
End Detailed Design	May 2020
Acquisition of Permits	May 2020
Bid Solicitation/ Procurement	June 2020
Begin Construction	August 2020
End of Construction, Commissioning and Startup	July 2021
Wetland Vegetation Growing Season 1	August 2021 – July 2022
Wetland Vegetation Growing Season 2	August 2022 – July 2023
Alternative 1 Treatment in Full Operation, Vegetation Established	August 2023
Submit Report Evaluating Effectiveness of New Treatment System	November 2023
Achieve Compliance with 2016 NPDES Permit Effluent Limits	February 2023

5.2 Alternative 2 – Rock Filter with Bypass Flow and Sedimentation

5.2.1 Description of Alternative 2

Originally proposed as a rock filter in the 2015 Facilities Evaluation, Alternative 2 proposes a trickling filter and clarification design for use in meeting the new NPDES permit effluent limits. Trickling filters are aerobic attached growth reactors and are one of the earliest methods of secondary treatment and continue to be a widely adopted form of treatment in small- and medium-sized communities for their relative simplicity.

In their most common form, trickling filters are cylindrical structures with a media bed of rock, slag, or plastic which provides surface area for biofilm growth, a means of distribution at the top of the media bed, and an underdrain system for collecting the treated effluent. Trickling filters receive influent water through a center well which is then dispersed evenly across the top of the media bed through use of a hydraulically- or motor-driven rotary distributor arm. Water is treated as it passes over the media and attached biofilm. Effluent, which contains sloughed biofilm (i.e., sludge), is collected by the underdrain system and conveyed to a clarifier where the sludge is concentrated and supernatant can continue on to downstream processes. Concentrated sludge from the clarifiers is then treated in solids management processes, such as anaerobic digestion, for stabilization and volume reduction.

Based on prior GHD experience and a review of previously constructed trickling filters, it is recommended to utilize a hybrid treatment design that continues to use the existing AIPS ponds followed by new trickling filters and clarifiers in order to achieve enhanced biological degradation and polishing of the final effluent for meeting the new NPDES permit limits.

Two trickling filters would be operated in parallel and operated in a single-stage trickling filter configuration. The trickling filters would likely be followed by two clarifiers, also known as humus tanks (HT), or a settling pond, for settling out of solids and sludge sloughed off of the trickling filter media. Clarified effluent would then be conveyed to the existing chlorine contact basin for disinfection prior to discharge while settled sludge in a HT would be pumped back to the Ponds 1A and/or 1B while settled sludge in a settling pond would be allowed to accumulate in a settling pond until removal becomes necessary, although a return system could also be designed. Because this alternative relies on continued use of the existing AIPS ponds as the main secondary treatment process, it is expected to have low capital costs and operations and maintenance costs.

The proposed configuration will effectively remove the algae which contribute to elevated BOD and TSS. While the project scope does not require further nitrogen removal, this process would also achieve significant levels of nitrification. If future standards include more stringent limits on nitrogen in the effluent discharge, then additional treatment processes may be developed. These may include recycling filter effluent to the facultative ponds (i.e., Ponds 1A and 1B) for denitrification which can achieve up to 85% nitrogen removal or installing a denitrifying filter after the clarification step. It is important to note that clarification after the trickling filter is critical to ensuring sufficient removal of TSS and BOD. The clarification methods presented in this section are conceptual, and further sampling and analyses of nitrogen data is required to finalize the method.

The proposed treatment process is shown in Figure 11. The design originates from the patented Pond Enhanced Treatment and Operations (PETRO) process, which combines a fermentation pond (e.g., Ponds 1A and 1B), oxidation pond (e.g., Pond 2), a trickling filter and a settling tank. In the PETRO process, it is critical to bypass between 15% and 50% of the effluent from the facultative

ponds directly to the trickling filters to effectively remove algae, BOD and TSS. Without the bypass flow, algae are expected to pass through the trickling filters. The bypass flow provides substrate which stimulates the establishment of heterotrophic bacteria and heterotrophic algal growth in the filter's biofilm. The process flow diagrams for the modified St. Helena WWTRP under two configurations of Alternative 2 are shown in Figures 12 and 13 (see Section 5.2.2 for a description of the configurations).

The biofilm/algae combination which makes up the growth on the trickling filter media augments the overall purification process. Algae are adsorbed and immobilized in very limited numbers on a newly commissioned heterotrophic biofilm; however, among the heterotrophic algae certain species continue to reproduce even in the dark. Under stress, the heterotrophic algae excrete large amounts of exocellular polysaccharides which greatly enhance the trickling filter's capacity to flocculate and adsorb new algae passing over the biofilm. Another mechanism of microalgae removal in the PETRO process is predation by rotifers and protozoa, which have superior settleability characteristics in comparison to microalgae (Barnard et al., 2010).

In addition to the enhanced algae, BOD and TSS removal, the bypass from Pond 1A and 1B results in improved nitrification. The bypass stream consists of a readily degradable organic substrate which oxidizes rapidly. The inter-pond recirculation from the oxidation pond (i.e., Pond 2) to the surface of the primary facultative pond (i.e., Pond 1A) is an important component of the PETRO process design. This recycle stream is highly oxygenated and not only covers the surface of the anaerobic pond and neutralizes the rising hydrogen sulfide gases, but also enhances biological stability and encourages uniform conditions in the entire pond system (Barnard et al., 2010).

Humus sludge which sloughs from the filters would be collected in the HTs and pumped back to the fermentation pit in Pond 1A for stabilization or potentially allowed to accumulate in the bottom of the settling pond, thus minimizing sludge handling. The new trickling filters and the HT/settling pond could be constructed in the existing footprint of Pond 4 as depicted in Figure 14 or in the irrigation disposal field as shown in Figure 15. If constructed within the Pond 4 footprint, the remaining area of approximately 1.6 acres may be converted to an equalization storage or settling pond with a total volume of up to approximately 5.5 MG. Configuration and construction issues are discussed further in the configuration options below.

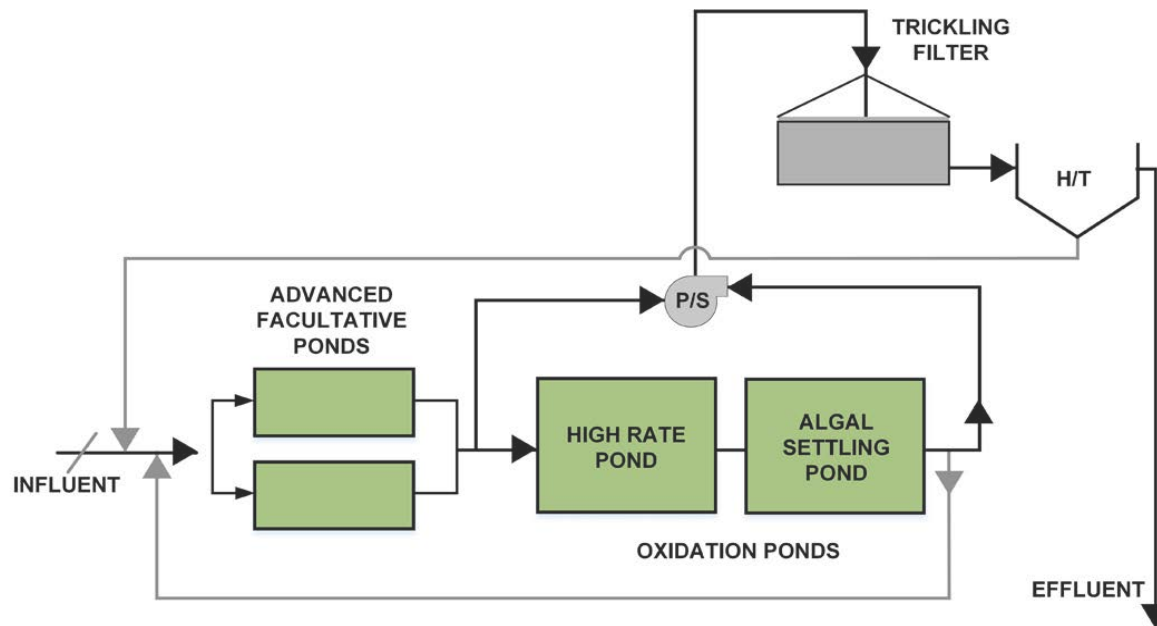
Tertiary treatment with nutrient removal may be necessary prior to discharge in the future, and the proposed trickling filter system can be modified when necessary to provide recycled water that meets the requirements outlined in Section 2.4.

Selection of Trickling Filter Over Rock Filter

As stated, the 2015 Facilities Evaluation had originally proposed a submerged rock filter for polishing of the AIPS pond effluent. Rock filters are configured as horizontal- or vertical-flow beds of rock with rock diameters ranging from three to eight inches and bed depths of six to seven feet. Their primary mode of treatment is sedimentation. Algae and other solids accumulate in the void spaces of the rock filter. Rates of anaerobic biological degradation are reported to be minimal and as such rock filters are not thought of as biological systems.

There are approximately 20 installations of rock filters used for polishing of wastewater pond effluent with most of these constructed between 1970 and 1985 (USEPA, 2002). Treatment performance observed at these facilities is reported to vary widely with the best performing facility located in Veneta, Oregon. The Veneta facility is able to consistently achieve BOD and TSS levels of 30 mg/L or less. Generally, the ability of rock filters to consistently maintain BOD and TSS concentrations below 30 mg/L or less is questionable (Crites, 2014; USEPA, 2002). Design details

guidelines are limited, although vertical configurations and lower hydraulic loading rates limited to 0.2 gallons per cubic foot per day appear to produce the best effluent qualities.



Reference: Recovery of Algae from Pond Treatment Systems (Barnard, Holakoo, and Merring, WEFTEC 2010)



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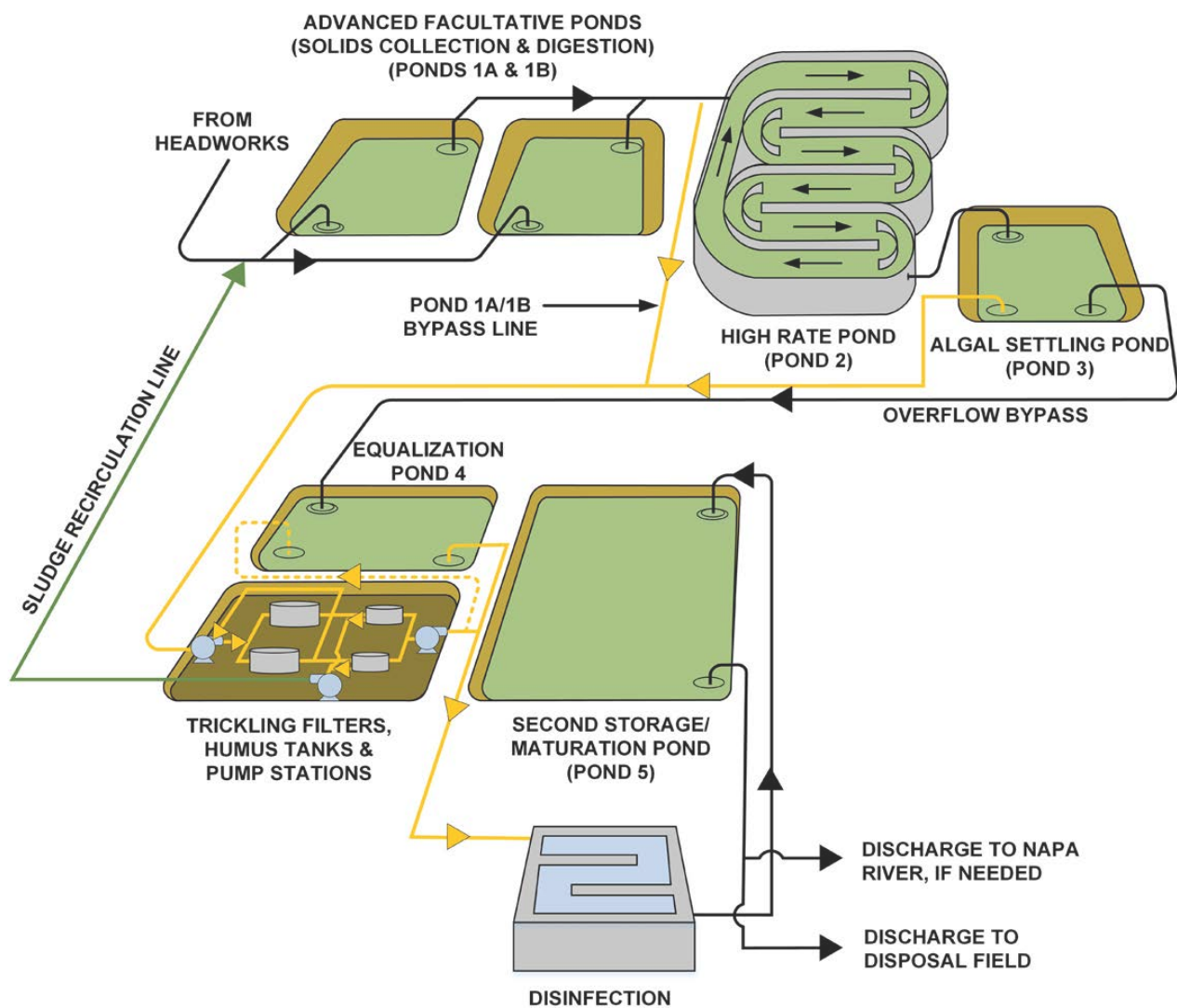
Proposed Hybrid Process
Based on PETRO Process

Figure 11

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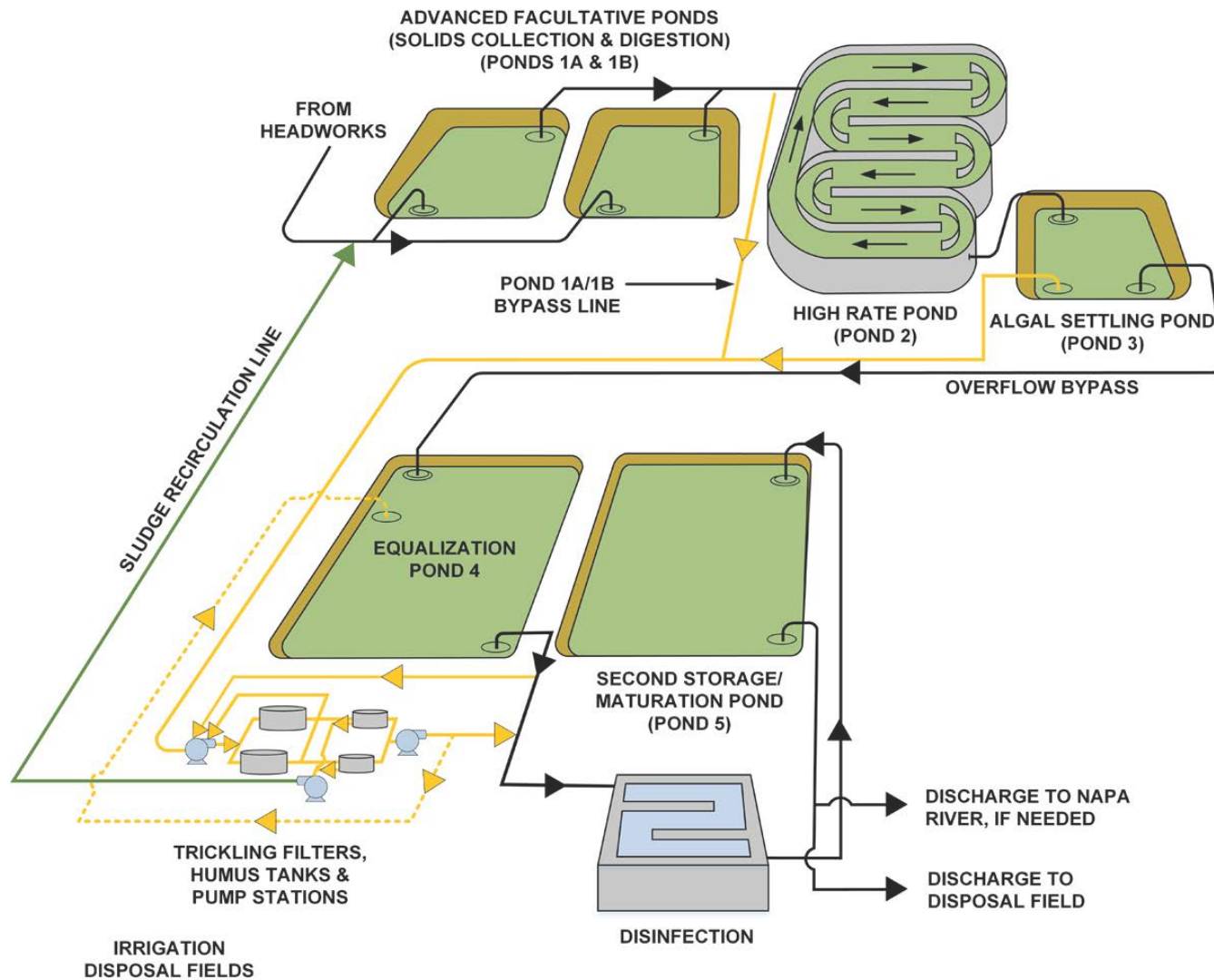
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Alternative 2, Configuration 2
Process Flow Diagram

Figure 12



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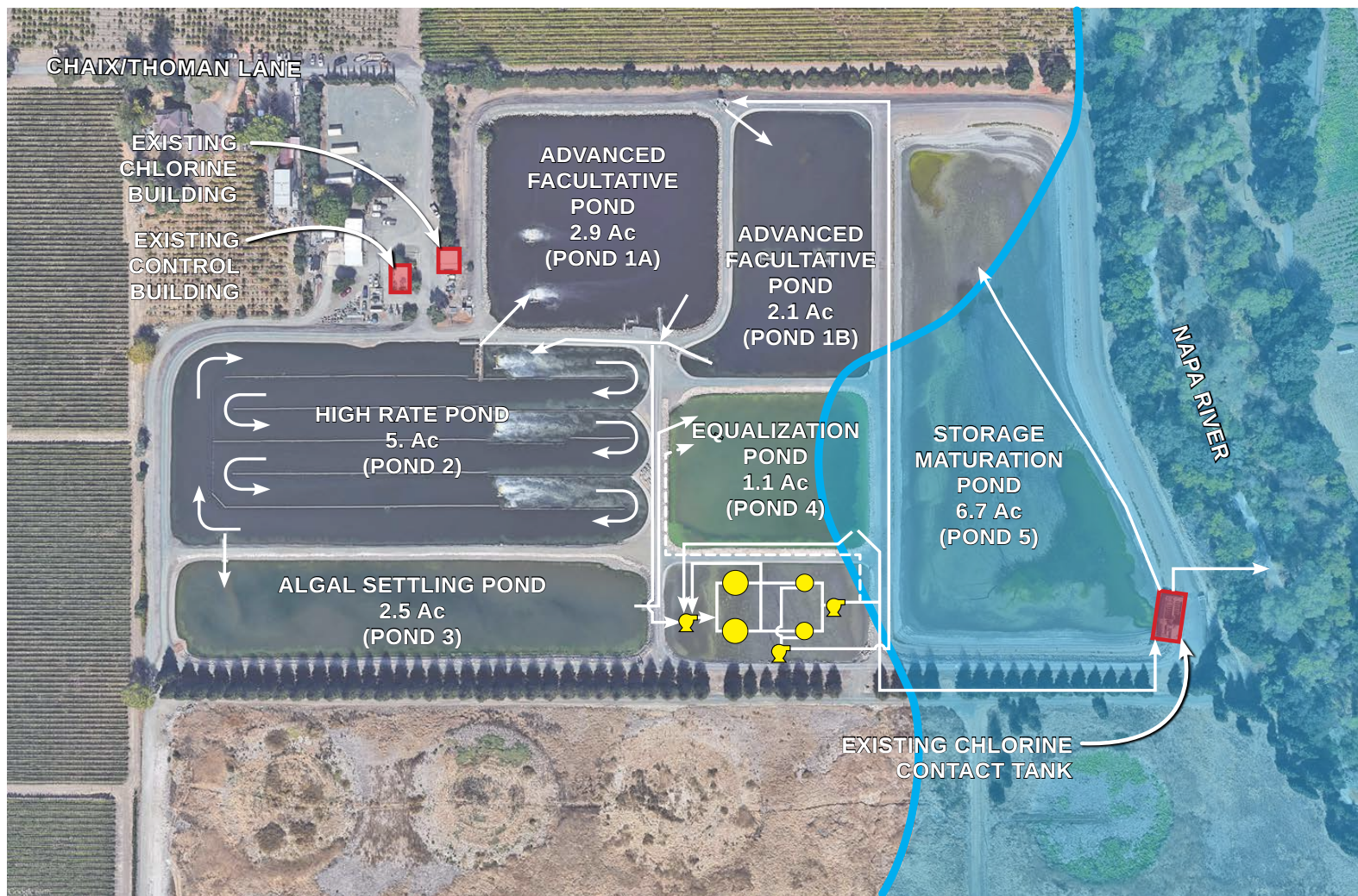
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Alternative 2, Configuration 4
Process Flow Diagram

Figure 13

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0 50 100
Scale in Feet



LEGEND

-  Pump Station
-  Humus Tank
-  PETRO Tricking Filter

 100 Year Flood Zone



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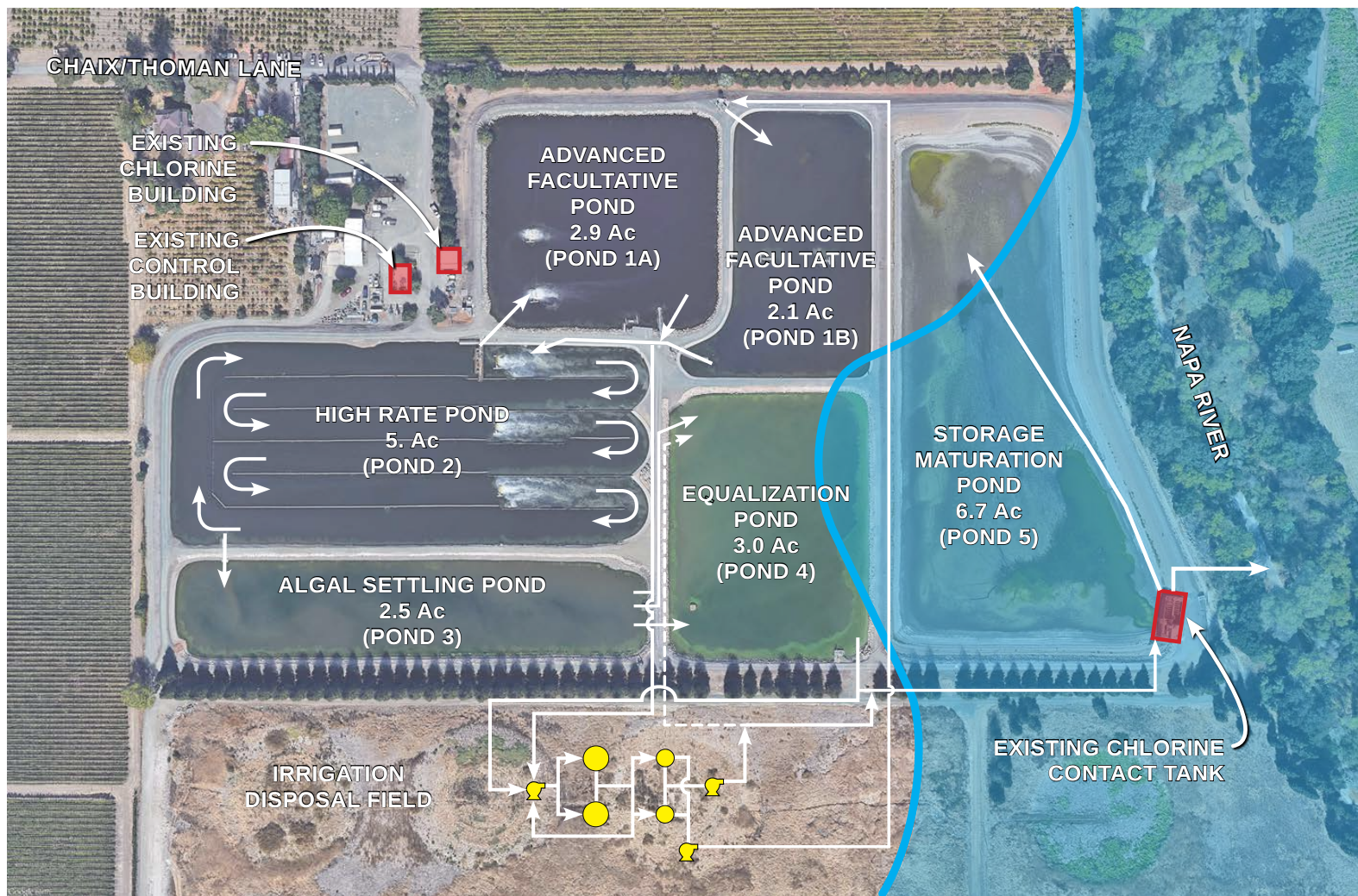
Alternative 2, Configuration 2
Potential Layout

Figure 14

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0 50 100
Scale in Feet



LEGEND

-  Pump Station
-  Humus Tank
-  PETRO Tricking Filter

 100 Year Flood Zone



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Alternative 2, Configuration 4
Potential Layout

Figure 15

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The primary advantages of rock filters are their low capital construction costs and low operations and maintenance requirements. Once constructed, there is no routine maintenance other than water quality monitoring and flow regulation. Sufficient void space is provided to avoid plugging (Swanson, 1980). Should plugging occur measures for cleaning may be limited to draining, removing, scouring, and replacing the clogged rock; no other preventative maintenance measures are typically provided.

Shortcomings of the rock filters include the lack of ammonia removal, unless separate aeration is provided, accumulation of heavy biofilm and plugging potential, propagation of *Psychoda* flies, and poor hydraulic patterns leading to high levels of dead space. In some cases, the rock filters may contribute to increased levels of ammonia in the effluent due to anaerobic degradation of the accumulated solids in the filter's void space (USEPA, 2002). New installations of rock filters are relatively rare due to their inability to provide any level of nitrification and the preference for constructed wetlands as a means to treat lagoon effluent. While they may be applicable to communities without ammonia limits, they cannot be relied upon for consistent compliance with BOD and TSS limits below 30 mg/L. For these reasons, the rock filter is not recommended as a treatment method for achieving the 2016 NPDES Permit effluent limits. Instead, a trickling filter configured for use in the PETRO process is recommended as a viable alternative to the rock filter.

5.2.2 Conceptual Design of PETRO Process Trickling Filter and Sedimentation Units

Criteria for Sizing

The conceptual trickling filter design is based on an ADWF of 0.65 MGD (Table 7). A peaking factor of 2.5 was selected for maximum hydraulic loading that the trickling filter could be subjected to without significantly degrading its performance. A peaking factor of 2.5 yields a peak flow to the trickling filter of 1.63 MGD. Note that this is greater than the average day max month value presented in Table 7, but less than the design peak flow of 3.02 MGD for the AIPS ponds.

Sizing the trickling filter for higher flows experienced less frequently may compromise the performance of the trickling filters during dry weather conditions and moderate storm events. For proper functionality, trickling filters require target hydraulic and organic loading rates. If the trickling filter is designed for higher flows, then during dry periods more recirculated effluent would be required to ensure an adequate wetting (i.e., hydraulic loading) rate which would in turn dilute the influent to the trickling filter and lower the organic loading rate. Higher recirculation rates would also increase pumping-related energy requirements. Further, trickling filters depend on continual wetting and operation to promote the health of the system's biofilm; therefore, taking a trickling filter offline during dry weather and bringing it back on during peak flows is not a viable option since the biofilm would have to be re-established in any unit taken out of service.

During prolonged, high intensity storm events where flows through the system exceed 1.63 MGD, excess flow would be diverted from the trickling filter system. Depending on the final design configuration, provisions would have to be made for equalization. See the section on configuration options below for further consideration of opportunities for equalization.

The influent to the trickling filter would include a bypass of about 15% to 50% of the combined effluent flows from Ponds 1A and 1B which would be combined with the flow from Pond 3. Tables 20 and 21 summarize the flow and loads, respectively, to the trickling filter at an assumed 50% bypass flow from Ponds 1A and 1B. The loads are developed based on the supplemental sampling data from June 2016 presented in Table 11.

Table 20 Trickling Filter Design Flows

Input	Flow (MGD)
50% Bypass from Pond 1A/1B	0.325
Flow from Pond 3	0.325
Total Flow	0.65

Table 21 Trickling Filter Design Loads

Parameter	Concentration mg/L	Load (lb/day)
BOD	69	373
SBOD	17	92
COD	151	820
SCOD	55	296
TKN	16	88
STKN	9	47
TSS	53	288
Alkalinity	207	1,124

Based on the June 2016 sampling results, there appears to be adequate alkalinity in the wastewater to support complete nitrification and maintain a residual alkalinity in the effluent. Therefore, there is no need for provisions to supply alkalinity to the trickling filters.

Trickling Filter Sizing

Table 22 summarizes the preliminary sizing of the PETRO trickling filter for implementation at the St. Helena WWTRP and Table 23 presents the design criteria for trickling filters used in the PETRO process. Two 46-foot diameter trickling filters operating in parallel, each with a media depth of 14 feet will be required to meet the design carbonaceous and hydraulic loading rates. Plastic media with a specific surface area (SSA) of 60 m²/m³ are recommended; the SSA of 60 m²/m³ is similar to that of the original PETRO design which relied upon rock media filters. Calculations used for sizing of the trickling filter are included in Appendix F.

Table 22 Conceptual Sizing of the PETRO Trickling Filter

Description	Value
No. of Trickling Filters	2 (in parallel)
Media Specific Surface Area, m^2/m^3	60
Media Depth, feet	14
Media Surface Area (each), ft^2	403,650
Trickling Filter Diameter, feet	46
Projected Peak Day Wetting Rate (without recirculation) gpm/ft^2	0.3 (two units in service) 0.7 (one unit in service)

Table 23 Design Criteria for the PETRO Trickling Filter

Description	Both Units in Service	One Unit Out of Service	Design Criteria	Source
Carbonaceous Loading Rate, $g/m^2_{media}.d$	2.3	4.5	2.5 2.4	PETRO Design Guidelines; Metcalf and Eddy 4th Ed., P. 923
Nitrogenous Loading Rate, $g/m^2_{media}.d$	0.5	1.1	1.0 0.2-1.0	PETRO Design guidelines; Metcalf and Eddy 4th Ed., P. 909
Carbonaceous Volumetric Loading, $kg/m^3.d$	0.1	0.3	0.15 0.1-0.3	PETRO Design Guidelines; Metcalf and Eddy 4th Ed., P. 909
Average Wetting Rate, gpm/ft^2	0.2	0.4	0.2	PETRO Design

Media Selection

The intent of the design is to mimic the design criteria used in other PETRO process designs. As stated, these projects relied upon rock media; therefore, in selecting a media type for the St. Helena WWTRP system, a similar SSA is desired. However, plastic media offer the advantage of being lighter in weight than rock for a given treatment volume putting less stress on the concrete containment structure and underdrain system. For the underdrain system, this reduction in weight allows for a taller underdrain support system which in turn promotes greater air flow into the underside of the media resulting in improved ventilation through the trickling filter media. Further, as fabricated structures, the plastic media are configured to optimize water flow horizontally across and vertically through the entire filter volume, maximizing the surface area to which treated water is exposed. However, rock media are readily available and cheaper for the intended treatment volume (approximately \$2/cubic foot for rock versus \$5/cubic foot for plastic media). Nonetheless, plastic media are recommended with preference given to the aforementioned advantages.

Distribution System

Trickling filter distribution systems typically can be grouped into stationary or rotary systems. Early trickling/ rock filter designs used fixed-nozzle distribution system rather than the rotary distributors more commonly used today. In fixed-nozzle distribution systems a network of pipes installed either above or below the filter media deliver water from a pump station or dosing siphon box to fixed-nozzles which spray water much like a garden sprinkler system. Pressure is systematically varied to allow spray to fall at varying distances from the nozzles and enhance the distribution of wastewater; however, ensuring even water application over the media surface is more difficult than in a rotary distributor system.

The fixed-nozzle distribution system has the advantage of having no moving parts which reduces the potential for mechanical failure. On the other hand, because the piping and nozzles are distributed throughout the areal extent of the media, access for maintenance is more difficult and can raise safety concerns (WEF, 2007). The fixed-nozzle distribution systems are better suited to square or rectangular trickling filter structures, but overall the rotary distribution method is a more popular choice.

Sedimentation Basin Sizing

There are a couple options for sedimentation basin facilities. New steel or concrete clarifiers may be constructed with the capability of continual sludge removal and conveyance to the primary facultative ponds. A second option is a settling pond which makes use of the existing Pond 4 footprint. The settling pond would be of earthen construction similar to settling Pond 3. It would require more area than a clarifying tank as sludge would be allowed to accumulate across the extent of the pond rather than having provisions for its continual removal. Continuous removal could be designed into the settling pond system; however, its effectiveness is not considered as reliable as a clarifying tank.

Tables 24 and 25 summarize the sizing of the sedimentation basins if they are installed as clarifying HT or settling ponds, respectively. Table 26 presents the design criteria for the sedimentation basins under both configurations.

As HTs, or secondary clarifiers, two 34-foot diameter tanks with a sidewall depth (SWD) of 14 feet are recommended to handle effluent from the trickling filters. The design upflow velocity is 0.6 m/h at average daily flows and 2.1 m/h during peak flows. The solids from the bottom of the HTs would be pumped back to the anaerobic pit of the primary anaerobic ponds at an estimated rate of between 2% to 7% of the plant design flow of 0.65 MGD.

As a settling pond, an area of approximately 0.46 acres would be required to maintain a hydraulic residence time of 1.5 days at the average dry weather flow of 0.65 MGD. This area could be provided in the remaining section of Pond 4. Calculations used for sizing of the HT and settling pond are included in Appendix F.

Table 24 Conceptual Sizing of the Sedimentation Basin as Humus Tank

Description	Value
Number of HTs	2 (parallel operation)
Diameter (each), feet	34
Sidewall Depth (SWD), feet	14
Return Solids Flow as Percentage of Influent Flow	2% - 7%

Table 25 Conceptual Sizing of the Sedimentation Basin as Settling Pond

Description	Value
Number of Settling Ponds	1
Surface Area, square feet	19,861 (81' x 244')
Depth, feet	11.5

Table 26 Design Criteria for the Sedimentation Basin

Description	Both Units in Service	One Unit out of Service	Design Criteria	Source
Humus Tank				
Upflow Velocity at Average flow, m/h	0.6	1.2	0.7 m/h	PETRO Design Guidelines
Upflow Velocity at Peak hourly flow, m/h	2.1	4.3	2 m/h at peak hour	10-State Standard (2014)
Assumed Influent SS (Trickling Filter Effluent SS), mg/L	50 - 200	-	-	Assumed
Assumed Return Solids Concentration, mg/L	1,500	-	-	Assumed
Settling Pond				
Hydraulic Residence Time, days	1.5 (at 0.65 MGD)	-	< 2	Metcalf and Eddy, 4 th Edition

Configuration Options

The construction of the PETRO process trickling filter and sedimentation basin system could either be installed within the footprint of existing Pond 4 or in the irrigation disposal field to the south of the AIPS. There are several options for system configuration considered that take advantage of the existing site conditions. These sub-options are briefly described below:

- Configuration 1 – Pond 4 would be divided into northern and southern sections. The southern section would receive the new trickling filters. A new berm would be constructed to separate

the area from the northern section. The northern section would remain a pond to serve as a sedimentation pond in place of clarifiers/HT.

- This option would rely on pumping to convey water from Pond 3 and recirculated trickling filter effluent to the trickling filters. With Pond 4 acting as the HT/sedimentation pond, no sludge pumps would be required. Pumping would be required to discharge trickling filter effluent to Pond 4. Pond 4 effluent would flow by gravity to the Chlorine Contact Basin.
- Backfilling the southern section to near the top berm elevation surrounding Pond 4 was considered to raise the elevation of the new trickling filter. Approximately 11,000 cubic yards of fill would be needed in addition to sludge removal and extensive overexcavation and subgrade preparation required to improve soil structural conditions. The fill would allow the trickling filter and HT effluent to discharge by gravity and avoid the need for pumping; however, due to the high cost associated with earthwork to elevate the structures filling of this section of Pond 4 is not further considered.
- Reliance on part of Pond 4 for placement of the trickling filters and the other part as a settling pond reduces the ability to provide equalization during high flow events. No designated equalization pond would exist, but the ability to attenuate peak flows would still be possible through lowering of operating levels in Ponds 3 and the modified Pond 4.
- During periods of high flows, the trickling filters would be operated at the maximum hydraulic loading achievable while the remainder of the flow would be bypassed from Pond 3 directly to Pond 4 without treatment through the trickling filter. As the bypassed flow will have passed through the oxidation pond and be combined with trickling filter effluent, the discharge water quality is anticipated to be improved through blending of the two flows. Evaluation of effluent data during high flow events suggest that effluent water concentrations of BOD and TSS tend to be lower ostensibly through dilution accompanied by inflow and infiltration flows (see Section 3.2.3); however, meeting the discharge limits would not be certain. The need for additional equalization capacity or treatment for peak flows will be explored during the project's design phase.
- Configuration 2 – Pond 4 would be divided into northern and southern sections. The southern section would receive the new trickling filter and clarifier tanks. These units would be installed at or near the existing Pond 4 bottom to avoid the need for fill. A new berm would be constructed to separate the area from the northern section. The northern section would remain a pond for flow equalization purposes.
 - This option would rely on pumping to convey water from Pond 3 and recirculated trickling filter effluent to the trickling filters and sludge pumps to convey sludge from the HTs to Ponds 1A and 1B. Pumping would also be required to discharge HT effluent to the Chlorine Contact Basin.
 - Backfilling the southern section to near the top berm elevation surrounding Pond 4 was considered to raise the elevation of the new trickling filter and HTs. Approximately 11,000 cubic yards of fill would be needed in addition to sludge removal and extensive overexcavation and subgrade preparation required to improve soil structural conditions. The fill would allow the trickling filter and HT effluent to discharge by gravity and avoid the need for pumping; however, due to the high cost associated with earthwork to elevate the structures filling of this section of Pond 4 is not further considered.
- Configuration 3 – Trickling filters would be installed in the irrigation disposal field south of Pond 3. Pond 4 would be divided into northern and southern sections. The southern section would serve as equalization storage. The northern section would serve as a settling pond for

the trickling filter effluent. A new berm would be constructed to separate the two Pond 4 sub-areas.

- This option would rely on pumping to convey water from Pond 3 and recirculated trickling filter effluent to the trickling filters. With Pond 4 acting as the HT/sedimentation pond, no sludge pumps would be required. Pumping would be required to discharge trickling filter effluent to Pond 4. Pond 4 effluent would flow by gravity to the Chlorine Contact Basin.
- Equalization storage would be provided during high flow events in part of Pond 4 which provides an advantage over Configuration 1. More equalization volume would be provided under Configurations 2 and 4.
- Configuration 4 – Trickling filters and clarifier tanks would be installed in the irrigation disposal field south of Pond 3. Pond 4 would remain in place and serve as an equalization storage pond.
 - This option would rely on pumping to convey water from Pond 3 to the trickling filters and for trickling filter recirculation flows. Sludge pumps would be required to convey sludge from the HTs to Ponds 1A and 1B. Pumping would also be required to discharge HT effluent to the Chlorine Contact Basin.
 - Equalization storage would be provided during high flow events in the entirety of Pond 4. This option provides the greatest storage volume amongst the other Configurations.

Selected Configurations

Use of Pond 4 as a settling pond has the advantage of reduced upfront capital costs; however, drawbacks related to maintenance and effluent quality must be considered. Unlike a clarifying tank, the settling pond allows settled sludge/humus to accumulate along the floor of the pond. The sludge will accumulate until a point where it must be removed otherwise the settling performance of the pond suffers. This periodic removal (on the order of five years) will require pond drawdown, dredging or mechanical removal, sludge drying and final disposal. With a clarifying tank, sludge is collected and transferred to the facultative ponds where it is intended to be treated anaerobically. Sludge treatment at the facultative ponds promotes sludge volume reduction and minimizes the locations where sludge is stored.

Of further concern in a settling pond configuration versus a clarifying tank is the potential for sludge to undergo anaerobic digestion in the settling pond and contribute BOD and ammonia to the effluent especially during the warmer summer months. As sludge is digested in the facultative ponds when using clarifying tanks there is no concern about it impacting the effluent treated through the trickling filter system.

Furthermore, use of part of Pond 4 as a settling pond reduces the WWTRP's equalization storage capacity which limits the operational flexibility of the plant and may compromise its ability to meet discharge limits during peak events.

For these reasons, Configurations 2 and 4, which provide new clarification tanks and maximize equalization storage, are further examined under this Feasibility Study; Options 1 and 3 or others may be reconsidered during detailed design.

5.2.3 Performance Expectations, Effectiveness and Reliability

General Performance

Trickling filters remove soluble organics and ammonia. Therefore, the performance of trickling filters also depends on the ability of the sedimentation basin to separate the solids that slough off from the trickling filter media. The distinct advantage of the PETRO process is that the biofilm has the ability to adsorb and remove algae; the sloughed biofilm has enhanced settleability compared to that of algae from integrated pond systems which lacks the bypass feed from the initial facultative pond. Based on the performance of other municipal sewage wastewater treatment plants with integrated pond systems with PETRO trickling filters, it is anticipated that the proposed design can achieve a BOD and TSS of less than 15 mg/L and nearly complete nitrification (Bernard et al. 2010; Shipin et al., 1998). A relatively long acclimatization period, as much as a few months, may be necessary to develop the biofilm that has the ability to trap the algae (Bernard et al. 2010; Shipin et al., 1998).

Nitrification

The degree of nitrification will be dependent upon the organic loading rates and amount of dissolved oxygen available. At higher organic loadings, the autotrophic nitrifiers are outcompeted by heterotrophic bacteria and efficiency of nitrification may drop. Nitrification generally increases with depth in trickling filter systems as organic strengths attenuate through the depth of the filter. It is anticipated that the trickling filter will produce elevated levels of nitrates in the effluent, which may impact the groundwater quality and cause an increase in the nitrate levels compared to background levels. In order to remove the nitrates from the effluent, it is recommended that a denitrifying sand filter be installed downstream of the trickling filter. The denitrifying system would also require chemical addition in order to function, which is an added operations cost for the trickling filters. This is further described in the following section.

Temperature

Temperature differences between ambient air and the wastewater and the ambient humidity and that in the trickling filter creates a draft through the trickling media filter which provides the opportunity for oxygen transfer from air to wastewater. Traditionally, trickling filter design depended on this passive ventilation to deliver oxygen for aerobic degradation of organic wastes and for nitrification. At times when the temperature differentials are lower, the production of the draft decreases. During such times, forced air ventilation aids in supplying adequate oxygen. Because the trickling filter for this application will operate downstream of an existing secondary treatment unit (i.e., oxidation pond), influent BOD loadings to the trickling filter will be lower than raw influent or primary-treated wastewater. In addition, the 2016 NPDES Permit effluent limits do not require complete nitrification. Therefore, for the purposes of this Feasibility Study, it is assumed that passive ventilation will be adequate for achieving the effluent limits, but during design provisions should be made to allow for future introduction of a blower system should regulatory nitrification requirements increase.

Table 27 Alternative 2 Anticipated Effluent Quality

Parameter	Anticipated Effluent Concentration (mg/L)	Monthly Average Effluent Concentration (mg/L)
BOD	<15	15
TSS	<15	15
NH3-N	<5	16

Trickling filters are thought of as highly reliable treatment unit processes as they are inherently simple with few motorized, mechanical components. Very little maintenance is required for the trickling filter itself; although organic loads higher than design values will likely lead to clogging resulting in poor performance in addition to increased potential for odor generation and fly propagation. To keep the trickling filters performing well, proper oversight of the hydraulic and organic loading rates must be monitored.

Effectiveness will be highly linked to the ability to provide a wastewater relatively consistent in quantity and quality to the trickling filters. Pond systems are particularly well suited for handling shock loads as they are attenuated through the large treatment volumes which would assist in providing relatively stable loads to the downstream trickling filters.

Most of the operations and maintenance required to keep the trickling filter performing well would be related to the pumps used to dose the trickling filters and convey its effluent to the settling pond. If a motorized drive is used to operate the rotary distributor arms, then maintenance will be associated with that equipment as well.

Ease of Operation

Ease of operation is one of the greatest advantages for the trickling filter systems. As stated, hydraulic and organic loading must be verified and maintained to ensure a high level of performance of the trickling filter systems. Trickling filters rely on relatively few motorized components therefore there are fewer opportunities for mechanical failures. Treatment within a trickling filter is a passive, biological process. Attention must be given to ensure the conditions are optimal to encourage the proliferation of a desirable biofilm; however, there is flexibility in terms of the resilience of the biofilm in handling short-term shock loadings and temporary changes in loading characteristics. It is critical that the minimum hydraulic loading rate be maintained at all times when the trickling filter is in operation to ensure the established biofilm survives.

The proposed trickling filter system will be designed with two trickling filters operated in parallel. This configuration would allow for planned maintenance to be performed on one unit while diverting influent flow to the remaining unit. Planned maintenance must be scheduled for dry weather conditions when flows are low enough that the remaining unit could handle a doubling of influent flow. Taking a trickling filter offline during high flow events should be avoided to the extent possible.

Ability to Produce Recycled Water

This Feasibility Study did not analyze the specific tertiary treatment processes required to attain disinfected-tertiary recycled water standards, but the following paragraph provides a general overview of how the existing AIPS and PETRO process can be adapted with tertiary treatment to provide recycled water.

If the City intends to meet recycled water permit requirements at a disinfected-tertiary level, additional treatment will be required after the PETRO process trickling filters. Modifications can be made to include tertiary treatment after the trickling filters. To do so, a secondary effluent pump station will need to be constructed to transfer the secondary effluent from the trickling filters into the tertiary treatment system. Tertiary treatment may include a flocculation system, filtration system, and a UV disinfection system. A tertiary pumping station may also be required to pump the treated water into a tertiary treated storage tank. For water that is used in the agricultural spray irrigation system, the secondary effluent from the trickling filter system would be chlorinated, bypass the tertiary treatment system and go directly to the fields. The City may also use undisinfected secondary effluent for drip irrigation of vineyards and orchards without the need for additional treatment if suitable customers can be identified. Further discussion on recycled water and associated distribution facilities is provided in Chapter 6.

Advantages and Disadvantages

Some advantages and disadvantages of trickling filters as presented in the EPA Factsheet on Trickling Filters are listed in Table 28 (USEPA, 2000).

Table 28 Advantages and Disadvantages of Trickling Filters

Advantages	Disadvantages
Simple, reliable, biological process	Additional treatment may be needed to meet more stringent discharge standards
Not a land intensive treatment systems	Regular operator attention is needed.
Effective in treating high concentrations of organics depending on the type of medium used.	Incidence of clogging is relatively high.
May qualify for equivalent secondary discharge standards.	Possible accumulation of excess biomass that cannot retain an aerobic condition and can impair trickling filter performance
Appropriate for small- to medium-sized communities.	Relatively low organic loadings required depending on media.
Rapidly reduce soluble BOD in applied wastewater.	Flexibility and control are limited in comparison with activated-sludge processes
Efficient nitrification units	Potential vector and odor problems.
Durable process elements	Autotrophic nitrifying bacteria are sensitive to changes in the waste stream (pH, temperature, organics, etc.) and more sensitive to shock loads.
Low power requirements	The presence of fly larvae, worms and snails limits the nitrifying capacity of the system
Moderate level of skill and technical expertise needed to manage and operate the system.	
Nitrifying trickling filters can reliably reduce ammonia-nitrogen concentrations in the wastewater	May result in elevated nitrate levels in the effluent, requiring denitrification and chemical addition (added costs).

Source: United States Environmental Protection Agency (USEPA). 2000. Trickling Filter Nitrification. Wastewater Technology Fact Sheet. <http://1.usa.gov/1ucaL1f>.

5.2.4 Construction

Sequence of Construction Operations

As stated in Section 5.1.4, disruption to the existing treatment process during construction must be minimized to avoid discharge violations. Ponds 3 and 4 should be left in operation for the longest extent possible. When either Pond is taken offline, the City faces higher risks in violating the interim effluent discharge and reclamation limits. Construction should be staged in the dry season when irrigation disposal can be maximized as the effluent will be more likely to meet the WRR disposal limits; discussion with the SFBRWQCB is recommended to seek a temporary relaxation of the WRR disposal limits when part of the system must be taken off line during construction.

During construction of the PETRO trickling filter system, wastewater flow must be diverted from the ponds in which work is occurring. During modification to the outlet structure in Pond 3, flow would be bypassed from Pond 2, using temporary pumping facilities, directly to Pond 4 which would act as an interim sedimentation pond. Likewise, during modification of Pond 4, flow would be routed directly from Pond 3 to the Chlorine Contact Basin. Additional measures would be needed to further treat the Pond 3 effluent prior to discharge; a temporary, packaged treatment plant including filtration or clarification could be rented for this purpose. Those measures would be detailed in the design phase.

As an alternative, GHD recommends the City consider constructing the trickling filters as described above in Section 5.2.2 under the description of Configuration 4 (see Figure 15). Under this configuration, the trickling filters and clarification tanks would be constructed outside the footprint of the existing pond footprints and in the irrigation field south of Pond 3. This would allow operation of the AIPS to continue its nearly normal operation (except during work in Ponds 3 and 4) until the trickling filters can be brought online and with significant potential cost savings. The duration which Ponds 3 and 4 would be taken offline would be expected to be less than under Alternative 2 and is assumed to not require temporary treatment which would bring the overall project costs down approximately \$560,000 (see Table 29). It will also reserve capacity for equalization in Pond 4. The preferred configuration can be further explored during design.

Trickling Filter and Settling Pond Construction – Configuration 2

Approximately one-third of the land area of Pond 4 will be devoted to installation of the two 48-foot diameter trickling filters and two 34-foot diameter clarification tanks. A new earthen berm would be constructed at the new southern border of Pond 4 to separate it from the trickling filter unit area with 2:1 interior side slopes and a minimum of 2 feet of freeboard above the average water surface Pond 4. The berm will provide 12-foot wide access by service vehicles.

The southern end of Pond 4 would undergo extensive site preparation to allow construction of the new system. Preparation would include sludge removal, overexcavation, soil stabilization, backfill, and grading. An access ramp for maintenance equipment will be installed to allow access to the trickling filter area.

Pumping station wet wells would be required upstream and downstream of the new trickling filters. Upstream, a wet well collecting effluent from Ponds 3, 1A and 1B in addition to recirculated trickling filter effluent would be needed to transfer water to the centerwell of the trickling filters. Downstream, effluent from the trickling filters would be collected in a wet well and pumped to the inlet of Pond 4. A portion of this pumped flow would be diverted to the upstream wet well to be recirculated through

the trickling filters. A sludge pumping station wet well would also be required downstream of the clarification tanks to convey sludge to the Pond 1A/1B inlet.

Pond 3 would be modified with a new overflow outlet structure and piping that would convey wet weather flows above the capacity of the trickling filter system to the Pond 4 equalization basin. As existing inlet and outlet structures for Pond 4 are located in the southern half of the Pond, they would have to be removed and new inlet and outlet structures constructed in the northern section. Piping from the Pond 4 outlet would flow to the Chlorine Contact Basin or the wet well upstream of the trickling filters for additional treatment.

New yard piping will be required between the pump stations, trickling filters, clarification tanks, Pond 3, Pond 1A/1B combined outlet, Pond 4 and the Chlorine Contact Basin.

Trickling Filter and Settling Pond Construction – Configuration 4

An area of approximately one acre south of Pond 3 will be devoted to installation of the two 48-foot diameter trickling filters and two 34-foot diameter clarification tanks. This area would be located outside the 100-year flood zone boundary. A new access road would be constructed to the trickling filter area.

Pumping station wet wells would be required upstream and downstream of the new trickling filters. Upstream, a wet well collecting effluent from Ponds 3, 1A and 1B in addition to recirculated trickling filter effluent would be needed to transfer water to the centerwell of the trickling filters. Downstream, effluent from the trickling filters would be collected in a wet well and pumped to the inlet of Pond 4. A portion of this pumped flow would be diverted to the upstream wet well to be recirculated through the trickling filters. A sludge pumping station wet well would also be required downstream of the clarification tanks to convey sludge to the Pond 1A/1B inlet.

Pond 3 would be modified with a new overflow outlet structure and piping that would convey wet weather flows above the capacity of the trickling filter system to the Pond 4 equalization basin. A new inlet structure for the Pond 3 overflow would be constructed in the northern section of Pond 4. Piping from the Pond 4 outlet would flow to the Chlorine Contact Basin or the wet well upstream of the trickling filters for additional treatment.

New yard piping will be required between the pump stations, trickling filters, clarification tanks, Pond 3, Pond 1A/1B combined outlet, Pond 4 and the Chlorine Contact Basin.

5.2.5 Operations and Maintenance

Trickling filters are expected to have relatively minimal power and O&M requirements compared to more active forms of secondary wastewater treatment such as activated sludge or oxidation ditch processes. Typical operations and maintenance tasks for operating the trickling filter system will include:

- Running and maintaining dosing pumps
- Running and maintaining effluent/recirculation pumps
- Flow and water quality monitoring
- Control system calibrating and troubleshooting
- Inspecting and lubricating distributor bearings
- Verifying wetting pattern and nozzle cleaning, adjusting, flushing, and/or replacement
- Inspecting/replacing splash plates

- Inspecting for ponding and odors
- Periodic flooding of the filters to avoid fly propagation
- Inspecting distributor arms for level installation
- Monthly opening and flushing of ports
- Inspecting seals on center column
- Quarterly inspecting of underdrain system to ensure proper water and air flows, flushing periodically
- Inspecting coatings periodically
- Exercising valves annually

5.2.6 Estimated Construction and Operational Cost

Cost components associated with operating and maintaining a trickling filter nitrification system depends on a variety of factors including the system size as media type, and the site specifics. Table 29 summarizes the preliminary estimate of design and construction costs associated with installation of a PETRO process trickling filter system per Configuration 2 (Figure 14); Table 30 shows the estimated costs for the alternative if the trickling filters are constructed outside the footprint of Pond 4 per Configuration 4 (Figure 15). Depending on the layout selected, the total estimated project design and construction cost is estimated to range from \$8.1 to \$11.7 million; this cost estimate includes a 30% contingency.

Table 29 Alternative 2 Estimated Capital Costs

Item	Unit	Cost	Quantity	Total
General Requirements				
Temporary Wastewater Bypass and Treatment	LS	\$ 562,300	1	\$ 562,300
Civil				
Remove Pond Sludge	TON	\$ 650	340	\$ 221,000
Site Preparation, Grading, Stabilization	LS	\$ 588,400	1	\$ 588,400
Excavation and Fill	LS	\$ 559,000	1	\$ 559,000
Berm Construction	LS	\$ 503,000	1	\$ 503,000
Access Road	LS	\$ 26,100	1	\$ 26,100
Yard Piping	LS	\$ 587,400	1	\$ 587,400
Structural				
Trickling Filter Structures (2)	LS	\$ 373,000	1	\$ 466,200
Clarifier Structures (2)	LS	\$ 247,400	1	\$ 309,200
Wet Well Pump Stations	LS	\$ 281,700	1	\$ 281,700
Pond 3 Overflow Structure	EA	\$ 34,600	1	\$ 34,600
Pond 4 Inlet and Outlet Structures	EA	\$ 34,600	2	\$ 69,200
Mechanical				
Trickling Filter Media and Underdrain	EA	\$ 252,650	2	\$ 505,300
Trickling Filter Distribution Arms	EA	\$ 252,050	2	\$ 501,400
Clarifier Equipment	EA	\$ 172,850	2	\$ 345,700
Pond 3 and Trickling Filter Effluent Pump Stations	LS	\$ 425,700	1	\$ 425,700
Sludge Wet Well Equipment	LS	\$ 21,300	1	\$ 21,300
Electrical and Instrumentation				
	LS	\$ 360,400	1	\$ 360,400
Subtotal				\$6,370,600
Geotechnical Work	LS	1		\$ 318,500
Mobilization		5%		\$ 191,100
Bonds		3%		\$ 1,274,100
Engineering Design Services		20%		\$ 637,100
Construction services and start-up		10%		\$ 955,600
Contractor's Overhead and Profit		15%		\$ 1,911,200
Contingency		30%		\$ 318,500
Total Project Cost (Excludes O&M)				\$11,733,200

Table 30 Alternative 2 Estimated Capital Costs (Trickling Filters Outside Pond 4)

Item	Unit	Cost	Quantity	Total
Civil				
Site Preparation, Grading, Stabilization	LS	\$ 110,800	1	\$ 110,800
Excavation and Fill	LS	\$ 11,500	1	\$ 11,500
Access Road	LS	\$ 189,900	1	\$ 189,900
Yard Piping	LS	\$ 806,100	1	\$ 806,100
Structural				
Trickling Filter Structures (2)	LS	\$ 373,000	1	\$ 466,200
Clarifier Structures (2)	LS	\$ 247,400	1	\$ 309,200
Wet Well Pump Stations	LS	\$ 281,700	1	\$ 281,700
Pond 3 Overflow Structure	EA	\$ 34,600	1	\$ 34,600
Pond 4 Inlet Structures	EA	\$ 34,600	1	\$ 34,600
Mechanical				
Trickling Filter Media and Underdrain	EA	\$ 252,700	2	\$ 505,400
Trickling Filter Distribution Arms	EA	\$ 252,050	2	\$ 504,100
Clarifier Equipment	EA	\$ 172,850	2	\$ 345,700
Pond 3 and Trickling Filter Effluent Pump Stations	LS	\$ 425,700	1	\$ 425,700
Sludge Wet Well Equipment	LS	\$ 21,300	1	\$ 21,300
Electrical and Instrumentation	LS	\$ 360,500	1	\$ 360,500
Subtotal				\$4,407,300
Geotechnical Work	LS	1		\$ 75,000
Mobilization		5%		\$ 220,400
Bonds		3%		\$ 132,200
Engineering Design Services		20%		\$ 881,500
Construction services and start-up		10%		\$ 440,700
Contractor's Overhead and Profit		15%		\$ 661,100
Contingency		30%		\$ 1,322,200
Total Project Cost (Excludes O&M)				\$8,140,400

Table 31 presents estimated O&M costs which are adapted from Martin and Martin (1991) and adjusted to 2018 prices. The table suggests an annual O&M cost of approximately \$120,000 for a 1 MGD system or \$78,000 for a 0.65 MGD system. For comparison purposes, a separate O&M cost was developed based on energy and labor required and this total came to \$65,000 annually.

Table 31 Alternative 2 Estimated Operations and Maintenance Costs

Flow (MGD)	Costs \$Million
1	\$0.12
10	\$0.28
49.9	\$1.30
100.4	\$2.41

Source: Adapted from Martin and Martin (1991) and adjusted to 2018 prices.

5.2.7 Implementation Schedule

Once constructed, start-up procedures will include mechanical inspection of the trickling filter system components and establishment of biofilm on the trickling filter media. A robust biofilm may take up to a few months to establish and gain the ability to trap algae (Bernard et al. 2010; Shipin et al., 1998). High rate recirculation, uniform hydraulic loading, and low organic loadings are recommended during this establishment phase (Pennsylvania Department of Environmental Protection, *Wastewater Treatment Plant Operator Certification Training, Module 20*). Verification of the system's flow control operations must be performed during system commissioning.

Table 32 presents a preliminary implementation schedule for installation of a PETRO trickling filter system at the St. Helena WWTRP which meets the timeline outlined in the CDO.

Table 32 Alternative 2 Preliminary Implementation Schedule

Milestone	Tentative Completion Date
Completion of Final Feasibility Study	August 2018
Completion of Final Workplan	October 2018
Complete Funding Application / Engineering Report	November 2018
Begin Detailed Design/ Permitting	December 2018
Submit a Draft Design to RWQCB	April 1, 2019
Submit Final Design to RWQCB	October 2019
Acquisition of Permits	November 2019
Bid Solicitation/ Procurement	December 2019
Begin Construction	February 2020
End of Construction, Commissioning and Startup	November 2021
Submit Documentation of Final Workplan Implementation/Begin Operations of New Treatment System	December 1, 2021
Alternative 2 Treatment in Full Operation, Biofilm Established	July 2022
Submit Report Evaluating Effectiveness of New Treatment System	September 2022
Achieve compliance with 2016 NPDES Permit effluent limits	March 2023

6. Tertiary Filtration

The City is interested in adding tertiary filtration after the proposed secondary treatment system of trickling filters or constructed wetlands to provide a final polishing step before disinfection, and to produce California Title 22 treatment for water reuse. Tertiary filtration with denitrification capabilities is recommended to protect groundwater quality, meet anticipated future nitrate limits in the effluent, and to remove nitrates if the trickling filter process is selected for secondary treatment. It is anticipated that the trickling filters will produce elevated nitrate levels in the effluent, which may be removed in denitrifying sand filter with chemical addition.

The tertiary filtration system would not need redundancy since it is expected that the proposed secondary treatment system would be capable of meeting the effluent discharge limits included in the CDO, which are 15 mg/L for BOD and 15 mg/L for TSS. Redundancy may be desired if the tertiary are used for water reuse, however, it was not included in the evaluation at this time. Options for denitrifying sand filters will also be included.

The WWTRP staff have also expressed interest in tertiary filtration directly after Pond 4, without any secondary treatment. Tertiary filtration alone may not provide the treatment needed to meet the BOD and TSS effluent discharge limits under the CDO. Tertiary filtration without secondary treatment may also not produce high enough effluent quality during all the seasonal variations in current and future flows and loads, or when a pond is taken out of service for maintenance.

It may be possible to enhance the pond treatment system to obtain the effluent discharge limits under the CDO and not have secondary treatment. However, this would require modeling the ponds to establish performance characteristics, sampling for additional ammonia data, and evaluating treatment enhancements and performances under the various flow and loading scenarios. This evaluation will not be included in the Feasibility Study at this time.

This section will discuss conceptual sizing and cost criteria for two types of tertiary filters that follow the proposed secondary treatment. The two types of tertiary filters evaluated include:

1. Cloth Filter
2. Sand Filter, including denitrifying capabilities

Vendors were solicited for filter proposals. The vendors were provided with the following design criteria:

- Peak Month Wet Weather Flow Alternative 1: 3.0 MGD (per the Feasibility Study)
- Average Day Max Month Flow Alternative 2: 1.46 MGD (per the Feasibility Study)
- Influent Peak TSS: 30 mg/L
- Influent Average TSS: 15 mg/L
- Influent Peak BOD: 30 mg/L
- Influent Average BOD: 15 mg/L
- Meets California Title 22 requirements for filtered wastewater

The requirements for Title 22 filtered wastewater are included below from the California Code of Regulations:

§60301.320. Filtered wastewater.

"Filtered wastewater" means an oxidized wastewater that meets the criteria in subsection (a) or (b):

(a) Has been coagulated and passed through natural undisturbed soils or a bed of filter media pursuant to the following:

(1) At a rate that does not exceed 5 gallons per minute per square foot of surface area in mono, dual or mixed media gravity, upflow or pressure filtration systems, or does not exceed 2 gallons per minute per square foot of surface area in traveling bridge automatic backwash filters; and

(2) So that the turbidity of the filtered wastewater does not exceed any of the following:

(A) An average of 2 NTU within a 24-hour period;

(B) 5 NTU more than 5 percent of the time within a 24-hour period; and

(C) 10 NTU at any time.

(b) Has been passed through a microfiltration, ultrafiltration, nanofiltration, or reverse osmosis membrane so that the turbidity of the filtered wastewater does not exceed any of the following:

(1) 0.2 NTU more than 5 percent of the time within a 24-hour period; and

(2) 0.5 NTU at any time.

6.1 Cloth Filter

Cloth filters typically consist of woven cloth or fiber pile media configured as a set of vertical discs combined in a module. Modules are often placed in concrete tanks or packaged steel tank units. They are designed for 10 micron removal of TSS and often get <5 mg/L TSS. Other configurations include drum or diamond lateral styles. Cloth filter applications include effluent TSS polishing, water reuse, membrane pretreatment, stormwater treatment and phosphorous removal. Benefits include a high surface area and flux rate in a small footprint. Flow through the cloth filter can flow from the inside to outside, or outside to inside, and this affects how the solids are removed, the type of cloth media, and the active filter area.

A conceptual proposal was received from one vendor:

- Veolia Water Technologies / Kruger Hydrotech Disc

Veolia Water Technologies / Kruger Hydrotech Disc: The Hydrotech disc utilizes an inside-out flow, in which the discs are all attached to a central rotating drum (Figure 16). The media is a 10 micron woven cloth. The influent water flows by gravity into the center drum and then passes through the filter media on the discs. Filtered effluent flows into the collection tank. Backwash is initiated when the sufficient solids collect on the media and the influent level rises to a maximum of 12 inches in the tank. Filtered effluent is pumped to backwash a portion of the cloth media at a time, therefore, filtration continues even during a backwash.

The model HSF 2212 with 12 discs per unit is recommended to treat a flow of 3.0 MGD. The model HSF 2206 with 6 discs per unit recommended to treat a flow of 1.5 MGD. Both models may be configured as a packaged steel tank unit or as a stand-alone unit that must be installed in a concrete tank. The conceptual cost estimate assumed that the units are installed in a concrete tank. The Hydrotech design summary is included in Table 33.

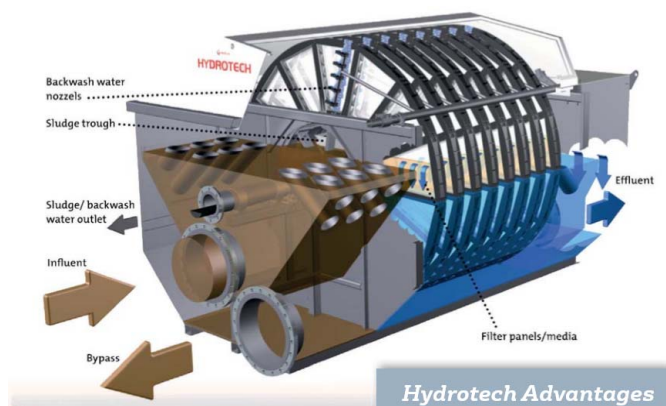


Figure 16 – Hydrotech Disc (Veolia Water Technologies, 2016)

Table 33 Veolia Hydrotech Disc Design Summary

	Flow, mgd	# of Units	# of Filter Disks per Unit	Peak Hydraulic Loading Rate (gpm/ft ²)	Flow Direction	Active Area Ratio	Approx. Footprint Size	Media
Veolia Hydrotech Disc 2212	3.0	1	12	4.46	Inside-Out	65%	7.5'x14'	woven cloth
Veolia Hydrotech Disc 2206	1.5	1	6	4.31	Inside-Out	65%	7.5'x10'	woven cloth

6.1 Sand Filter

Sand filters typically consist of sand and/or other granular media (e.g. anthracite, garnet) supported by a gravel layer and/or filter underdrain system. Depths vary from 11-inches for shallow-bed filters to 9-feet for deep-bed filters. Influent water passes through the granular media layers either by gravity or under pressure in a downflow or upflow direction. The filtered effluent is collected in the underdrain system. Filtered effluent may be used to backwash the media by pushing the water through the media in a reverse flow to dislodge solids. Solids are sent back to the headworks for treatment. Sand filters applications include effluent polishing, and turbidity, TSS, iron, manganese, nitrogen, BOD and phosphate removal.

Sand filters may also be used for denitrifying the effluent in deep bed configurations with a carbon source chemical addition, such as methanol, to promote denitrifying bacteria growth. Denitrification capabilities may be desirable since it is anticipated that the WWTRP may have nutrient effluent limits for nitrogen and phosphorous in the future.

Conceptual proposals were received from two vendors for upflow and downflow sand filters:

- Upflow Sand Filter:
 - o Parkson DynaSand
 - o Evoqua Continuous Backwash Filter

- Downflow Sand Filter:
 - o Evoqua Gravisand Filter

Upflow Sand Filter: The Parkson DynaSand and Evoqua Continuous Backwash Filter are continuous upflow granular deep-bed media filters (Figure 17 and Figure 18). Influent water enters at the top of the filter, flows down a center pipe, and is distributed radially to the sand media near the bottom of the filter. The water travels upwards through the sand media and exits near the top of the filter over an effluent weir. Sand media with captured solids moves towards the bottom of the filter and is drawn up through the center column using compressed air, which also scours the sand. The lighter solids rise to the top and are discharged through the reject weir, whereas the heavier cleaner sand falls back down to the top of the sand bed. The sand media scouring occurs at the same time as filtration. Backwash pumps are not used in this application.

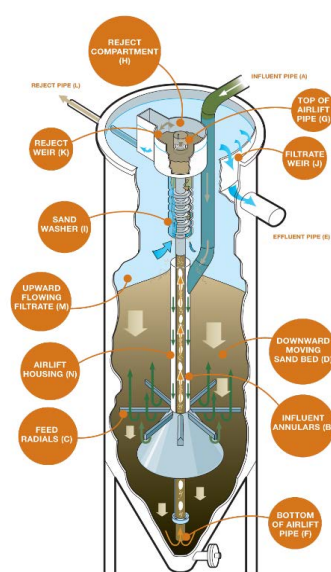


Figure 17 – DynaSand Filter
(Parkson, 2017)

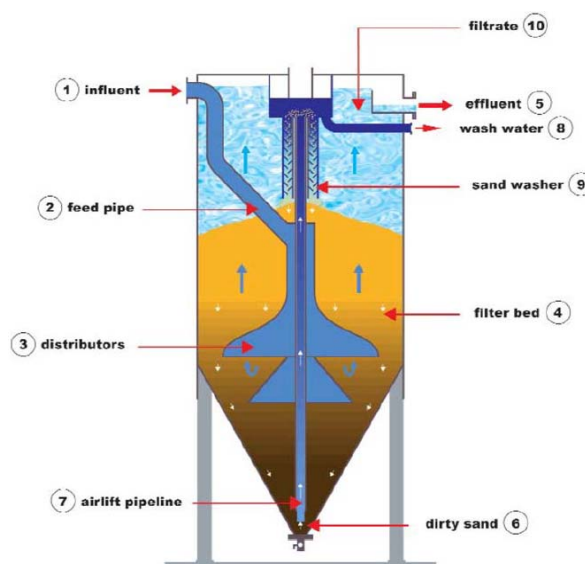


Figure 18 – Continuous Backwash Filter
(Evoqua, 2014)

The DynaSand model DSF50CDBTF is recommended to meet the TSS and BOD effluent discharge limitations. The system is also designed to meet Title 22 water reuse requirements. For a peak flow of 3.0 MGD, two cells with six DynaSand modules each (12 modules total) are recommended. For a peak flow of 1.46 MGD, one cell of six DynaSand modules is recommended. The standard depth configuration (40 inches) has a loading rate of 5 gpm/SF. For future denitrification capabilities, the system would be designed for a deep-bed depth (80 inches) with a loading rate of 4 gpm/SF. Controls and chemical feed would need to be added to convert the sand filter into a denitrifying sand filter.

The Continuous Backwash Filter with 14 modules is recommended for a flow of 3.0 MGD, with 2 of those modules used for redundancy. For a flow of 1.46 MGD, 8 modules are recommended with 2 of those modules used for redundancy. Similar to the DynaSand filter, controls and chemical feed additions are required for the sand filter to denitrify.

The upflow sand filter design summary is included in Table 34.

Table 34 Upflow Sand Filter Design Summary

Item	Flow, mgd	# Units	# of Modules per Unit	Peak Hydraulic Loading Rate (gpm/ft ²)	Flow Direction	Filter Bed Depth, in	Approx. Footprint Size	Media	Backwash	Denitrifying Capability?
Dynasand DSF50CDBTF	3.0	2	6	3.47	Upflow	80	30'x30'	sand	Continuous	Yes
Dynasand DSF50CDBTF	1.5	1	6	3.38	Upflow	80	15'x30'	sand	Continuous	Yes
Continuous Backwash Filter	3.0	7	2	-	Upflow	-	40'x57'	sand	Continuous	Yes
Continuous Backwash Filter	1.5	4	2	-	Upflow	-	40'x33'	sand	Continuous	Yes

Downflow Sand Filter - Evoqua Gravisand Filter: The Gravisand filter is a continuous downflow granular shallow bed filter with low head and an automatic backwash system that moves on a traveling bridge (Figure 19). Wastewater flows through the medium by gravity. The filter is divided into cells, and the backwash bridge cleans each cell individually while the other cells remain in service. The filter has a tubular underdrain system to eliminate filter media leakage and is not susceptible to irreversible fouling. The Gravisand filter does not have denitrifying capabilities. The downflow Gravisand filter design summary is included in Table 35.

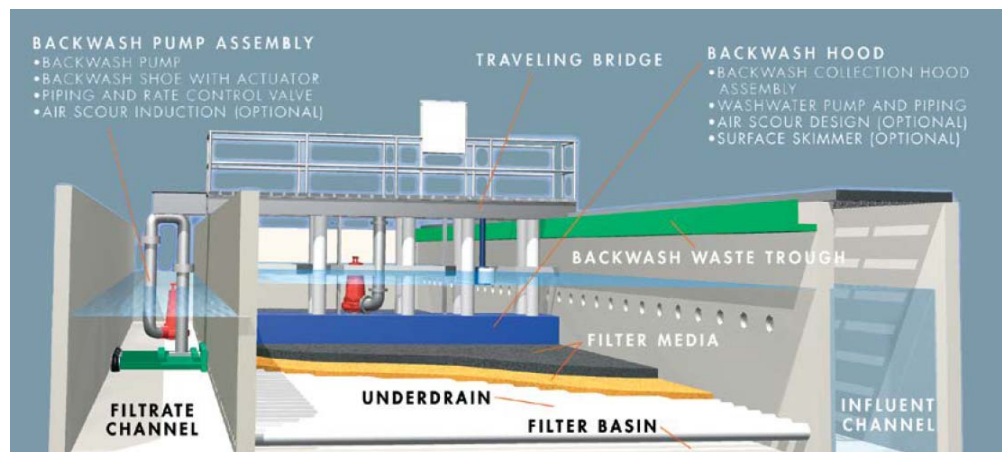


Figure 19 – Gravisand Filter (Evoqua, 2014)

Table 35 Gravisand Filter Summary

Item	Flow, mgd	# of Units	Peak Hydraulic Loading Rate (gpm/ft ²)	Flow Direction	Filter Bed Depth, in	Approx. Footprint Size	Media	Backwash	Denitrifying Capability?
Gravisand MX10-50	3.0	2	2	Downflow	11	16'x83.3'	sand, anthracite	Semi-continuous	No
Gravisand MX10-50	1.5	2	2	Downflow	11	12.5'x60'	sand, anthracite	Semi-continuous	No

6.1 Summary

Budgetary costs were provided by the manufacturer for the filter equipment, however, it does not include the costs of concrete tanks or installation. Based on these costs, the cloth filters are the lowest cost filter type at \$226,000 for a 12-disc system that treats flows of 3.0 MGD with no redundancy. The cloth filters also have the smallest footprint at approximately 7.5-feet by 14-feet. This footprint does not include ancillary equipment that may be required for pumping and piping.

While cloth filters appear to be the most economical option, a denitrifying sand filter is recommended in order to offer the most flexibility in being able to meet potential future nutrient effluent discharge limits and mitigate for potential impacts to the groundwater, especially if the trickling filter is the selected secondary treatment alternative. The Parkson Dyansand filter is approximately double the cost of the cloth filter, at \$441,000 for a 12-module system to treat flows of 3.0 MGD with no redundancy. Denitrifying controls and instrumentation would cost an additional \$112,000 from the manufacturer, not including the costs for the chemical feed, installation, or other associated appurtenances. The footprint is also significantly larger, at approximately 30-feet by 26-feet.

A summary of the filter costs are shown in Table 36.

Table 36 Filter Unit Conceptual Cost Summary

Item	Flow, MGD	Filter Type	Redundancy	Approx. Filter Footprint	Filter Cost	Denitrification Cost	Includes	Excludes
Veolia Hydrotech Discfilter	3.0	Cloth Inside-Out	None	7.5'x14'	\$226,000	NA	discfilter modules, backwash pump, instrumentation and control system, NEMA4X local control panel for each Discfilter unit, spare parts, start up services	concrete tank, freight
Veolia Hydrotech Discfilter	1.5	Cloth Inside-Out	None	7.5'x10'	\$203,000	NA	discfilter modules, backwash pump, instrumentation and control system, NEMA4X local control panel for each Discfilter unit, spare parts, start up services	concrete tank, freight
Evoqua Gravisand	3.0	Sand Downflow	Full	16'x83.3'	\$327,000	NA	bridge assembly, control panel, backwash assembly, underdrains, media, backwash trough, drive tracks, and festooning/indexing system	concrete tank, freight
Evoqua Gravisand	1.5	Sand Downflow	Full	12.5'x60'	\$368,000	NA	bridge assembly, control panel, backwash assembly, underdrains, media, backwash trough, drive tracks, and festooning/indexing system	concrete tank, freight
Parkson Dynasand	3.0	Sand Upflow	None	30'x26'	\$441,000	\$112,000	filter module, filtration media, air compressor system, NEMA 4X air control panels, float switch for low-level shut-off, ENR Controls and Instrumentation Package, Chem-Feed by Others, Start-up services including travel and living expenses; Denitrification Controls and Instrumentation Package for	concrete tank, chemical feed, taxes

							denitrification conversion; freight	
Parkson Dynasand	1.5	Sand Upflow	None	15'x26'	\$277,000	\$112,000	filter module, filtration media, air compressor system, NEMA 4X air control panels, float switch for low-level shut-off, ENR Controls and Instrumentation Package, Chem-Feed by Others, Start-up services including travel and living expenses; Denitrification Controls and Instrumentation Package for denitrification conversion; freight	concrete tank, chemical feed, taxes
Evoqua Continuous Backwash Filter	3.0	Sand Upflow	Partial	40'x57'	\$572,000		washbox and airlift, influent piping, distribution radials, effluent weir trough, pneumatic control panel and compressor system	concrete tank, denitrifying system, freight
Evoqua Continuous Backwash Filter	1.5	Sand Upflow	Partial	40'x33'	\$368,000		washbox and airlift, influent piping, distribution radials, effluent weir trough, pneumatic control panel and compressor system	concrete tank, denitrifying system, freight

In order to provide an example of potential costs for adding tertiary filtration, a conceptual opinion of probable cost is provided for the DynaSand filter for the 3.0 MGD and 1.46 MGD flow alternatives.

Capital cost construction items include:

- Site Work
- Yard Piping
- Filter Concrete Structure
- Concrete Pads
- Filter Feed Pumps
- Filter
- Denitrifying Equipment
- Electrical, Control and Instrumentation

The following soft costs are also included in the budgetary estimate:

- Mobilization (5%)
- Bonds (3%)
- Engineering Design Services (20%)
- Construction services and start-up (10%)
- Contractor's Overhead and Profit (15%)
- Contingency (30%)

These costs are included in Table 37 and Table 38. The conceptual opinion of probable cost is approximately \$2.2M for the 3.0 MGD flow alternative and \$1.5M for the 1.46 MGD flow alternative. The 1.46 MGD flow alternative is significantly more economical than the 3.0 MGD alternative. If flows are higher than 1.46 MGD, then it may be possible to blend the tertiary treated flows with secondary treated flows to achieve the desired effluent quality.

In addition, Parkson Dynasand estimated that annual chemical feed costs for the denitrifying system could total to approximately \$60,000 a year, assuming peak loads of 50 mg/L of nitrate for 2 months out of year, at the 1.46 MGD flows discharged onto the ground. However, this amount could be significantly less if discharge to the river is optimized or if wetlands are the selected secondary treatment option, in which the expected nitrate concentration in the effluent is lower.

Table 37 DynaSand Filter 3.0 MGD Conceptual Opinion of Probable Cost

Item	Quantity	Unit	Unit Cost	Total
Sitework	1	LS	\$ 76,080	\$ 76,100
Yard Piping	1	LS	\$ 175,200	\$ 175,200
Filter Concrete Structure	85	CY	\$ 1,000	\$ 84,800
Concrete Pads	55	CY	\$ 1,000	\$ 54,800
Filter Feed Pumps	4	EA	\$ 31,000	\$ 124,000
Filter	1	LS	\$ 441,000	\$ 441,000
Denitrifying Equipment	1	LS	\$ 112,000	\$ 112,000
Electrical and Instrumentation	1	LS	\$ 116,800	\$ 116,800
Subtotal				\$ 1,184,700
Mobilization			5%	\$ 59,200
Bonds			3%	\$ 35,500
Engineering Design Services			20%	\$ 236,900
Construction services and Start-up			10%	\$ 118,500
Contractor's Overhead and Profit			15%	\$ 177,700
Contingency			30%	\$ 355,400
Total Project Cost (Excludes O&M)				\$2,167,900

Table 38 DynaSand Filter 1.46 MGD Conceptual Opinion of Probable Cost

Item	Quantity	Unit	Unit Cost	Total
Sitework	1	LS	\$ 54,760	\$ 54,800
Yard Piping	1	LS	\$ 126,000	\$ 126,000
Filter Concrete Structure	52	CY	\$ 1,000	\$ 52,000
Concrete Pads	29	CY	\$ 1,000	\$ 29,400
Filter Feed Pumps	2	EA	\$ 31,000	\$ 62,000
Filter	1	LS	\$ 277,000	\$ 277,000
Denitrifying Equipment	1	LS	\$ 112,000	\$ 112,000
Electrical and Instrumentation	1	LS	\$ 84,000	\$ 84,000
Subtotal				\$ 797,2000
Mobilization			5%	\$ 39,900
Bonds			3%	\$ 23,900
Engineering Design Services			20%	\$ 159,400
Construction services and Start-up			10%	\$ 79,700
Contractor's Overhead and Profit			15%	\$ 119,600
Contingency			30%	\$ 239,200
Total Project Cost (Excludes O&M)				\$ 1,458,900

7. Solids Management Analysis

7.1 Facultative Ponds

Pond 1A and 1B were designed as facultative ponds, which is the most common type of wastewater treatment pond according to the 2011 EPA Manual: *Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers* (EPA WW Pond Manual). Facultative ponds have been used widely in the United States for 100 years. They are used to treat raw and screened municipal wastewater in small communities and to treat primary and secondary effluent in small or large cities, and industrial waste. These ponds have an upper aerobic layer to provide odor control, ammonia, and BOD removal and a lower anaerobic layer to perform fermentation processes such as sludge digestion, denitrification and some BOD removal. The middle layer is the facultative zone, which is aerobic near the top and anaerobic near the bottom.

Oxygen is produced by photosynthetic algae or re-aeration of the surface, typically without mechanical aeration, in order to support the growth of aerobic and facultative bacteria that oxidize and stabilize the wastewater organic material, thereby removing ammonia and other nutrients. EPA studies of facultative ponds in the 1970s showed that up to 90% ammonia removal could occur during the summer. More recent studies indicate that nitrogen removal can range from 40% to 95% (Crites et al., 2006). Phosphorous removal is typically less than 40%. Algae produced more oxygen on warm days, which also increased pH levels in the upper aerobic layer and encourage ammonia removal by volatilization. Anaerobic bacteria exist in the bottom layer to decompose the settled sludge deposits. According to the EPA WW Pond Manual, facultative ponds are effective at removing settleable solids, BOD, pathogens, fecal coliform and ammonia.

Facultative ponds are typically designed with a depth between 3 to 8 feet and a long detention time of 5 to 50 days in warm climates and up to 200 days in cold climates. These long detention times result in significant pathogen and nitrogen removal (USEPA, 2009). Typical effluent values for BOD₅ range from 20 to 60 mg/L and TSS range from 30 to 150 mg/L. Mechanical aeration may be used to increase the treatment capacity of the pond. Facultative ponds should have a liner to control seepage and plant growth, properly designed inlet and outlet structures, and baffles or floating dividers to create separate cells. The ponds are considered easy to operate and are typically designed for gravity flow.

Solids are designed to stay in the pond for a long period of time (decades). It is important to understand the sludge characteristics and perform effective solids removal periodically to avoid significantly reducing the pond's detention time and treatment capacity. Typical organic loading rates range from 15 to 80 kg/ha/day. Studies conducted by the EPA the 1970s and 1980s and studies conducted by other countries (Racault and Boutin, 2001; Kotsovinos et al., 2004; Oliveira and von Sperling, 2008; von Sperling and Oliveira, 2009) include evaluations of pond loading rates. The recommended loadings rates are 22 to 45 kg/ha/day when average winter air temperatures range from 0 to 15 degrees Celsius, which is the condition at the St. Helena WWTRP.

7.2 Pond 1A and 1B History

The primary Pond 1A and Pond 1B were designed to settle out SS over a period of many years. In 2011, solids removal was performed in Pond 1A after 40 years of being in continuous service and approximately 5 feet of sludge depth, per the 2015 Facilities Evaluation. However, allowing the solids to accumulate for 40 years significantly reduced Pond 1A's treatment capacity. WWTRP staff

stated that treatment capacity began to decline after Pond 1A was in service for approximately 30 years. This is estimated to equate to a sludge depth ranging from 3 to 4 feet or a sludge volume ranging from 2.8 MG to 3.8 MG.

Performing solids removal after such a long length of time was also problematic because Pond 1A was taken out of service for approximately 1 year while it was drained and the solids sufficiently dewatered for removal. All plant loading was directed to Pond 1B during the time that Pond 1A was offline, thereby decreasing the plant's treatment capacity. Additionally, solids removal has never been performed on Pond 1B. Both ponds are currently in service and operated in parallel, with an equal amount of flow generally being conveyed to both ponds.

The following sections include an estimate of the amount of solids generated in Pond 1A and 1B and loading rates, solids management alternatives including monitoring and removal, removal costs and financial considerations, and an implementation schedule. Also discussed are solids management options for the Trickling Filter design.

7.3 Conceptual Design of Solids Generated

7.3.1 Design Criteria

The amount of solids generated in Pond 1A and Pond 1B was estimated using the design criteria and loading rates shown in Table 39, assuming that the ponds are operated in parallel with influent loads split evenly between both ponds. It is assumed that the solids loading consists of TSS, unscreened solids, and grit. Typically, the percent total solids for primary sludge ranges from 3% to 12%. Since the solids are expected to accumulate and compact over time, the percent of total solids was modified to range from 6% to 12%.

Table 39 Design Criteria

Description	Units	Value
Design Flow ^a	MGD	0.42
Influent TSS ^b	mg/L	286
Effluent TSS from Pond 1A/1B ^c	mg/L	78
Unscreened Solids ^d	L/1000m ³	50
Grit ^e	m ³ /1000m ³	0.0205
Sludge Total Solids	%	6 – 12
Sludge Depth	feet	3 – 4

^a 2014 average dry weather flows.

^b Average influent TSS from 2010-2013.

^c Average effluent TSS from Pond 1A/1B in 2015.

^d Typical values for screenings removed from wastewater with 12.5 mm coarse screen, Metcalf and Eddy, 4th edition, Table 5-7.

^e Typical values for grit for a separate system, Metcalf and Eddy, 4th edition, Table 5-19.

Based on the design criteria in Table 39, it would take approximately 14 to 20 years for the sludge depth to reach 3 to 4 feet and negatively impact the treatment capacity of the ponds. It is estimated that between 1,803 and 2,563 dry tons of solids will be generated in Pond 1A and Pond 1B after 14 and 20 years of accumulation, respectively. Calculations for estimating the amount of solids generated are included in Appendix H.

Table 40 Solids Generated After 14 and 20 Years

Time, years	Units	Value
14	Dry Tons	1,803
20	Dry Tons	2,563

In order to more effectively manage the solids disposal at the WWTP, alternatives were developed to remove the solids from Ponds 1A and 1B on a more frequent basis and prior to any negative effects to treatment capacity. These alternatives are based on typical solids management options for wastewater ponds per the EPA WW Pond Manual (2011), *Removal of Sludge from Pond Fact Sheet* by the Australian Pork Industry (2014), and solids removal methods performed at other wastewater treatment plants (Town of Windsor and Maxwell Public Utilities Commission).

- Alternative 1: Pumping or Dredging
- Alternative 2: Drain Pond and Dewater in Place

7.4 Alternative 1 – Pumping or Dredging

7.4.1 Description of Alternative

The sludge at the bottom of the pond may be removed, dewatered, and hauled offsite for disposal. The solids may be removed through stationary pumping or dredging pumping. These options may be conducted while the pond is still in service.

Stationary Pumping

A sludge pump is installed on the pond embankment. Various types of sludge pumps include a vacuum pump, centrifugal pump with a chopper, or a positive displacement pump. A suction pipe is lowered into the pond and placed about 1 foot above the pond bottom in order to prevent damage to the pond bottom lining or surface. The suction pipe may be kept in place on the pond bottom using guide wheels. The sludge is pumped to a storage tank or tanker vehicle for flow equalization and then conveyed to dewatering equipment. Dewatering equipment may consist of a belt filter press (Figure 20) or centrifuge (Figure 21). The sludge is dewatered to an appropriate solids concentration for land application offsite (minimum typically 20%) or disposal at a landfill approved to receive sludge (minimum typically 50%). The water is sent back to the pond or to the plant headworks. Approximately 1 foot of sludge would be left in the pond.

Pumping the solids works best when the solids concentration is below 6 percent. Pumping flow rates decrease significantly when the solids concentration is above 12 percent. The typical solids concentration in a primary waste receiving pond ranges between 3 and 12 percent, therefore, it is expected that the sludge may be pumped easily out of the pond. Typical pumping rates range between 350 gallons per minute (gpm) and 600 gpm. If the sludge has settled into a solid mass or has a total solids concentration of greater than 15%, then the sludge may need to be mixed using a mechanical agitator.

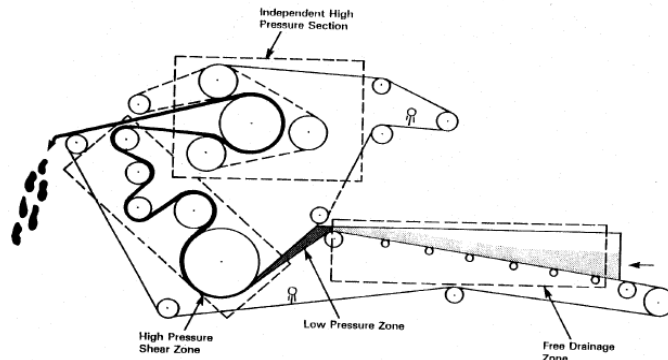


Figure 20 – Belt Filter Press Schematic (EPA, 2000)

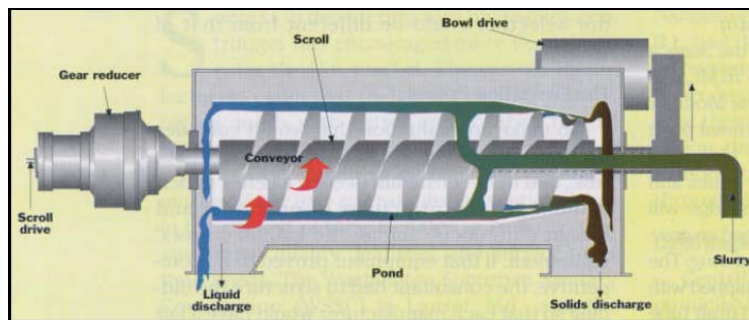


Figure 21 – Centrifuge Thickening and Dewatering System (EPA, 2000)

Dredging

Dredging consists of pumping from a floating platform or vehicle on the pond (Figure 22). The floating platform moves across the pond using traverse cables in order to access all areas of the sludge. A submersible cutter head may be attached to the suction inlet and lowered to near the bottom of the pond. As with stationary pumping, the suction inlet and cutter head must be kept at least 1 foot above the pond bottom to avoid damaging any natural or artificial liner.



Figure 22 – Dredging Equipment on a Lagoon (Synagro, 2017)

Similar Systems Nearby

The Town of Windsor has Wastewater Treatment, Reclamation and Disposal Facility (WWTF) that has two sludge ponds and a sludge decant tank. The two sludge ponds provide 12.2 MG of sludge stabilization and storage capacity. A third pond is being used for 6.8 MG of storage and will be converted to a sludge stabilization pond in the future. Within the ponds, sludge concentrates to a higher solids content and volatile SS are degraded. Sludge is typically pumped out of these ponds annually, dewatered, and hauled offsite by an outside contractor (currently Synagro) to a site for beneficial land application of biosolids. The land application site is outside of the WWTF's SFBRWQCB's jurisdiction. The outside contractor manages the biosolids land application permit requirements in SFBRWQCB Regions 2 and 5 on behalf of the WWTF. It is anticipated that the WWTRP may be able to manage its solids in a similar manner.

7.4.2 Estimated Costs

Costs were estimated assuming a time interval of 20 years and that the solids would be dewatered to a solids content of approximately 20% and hauled offsite for land application, similar to the solids removal procedure for the Town of Windsor WWTF. Budgetary unit costs were obtained from Synagro and included the following items: sludge pumping, sludge dewatering, sludge transportation, and land application and permitting.

The total estimate cost in 2018 dollars for removing solids from Pond 1A and Pond 1B is approximately \$3.4M every 20 years, or \$171,200 per year. This estimate includes a 30% contingency. It is recommended that the City budget an adequate amount each year for solids removal operations.

Table 41 Alternative 1 Estimated Solids Removal Costs^a

Item	Unit	Cost	Quantity	Total
Dredging, Dewatering, Transportation, Land Application, Permitting	Dry Ton	\$ 979	2,563	\$ 2,507,900
Mobilization / Demobilization		5%		\$ 125,400
Subtotal				\$ 2,633,300
Contingency		30%		\$ 790,000
Total Cost over 20 years				\$ 3,423,300
Total Cost per Year				\$ 171,200

^a Costs are rounded to the nearest hundred.

7.5 Alternative 2 – Drain Pond and Dewater in Place

7.5.1 Description of Alternative

This solids removal alternative involves draining Pond 1A or Pond 1B, dewatering the sludge to a minimum of 50% solids content, and hauling the dewatered sludge to the local landfill. One pond would be drained by isolating the influent flow and conveying or pumping the top layer of wastewater effluent to the other pond until only the sludge blanket remained. Sludge is typically dewatered by running a rototiller over the entire pond to mix and dry the sludge, allowing the sludge to dry out for a week, and repeating the process until the solids content reaches 50%. The dewatered sludge may then be scooped up with a long reach excavator, deposited into trucks, and hauled to the Clover Flat Landfill for disposal.



Figure 23 – Rototiller Mixing and Drying Sludge at Maxwell WWTP Pond



Figure 24 – Rototiller and Long Reach Excavator at Maxwell WWTP Pond

One pond would be taken offline at a time, while the other pond would remain online. The pond would be taken offline during the summer months when influent flows are lower and the effluent could be discharged to the irrigation fields. It is expected that the WWTRP could absorb the reduction in treatment capacity with one pond offline, based on previous operational history and with the additional treatment capacity obtained with either the wetlands or Trickling Filter option.

The amount of sludge in the ponds after 15-20 years is also significantly less than the amount of sludge after 40 years. If a pond could be fully taken offline for dewatering operations, then it is anticipated that the time to dewater the sludge would be approximately 2 to 3 months. One option to minimize the impact to the system could involve pumping the sludge from one pond to the other pond while both ponds are still service, then taking the sludge loaded pond offline for sludge removal operations. Dewatering equipment, such as centrifuge or belt filter press, could also be installed to speed up the dewatering process, however, the costs associated with these options are much higher than drying it in place.

7.5.2 Estimated Costs

The estimated cost to remove the solids every 20 years is approximately \$449,400. Costs include hauling 2,563 dry tons of solids to the Clover Flat Landfill, a Class III landfill located approximately 10 miles away in Calistoga, and paying the disposal fee at the landfill. One truck trip to and from the landfill is assumed to take approximately 1 hour. If a 10 cubic yard truck is used for hauling, then approximately 615 hours would be required to haul all the solids to the landfill. Dewatering costs are based on drying the solids in place using a rototiller and evaporation.

Table 42 Alternative 2 Estimated Solids Removal Costs

Item	Unit	Cost	Quantity	Total
Drain	LS	\$ 15,700	-	\$ 15,700
Dewater	LS	\$ 105	-	\$ 10,500
Haul	Hour	\$ 105	615	\$ 64,500
Disposal Fee at Landfill ^a	Dry Ton	\$ 79	2,563	\$ 202,600
Mobilization/Demobilization	LS	\$ 15,700	-	\$ 52,400
Subtotal				\$ 345,700
Contingency		30%		\$ 103,700
Total Cost every 20 years^b				\$ 449,400
Total Cost per Year^b				\$ 22,500

^a Costs from Clover Flat Landfill fee schedule dated July 1, 2016, escalated to 2018 dollars.

^b Costs rounded to the nearest hundred.

7.5.3 Implementation Schedule

As discussed in Section 1.3, it is estimated that solids removal will be required for the ponds every 15 to 20 years in order to maintain their treatment capacity. Solids were last removed from Pond 1A in 2011 and it resumed operations in 2014. Solids have never been removed from Pond 1B since its construction in 1996. Therefore, Pond 1B may be at or nearing its treatment capacity. Pond 1A may have another 12 to 17 years before reaching its treatment capacity.

7.5.4 Sludge Monitoring

The time intervals for solids removal are estimates based on assumptions for solids loading and sludge density and existing flows. Solids levels in the ponds should be monitored and recorded at least every 12 months to verify the depth using a Sludge Judge monitoring device. Depths should be taken in a grid pattern across the pond with 4 to 6 measurements along a line in each direction. All measurements should be averaged to estimate the sludge depth for the entire pond.

7.6 Trickling Filter Solids Management

Trickling filter effluent contains a sloughed biofilm which can be managed in 2 ways:

1. Convey the sludge to HTs where it can settle into a concentrated sludge. The sludge would be recirculated to Pond 1A and 1B.
2. Convey the sludge to a settling pond where it is stored. Sludge would be removed from the pond every 4 years.

Humus Tanks

Table 43 presents the estimate sludge removal costs associated with the additional sludge recirculated from the HT to Pond 1A and 1B. Based on an assumed influent TSS of 1,500 mg/L and an effluent TSS of 78 mg/L, the amount of solids generated after 20 years is 215 dry tons. Costs were estimated assuming that the solids would be dewatered to a solids content of approximately 50% and hauled offsite the Clover Flat Landfill for disposal. The costs to remove the additional volume of solids associated with the recirculation every 20 years is estimated to be approximately

\$30,000. It is assumed that costs for draining the pond and mobilization would be incorporated in the overall solids removal operation.

Table 43 Estimated Solids Removal Costs from Trickling Filter Humus Tanks

Item	Unit	Cost	Quantity	Total
Dewater	LS	\$ 105	1	\$ 800
Haul	Hour	\$ 105	51	\$ 5,300
Disposal Fee at Landfill ^a	Dry Ton	\$ 79	215	\$ 17,000
Subtotal				\$ 23,100
Contingency		30%		\$ 6,900
Total Cost every 20 years^b				\$ 30,000
Total Cost per Year^b				\$ 1,500

^a Costs from Clover Flat Landfill fee schedule dated July 1, 2016, escalated to 2018 dollars.

^b Costs rounded to the nearest hundred.

Settling Pond

Table 44 presents the estimate sludge removal costs associated with the settling pond. Costs were estimated assuming that the solids would be dewatered to a solids content of approximately 50% and hauled offsite the Clover Flat Landfill for disposal. The costs to remove the solids from the settling pond every 4 years is estimated to be approximately \$77,500.

Table 44 Estimated Solids Removal Costs from Trickling Filter Settling Pond

Item	Unit	Cost	Quantity	Total
Drain	LS	\$ 15,700	1	\$ 15,700
Dewater	LS	\$ 10,500	1	\$ 10,500
Haul	Hour	\$ 105	41	\$ 4,300
Disposal Fee at Landfill ^a	Dry Ton	\$ 79	170	\$ 13,400
Mobilization/Demobilization	LS	\$ 15,700	1	\$ 15,700
Subtotal				\$ 59,600
Contingency		30%		\$ 17,880
Total Cost every 4 years^b				\$ 77,500
Total Cost per Year^b				\$ 19,400

^a Costs from Clover Flat Landfill fee schedule dated July 1, 2016, escalated to 2018 dollars.

^b Costs rounded to the nearest hundred.

7.7 Recommendation

Alternative 2 is recommended as the most cost effective method to manage the solids in Pond 1A and 1B. One pond would need to be taken completely offline during solids removal procedures, however, the other pond would remain online to treat flows.

The HTs are recommended as the most effective method to manage solids removal from the Trickling Filters.

It is recommended that funding for solids management be paid through building a reserve on an annual basis by the City. The reserves should be built through rate increases or grants / loans through the Clean Water State Revolving Fund, as discussed in Section 11.

8. Water Management Strategy

A water balance is a mathematical model that accounts for all significant water inputs and outputs of a system on a monthly basis for the duration of a year. A water balance is achieved when the total amount of water coming into a system equals the total amount of water leaving the system on an annual basis. Inflow into the treatment system at St. Helena includes wastewater and precipitation, while outflows include evaporation from the total pond system, discharge to the river, seepage, and irrigation. Where inflow does not equal outflow, a change in storage volume (pond water surface elevation) occurs. The water balance model is typically used as a tool to assess water quantities within the system, in which the parameters can be changed to account for different potential operating conditions.

Two primary water balance models were developed: (1) a baseline water balance to evaluate the current storage and irrigation requirements, and (2) a wetland water balance to evaluate the effects of constructed wetlands. The baseline water balance is also assumed to reflect the water balance for the Trickling Filter Alternative (Alternative 2) because the trickling filter system does not have a large footprint (approximately 1 acre).

8.1 Baseline Water Balance

The City currently disposes treated effluent from the treatment facility in three ways:

- 1) Discharge to Napa River: Per the NPDES permit, St. Helena can discharge secondary treated effluent to the Napa River during the wet weather period between November 1 and May 31 if the river to wastewater dilution flow ratio is at least 50:1.
- 2) Storage in Pond 5: When the river-to-effluent ratio conditions cannot be met, wastewater can be stored in Pond 5, which has a maximum capacity of 24.5 MG.
- 3) Spray to adjacent irrigation field: Per the WRR R2-1987-090, "The discharger will apply reclaimed wastewater to the grassland through low trajectory sprinklers at a controlled rate corresponding to grass evapotranspiration rate." The City can discharge treated effluent through spray irrigation year-round including the winter months, depending on weather and ground conditions. Specifically, effluent should not be applied to the irrigation field during rainfall, or when soils are saturated to a point where runoff is likely. It is important that the amount of reclaimed water applied does not exceed the agronomic rate of the vegetation in the irrigation field in order to minimize nutrient loading.

Because current disposal is primarily through spray irrigation, the demands for reclaimed water in the spray irrigation field generally follows the seasonal water demands of the crops. These seasonally varying demands need to be balanced with the more constant wastewater flow through the use of storage. Wastewater inflow typically outweighs the irrigation demand during late fall and winter and water accumulates in storage until early spring and summer when the outflows become dominant and exceed wastewater inflow and hence empty storage. In addition, discharge occurs in the winter during the allowable discharge period to the Napa River based on river flow, but if the river does not have adequate flow the volume of storage and level in Pond 5 will increase.

If the river flow is low, storage in Pond 5 has reached its capacity, and if the irrigation discharge is already at agronomic rate, then there is a water storage problem. Based on the water balance and discussions with the City, the City has experienced previous situations in which the lack of storage resulted in discharge violations to the irrigation fields. Therefore, it is important to assess the current

irrigation and storage requirements to determine whether improvements need to be made to the City's disposal pathways. Additionally, the effects of future design flows on the system need to be evaluated.

Several water balances were developed to determine the amount of storage and the amount of area necessary to accommodate spray irrigation under current and future flows. The ultimate purpose of the water balance is to develop appropriate planning scenarios (with varying wastewater flow rates, wet and dry year precipitation, and crop demand patterns) with sufficient storage, discharge, and irrigation that allows for appropriate management of all wastewater in compliance with permit requirements. Given that irrigation demand will vary based on precipitation patterns, and the goal is to irrigate recycled water only based on the irrigation demand, the overall water balance was evaluated to consider the effects of both average and wet years in terms of the storage and irrigation area required. Specifically, a "baseline" water balance was developed for each of the following scenarios:

1. Existing flow, Normal Year
2. Existing flow, Wet Year
3. Existing flow, Normal Year, with optimized Discharge and alfalfa
4. Existing flow, Wet Year, with optimized Discharge and alfalfa
5. Future flow, Normal Year, with optimized Discharge and alfalfa
6. Future flow, Wet Year, with optimized Discharge and alfalfa

The baseline water balance investigates the changes in water quantity based on existing flows and projected future flow rates without the addition of wetlands (Alternative 1, discussed in Chapter 5).

The water balance was created based on the following assumptions and data:

- Wastewater flows were obtained from historical plant flow data provided by the City.
- Approximately 70 acres of turf area is currently adjacent to the treatment plant available for irrigation and/or storage. This amount is somewhat less than the overall gross irrigation area to account for roads, setbacks, and unusable land.
- Based on data summarized for the existing AIPS ponds presented in Table 1, Pond 5 has a storage capacity of 24.6 MG.
- A water balance evaluation was completed for a "normal rainfall record" and for rainfall record equivalent to a 10-year return period wet weather season. Annual precipitation totals from the UC Agriculture and Natural Resources Weather database were used to determine the recurrence interval for each year between 1951 and 2017. A Weibull plot was then used to determine the annual precipitation corresponding to a 10-year recurrence interval. The annual precipitation for a 10 year wet season is 51.7 inches. The average precipitation based on the data was 35.6 inches. Based on that information, 2010 (total precipitation of 51 inches) was selected as the wet year, and 2011 (total precipitation of 36.9 inches) was selected as the normal year.
- Monthly Rainfall data from 2010 (wet year) and 2011 (normal year) were obtained from the National Climatic Data Center (NCDC) #7643 in St. Helena.
- Evapotranspiration rates were obtained from the California Irrigation Management Information System (CIMIS) for Oakville (Station ID 077).

- Allowable seepage rate is assumed to be 1×10^{-6} centimeters per second (cm/sec) per the California NRCS Conservation Practice Standard 313, and was used for all existing ponds.
- Existing irrigation field is assumed to be an irrigated pasture, with grasses 4 to 6 inches tall. Per the California Department of Water Resources Leaflet 21427, the evapotranspiration rate (ET_o) is 1.0, which is the same as the average ET_o for alfalfa. If the irrigation field is planted with alfalfa, then a leaching fraction of 0.1 can be applied.
- Irrigation system efficiency is at 70%.
- The ADWF of 0.65 MGD and AWWF of 1.22 MGD were used for the design flows in the future.
- Pond 5 is assumed to hold water when the irrigation water demand is low, and then gradually discharge as irrigation demand increases and the river-to-effluent flow ratio is at least 50:1, such that the storage is empty by September 1st each year; at which point the cycle starts again. The amount of storage is calculated to balance with the irrigation area required for a given scenario.
- "Optimized" discharge indicates a planning scenario in which the City will discharge all treated effluent out of Pond 4 (after disinfection) to the river whenever the flow ratio is met, and will also optimally discharge stored water in Pond 5 to the river whenever the flow ratio is met.

The results for the six baseline scenarios are presented in Table 45, and detailed calculations are provided in Appendix G.

Table 45 Baseline Water Balance Results

Scenario	Conditions	Existing Storage (Pond 5), MG	Total Storage Required, MG	Additional Storage Required, MG	Existing Irrigation Area, ac	Total Irrigation Area Required, ac	Additional Irrigation Area Required, ac
1	Existing flow, Normal Year	25	57	32	70	96	26
2	Existing flow, Wet Year	25	138	113	70	176	106
3	Existing flow, Normal Year, with optimized Discharge and alfalfa	25	26	1	70	55	0
4	Existing flow, Wet Year, with optimized Discharge and alfalfa	25	27	2	70	50	0
5	Future flow, Normal Year, with optimized Discharge and alfalfa	25	80	55	70	70	0
6	Future flow, Wet Year, with optimized Discharge and alfalfa	25	56	31	70	70	0

The overall conclusion from the analysis is that there is an issue with storage and wintertime disposal. Under existing wastewater flows in both normal and wet precipitation years, the City has not taken advantage of discharging to the river when possible (Scenarios 1 and 2, which directly used recorded precipitation, plant flow, and discharge data), and therefore required much more storage and irrigation area than available. If the City optimizes discharge to the river and actively manages the storage pond elevations during the winter months, then the current irrigation area

satisfies the irrigation needs, but additional storage, although marginal, is still required (Scenarios 3 and 4). Based on the water balance, the existing storage cannot accommodate future flows. In order for the City to handle future flows, a new water management strategy will need to be developed, which will include a combination of utilizing storage, outflow to percolation, and/or increasing the irrigation area. Recommendations to address the storage requirements are provided in Section 8.3.

8.2 Wetland Water Balance

To assess the effects of the proposed wetlands (Alternative 2) on the City's disposal pathways, a water balance was developed to determine the amount of storage and the amount of area necessary to accommodate spray irrigation under current and future flows.

The assumptions and information used in the wetland water balance are the same as the baseline case, with the exception that constructing wetlands would reduce the area available to approximately 50 acres, and the allowable seepage rate of 1×10^{-6} cm/sec was applied for the wetlands too. The main difference between the baseline model and the wetlands model is that there is more evaporation and seepage in the wetlands model due to its surface area.

The table below summarizes the irrigation and storage requirements under six different scenarios. Details on the water balance calculations are provided in Appendix G and will be refined if the City decides to pursue this alternative.

Table 46 Wetland Water Balance Results

Scenario	Conditions	Existing Storage (Pond 5), MG	Total Storage Required, MG	Additional Storage Required, MG	Existing Irrigation Area, ac	Total Irrigation Area Required, ac	Additional Irrigation Area Required, ac
1	Existing flow, Normal Year	25	61	36	50	81	31
2	Existing flow, Wet Year	25	153	128	50	166	116
3	Existing flow, Normal Year, with optimized Discharge and alfalfa	25	27	2	50	32	0
4	Existing flow, Wet Year, with optimized Discharge and alfalfa	25	28	3	50	32	0
5	Future flow, Normal Year, with optimized Discharge and alfalfa	25	81	56	50	56	6
6	Future flow, Wet Year, with optimized Discharge and alfalfa	25	57	32	50	67	17

Similar to the baseline water balance model, the overall conclusion from our analysis is that there is an issue with storage and wintertime disposal. Under existing wastewater flows in both normal and wet precipitation years, the City has not taken advantage of discharging to the river when possible (Scenarios 1 and 2, which directly used recorded precipitation, plant flow, and discharge data), and therefore required much more storage and irrigation area than available. If the City optimizes discharge to the river and actively manages the storage pond elevations during the winter months, then the current irrigation area satisfies the irrigation needs, but additional storage, although marginal, is still required (Scenarios 3 and 4). Based on the water balance, the existing storage and

sprayfield area cannot accommodate future flows. Generally, more storage, outflow to percolation, and/or irrigation area is required for the wetlands than for the baseline scenario/ trickling filter (Alternative 2).

With the Napa River to the north of the WWTRP and private properties and vineyards surrounding the facility, this means that the City does not have enough land in close proximity to irrigate the secondary-treated reclaimed water during future design flows if wetlands were constructed. Because there is limited storage and area for irrigation, this alternative may not be feasible unless additional measures are performed to minimize the amount of excess water. Recommendations to address the storage, additional disposal and irrigation requirements are provided in Section 8.3.

8.3 Recommendations on Water Management Strategy

Based on the water balance models, the existing Pond 5 and irrigation area is insufficient to accommodate the flows under certain current and all future conditions. Regardless of the chosen alternative, GHD recommends the City to consider the following recommendations for their water management strategy.

8.3.1 Irrigation Recommendations

The City currently has approximately 70 acres of on-site irrigation, although it is not currently configured and managed to maximize application. GHD recommends that the City evaluates the existing irrigation area to be redeveloped and managed to maximize irrigation effectiveness. This will include replanting the area with alfalfa, and verifying that there is proper grading to minimize runoff. However, it is anticipated that the introduction of alfalfa would only decrease the amount of excess water, and a significant amount of water would still need to be stored or disposed of or used elsewhere.

Note that in Tables 45 and 46, the irrigation requirement in Scenarios 3 and 4 is less than the existing irrigation area, meaning that if the City optimizes discharge to the river, there will not be enough water to irrigate the entire area with reclaimed water. There are a number of strategies available to handle this situation and in fact it can be beneficial for farming that there would be excess land available. For example, when a crop like alfalfa is grown, it is possible to adjust the amount of irrigation water applied to the overall area and reduce the number of cuttings that can be achieved. Alternatively, some land could be rotated out of production allowing for one crop to be harvested while simultaneously planting another. This will allow the irrigation area to be used for both current and future flow situations.

8.3.2 Off-site Demand

In addition to increasing discharges to the Napa River and maximizing application to the spray fields, the City will consider off-site recycled water use in order to handle excess water that cannot be discharged, stored, or reused in the spray irrigation fields. It may be possible for the City to increase overall off-site demand so that no further development of on-site irrigation area beyond the 70 acres is necessary.

The City is currently developing a survey to determine if there is demand and additional customers for off-site recycled water. Results from the new demand survey were not available for this Feasibility Study. If there is demand for recycled water and if the City decides to pursue additional treatment to provide recycled water, this would add another level of design and construction costs, as described in Section 10.

However, even if there is demand for off-site irrigation, there is still a storage and disposal issue; during the winter months. Irrigation demand (both on-site and off-site) during the winter months is low, and storage and disposal are the key constraints.

8.3.3 Storage and Additional Disposal Recommendations

Based on the water balances, additional storage and as a result an additional method of disposal is required. Storage is an essential part of reclaimed water management, but the City can only accommodate 24.5 MG in Pond 5 and therefore does not currently have sufficient storage capacity for wintertime flows, both under current and future flows. To minimize the amount of storage under current flows, the City can implement the following operational changes:

- Since demand for irrigation is low during wet weather and the river stage is likely to be elevated, the City can discharge to the river to the maximum extent permissible after treatment and disinfection through Pond 4.
- Water surface elevations in Pond 5 should be monitored during the winter months, and water should be discharged to the river to the maximum extent permissible while also maintaining storage for irrigation during the summer months.

However, even with the operational modifications, an additional 1-3 MG of water is not discharged and therefore additional storage and disposal is still necessary to manage the current flows.

Furthermore, it is estimated that a total of approximately 80 MG of storage would be needed to accommodate future flows during wet years (81 MG if wetlands are constructed), which would require the development of an additional 39-55 MG of storage on site. Ultimately, the stored water will need to be disposed in order to provide adequate volume for incoming flows that cannot be discharged to the river or irrigation field. The best alternative is to dispose the water while storing because it would decrease the amount of required storage area. To accommodate the excess water, the following alternate disposal methods are recommended for further investigation:

1. Consider disposal through an unlined or partially lined ("leaky") wetland or storage pond such that there is outflow through percolation. With this option, the wetland or storage pond would have a seepage rate greater than 1×10^{-6} cm/sec to allow treated water to percolate into the ground. The concept of a "leaky" wetland or storage pond takes advantage of natural processes to purify water as it moves downward through soil to recharge the groundwater. This storage pond would only be used during the winter season when flows are typically higher and constituents in the water would be at a lower concentration due to dilution such that the infiltration of the water would not adversely affect groundwater. Furthermore, constructing the storage pond would decrease the amount of land available for irrigation potential but would provide disposal through infiltration.

If outflow to percolation was included in the water management strategy, then approximately 66 MG of water per year will need to infiltrate into the ground, with a maximum of 20 MG per two weeks. See Appendix G for detailed calculations showing the volume of water necessary for percolation if discharge to the river, and the 25 MG storage pond and the 70 acres of irrigation area are fully utilized. This option is discussed further in the Section 9.

2. Modify the existing irrigation field to allow for additional spray irrigation. If the City was allowed to spray at a rate greater than agronomic rate, then the water can percolate into the ground, similar to the "leaky" storage pond or wetland described in Recommendation 1 during winter months. To manage runoff from the increased spray irrigation, berms would be

constructed along the perimeter of the fields and runoff would be managed with a tail water pump station.

3. Decrease the dilution ratio. Currently, the NPDES permit only allows discharges to the river when the river-to-effluent flow ratio is at least 50:1. If the ratio was decreased to 20:1 then storage requirements would be significantly lower.

In order to proceed with the recommendations listed above it is necessary to first obtain additional information on the groundwater. Larry Walker and Associates is developing a Report of Waste Discharge (ROWD) for the irrigation field. The ROWD will include information on groundwater movement and fate, groundwater monitoring, and nutrient balance of nitrogen discharges.

An initial infiltration assessment was completed in October 2017, which determined infiltration rates within the irrigation fields. As discussed in Section 9, this information will be used to calculate the subsurface disposal needed to size disposal facilities and determine groundwater movement based on additional disposal. This information would allow the City a "leaky" storage pond and/or to determine the effects of nutrient loads on the irrigation area. Unfortunately, the potential effects to groundwater from the discharges to the irrigation field are not available at the time this Feasibility Study was prepared. Depending on the results of the ROWD, the City may be able to discharge to the irrigation field at a rate greater than agronomic needs or dispose through infiltration such that the excess water can percolate into the ground.

9. Infiltration Disposal

As discussed in the previous Section, additional storage capacity is needed to dispose of all of the effluent during the winter months for either secondary treatment process alternative. This Section discusses the feasibility of storing the effluent in the irrigation fields and slowly infiltrating it into the soil for disposal (i.e. unlined “leaky” storage pond). An infiltration study was conducted in 2017 by GHD to determine the percolation and infiltration rate of water into the soil at the irrigation fields. The study is summarized below, and the data is used to determine the size and configuration of the area needed for infiltration disposal.

9.1 Initial Infiltration Assessment

In July and August 2017, GHD performed seven percolation tests in the irrigation fields, as detailed in the Initial Infiltration Assessment (Appendix J). The percolation tests were completed in borings drilled 2 to 3-1/2 feet deep below the existing site grade. Based on the field and laboratory testing, GHD concluded that the preliminary design infiltration rate across the site is 1×10^{-5} cm/second (0.34 inches/day).

Actual infiltration rates may vary from this value depending on the location and depth of the infiltration detention basin, or if the test were conducted during the wet season. It is recommended that the percolation tests be repeated during wet weather events.

9.2 Infiltration Storage Pond Sizing

Based on an infiltration rate of 0.34 inches/day, the equivalent infiltration rate for an acre is calculated as 9,236 gal/ac/day. The area needed to dispose of the additional storage was calculated for worst case scenario in the baseline conditions, which is Scenario 5 for future flow in a normal year with optimized discharge to the Napa River and alfalfa crops planted in the irrigation fields.

For Scenario 5, the highest disposal capacity need occurs during the first half of November, in which approximately 19 MG of effluent would need to be disposed of over 15 days. If this volume is infiltrated into the soil at the rate of 0.34 inches/day over 15 days, it would require 138 acres. This area is greater than the existing area and would not be a feasible solution.

It may also be possible to store the effluent in a shallow pond for slow infiltration and disposal of the effluent into the soil. The pond may be created by constructing short berms (e.g. 6 to 18-inches tall) around a few acres of the irrigation fields. The area would be minimally graded and would serve the dual purpose for disposal through the existing spray irrigation system and infiltration. The area required for a shallow infiltration pond with storage is significantly less than the area required for infiltration straight into the soil with no storage capacity included. For example, the area required could range from 3 to 8 acres, depending on the depth. A deeper pond would require less area but the total disposal duration would increase. The infiltration pond sizing results are shown in the table below.

Constructing a small shallow infiltration storage pond would allow the WWTRP to increase its effluent storage capacity significantly while using up only a small fraction of the available irrigation field area. The size and configuration of an infiltration pond would be further refined during design.

Table 47 Infiltration Storage Pond Sizing

Conditions	Outflow to Percolation (MG)	Storage Needed, gal / day ¹	Acres Needed-no depth ²	Acres Needed for 6" High Pond ³	Acres Needed for 12" High Pond ³	Acres Needed for 18" High Pond ³
Scenario 5: Future flow, Normal Year, with optimized Discharge and alfalfa	19.17	1,278,000	138	7.8	3.9	2.6

Notes:

1. Calculation: Outflow to percolation * 1000000 / 15 days.
2. Calculation: Storage Needed / Infiltration Rate per Acre.
3. Calculation: Storage Needed / Height of Pond / 7.48 gal per cf / 43,560 sf per acre.

The estimated conceptual opinion of probable cost for the infiltration pond sized conservatively at 8 acres is included in Table 48. Costs include sitework needed to grade the pond area, construct berms, construct piping and valves to and from the infiltration pond, pumps to convey water to the ponds, and electrical and instrumentation for the pumps and valves.

Table 48 Infiltration Pond Conceptual Opinion of Probable Cost

Item	Quantity	Unit	Unit Cost	Total
Sitework	8	AC	\$ 23,149	\$ 185,200
Yard Piping / Valving	1	LS	-	\$ 37,040
Pumps	1	LS	\$ 50,000	\$ 50,000
Electrical and Instrumentation	1	LS	-	\$ 25,000
Subtotal				\$ 297,200
Mobilization			5%	\$ 14,900
Bonds			3%	\$ 8,900
Engineering Design Services			20%	\$ 59,400
Construction services and Start-up			10%	\$ 29,700
Contractor's Overhead and Profit			15%	\$ 44,600
Contingency			30%	\$ 89,200
Total Project Cost (Excludes O&M)				\$ 543,900

10. Groundwater Modeling Study

The SFBRWQCB issued a notice of violation letter to the City stating that the reclaimed wastewater was being land applied at greater than agronomic rates. The letter included a requirement that the City develop a Groundwater Monitoring Plan to characterize groundwater depth, quality, and movement, and any potential changes that may occur as a result of the land discharge practices. LWA developed the Groundwater Monitoring Plan which included installing seven new monitoring wells around the perimeter of the land discharge area. LWA developed a report to describe sample collection from the monitoring wells and the groundwater model used to simulate flow and transport in the area of the WWTRP. The report, "St. Helena WWTRP: Groundwater Investigation / Fate and Transport Modeling Report" (LWA, June 2018), is included in Appendix K.

10.1 Monitoring Wells

The seven monitoring wells (MW-1 to MW-7) were installed and completed development on November 7, 2017. The wells are considered shallow aquifer monitoring wells with total depth for each well ranging from 40.2 feet below ground surface (bgs) to 60.6 feet bgs. One effluent monitoring location, REC-001, was also identified to compare effluent results with monitoring well results. The location of the monitoring wells and effluent monitoring location is shown in Figure 25.

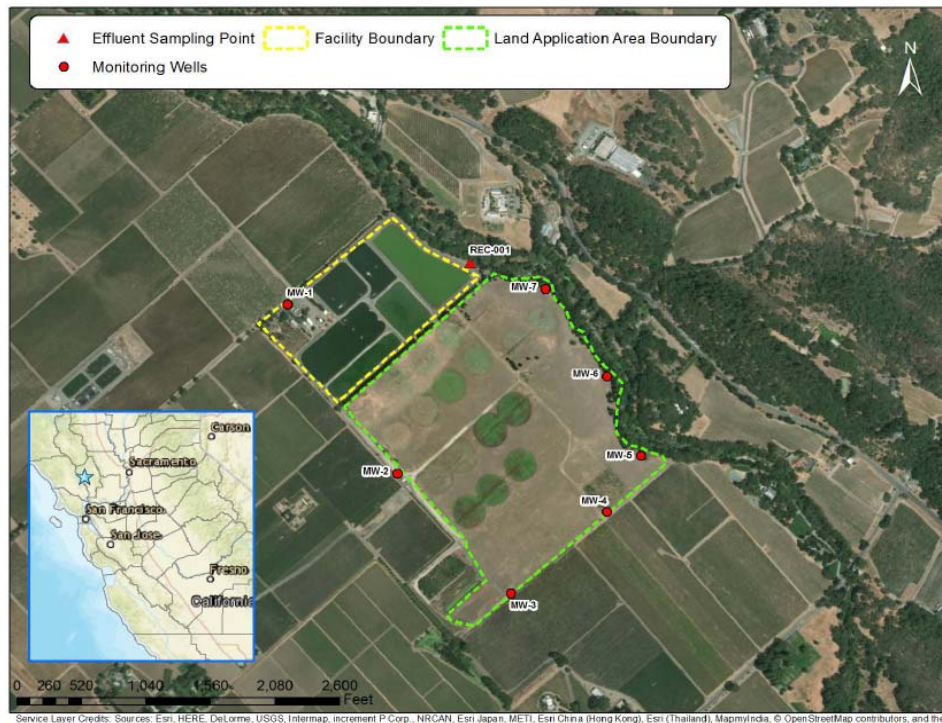


Figure 25 – Groundwater Monitoring Well Locations (LWA, 2018)

10.2 Monitoring Well Data and Results

Monitoring well data for the study was collected monthly from November 2017 to April 2018 and included the following constituents:

- Depth to groundwater
- Static Water Level and Direction of Gradient
- Color
- pH
- Conductivity
- Dissolved Oxygen
- Temperature
- Turbidity
- Total Coliform
- Biochemical oxygen demand (BOD5) (20°C)
- Total Dissolved Solids (TDS)
- Total Suspended Solids (TSS)
- Chloride
- Total Kjeldahl Nitrogen (TKN)
- Ammonia-N
- Nitrate-N

The groundwater depth ranged from approximately 10 feet bgs to 25 feet bgs, and typically decreased in depth through the course of sampling. The change in depth is likely due to seasonal variations in groundwater depth during the wet season. The depth did not decrease for MW-6 and MW-7, which may be due to their closer proximity to the Napa River keeping levels relatively stable.

The water quality sampling results are summarized in Table 49. The results appear to indicate that the groundwater is minimally impacted by the effluent discharge to the irrigation fields. The water samples are considered of reasonable water quality, except for the total coliform readings as noted in Table 49. MW-7 is located closest to the aeration ponds, which may be affecting the water quality, as noted by the higher dissolved oxygen levels. It is recommended that further data analysis be conducted on samples collected during the dry season.

Table 49 Water Quality Sampling Results Summary

Constituent	Results Summary
Dissolved Oxygen	MW-7 levels higher than other wells
Turbidity	November samples results higher than subsequent sample results, possibly due to residual sediment from installation
Total Coliform	Detected: MW-4, November MW-7, all samples (highest measurement at 1,600 MPN/100 ml in November which dropped to 79 MPN/100 ml in April) MW-5, January MW-2, January, April MW-3, January
Biochemical oxygen demand (BOD5) (20°C)	Non-detect for all samples
Total Dissolved Solids (TDS)	Below MCL all samples
Total Suspended Solids (TSS)	November samples results higher than subsequent sample results, possibly due to residual sediment from installation
Chloride	Below MCL all samples
Total Kjeldahl Nitrogen (TKN)	Below MCL all samples
Ammonia-N	Non-detect or low-level detection
Nitrate-N	Below MCL all samples

Source: LWA, 2018.

10.3 Groundwater Fate and Transport

LWA developed a flow simulation model to assess the groundwater movement and fate in the effluent land application area in order to determine potential impact on the Napa River. The groundwater model is only focused on the upper shallow aquifer beneath the WWTRP and irrigation fields.

Based on groundwater elevation data collected from the monitoring wells, and simulated by the groundwater model, the groundwater generally flows east and southeast. The observed groundwater elevations also show a strong gradient towards MW-7, however, LWA concluded that the groundwater data for MW-7 is likely not accurate and MW-7 monitoring results are not included in the model.

The model was used to simulate the movement of the effluent through the underlying aquifer, which indicated that the effluent moved relatively slowly towards the east and southeast boundaries.

10.4 Nutrient Loading

The SFBRWQCB requested an analysis of the nutrient loading on the irrigation fields, which includes nitrogen loading based on effluent water quality, nutrient uptake capacity of the vegetation in the irrigation fields, and potential for degradation of the groundwater and surface water quality. Nitrate as nitrogen was measured in all of the monitoring wells during the 2017-2018 sampling set and ranged from non-detect to 10 mg/L. The City does not have a nitrate effluent limit currently, however, it is anticipated that it may be set at 10 mg/L or less in the future.

Nutrient loading scenarios were modelled to estimate the nitrate concentrations in the groundwater based on various effluent nitrate loading rates (20, 35 and 45 mg/L) and flows (dry and normal

years). Wet years were not modelled because discharge to the Napa River could be maximized, therefore, the volume of water requiring disposal would be less than agronomic rates.

The results indicated that during a normal year, effluent nitrate concentrations applied to the irrigation fields up to 45 mg/L of nitrate would result in potential groundwater nitrate concentrations of less than 10 mg/L. During a dry year, effluent nitrate concentrations applied to the irrigation fields at 20 mg/L of nitrate would result in potential groundwater nitrate concentrations of less than 10 mg/L. During a dry year, effluent nitrate concentrations applied to the irrigation fields at 35 or 45 mg/L of nitrate would typically be below 10 mg/L, but could potentially result in groundwater nitrate concentrations up to 23 mg/L. The results are included in Table 50.

Based on the modelling results, the effluent nutrient loading to the irrigation fields will typically have minimal impact on the groundwater nitrate levels. However, it is possible that groundwater nitrate concentrations may exceed 10 mg/L at higher effluent nitrate concentrations during dry years, in which case, the denitrifying sand filter should be utilized to decrease nitrate concentrations in the effluent.

Table 50 Modeled Nutrient Loading Scenario Results

Normal Year	Nitrate Concentrations (mg/L)							
	Current Effluent		Effluent = 20 mg/L		Effluent = 35 mg/L		Effluent = 45 mg/L	
Well	Min	Max	Min	Max	Min	Max	Min	Max
MW-4	3.1	6.3	3.1	6.3	3.1	6.3	3.1	6.3
MW-5	1.6	2.2	1.6	2.2	1.6	2.2	1.6	2.2
MW-6	0.5	1.8	1.7	4.4	1.7	7.5	1.7	9.6
Dry Year	Nitrate Concentrations (mg/L)							
	Current Effluent		Effluent = 20 mg/L		Effluent = 35 mg/L		Effluent = 45 mg/L	
Well	Min	Max	Min	Max	Min	Max	Min	Max
MW-4	3.1	6.3	3.1	6.3	3.1	6.3	3.1	6.3
MW-5	1.6	2.2	1.6	2.2	1.6	2.2	1.6	2.2
MW-6	0.5	1.8	1.7	9.9	1.7	17.5	1.7	22.6

Source: LWA, 2018.

11. Ability to Produce Recycled Water

11.1 Recycled Water Title 22 Effluent Limits

Recycled water must meet the requirements under California Code of Regulations, Title 22, Division 4, Chapter 3 Water Recycling Criteria (Title 22 regulations). These regulations stipulate the level of treatment required for various end uses of recycled water in addition to system redundancy and reliability. A sample of end uses and required level of treatment is presented in Table 51.

Table 51 Required Water Qualities for Potential Uses

Potential Use	Treatment Level
Irrigation:	
Orchards and vineyards with no contact between edible portion and recycled water	Undisinfected Secondary
Fodder and fiber crops and pasture for animals not producing milk for human consumption	Undisinfected Secondary
Ornamental nursery stock, sod farms not irrigated less than 14 days before harvest	Undisinfected Secondary
Surface irrigation of food crops where recycled water does not contact edible portion of crop	Secondary-2.2
Freeway landscaping	Secondary-23
Non-edible vegetation in controlled access area	Secondary-23
Pastures for milk-producing animals for human consumption	Secondary-23
Surface irrigation of edible food crops where recycled water contacts edible portion of crop (including roots)	Disinfected Tertiary
Parks and playgrounds	Disinfected Tertiary
School yards	Disinfected Tertiary
Residential landscaping	Disinfected Tertiary
Unrestricted-access golf course	Disinfected Tertiary
Restricted access golf course	Secondary-23
Cemeteries	Secondary-23
Other Uses:	
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist	Disinfected Tertiary
Flushing toilets and urinals	Disinfected Tertiary
Industrial process water that may contact workers	Disinfected Tertiary
Commercial car washes	Disinfected Tertiary
Dust control	Secondary-23
Mixing concrete	Secondary-23
Soil compaction	Secondary-23
Wash down of outdoor work areas	Secondary-23
Flushing Sanitary Sewers	Undisinfected Secondary

The primary purpose of this Feasibility Study is to evaluate alternatives which will help the WWTRP meet the interim effluent limits in the CDO and the effluent limits in the 2016 NPDES permit. The CDO requires the assessment of each alternative to produce recycled water or explain the additional efforts required to produce recycled water. For either alternative evaluated, the most likely reuse options would include crop irrigation and landscape irrigation including schools and parks. Given these likely uses, it is assumed disinfected tertiary level treatment would be required.

The 2006 WWTRP Design Memo presented a recycled water demand analysis which identified total recycled water demands within the City of 400 acre-feet annually (afa). Of that total, approximately 213 afa are attributable to 65 acres of turf irrigation and 190 afa are attributable to 380 acres of agricultural irrigation within the City limits. The report also estimated the maximum annual recycled water production volumes under ADWF and 100-Year storm events as approximately, 950 and 1,450 afa, respectively.

The potential recycled water demand within City limits is anticipated to be on the order of 25% and 40% of the recycled water production during peak and average years, respectively. The excess 60% to 75% of water produced would need to be discharged, reclaimed at the WWTRP's irrigation fields, or recycled outside the City limits. While the 2006 WWTRP Design Memo identified approximately 1,174 acres potentially available for recycled water use outside the City limits these areas are dominated by vineyard agriculture which are typically irrigated with onsite groundwater sources which, in some cases, may be augmented with the vineyard's own reclaimed water system. In addition, nitrogen levels in the recycled water may be of concern at some vineyards where nitrogen fertilization is not practiced. For these reasons, little demand from vineyards is anticipated especially under current regulatory conditions which do not explicitly limit groundwater pumping by the vineyards. The more feasible option is continued discharge to the irrigation fields or to the Napa River which would require secondary treatment to meet the existing WRR and NPDES limits.

Only under an offsite recycled water discharge scenario would further treatment be required beyond the improvements to the secondary treatment processes described under Alternatives 1 and 2 (constructed wetlands and trickling filter, respectively). St. Helena has considered recycled water as a third option for disposal of its treated effluent. Implementing a recycled water program would require the following infrastructure:

- Tertiary treatment process(es)
- Tertiary effluent recycled water storage
- Recycled water distribution pumps
- Recycled water transmission piping to users
- Provision of irrigation service laterals to customers
- Provision of irrigation system cross connection control
- Acquisition and development of real estate for off-site facilities

The transmission mains would be designed to convey the ultimate discharge capacity allowing for future zero discharge to the Napa River. Under such a scenario, the distribution system and pump stations would be designed for peak flows greater than 4,000 gpm to handle the 100-year precipitation season (3,000 gpm under normal precipitation year flows). A recycled water storage reservoir of approximately 1.7 MG would provide approximately two days of peak month irrigation demand within the City limits based on the 2006 WWTRP Design Memo.

Under the potential recycled water system outlined in the 2006 WWTRP Design Memo, and assuming facilities are sized for recycled water demand within the City limits only, it can be assumed that the distribution facilities would include:

- Disinfected tertiary storage facilities capable of storing 1.7 MG,
- A pump station rated for 2.1 MGD, 750 kW backup generator, hydraulic surge control, and VFDs,
- Approximately 21,000 feet of 18-inch DIP or 20-inch PVC transmission main, and
- Approximately 60,000 feet of smaller diameter PVC distribution piping.

The recycled water system would be required to consistently achieve treatment standards established under Title 22 which would necessitate tertiary treatment options such as a filtration system and include measures ensuring system redundancy and reliability. Measures to provide system redundancy and reliability would include:

- Monitoring of treatment unit capacity (e.g., measuring pond sludge levels),
- Automated alarms (e.g., effluent water quality, pump/equipment failure, chemical storage levels),
- Backup metering pumps for chlorination, dechlorination, or any other chemical dosing,
- Automated metering pumps,
- Automatic shutdown of tertiary system for out of spec water quality,
- Control of filtration loading rate below maximum allowed,
- Inline water quality monitoring.

A tertiary level of treatment would not be required to meet the new discharge limits under the SFBRWQCB's 2016 Order as advanced secondary treatment would be able to achieve those limits. Although this Feasibility Study does not evaluate capital and operating costs or provide planning for a recycled water system, it is likely that new infrastructure to deliver recycled water to customers in the City would likely not be cost effective compared to the currently employed discharge scenarios. Further investigation into a future recycled water system is warranted to update the evaluation in the 2006 WWTRP Design Memo and reassess projected demand and cost effectiveness. A conceptual cost estimate for the recycled water system is presented in Table 52.

There is a potential opportunity to discharge recycled water to neighboring vineyards, although the viability of this option is considered low. As shown in Table 51, undisinfected secondary-treated water may be applied to orchards and vineyards with no contact between edible portion and recycled water. In practice, this would allow application in vineyards through drip irrigation although it is recommended that the reuse of secondary treated wastewater utilize disinfection even though the regulations allow undisinfected secondary wastewater for that application. This use of recycled water would preclude the need for tertiary-levels of treatment and would reduce the footprint of a recycled water distribution piping network; however, basic infrastructure needed would still include a means of pumping recycled water and conveying it to surrounding vineyards. The aforementioned disincentives mentioned above would still apply (i.e., reluctance of vineyards to accept wastewater, presence of vineyard-owned wells and reuse facilities, lack of regulatory drivers, etc.). The City would likely need to offer the recycled water at a rate competitive with the vineyard's current costs of pumping and distributing groundwater. Anecdotally, St. Helena WWTRP operations staff has

indicated that there is little interest amongst local vineyards to obtain reclaimed water from the facility.

St. Helena staff has recently reached out to local vineyards to inquire about their potential use of recycled water, but to date they have received little interest in response. In addition, staff contacted the Napa County Farm Bureau for further information regarding existing or perceived need for recycled water. The Farm Bureau did not have definitive information regarding potential users, but did indicate that there is a need for water on the west side of St. Helena.

Further efforts to evaluate the level of interest among neighboring vineyards or other agricultural enterprises are recommended so that the viability of this discharge option can be determined using numbers reflective of actual demand and backed by potential user commitments. Without specific information for potential users, this section of the Feasibility Study relies on hypothetical demand considering both a full-scale recycled water system for users inside the city limits as conceptualized in the 2006 WWTRP Design Memo and summarized above, as well as a limited-scale system intended to serve a few vineyard owners within the western city limits in accordance with the Farm Bureau's suggestion that there may be a need in that area.

A limited-scale recycled water system may be more realistic in the short-term since the required infrastructure needs and costs would be lower than a fully built-out recycled water treatment and distribution system envisioned in the first scenario described in the beginning of this section.

Disposal of treated wastewater via water recycling is generally most difficult during the winter months when irrigation demand is lowest. In addition, disposal through land application is typically limited by the elevated moisture content of soils during and after storm events. The most viable option during this period is surface water discharge when flows in the Napa River are highest. Use of water for frost protection during the winter months presents another viable option; however, use in this manner is not as consistent as irrigation use since frost protection is needed on relatively few nights over the course of the winter.

Temperature data were obtained from the National Oceanic and Atmospheric Administration's National Climatic Data Center's online portal (<https://www.ncdc.noaa.gov/>) for St. Helena from 2010 through 2016. The data were evaluated for the number of days with temperatures at or below 32°F as an indicator of likely days requiring water for use in frost protection. Over this time period, the average number of days per year with minimum temperatures equal to or less than 32°F is approximately 13 days, with a range of 2 to 25 days.

According to information provided through UC Davis' Biometeorology Group, instantaneous application rates for frost protection may range from 36 to 45 gpm/AC based on low wind speed and temperatures of 29°F (<http://biomet.ucdavis.edu/frostprotection/Sprinkler%20Application/fp004.html>) which exceeds the peak unit demand for irrigation use of 1.6 gpm/AC. Assuming a 3 hour window per frost event during which frost protection would be required, approximately 6,500 to 8,100 gallons per acre would be required during a frost event. Storage would be required to reserve this water between frost events as it would likely not be needed for irrigation during this time. Tertiary water production would have to be managed to meet this demand while relying on discharge to the Napa River during periods when there is no frost protection demand.

Two approaches to meet frost protection demand would be:

- City installs a centralized recycled water storage and pumping facility which could meet the frost protection demand

- End users provide on-site storage and pumping facilities that could meet their individual frost protection needs.

The latter approach would be more likely to be implemented as it could allow the City to size its tertiary treatment, pumping, and conveyance systems supply peak irrigation demands which would require less space and cost to install.

An area totaling approximately 78 acres adjacent to the St. Helena High School was used in this analysis as a hypothetical service area for a limited recycled water program. Peak flow requirements for summertime irrigation would be approximately 150 gpm. Providing two days of storage would require a reservoir of approximately 200,000 gallons. In contrast, the frost protection peak demand would be expected to be approximately 2,800 gpm and storage for one day would require a reservoir of approximately 500,000 gallons.

Under this limited-scale scenario the recycled water system would include the following:

- 0.1 MGD tertiary treatment system
- Pumping and distribution facilities sized for peak flows of 150 gpm.
- 200,000 gallon recycled water storage tank

The users of the recycled water would be responsible for storing purchased water onsite and pumping to meet demand at their vineyards. Costs for this limited-scale scenario are provided in Table 52.

Ultimately, the demand for recycled water in and surrounding St. Helena would need to be evaluated to verify if either a limited- or full-scale program is feasible. Options for funding including changes to existing rate structures, new rates for recycled water use, grants, or other mechanisms need to be explored to raise the necessary capital for these improvements. The St. Helena WWTRP's primary obligation and mission is to meet the requirements of the CDO and provide sufficient wastewater treatment for safe discharge into the Napa River. Until that objective is met, the implementation of a recycled water program will likely need to be delayed pending further evaluation of its feasibility.

Table 52 Conceptual Costs for Full-Scale Recycled Water Distribution System

Item	Unit	Cost	Quantity	Total
Civil/Structural/Mechanical				
Tertiary Treatment	LS	\$ 2,745,000	1	\$ 2,745,000
Recycled Water Storage Tank	LS	\$ 4,126,000	1	\$ 4,126,000
Recycled Water Pump Station	LS	\$ 1,385,000	1	\$ 1,385,000
Main Transmission Line Station	LF	\$ 235	21,000	\$ 4,944,000
Main Transmission Line Station	LF	\$ 180	60,000	\$ 10,803,000
Electrical and Instrumentation				
	LS	\$ 1,651,000	1	\$ 1,651,000
Subtotal				\$ 26,654,000
Geotechnical	LS	\$ 75,000	1	\$ 75,000
Utility Location/Potholing	LS	\$ 19,000	1	\$ 19,000
Mobilization		5%		\$ 1,283,000
Bonds		3%		\$ 770,000
Engineering Design Services		20%		\$ 5,131,000

Item	Unit	Cost	Quantity	Total
Construction services and start-up		10%		\$ 2,565,000
Contractor's Overhead and Profit		15%		\$ 3,848,000
Contingency		30%		\$ 7,696,000
Total Project Cost (Excludes O&M)				\$ 47,041,000

Table 53 Conceptual Costs for Limited Recycled Water Distribution System

Item	Unit	Cost	Quantity	Total
Civil/Structural/Mechanical				
Tertiary Treatment	LS	\$ 796,000	1	\$ 796,000
Recycled Water Storage Tank	LS	\$ 485,000	1	\$ 485,000
Recycled Water Pump Station	LS	\$ 415,000	1	\$ 415,000
Main Transmission Line Station	LF	\$ 180	11,350	\$ 2,044,000
Electrical and Instrumentation	LS	\$ 339,000	1	\$ 339,000
Subtotal				\$ 4,079,000
Geotechnical		\$ 48,000	1	\$ 48,000
Utility Location/Potholing		\$ 14,000	1	\$ 14,000
Mobilization		5%		\$ 204,000
Bonds		3%		\$ 122,000
Engineering Design Services		20%		\$ 612,000
Construction services and start-up		10%		\$ 408,000
Contractor's Overhead and Profit		15%		\$ 612,000
Contingency		30%		\$ 816,000
Total Project Cost (Excludes O&M)				\$ 6,917,000

12. Disinfection System

12.1 Description of Existing Disinfection System

12.1.1 Existing Disinfection Facilities

The existing disinfection system was originally constructed in 1982 and 1987. It consists of a chlorine building, chlorine contact tanks, effluent pump station, and dechlorination system. The WWTRP originally used chlorine gas as the disinfectant chemical, and has since switched over to sodium hypochlorite. Sulfur dioxide was also previously used as the dechlorination chemical, however, WWTRP staff stated that it did not perform well and are currently using ascorbic acid to dechlorinate the wastewater effluent prior to discharge to the Napa River.

The disinfection system was previously operated as a batch system, in which water was stored in Pond 4 and sent to the chlorine contact tanks in batches at a flow rate of approximately 1,500 gpm. The disinfection system is currently operating continuously in order to increase the contact time in the chlorine contact tanks.

Chlorine Building

The chlorine building is located adjacent to the WWTRP headworks and near Pond 1A (Figure 26). The chlorine building is used to store the sodium hypochlorite chemical tanks and chemical metering pumps.

WWTRP staff stated that the sodium hypochlorite usage rate is approximately 100 to 150 gallons per day. It is estimated that the chlorine strengths may decrease from about 15% to 11% over the course of a month.

The ascorbic acid is delivered in powder form. The ascorbic acid is mixed in batches every 1 to 1.5 days and stored in a tank adjacent to the chlorine contact tanks.

The sodium hypochlorite and ascorbic acid are dosed using 2 Tuthill metering pumps each. The target dose for sodium hypochlorite is 45 mg/L. The sodium hypochlorite dose levels are manually checked three times a day. The ascorbic acid dose varies, and the dose is not regularly recorded.



Figure 26 – Chlorine Building

Chlorine Contact Tanks and Effluent Pump Station

The Chlorine Contact Tanks and Effluent Pump Station are located at the eastern end of Pond 5 (Figure 27). The Chlorine Contact Tanks and building housing the instrumentation and electrical equipment are located near Pond 5 access road. The Effluent Pump Station has two pumps located beneath the building for pumping Pond 5 effluent to the irrigation fields.

Wastewater effluent from Pond 4 is sent through the chlorine contact tanks continuously. The sodium hypochlorite is conveyed in a 1-1/4-inch pipeline to the Effluent Pump Station and into a rapid mixing chamber with the Pond 4 effluent. The Pond 4 effluent then travels through the baffled chlorine contact tank and is discharged to Pond 5 for storage. The chlorine contact tanks have a volume of approximately 70,000 gallons and a minimum contact time of 30 minutes.



Figure 27 – Chlorine Contact Tank and Effluent Pump Station at Pond 5

Disposal to Irrigation Fields

The Pond 5 effluent is pumped to the spray irrigation fields for disposal year round. Effluent is stored in Pond 5 until it can be applied at agronomic rates to the irrigation fields or discharged to the Napa River when conditions allow it based on the 2016 NPDES Permit.

Disposal to Napa River

Discharge to the Napa River is allowed per the 2016 NPDES Permit during the wet season from November 1 through May 31 and when the river flow-to-effluent flow ratio is least 50:1. Pond 5 effluent is dechlorinated with ascorbic acid prior to discharge to the Napa River. According to WWTRP staff, some additional dechlorination also occurs when the wastewater is discharged to Pond 5.

Ascorbic acid is conveyed from the Chlorine Building in a 1-inch pipeline to the dechlorination channel, which is located adjacent to the chlorine contact tank. Effluent from Pond 5 is dechlorinated as it passes through the dechlorination channel. The dechlorinated effluent is conveyed in a 24-inch pipeline to a nearby effluent structure and then discharged to the Napa River.

12.1.2 Existing Disinfection Permit Requirements

The permit requirements were previously discussed in Section 2. Disinfection requirements are summarized again in Table 54.

Table 54 Existing Disinfection Permit Requirements

Parameter	Units	Instantaneous Maximum	5-sample moving median	Maximum daily	7-day moving median	2 consecutive samples	Average Monthly
Chlorine, Total Residual ^a	mg/L	0.0	-	-	-	-	
Total Coliform ^b	MPN/100 ml		23	240			
Total Coliform ^c	MPN/100 ml				23	240	
Cyanide ^b	µg/L			39			16

^a Per the NPDES Permit R2-2016-0003 for monitoring location EFF-001 at the chlorine contact tank effluent for discharges to the Napa River.

^b Per the NPDES Permit R2-2016-0003 for monitoring location EFF-001.

^c Per the WRR Order No. 87-090 for discharge to the irrigation fields.

12.2 Issues

12.2.1 Total Coliform

WWTRP staff have indicated that they have inconsistent Total Coliform results for the chlorine contact effluent, occasionally leading to Total Coliform permit violations. Staff were not able to note any variations in operating conditions or influent loads to account for the variations in Total Coliform results. WWTRP staff are spending significant amounts of time monitoring and adjusting the chlorine dose levels to keep the Total Coliform within permit limits.

12.2.2 Chlorine Residual

Effluent from Pond 5 must be dechlorinated prior to discharge to the Napa River. Total chlorine residual is measured continuously for the dechlorination channel effluent using an ATI model A15/79 Total Residual Chlorine Monitor. Chlorine residual may also be measured using a portable handheld LaMotte 1200 Colorimeter. A Rosemount model FCL Free Chlorine monitoring system is currently not operational.

Ascorbic acid is dosed at two locations. First, a small amount of ascorbic acid is dosed into the wastewater before it is discharged to Pond 5. The chlorine residual is measured before and after this first dose point. Ascorbic acid is added until a drop in chlorine residual is measured. Typically, some dechlorination occurs naturally in Pond 5. Ascorbic acid is dosed again in the dechlorination channel prior to discharge to the Napa River. The actual dose of ascorbic is typically not recorded at either location.

Significant amounts of ascorbic acid are required during wet weather events to sufficiently dechlorinate the Pond 5 effluent. WWTRP staff have stated that the entire annual budget for ascorbic acid was spent during the first quarter of 2017 due to the increased flows (up to \$125,000/week). Staff would like to determine whether there is way to economize on the amount of ascorbic acid required for dechlorination.

12.2.3 Cyanide Generation

WWTRP staff have reported increased cyanide concentrations in the effluent during 2016-2017, and the WWTRP is at risk for violating its effluent cyanide limit. It is possible that cyanide may be formed during the disinfection process, as documented in research conducted by the Water Environmental Research Foundation. The research also indicated that false positives were possible for cyanide readings, which is caused by sampling handling, analytical techniques and pH adjustment. In particular, cyanide may be formed when ascorbic acid and nitrite ions are present in the wastewater samples.

12.2.4 Chemical Feed Lines

The chemical feed lines for sodium hypochlorite have reached the end of their useful life and must be replaced. WWTRP staff have reported that frequent repairs are necessary. The existing feed lines also do not meet the current codes for secondary containment and leak detection. It is recommended that all of chemical feed lines be replaced with new piping that meets secondary containment and leak detection requirements. It is important that any vaults be completely waterproof, and ideally, not installed in the flood plain in order to prevent leakage of groundwater into the vaults that result in false positives for leaks.

12.3 Disinfection Study

In order to determine the origin of the inconsistent Total Coliform results, sampling and field measurements were conducted by Larry Walker and Associates to verify the measurements and disinfection processes that are occurring at the WWTRP. The purpose of the sampling and testing procedures are to simulate conditions for chlorine dosing and dechlorination in Pond 5. The results of the study are described in the St. Helena Disinfection Study Technical Memorandum (Appendix I).

The following measurements were collected at various locations:

- pH
- Temperature
- Total chlorine residual
- Total coliform
- Ammonia

Sampling locations included the following:

- Pond 3 effluent (chlorine contact tank influent)
- Chlorine contact tank effluent before dechlorination
- Pond 5 at six locations between discharge outlet and dechlorination channel intake

12.3.1 Sampling and Results

The sampling plan originally proposed collecting a sample from the chlorine contact tank influent, which would also be the Pond 4 effluent. During the study, Pond 4 was offline, therefore, samples were collected from the Pond 3 effluent instead. The Pond 3 effluent sample had low ammonia levels of 0.87 mg/L, indicating that almost complete nitrification occurs during the pond treatment process.

Additional Pond 3 effluent samples were collected, dosed with varying levels of sodium hypochlorite (5 to 50 mg/L), and tested immediately for chlorine residual and pH, and total coliform after 8 hours. The results indicated that all samples achieved complete disinfection at all dose levels, with most of the Total Coliform levels near the detection limit of 1.8 MPN/100 ml. The disinfection process was likely to the right of the breakpoint chlorination curve.

Pond 5 effluent samples were collected and stored for 24 hours in the shade to simulate the dechlorination effects of Pond 5. Total chlorine residual was tested on the sample every 8 hours, and the results indicated that dechlorination can occur through evaporation and oxidation.

Pond 5 effluent samples were collected at six locations between discharge outlet and dechlorination channel intake. These samples were tested for total chlorine residual. The results ranged from 0.1 to 0.2 mg/L, indicating that very little residual is remaining in the Pond 5 water and that only low quantities of dechlorination chemical should be required to remove the chlorine residual. It is possible that not enough mixing and contact time is occurring in the dechlorination channel to effectively remove the chlorine residual.

12.3.2 Recommendations

The disinfection study recommended that the disinfection system be automated, in which the chlorine dosing level is flow paced to match influent flows and ammonia levels into the chlorine contact tanks. The chlorine contact tank effluent should also be continuously monitored for chlorine residual. Alternative dechlorination chemicals to ascorbic acid should be considered, such as calcium thiosulfate, to increase the reliability of dechlorination of the chlorinated effluent.

12.4 Proposed Improvements

12.4.1 Near-Term Infrastructure Improvements

Near-term improvements to the disinfection system are recommended to reduce staff labor associated with adjusting the sodium hypochlorite dose, maximize the disinfection chemical strength, and provide better access to the disinfection system controls.

These improvements may include the following:

- Relocate the chemical feed pumps and controls to the Effluent Pump Station
- Replace all chemical feed lines from chemical storage to the Effluent Pump Station with piping that meets secondary containment and leak detection requirements. Install waterproof vaults.
- Install transfer pumps at the Chlorine Building to pump the sodium hypochlorite to a day tank located adjacent to the ascorbic acid tank.
- Provide secondary containment for sodium hypochlorite and ascorbic acid tanks.
- Deliver smaller quantities of sodium hypochlorite so that the volume is used up in shorter time intervals and the strength degrades less over time
- Increase the chemical feed line diameters to 1 to 1.5-inches
- Automate the chlorine and ascorbic acid injection using flow paced dosing methods.
- Consider using more cost-effective dechlorinating chemicals than powder ascorbic acid

Moving the equipment and chemicals closer to the chlorine contact tank would enable more localized control over the dosing levels and provide better access to the supplies. Automatic dosing of the sodium hypochlorite and ascorbic acid is highly recommended in order to reduce operator labor time and provide more accurate dosing levels since the sodium hypochlorite dose would be continuously adjusted throughout the day to meet variations in the wastewater quality. Replacing the chemical feed lines with new secondary contained piping would eliminate issues with broken pipes and unreliable chlorine feed to the chlorine contact tanks. Staff have indicated that using transfer pumps to convey the chemicals to a day tank is not preferable, however, this may be explored further during design.

12.4.2 Sampling Improvements

It is recommended that sampling and analytical techniques for cyanide follow the "ASTM D 7365-09a Standard Practice for Sampling, Preservation and Mitigating Interferences in Water Samples for Analysis of Cyanide" in order to ensure accurate results. Future results will be compared with historical data in order to develop specific recommendations to reduce cyanide levels in plant discharges.

12.4.3 Costs and Implementation Schedule

Budgetary costs for the improvements are based on a continuous line leak detection system provided by Asahi. The Asahi system includes double walled containment pipes and a cable located between the carrier pipe and containment pipe which continuously monitors the pipe network for leaks and identifies the location of the leak. This system reflects a higher cost solution for providing double containment for the chlorine disinfection piping system, however, it provides a reliable and accurate detection system for leaks. Additional options for the disinfection system improvements may be evaluated during design. The costs are presented in Table 55.

Table 55 Disinfection Improvements Conceptual Opinion of Probable Cost

Item	Quantity	Unit	Unit Cost	Total
Sitework	1	LS	-	\$ 54,300
Metering Pumps	2	EA	\$ 18,551	\$ 37,100
Transfer Pump	2	EA	\$ 2,854	\$ 5,700
Asahi Chemproline PE DR11 pipe	2700	LF	\$ 61	\$ 164,300
Asahi Chemproline PE 90d Elbow	3	EA	\$ 481	\$ 1,400
Asahi Chemproline PE Dogbone Fitting	3	EA	\$ 709	\$ 2,100
AT75C Pal AT Panel	1	EA	\$ 7,754	\$ 7,800
Sensor Cable	2700	LF	\$ 17	\$ 45,600
Jumper Cable	400	LF	\$ 6	\$ 2,300
1500 Gallon Sodium Hypochlorite Double Contained Tank	1	EA	\$ 6,051	\$ 6,100
10,000 Gallon Ascorbic Acid Double Contained Tank	1	EA	\$ 44,375	\$ 44,400
Trenching	983	CY	\$ 2.60	\$ 2,600
Trench Backfill	239	CY	\$ 37.50	\$ 9,000
Bedding Backfill	243	CY	\$ 57	\$ 13,900
Compaction	973	CY	\$ 8	\$ 7,800
Concrete pads	12	CY	\$ 1,000	\$ 12,100
Electrical and Instrumentation	1	LS	-	\$ 47,520
Subtotal				\$ 464,000
Mobilization			5%	\$ 23,200
Bonds			3%	\$ 13,900
Engineering Design Services			20%	\$ 92,800
Construction services and Start-up			10%	\$ 46,400
Contractor's Overhead and Profit			15%	\$ 69,600
Contingency			30%	\$ 139,200
Total Project Cost (Excludes O&M)				\$ 849,100

13. Recommendations

The Feasibility Study prepared by GHD in response to Cease and Desist Order (CDO) No. R2-2016-0004 was developed to further evaluate various alternatives the City has studied that would allow the WWTRP to meet the new BOD and TSS limits. The two alternatives evaluated for providing secondary treatment that would meet the new permit effluent limits are: 1) constructed wetlands with an infiltration pond or 2) a trickling filter system with infiltration pond. Based on regulatory requirements tertiary filtration is required following each alternative to provide additional treatment for disposal and to allow the City to provide tertiary treated water as an option for future disposal and use. In addition the existing disinfection system is required to be upgraded to meet regulatory requirements and recommendations for disinfection upgrades are included in the Feasibility Study.

Table 56 provides a summary of the main points of comparison between the two secondary alternatives evaluated in the Feasibility Study. The information in the Feasibility Study will be presented to the City Council for consideration and selection of a preferred secondary treatment alternative. The selected alternative will be included as a final recommendation in the Feasibility Study for submittal to the SFBRWQCB for approval for design and construction.

Table 56 Alternative Comparison Table

Criteria	Alternative 1 – Constructed Wetlands	Alternative 2 – Trickling Filter with Bypass Flow and Settling Tank
Estimated Design and Construction Costs	\$7.5 million	\$8.1 - \$11.7 million
Estimated O&M Costs	\$45,000 - \$72,000/year	\$65,000 - \$78,000/year
Effectiveness	Effective - Constructed wetlands can be sturdy, effective systems if carefully designed, constructed, operated and maintained. However, small changes in hydrology or vegetation can have fairly significant effects on a wetland and its treatment effectiveness.	Highly Effective - Trickling filters are a proven, widely adopted technology. Performance dependent on consistent level of hydraulic and organic loading.
Reliability	Reliable – With two parallel trains for redundancy, the constructed wetland would be able to accommodate peak flows and would allow operators to remove one train for maintenance when necessary. Flows will enter the wetlands via gravity.	Reliable – Relatively simple operation. Reliability will be tightly linked to operation of pumping equipment delivering influent to and effluent from the trickling filter system.
Ease of Operation	Easy to Moderate – Constructed wetland systems require minimal effort to maintain and operate. There is very little mechanical equipment involved, and O&M typically includes monthly inspection and maintenance.	Easy to Moderate – trickling filters are commonly used at WWTPs for small- to medium-size communities. Mechanical equipment to maintain includes pumps, valves, rotary distributor and drive, and control systems.
Implementation Schedule	Planting establishment requires timeframe of up to two years. The	Can be implemented within CDO timeframe.

	wetland may not produce effluent that meets the new NPDES limits until late 2022.	
Overall Feasibility	Data from previous projects of similar size and locations indicate that effluent quality would be able to meet the requirements of the new NPDES permit. However, the installation of constructed wetlands would require an extensive amount of land (35 acres), which would decrease the land for irrigation, and alternative disposal methods will be required because there is insufficient storage and irrigation area at the site. In addition, full-scale implementation of the alternative may not be achievable within the CDO timeframe.	The installation and operation of trickling filters for use in the PETRO process is highly feasible and is compatible with the current plant's level of staffing and space availability. Costs for design, construction, and operation are expected to be less than those for Alternative 1. When operated in accordance with design, system is anticipated to consistently meet the 2016 NPDES effluent limits for TSS and BOD and will enhance ammonia removal. However, denitrification may be needed to remove elevated nitrate levels in the effluent.

Based on acceptance of the proposed project by the SFBRWQCB from this Feasibility Study, the City will then proceed to prepare and submit a Draft Workplan and schedule for implementation of the preferred option, including a plan and schedule for funding the project, as specified per the CDO requirements.

Additional water quality data may also be required to complete an antidegradation analysis to show that disposal through infiltration is in compliance with the Basin Plan.

It is also recommended that the remainder of the improvements discussed in the Feasibility Study and Facilities Masterplan also be implemented as part of the Phase 1 capital improvements program. The electrical upgrades are considered key improvements to maintain the reliability of the WWTRF and operations. These improvements and select costs are included in Table 57.

Table 57 Phase 1 Recommended Improvements

Item	Description	Estimated Capital Cost
Secondary Treatment Alternative	Constructed wetlands or Trickling Filter with Humus Tanks	\$7.5M to \$11.6M
Tertiary Treatment	Denitrifying sand filter that produces Title 22 recycled water	\$1.5M to \$2.2M
Solids Management	Remove sludge from Ponds 1A/1B	\$22,500 to \$171,200
Solids Management for Trickling Filters	Remove sludge from Humus Tanks	\$1,500
Infiltration Pond	Utilize small area of irrigation fields for flood irrigation to dispose of excess effluent during dry years, including pumping.	\$543,900
Disinfection System	Secondary containment system for chlorine feed piping, transfer pumps, day tank, automation for dosing chemicals	\$849,100
Ponds 1A/1B	Upsize recirculation pumps, piping and transfer structure upgrades, levee and wood dock repairs	TBD during funding
Pond 2	Repair/replace baffles, wood dock, levee	TBD during funding
Pond 3	Reconstruct levee and rip rap	TBD during funding
Pond 4	Reconstruct levee and rip rap	TBD during funding
Pond 5	Reconstruct levee and rip rap; replace effluent discharge pipe	TBD during funding
Spray Field and Irrigation System	Expand irrigation area, plant crops, install new irrigation lines	TBD during funding
Control Building	Relocate electrical equipment to new location / building.	TBD during funding
Electrical	Upgrades main electrical service; replace/upgrade various equipment (generator, MCCs, SCADA HMI, panels, VFDs, etc. as listed in the Facilities Masterplan)	TBD during funding

14. Funding Options

The City has several options to consider when looking for funding for wastewater system improvements. This section looks at both grant and loan opportunities. While there may be some grant funds available, the City will likely need to fund a majority of the project through loans. Thus, loan options and loan security are discussed in this section, in addition to potential funding sources.

14.1 Funding Programs

This section reviews possible funding sources for the Wastewater Improvement Project. Many funding programs base eligibility on the community's median household income (MHI) and population. The 2010-2014 American Community Survey 5-Year estimates for the City of St. Helena are an MHI of \$78,421 and a population of 5,895. A typical benchmark for grant qualification is a community's MHI is less than 80% of the statewide, the statewide MHI is \$61,489, thus St. Helena is above this amount. Specific funding programs are discussed below.

State Water Board's Clean Water State Revolving Fund (CWSRF) Program: Provides up to \$50 million in loans for water quality improvement projects, including wastewater, stormwater and recycled water. The CWSRF Program can also provide "principal forgiveness" (which is effectively grant funds) for disadvantaged communities and small communities with high wastewater rates. The State Water Resources Control Board's principal forgiveness program varies year by year, but can typically provide between \$2 million and \$4 million for communities serving less than 20,000 people whose average wastewater bill is greater than 4% of the community MHI, regardless of MHI. For St. Helena, wastewater rates would need to be over \$262 per month per connection to qualify. The CWSRF program also provide loans, CWSRF loan terms are typically 20 years in length and the interest rate typically averages 2.5%, and has been below 2% in the last several years. The CWSRF program is proven and certain with a 20-year history of assisting communities with low interest loans. CWSRF loans are typically secured by rates or assessments. The CWSRF program has both a planning/ design and construction program. Loans can be obtained to fund design and permitting work. Costs eligible for reimbursement are those incurred after the initial application is submitted.

I-Bank: Provides loans of up to \$20 million for local public projects that meet tax-exempt financing criteria, promote economic development and attract long-term employment opportunities. Loans are typically secured by rates or assessments. I-Bank's funding approval process is relatively rapid and it can be an effective source of funding for communities with strict, short compliance deadlines. I-Bank loans are typically secured by rates or assessments. I-Bank provides loans only and the City's wastewater project would likely qualify. I-Bank provides loans with up to a 30-year repayment period and interest rates average 3.5%. I-Bank also has a Public Agency Revenue Bond Program that can be accessed for tax-exempt conduit bond financing for governmental entities and revenue bonds issued to leverage I-Banks Infrastructure State Revolving Fund Loan Program.

USDA Rural Development: Provides loans and grants to protect and preserve the livelihood of rural communities across the United States. Wastewater projects for communities serving less than 10,000 people are eligible for funding under the Water and Waste Disposal Loan and Grant Program. The program provides loans with terms up to 40 years, at interest rates between 2.5% to 4%. Grants are up to 75% of project costs and are based on financial need. Based on the evaluation of the community's median household income, the community may not qualify for a grant, but it is worth discussing with the Area Specialist. USDA loans can be secured by general

obligation bonds, pledges of taxes or assessment, and/or pledges of facility revenue and liens on all land, easements, rights-of-way. Funds are provided at the time the project is ready to proceed to construction, and eligible planning, design, and permitting costs are reimbursable once the project notice to proceed is issued.

14.2 Loan Security

Funding agencies want to be assured that any loan can be repaid, and depending on the funding sources various types of security are allowed, including bonds, tax assessments, and rate revenue. In addition, many programs require a specified amount in reserve funds and documentation that land for the project has been secured.

Enterprise Revenue Borrowing: A local government that operates a water or wastewater facility may designate all or a portion of the facility as an *enterprise*, or revenue producing improvement, (as defined in the Revenue Bond Law of 1941 – Government Code 54300). The local government may seek approval from the voters to issue revenue bonds to finance capital improvements with the debt secured by a pledge of net enterprise revenues. As an alternative, the local agency may enter into an *installment sale agreement* based upon the agency's general power to purchase property that may allow for the sale of *certificates of participation* without voter approval.

Water and wastewater agencies are generally authorized to purchase property for agency purposes without limitation. Through an installment sale agreement, an agency may finance the acquisition of real property, improvements to real property or the acquisition of equipment. "Soft costs" (e.g., architecture and engineering costs) associated with tangible property may generally be financed as well. In an installment sale agreement, the seller agrees to acquire or improve the property (implement a project) using bond or certificate of participation proceeds and sell the property to the agency. The agency makes installment payments (consisting of principal and interest) and pays all other expenses associated with the financing and the property. The obligation of the agency to make such payments is "unconditional" in the sense that the agency must make payments regardless of whether or not the property is usable or of value to the agency.

Assessment Bonds: Assessment bonds are issued to finance capital improvements, and debt service on assessment bonds is paid from the proceeds of assessments levied upon real property specially benefited by such improvements and secured by a lien on such property. Assessments are collected by counties on the property tax roll. Most water agencies in California have authority to issue assessment bonds. Assessments may be levied under the Improvement Act of 1911 (the "1911 Act"), the Municipal Improvement Act of 1913 (the "1913 Act"), the Landscaping and Lighting Act of 1972 (the "1972 Act") or an agency's governing statute, and bonds may be issued under the 1911 Act, the Improvement Bond Act of 1915 (the "1915 Act") or an agency's governing statute. Assessment acts vary in terms of the particular items financeable and procedures to be followed. Agencies wishing to consider financing options should consult a financing specialist to better understand the details of potential financing options.

While rate revenue is accepted by some programs, not all will simply accept the guarantee of rate revenue to repay loans. Table 58 illustrates how local rates, assessments and taxes can be utilized to secure debt for the wastewater improvement project. Several of the commonly employed local funding mechanisms require affirmative votes to implement, which can be a barrier to project implementation and long term operational funding. When local rates, assessments or taxes have been put in place, they provide a certain and long-lived mechanism for funding capital, operational and maintenance costs. However strong community outreach and understanding are often required to establish or increase these various local funding mechanisms.

Table 58 Common Local Agency Loan Security Mechanisms

	Water or Sewer Rates	Benefit Assessments (aka Property Based Fees and Storm Water Rates)	Special Parcel Tax
Loan Security	Certificates of Participation	Assessment Bonds	Certificates of Participation
Election Requirements	None	Mailed ballot with 45-day ballot period	With any general or special election
Who Votes	Not required	Property Owners	Registered Voters
Approval Requirements	Written protests do not exceed 50%	Majority of Assessment amount	2/3 of those voting
Reserve Requirement	Typically less than 10%	Typically less than 10%	Typically less than 10%
Term for Debt	Less than 40 years	Less than 40 years	Per Ballot – can be indefinite
Term for Operation and Maintenance	Indefinite	Per ballot - indefinite	Per ballot -indefinite
Additional Documentation	Rate Study	Engineers Report	N/A

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Appendices



Appendix A – SFBRWQCB Water Reclamation Requirements Order No. 87-090



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 87-090

WATER RECLAMATION REQUIREMENTS FOR:

CITY OF ST. HELENA
NAPA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. The City of St. Helena (hereinafter called the discharger) presently operates a secondary sewage treatment plant consisting of a series of 5 ponds with a designed capacity of 0.5 million gallons per day (MGD). During the period of December 1 through April 30, pond effluent is disinfected prior to discharging to the Napa River, a water of the United States, under the National Pollutant Discharge Elimination System (NPDES). The Board has adopted a separate set of waste discharge requirements (NPDES Permit No. CA0038016) for this discharge.
2. The discharger, by application dated July 13, 1983 and supplemental technical report dated April, 1985, proposed a summertime golf course irrigation project. The Board, on November 20, 1985, has adopted water reclamation requirements in Order No. 85-133 for this project. The golf course project was never implemented. The discharger hence studied other alternatives.
3. The discharger, on March 31, 1987, submitted an amended facilities plan and proposed a summertime grassland irrigation project. Secondary treated wastewater will be disinfected and stored in pond 5 prior to being pumped to a grassland through sprinkler spray during dry months. The grassland irrigation site is located on the west bank of the Napa River, adjacent to and southeast of the treatment plant, with 87.6 acres of net irrigable land. The discharger will purchase the land, plant grass and operate the irrigation site. The discharger is both the producer and user of the reclaimed wastewater. Attachment A is a location map of the irrigation site and is hereby made a part of this Order.
4. The discharger will apply reclaimed wastewater to the grassland through low trajectory sprinklers at a controlled rate corresponding to grass evapotranspiration rate. The irrigation pumps will be provided with shutoff switches controlled by an anemometer to stop spraying when wind velocity in the field is high. A minimum of 50-foot wide buffer zone will be maintained along the Napa River bank and along the southeast and southwest boundaries. Along the southeast and southwest boundaries, the buffer zones will be irrigated by well water using spray irrigation through a separate sprinkler system. During the irrigation season, runoff from the site will be collected in perimeter ditches leading to two tail water sumps and be pumped back to the field.

5. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The water quality goals to be used in regulating water quality factors as set forth in the Basin Plan include maximum feasible reclamation or reuse of municipal, industrial, and agricultural wastewaters.
6. Section 13523 of the California Water Code provides that a Regional Board, after consultation with and reception of recommendations from the State Department of Health, and if it is determined such action to be necessary to protect the public health, safety, or welfare, shall prescribe water reclamation requirements for water which is used or proposed to be used as reclaimed water.
7. These water reclamation requirements are in conformance with the statewide reclamation criteria established by the State Department of Health Services as prescribed in Title 22, Section 60301 through Section 60355, California Administrative Code.
8. The City of St. Helena, on February 2, 1987, certified as complete a Supplemental Environmental Impact Report (EIR) on the proposed wastewater reclamation project. The EIR finds that, with the mitigation measures included in the project, the project will not have a significant adverse impact on the environment.
9. The Board has notified the discharger, and interested agencies and persons of its intent to prescribe water reclamation requirements for the proposed reuse.
10. The Board, in a public meeting, heard and considered all comments pertaining to this reuse.

IT IS HEREBY ORDERED, that the discharger, in order to meet the provisions contained in Division 7 of the California Water code and regulations adopted thereunder, shall comply with the following:

A. Prohibitions

1. The treatment, storage, distribution, or reuse of reclaimed water shall not create a nuisance as defined in Section 13050(m) of the California Water Code.
2. No reclaimed water shall be allowed to escape from the designated use area via surface flow or airborne spray.
3. Reclaimed water shall not be used as a domestic or animal water supply. There shall be no cross-connection between potable water supply and piping containing reclaimed water. Supplementing reclaimed water with water used for domestic supply shall not be allowed except through an air-gap separation.
4. No waste shall be applied to the irrigation site during rainfall, or when soils are saturated to a point where runoff is likely.
5. Reclaimed wastewater shall not be sprayed on any facility or area not designated for reclamation such as walkways, passing

vehicles, buildings, domestic water facilities or food handling facilities. Drinking water facilities shall be protected from direct or windblown reclaimed water spray.

6. The use of reclaimed water shall not cause the degradation of groundwater suitable for domestic use or cause any change in a quality parameter which would make the groundwater less suitable for irrigation use.
7. There shall be no irrigation or impoundment of reclaimed water within 500 feet of any well used for domestic supply or 100 feet of any irrigation well unless it can be demonstrated that special circumstances justify lesser distances to be acceptable.

B. Reclaimed Water Use Specifications

1. The discharger shall assure that the reclaimed wastewater is at all times an adequately oxidized, disinfected wastewater that meets the following quality limits at all times:

In any grab sample:

- | | |
|------------------------------------|--------------------|
| a. 5-day Biochemical Oxygen Demand | 40.0 mg/l, maximum |
| b. Dissolved Oxygen | 1.0 mg/l, minimum |
| c. Dissolved Sulfides | 0.1 mg/l, maximum |

At any point in the disinfection facilities where adequate contact with disinfectant is assured:

- d. The median number of total coliform organisms shall not exceed 23 MPN/100 ml as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform organisms shall not exceed 240 MPN/100ml in any two consecutive samples.
2. The discharger shall discontinue the pumping of reclaimed water to the irrigation site during any period in which he has reason to believe that the limits specified in B.1 above are not being met. The pumping of reclaimed water shall not be resumed until all conditions which caused the limits specified in B.1 to be violated have been corrected.
3. All equipment, including pumps, piping, valves, etc. with public access which may at any time contain reclaimed water shall be adequately and clearly identified with warning signs and the discharger shall make all necessary provisions, in addition, to inform the public that the liquid contained is reclaimed water and is unfit for human consumption.
4. The buffer zones along the site perimeter shall have a minimum allowable width of 50 feet, as measured from the end of sprinkler radius of throw to the property line. The Board may require a buffer zone width beyond 50 feet in certain areas if deemed necessary. Under no circumstances may the buffer zones

along the southeast and southwest boundaries be spray irrigated by reclaimed wastewater. Surface irrigation of these buffer zones by reclaimed wastewater is not allowed, unless a specific plan is submitted for review and approval by the Executive Officer.

5. Under no circumstances may reclaimed wastewater be used to irrigate within 100 feet of the two wells located on the reclamation site.
6. The anemometer controlled irrigation pumps must be automatically shut down whenever wind velocity at the irrigation site exceeds a preset level. The discharger shall monitor the irrigation system performance with respect to wind velocity and direction to develop an operating envelop within which the irrigation system can operate without resulting in the escaping of wastewater from the irrigation site in the form of droplets, or airborne spray. An engineering report must be generated from this monitoring effort within three months of the start of the reclamation project and be submitted, to the satisfaction of the Executive Officer, for review and approval.
7. The discharger shall manage its spray irrigation so as to minimize wastewater ponding in the spray field which could cause mosquito breeding problem.
8. Adequate time should be provided between the last irrigation and grass mowing to allow the grass to dry.
9. Irrigation site shall be fenced to restrict public access. Perimeter warning signs indicating that the reclaimed wastewater is not safe for drinking or contact should be posted at least every 500 feet with a minimum of one sign at each corner and one at each access road.
10. There shall be at least a 10-foot horizontal and 1-foot vertical separation (with the domestic water above the reclaimed water pipeline) between all pipelines transporting reclaimed water and those transporting domestic water.
11. Along the southeastern and southwestern boundaries, the operation of well water spray in the buffer zones should be managed in a manner to effectively prevent reclaimed wastewater from escaping the irrigation site in the form of droplets, airborne spray, or mist.

C. Provisions

1. The discharger shall comply with a Self-Monitoring Program as ordered by the Executive Officer.
2. The discharger shall permit the Board or its authorized representatives in accordance with California Water Code Section 13267(c):

- (a) Entry upon premises in which an effluent source is located or in which any required records are kept.
 - (b) Access to copy any records required to be kept under terms and conditions of this Order.
 - (c) Inspection of any monitoring equipment or method required by this Order.
 - (d) Sampling of reclaimed water.
3. The discharger shall maintain in good working order and operate, as efficiently as possible, any facility or control system installed by the discharger to achieve compliance with this Order.
 4. A contingency plan shall be developed outlining the action to be taken in the event effluent quality fails to meet required standards. The plan must be submitted for review, to the satisfaction of the Executive Officer, prior to the startup of the irrigation operation.
 5. In the event of any change in control or ownership of land or water reclamation facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by a letter, a copy of which shall be forwarded to this Board.
 6. The discharger shall file with the Regional Board a report on waste discharge at least 180 days before making any material change or proposed change in the character, location, or volume of the reuse, except for emergency conditions in which case the Board shall be notified.
 7. The Board will review this Order periodically and may revise the requirements when necessary.
 8. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
 - (a) Violation of any term or condition contained in this Order;
 - (b) Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts; and
 - (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized reuse.
 9. The water reclamation requirements previously prescribed by the Board in Order No. 85-133 is no longer applicable. Order No. 85-133 is hereby rescinded.

I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July

15, 1987.



ROGER B. JAMES
Executive Officer

Attachments:
Location Map
Self-Monitoring Program

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

FINAL
SELF-MONITORING PROGRAM
FOR

CITY OF ST. HELENA

WASTEWATER RECLAMATION PROJECT

NAPA COUNTY

ORDER NO. 87-090

CONSISTS OF

PART A

PART A

CITY OF ST. HELENA
WASTEWATER RECLAMATION PROJECT

I. GENERAL

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13268, 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16.

The principal purposes of a monitoring program by a waste discharger or reclaimed water user, also referred to as a self-monitoring program, are:

1. To document compliance with waste discharge and/or water reclamation requirements and prohibitions established by the Regional Board.
2. To facilitate self-policing by the waste discharger or reclaimed water user in the prevention and abatement of pollution arising from waste discharge or water reclamation.

II. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according to the latest edition of "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation, or other methods approved and specified by the Executive Officer of this Regional Board.

Water and waste analyses shall be performed by a laboratory approved for these analyses by the State Department of Health or a laboratory approved by the Executive Officer. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his laboratory and shall sign all reports of such work submitted to the Regional Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

III. DEFINITION OF TERMS

1. A grab sample is defined as an individual sample collected in fewer than 15 minutes.
2. Standard Observations
 - a. Land Retention or Pond Area

This applies both to liquid and solid wastes confined or unconfined.

- (1) Determine height of the freeboard at lowest point of dikes confining liquid wastes.
- (2) Evidence of leaching liquid from area of confinement and estimated size of affected area. (Show affected area on a sketch.)
- (3) Odor: presence or absence, characterization, source, and distance of travel.
- (4) Estimated number of waterfowl and other water-associated birds in the pond area and vicinity.

b. Periphery of Spray Irrigation Site

- (1) Evidence of reclaimed wastewater escaping the irrigation site through surface runoff or airborne spray. (Show affected area on a sketch.)
- (2) Odor: presence or absence, characterization, source, and distance of travel.
- (3) Evidence of surfacing or ponding of reclaimed water as well as mosquitoes breeding within the irrigation area due to excessive spray.
- (4) Warning signs or notices adequately posted to inform public that the water used for irrigation is reclaimed waste.

IV. DESCRIPTION OF SAMPLING STATIONS AND SCHEDULE OF SAMPLING, ANALYSIS AND OBSERVATIONS

1. DESCRIPTION OF SAMPLING STATIONS

a. EFFLUENT

<u>Station</u>	<u>Description</u>
E-001	Located at any point in the effluent from the treatment plant, prior to being pumped to the irrigation site. (Maybe the same point as E-001-D.)
E-001-D	Located at any point in the effluent from disinfection facilities at which point adequate contact with the disinfectant is assured.

b. STORAGE PONDS

<u>Station</u>	<u>Description</u>
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P-1 Located at a point in pond No.5, within one foot of the water surface and no less than two feet from the bank, representative of the wastewater.

c. LAND OBSERVATION

<u>Station</u>	<u>Description</u>
L-1 thru L-'n'	Located at ends and midpoints of the perimeter levees of pond No.5.
I-1 thru I-'n'	Located at points spaced equidistantly around the periphery of the spray irrigation area. Points shall be separated by not more than 1000 feet. A sketch showing the stations shall be submitted with the first monitoring report and subsequent self-monitoring reports when station location is changed or a violation is noted.

d. GROUNDWATER

<u>Station</u>	<u>Description</u>
G-1	An existing well located within the irrigation site, along the southwest boundary, to be used as the irrigation source in buffer areas. This well will be sanitary sealed.
G-2	An existing well located within the irrigation site, northeastern to the center of the field. This well will be sanitary sealed.

2. SCHEDULE OF SAMPLING, ANALYSIS, AND OBSERVATIONS

- a. This self-monitoring program is applicable when wastewater is reclaimed for irrigation.
- b. The discharger is required to perform observations, sampling, and analyses according to the schedule given in Table I. (Attachment A)

V. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Violation of Requirements:

In the event the discharger is unable to comply with the conditions of the water reclamation requirements and prohibitions due to:

- (a) maintenance work, power failure, or breakdown of waste treatment equipment, or
- (b) accidents caused by human error or negligence, or
- (c) other causes such as acts of nature,

the discharger shall notify the Regional Board office by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written report shall include pertinent information explaining reasons for the non-compliance and shall indicate what steps were taken to prevent the problems from recurring.

2. Self-Monitoring Reports

Written reports shall be filed regularly for each calendar month by the fifteenth day of the following month. The reports shall be comprised of the following:

a. Letter of Transmittal:

A letter transmitting self-monitoring reports should accompany each report. Such a letter shall include a discussion of requirement violations found during the past month and actions taken or planned for correcting violations, such as operation modifications and/or facilities expansion. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true and correct.

b. Results of Analyses and Observations

Tabulations of the results from each required analysis and/or observations specified in Table I by date, time, type of sample, and station.

c. List of Approved Analyses

- (1) Listing of analyses for which the discharger is approved by the State Department of Health.
- (2) List of analyses performed for the discharger by another approved laboratory (and copies of reports signed by the laboratory director of that laboratory shall also be submitted as part of the report).

I, Roger B. James, Executive Officer, do hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with the Water Reclamation Requirements established in Regional Board Order No. 87-090.
2. Is effective on the date shown below.
3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer.



ROGER B. JAMES
Executive Officer

Effective Date: July 15, 1987

Attachments:

- A. Table I
- B. User's Self-Monitoring Report Form

ATTACHMENT A

TABLE ISCHEDULE FOR SAMPLINGS, MEASUREMENTS, AND ANALYSES
CITY OF ST. HELENA

SAMPLING STATIONS	E-001	E-001 -D	P-1	L-1 thru L-'n'	I-1 thru I-'n'	G-1 thru G-2
Type of Samples	G	G	G	O	O	G
Flow Rate, (MGD)	D					
5-day Biochemical Oxygen Demand	2W					
pH, (unit)	2W		M			
Dissolved Oxygen, (mg/l)	2W		M			
Dissolved Sulfides, (mg/l), (1)	2W		M			
Settleable Matter, (ml/l-hr)	2W					
Total Coliform, (MPN/100 ml)		D				M
Total Dissolved Solids, (mg/l)						Q
Nitrate, (mg/l)						Q
Applicable Standard Observations	2W			W	W (2)	

LEGEND FOR TABLEG= Grab sample,
O= Observation,D= Daily,
W= Once each week,
2W= Every two weeks,
M= Monthly,
Q= Quarterly,

Notes:

- (1). Analyze for this item only when Dissolved Oxygen is below 2.0 mg/l.
- (2). The discharger shall perform the designated observations and file the User's Report (in Attachment B) as part of the Self-Monitoring Report monthly during the irrigation period. The observation must be made during the period when reclaimed wastewater irrigation is in progress.

ATTACHMENT B

User's Self-Monitoring Report

1. Name of User: CITY OF ST. HELENA
2. Month and Year: _____
3. Circle dates that Reclaimed water being used: 1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
4. Total gallons used for the month: _____
5. Required weekly observations: (Fill in the date of the inspection and write "yes" or "no" for each observation.)

Date and Time					
Observed Escape of Wastewater from the Irrigation Site by Surface Flow or Airborne Spray					
Wastewater Used on Unauthorized Areas					
Odor from Wastewater					
Mosquitoes Breeding Resulted from Wastewater Ponding					
Warning Signs Properly Posted					
Public Contact with Wastewater					
Tailwater System Failure					
Automatic Shutoff switch being Tested and Functions Properly					

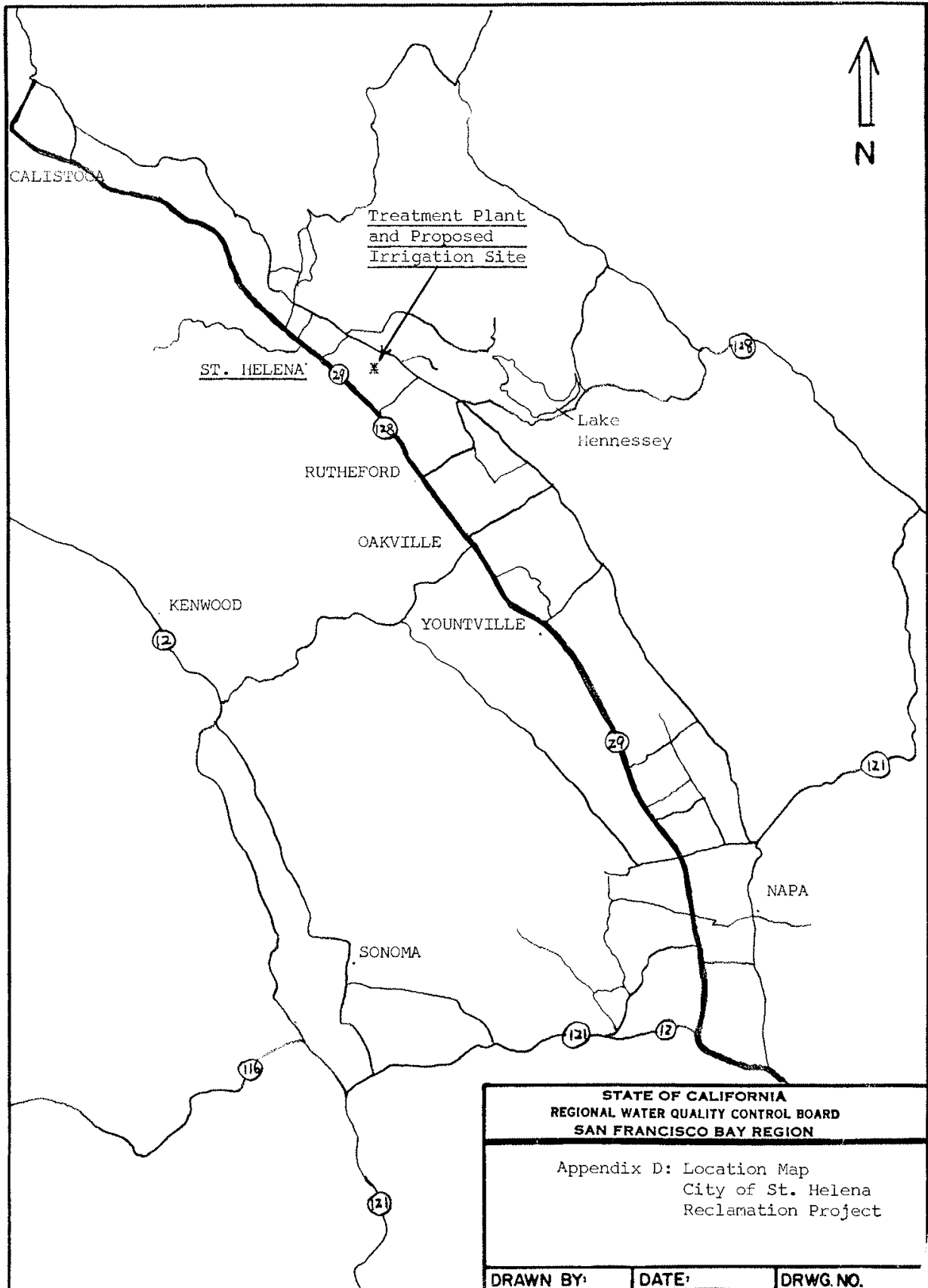
If any of the observations were yes, a written report containing the following information shall be submitted:

- (1) State time when noted violation(s) was observed and show its location on a map.
- (2) Explain cause and extent of violation(s) observed.
- (3) Describe corrective action taken and the dates compliance was achieved and irrigation was resumed.

6. I certify that the information in this report, to the best of my knowledge, is true and correct.

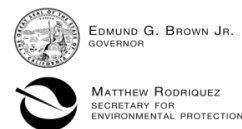
Signature of Operator

Date



Appendix B – SFBRWQCB Order No. R2-2016-0003,
NPDES No. CA0038016





San Francisco Bay Regional Water Quality Control Board

ORDER No. R2-2016-0003
NPDES No. CA0038016

The following discharger is subject to waste discharge requirements (WDRs) set forth in this Order:

Table 1. Discharger Information

Discharger	City of St. Helena
Facility Name	City of St. Helena Wastewater Treatment and Reclamation Plant and its wastewater collection system
Facility Address	1 Chaix/Thomann Lane St. Helena, CA 94574 Napa County
CIWQS Place Number	258386

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude (North)	Discharge Point Longitude (West)	Receiving Water
001	Secondary-treated municipal wastewater	38.502778	-122.437500	Napa River

Table 3. Administrative Information

This Order was adopted on:	January 13, 2016
This Order shall become effective on:	March 1, 2016
This Order shall expire on:	February 28, 2021
CIWQS Regulatory Measure	404297
The Discharger shall file a Report of Waste Discharge as an application for reissuance of WDRs in accordance with California Code of Regulations, title 23, and an application for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit no later than:	June 1, 2020
The U.S. Environmental Protection Agency (U.S. EPA) and the California Regional Water Quality Control Board, San Francisco Bay Region, have classified this discharge as follows:	Minor

I, Bruce H. Wolfe, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of the Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on the date indicated above.

 Bruce H. Wolfe, Executive Officer

City of St. Helena
Wastewater Treatment and Reclamation Plant

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City of St. Helena
Wastewater Treatment and Reclamation Plant

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I. FACILITY INFORMATION

Information describing the City of St. Helena Wastewater Treatment and Reclamation Plant and its wastewater collection system (Facility) is summarized in Table 1 and in Fact Sheet (Attachment F) sections I and II.

II. FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), finds:

- A. Legal Authorities.** This Order serves as WDRs pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by U.S. EPA and Water Code chapter 5.5, division 7 (commencing with § 13370). It shall serve as an NPDES permit for point source discharges from the Facility to surface waters.
- B. Background and Rationale for Requirements.** The Regional Water Board developed the requirements in this Order based on information the Discharger submitted as part of its application, information obtained through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F) contains background information and rationale for the requirements in this Order and is hereby incorporated into and constitutes findings for this Order. Attachments A through E and G are also incorporated into this Order.
- C. Provisions and Requirements Implementing State Law.** Provision VI.C.5.c is included to implement State law only (California Water Code section 13241). This provision is not required or authorized under the federal CWA; consequently, violations of this provision are not subject to the enforcement remedies available for NPDES violations.
- D. Notification of Interested Parties.** The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe these WDRs and provided an opportunity to submit written comments and recommendations. The Fact Sheet provides details regarding the notification.
- E. Consideration of Public Comment.** The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. The Fact Sheet provides details regarding the public hearing.

THEREFORE, IT IS HEREBY ORDERED that Order No. R2-2010-0105 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions of Water Code division 7 (commencing with § 13000) and regulations adopted thereunder and the provisions of the CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order. This action in no way prevents the Regional Water Board from taking enforcement action for past violations of the previous order.

III. DISCHARGE PROHIBITIONS

- A.** Discharge of treated wastewater at a location or in a manner different from that described in this Order is prohibited.

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- B.** Discharge at Discharge Point No. 001 is prohibited unless the river flow-to-effluent flow ratio is at least 50:1.
- C.** The bypass of untreated or partially-treated wastewater to waters of the United States is prohibited, except as provided for in Attachment D sections I.G.2 and I.G.3.
- D.** Average dry weather influent flow from the treatment plant in excess of 0.50 MGD is prohibited. Average dry weather influent flow shall be determined from three consecutive dry weather months each year, with compliance measured at Monitoring Location REC-001 as described in the Monitoring and Reporting Program (MRP, Attachment E).
- E.** Any sanitary sewer overflow that results in a discharge of untreated or partially-treated wastewater to waters of the United States is prohibited.
- F.** Discharge to the Napa River is prohibited during the dry season each year, from June 1 through October 31. The need to discharge during the dry season may arise as a result of early or late season storms. As soon as possible after determining that discharge will be necessary, the Discharger shall notify the Regional Water Board case manager by phone or email and provide information supporting its determination. Unless the case manager objects, the Discharger may commence discharge but only when absolutely necessary and only to the extent necessary for the reason stated above. The discharge shall be monitored and meet limitations and shall consist of fully treated effluent.

For each dry season discharge event, the Discharger shall submit a report within five business days after the end of the discharge that describes the reasons for the need to discharge, with supporting information, and describe the discharge flow volume, duration, and estimated dilution within the receiving water. In accordance with the Monitoring and Reporting Program (Attachment E), the discharge quality shall be reported in the next monthly self-monitoring report.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

- A.** Discharges at Discharge Point No. 001 shall comply with the following effluent limitations, with compliance measured at Monitoring Locations EFF-001 as described in the MRP:

Table 4. Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Biochemical Oxygen Demand, 5-day @ 20°C (BOD ₅)	mg/L	15	25	---	---	---
Total Suspended Solids (TSS)	mg/L	15	20	---	---	---
Oil and Grease	mg/L	10	---	20	---	---
pH ^[1]	standard units	---	---	---	6.5	8.5
Total Residual Chlorine	mg/L	---	---	---	---	0.0 ^[2]
Copper, Total	µg/L	8.3	---	17	---	---
Cyanide, Total	µg/L	15	---	30	---	---
Ammonia, Total	mg/L as N	16	---	39	---	---

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Unit Abbreviations:

mg/L = milligrams per liter

µg/L = micrograms per liter

Footnote:

- [1] If the Discharger monitors pH continuously, pursuant to 40 C.F.R. section 401.17, the Discharger shall be in compliance with this pH limitation provided that both of the following conditions are satisfied: (i) the total time during which the pH is outside the required range shall not exceed 7 hours and 26 minutes in any calendar month; and (ii) no individual excursion from the required pH range shall exceed 60 minutes.
- [2] The Discharger may elect to use a continuous on-line monitoring system for measuring or determining that residual dechlorinating agent is present. This monitoring system may be used to prove that anomalous residual chlorine exceedances measured by on-line chlorine analyzers are false positives because it is chemically improbable to have chlorine present in the presence of sodium bisulfite. If Regional Water Board staff finds convincing evidence that chlorine residual exceedances are false positives, the exceedances are not violations of this Order's total chlorine residual limit.

B. Percent Removal. The average monthly percent removal of biochemical oxygen demand (BOD₅) and total suspended solids (TSS) at Discharge Point No. 001 shall not be less than 85 percent (i.e., in each calendar month, the arithmetic mean of BOD₅ and TSS, by concentration, for effluent samples collected at Monitoring Location EFF-001 or REC-001 as described in the MRP, shall not exceed 15 percent of the arithmetic mean of the BOD₅ and TSS, by concentration, for influent samples collected at Monitoring Location INF-001 as described in the MRP at approximately the same times during the same period).

C. Total Coliform. Discharges at Discharge Point No. 001 shall comply with the following total coliform limitations, with compliance measured at Monitoring Location EFF-001 as described in the MRP:

1. The five-sample moving median shall not exceed 23 Most Probable Number (MPN)/100 mL.
2. The daily maximum shall not exceed 240 MPN/100 mL.

D. Whole Effluent Acute Toxicity. Discharges at Discharge Point No. 001 shall meet the following acute toxicity limitations, with compliance measured at Monitoring Location EFF-001 as described in the MRP:

1. A three-sample median value of not less than 90 percent survival; and
2. A single-sample maximum value of not less than 70 percent survival.

These acute toxicity limitations are defined as follows:

- **Three-sample median.** A bioassay test showing survival of less than 90 percent represents a violation of this effluent limit if one of the past two bioassay tests also shows less than 90 percent survival.
- **Single sample maximum.** A bioassay test showing survival of less than 70 percent represents a violation of this effluent limit.

If the Discharger can demonstrate that toxicity exceeding the levels cited above is caused by ammonia and that the ammonia in the discharge complies with the total ammonia effluent limitations in Table 4 of this Order, then such toxicity shall not constitute a violation of this effluent limitation.

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V. RECEIVING WATER LIMITATIONS

- A. The discharge shall not cause the following conditions to exist in receiving waters:
1. Floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses;
 2. Alteration of suspended sediment in such a manner as to cause nuisance or adversely affect beneficial uses, or detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life;
 3. Suspended material in concentrations that cause nuisance or adversely affect beneficial uses;
 4. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;
 5. Alteration of temperature beyond present natural background levels;
 6. Changes in turbidity that cause nuisance or adversely affect beneficial uses, or increases from normal background light penetration or turbidity greater than 10 percent in areas where natural turbidity is greater than 50 nephelometric turbidity units;
 7. Coloration that causes nuisance or adversely affects beneficial uses;
 8. Visible, floating, suspended, or deposited oil or other products of petroleum origin; or
 9. Toxic or other deleterious substances in concentrations or quantities that cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.
- B. The discharge shall not cause the following limitations to be exceeded in receiving waters at any place within one foot of the water surface:
1. Dissolved Oxygen 7.0 mg/L, minimum
The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation. When natural factors cause concentrations less than that specified above, the discharge shall not cause further reduction in ambient dissolved oxygen concentrations.
 2. Dissolved Sulfide Natural background levels
 3. Nutrients Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
- C. The discharge shall not cause a violation of any water quality standard for receiving waters adopted by the Regional Water Board or the State Water Resources Control Board (State Water Board) as required by the CWA and regulations adopted thereunder. If more stringent water

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quality standards are promulgated or approved pursuant to CWA section 303, or amendments thereto, the Regional Water Board may revise or modify this Order in accordance with the more stringent standards.

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all “Standard Provisions” in Attachment D.
2. The Discharger shall comply with all applicable provisions of the “Regional Standard Provisions, and Monitoring and Reporting Requirements for NPDES Wastewater Discharge Permits” (Attachment G).

B. Monitoring and Reporting

The Discharger shall comply with the MRP (Attachment E) and future revisions thereto and applicable sampling and reporting requirements in Attachments D and G.

C. Special Provisions

1. Reopener Provisions

The Regional Water Board may modify or reopen this Order prior to its expiration date in any of the following circumstances as allowed by law:

- a. If present or future investigations demonstrate that the discharges governed by this Order have or will have a reasonable potential to cause or contribute to, or will cease to have, adverse impacts on water quality or beneficial uses of the receiving waters.
- b. If new or revised water quality objectives or total maximum daily loads (TMDLs) come into effect (whether statewide, regional, or site-specific). In such cases, effluent limitations in this Order may be modified as necessary to reflect the updated water quality objectives and wasteload allocations in the TMDLs. Adoption of the effluent limitations in this Order is not intended to restrict in any way future modifications based on legally-adopted water quality objectives or TMDLs or as otherwise permitted under federal regulations governing NPDES permit modifications.
- c. If translator, dilution, or other water quality studies provide a basis for determining that a permit condition should be modified.
- d. If State Water Board precedential decisions, new policies, new laws, or new regulations are adopted.
- e. If an administrative or judicial decision on a separate NPDES permit or WDRs addresses requirements similar to this discharge.
- f. Or as otherwise authorized by law.

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The Discharger may request a permit modification based on any of the circumstances above. With any such request, the Discharger shall include antidegradation and anti-backsliding analyses.

2. Effluent Characterization Study and Report

- a. Study Elements.** The Discharger shall continue to characterize and evaluate the discharge from the following discharge point to verify that the “no” or “unknown” reasonable potential analysis conclusions of this Order remain valid and to inform the next permit reissuance. The Discharger shall collect representative samples at the monitoring station set forth below, as defined in the MRP, at no less than the frequency specified below:

<u>Discharge Point</u>	<u>Monitoring Location</u>	<u>Minimum Frequency</u>
001	EFF-001 or REC-001	Once

The samples shall be analyzed for the pollutants listed in Attachment G, Table C, except for those pollutants with effluent limitations where the MRP already requires more frequent monitoring, and except for those pollutants for which there are no water quality criteria (see Fact Sheet Table F-6). Samples shall also be analyzed for the pollutants listed in Basin Plan Tables 3-5 and 3-6, except for odor and radioactivity (see Fact Sheet Table F-7). Compliance with this requirement shall be achieved in accordance with the specifications of Attachment G sections III.A.1 and III.A.2.

The Discharger shall evaluate whether concentrations of any of these pollutants significantly increase over past performance. The Discharger shall investigate the cause of any such increase. The investigation may include, but need not be limited to, an increase in monitoring frequency, monitoring of internal process streams, and monitoring of influent sources. The Discharger shall establish remedial measures addressing any increase resulting in reasonable potential to cause or contribute to an excursion above applicable water quality objectives. This requirement may be satisfied through identification of the constituent as a “pollutant of concern” in the Discharger’s Pollutant Minimization Program, described in Provision VI.C.3.

b. Reporting Requirements

- i. Routine Reporting.** The Discharger shall, within 45 days of receipt of analytical results, report the following in the transmittal letter for the appropriate self-monitoring report:
- (a)** Indication that a sample for this study was collected; and
 - (b)** Identity of pollutants detected at or above applicable water quality criteria (see Fact Sheet Tables F-6 and F-7) and the detected concentrations of those pollutants.
- ii. Final Report.** The Discharger shall submit a final report that presents all these data with the application for permit reissuance.

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3. Receiving Water Characterization Study and Report

- a. Study Elements.** The Discharger shall characterize and evaluate the receiving water at the following discharge points to verify that the “no” or “unknown” reasonable potential analysis conclusions of this Order remain valid and to inform the next permit reissuance. The Discharger shall collect representative samples at the monitoring stations set forth below, as defined in the MRP, at no less than the frequency specified below:

<u>Monitoring Location</u>	<u>Minimum Frequency</u>
RSW-001	Once
RSW-900	Once

At Monitoring Locations RSW-001 and RSW-900, samples shall be analyzed for the pollutants listed in Attachment G, Table C, except for those pollutants for which there are no water quality criteria (see Fact Sheet Table F-6). At Monitoring Location RSW-900, the samples shall also be analyzed for the pollutants listed in Basin Plan Tables 3-5 and 3-6, except for odor and radioactivity (see Fact Sheet Table F-7). Compliance with this requirement shall be achieved in accordance with the specifications of Attachment G sections III.A.1 and III.A.2.

The Discharger may complete this study on its own or in collaboration with other Napa River dischargers (i.e., the City of Calistoga and the Town of Yountville).

b. Reporting Requirements

- i. Routine Reporting.** The Discharger shall, within 45 days of receipt of analytical results, report the following in the transmittal letter for the appropriate self-monitoring report:
- (a)** Indication that a sample for this study was collected; and
 - (b)** Identity of pollutants detected at or above applicable water quality criteria (see Fact Sheet Tables F-6 and F-7) and the detected concentrations of those pollutants.
- ii. Final Report.** The Discharger shall submit a final report that presents all these data with the application for permit reissuance.

4. Pollutant Minimization Program

- a.** The Discharger shall continue to improve its existing Pollutant Minimization Program to promote minimization of pollutant loadings to the treatment plant and therefore to the receiving waters.
- b.** The Discharger shall submit an annual report no later than February 28 each year. Each annual report shall include at least the following information:
- i. Brief description of treatment plant.** The description shall include the service area and treatment plant processes.

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- ii. **Discussion of current pollutants of concern.** Periodically, the Discharger shall analyze its circumstances to determine which pollutants are currently a problem and which pollutants may be potential future problems. This discussion shall include the reasons for choosing the pollutants.
- iii. **Identification of sources for pollutants of concern.** This discussion shall include how the Discharger intends to estimate and identify pollutant sources. The Discharger shall include sources or potential sources not directly within the ability or authority of the Discharger to control, such as pollutants in the potable water supply and air deposition.
- iv. **Identification of tasks to reduce the sources of pollutants of concern.** This discussion shall identify and prioritize tasks to address the Discharger's pollutants of concern. The Discharger may implement the tasks by itself or participate in group, regional, or national tasks that address its pollutants of concern. The Discharger is strongly encouraged to participate in group, regional, or national tasks that address its pollutants of concern whenever it is efficient and appropriate to do so. An implementation timeline shall be included for each task.
- v. **Outreach to employees.** The Discharger shall inform employees about the pollutants of concern, potential sources, and how they might be able to help reduce the discharge of these pollutants of concern into the treatment facilities. The Discharger may provide a forum for employees to provide input.
- vi. **Continuation of Public Outreach Program.** The Discharger shall prepare a pollution prevention public outreach program for its service area. Outreach may include participation in existing community events, such as county fairs; initiating new community events, such as displays and contests during Pollution Prevention Week; conducting school outreach programs; conducting plant tours; and providing public information in newspaper articles or advertisements, radio or television stories or spots, newsletters, utility bill inserts, or web sites. Information shall be specific to target audiences. The Discharger shall coordinate with other agencies as appropriate.
- vii. **Discussion of criteria used to measure Pollutant Minimization Program and task effectiveness.** The Discharger shall establish criteria to evaluate the effectiveness of its Pollutant Minimization Program. This discussion shall identify the specific criteria used to measure the effectiveness of each task in Provisions VI.C.3.b.iii, iv, v, and vi.
- viii. **Documentation of efforts and progress.** This discussion shall detail all of the Discharger's Pollutant Minimization Program activities during the reporting year.
- ix. **Evaluation of Pollutant Minimization Program and task effectiveness.** This Discharger shall use the criteria established in Provision VI.C.3.b.vii to evaluate the program and task effectiveness.
- x. **Identification of specific tasks and timelines for future efforts.** Based on the evaluation, the Discharger shall explain how it intends to continue or change its tasks

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to more effectively reduce the amount of pollutants flowing to the treatment plant and, subsequently, in its effluent.

- c. The Discharger shall develop and conduct a Pollutant Minimization Program as further described below when there is evidence that a priority pollutant is present in the effluent above an effluent limitation (e.g., sample results reported as detected but not quantified [DNQ] when the effluent limitation is less than the method detection limit [MDL], sample results from analytical methods more sensitive than those methods required by this Order, presence of whole effluent toxicity, health advisories for fish consumption, or results of benthic or aquatic organism tissue sampling) and either:
 - i. A sample result is reported as DNQ and the effluent limitation is less than the Reporting Level (RL); or
 - ii. A sample result is reported as not detected (ND) and the effluent limitation is less than the MDL, using definitions in Attachment A and reporting protocols described in the MRP.
- d. If triggered by the reasons set forth in Provision VI.C.3.c, above, the Discharger's Pollutant Minimization Program shall include, but not be limited to, the following actions and submittals:
 - i. Annual review and semi-annual monitoring of potential sources of the reportable priority pollutants, which may include fish tissue monitoring and other bio-uptake sampling or alternative measures when source monitoring is unlikely to produce useful analytical data;
 - ii. Quarterly monitoring for the reportable priority pollutants in the influent to the Facility. The Executive Officer may approve alternative measures when influent monitoring is unlikely to produce useful analytical data;
 - iii. Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable priority pollutants in the effluent at or below the effluent limitation;
 - iv. Implementation of appropriate cost-effective control measures for the reportable priority pollutants, consistent with the control strategy; and
 - v. Inclusion of the following specific items within the annual report required by Provision VI.C.3.b above:
 - (a) All Pollutant Minimization Program monitoring results for the previous year;
 - (b) List of potential sources of the reportable priority pollutants;
 - (c) Summary of all actions undertaken pursuant to the control strategy; and
 - (d) Description of actions to be taken in the following year.

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5. Special Provisions for Municipal Facilities

a. Sludge and Biosolids Management

- i. All sludge and biosolids shall be disposed of, managed, or reused in a municipal solid waste landfill; through land application; as a Class A compost; through a waste-to-energy facility or another recognized and approved technology; in a sludge-only landfill; or in a sewage sludge incinerator in accordance with 40 C.F.R. part 503.
- ii. Sludge and biosolids treatment, storage, and disposal, or reuse, shall not create a nuisance, such as objectionable odors or flies, or result in groundwater contamination.
- iii. The sludge and biosolids treatment and storage site shall have facilities adequate to divert surface runoff from adjacent areas, to protect site boundaries from erosion, and to prevent any conditions that would cause drainage from the materials in the storage site. Adequate protection is defined as protection from at least a 100-year storm and the highest possible tidal stage that may occur.
- iv. Sludge or biosolids disposed in a municipal solid waste landfill shall meet the requirements of 40 C.F.R. part 258.
- v. This Order does not authorize permanent onsite sludge or biosolids storage or disposal. A Report of Waste Discharge shall be filed and the site brought into compliance with all applicable regulations prior to commencement of any such activity.

- b. **Collection System Management.** The Discharger shall properly operate and maintain its collection system (see Attachment D section I.D). The Discharger shall report any noncompliance (see Attachment D sections V.E.1 and V.E.2) and mitigate any discharge from its collection system that violates this Order (see Attachment D section I.C).

The *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems* (General Collection System WDRs), State Water Board Order No. 2006-0003 DWQ as amended by State Water Board Order No. WQ 2013-0058-EXEC, has requirements for operation and maintenance of separate sanitary sewer collection systems and for reporting and mitigating sanitary sewer overflows from the separate sanitary sewer portion of the Discharger's collection system. While the Discharger must comply with both the General Collection System WDRs and this Order, the General Collection System WDRs more clearly and specifically stipulate requirements for operation and maintenance and for reporting and mitigating sanitary sewer overflows. Implementation of the General Collection System WDRs for proper operation and maintenance and mitigation of sanitary sewer overflows will satisfy the corresponding federal NPDES requirements specified in Attachment D (as supplemented by Attachment G). Following the notification and reporting requirements in the General Collection System WDRs will satisfy the corresponding NPDES reporting requirements specified in Attachment D (as supplemented by Attachment G) for sanitary sewer overflows from the separate sanitary sewer portion of the collection system.

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- c. Wastewater Impoundment Integrity.** The Discharger shall take measures necessary to ensure that any impoundment the Discharger uses for storage or treatment of untreated or partially-treated wastewater is sufficiently water tight to prevent leakage of wastewater to groundwater. This shall include inspection and testing of liner integrity prior to putting back into service any impoundment that has been out of service and dry for one month or longer and any necessary routine maintenance and inspection of impoundments while in service.
- d. Standard Operating Procedures for Resource Recovery.** If the Discharger receives hauled-in anaerobically-digestible material for injection into an anaerobic digester, the Discharger shall notify the Regional Water Board and develop and implement Standard Operating Procedures for this activity. The Standard Operating Procedures shall be developed prior to initiation of hauling. The Standard Operating Procedures shall address material handling, including unloading, screening or other processing prior to anaerobic digestion, and transportation; spill prevention; spill response; avoidance of the introduction of materials that could cause interference, pass through, or upset of the treatment processes; avoidance of prohibited material; vector control; odor control; operation and maintenance; and the disposition of any solid waste segregated from introduction to the digester. The Discharger shall train its staff on the Standard Operating Procedures and maintain records for a minimum of three years for each load received, describing the hauler, waste type, and quantity received. In addition, the Discharger shall maintain records for a minimum of three years for the disposition, location, and quantity of cumulative pre-digestion segregated solid waste hauled offsite.

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ATTACHMENT A – DEFINITIONS

Arithmetic Mean (μ)

Also called the average, the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where: Σx is the sum of the measured ambient water concentrations, and n is the number of samples.

Average Monthly Effluent Limitation (AMEL)

The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL)

The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Bioaccumulative

Taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Carcinogenic

Known to cause cancer in living organisms.

Coefficient of Variation

Measure of data variability calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Daily Discharge

Either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit) for a constituent with limitations expressed in units of mass; or (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period is considered the result for the calendar day in which the 24-hour period ends.

Detected, but Not Quantified (DNQ)

Sample result less than the RL, but greater than or equal to the laboratory's MDL. Sample results reported as DNQ are estimated concentrations.

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Dilution Credit

Amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined by conducting a mixing zone study or modeling the discharge and receiving water.

Effluent Concentration Allowance (ECA)

Value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the CV for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in U.S. EPA guidance (*Technical Support Document For Water Quality-based Toxics Control*, March 1991, second printing, EPA/505/2-90-001).

Enclosed Bay

Indentation along the coast that encloses an area of oceanic water within a distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

Estimated Chemical Concentration

Concentration that results from the confirmed detection of the substance below the ML value by the analytical method.

Estuaries

Waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars are considered estuaries. Estuarine waters are considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters include, but are not limited to, the Sacramento-San Joaquin Delta, as defined in Water Code section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

Inland Surface Waters

All surface waters of the state that do not include the ocean, enclosed bays, or estuaries.

Instantaneous Maximum Effluent Limitation

Highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation

Lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

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Maximum Daily Effluent Limitation (MDEL)

Highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Median

Middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (n) is odd, then the median = $X_{(n+1)/2}$. If n is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between $n/2$ and $n/2+1$).

Method Detection Limit (MDL)

Minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 C.F.R. part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML)

Concentration at which the entire analytical system gives a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Mixing Zone

Limited volume of receiving water allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

Not Detected (ND)

Sample results less than the laboratory's MDL.

Persistent Pollutants

Substances for which degradation or decomposition in the environment is nonexistent or very slow.

Pollutant Minimization Program

Program of waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the Pollutant Minimization Program is to reduce all potential sources of a priority pollutant through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. Cost effectiveness may be considered when establishing the requirements of a Pollutant Minimization Program. The completion and implementation of a Pollution Prevention Plan, if required pursuant to Water Code section 13263.3(d), is considered to fulfill Pollutant Minimization Program requirements.

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Pollution Prevention

Any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State Water Board or Regional Water Board.

Reporting Level (RL)

ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order, including an additional factor if applicable as discussed herein. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from SIP Appendix 4 in accordance with SIP section 2.4.2 or established in accordance with SIP section 2.4.3. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

Source of Drinking Water

Any water designated as having a municipal or domestic supply (MUN) beneficial use.

Standard Deviation (σ)

Measure of variability calculated as follows:

$$\sigma = \left(\frac{\sum[(x - \mu)^2]}{(n - 1)} \right)^{0.5}$$

where:

x is the observed value;

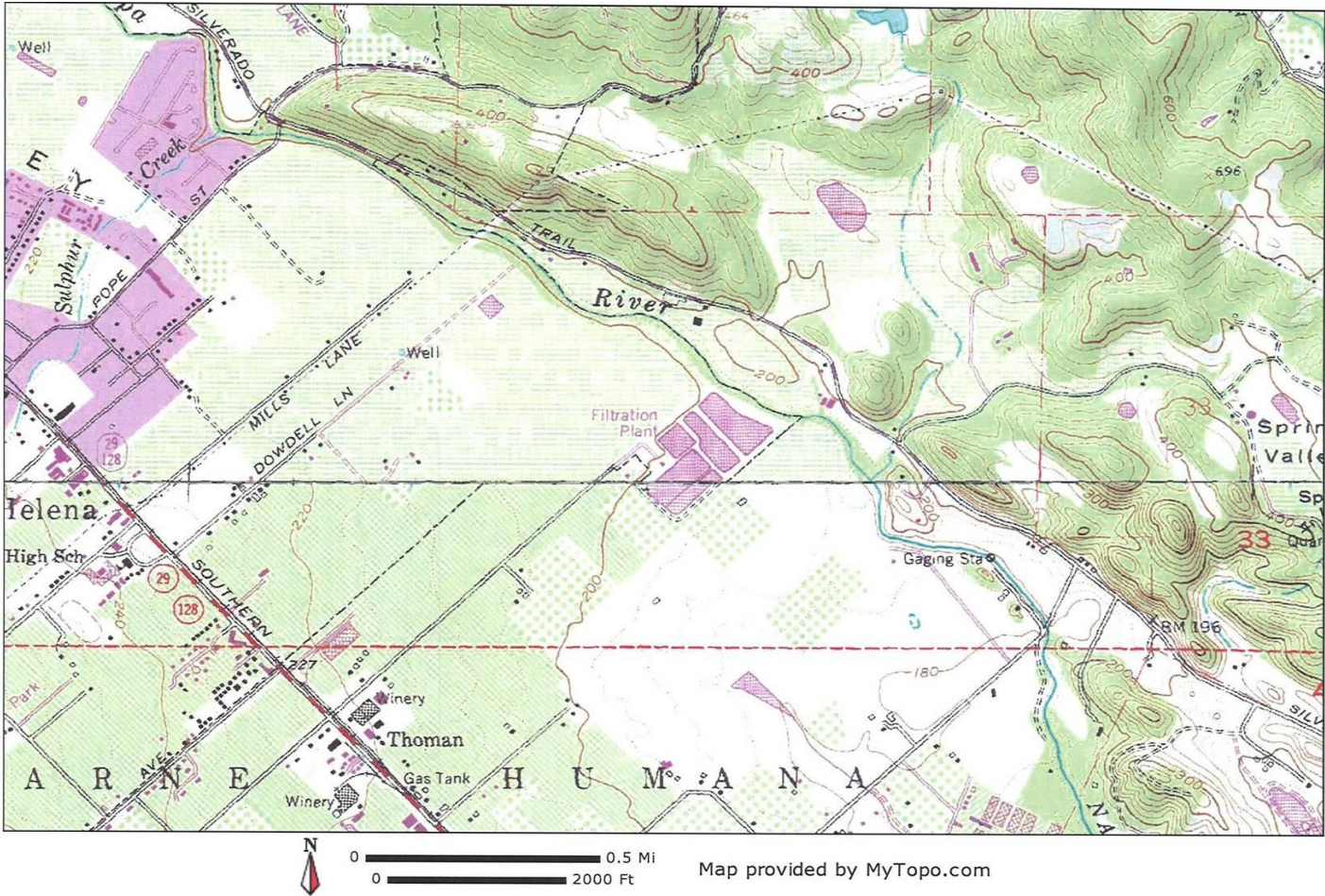
μ is the arithmetic mean of the observed values; and

n is the number of samples.

Toxicity Reduction Evaluation (TRE)

Study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. A TIE is a set of procedures to identify the specific chemicals responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.

ATTACHMENT B – FACILITY MAP



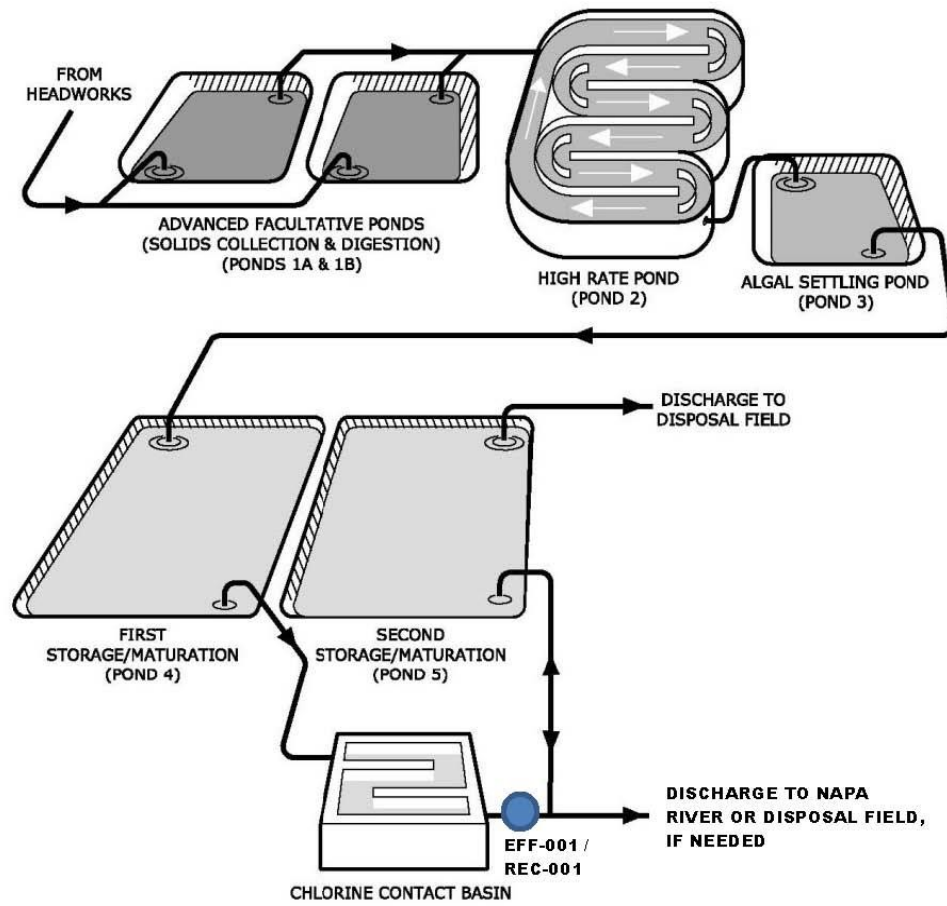
Attachment B – Facility Map

B-1

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ATTACHMENT C – PROCESS FLOW DIAGRAM



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ATTACHMENT D –STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the terms, requirements, and conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action; permit termination, revocation and reissuance, or modification; denial of a permit renewal application; or a combination thereof. (40 C.F.R. § 122.41(a); Wat. Code §§ 13261, 13263, 13265, 13268, 13000, 13001, 13304, 13350, 13385.)
2. The Discharger shall comply with effluent standards or prohibitions established under CWA section 307(a) for toxic pollutants and with standards for sewage sludge use or disposal established under CWA section 405(d) within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 C.F.R. § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 C.F.R. § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 C.F.R. § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 C.F.R. § 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 C.F.R. § 122.41(g).)
2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 C.F.R. § 122.5(c).)

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F. Inspection and Entry

The Discharger shall allow the Regional Water Board, State Water Board, U.S. EPA, and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (33 U.S.C. § 1318(a)(4)(B); 40 C.F.R. § 122.41(i); Wat. Code, §§ 13267, 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(B)(i); 40 C.F.R. § 122.41(i)(1); Wat. Code, §§ 13267, 13383);
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(2)); Wat. Code, §§ 13267, 13383);
3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (33 U.S.C. § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(3); Wat. Code, §§ 13267, 13383); and
4. Sample or monitor, at reasonable times, for the purposes of ensuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (33 U.S.C. § 1318(a)(4)(B); 40 C.F.R. § 122.41(i)(4); Wat. Code, §§ 13267, 13383.)

G. Bypass

1. Definitions

- a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 C.F.R. § 122.41(m)(1)(i).)
- b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 C.F.R. § 122.41(m)(1)(ii).)
2. **Bypass not exceeding limitations.** The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 C.F.R. § 122.41(m)(2).)
3. **Prohibition of bypass.** Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless (40 C.F.R. § 122.41(m)(4)(i)):
 - a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 C.F.R. § 122.41(m)(4)(i)(A));
 - b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of

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equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 C.F.R. § 122.41(m)(4)(i)(B)); and

- c. The Discharger submitted notice to the Regional Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 C.F.R. § 122.41(m)(4)(i)(C).)
4. **Approval.** The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions—Permit Compliance I.G.3 above. (40 C.F.R. § 122.41(m)(4)(ii).)

5. Notice

- a. **Anticipated bypass.** If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 C.F.R. § 122.41(m)(3)(i).)
- b. **Unanticipated bypass.** The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 C.F.R. § 122.41(m)(3)(ii).)

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 C.F.R. § 122.41(n)(1).)

- 1. **Effect of an upset.** An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 C.F.R. § 122.41(n)(2).)
- 2. **Conditions necessary for a demonstration of upset.** A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 C.F.R. § 122.41(n)(3)):
 - a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 C.F.R. § 122.41(n)(3)(i));
 - b. The permitted facility was, at the time, being properly operated (40 C.F.R. § 122.41(n)(3)(ii));
 - c. The Discharger submitted notice of the upset as required in Standard Provisions—Reporting V.E.2.b below (24-hour notice) (40 C.F.R. § 122.41(n)(3)(iii)); and

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- d. The Discharger complied with any remedial measures required under Standard Provisions—Permit Compliance I.C above. (40 C.F.R. § 122.41(n)(3)(iv).)

- 3. **Burden of proof.** In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 C.F.R. § 122.41(n)(4).)

II. STANDARD PROVISIONS—PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 C.F.R. § 122.41(f).)

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 C.F.R. § 122.41(b).)

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 C.F.R. §§ 122.41(l)(3), 122.61.)

III. STANDARD PROVISIONS – MONITORING

- A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 C.F.R. § 122.41(j)(1).)
- B. Monitoring must be conducted according to test procedures approved under 40 C.F.R. part 136 for the analyses of pollutants unless another method is required under 40 C.F.R. chapter 1, subchapters N or O. Monitoring must be conducted according to sufficiently sensitive test methods approved under 40 C.F.R. part 136 for the analysis of pollutants or pollutant parameters or required under 40 C.F.R. chapter 1, subchapter N or O. For the purposes of this paragraph, a method is sufficiently sensitive when:
 - 1. The method minimum level (ML) is at or below the level of the effluent limitation established in the permit for the measured pollutant or pollutant parameter, and either (a) the method ML is at or below the level of the applicable water quality criterion for the measured pollutant or pollutant parameter, or (b) the method ML is above the applicable water quality criterion but the amount of the pollutant or pollutant parameter in a facility's discharge is high enough that the method detects and quantifies the level of the pollutant or pollutant parameter in the discharge; or
 - 2. The method has the lowest ML of the analytical methods approved under 40 C.F.R. part 136 or required under 40 C.F.R. chapter 1, subchapter N or O for the measured pollutant or pollutant parameter.

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In the case of pollutants for which there are no approved methods under 40 C.F.R. part 136 or otherwise required under 40 C.F.R. chapter 1, subchapters N or O, monitoring must be conducted according to a test procedure specified in this Order for such pollutants. (40 C.F.R. §§ 122.21(e)(3), 122.41(j)(4), 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS—RECORDS

- A.** Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 C.F.R. part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time. (40 C.F.R. § 122.41(j)(2).)
- B.** Records of monitoring information shall include the following:
 - 1.** The date, exact place, and time of sampling or measurements (40 C.F.R. § 122.41(j)(3)(i));
 - 2.** The individual(s) who performed the sampling or measurements (40 C.F.R. § 122.41(j)(3)(ii));
 - 3.** The date(s) the analyses were performed (40 C.F.R. § 122.41(j)(3)(iii));
 - 4.** The individual(s) who performed the analyses (40 C.F.R. § 122.41(j)(3)(iv));
 - 5.** The analytical techniques or methods used (40 C.F.R. § 122.41(j)(3)(v)); and
 - 6.** The results of such analyses. (40 C.F.R. § 122.41(j)(3)(vi).)
- C.** Claims of confidentiality for the following information will be denied (40 C.F.R. § 122.7(b)):
 - 1.** The name and address of any permit applicant or Discharger (40 C.F.R. § 122.7(b)(1)); and
 - 2.** Permit applications and attachments, permits, and effluent data. (40 C.F.R. § 122.7(b)(2).)

V. STANDARD PROVISIONS—REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or U.S. EPA within a reasonable time, any information which the Regional Water Board, State Water Board, or U.S. EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or U.S. EPA copies of records required to be kept by this Order. (40 C.F.R. § 122.41(h); Wat. Code, §§ 13267, 13383.)

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B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or U.S. EPA shall be signed and certified in accordance with Standard Provisions—Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 C.F.R. § 122.41(k).)
2. For a corporation, all permit applications shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. (40 C.F.R. § 122.22(a)(1).)

For a partnership or sole proprietorship, all permit applications shall be signed by a general partner or the proprietor, respectively. (40 C.F.R. § 122.22(a)(2).)

For a municipality, state, federal, or other public agency, all permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA). (40 C.F.R. § 122.22(a)(3).)

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or U.S. EPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described in Standard Provisions—Reporting V.B.2 above (40 C.F.R. § 122.22(b)(1));
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 C.F.R. § 122.22(b)(2)); and
 - c. The written authorization is submitted to the Regional Water Board and State Water Board. (40 C.F.R. § 122.22(b)(3).)

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4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions—Reporting V.B.3 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 C.F.R. § 122.22(c).)
5. Any person signing a document under Standard Provisions—Reporting V.B.2 or V.B.3 above shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.” (40 C.F.R. § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program in this Order. (40 C.F.R. § 122.22(l)(4).)
2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 C.F.R. § 122.41(l)(4)(i).)
3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 C.F.R. part 136, or another method required for an industry-specific waste stream under 40 C.F.R. subchapters N or O, the results of such monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water Board. (40 C.F.R. § 122.41(l)(4)(ii).)
4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 C.F.R. § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 C.F.R. § 122.41(l)(5).)

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written

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submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 C.F.R. § 122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 C.F.R. § 122.41(l)(6)(ii)):
 - a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 C.F.R. § 122.41(l)(6)(ii)(A).)
 - b. Any upset that exceeds any effluent limitation in this Order. (40 C.F.R. § 122.41(l)(6)(ii)(B).)
3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 C.F.R. § 122.41(l)(6)(iii).)

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 C.F.R. § 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 C.F.R. section 122.29(b) (40 C.F.R. § 122.41(l)(1)(i)); or
2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (Alternatively, for an existing manufacturing, commercial, mining, or silvicultural discharge as referenced in 40 C.F.R. section 122.42(a), this notification applies to pollutants that are subject neither to effluent limitations in this Order nor to notification requirements under 40 C.F.R. section 122.42(a)(1) (see Additional Provisions—Notification Levels VII.A.1).) (40 C.F.R. § 122.41(l)(1)(ii).)
3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 C.F.R. § 122.41(l)(1)(iii).)

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with this Order's requirements. (40 C.F.R. § 122.41(l)(2).)

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H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions—Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision—Reporting V.E above. (40 C.F.R. § 122.41(l)(7).)

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or U.S. EPA, the Discharger shall promptly submit such facts or information. (40 C.F.R. § 122.41(l)(8).)

VI. STANDARD PROVISIONS – ENFORCEMENT

- A. The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13268, 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS—NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following (40 C.F.R. § 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to CWA sections 301 or 306 if it were directly discharging those pollutants (40 C.F.R. § 122.42(b)(1)); and
2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of this Order. (40 C.F.R. § 122.42(b)(2).)
3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 C.F.R. § 122.42(b)(3).)

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

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Clean Water Act section 308 and 40 C.F.R. sections 122.41(h), 122.41(j)-(l), 122.44(i), and 122.48 require that all NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Regional Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. This MRP establishes monitoring, reporting, and recordkeeping requirements that implement federal and State laws and regulations.

I. GENERAL MONITORING PROVISIONS

- A.** The Discharger shall comply with this MRP. The Executive Officer may amend this MRP pursuant to 40 C.F.R. sections 122.62, 122.63, and 124.5. If any discrepancies exist between this MRP and the “Regional Standard Provisions, and Monitoring and Reporting Requirements (Supplement to Attachment D) for NPDES Wastewater Discharge Permits” (Attachment G), this MRP shall prevail.
- B.** The Discharger shall conduct all monitoring in accordance with Attachment D, section III, as supplemented by Attachment G. Equivalent test methods must be more sensitive than those specified in 40 C.F.R. section 136 and must be specified in this permit.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Locations

Monitoring Location Type	Monitoring Location Name	Monitoring Location Description
Influent	INF-001	Any point in the plant at which all waste tributary to the treatment system is present and preceding any phase of treatment that may alter the influent character.
Effluent	EFF-001	Any point after full treatment, including disinfection, that represents all wastewater discharged to the Napa River at Discharge Point No. 001.
Effluent	REC-001	Any point after full treatment, including disinfection, that represents all wastewater directed to irrigation fields or recycled (excluding internal recycle at the treatment plant), and thus not discharged to the Napa River at Discharge Point No. 001.
Receiving Water	RSW-001	Any point in the Napa River upstream of Discharge Point No 001.
Receiving Water	RSW-002	A point in the Napa River approximately 600 feet downstream of Discharge Point No. 001.
Receiving Water	RSW-900	Any point or points in the Napa River for the purpose of collecting data for the Receiving Water Characterization Study identified in Provision VI.C.3 of the Order.
Biosolids	BIO-001	Any point following onsite biosolids processing.

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III. INFLUENT MONITORING REQUIREMENTS

The Discharger shall monitor plant influent at Monitoring Location INF-001 as follows:

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow ^[1]	MGD	Continuous	Continuous/D
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	C-24	3/Week ^[2]
Total Suspended Solids	mg/L	C-24	3/Week ^[2]

Abbreviations:

MGD = million gallons per day
mg/L = milligrams per liter
C-24 = 24-hour composite sample
Continuous/D = measured continuously, and recorded and reported daily
1/Week = once per week

Footnotes:

^[1] Flow shall be monitored continuously and the following information shall be reported in monthly self-monitoring reports:

- Daily average flow (MGD)
- Monthly average flow (MGD)
- Total monthly flow volume (MG)
- Maximum daily average flow rates (MGD)

^[2] The Discharger shall collect influent samples on the same days as effluent samples. The monitoring frequency may be decreased to once per quarter when not discharging to the Napa River.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Discharges to Napa River

When discharging to the Napa River, the Discharger shall monitor plant effluent at Monitoring Location EFF-001 as follows. When the minimum sampling frequency is weekly, monthly, or quarterly, at least one sample is required for any weekly, monthly, or quarterly period in which a discharge to Discharge Point No. 001 occurs.

Table E-3. Effluent Monitoring—Monitoring Location EFF-001

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow ^[1]	MGD	Continuous	Continuous/D
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	C-24	3/Week
Total Suspended Solids	mg/L	C-24	3/Week
Oil and Grease	mg/L	C-24	1/Quarter ^[2]
Total Coliform Bacteria	MPN/100 mL ^[3]	Grab	3/Week
Ammonia, Total	mg/L as N	C-24	1/Quarter ^[4]
pH	standard units	Grab	1/Day ^[4,5]
Temperature	°C	Grab	1/Quarter ^[4]
Acute Toxicity ^[6]	% survival	C-24	1/Quarter
Chlorine Residual ^[7]	mg/L	Continuous or Grab	1/Day or Continuous/2H
Copper	µg/L	C-24	1/Month
Cyanide ^[8]	µg/L	Grab	1/Month
River Flow-to-Effluent Flow Ratio ^[9]	---	Calculated	1/Day

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Abbreviations:

MGD	= million gallons per day
mg/L	= milligrams per liter
µg/L	= micrograms per liter
mg/L as N	= milligrams per liter as nitrogen
°C	= degrees Celsius
% survival	= percent survival
C-24	= 24-hour composite
Grab	= grab sample
Continuous/D	= measured continuously, and recorded and reported daily
Continuous/2H	= measured continuously or, if infeasible, at least every 2 hours
1/Day	= once per day
3/Week	= three times per week
1/Month	= once per month
1/Quarter	= once per quarter

Footnotes:

- [1] Flow shall be monitored continuously and the following information shall be reported in self-monitoring reports:
- Daily average flow (MGD)
 - Monthly average flow (MGD)
 - Total monthly flow volume (MG)
 - Maximum daily average flow rates (MGD)
- [2] Oil and grease sampling and analysis shall be conducted in accordance with U.S. EPA Method 1664A.
- [3] Results may be reported as Colony Forming Units/100 milliliters (CFU/100 mL) if the laboratory method used provides results in CFU/100 mL.
- [4] Ammonia monitoring shall occur concurrently with pH and temperature monitoring.
- [5] If pH is monitored continuously, the minimum and maximum pH values for each day shall be reported in self-monitoring reports.
- [6] Acute bioassay tests shall be performed in accordance with MRP section V.A.
- [7] Effluent residual chlorine concentrations shall be monitored once per day by grab sample from the recycled water storage pond, or continuously, or at a minimum every other hour, immediately following dechlorination. The Discharger shall describe all excursions of the chlorine limit in the transmittal letter of self-monitoring reports as required by Attachment G section V.C.1.a. If monitoring continuously, the Discharger shall report through data upload to CIWQS, from discrete readings of the continuous monitoring every hour on the hour, the maximum for each day and any other discrete hourly reading that exceed the effluent limit, and, for the purpose of mandatory minimum penalties required by Water Code section 13385(i), compliance shall be based only on these discrete readings. The Discharger shall retain continuous monitoring readings for at least three years. The Regional Water Board reserves the right to use all continuous monitoring data for discretionary enforcement.
- [8] The Discharger may, at its option, analyze for cyanide as Weak Acid Dissociable Cyanide using protocols specified in Standard Method Part 4500-CN-I, USEPA Method OI 1677, or an equivalent method in the latest edition.
- [9] The Discharger shall calculate and report the river flow-to-effluent flow ratio once per day when discharging to the Napa River. The river flow-to-effluent flow ratio shall be calculated as the ratio of the instantaneous flow of the Napa River measured at USGS Station No. 11458000 (at 8 a.m. every morning) to the average effluent flow during the previous 24 hours (8 a.m. to 8 a.m.) measured at Monitoring Location EFF-001.

B. Discharges to Irrigation Fields or Reused Offsite

The Discharger shall monitor plant effluent flow at Monitoring Location REC-001 continuously and the following information shall be reported in self-monitoring reports:

- Daily average flow (MGD)
- Monthly average flow (MGD)
- Total monthly flow volume (MG)
- Maximum daily average flow (MGD)

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V. WHOLE EFFLUENT ACUTE TOXICITY TESTING REQUIREMENTS

- A. Compliance with the whole effluent acute toxicity effluent limitations at Discharge Point No. 001 shall be evaluated at Monitoring Location EFF-001 by measuring survival of test organisms exposed to 96-hour static renewal bioassays.
- B. Test organisms shall be fathead minnow (*Pimephales promelas*). Alternatively, the Executive Officer may specify a more sensitive organism or, if testing a particular organism proves unworkable, the most sensitive organism available.
- C. Bioassays shall be performed according to the most up-to-date protocols in 40 C.F.R. part 136, currently *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms*, 5th Edition (EPA-821-R-02-012). If these protocols prove unworkable, the Executive Officer and the Environmental Laboratory Accreditation Program may grant exceptions in writing upon the Discharger's request with justification.
- D. If the Discharger demonstrates that specific identifiable substances in the discharge are rapidly rendered harmless upon discharge to the receiving water, compliance with the acute toxicity limit may be determined after test samples are adjusted to remove the influence of those substances. Written acknowledgement that the Executive Officer concurs with the Discharger's demonstration and that the adjustment will not remove the influence of other substances must be obtained prior to any such adjustment. The Discharger may manually adjust the pH of whole effluent acute toxicity samples prior to performing bioassays to minimize ammonia toxicity interference.
- E. The sample may be taken from final secondary effluent prior to disinfection. Bioassay water monitoring shall include, on a daily basis, pH, dissolved oxygen, ammonia (if toxicity is observed), temperature, hardness, and alkalinity. These results shall be reported. If final or intermediate results of an acute bioassay test indicate a violation or threatened violation (e.g., the percentage of surviving test organisms is less than 70 percent), the Discharger shall initiate a new test as soon as practical and shall investigate the cause of the mortalities and report its findings in the next self-monitoring report. The Discharger shall repeat the test until a test fish survival rate of 90 percent or greater is observed. If the control fish survival rate is less than 90 percent, the bioassay test shall be restarted with new fish and shall continue as soon as practical until an acceptable test is completed (i.e., control fish survival rate is 90 percent or greater).

VI. RECEIVING WATER MONITORING REQUIREMENTS

The Discharger shall monitor receiving waters at Monitoring Location RSW-002 as set forth in the table below. In addition, the Discharger shall obtain flow data from USGS Station No. 11458000 at approximately 8 a.m. each day that a discharge to the Napa River occurs (this flow shall be used to calculate the river flow-to-effluent flow ratio; see Discharge Prohibition III.C of the Order).

Table E-4. Receiving Water Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
pH	standard units	Grab	2/Year ^[1]
Temperature	°C	Grab	2/Year ^[1]

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Parameter	Units	Sample Type	Minimum Sampling Frequency
Total Ammonia	mg/L as N	Grab	2/Year ^[1]
Hardness	mg/L as CaCO ₃	Grab	2/Year ^[1]

Abbreviations:

MGD = million gallons per day
 °C = degrees Celsius
 mg/L = milligrams per liter
 mg/L as N = milligrams per liter as nitrogen
 mg/L as CaCO₃ = milligrams per liter as calcium carbonate
 Grab = grab sample
 1/Day = once per day
 2/Year = twice per year

Footnote:

^[1] Parameters shall be analyzed twice per year during the discharge season; once after the first storm of the season during the interval from October 1 through January 31, and once during the interval from February 1 through May 15.

VII. OTHER MONITORING REQUIREMENTS

The Discharger shall adhere to sludge monitoring requirements required by 40 C.F.R. part 258 (for landfill disposal) and 40 C.F.R. part 503 (for land application).

VIII. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

The Discharger shall comply with all Standard Provisions (Attachments D and G) related to monitoring, reporting, and recordkeeping, with modifications shown in section X, below.

B. Self-Monitoring Reports (SMRs)

- SMR Format.** The Discharger shall electronically submit SMRs using the State Water Board's California Integrated Water Quality System (CIWQS) Web site (http://www.waterboards.ca.gov/water_issues/programs/ciwqs). The CIWQS website will provide additional information for SMR submittal in the event of a planned service interruption for electronic submittal.
- SMR Due Dates and Contents.** The Discharger shall submit SMRs by the due dates, and with the contents, specified below:
 - Monthly SMRs** — Monthly SMRs shall be due 30 days after the end of each calendar month, covering that calendar month. The monthly SMR shall contain the applicable items described in sections V.B and V.C of both Attachments D and G of this Order. See Provision VI.C.2 (Effluent Characterization Study and Report) and Provision VI.C.3 (Receiving Water Characterization Study and Report) of this Order for information that must also be reported with monthly SMRs.

Monthly SMRs shall include all new monitoring results obtained since the last SMR was submitted. If the Discharger monitors any pollutant more frequently than required by this Order, the Discharger shall include the results of such monitoring in the calculations and reporting for the SMR.

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- b. Annual SMR** — Annual SMRs shall be due February 1 each year, covering the previous calendar year. The annual SMR shall contain the items described in sections V.C.1.f of Attachment G. See Provision VI.C.2 (Effluent Characterization Study and Report), Provision VI.C.3 (Receiving Water Characterization Study and Report), and Provision VI.C.4 (Pollution Minimization Program) of this Order for information that must also be reported with the annual SMR.
- c. Specifications for Submitting SMRs to CIWQS** — The Discharger shall submit analytical results and other information using one of the methods in the table below:

Table E-5. CIWQS Reporting

Parameter	Method of Reporting	
	EDF/CDF data upload or manual entry	Attached File
All parameters identified in influent, effluent, and receiving water monitoring tables (except Dissolved Oxygen and Temperature)	Required for all results	
Dissolved Oxygen Temperature	Required for monthly maximum and minimum results only ^[1]	Discharger may use this method for all results or keep records
Antimony Arsenic Beryllium Cadmium Chromium Copper Cyanide Lead Mercury Nickel Selenium	Silver Thallium Zinc Dioxins & Furans (by U.S. EPA Method 1613) Other Pollutants (by U.S. EPA methods 601, 602, 608, 610, 614, 624, and 625)	Required for all results ^[2]
Volume and Duration of Blended Discharge ^[3]	Required for all blended effluent discharges	
Analytical Method	Not required (Discharger may select “data unavailable”) ^[1]	
Collection Time Analysis Time	Not required (Discharger may select “0:00”) ^[1]	

Footnotes:

- ^[1] The Discharger shall continue to monitor at the minimum frequency specified in this MRP, keep records of the measurements, and make the records available upon request.
- ^[2] These parameters require EDF/CDF data upload or manual entry regardless of whether monitoring is required by this MRP or other provisions of this Order (except for biosolids, sludge, or ash provisions).
- ^[3] The requirement for volume and duration of blended discharge applies only if this Order authorizes the Discharger to discharge blended effluent.

The Discharger shall arrange all reported data in a tabular format and summarize data to clearly illustrate whether the Facility is operating in compliance with effluent limitations. The Discharger is not required to duplicate the submittal of data entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide

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for entry into a tabular format, the Discharger shall electronically submit the data in a tabular format as an attachment.

- 3. Monitoring Periods.** Monitoring periods for all required monitoring shall be as set forth below unless otherwise specified:

Table E-6. Monitoring Periods

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period
Continuous	Order effective date	All times
1/2 Hours	Order effective date	Every two-hour period, beginning at midnight (e.g., 12:00 a.m. through 1:59 a.m.)
1/Day	Order effective date	Every 24-hour period, beginning at midnight and continuing through 11:59 p.m.
1/Week or 3/Week	Sunday following (or on) Order effective date	Sunday through Saturday
1/Month	First day of calendar month following (or on) Order effective date	First day of calendar month through last day of calendar month
1/Quarter ^[1]	Closest January 1, April 1, July 1, or October 1 before or after Order effective date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31
2/Year ^[1]	Closest October 1 or February 1 before or after Order effective date	October 1 through January 31 February 1 through May 15
1/Year ^[1]	Closest January 1 before or after Order effective date	January 1 through December 31
Once	Order effective date	Anytime such that monitoring results may be submitted with the application for permit reissuance

Footnote:

^[1] Monitoring performed during the previous order term may be used to satisfy monitoring required by this Order.

- 4. RL and MDL Reporting.** The Discharger shall report with each sample result the Reporting Level (RL) and Method Detection Limit (MDL) as determined by the procedure in 40 C.F.R. part 136. The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

- a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).
- b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

For purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ. The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (+/- a percentage of the reported value), numerical ranges (low to high), or any other means the laboratory considers appropriate.

- c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

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- d. The Discharger shall instruct laboratories to establish calibration standards so that the minimum level (ML) value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

- 5. **Compliance Determination.** Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined above and in the Fact Sheet and Attachments A, D, and G. For purposes of reporting and administrative enforcement by the Regional Water Board and the State Water Board, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

C. Discharge Monitoring Reports (DMRs)

At any time during the term of this Order, the State Water Board or the Regional Water Board may notify and require the Discharger to submit DMRs. Once notified, the Discharger shall electronically certify and submit DMRs with SMRs using the Electronic Self-Monitoring Reports module eSMR 2.5 or any upgraded version. Electronic DMR submittal shall be in addition to electronic SMR submittal. Information about electronic DMR submittal is available at the DMR website at http://www.waterboards.ca.gov/water_issues/programs/discharge_monitoring.

IX. MODIFICATIONS TO ATTACHMENT G

This MRP modifies Attachment G as indicated below.

A. Attachment G section V.C.1.c.2 is revised as follows:

- 2) When determining compliance with an average monthly or maximum daily effluent limitation, and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of detected but not quantified (DNQ) or nondetect (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:
 - i. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
 - ii. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

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If a sample result, or the arithmetic mean or median of multiple sample results, is below the reporting limit, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the Discharger conducts a Pollutant Minimization Program, the Discharger shall not be deemed out of compliance.

B. Attachment G sections V.C.1.f and V.C.1.g are revised as follows, and section V.C.1.h (Reporting data in electronic format) is deleted:

f. Annual self-monitoring report requirements

By the date specified in the MRP, the Discharger shall submit an annual report to the Regional Water Board covering the previous calendar year. The report shall contain the following:

- 1) Annual compliance summary table of treatment plant performance, including documentation of any blending events (this summary table is not required if the Discharger has submitted the year's monitoring results to CIWQS in electronic reporting format by EDF/CDF upload or manual entry);
- 2) Comprehensive discussion of treatment plant performance and compliance with the permit (This discussion shall include any corrective actions taken or planned, such as changes to facility equipment or operation practices that may be needed to achieve compliance, and any other actions taken or planned that are intended to improve performance and reliability of the Discharger's wastewater collection, treatment, or disposal practices.);
- 3) Both tabular and graphical summaries of the monitoring data for the previous year if parameters are monitored at a frequency of monthly or greater (this item is not required if the Discharger has submitted the year's monitoring results to CIWQS in electronic reporting format by EDF/CDF upload or manual entry);
- 4) List of approved analyses, including the following:
 - (i) List of analyses for which the Discharger is certified;
 - (ii) List of analyses performed for the Discharger by a separate certified laboratory (copies of reports signed by the laboratory director of that laboratory shall not be submitted but be retained onsite); and
 - (iii) List of "waived" analyses, as approved;
- 5) Plan view drawing or map showing the Discharger's facility, flow routing, and sampling and observation station locations;
- 6) Results of annual facility inspection to verify that all elements of the SWPP Plan are accurate and up to date (only required if the Discharger does not route all stormwater to the headworks of its wastewater treatment plant); and
- 7) Results of facility report reviews (The Discharger shall regularly review, revise, and update, as necessary, the O&M Manual, the Contingency Plan, the Spill

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Prevention Plan, and Wastewater Facilities Status Report so that these documents remain useful and relevant to current practices. At a minimum, reviews shall be conducted annually. The Discharger shall include, in each Annual Report, a description or summary of review and evaluation procedures, recommended or planned actions, and an estimated time schedule for implementing these actions. The Discharger shall complete changes to these documents to ensure they are up-to-date.).

g. Report submittal

The Discharger shall submit SMRs addressed as follows, unless the Discharger submits SMRs electronically to CIWQS:

California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
Attn: NPDES Wastewater Division

h. Reporting data in electronic format – *Deleted*

C. Attachment G sections V.E.2, V.E.2.a, and V.E.2.c are revised as follows, and sections V.E.2.b (24-hour Certification) and V.E.2.d (Communication Protocol) are deleted:

2. Unauthorized Discharges from Municipal Wastewater Treatment Plants¹

The following requirements apply to municipal wastewater treatment plants that experience an unauthorized discharge at their treatment facilities and supersede requirements imposed on the Discharger by the Executive Officer by letter of May 1, 2008.

a. Two (2)-Hour Notification

For any unauthorized discharges that enter a drainage channel or a surface water, the Discharger shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the California Office of Emergency Services (CalOES, currently 800-852-7550), the local health officers or directors of environmental health with jurisdiction over the affected water bodies, and the Regional Water Board. Timely notification by the Discharger to CalOES also satisfies notification to the Regional Water Board. Notification shall include the following:

- 1) Incident description and cause;
- 2) Location of threatened or involved waterway(s) or storm drains;

¹ California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

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- 3) Date and time the unauthorized discharge started;
 - 4) Estimated quantity and duration of the unauthorized discharge (to the extent known), and the estimated amount recovered;
 - 5) Level of treatment prior to discharge (e.g., raw wastewater, primary treated, undisinfected secondary treated, and so on); and
 - 6) Identity of the person reporting the unauthorized discharge.
- b. 24-hour Certification – *Deleted*
- c. 5-day Written Report

Within five business days, the Discharger shall submit a written report that includes, in addition to the information required above, the following:

- 1) Methods used to delineate the geographical extent of the unauthorized discharge within receiving waters;
 - 2) Efforts implemented to minimize public exposure to the unauthorized discharge;
 - 3) Visual observations of the impacts (if any) noted in the receiving waters (e.g., fish kill, discoloration of water) and the extent of sampling if conducted;
 - 4) Corrective measures taken to minimize the impact of the unauthorized discharge;
 - 5) Measures to be taken to minimize the chances of a similar unauthorized discharge occurring in the future;
 - 6) Summary of Spill Prevention Plan or O&M Manual modifications to be made, if necessary, to minimize the chances of future unauthorized discharges; and
 - 7) Quantity and duration of the unauthorized discharge, and the amount recovered.
- d. Communication Protocol – *Deleted*

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ATTACHMENT F - FACT SHEET

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ATTACHMENT F – FACT SHEET

This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order. As described in section II.B of the Order, the Regional Water Board incorporates this Fact Sheet as findings supporting the issuance of the Order.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility:

Table F-1. Facility Information

WDID	2 283014001
CIWQS Place ID	258386
Discharger	City of St. Helena
Facility Name	City of St. Helena Wastewater Treatment and Reclamation Plant and its wastewater collection system
Facility Address	1 Chaix/Thomann Lane St. Helena, CA 94574 Napa County
Facility Contact, Title, Phone	Steven Palmer, Public Works Director, 707-967-2792
Authorized Person to Sign and Submit Reports	Same as facility contact
Mailing Address	1480 Main Street, St. Helena, CA 94574
Billing Address	Same as mailing address
Facility Type	Publicly-Owned Treatment Works (POTW)
Major or Minor Facility	Minor
Threat to Water Quality	2
Complexity	B
Pretreatment Program	No
Recycled Water Requirements	Regional Water Board Order No. 87-090
Mercury and PCBs Requirements	NPDES Permit No. CA0038849
Permitted Flow	0.50 million gallons per day (MGD) – average daily dry weather design flow
Design Flow	2.8 MGD – peak wet weather flow
Watershed	San Pablo Bay
Receiving Water	Napa River
Receiving Water Type	Freshwater

- A. The City of St. Helena (Discharger) owns and operates the City of St. Helena Wastewater Treatment and Reclamation Plant (plant) and its associated wastewater collection system (collectively, the Facility). The plant provides secondary treatment of wastewater collected from its service area and discharges treated effluent to the Napa River when plant influent exceeds the capacity of the recycled water distribution and storage system. The Napa River is a water of the United States within the San Pablo Bay watershed. Attachment B provides maps of the area around the Facility, and Attachment C provides a plant flow schematic.

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and State laws, regulations, plans, and policy are held to be equivalent to references to the Discharger herein.

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- B.** The Discharger is regulated pursuant to National Pollutant Discharge Elimination System (NPDES) Permit No. CA0038016. The Discharger is authorized to discharge subject to waste discharge requirements in this Order at the discharge location described in Table 2 of this Order. Regulations at 40 C.F.R. section 122.46 limit the duration of NPDES permits to a fixed term not to exceed five years. Accordingly, Table 3 of this Order limits the effective period for the discharge authorization.
- C.** Pursuant to California Code of Regulations, title 23, section 2235.4, the terms and conditions of an expired permit are automatically continued pending reissuance of the permit if the Discharger complies with all federal NPDES regulation requirements for continuation of expired permits. The Discharger was previously subject to Order No. R2-2010-0105 (previous order), which became effective on November 1, 2010. The Discharger filed a Report of Waste Discharge and submitted an application for reissuance of its Waste Discharge Requirements (WDRs) and NPDES permit on May 1, 2015. The previous order was therefore administratively extended by operation of law beyond its stated expiration date (October 31, 2015).
- D.** The discharge is also regulated under NPDES Permit No. CA0038849, which establishes requirements on mercury and polychlorinated biphenyls (PCBs). This Order does not affect that permit.

The Discharger is also regulated by Order No. 87-090 for the discharge or disposal of plant effluent to the Discharger's spray irrigation fields during dry weather. In contrast, this Order regulates the discharge of plant effluent to the Napa River during wet weather when the irrigation fields are saturated. Discharge to the irrigation fields occurs more commonly than discharge to Napa River.

- E.** When applicable, State law requires dischargers to file a petition with the State Water Board's Division of Water Rights and receive approval for any change in the point of discharge, place of use, or purpose of use of treated wastewater that decreases the flow in any portion of a watercourse. The State Water Board retains separate jurisdictional authority to enforce such requirements under Water Code section 1211. This is not an NPDES permit requirement.

II. FACILITY DESCRIPTION

A. Wastewater and Biosolids Treatment

- 1. Location and Service Area.** The plant is located at 1 Chaix/Thomann Lane in St. Helena. It provides secondary treatment of domestic and commercial source wastewater from the City of St. Helena. The estimated service area population is about 6,000.
- 2. Collection System.** The Discharger operates about 18.8 miles of sewer lines and one pump station on Crinella Drive.
- 3. Current Wastewater Treatment.** The average dry weather design treatment capacity of the plant is 0.50 million gallons per day (MGD). Wastewater treatment processes include solids grinding by a comminutor, biological treatment through a series of ponds (described in Table F-2), and chlorine disinfection. These treatment processes are capable of meeting secondary treatment standards. The average dry weather flow treated in 2014 was 0.36 MGD. The average annual flow treated in 2014 was 0.47 MGD, and the highest daily flow treated was 1.03 MGD during wet weather.

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The previous order had required the Discharger to evaluate the adequacy of its treatment capacity. The Discharger's March 2015 *Wastewater Facilities Evaluation Update* (Bennett Engineering Services) indicated that the service area population is only growing slightly (less than earlier projections) and that the per capita wastewater flows are declining due to conservation measures. Therefore, the existing treatment system is capable of meeting the Discharger's near-term waste loads and flows. The report projected that in 2030 the average dry weather flows will be about 0.50 MGD, the current capacity. However, the report also indicated that the Discharger should plan to increase its capacity to 0.65 MGD by 2030 to account for uncertainty.

Table F-2. Wastewater Ponds

Pond	Type	Surface Area (acres)	Depth (feet)	Volume (million gallons)
1A	Facultative with Digester	2.9	10	8.1
1B	Facultative with Digester	2.1	14	7.5
2	High-rate (aeration)	5.1	3	4.0
3	Algae Sedimentation	2.5	9	6.3
4	Maturation/Storage	3.0	11.5	9.8
5	Maturation/Storage	6.7	13	24.6

- 4. Future Wastewater Treatment.** To comply with the effluent limitations listed in Table 4 of this Order, the Discharger will design and construct upgrades to the treatment plant.
- 5. Biosolids Management.** The Discharger does not remove solids from its ponds on a regular basis. Most of the solids settle out in Ponds 1A and 1B, where they are anaerobically digested at the bottom of the pond. When solids accumulate to the point where treatment becomes ineffective, the Discharger drains Ponds 1A and 1B to excavate the solids. The Discharger last did this for Pond 1A in 2014.
- 6. Stormwater.** Stormwater discharges at the plant are covered under the State Water Board's General Permit for Industrial Stormwater Discharges (NPDES General Permit CAS000001).

B. Discharge Points and Receiving Waters

Plant effluent is discharged into the Napa River through a shallow water outfall (Discharge Point No. 001). This occurs typically only during wet weather when the Discharger's irrigation fields are saturated. Normally during dry weather, the Discharger disposes of plant effluent to its 88 acres of fields through spray irrigation pursuant to Order No. 87-090. A small portion of plant effluent, less than 2 percent, is also reused to irrigate a redwood tree farm and to grow mosquito fish.

C. Summary of Existing Requirements and Monitoring Data

The effluent limitations in the previous order and representative monitoring data from the previous order term are presented below:

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Table F-3. Historic Effluent Limitations and Monitoring Data

Parameter	Units	Effluent Limits			Monitoring Data (when discharging to Napa River) (12/1/10-6/30/15)		
		Monthly Average	Weekly Average	Daily Maximum	No. of Samples / No. Below Detection Limit	Highest Daily Discharge	Average ± Standard Deviation ^[1]
Biochemical Oxygen Demand (BOD)	mg/L	30	45	---	21/4	23	8.1 ± 4.6
Total Suspended Solids (TSS)	mg/L	30	45	---	21/3	20	12 ± 5.1
Oil and Grease	mg/L	10	---	20	6/6	<1.4	---
pH	standard units	6.5 - 8.5			4/0	6.3-7.2 ^[2]	6.6 ± 0.4
Residual Chlorine, Total	mg/L	0.0 maximum			---	0.0	---
Copper, Total	µg/L	14	---	24	6/0	6.9	5.0 ± 1.4
Cyanide, Total	µg/L	30	---	15	5/0	23	13 ± 8
Bis(2-ethylhexyl)phthalate	µg/L	6.0	---	3.0	6/6	<3.0	---
Dioxin-TEQ	µg/L	2.6 x 10 ⁻⁸	---	1.3 x 10 ⁻⁸	4/4	<3.40E-07	---
Ammonia, Total	mg/L as N	39	---	16	6/0	16	9.9 ± 4.0
Acute Toxicity	% Survival	Greater than 90% (3-sample median) Not less than 70% (single sample)			6/0	95 ^[3]	98 ± 3

Unit Abbreviations:

mg/L = milligrams per liter
µg/L = micrograms per liter
mg/L as N = milligrams per liter as nitrogen
% = percent

Footnotes:

- ^[1] Samples below the detection limit were assumed to be one-half the detection limit.
^[2] Lowest and highest values.
^[3] Lowest value.

D. Compliance Summary

- 1. Treatment Plant.** The table below lists violations from November 2010 through August 2015 of the previous order and Order No. 87-090, which regulates discharge of the treated effluent to land:

Table F-4. Effluent Limitation Violations

Date	Violation	Unit	Effluent Limit	Reported Value
NPDES Permit Violations				
11/04/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/19/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/20/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/24/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/30/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
12/28/2010	Copper Daily Maximum	µg/L	24	123

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09/27/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	37
10/12/2012	Total Coliform Single-Sample Maximum	MPN/100 mL	240	500
10/12/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/15/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/15/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
10/15/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/23/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
12/26/2012	Residual Chlorine Daily Maximum	mg/L	0.0	0.4
12/27/2012	Residual Chlorine Daily Maximum	mg/L	0.0	0.1
05/22/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
05/23/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/25/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
10/30/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
10/31/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
02/12/2014	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	33
02/13/2014	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	33
02/14/2014	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	33
12/22/2014	Cyanide, Total (as CN) 30-Day Average	µg/L	15	16
Water Reclamation Requirements (Order No. 87-090) Violations				
12/24/2010	Biochemical Oxygen Demand Daily Maximum	mg/L	40	76
03/02/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	>220
06/28/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	43
07/03/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	43
09/17/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	42
09/25/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	44
10/08/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	87
06/12/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	42
06/20/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	49
09/03/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	45
09/20/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	44
10/04/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	101
10/11/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	51
11/08/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	46
12/04/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	67
12/13/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	54
05/01/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	46
06/01/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	46
06/17/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	51
08/08/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	70
08/28/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	59
09/09/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	59
11/25/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	81
11/26/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	61
12/09/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	111
12/10/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	124
03/12/2015	Biochemical Oxygen Demand Daily Maximum	mg/L	40	76

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- 2. Collection System.** The table below shows the Discharger's sanitary sewer overflow (SSO) rates (total SSOs per 100 miles of collection system for each of the past four years) and other information along with those for the county and region. The Discharger had three SSOs in 2012 and none since. Future SSOs could potentially reach waters of the U.S. and thus could violate Prohibition III.D of this Order.

Table F-5. SSO Rates (total SSOs/100 miles of sewer)
(based on CIWQS data analysis completed in February 2015)^[1]

	Sewer System Length (miles)	Sewer System Average Age (years)^[2]	2011	2012	2013	2014
St. Helena	20	30.4	0	6.3	0	0
Napa County average of 3 medium systems (10-99 miles)	29.8	38.9	2.7	4.9	4.2	4.6
San Francisco Bay Region average of 49 medium systems (10-99 miles)	31.8	45.2	10.7	10.9	12.9	10.4
San Francisco Bay Region median of all 132 systems	42	44.5	4.2	4.8	4.5	2.7

Footnotes:

^[1] The State Water Board's Enrollee's Guide to the SSO Database defines "Total number of SSOs per 100 miles of Sewer" as "...the number of SSOs, for which the reporting Enrollee is responsible, for every 100 miles of pipe or sewer lines in an Enrollee's sanitary sewer system. Due to the large variation in facility specific characteristics, this metric should only be viewed as a rough comparison of the operation and maintenance performance of Enrollees and their sanitary sewer systems."

^[2] Average age as of 2014.

E. Planned Changes

To comply with the new limitations for BOD and TSS in Table 4 of this Order, which reflect pollutant levels achievable by implementing advanced secondary treatment, the Discharger will upgrade the plant. Concurrent with adoption of this Order, the Regional Water Board considered a cease and desist order containing a time schedule of tasks to achieve advanced secondary treatment.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

A. Legal Authorities

This Order serves as WDRs pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to Clean Water Act (CWA) section 402 and implementing regulations adopted by U.S. EPA and Water Code chapter 5.5, division 7 (commencing with § 13370). It shall serve as an NPDES permit for point source discharges from the Facility to surface waters.

B. California Environmental Quality Act

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act, Public Resources Code division 13, chapter 3 (commencing with § 21100).

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C. State and Federal Regulations, Policies, and Plans

- 1. Water Quality Control Plan.** The Regional Water Board adopted the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. Requirements in this Order implement the Basin Plan. In addition, this Order implements State Water Board Resolution No. 88-63, which established State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Beneficial uses applicable to the Napa River are listed below:

Table F-6. Napa River Beneficial Uses

Discharge Point	Receiving Water	Beneficial Uses
001	Napa River	Agricultural Supply (AGR) Municipal and Domestic Supply (MUN) Cold Freshwater Habitat (COLD) Fish Spawning (SPWN) Warm Freshwater Habitat (WARM) Wildlife Habitat (WILD) Water Contact Recreation (REC1) Non-Contact Water Recreation (REC2) Navigation (NAV) Fish Migration (MIGR) Preservation of Rare and Endangered Species (RARE)

- 2. National Toxics Rule (NTR) and California Toxics Rule (CTR).** U.S. EPA adopted the NTR on December 22, 1992, and amended it on May 4, 1995 and November 9, 1999. About 40 criteria in the NTR apply in California. On May 18, 2000, U.S. EPA adopted the CTR. The CTR promulgated new toxics criteria for California and incorporated the previously adopted NTR criteria that applied in the State. U.S. EPA amended the CTR on February 13, 2001. These rules contain water quality criteria for priority pollutants.
- 3. State Implementation Policy.** On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria U.S. EPA promulgated for California through the NTR and the priority pollutant objectives the Regional Water Board established in the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria U.S. EPA promulgated through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives, and provisions for chronic toxicity control. Requirements of this Order implement the SIP.
- 4. Domestic Water Quality.** In accordance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order complies with that policy by requiring discharges to meet, when necessary, maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.

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5. **Antidegradation Policy.** Federal regulations at 40 C.F.R. section 131.12 requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy through State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California*, which is deemed to incorporate the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. Permitted discharges must be consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.
6. **Anti-Backsliding Requirements.** CWA sections 402(o) and 303(d)(4) and 40 C.F.R. section 122.44(l) restrict backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed.
7. **Recycled Water Policy.** The State Water Board adopted Resolution No. 2013-0003 on January 22, 2013, titled *Policy for Water Quality Control for Recycled Water*, which is intended to promote sustainable local water supplies by increasing the acceptance and promoting the use of recycled water. The policy sets a goal to increase the use of recycled water statewide by at least one million acre feet per year (afy) over the 2002 baseline-level by 2020 and by at least two million afy by 2030. Consistent with the policy, the Regional Water Board is to exercise its authority to the fullest extent possible to encourage the use of recycled water and to develop watershed-based salt and nutrient management plans to ensure use of recycled water does not degrade groundwater resources.

D. Impaired Waters on CWA 303(d) List

In October 2011, U.S. EPA approved a revised list of impaired waters pursuant to CWA section 303(d), which requires identification of specific water bodies where it is expected that water quality standards will not be met after implementation of technology-based effluent limitations on point sources. Where it has not done so already, the Regional Water Board plans to adopt total maximum daily loads (TMDLs) for pollutants on the 303(d) list. TMDLs establish wasteload allocations for point sources and load allocations for non-point sources and are established to achieve the water quality standards for the impaired waters.

The Napa River is listed as impaired by nutrients, pathogens, and sediment. San Pablo Bay, to which the Napa River is tributary, is listed for chlordane, DDT, dieldrin, dioxins and furans, mercury, nickel, PCBs, selenium, and exotic species. The SIP requires final effluent limitations for all 303(d)-listed pollutants to be consistent with TMDLs and associated wasteload allocations.

On February 12, 2008, U.S. EPA approved a TMDL for mercury in San Francisco Bay. On March 29, 2010, U.S. EPA approved a TMDL for PCBs in San Francisco Bay. The TMDLs for mercury and PCBs apply to this discharge but are implemented through NPDES Permit No. CA0038849.

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On February 29, 2008, U.S. EPA approved a TMDL for pathogens in the Napa River. This Order's total coliform effluent limitations are more stringent than the Napa River pathogens TMDL requires.

On January 21, 2011, U.S. EPA approved a TMDL for sediment in the Napa River. This Order's TSS effluent limitations are more stringent than specified by the Napa River sediment TMDL (see Basin Plan Table 7.8.4-3b, footnote a).

The discharge is a potential source of nutrients to the Napa River but is not expected to be a significant contributor to the impairment. The Napa River was listed as impaired for nutrients in the 1970s because of high nutrient levels and excessive algae growth, but water quality has significantly improved as a result of changes in agricultural practices in the watershed and reduced nutrient loads from wastewater treatment plants. In the 1980s, the Regional Water Board started prohibiting wastewater discharges to the river during the dry season when flows are naturally low because of the summer droughts in this Mediterranean climate. While the discharge prohibition in this Order does not apply exclusively to the "dry season," it serves the same function because it limits discharge to the river when there is recycled water demand, which correlates closely to the dry season. Also, the three treatment plants discharging to the non-tidal portion of the river (Calistoga, St. Helena, and Yountville) have improved their treatment processes. Receiving water nutrient concentrations (i.e., nitrate, nitrite, and ammonia) and other indicators (i.e., algae and chlorophyll *a*) are now below levels of concern. On February 12, 2014, the Regional Water Board approved a proposal to remove the nutrients listing, subject to State Water Board and U.S. EPA approval.

The discharge is not a significant source of chlordane, DDT, and dieldrin because these pollutants have not been detected in the discharge. The discharge is also not a source of exotic species because it is disinfected. It is an insignificant source of dioxins and furans, nickel, and selenium because discharge concentrations of these pollutants are consistently below water quality objectives or detection limits.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants discharged into waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations: 40 C.F.R. section 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 C.F.R. section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of receiving waters.

A. Discharge Prohibitions

1. **Discharge Prohibition III.A (Discharge at a location or in a manner different from that described in this Order is prohibited):** This prohibition is based on 40 C.F.R. section 122.21(a) and Water Code section 13260, which require filing an application and Report of Waste Discharge before a discharge can occur. Discharges not described in the application and Report of Waste Discharge, and subsequently in this Order, are prohibited.

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- 2. Discharge Prohibition III.B (Discharge is prohibited unless the river flow-to-effluent flow ratio is at least 50:1):** This prohibition ensures that the discharge does not fully use the assimilative capacity of the Napa River in consideration of the other permitted wastewater discharges to this same segment of the river, specifically the City of Calistoga and the Town of Yountville, because all dischargers share the same receiving water monitoring for priority pollutants. Attachment F-1 to this Fact Sheet estimates that a ratio of at least 46:1 is necessary to ensure that assimilative capacity is available for all Napa River dischargers. These relatively simple calculations involve the following assumptions:

- The mass of pollutants flowing downstream through the river equals the masses from each source flowing into the river;
- Urban runoff flows are about 15 times the combined flows of the treatment plants discharging to the river; and
- Urban runoff copper loads are about 8 times those of the wastewater discharges.

This prohibition also ensures that the river flow-to-effluent flow ratio is consistent with an underlying assumption of the mixing zone study (June 2010 Effluent Mixing Zone / Dilution Credit Study, Larry Walker Associates) that serves as the basis for dilution credits used to analyze reasonable potential for non-priority pollutants (see Fact Sheet section IV.C.3.c) and to derive water quality-based effluent limits for others (see Fact Sheet section IV.C.4).

- 3. Discharge Prohibition III.C (Bypass is prohibited):** This prohibition is based on 40 C.F.R. section 122.41(m) (see Attachment D section I.G).
- 4. Discharge Prohibition III.D (Average dry weather influent flow in excess of 0.50 MGD is prohibited):** This Order prohibits an average dry weather influent flow greater than 0.50 MGD because the plant design treatment capacity (i.e., its historic and tested treatment reliability) is 0.50 MGD. Exceeding this flow could result in lower reliability and greater potential to violate water quality requirements.
- 5. Discharge Prohibition III.E (Sanitary sewer overflows are prohibited):** Basin Plan Table 4-1, Discharge Prohibition 15, and the CWA prohibit the discharge of wastewater to surface waters, except as authorized under an NPDES permit. Publicly-owned treatment works must achieve secondary treatment at a minimum and any more stringent limitations necessary to meet water quality standards (33 U.S.C. § 1311[b][1][B and C]). A sanitary sewer overflow that results in the discharge of raw sewage or wastewater not meeting this Order's effluent limitations to surface waters is therefore prohibited under the CWA and the Basin Plan.
- 6. Discharge Prohibition III.F (Discharge to Napa River is prohibited during dry season) and Exception to Non-Tidal Water Discharge Prohibition:** Basin Plan Table 4-1, Discharge Prohibition 1, prohibits discharges to any non-tidal water. Discharge Point No. 001 discharges to the Napa River where the river is non-tidal. Discharge Prohibition III.F of this Order is similar to the previous order and maintains Basin Plan Discharge Prohibition 1 during the dry season when it is feasible to not discharge (i.e., when the treated wastewater can be discharged to irrigation fields or used to supply recycled water demand) and provides an exception when it is infeasible to not discharge (i.e., during wet weather when there is no recycled water demand or demand is low and the irrigation fields are saturated). Basin Plan

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section 4.2 provides for exceptions to Basin Plan Discharge Prohibition 1 under certain circumstances:

- An inordinate burden would be placed on a discharger relative to the beneficial uses protected, and an equivalent level of environmental protection can be achieved by alternate means;
- A discharge is approved as part of a reclamation project;
- Net environmental benefits will be derived as a result of the discharge; or
- A discharge is approved as part of a groundwater cleanup project.

The Basin Plan further states:

Significant factors to be considered by the Regional Water Board in reviewing requests for exceptions will be the reliability of the discharger's system in preventing inadequately treated wastewater from being discharged to the receiving water and the environmental consequence of such discharges.

This Order grants an exception to Basin Plan Discharge Prohibition 1 for the following reasons:

- At times, avoiding discharge to non-tidal waters is an inordinate burden. There is no feasible alternative to discharge when the irrigation field is saturated during wet weather. Regional Water Board Order No. 87-090 prohibits discharge to the Discharger's irrigation fields when they are saturated. The wastewater volume during these times can far exceed the storage capacity of the ponds.
- An equivalent level of protection is provided when the discharge meets the BOD and TSS effluent limits in Table 4 of the Order, which reflect advanced secondary treatment.

The basis for this Order granting an exception to Basin Plan Discharge Prohibition 1 is different than the basis set forth in the previous order. The previous order granted an exception based on the Discharger providing reliable treatment. However, the compliance record summarized in Fact Sheet section II.D.1 shows that assuming reliable treatment is unjustified. The new basis relies on equivalent protection resulting from more stringent BOD and TSS limits than those in the previous order. More stringent BOD and TSS limits will also improve disinfection performance to ensure compliance with total coliform limits. Moreover, it is reasonable to re-assess the appropriateness of the exemption based simply on "reliable" secondary treatment nearly four decades after the secondary treatment standards were established nationally.

The Discharger cannot immediately comply with the more stringent limits; therefore, concurrent with the adoption of this Order, the Regional Water Board considered a cease and desist order that requires actions leading to compliance with these new more stringent requirements.

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B. Conventional and Non-Conventional Pollutant Effluent Limitations

1. Scope and Authority

CWA section 301(b) and 40 C.F.R. section 122.44 require that permits include conditions meeting technology-based requirements, at a minimum, and any more stringent effluent limitations necessary to meet water quality standards. The discharges authorized by this Order must meet minimum federal technology-based requirements based on the Secondary Treatment Standards at 40 C.F.R. section 133 as summarized below. The Basin Plan contains additional requirements for certain pollutants.

Table F-7. Secondary Treatment Requirements

Parameter	Monthly Average	Weekly Average
BOD ₅ ^[1]	30 mg/L	45 mg/L
CBOD ₅ ^[1]	25 mg/L	40 mg/L
TSS	30 mg/L	45 mg/L
BOD (or CBOD) and TSS Removal	85 percent or greater	-
pH	6.0 – 9.0 standard units	

Abbreviations:

BOD₅ = biochemical oxygen demand (5 days at 20°C)

CBOD₅ = carbonaceous biochemical oxygen demand (5 days at 20°C)

Footnote:

^[1] CBOD₅ effluent limitations may be substituted for BOD₅ limitations.

2. Effluent Limitations

- a. BOD and TSS.** The BOD and TSS 85 percent removal requirement is based on secondary treatment standards. The weekly and average monthly limitations are based on performance reflective of advanced secondary treatment and are comparable to limits for other facilities in the region operating advanced secondary systems.

The TSS limits are also more stringent than necessary to comply with the Napa River sediment TMDL (Basin Plan section 7.8.4). Basin Plan Table 7.8.4-3b (footnote a) states, “For wastewater treatment plant discharges, compliance with [an] existing permit effluent limit of 30 mg/L of TSS is consistent with these wasteload allocations.”

- b. Oil and Grease.** The oil and grease effluent limitations are based on Basin Plan Table 4-2.
- c. pH.** The pH effluent limitations are based on the Secondary Treatment Standards and Basin Plan Table 4-2.
- d. Total Residual Chlorine.** The total residual chlorine effluent limitation is based on Basin Plan Table 4-2.
- e. Total Coliform.** The total coliform effluent limitations are based on Basin Plan Table 4-2A, footnotes b and d. Footnote b allows total coliform limits in lieu of enterococcus limits for intermittent discharges and discharges for which total coliform monitoring is required (e.g., at water recycling facilities). Footnote d allows exceptions to the limits listed in Table 4-2A as long as beneficial uses are not compromised and

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discharges do not exceed a five-sample median of 23 MPN/100 mL nor a maximum of 240 MPN/100 mL during dry weather. The total coliform limits are more stringent than the Napa River Pathogen TMDL requires (Basin Plan section 7.8.2 and Table 7.8.2-4 require a five-sample median less than 240 colony-forming units [CFU]/100 mL and a single-sample maximum of 10,000 CFU/100 mL).

C. Toxic Pollutant Effluent Limitations

1. Scope and Authority

For toxic pollutants, this Order contains water quality-based effluent limitations (WQBELs) that implement water quality objectives that protect beneficial uses. CWA section 301(b) and 40 C.F.R. section 122.44(d) require that permits include limitations more stringent than federal technology-based requirements where necessary to achieve applicable water quality standards. According to 40 C.F.R. section 122.44(d)(1)(i), permits must include effluent limitations for all pollutants that are or may be discharged at levels that have a reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective, WQBELs must be established using (1) U.S. EPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting a narrative criterion, supplemented with relevant information (40 C.F.R. § 122.44[d][1][vi]). The process for determining reasonable potential and calculating WQBELs is intended to achieve applicable water quality objectives and criteria and to protect designated uses of receiving waters as specified in the Basin Plan. This Order imposes numeric effluent limitations for toxic pollutants with reasonable potential to cause or contribute to exceedances of water quality standards.

2. Beneficial Uses and Water Quality Criteria and Objectives

Discharge Point No. 001 discharges to the Napa River. Fact Sheet section III.C.1, above, identifies the beneficial uses of the Napa River. Water quality criteria and objectives to protect these beneficial uses are described below:

- a. Basin Plan Objectives.** The Basin Plan specifies numeric water quality objectives for many pollutants to protect aquatic life, municipal drinking water supplies, and agricultural water supplies (see Basin Plan sections 3.3.21 and 3.3.22). It also specifies several narrative water quality objectives, including objectives for toxicity, bioaccumulation, and temperature. The narrative toxicity objective states, “All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms.” The narrative bioaccumulation objective states, “Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.” The narrative temperature objective states, “The natural receiving water temperature of inland surface waters shall not be altered...,” and “The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature.”

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- i. **Agricultural Supply Pollutants.** The agricultural supply water quality objectives listed in Basin Plan Table 3-6 include threshold and limit concentrations. Pollutant effects are observable at threshold concentrations and undesirable at limit concentrations; therefore, the limit concentrations listed in Basin Plan Table 3-6 are the applicable water quality objectives for this Order.
- ii. **Dioxins and Furans.** With respect to dioxins and furans, the narrative bioaccumulation objective is translated into a numeric criterion as follows. When the CTR was promulgated, U.S. EPA stated its support of the regulation of dioxin and dioxin-like compounds through the use of toxicity equivalencies (TEQs). U.S. EPA stated, “For California waters, if the discharge of dioxin or dioxin-like compounds has reasonable potential to cause or contribute to a violation of a narrative criterion, numeric WQBELs for dioxin or dioxin-like compounds should be included in NPDES permits and should be expressed using a TEQ scheme” (65 Fed. Reg. 31695-31696, May 18, 2000). This Order uses a TEQ scheme based on a set of toxicity equivalency factors (TEFs) the World Health Organization developed in 1998, and a set of bioaccumulation equivalency factors (BEFs) U.S. EPA developed for the Great Lakes region (40 C.F.R. part 132, Appendix F) to convert the concentration of any congener of dioxin or furan into an equivalent concentration of 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (2,3,7,8-TCDD). Although the 1998 World Health Organization scheme includes TEFs for dioxin-like PCBs, they are not included in this Order’s TEQ scheme. The CTR has established a specific water quality criterion for PCBs, and dioxin-like PCBs are included in the analysis of total PCBs.

The CTR establishes a numeric water quality objective for 2,3,7,8-TCDD of 1.4×10^{-8} µg/L for the protection of human health when aquatic organisms are consumed. The CTR criterion is used as a criterion for dioxin-TEQ because dioxin-TEQ represents a toxicity-weighted concentration equivalent to 2,3,7,8-TCDD, thus translating the narrative bioaccumulation objective into a numeric criterion.

- iii. **Total Ammonia.** Basin Plan section 3.3.20 contains water quality objectives for un-ionized ammonia of 0.025 mg/L as an annual median and 0.16 mg/L as a maximum for Central San Francisco Bay and upstream waters. Using the receiving water temperature, salinity levels, and pH concentrations, as explained below, this translates to 52 mg/L (as nitrogen) as the chronic objective for total ammonia and 64 mg/L (as nitrogen) as the acute total ammonia objective. Translation is necessary since (1) sampling and laboratory methods are unavailable to analyze for un-ionized ammonia, and (2) the fraction of total ammonia that exists in the toxic un-ionized form depends on the pH, salinity, and temperature of the receiving water.

To translate the un-ionized ammonia objectives, pH, salinity, and temperature data were obtained from the Napa River from December 2010 through December 2012. The un-ionized fraction of total ammonia was calculated as follows:

$$\text{For salinity} < 10 \text{ ppt: fraction of NH}_3 = \frac{1}{1 + 10^{(pK - pH)}}$$

Where:

$$pK = 0.09018 + \frac{2729.92}{T}$$

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T = Temperature (Kelvin)

The median and maximum un-ionized ammonia fractions were then used to express the daily maximum and the annual average un-ionized objectives as chronic and acute total ammonia criteria. The results were 52 mg/L for the chronic objective and 64 mg/L for the acute objective.

- b. CTR Criteria.** The CTR specifies numeric aquatic life and human health criteria for numerous priority pollutants. These criteria apply to inland surface waters and enclosed bays and estuaries. Some human health criteria are for consumption of “water and organisms” and others are for consumption of “organisms only.” The criteria applicable to “water and organisms” apply to the Napa River because it is a potential source of drinking water.
- c. NTR Criteria.** The NTR establishes numeric aquatic life and human health criteria for a number of toxic pollutants for San Francisco Bay waters upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta. The NTR criteria apply to the Napa River.
- d. Receiving Water Salinity.** The Napa River is a freshwater river in the vicinity of the discharge. As confirmed by the *Collaborative Napa River Receiving Water Evaluation* (2003), Napa River salinity in all samples upstream and downstream of the discharge falls below one part per thousand, indicating a freshwater environment. Therefore, the freshwater water quality objectives from the Basin Plan, NTR, and CTR apply to this discharge.
- e. Receiving Water Hardness.** Ambient hardness data were used to calculate freshwater water quality objectives that are hardness dependent. Six data were collected downstream of the discharge point between April 2010 and December 2012. The average hardness of 69 mg/l was used to calculate the water quality objectives.
- f. Site-Specific Metals Translators.** Effluent limitations for metals must be expressed as total recoverable metal (40 C.F.R. § 122.45[c]). Since the water quality objectives for metals are typically expressed as dissolved metal, translators must be used to convert metals concentrations from dissolved to total recoverable and vice versa. The CTR contains default translators; however, site-specific conditions, such as water temperature, pH, total suspended solids, and organic carbon may affect the form of metal (dissolved, non-filterable, or otherwise) present and therefore available to cause toxicity. In general, dissolved metals are more available and more toxic to aquatic life than other forms. Site-specific translators can account for site-specific conditions, thereby preventing overly stringent or under-protective water quality objectives. In determining the need for and calculating WQBELs for all applicable metals, CTR default translators were used.

3. Need for Water Quality-Based Effluent Limitations (Reasonable Potential Analysis)

Assessing whether a pollutant has reasonable potential to exceed a water quality objective is the fundamental step in determining whether a WQBEL is required.

- a. Available Information.** The reasonable potential analysis for this Order is based on

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effluent monitoring data the Discharger collected from November 2010 to March 2015, as supplemented by effluent data the Discharger collected in March 2015 (for pollutant objectives listed in Basin Plan Tables 3-5 and 3-6). The reasonable potential analysis is based on ambient monitoring data the Discharger collected from April 2007 to February 2009 and data reported in *Collaborative Napa River Receiving Water Evaluation* (2003).

In some cases, reasonable potential cannot be determined because effluent data are limited or ambient background concentrations are unavailable. Provision VI.C.2 of the Order requires the Discharger to continue monitoring for such constituents in its effluent using analytical methods that provide the best feasible detection limitations. When additional data become available, further analysis will be conducted to determine whether numeric effluent limitations are necessary.

This Order does not contain WQBELs for constituents that do not demonstrate reasonable potential; however, Provision VI.C.2 of the Order still requires monitoring for such pollutants. If concentrations are found to have increased significantly, Provision VI.C.2 of the Order requires the Discharger to investigate the sources of the increases and implement remedial measures if the increases pose a threat to receiving water quality.

- b. Priority Pollutants.** For the priority pollutants (including those with Basin Plan water quality objectives for municipal and agricultural supply beneficial uses), the reasonable potential analysis for this Order is based on the methodology set forth in SIP section 1.3. Dioxin-TEQ is also included because these objectives are intended to protect aquatic life and human health, similar to the priority pollutant objectives. The analysis begins with identifying the maximum effluent concentration (MEC) observed for each pollutant based on available effluent concentration data and the ambient background concentration (B). SIP section 1.4.3 states that ambient background concentrations are either the maximum ambient concentration observed or, for water quality objectives intended to protect human health, the arithmetic mean of observed concentrations. There are three triggers in determining reasonable potential:
- i. Trigger 1** is activated if the maximum effluent concentration is greater than or equal to the lowest applicable water quality objective ($\text{MEC} \geq \text{water quality objective}$).
 - ii. Trigger 2** is activated if the ambient background concentration observed in the receiving water is greater than the lowest applicable water quality objective ($B > \text{water quality objective}$), *and* the pollutant is detected in any effluent sample.
 - iii. Trigger 3** is activated if a review of other information indicates that a WQBEL is needed to protect beneficial uses.

The maximum effluent concentrations (MECs), most stringent applicable water quality criteria and objectives, and background concentrations used in the analysis are presented below, along with the reasonable potential analysis results (yes or no) for each pollutant. The pollutants that exhibit reasonable potential are copper and cyanide by Trigger 1.

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Table F-8. Priority Pollutant Reasonable Potential Analysis

CTR No.	Pollutants	C or Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) ^{[1][2]}	B or Minimum DL (µg/L) ^{[1][2]}	RPA Results ^[3]
1	Antimony	6	0.16	1.8	No
2	Arsenic	50	1.4	4.3	No
3	Beryllium	4	<0.09	0.06	U
4	Cadmium	0.85	0.06	<0.02	No
5a	Chromium (III)	50	---	1.8	U
5b	Chromium (VI)	11	<4.5	<0.6	No
6	Copper	6.8	6.9	3.1	Yes
7	Lead	2.0	0.45	1.1	No
8	Mercury (303(d) listed) ^[4]	---	---	---	---
9	Nickel	38	5	4.1	No
10	Selenium (303(d) listed)	5.0	<0.4	3.0	No
11	Silver	2.1	0.04	0.02	No
12	Thallium	1.7	<0.05	<0.01	No
13	Zinc	87	17	12	No
14	Cyanide	5.2	23	<0.6	Yes
16	2,3,7,8-TCDD	1.4 E-08	<5.3 E-07	<3.4 E-07	U
	Dioxin-TEQ	1.4 E-08	<3.4 E-07	1.1 E-11	U
17	Acrolein	320	2.8	<1.2	No
18	Acrylonitrile	0.059	<0.69	<0.58	U
19	Benzene	1	<0.18	<0.10	No
20	Bromoform	4.3	<0.15	<0.10	No
21	Carbon Tetrachloride	0.25	<0.16	<0.06	No
22	Chlorobenzene	70	<0.18	<0.1	No
23	Chlorodibromomethane	0.40	<0.17	<0.08	No
24	Chloroethane	No Criteria	<0.38	<0.11	U
25	2-Chloroethylvinyl ether	No Criteria	<0.28	<0.29	U
26	Chloroform	No Criteria	1.4	<0.09	U
27	Dichlorobromomethane	0.56	<0.17	<0.08	No
28	1,1-Dichloroethane	5	<0.19	<0.06	No
29	1,2-Dichloroethane	0.38	<0.18	<0.09	No
30	1,1-Dichloroethylene	0.057	<0.21	<0.07	U
31	1,2-Dichloropropane	0.52	<0.18	<0.07	No
32	1,3-Dichloropropylene	0.5	<0.16	<0.07	No
33	Ethylbenzene	300	<0.26	<0.09	No
34	Methyl Bromide	48	<0.17	<0.06	No
35	Methyl Chloride	No Criteria	<0.23	<0.09	U
36	Methylene Chloride	4.7	<0.2	<0.08	No
37	1,1,2,2-Tetrachloroethane	0.17	<0.1	<0.07	No
38	Tetrachloroethylene	0.8	<0.19	<0.12	No
39	Toluene	150	1.2	<0.06	No
40	1,2-Trans-Dichloroethylene	10	<0.22	<0.09	No
41	1,1,1-Trichloroethane	200	<0.19	<0.11	No
42	1,1,2-Trichloroethane	0.6	<0.16	<0.06	No

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CTR No.	Pollutants	C or Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) ^{[1][2]}	B or Minimum DL (µg/L) ^{[1][2]}	RPA Results ^[3]
43	Trichloroethylene	2.7	<0.2	<0.07	No
44	Vinyl Chloride	0.5	<0.25	<0.14	No
45	2-Chlorophenol	120	<0.98	<0.80	No
46	2,4-Dichlorophenol	93	<0.99	<0.70	No
47	2,4-Dimethylphenol	540	<0.87	<0.80	No
48	2-Methyl- 4,6-Dinitrophenol	13.4	<0.91	<0.60	No
49	2,4-Dinitrophenol	70	<0.83	<0.60	No
50	2-Nitrophenol	No Criteria	<0.89	<0.60	U
51	4-Nitrophenol	No Criteria	<0.83	<0.70	U
52	3-Methyl 4-Chlorophenol	No Criteria	<0.91	<0.60	U
53	Pentachlorophenol	0.28	<0.81	<0.60	U
54	Phenol	21000	<0.69	<0.60	No
55	2,4,6-Trichlorophenol	2.1	<0.97	<0.60	No
56	Acenaphthene	1200	<0.03	<0.03	No
57	Acenaphthylene	No Criteria	<0.03	<0.02	U
58	Anthracene	9600	<0.03	0.02	No
59	Benzidine	0.00012	<5	<5.0	U
60	Benzo(a)Anthracene	0.0044	<0.03	<0.02	U
61	Benzo(a)Pyrene	0.0044	<0.03	<0.02	U
62	Benzo(b)Fluoranthene	0.0044	<0.03	<0.02	U
63	Benzo(ghi)Perylene	No Criteria	<0.03	<0.02	U
64	Benzo(k)Fluoranthene	0.0044	<0.03	<0.03	U
65	Bis(2-Chloroethoxy)Methane	No Criteria	<0.93	<0.70	U
66	Bis(2-Chloroethyl)Ether	0.031	<0.93	<0.90	U
67	Bis(2-Chloroisopropyl)Ether	1400	<0.95	<0.60	No
68	Bis(2-Ethylhexyl)Phthalate	1.8	<0.81	<0.60	No
69	4-Bromophenyl Phenyl Ether	No Criteria	<0.97	<0.97	U
70	Butylbenzyl Phthalate	3000	<0.98	<0.70	No
71	2-Chloronaphthalene	1700	<0.98	<0.98	No
72	4-Chlorophenyl Phenyl Ether	No Criteria	<0.99	<0.99	U
73	Chrysene	0.0044	<0.03	<0.02	U
74	Dibenzo(a,h)Anthracene	0.0044	<0.03	<0.02	U
75	1,2-Dichlorobenzene	600	<0.27	<0.11	No
76	1,3-Dichlorobenzene	400	<0.18	<0.11	No
77	1,4-Dichlorobenzene	5	<0.18	<0.10	No
78	3,3 Dichlorobenzidine	0.04	<5	<0.10	U
79	Diethyl Phthalate	23000	<0.86	<0.60	No
80	Dimethyl Phthalate	313000	<0.97	<0.70	No
81	Di-n-Butyl Phthalate	2700	<0.91	<0.60	No
82	2,4-Dinitrotoluene	0.11	<0.96	<0.60	U
83	2,6-Dinitrotoluene	No Criteria	<0.98	<0.60	U
84	Di-n-Octyl Phthalate	No Criteria	<0.92	<0.70	U
85	1,2-Diphenylhydrazine	0.04	<0.9	<0.60	U
86	Fluoranthene	300	<0.03	<0.02	No

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CTR No.	Pollutants	C or Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) ^{[1][2]}	B or Minimum DL (µg/L) ^{[1][2]}	RPA Results ^[3]
87	Fluorene	1300	<0.03	<0.02	No
88	Hexachlorobenzene	0.00075	<0.91	<0.91	U
89	Hexachlorobutadiene	0.44	<0.92	<0.92	U
90	Hexachlorocyclopentadiene	50	<0.9	<0.80	No
91	Hexachloroethane	1.9	<0.94	<0.94	No
92	Indeno(1,2,3-cd)Pyrene	0.0044	<0.03	<0.02	U
93	Isophorone	8.4	<0.93	<0.8	No
94	Naphthalene	No Criteria	<0.03	<0.02	U
95	Nitrobenzene	17	<0.95	<0.70	No
96	N-Nitrosodimethylamine	0.00069	<0.88	<0.80	U
97	N-Nitrosodi-n-Propylamine	0.005	<0.97	<0.60	U
98	N-Nitrosodiphenylamine	5	<0.83	<0.60	No
99	Phenanthrene	No Criteria	<0.03	0.04	U
100	Pyrene	960	<0.03	<0.02	No
101	1,2,4-Trichlorobenzene	5	<0.98	<0.98	No
102	Aldrin	0.00013	<0.0047	<0.002	U
103	Alpha-BHC	0.0039	<0.005	<0.002	U
104	Beta-BHC	0.014	<0.004	<0.002	No
105	Gamma-BHC	0.019	<0.004	<0.002	No
106	Delta-BHC	No Criteria	<0.004	<0.02	U
107	Chlordane (303(d) listed)	0.00057	<0.005	<0.003	U
108	4,4'-DDT (303(d) listed)	0.00059	<0.004	<0.003	U
109	4,4'-DDE (linked to DDT)	0.00059	<0.003	<0.003	U
110	4,4'-DDD	0.00083	<0.004	<0.002	U
111	Dieldrin (303d listed)	0.00014	<0.004	<0.003	U
112	Alpha-Endosulfan	0.056	<0.004	<0.003	No
113	beta-Endosulfan	0.056	<0.005	<0.002	No
114	Endosulfan Sulfate	110	<0.005	<0.002	No
115	Endrin	0.036	<0.005	<0.002	No
116	Endrin Aldehyde	0.76	<0.005	<0.002	No
117	Heptachlor	0.00021	<0.005	<0.003	U
118	Heptachlor Epoxide	0.0001	<0.004	<0.002	U
119-125	PCBs sum (303(d) listed) ^[4]	---	---	---	---
126	Toxaphene	0.0002	<0.2	---	U

Unit Abbreviations:

mg/L = milligrams per liter

µg/L = micrograms per liter

Footnotes:

^[1] The maximum effluent concentration and ambient background concentration are the actual detected concentrations unless preceded by a "<" sign, in which case the value shown is the minimum detection level (DL).

^[2] The maximum effluent concentration or ambient background concentration is "Unavailable" when there are no monitoring data for the constituent.

^[3] RPA Results = Yes, if MEC ≥ WQC, B > WQC and MEC is detected, or Trigger 3
= No, if MEC and B are < WQC or all effluent data are undetected
= Unknown, cannot determine (U), if no criteria have been promulgated or data are insufficient.

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^[4] SIP section 1.3 excludes from its reasonable potential analysis procedure priority pollutants for which a TMDL has been developed. TMDLs have been developed for mercury and PCBs in San Francisco Bay. Mercury and PCBs from wastewater discharges are regulated by NPDES Permit No. CA0038849, which implements the San Francisco Bay Mercury and PCBs TMDLs.

- c. Municipal and Agricultural Supply Pollutants.** Municipal and agricultural supply are beneficial uses of the Napa River. For water quality objectives designed to protect municipal and agricultural supply (see Basin Plan Tables 3-5 and 3-6), except for those already analyzed in Table F-8, the reasonable potential analysis is based on the *Technical Support Document for Water Quality-based Toxics Control* (Technical Support Document or TSD) (EPA/505/2-90-001). The TSD allows reasonable potential analyses using either receiving water concentrations projected from effluent data or measured receiving water concentrations. The analysis presented in Table F-9 is based on the method that predicts receiving water quality based on pollutant concentrations, a confidence interval, and the number of samples available. The first step is to calculate the percentile, p_n , represented by the maximum effluent concentration (MEC) in a set of n samples based on the desired confidence level, e.g., 95% or 99% (the higher the confidence level, the more conservative the analysis).

$$p_n = (1 - \text{confidence level})^{1/n}$$

Only one sample was taken for these pollutants in this analysis. Using a 95 percent confidence interval, the percentile is:

$$p_1 = (1 - 0.95)^{1/1} = 0.05$$

For a normal distribution, the Z-score for 0.95 percentile is:

$$Z_{0.95} = 1.64$$

The concentration multiplying factor (C)¹ corresponding to the MEC percentile (C_{p_n}) and the selected upper bound percentile ($C_{p_{upper\ bound}}$) is found using the following equation, where $\sigma^2 = \ln(CV^2 + 1)$, p is the percentile ($p_{upper\ bound}$ or p_n), and z_p is the standard normal distribution value for the percentile p :

$$C_p = \exp(Z_p \sigma - 0.5 \sigma^2)$$

Assuming the coefficient of variation (CV) is 0.6 (the TSD assumes 0.6 whenever there are fewer than ten samples), the variability $\sigma^2 = \ln(CV^2 + 1) = 0.307$. Therefore,

$$\begin{aligned} C_{0.05} &= \exp(Z_{0.05} \sigma - 0.5 \sigma^2) = \exp(-1.64 * 0.55 - 0.5 * 0.55^2) = 0.35 \\ C_{upperbound} &= C_{0.95} = \exp(Z_{0.95} \sigma - 0.5 \sigma^2) = \exp(1.64 * 0.55 - 0.5 * 0.55^2) = 2.13 \end{aligned}$$

The concentration ratio (R) is calculated using the following equation:

$$R = \frac{C_{upperbound}}{C_{p_n}} = \frac{2.13}{0.35} = 6.1$$

¹ The TSD refers to these values as “reasonable potential multiplying factors.” In this context, they are directly proportional to the effluent concentrations at the corresponding percentiles.

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The Discharger's mixing zone study (June 2010 Effluent Mixing Zone / Dilution Credit Study, Larry Walker Associates) indicates that the effluent plume is diluted 21:1 (i.e., 20 parts river water for each part effluent or $D = 20$) about 225 feet downstream from Discharge Point No. 001 when the river flow-to-effluent flow ratio is 50:1. Discharge Prohibition III.B maintains this ratio, and Fact Sheet section IV.C.4.a justifies a mixing zone as large as 225 feet downstream. Therefore, to calculate the receiving water concentration, this analysis assumes a dilution factor of $D=20$. This dilution factor accounts for upstream discharges (Calistoga), which for the purpose of this calculation are assumed to contain pollutant concentrations similar to those of this discharge (few data are available for the pollutants listed in Table F-7).

Using $R=6.1$ and $D=20$, the projected maximum receiving water concentrations (RWC) is then estimated using the following equation:

$$RWC = MEC \times R / \text{dilution factor} = MEC \times 0.305$$

The most stringent applicable water quality objectives, maximum effluent concentrations, and calculated receiving water concentrations (RWC) are presented below, along with the reasonable potential analysis results (yes or no) for each pollutant. Reasonable potential was not exhibited for any pollutants.

Table F-9. Municipal and Agricultural Supply Pollutant Reasonable Potential Analysis

Pollutant	Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) ^[1]	RWC (µg/L) ^[1]	RPA Results ^[2]
Total Dissolved Solids	500,000	430,000	130,000	No
Electrical Conductivity	900 mmhos/cm	630 mmhos/cm	190 mmhos/cm	No
Aluminum	200	310	95	No
Barium	1,000	44	13	No
Boron	2,000	200	61	No
Chloride	360,000	65	20	No
Cobalt	5,000	1	0.3	No
Fluoride	600	<0.1	<0.1	No
Iron	300	780	240	No
Lithium	2,500	6.9	2.1	No
Manganese	50	140	43	No
Molybdenum	50	0.95	0.58	No
Nitrate (as NO ₃)	45,000	---	---	U
Nitrate + Nitrite (as N)	5,000	1,300	390	No
Nitrite (as N)	1,000	---	---	U
Sulfate	250,000	46,000	28,000	No
Vanadium	1,000	3.3	2.0	No
MBAS (foaming agents)	500	200	61	No
Phenols	1.0	<1.0	<1.0	No
Trihalomethanes	100	1.2	0.40	No
Lindane	0.2	<0.04	<0.04	No
Methoxychlor	30	<0.005	<0.005	No
2,4-D	70	<0.028	<0.028	No
2,4,4-TP Silvex	50	<0.2	<0.2	No

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Pollutant	Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) ^[1]	RWC (µg/L) ^[1]	RPA Results ^[2]
Alachlor	2.0	<0.022	<0.022	No
Atrazine	1.0	<0.048	<0.048	No
Bentazon	18	<0.063	<0.063	No
Dalapon	200	<0.12	<0.12	No
Dinoseb	7.0	<0.2	<0.2	No
Diquat	20	<0.34	<0.34	No
Endothall	100	<2.7	<2.7	No
Ethylene dibromide	0.05	<0.0057	<0.0057	No
Glyphosate	700	<1.6	<1.6	No
Molinate	20	<0.015	<0.015	No
Oxaryl	50	<0.40	<0.40	No
Picloram	500	<0.015	<0.015	No
Simazine	4.0	<0.028	<0.028	No
Thiobencarb	1.0	<0.008	<0.008	No
1,2-dibromo-3-chloropropane	0.2	<0.01	<0.01	No
Cis-1,2-dichloroethylene	6.0	<0.20	<0.20	No
Methyl-tert-butyl ether	5	<0.15	<0.15	No
Monochlorobenzene	70	<0.5	<0.5	No
Styrene	100	<0.5	<0.5	No
Trichlorofluoromethane	150	<0.29	<0.29	No
1,1,2-trichloro-1,2,2-trifluoromethane	1,200	<1.0	<1.0	No

Unit Abbreviations:

µg/L = micrograms per liter
mmhos/cm = millisiemens per centimeter

Footnotes:

^[1] The maximum effluent concentration and ambient background concentration are the actual detected concentrations unless preceded by a "<" sign, in which case the value shown is the minimum detection level (DL).

^[2] RPA Results = Yes, if RWC ≥ WQC
= No, if RWC < WQC or all effluent data are undetected
= Unknown, cannot determine (U), if no criteria have been promulgated or data are insufficient.

d. Ammonia. Reasonable potential for ammonia was evaluated using two approaches, one based on effluent ammonia concentrations and one based on receiving water ammonia concentrations.

i. Effluent Approach. The effluent approach uses the TSD method described in Fact Sheet section IV.C.3.c above. Four un-ionized ammonia effluent samples were collected between December 2010 and December 2012. Using a 95 percent confidence interval, the percentile is:

$$p_1 = (1 - 0.95)^{1/5} = 0.473$$

For a normal distribution, the Z-score for 0.95 percentile is:

$$Z_{0.473} = -0.07$$

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The concentration multiplying factor (C) corresponding to the MEC percentile (C_{Pn}) and the selected upper bound percentile ($C_{P \text{ upper bound}}$) is found using the following equations, assuming the coefficient of variation (CV) is 0.6:

$$C_{0.05} = \exp(Z_{0.473}\sigma - 0.5\sigma^2) = \exp(-0.07 * 0.55 - 0.5 * 0.55^2) = 0.83$$

$$C_{\text{upperbound}} = C_{0.95} = \exp(Z_{0.95}\sigma - 0.5\sigma^2) = \exp(1.64 * 0.55 - 0.5 * 0.55^2) = 2.13$$

The concentration ratio (R) is calculated using the following equation:

$$R = \frac{C_{\text{upperbound}}}{C_{Pn}} = \frac{2.13}{0.83} = 2.58$$

Using R=2.32 and assuming no dilution, the projected maximum receiving water concentration (RWC) is estimated using the following equation, where the MEC is expressed as un-ionized ammonia based on effluent temperature and pH as described in Fact Sheet section IV.C.2.a.ii above:

$$\text{RWC} = \text{MEC} \times R = 0.063 \text{ mg/L} \times 2.58 = 0.16 \text{ mg/L}$$

This projected RWC is equals the acute water quality objective (0.016 mg/L) and is greater than the chronic water quality objective (0.025 mg/L), indicating reasonable potential.

- ii. **Receiving Water Approach.** The receiving water approach is based on four receiving water samples collected about 100 feet downstream of the discharge outfall from December 2010 through December 2012. Un-ionized ammonia concentrations are calculated based on receiving water temperature and pH as described in Fact Sheet section IV.C.2.a.ii above. The observed maximum concentration (0.0033 mg/L) was less than the acute water quality objective (0.16 mg/L) and the observed median concentration (0.00042 mg/L) was less than the chronic water quality objective (0.025 mg/L). Therefore, reasonable potential is not triggered using this approach. Nevertheless, since the effluent approach results in reasonable potential, this Order contains ammonia WQBELs.
- e. **Temperature.** Basin Plan section 3.3.17 prohibits the alteration of natural receiving water temperatures such that beneficial uses are adversely affected and temperature increases greater than 2.8°C above natural receiving water temperatures. Receiving water and effluent monitoring from April 2010 through December 2014 showed no significant difference between the upstream, downstream, and effluent monitoring stations. Therefore, the discharge will not increase the river temperature, and there is no reasonable potential for temperature to exceed the Basin Plan water quality objective.
- f. **Acute Toxicity.** Basin Plan section 4.5.5.3.1 requires acute toxicity monitoring and limitations, implying there is reasonable potential for the discharge to cause or contribute to exceedances of the acute toxicity water quality objective.
- g. **Chronic Toxicity.** Consistent with Basin Plan section 4.5.5.3.2, the Discharger does not monitor for chronic toxicity because the Facility is small, there are no industrial dischargers within its service area, and its discharges are intermittent. For these same

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reasons, there is no reasonable potential for the discharge to cause or contribute to exceedances of the chronic toxicity water quality objective.

4. Water Quality-Based Effluent Limitations (WQBELs)

WQBELs were developed for the pollutants determined to have reasonable potential to cause or contribute to exceedances of water quality objectives. The WQBELs are based on the procedure specified in SIP section 1.4, which is required for priority pollutants. SIP section 1.4 is used as guidance for other pollutants.

- a. Mixing Zones and Dilution Credits.** The Order provides dilution credits for cyanide and copper. The SIP allows dilution credits for completely-mixed discharges and, under certain circumstances, incompletely-mixed discharges. The discharge is incompletely-mixed as defined in the SIP (more than 5 percent difference in pollutant concentrations in a cross section of the river within two river widths downstream). The outfall does not have a diffuser.

A CORMIX model was run under various flow conditions with a 50:1 river flow-to-wastewater flow ratio. According to the Discharger's mixing zone study (June 2010 Effluent Mixing Zone / Dilution Credit Study, Larry Walker Associates), within 25 feet downstream, the model estimated the plume had 6:1 dilution and spread 5 to 10 feet across the channel due to lateral momentum. At about 100 feet downstream, the plume was fully mixed vertically and spread about 12 feet across the channel. A dye tracer study provided similar results; the dye was diluted by at least 5:1 within this zone and spread across half of the river's width 100 feet downstream.

The dilution ratio was 21:1 by about 225 feet downstream under worst-case conditions (e.g., maximum daily average flow of 8.1 MGD). As discussed in Fact Sheet section IV.C.3.c, above, a mixing zone extending 225 feet downstream was used for the reasonable potential analysis for most non-priority pollutants with municipal or agricultural supply water quality objectives. A mixing zone extending no more than 225 feet downstream from the outfall meets SIP section 1.4.2.2.A requirements because it will not do any of the following:

- i. Compromise the integrity of the water body.** The mixing zone will not compromise the integrity of the receiving waters because it is small (less than 225 feet) relative to the size of the Napa River (55 miles).
- ii. Cause acute toxicity to aquatic life passing through the mixing zone.** Acutely toxic conditions will not exist inside the mixing zone because this Order contains acute toxicity effluent limits and requires acute toxicity testing to demonstrate compliance. These limits do not account for any dilution; therefore, compliance with these limits protects areas within the mixing zones. Bioassay monitoring conducted on fathead minnow during the past permit cycle showed high survival rates, indicating that organisms passing through the mixing zone are unlikely to experience acute toxicity.
- iii. Restrict the passage of aquatic life.** The mixing zone will not restrict the passage of aquatic life because the mixing zone is small compared to the size of the river at the

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discharge location. The mixing zone extends about 100 feet downstream and about 12 feet from the bank. The width of the river is about 40 feet. Aquatic organisms can easily pass around the mixing zone.

iv. Adversely affect biologically sensitive or critical habitats, including, but not limited to, habitats of species under federal or State endangered species laws.

The Napa River has two potential species of concern in the area. Steelhead (*Oncorhynchus mykiss irideus*) is a federally-listed “threatened” species known to spawn in the Napa River in January and February. The western pond turtle (*Actinemys marmorata*) is a State-listed species of special concern. Since turtles breathe air, they are unlikely to be adversely affected by contact with diluted effluent. Steelhead may take in pollutants through their gills as they pass through the mixing zone, but, because the mixing zone extends only 12 feet from the bank and 100 feet downstream, steelhead are unlikely to reside within the mixing zone for any significant duration that could adversely affect them.

v. Produce undesirable or nuisance aquatic life. The mixing zone will not produce undesirable or nuisance aquatic life. Cyanide and copper are not biostimulants or plant nutrients so they will not cause growth of aquatic nuisance species. Moreover, this Order imposes receiving water limitations that prohibit bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses.

vi. Result in floating debris, oil, or scum. The mixing zone will not result in floating debris, oil, or scum because the effluent receives treatment that will eliminate oils, grease, debris, and scum. In addition, this Order imposes receiving water limitations that prohibit floating debris, oil, or scum at any place and at any time.

vii. Produce objectionable color, odor, taste, or turbidity. The mixing zone will not produce objectionable color, odor, taste, or turbidity because the effluent receives treatment and is disinfected prior to discharge. Secondary treatment generally addresses objectionable odor, taste, and turbidity through the biological degradation of organic compounds and clarification. In addition, this Order prohibits alteration of color or turbidity beyond natural background levels.

viii. Cause objectionable bottom deposits. The mixing zone will not cause objectionable bottom deposits because the effluent receives treatment and is free of settleable solids. In addition, this Order prohibits bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses.

ix. Cause nuisance. The mixing zone will not cause a nuisance because the effluent receives treatment and is disinfected prior to discharge. This Order prohibits discharges from causing a nuisance, which Water Code section 13050(m) defines to mean anything that meets all three of the following criteria:

- is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property;

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- affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; and
 - occurs during, or as a result of, the treatment or disposal of wastes.
- x. Dominate the receiving water body or overlap a mixing zone from a different outfall.** The mixing zone will not overlap any other mixing zone because the Regional Water Board has not established any other mixing zone nearby.
- xi. Be located at or near any drinking water intake.** There are no drinking water intakes within 225 feet of the outfall.

In compliance with SIP section 1.4.2.2.B, the mixing zone protects all beneficial uses and complies with all regulatory requirements. Copper and cyanide are not carcinogenic, bioaccumulative, or persistent in the environment. Moreover, the Napa River flows freely at the point of discharge and flushes and dilutes pollutants downstream.

SIP section 1.4.2.2 requires mixing zones to be as small as practicable. To ensure that the cyanide and copper mixing zones are as small as possible, the cyanide and copper WQBELs are based on the smallest possible dilution credits ($D = 3$ and $D = 1$). Based on current performance, these dilution credits are minimum necessary for the Discharger to consistently meet the resulting WQBELs. These dilution credits are much smaller than the dilution credit associated with the 225-foot mixing zone ($D = 20$).

- b. WQBEL Calculations.** For those pollutants with reasonable potential, average monthly effluent limitations (AMELs) and maximum daily effluent limitations (MDELs) were calculated as shown in the table below:

Table F-10. WQBEL Calculations

PRIORITY POLLUTANTS	Cyanide	Copper	Total Ammonia (acute)	Total Ammonia (chronic)
Units	µg/L	µg/L	mg/L N	mg/L N
Basis and Criteria type	NTR	Basin Plan	Basin Plan Aquatic Life	Basin Plan Aquatic Life
Criteria -Acute	22	9.9	64	---
Criteria -Chronic	5.2	6.8	---	52
Criteria –Human Health	---	---	---	---
Water Effects Ratio (WER)	1	1	1	1
Lowest WQO	5.2	6.8	64	52
Dilution Factor (D) (if applicable)	3.0	1.0	0	0
No. of samples per month	4	4	4	30 ^[1]
Aquatic life criteria analysis required? (Y/N)	Y	Y	Y	Y
HH criteria analysis required? (Y/N)	Y	N	N	N
Applicable Acute WQO	22	9.9	64	---
Applicable Chronic WQO	5.2	6.8	---	52

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PRIORITY POLLUTANTS	Cyanide	Copper	Total Ammonia (acute)	Total Ammonia (chronic)
Units	µg/L	µg/L	mg/L N	mg/L N
HH criteria	220,000	---	---	---
Background (Maximum Conc for Aquatic Life calc)	0.60	3.10	0.40	0.40
Background (Average Conc for Human Health calc)	0.60	---	---	---
Is the pollutant on the 303d list and/or bioaccumulative (Y/N)?	N	N	N	N
ECA acute	86	17	64	---
ECA chronic	19	10	---	52
ECA HH	700	---	---	---
No. of data points <10 or at least 80% of data reported non detect? (Y/N)	N	N	N	N
Avg of effluent data points	12	4.2	8.7	8.7
Std Dev of effluent data points	0.75	0.08	0.34	0.34
CV calculated	0.60	0.80	0.04	0.04
CV (Selected) - Final	0.60	0.60	0.60	0.60
ECA acute mult99	0.32	0.32	0.32	----
ECA chronic mult99	0.53	0.53	---	0.93
LTA acute	28	5.3	21	---
LTA chronic	10	5.5	---	48
minimum of LTAs	10	5.3	21	48
AMEL mult95	1.6	1.6	1.6	1.2
MDEL mult99	3.1	3.1	3.1	3.1
AMEL (aq life)	16	8.3	32	57
MDEL(aq life)	31	17	64	150
MDEL/AMEL Multiplier	2.0	2.0	2.0	2.6
AMEL (human hlth)	700	---	---	---
MDEL (human hlth)	1,400	---	----	---
minimum of AMEL for Aq. life vs HH	16	8.3	32	57
minimum of MDEL for Aq. Life vs HH	31	17	64	150
Previous order limit (average monthly)	15	14	16	16
Previous order limit (maximum daily)	30	24	39	39
Final limit - AMEL	15	8.3	16	16
Final limit - MDEL	30	17	39	39

Footnote:

^[1] Statistical adjustments were made to the total ammonia WQBEL calculations. The SIP assumes a 4-day average concentration and a monthly sampling frequency of 4 days per month to calculate effluent limitations based on

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chronic criteria, but the Basin Plan chronic water quality objective for un-ionized ammonia is based on an annual median instead of the typical 4-day average. Therefore, a 365-day average and a monitoring frequency of 30 days per month (the maximum daily sampling frequency in a month since the averaging period for the chronic criteria is longer than 30 days) were used. These statistical adjustments are supported by U.S. EPA's *Water Quality Criteria; Notice of Availability; 1999 Update of Ambient Water Quality Criteria for Ammonia* (64 Fed. Reg. 71974-71980, December 22, 1999).

- c. **Acute Toxicity QBELs.** This Order includes whole effluent acute toxicity QBELs based on Basin Plan Table 4-3. Bioassays are to be performed as specified in the MRP. Based on Basin Plan section 3.3.20, if the Discharger can demonstrate that ammonia causes acute toxicity in excess of the whole effluent acute toxicity QBELs, and that the ammonia in the discharge complies with the total ammonia QBELs in this Order, then such toxicity does not constitute a violation of the whole effluent acute toxicity QBELs.

D. Discharge Requirement Considerations

1. **Anti-backsliding.** This Order complies with the anti-backsliding provisions of CWA sections 402(o) and 303(d)(4), and 40 C.F.R. section 122.44(l), which generally require effluent limitations in a reissued permit to be as stringent as those in the previous order. The requirements of this Order are at least as stringent as those in the previous order.

This Order does not retain QBELs for dioxin-TEQ from the previous order because data do not indicate reasonable potential to exceed water quality objectives. This is consistent with State Water Board Order No. WQ 2001-16.

2. **Antidegradation.** This Order complies with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16. It continues the status quo with respect to the level of discharge authorized in the previous order, which is the baseline by which to measure whether degradation will occur. This Order does not allow for an increase in flow, a reduced level of treatment, or less stringent effluent limitations relative to those in the previous order.

This Order removes a prohibition in the previous order against discharge of elevated temperature into the Napa River; however, this removal will not degrade water quality because monitoring during the past permit cycle showed no temperature difference between the effluent and receiving water. Moreover, the receiving water limitation in Provision V.5 of the Order requires that present natural background temperatures not be altered.

3. **Stringency of Requirements for Individual Pollutants.** This Order contains both technology-based and water quality-based effluent limitations for individual pollutants. This Order's technology-based requirements implement minimum, applicable federal technology-based requirements. In addition, this Order contains more stringent effluent limitations as necessary to meet water quality standards. Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement CWA requirements.

This Order's QBELs have been derived to implement water quality objectives that protect beneficial uses. The beneficial uses and water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that QBELs were derived from the CTR, the CTR is the applicable standard pursuant to

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40 C.F.R. section 131.38. The procedures for calculating these WQBELs are based on the CTR, as implemented in accordance with the SIP, which U.S. EPA approved on May 18, 2000. U.S. EPA approved most Basin Plan beneficial uses and water quality objectives prior to May 30, 2000. Beneficial uses and water quality objectives submitted to U.S. EPA prior to May 30, 2000, but not approved by U.S. EPA before that date, are nonetheless “applicable water quality standards for purposes of the CWA” pursuant to 40 C.F.R. section 131.21(c)(1). U.S. EPA approved the remaining beneficial uses and water quality objectives so they are applicable water quality standards pursuant to 40 C.F.R. section 131.21(c)(2).

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

The receiving water limitations in sections V.A and V.B of the Order are based on Basin Plan narrative and numeric water quality objectives. The receiving water limitation in section V.C of the Order requires compliance with federal and State water quality standards in accordance with the CWA and regulations adopted thereunder.

VI. RATIONALE FOR PROVISIONS

A. Standard Provisions

Attachment D contains standard provisions that apply to all NPDES permits in accordance with 40 C.F.R. section 122.41 and additional conditions applicable to specific categories of permits in accordance with 40 C.F.R. section 122.42. The Discharger must comply with these provisions. The conditions set forth in 40 C.F.R. sections 122.41(a)(1) and (b) through (n) apply to all state-issued NPDES permits and must be incorporated into the permits either expressly or by reference.

In accordance with 40 C.F.R. section 123.25(a)(12), states may omit or modify conditions to impose more stringent requirements. Attachment G contains standard provisions that supplement the federal standard provisions in Attachment D. This Order omits federal conditions that address enforcement authority specified in 40 C.F.R. sections 122.41(j)(5) and (k)(2) because the State’s enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates Water Code section 13387(e) by reference.

B. Monitoring and Reporting

CWA section 308 and 40 C.F.R. sections 122.41(h), 122.41(j)-(l), 122.44(i), and 122.48 require that NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Regional Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The Monitoring and Reporting Program (Attachment E) establishes monitoring, reporting, and recordkeeping requirements that implement federal and State requirements. For more background regarding these requirements, see Fact Sheet section VII.

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C. Special Provisions

1. Reopener Provisions

These provisions are based on 40 C.F.R. sections 122.62 and 122.63 and allow modification of this Order and its effluent limitations as necessary in response to updated water quality objectives, regulations, or other new and relevant information that may become available in the future, and other circumstances as allowed by law.

2. Effluent Characterization Study and Report

This Order does not include effluent limitations for pollutants that do not demonstrate reasonable potential, but this provision requires the Discharger to continue monitoring for these pollutants as described in the MRP and Attachment G. Monitoring data are necessary to verify that the “no” and “unknown” reasonable potential analysis conclusions of this Order remain valid. This requirement is authorized pursuant to Water Code section 13267 and is necessary to inform the next permit reissuance and to ensure that the Discharger takes timely steps in response to any unanticipated change in effluent quality during the term of this Order.

3. Receiving Water Characterization Study and Report

This Order does not include effluent limitations for pollutants that do not demonstrate reasonable potential, but this provision requires the Discharger to continue monitoring for these pollutants as described in the MRP and Attachment G. Monitoring data are necessary to verify that the “no” and “unknown” reasonable potential analysis conclusions of this Order remain valid. This requirement is authorized pursuant to Water Code section 13267 and is necessary to inform the next permit reissuance. The Order allows the Discharger to complete the study on its own or in collaboration with other Napa River dischargers.

4. Pollutant Minimization Program

This provision is based on Basin Plan section 4.13.2 and SIP section 2.4.5.

5. Special Provisions for Municipal Facilities

- a. **Sludge and Biosolids Management.** This provision is based on Basin Plan section 4.17 and 40 C.F.R. parts 257 and 503. “Sludge” refers to the solid, semisolid, and liquid residue removed during primary, secondary, and advanced wastewater treatment processes. “Biosolids” refers to sludge that has been treated and may be beneficially reused.
- b. **Collection System Management.** The Discharger’s collection system is part of the Facility regulated through this Order. This provision explains this Order’s requirements as they relate to the Discharger’s collection system and promotes consistency with the State Water Board’s *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems* (General Collection System WDRs), Order No. 2006-0003-DWQ, as amended by Order No. WQ 2013-0058-EXEC. The General Collection System WDRs contain requirements for collection system operation and maintenance, and for reporting

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and mitigating sanitary sewer overflows. They also require agencies to develop sanitary sewer management plans and report all sanitary sewer overflows. The Discharger must comply with both the General Collection System WDRs and this Order.

- c. **Wastewater Impoundment Integrity.** This provision is required to ensure that the wastewater storage ponds do not leak and potentially threaten groundwater beneficial uses. Because this provision implements State requirements only and does not contain NPDES-related requirements, the following factors listed in Water Code section 13241 are considered:
 - i. **Past Present, and Probable Future Beneficial Uses.** This provision will protect the municipal and agricultural beneficial uses of groundwater by ensuring that untreated or partially-treated wastewater does not leak through the impoundments and contaminate the groundwater. In the past, leaking impoundments have contaminated nearby municipal supply wells.
 - ii. **Environmental Characteristics of Hydrographic Unit.** This provision will not affect the Napa River hydrographic unit because the impoundments are not intended or designed to serve as a water source for underlying groundwater or the Napa River.
 - iii. **Water Quality Conditions That Could Reasonably Be Achieved Through Coordinated Control.** This provision will protect water quality in the area by fully containing wastewater until it meets specified treatment levels.
 - iv. **Economic Considerations.** This provision will have no cost beyond the expected expenses to maintain impoundments as designed. This provision could avoid costs associated with potentially contaminating groundwater.
 - v. **Need For Developing Housing Within Region.** This provision will not affect the need to develop housing in the region because it does not affect population or land use within the region.
 - vi. **Need To Develop and Use Recycled Water.** This provision may improve the Discharger's ability to recycle water by containing water long enough to achieve full treatment to meet water quality criteria for multiple uses, including recycled water. It will also prevent water loss through percolation.
- d. **Standard Operating Procedures for Resource Recovery.** Standard Operating Procedures are required for dischargers that accept hauled waste fats, oil, and grease for injection into anaerobic digesters. The development and implementations of Standard Operating Procedures for management of these materials is intended to allow the California Department of Resources Recycling and Recovery to exempt operations from separate and redundant permitting programs. If the Discharger does not accept fats, oil, and grease for resource recovery purposes, it is not required to develop and implement Standard Operating Procedures.

VII. RATIONALE FOR MONITORING AND REPORTING PROGRAM

Attachment E contains the MRP for this Order. It specifies sampling stations, pollutants to be monitored (including all parameters for which effluent limitations are specified), monitoring

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frequencies, and reporting requirements. The following provides the rationale for the MRP requirements.

A. MRP Requirements Rationale

1. Influent Monitoring. Influent flow monitoring is necessary to understand Facility operations and to evaluate compliance with Discharge Prohibition III.D, which prohibits dry weather influent flow greater than 0.5 MGD. Influent BOD₅ and TSS monitoring is necessary to evaluate compliance with this Order's 85 percent removal requirements.

2. Effluent Monitoring. Effluent flow monitoring at Monitoring Location EFF-001 is necessary to distinguish flows discharged to the Napa River versus flows that go to the irrigation fields. Monitoring for other parameters at this location is necessary to evaluate compliance with this Order's effluent limitations and to conduct future reasonable potential analyses.

Effluent flow monitoring at Monitoring Location REC-001 is to understand Facility operations and to distinguish flows discharged to the Napa River versus flows that go to the irrigation fields.

3. Whole Effluent Acute Toxicity Testing. Acute whole effluent toxicity tests are necessary to evaluate compliance with the whole effluent acute toxicity effluent limitations.

4. Receiving Water Monitoring. Napa River flow monitoring is needed to determine the river flow-to-effluent flow ratio and to evaluate compliance with Discharge Prohibition III.C. Monitoring for hardness is necessary to determine applicable water quality objectives. Monitoring for pH and temperature is necessary to provide data to translate the Basin Plan's un-ionized ammonia water quality objectives into total ammonia criteria. Monitoring for total ammonia may be useful to complete future reasonable potential analyses.

5. Other Monitoring. Biosolids monitoring is required pursuant to 40 C.F.R. part 258 (for landfill disposal) or 40 C.F.R. part 503 (for land application).

B. Monitoring Requirements Summary. The table below summarizes routine monitoring requirements. This table is for informational purposes only. The actual requirements are specified in the MRP and elsewhere in this Order.

Table F-11. Monitoring Requirements Summary

Parameter	Influent INF-001	Effluent EFF-001	Effluent REC-001	Receiving Water RSW-001 and RSW-002	Biosolids BIO-001
Flow	Continuous/D	Continuous/D	Continuous/D	1/Day ^[1]	----
Biochemical Oxygen Demand 5-day @ 20°C BOD ₅	1/Week ^[2]	3/Week	---	----	----
Total Suspended Solids	1/Week ^[2]	3/Week	---	----	----
Oil and Grease	----	1/Quarter	----	----	----
pH	----	1/Day	----	2/Year ^[3]	----
Temperature	----	1/Quarter	----	2/Year ^[3]	----
Total Coliform Bacteria	----	3/Week	----	----	----

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Parameter	Influent INF-001	Effluent EFF-001	Effluent REC-001	Receiving Water RSW-001 and RSW-002	Biosolids BIO-001
Acute Toxicity	----	1/Quarter	----	----	----
Chlorine Residual	----	Continuous/2H	----	----	----
Ammonia, Total	----	1/Quarter	----	2/Year ^[3]	----
Hardness	----	---	----	2/Year ^[3]	----
Copper, Total	----	1/Month	----	---	----
Cyanide, Total	----	1/Month	----	---	----
Other Pollutants	----	Once	----	Once ^[4]	----
River Flow-to-Effluent Flow Ratio	----	1/Day	----	----	----
Paint Filter Test	----	----	----	----	1/Year

Abbreviations:

Continuous/D = measured continuously, and recorded and reported daily
Continuous/2H= measured continuously or, if infeasible, at least every 2 hours
1/Day = once per day
1/Week = once per week
3/Week = three times per week
1/Month = once per month
1/Quarter = once per quarter
2/Year = twice per year

Footnotes:

- ^[1] Monitoring is required at the USGS Station No.11458000 and only when discharging to the Napa River.
^[2] The frequency is to be once per quarter when not discharging to the Napa River.
^[3] Monitoring is required only at Monitoring Location RSW-002.
^[4] Collaborative downstream monitoring is to be conducted at Monitoring Location RSW-900.

VIII. PUBLIC PARTICIPATION

The Regional Water Board considered the issuance of WDRs that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, Regional Water Board staff developed tentative WDRs and encouraged public participation in the WDR adoption process.

A. Notification of Interested Parties. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and provided an opportunity to submit written comments and recommendations. Notification was provided through *The Napa Valley Register*. The public had access to the agenda and any changes in dates and locations through the Regional Water Board's website at <http://www.waterboards.ca.gov/sanfranciscobay>.

B. Written Comments. Interested persons were invited to submit written comments concerning the tentative WDRs as explained through the notification process. Comments were to be submitted either in person or by mail to the Executive Officer at the Regional Water Board at 1515 Clay Street, Suite 1400, Oakland, California 94612, Attention: Vince Christian.

For full staff response and Regional Water Board consideration, the written comments were due at the Regional Water Board office by 5:00 p.m. on November 23, 2015.

C. Public Hearing. The Regional Water Board held a public hearing on the tentative WDRs during its regular meeting at the following date and time, and at the following location:

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Date: January 13, 2016
Time: 9:00 a.m.
Location: Elihu Harris State Office Building
1515 Clay Street, 1st Floor Auditorium
Oakland, CA 94612
Contact: Vince Christian, (510) 622-2336, vchristian@waterboards.ca.gov.

Interested persons were invited to attend. At the public hearing, the Regional Water Board heard testimony pertinent to the discharge, WDRs, and permit. For accuracy of the record, important testimony was requested to be in writing.

Dates and venues change. The Regional Water Board web address is <http://www.waterboards.ca.gov/sanfranciscobay>, where one could access the current agenda for changes in dates and locations.

- D. Reconsideration of Waste Discharge Requirements.** Any aggrieved person may petition the State Water Board to review the Regional Water Board decision regarding the final WDRs. The State Water Board must receive the petition at the following address within 30 calendar days of the Regional Water Board action:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100
Sacramento, CA 95812-0100

For instructions on how to file a petition for review, see http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wqpetition_instr.shtml.

- E. Information and Copying.** The Report of Waste Discharge, related supporting documents, and comments received are on file and may be inspected at the address above at any time between 8:00 a.m. and 5:00 p.m. (except noon to 1 p.m.), Monday through Friday. Copying of documents may be arranged by calling (510) 622-2300.
- F. Register of Interested Persons.** Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference the Facility, and provide a name, address, and phone number.
- G. Additional Information.** Requests for additional information or questions regarding this Order should be directed to Vince Christian, at (510) 622-2336 or vchristian@waterboards.ca.gov.

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APPENDIX F-1 RIVER FLOW-TO-EFFLUENT FLOW RATIO CALCULATIONS

The flow balance for the Napa River from a point just upstream of the City of Calistoga's outfalls to a point just downstream of the City of St. Helena's outfall can be expressed as in Equation 1.

$$Q_{\text{RivUpstrm}} + Q_c + Q_{\text{sh}} + Q_y + Q_{\text{urban}} + Q_{\text{trib}} = Q_{\text{RivDnstrm}}$$

Where:

$Q_{\text{RivUpstrm}}$ = Upstream River Flow
 Q_c = Calistoga Effluent Flow
 Q_{sh} = Saint Helena Effluent Flow
 Q_y = Yountville Effluent Flow
 Q_{urban} = Urban Runoff Flow
 Q_{trib} = Tributary Flow
 $Q_{\text{RivDnstrm}}$ = Downstream River Flow

Conservatively assuming that Q_{trib} is negligible during the early part of the discharge season, this equation yields the following:

$$\textbf{Equation 1: } Q_{\text{RivUpstrm}} + Q_c + Q_{\text{sh}} + Q_y + Q_{\text{urban}} = Q_{\text{RivDnstrm}}$$

Conservatively using wet weather influent data¹ to estimate the flows of each wastewater treatment facility yields the following:

$$\begin{aligned} Q_{\text{sh}} &= 1.0 \text{ Mgal/day} \\ Q_y &= 0.80 \text{ Mgal/day} = 0.8 * Q_{\text{sh}} \\ Q_c &= 0.89 \text{ Mgal/day} = 0.89 * Q_{\text{sh}} \end{aligned}$$

Thus:

$$\textbf{Equation 2: } Q_c + Q_{\text{sh}} + Q_y = 2.69 * Q_{\text{sh}} = 2.69 \text{ Mgal/day} = 982 \text{ Mgal/year}$$

Q_{urban} can be estimated through this equation:²

$$Q_{\text{urban}} = C_{\text{mun}} * I * A_{\text{mun}} + C_{\text{ind}} * I * A_{\text{ind}}$$

Where:

I = rainfall = 30 inches / year
 C_{mun} = municipal runoff fraction = 0.2
 C_{ind} = industrial runoff fraction = 1.0
 A_{mun} = municipal area = 25,667 acres
 A_{ind} = industrial area = 1,447 acres

¹ Average flow data are from Calistoga, St. Helena, and Yountville self-monitoring reports for December 2014, a very wet month.

² This equation, the runoff fractions, and land use areas are from Table 7b of the staff report for the Napa River Sediment Total Maximum Daily Load (January 16, 2007).

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$$Q_{urban} = [0.2(30in/year)(25667acres) + 1.0(30in/year)(1447acres)] \times \left[\frac{1.008ft^3/sec}{acre-in/hr} \right] \times \left[\frac{3600sec}{hr} \right] \times \left[\frac{7.4805gal}{ft^3} \right]$$

$$Q_{urban} = 5,359 \text{ Mgal/year}$$

Therefore, Q_{urban} is about 5.5 times the combined flow of the treatment plants.

$$\frac{Q_{urban}}{Q_c + Q_{sh} + Q_y} = \frac{5359 \text{ Mgal/year}}{982 \text{ Mgal/year}} = 5.5$$

$$Q_{Urban} = 5.5 * (Q_c + Q_{sh} + Q_y)$$

Substituting this ratio into Equation 1:

$$Q_{RivUpstrm} + 6.5 * (Q_c + Q_{sh} + Q_y) = Q_{RivDnstrm}$$

Using Equation 2:

$$\text{Equation 3: } Q_{RivUpstrm} = Q_{RivDnstrm} - 17.485 * Q_{sh}$$

Effluent and ambient background data suggest that the Napa River's assimilative capacity may be most limited with respect to copper. Therefore, the minimum river flow-to-effluent flow ratio is calculated by setting the background, effluent, and runoff copper mass equal to the downstream copper mass based on the downstream flow and copper water quality objective (C_o).

The copper mass balance can be expressed as follows:

$$\text{Equation 4: } Q_{RivUpstrm} * C_b + Q_c * C_c + Q_{sh} * C_{sh} + Q_y * C_y + Q_{urban} * C_{urban} = Q_{RivDnstrm} * C_o$$

Where:

- C_b = Upstream Background River Copper Concentration
- C_c = Calistoga Effluent Copper Concentration
- C_{sh} = Saint Helena Effluent Copper Concentration
- C_y = Yountville Effluent Copper Concentration
- C_{urban} = Urban Runoff Copper Concentration
- C_{trib} = Tributary Copper Concentration
- C_o = Downstream River Copper Water Quality Objective Concentration

Assuming that urban and non-urban runoff copper loads are about eight times those of the wastewater treatment plants yields the following:³

$$Q_{urban} * C_{urban} = 8 * (Q_c * C_c + Q_{sh} * C_{sh} + Q_y * C_y)$$

Combining the above equation with Equation 4 yields the following:

$$Q_{RivUpstrm} * C_b + 9 * (Q_c * C_c + Q_{sh} * C_{sh} + Q_y * C_y) = Q_{RivDnstrm} * C_o$$

³ The relative copper loads are from the staff report for the Copper Site Specific Objectives (June 6, 2007).

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Substituting Equation 3 into Equation 4 and solving for the river flow-to-effluent flow ratio yields the following:

$$\frac{Q_{RivDnstrm}}{Q_{sh}} = \frac{17.485 \times C_b - 8.01 \times C_c - 9 \times C_{sh} - 7.2 \times C_y}{C_b - C_o}$$

Effluent copper concentrations are conservatively based on each wastewater treatment plant's 95th percentile effluent copper concentration from 2010 through 2014. The downstream copper water quality objective (7.9 mg/L) is based on Basin Plan Table 3-4 and the lowest measured downstream hardness of 82 mg/L. The background copper concentration (3.1 mg/L) is based on the highest upstream measurement the Discharger collected from February 2002 through March 2015.

$$C_c = 8.9 \text{ mg/L}$$

$$C_{sh} = 6.8 \text{ mg/L}$$

$$C_y = 16 \text{ mg/L}$$

$$C_o = 7.9 \text{ mg/L}$$

$$C_b = 3.1 \text{ mg/L}$$

Substituting these values into the equation above yields the following:

$$\frac{Q_{RivDnstrm}}{Q_{sh}} = \frac{17.485 \times 3.1 - 8.01 \times 8.9 - 9 \times 6.8 - 9 \times 16}{3.1 - 7.9} = \frac{46}{1}$$

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**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

**ATTACHMENT G
REGIONAL STANDARD PROVISIONS, AND MONITORING
AND REPORTING REQUIREMENTS
(SUPPLEMENT TO ATTACHMENT D)**

For

NPDES WASTEWATER DISCHARGE PERMITS

March 2010

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**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

**REGIONAL STANDARD PROVISIONS, AND MONITORING AND
REPORTING REQUIREMENTS
(SUPPLEMENT TO ATTACHMENT D)**

FOR

NPDES WASTEWATER DISCHARGE PERMITS

APPLICABILITY

This document applies to dischargers covered by a National Pollutant Discharge Elimination System (NPDES) permit. This document does not apply to Municipal Separate Storm Sewer System (MS4) NPDES permits.

The purpose of this document is to supplement the requirements of Attachment D, Standard Provisions. The requirements in this supplemental document are designed to ensure permit compliance through preventative planning, monitoring, recordkeeping, and reporting. In addition, this document requires proper characterization of issues as they arise, and timely and full responses to problems encountered. To provide clarity on which sections of Attachment D this document supplements, this document is arranged in the same format as Attachment D.

I. STANDARD PROVISIONS - PERMIT COMPLIANCE

A. Duty to Comply – Not Supplemented

B. Need to Halt or Reduce Activity Not a Defense – Not Supplemented

C. Duty to Mitigate – This supplements I.C. of Standard Provisions (Attachment D)

1. Contingency Plan - The Discharger shall maintain a Contingency Plan as originally required by Regional Water Board Resolution 74-10 and as prudent in accordance with current municipal facility emergency planning. The Contingency Plan shall describe procedures to ensure that existing facilities remain in, or are rapidly returned to, operation in the event of a process failure or emergency incident, such as employee strike, strike by suppliers of chemicals or maintenance services, power outage, vandalism, earthquake, or fire. The Discharger may combine the Contingency Plan and Spill Prevention Plan into one document. Discharge in violation of the permit where the Discharger has failed to develop and implement a Contingency Plan as described below will be the basis for considering the discharge a willful and negligent violation of the permit pursuant to California Water Code Section 13387. The Contingency Plan shall, at a minimum, contain the provisions of a. through g. below.
 - a. Provision of personnel for continued operation and maintenance of sewerage facilities during employee strikes or strikes against contractors providing services.

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- b. Maintenance of adequate chemicals or other supplies and spare parts necessary for continued operations of sewerage facilities.
 - c. Provisions of emergency standby power.
 - d. Protection against vandalism.
 - e. Expeditious action to repair failures of, or damage to, equipment and sewer lines.
 - f. Report of spills and discharges of untreated or inadequately treated wastes, including measures taken to clean up the effects of such discharges.
 - g. Programs for maintenance, replacement, and surveillance of physical condition of equipment, facilities, and sewer lines.
2. Spill Prevention Plan - The Discharger shall maintain a Spill Prevention Plan to prevent accidental discharges and minimize the effects of such events. The Spill Prevention Plan shall:
- a. Identify the possible sources of accidental discharge, untreated or partially treated waste bypass, and polluted drainage;
 - b. Evaluate the effectiveness of present facilities and procedures, and state when they became operational; and
 - c. Predict the effectiveness of the proposed facilities and procedures, and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

This Regional Water Board, after review of the Contingency and Spill Prevention Plans or their updated revisions, may establish conditions it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions may be incorporated as part of the permit upon notice to the Discharger.

D. Proper Operation & Maintenance – This supplements I.D of Standard Provisions (Attachment D)

- 1. Operation and Maintenance (O&M) Manual - The Discharger shall maintain an O&M Manual to provide the plant and regulatory personnel with a source of information describing all equipment, recommended operational strategies, process control monitoring, and maintenance activities. To remain a useful and relevant document, the O&M Manual shall be kept updated to reflect significant changes in treatment facility equipment and operational practices. The O&M Manual shall be maintained in usable condition and be available for reference and use by all relevant personnel and Regional Water Board staff.
- 2. Wastewater Facilities Status Report - The Discharger shall regularly review, revise, or update, as necessary, its Wastewater Facilities Status Report. This report shall document how the Discharger operates and maintains its wastewater collection, treatment, and disposal facilities to ensure that all facilities are adequately staffed, supervised, financed, operated, maintained, repaired, and upgraded as necessary to provide adequate and reliable transport, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the Discharger's service responsibilities.

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3. Proper Supervision and Operation of Publicly Owned Treatment Works (POTWs) - POTWs shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Division 4, Chapter 14, Title 23 of the California Code of Regulations.

E. Property Rights – Not Supplemented

F. Inspection and Entry – Not Supplemented

G. Bypass – Not Supplemented

H. Upset – Not Supplemented

I. Other – This section is an addition to Standard Provisions (Attachment D)

1. Neither the treatment nor the discharge of pollutants shall create pollution, contamination, or nuisance as defined by California Water Code Section 13050.
2. Collection, treatment, storage, and disposal systems shall be operated in a manner that precludes public contact with wastewater, except in cases where excluding the public is infeasible, such as private property. If public contact with wastewater could reasonably occur on public property, warning signs shall be posted.
3. If the Discharger submits a timely and complete Report of Waste Discharge for permit reissuance, this permit continues in force and effect until a new permit is issued or the Regional Water Board rescinds the permit.

J. Storm Water – This section is an addition to Standard Provisions (Attachment D)

These provisions apply to facilities that do not direct all storm water flows from the facility to the wastewater treatment plant headworks.

1. Storm Water Pollution Prevention Plan (SWPP Plan)

The SWPP Plan shall be designed in accordance with good engineering practices and shall address the following objectives:

- a. To identify pollutant sources that may affect the quality of storm water discharges; and
- b. To identify, assign, and implement control measures and management practices to reduce pollutants in storm water discharges.

The SWPP Plan may be combined with the existing Spill Prevention Plan as required in accordance with Section C.2. The SWPP Plan shall be retained on-site and made available upon request of a representative of the Regional Water Board.

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2. Source Identification

The SWPP Plan shall provide a description of potential sources that may be expected to add significant quantities of pollutants to storm water discharges, or may result in non-storm water discharges from the facility. The SWPP Plan shall include, at a minimum, the following items:

- a. A topographical map (or other acceptable map if a topographical map is unavailable), extending one-quarter mile beyond the property boundaries of the facility, showing the wastewater treatment facility process areas, surface water bodies (including springs and wells), and discharge point(s) where the facility's storm water discharges to a municipal storm drain system or other points of discharge to waters of the State. The requirements of this paragraph may be included in the site map required under the following paragraph if appropriate.
- b. A site map showing the following:
 - 1) Storm water conveyance, drainage, and discharge structures;
 - 2) An outline of the storm water drainage areas for each storm water discharge point;
 - 3) Paved areas and buildings;
 - 4) Areas of actual or potential pollutant contact with storm water or release to storm water, including but not limited to outdoor storage and process areas; material loading, unloading, and access areas; and waste treatment, storage, and disposal areas;
 - 5) Location of existing storm water structural control measures (i.e., berms, coverings, etc.);
 - 6) Surface water locations, including springs and wetlands; and
 - 7) Vehicle service areas.
- c. A narrative description of the following:
 - 1) Wastewater treatment process activity areas;
 - 2) Materials, equipment, and vehicle management practices employed to minimize contact of significant materials of concern with storm water discharges;
 - 3) Material storage, loading, unloading, and access areas;
 - 4) Existing structural and non-structural control measures (if any) to reduce pollutants in storm water discharges; and
 - 5) Methods of on-site storage and disposal of significant materials.
- d. A list of pollutants that have a reasonable potential to be present in storm water discharges in significant quantities.

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3. Storm Water Management Controls

The SWPP Plan shall describe the storm water management controls appropriate for the facility and a time schedule for fully implementing such controls. The appropriateness and priorities of controls in the SWPP Plan shall reflect identified potential sources of pollutants. The description of storm water management controls to be implemented shall include, as appropriate:

a. Storm water pollution prevention personnel

Identify specific individuals (and job titles) that are responsible for developing, implementing, and reviewing the SWPP Plan.

b. Good housekeeping

Good housekeeping requires the maintenance of clean, orderly facility areas that discharge storm water. Material handling areas shall be inspected and cleaned to reduce the potential for pollutants to enter the storm drain conveyance system.

c. Spill prevention and response

Identify areas where significant materials can spill into or otherwise enter storm water conveyance systems and their accompanying drainage points. Specific material handling procedures, storage requirements, and cleanup equipment and procedures shall be identified, as appropriate. The necessary equipment to implement a cleanup shall be available, and personnel shall be trained in proper response, containment, and cleanup of spills. Internal reporting procedures for spills of significant materials shall be established.

d. Source control

Source controls include, for example, elimination or reduction of the use of toxic pollutants, covering of pollutant source areas, sweeping of paved areas, containment of potential pollutants, labeling of all storm drain inlets with "No Dumping" signs, isolation or separation of industrial and non-industrial pollutant sources so that runoff from these areas does not mix, etc.

e. Storm water management practices

Storm water management practices are practices other than those that control the sources of pollutants. Such practices include treatment or conveyance structures, such as drop inlets, channels, retention and detention basins, treatment vaults, infiltration galleries, filters, oil/water separators, etc. Based on assessment of the potential of various sources to contribute pollutants to storm water discharges in significant quantities, additional storm water management practices to remove pollutants from storm water discharges shall be implemented and design criteria shall be described.

f. Sediment and erosion control

Measures to minimize erosion around the storm water drainage and discharge points, such as riprap, revegetation, slope stabilization, etc., shall be described.

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g. Employee training

Employee training programs shall inform all personnel responsible for implementing the SWPP Plan. Training shall address spill response, good housekeeping, and material management practices. New employee and refresher training schedules shall be identified.

h. Inspections

All inspections shall be done by trained personnel. Material handling areas shall be inspected for evidence of, or the potential for, pollutants entering storm water discharges. A tracking or follow up procedure shall be used to ensure appropriate response has been taken in response to an inspection. Inspections and maintenance activities shall be documented and recorded. Inspection records shall be retained for five years.

i. Records

A tracking and follow-up procedure shall be described to ensure that adequate response and corrective actions have been taken in response to inspections.

4. Annual Verification of SWPP Plan

An annual facility inspection shall be conducted to verify that all elements of the SWPP Plan are accurate and up-to-date. The results of this review shall be reported in the Annual Report to the Regional Water Board described in Section V.C.f.

K. Biosolids Management – This section is an addition to Standard Provisions (Attachment D)

Biosolids must meet the following requirements prior to land application. The Discharger must either demonstrate compliance or, if it sends the biosolids to another party for further treatment or distribution, must give the recipient the information necessary to ensure compliance.

1. Exceptional quality biosolids meet the pollutant concentration limits in Table III of 40 CFR Part 503.13, Class A pathogen limits, and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8). Such biosolids do not have to be tracked further for compliance with general requirements (503.12) and management practices (503.14).
2. Biosolids used for agricultural land, forest, or reclamation shall meet the pollutant limits in Table I (ceiling concentrations) and Table II or Table III (cumulative loadings or pollutant concentration limits) of 503.13. They shall also meet the general requirements (503.12) and management practices (503.14) (if not exceptional quality biosolids) for Class A or Class B pathogen levels with associated access restrictions (503.32) and one of the 10 vector attraction reduction requirements in 503.33(b)(1)-(b)(10).
3. Biosolids used for lawn or home gardens must meet exceptional quality biosolids limits.
4. Biosolids sold or given away in a bag or other container must meet the pollutant limits in either Table III or Table IV (pollutant concentration limits or annual pollutant loading rate limits) of 503.13. If Table IV is used, a label or information sheet must be attached to the biosolids packing that explains Table IV (see 503.14). The biosolids must also meet the Class A pathogen limits and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8).

II. STANDARD PROVISIONS – PERMIT ACTION – Not Supplemented

Attachment G
Regional Standard Provisions, and Monitoring and Reporting Requirements (March 2010)

G-6

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III. STANDARD PROVISIONS – MONITORING

A. Sampling and Analyses – This section is a supplement to III.A and III.B of Standard Provisions (Attachment D)

1. Use of Certified Laboratories

Water and waste analyses shall be performed by a laboratory certified for these analyses in accordance with California Water Code Section 13176.

2. Use of Appropriate Minimum Levels

Table C lists the suggested analytical methods for the 126 priority pollutants and other toxic pollutants that should be used, unless a particular method or minimum level (ML) is required in the MRP.

For priority pollutant monitoring, when there is more than one ML value for a given substance, the Discharger may select any one of the analytical methods cited in Table C for compliance determination, or any other method described in 40 CFR part 136 or approved by U.S. EPA (such as the 1600 series) if authorized by the Regional Water Board. However, the ML must be below the effluent limitation and water quality objective. If no ML value is below the effluent limitation and water quality objective, then the method must achieve an ML no greater than the lowest ML value indicated in Table C. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

3. Frequency of Monitoring

The minimum schedule of sampling analysis is specified in the MRP portion of the permit.

a. Timing of Sample Collection

- 1) The Discharger shall collect samples of influent on varying days selected at random and shall not include any plant recirculation or other sidestream wastes, unless otherwise stipulated by the MRP.
- 2) The Discharger shall collect samples of effluent on days coincident with influent sampling unless otherwise stipulated by the MRP or the Executive Officer. The Executive Officer may approve an alternative sampling plan if it is demonstrated to be representative of plant discharge flow and in compliance with all other permit requirements.
- 3) The Discharger shall collect grab samples of effluent during periods of day-time maximum peak effluent flows (or peak flows through secondary treatment units for facilities that recycle effluent flows).
- 4) Effluent sampling for conventional pollutants shall occur on at least one day of any multiple-day bioassay test the MRP requires. During the course of the test, on at least one day, the Discharger shall collect and retain samples of the discharge. In the event a bioassay test does

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not comply with permit limits, the Discharger shall analyze these retained samples for pollutants that could be toxic to aquatic life and for which it has effluent limits.

- i. The Discharger shall perform bioassay tests on final effluent samples; when chlorine is used for disinfection, bioassay tests shall be performed on effluent after chlorination-dechlorination; and
- ii. The Discharger shall analyze for total ammonia nitrogen and calculate the amount of un-ionized ammonia whenever test results fail to meet the percent survival specified in the permit.

b. Conditions Triggering Accelerated Monitoring

- 1) If the results from two consecutive samples of a constituent monitored in a 30-day period exceed the monthly average limit for any parameter (or if the required sampling frequency is once per month and the monthly sample exceeds the monthly average limit), the Discharger shall, within 24 hours after the results are received, increase its sampling frequency to daily until the results from the additional sampling show that the parameter is in compliance with the monthly average limit.
- 2) If any maximum daily limit is exceeded, the Discharger shall increase its sampling frequency to daily within 24 hours after the results are received that indicate the exceedance of the maximum daily limit until two samples collected on consecutive days show compliance with the maximum daily limit.
- 3) If final or intermediate results of an acute bioassay test indicate a violation or threatened violation (e.g., the percentage of surviving test organisms of any single acute bioassay test is less than 70 percent), the Discharger shall initiate a new test as soon as practical, and the Discharger shall investigate the cause of the mortalities and report its findings in the next self monitoring report (SMR).
- 4) The Discharger shall calibrate chlorine residual analyzers against grab samples as frequently as necessary to maintain accurate control and reliable operation. If an effluent violation is detected, the Discharger shall collect grab samples at least every 30 minutes until compliance with the limit is achieved, unless the Discharger monitors chlorine residual continuously. In such cases, the Discharger shall continue to conduct continuous monitoring as required by its permit.
- 5) When a bypass occurs (except one subject to provision III.A.3.b.6 below), the Discharger shall monitor flows and collect samples on a daily basis for all constituents at affected discharge points that have effluent limits for the duration of the bypass (including acute toxicity using static renewals), except chronic toxicity, unless otherwise stipulated by the MRP.
- 6) Unless otherwise stipulated by the MRP, when a bypass approved pursuant to Attachment D, Standard Provisions, Sections I.G.2 or I.G.4, occurs, the Discharger shall monitor flows and, using appropriate procedures as specified in the MRP, collect and retain samples for affected discharge points on a daily basis for the duration of the bypass. The Discharger shall analyze for total suspended solids (TSS) using 24-hour composites (or more frequent increments) and for bacteria indicators with effluent limits using grab samples. If TSS exceeds 45 mg/L in any composite sample, the Discharger shall also analyze the retained samples for that discharge for all other constituents that have effluent limits, except oil and grease, mercury, dioxin-

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TEQ, and acute and chronic toxicity. Additionally, at least once each year, the Discharger shall analyze the retained samples for one approved bypass discharge event for all other constituents that have effluent limits, except oil and grease, mercury, dioxin-TEQ, and acute and chronic toxicity. This monitoring shall be in addition to the minimum monitoring specified in the MRP.

c. Storm Water Monitoring

The requirements of this section only apply to facilities that are not covered by an NPDES permit for storm water discharges and where not all site storm drainage from process areas (i.e., areas of the treatment facility where chemicals or wastewater could come in contact with storm water) is directed to the headworks. For storm water not directed to the headworks during the wet season (October 1 to April 30), the Discharger shall:

- 1) Conduct visual observations of the storm water discharge locations during daylight hours at least once per month during a storm event that produces significant storm water discharge to observe the presence of floating and suspended materials, oil and grease, discoloration, turbidity, and odor, etc.
- 2) Measure (or estimate) the total volume of storm water discharge, collect grab samples of storm water discharge from at least two storm events that produce significant storm water discharge, and analyze the samples for oil and grease, pH, TSS, and specific conductance.

The grab samples shall be taken during the first 30 minutes of the discharge. If collection of the grab samples during the first 30 minutes is impracticable, grab samples may be taken during the first hour of the discharge, and the Discharger shall explain in the Annual Report why the grab sample(s) could not be taken in the first 30 minutes.

- 3) Testing for the presence of non-storm water discharges shall be conducted no less than twice during the dry season (May 1 to September 30) at all storm water discharge locations. Tests may include visual observations of flows, stains, sludges, odors, and other abnormal conditions; dye tests; TV line surveys; or analysis and validation of accurate piping schematics. Records shall be maintained describing the method used, date of testing, locations observed, and test results.
- 4) Samples shall be collected from all locations where storm water is discharged. Samples shall represent the quality and quantity of storm water discharged from the facility. If a facility discharges storm water at multiple locations, the Discharger may sample a reduced number of locations if it establishes and documents through the monitoring program that storm water discharges from different locations are substantially identical.
- 5) Records of all storm water monitoring information and copies of all reports required by the permit shall be retained for a period of at least three years from the date of sample, observation, or report.

d. Receiving Water Monitoring

The requirements of this section only apply when the MRP requires receiving water sampling.

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- 1) Receiving water samples shall be collected on days coincident with effluent sampling for conventional pollutants.
- 2) Receiving water samples shall be collected at each station on each sampling day during the period within one hour following low slack water. Where sampling during lower slack water is impractical, sampling shall be performed during higher slack water. Samples shall be collected within the discharge plume and down current of the discharge point so as to be representative, unless otherwise stipulated in the MRP.
- 3) Samples shall be collected within one foot of the surface of the receiving water, unless otherwise stipulated in the MRP.

B. Biosolids Monitoring – This section supplements III.B of Standard Provisions (Attachment D)

When biosolids are sent to a landfill, sent to a surface disposal site, or applied to land as a soil amendment, they must be monitored as follows:

1. Biosolids Monitoring Frequency

Biosolids disposal must be monitored at the following frequency:

<u>Metric tons biosolids/365 days</u>	<u>Frequency</u>
0-290	Once per year
290-1500	Quarterly
1500-15,000	Six times per year
Over 15,000	Once per month

(Metric tons are on a dry weight basis)

2. Biosolids Pollutants to Monitor

Biosolids shall be monitored for the following constituents:

- Land Application: Arsenic, cadmium, copper, mercury, molybdenum, nickel, lead, selenium, and zinc
- Municipal Landfill: Paint filter test (pursuant to 40 CFR 258)
- Biosolids-only Landfill or Surface Disposal Site (if no liner and leachate system): arsenic, chromium, and nickel

C. Standard Observations – This section is an addition to III of Standard Provisions (AttachmentD)

1. Receiving Water Observations

The requirements of this section only apply when the MRP requires standard observations of the receiving water. Standard observations shall include the following:

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- a. *Floating and suspended materials* (e.g., oil, grease, algae, and other macroscopic particulate matter): presence or absence, source, and size of affected area.
- b. *Discoloration and turbidity*: description of color, source, and size of affected area.
- c. *Odor*: presence or absence, characterization, source, distance of travel, and wind direction.
- d. *Beneficial water use*: presence of water-associated waterfowl or wildlife, fisherpeople, and other recreational activities in the vicinity of each sampling station.
- e. *Hydrographic condition*: time and height of corrected high and low tides (corrected to nearest National Oceanic and Atmospheric Administration location for the sampling date and time of sample collection).
- f. *Weather conditions*:
 - 1) Air temperature; and
 - 2) Total precipitation during the five days prior to observation.

2. Wastewater Effluent Observations

The requirements of this section only apply when the MRP requires wastewater effluent standard observations. Standard observations shall include the following:

- a. *Floating and suspended material of wastewater origin* (e.g., oil, grease, algae, and other macroscopic particulate matter): presence or absence.
- b. *Odor*: presence or absence, characterization, source, distance of travel, and wind direction.

3. Beach and Shoreline Observations

The requirements of this section only apply when the MRP requires beach and shoreline standard observations. Standard observations shall include the following:

- a. *Material of wastewater origin*: presence or absence, description of material, estimated size of affected area, and source.
- b. *Beneficial use*: estimate number of people participating in recreational water contact, non-water contact, or fishing activities.

4. Land Retention or Disposal Area Observations

The requirements of this section only apply to facilities with on-site surface impoundments or disposal areas that are in use. This section applies to both liquid and solid wastes, whether confined or unconfined. The Discharger shall conduct the following for each impoundment:

- a. Determine the amount of freeboard at the lowest point of dikes confining liquid wastes.
- b. Report evidence of leaching liquid from area of confinement and estimated size of affected area. Show affected area on a sketch and volume of flow (e.g., gallons per minute [gpm]).

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- c. Regarding odor, describe presence or absence, characterization, source, distance of travel, and wind direction.
- d. Estimate number of waterfowl and other water-associated birds in the disposal area and vicinity.

5. Periphery of Waste Treatment and/or Disposal Facilities Observations

The requirements of this section only apply when the MRP specifies periphery standard observations. Standard observations shall include the following:

- a. *Odor*: presence or absence, characterization, source, and distance of travel.
- b. *Weather conditions*: wind direction and estimated velocity.

IV. STANDARD PROVISIONS – RECORDS

A. Records to be Maintained – This supplements IV.A of Standard Provisions (Attachment D)

The Discharger shall maintain records in a manner and at a location (e.g., wastewater treatment plant or Discharger offices) such that the records are accessible to Regional Water Board staff. The minimum period of retention specified in Section IV, Records, of the Federal Standard Provisions shall be extended during the course of any unresolved litigation regarding the subject discharge, or when requested by the Regional Water Board or Regional Administrator of U.S. EPA, Region IX.

A copy of the permit shall be maintained at the discharge facility and be available at all times to operating personnel.

B. Records of monitoring information shall include – This supplements IV.B of Standard Provision (Attachment D)

1. Analytical Information

Records shall include analytical method detection limits, minimum levels, reporting levels, and related quantification parameters.

2. Flow Monitoring Data

For all required flow monitoring (e.g., influent and effluent flows), the additional records shall include the following, unless otherwise stipulated by the MRP:

- a. Total volume for each day; and
- b. Maximum, minimum, and average daily flows for each calendar month.

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3. Wastewater Treatment Process Solids

- a. For each treatment unit process that involves solids removal from the wastewater stream, records shall include the following:
 - 1) Total volume or mass of solids removed from each collection unit (e.g., grit, skimmings, undigested biosolids, or combination) for each calendar month or other time period as appropriate, but not to exceed annually; and
 - 2) Final disposition of such solids (e.g., landfill, other subsequent treatment unit).
- b. For final dewatered biosolids from the treatment plant as a whole, records shall include the following:
 - 1) Total volume or mass of dewatered biosolids for each calendar month;
 - 2) Solids content of the dewatered biosolids; and
 - 3) Final disposition of dewatered biosolids (disposal location and disposal method).

4. Disinfection Process

For the disinfection process, these additional records shall be maintained documenting process operation and performance:

- a. For bacteriological analyses:
 - 1) Wastewater flow rate at the time of sample collection; and
 - 2) Required statistical parameters for cumulative bacterial values (e.g., moving median or geometric mean for the number of samples or sampling period identified in this Order).
- b. For the chlorination process, when chlorine is used for disinfection, at least daily average values for the following:
 - 1) Chlorine residual of treated wastewater as it enters the contact basin (mg/L);
 - 2) Chlorine dosage (kg/day); and
 - 3) Dechlorination chemical dosage (kg/day).

5. Treatment Process Bypasses

A chronological log of all treatment process bypasses, including wet weather blending, shall include the following:

- a. Identification of the treatment process bypassed;
- b. Dates and times of bypass beginning and end;
- c. Total bypass duration;

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- d. Estimated total bypass volume; and
- e. Description of, or reference to other reports describing, the bypass event, the cause, the corrective actions taken (except for wet weather blending that is in compliance with permit conditions), and any additional monitoring conducted.

6. Treatment Facility Overflows

This section applies to records for overflows at the treatment facility. This includes the headworks and all units and appurtenances downstream. The Discharger shall retain a chronological log of overflows at the treatment facility and records supporting the information provided in section V.E.2.

C. Claims of Confidentiality – Not Supplemented

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information – Not Supplemented

B. Signatory and Certification Requirements – Not Supplemented

C. Monitoring Reports – This section supplements V.C of Standard Provisions (Attachment D)

1. Self Monitoring Reports

For each reporting period established in the MRP, the Discharger shall submit an SMR to the Regional Water Board in accordance with the requirements listed in this document and at the frequency the MRP specifies. The purpose of the SMR is to document treatment performance, effluent quality, and compliance with the waste discharge requirements of this Order.

a. Transmittal letter

Each SMR shall be submitted with a transmittal letter. This letter shall include the following:

- 1) Identification of all violations of effluent limits or other waste discharge requirements found during the reporting period;
- 2) Details regarding violations: parameters, magnitude, test results, frequency, and dates;
- 3) Causes of violations;
- 4) Discussion of corrective actions taken or planned to resolve violations and prevent recurrences, and dates or time schedule of action implementation (if previous reports have been submitted that address corrective actions, reference to the earlier reports is satisfactory);
- 5) Data invalidation (Data should not be submitted in an SMR if it does not meet quality assurance/quality control standards. However, if the Discharger wishes to invalidate any measurement after it was submitted in an SMR, a letter shall identify the measurement suspected to be invalid and state the Discharger's intent to submit, within 60 days, a formal request to invalidate the measurement. This request shall include the original measurement in question, the reason for invalidating the measurement, all relevant documentation that supports invalidation [e.g., laboratory sheet, log entry, test results, etc.], and discussion of the

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corrective actions taken or planned [with a time schedule for completion] to prevent recurrence of the sampling or measurement problem.);

- 6) If the Discharger blends, the letter shall describe the duration of blending events and certify whether blended effluent was in compliance with the conditions for blending; and
- 7) Signature (The transmittal letter shall be signed according to Section V.B of this Order, Attachment D – Standard Provisions.).

b. Compliance evaluation summary

Each report shall include a compliance evaluation summary. This summary shall include each parameter for which the permit specifies effluent limits, the number of samples taken during the monitoring period, and the number of samples that exceed applicable effluent limits.

c. Results of analyses and observations

- 1) Tabulations of all required analyses and observations, including parameter, date, time, sample station, type of sample, test result, method detection limit, method minimum level, and method reporting level, if applicable, signed by the laboratory director or other responsible official.
- 2) When determining compliance with an average monthly effluent limitation and more than one sample result is available in a month, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of detected but not quantified (DNQ) or nondetect (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:
 - i. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
 - ii. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

If a sample result, or the arithmetic mean or median of multiple sample results, is below the reporting limit, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the Discharger conducts a Pollutant Minimization Program, the Discharger shall not be deemed out of compliance.

- 3) Dioxin-TEQ Reporting: The Discharger shall report for each dioxin and furan congener the analytical results of effluent monitoring, including the quantifiable limit (reporting level), the method detection limit, and the measured concentration. The Discharger shall report all measured values of individual congeners, including data qualifiers. When calculating dioxin-TEQ, the Discharger shall set congener concentrations below the minimum levels (ML) to zero. The Discharger shall calculate and report dioxin-TEQs using the following formula, where the MLs, toxicity equivalency factors (TEFs), and bioaccumulation equivalency factors (BEFs) are as provided in Table A:

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$$\text{Dioxin-TEQ} = \Sigma (C_x \times \text{TEF}_x \times \text{BEF}_x)$$

where: C_x = measured or estimated concentration of congener x
 TEF_x = toxicity equivalency factor for congener x
 BEF_x = bioaccumulation equivalency factor for congener x

Table A
Minimum Levels, Toxicity Equivalency Factors,
and Bioaccumulation Equivalency Factors

Dioxin or Furan Congener	Minimum Level (pg/L)	1998 Toxicity Equivalency Factor (TEF)	Bioaccumulation Equivalency Factor (BEF)
2,3,7,8-TCDD	10	1.0	1.0
1,2,3,7,8-PeCDD	50	1.0	0.9
1,2,3,4,7,8-HxCDD	50	0.1	0.3
1,2,3,6,7,8-HxCDD	50	0.1	0.1
1,2,3,7,8,9-HxCDD	50	0.1	0.1
1,2,3,4,6,7,8-HpCDD	50	0.01	0.05
OCDD	100	0.0001	0.01
2,3,7,8-TCDF	10	0.1	0.8
1,2,3,7,8-PeCDF	50	0.05	0.2
2,3,4,7,8-PeCDF	50	0.5	1.6
1,2,3,4,7,8-HxCDF	50	0.1	0.08
1,2,3,6,7,8-HxCDF	50	0.1	0.2
1,2,3,7,8,9-HxCDF	50	0.1	0.6
2,3,4,6,7,8-HxCDF	50	0.1	0.7
1,2,3,4,6,7,8-HpCDF	50	0.01	0.01
1,2,3,4,7,8,9-HpCDF	50	0.01	0.4
OCDF	100	0.0001	0.02

d. Data reporting for results not yet available

The Discharger shall make all reasonable efforts to obtain analytical data for required parameter sampling in a timely manner. Certain analyses require additional time to complete analytical processes and report results. For cases where required monitoring parameters require additional time to complete analytical processes and reports, and results are not available in time to be included in the SMR for the subject monitoring period, the Discharger shall describe such circumstances in the SMR and include the data for these parameters and relevant discussions of any observed exceedances in the next SMR due after the results are available.

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e. Flow data

The Discharger shall provide flow data tabulation pursuant to Section IV.B.2.

f. Annual self monitoring report requirements

By the date specified in the MRP, the Discharger shall submit an annual report to the Regional Water Board covering the previous calendar year. The report shall contain the following:

- 1) Annual compliance summary table of treatment plant performance, including documentation of any blending events;
- 2) Comprehensive discussion of treatment plant performance and compliance with the permit (This discussion shall include any corrective actions taken or planned, such as changes to facility equipment or operation practices that may be needed to achieve compliance, and any other actions taken or planned that are intended to improve performance and reliability of the Discharger's wastewater collection, treatment, or disposal practices.);
- 3) Both tabular and graphical summaries of the monitoring data for the previous year if parameters are monitored at a frequency of monthly or greater;
- 4) List of approved analyses, including the following:
 - (i) List of analyses for which the Discharger is certified;
 - (ii) List of analyses performed for the Discharger by a separate certified laboratory (copies of reports signed by the laboratory director of that laboratory shall not be submitted but be retained onsite); and
 - (iii) List of "waived" analyses, as approved;
- 5) Plan view drawing or map showing the Discharger's facility, flow routing, and sampling and observation station locations;
- 6) Results of annual facility inspection to verify that all elements of the SWPP Plan are accurate and up to date (only required if the Discharger does not route all storm water to the headworks of its wastewater treatment plant); and
- 7) Results of facility report reviews (The Discharger shall regularly review, revise, and update, as necessary, the O&M Manual, the Contingency Plan, the Spill Prevention Plan, and Wastewater Facilities Status Report so that these documents remain useful and relevant to current practices. At a minimum, reviews shall be conducted annually. The Discharger shall include, in each Annual Report, a description or summary of review and evaluation procedures, recommended or planned actions, and an estimated time schedule for implementing these actions. The Discharger shall complete changes to these documents to ensure they are up-to-date.).

g. Report submittal

The Discharger shall submit SMRs to:

California Regional Water Quality Control Board

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San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
Attn: NPDES Wastewater Division

h. Reporting data in electronic format

The Discharger has the option to submit all monitoring results in an electronic reporting format approved by the Executive Officer. If the Discharger chooses to submit SMRs electronically, the following shall apply:

- 1) *Reporting Method*: The Discharger shall submit SMRs electronically via a process approved by the Executive Officer (see, for example, the letter dated December 17, 1999, "Official Implementation of Electronic Reporting System [ERS]" and the progress report letter dated December 17, 2000).
- 2) *Monthly or Quarterly Reporting Requirements*: For each reporting period (monthly or quarterly as specified in the MRP), the Discharger shall submit an electronic SMR to the Regional Water Board in accordance with the provisions of Section V.C.1.a-e, except for requirements under Section V.C.1.c(1) where ERS does not have fields for dischargers to input certain information (e.g., sample time). However, until U.S. EPA approves the electronic signature or other signature technologies, dischargers that use ERS shall submit a hard copy of the original transmittal letter, an ERS printout of the data sheet, and a violation report (a receipt of the electronic transmittal shall be retained by the Discharger). This electronic SMR submittal suffices for the signed tabulations specified under Section V.C.1.c(1).
- 3) *Annual Reporting Requirements*: Dischargers who have submitted data using the ERS for at least one calendar year are exempt from submitting the portion of the annual report required under Section V.C.1.f(1) and (3).

D. Compliance Schedules – Not supplemented

E. Twenty-Four Hour Reporting – This section supplements V.E of Standard Provision (Attachment D)

1. Spill of Oil or Other Hazardous Material Reports

- a. Within 24 hours of becoming aware of a spill of oil or other hazardous material that is not contained onsite and completely cleaned up, the Discharger shall report by telephone to the Regional Water Board at (510) 622-2369.
- b. The Discharger shall also report such spills to the State Office of Emergency Services [telephone (800) 852-7550] only when the spills are in accordance with applicable reporting quantities for hazardous materials.
- c. The Discharger shall submit a written report to the Regional Water Board within five working days following telephone notification unless directed otherwise by Regional Water Board staff. A report submitted electronically is acceptable. The written report shall include the following:
 - 1) Date and time of spill, and duration if known;

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- 2) Location of spill (street address or description of location);
- 3) Nature of material spilled;
- 4) Quantity of material involved;
- 5) Receiving water body affected, if any;
- 6) Cause of spill;
- 7) Estimated size of affected area;
- 8) Observed impacts to receiving waters (e.g., oil sheen, fish kill, water discoloration);
- 9) Corrective actions taken to contain, minimize, or clean up the spill;
- 10) Future corrective actions planned to be taken to prevent recurrence, and schedule of implementation; and
- 11) Persons or agencies notified.

2. Unauthorized Discharges from Municipal Wastewater Treatment Plants¹

The following requirements apply to municipal wastewater treatment plants that experience an unauthorized discharge at their treatment facilities and are consistent with and supercede requirements imposed on the Discharger by the Executive Officer by letter of May 1, 2008, issued pursuant to California Water Code Section 13383.

a. Two (2)-Hour Notification

For any unauthorized discharges that result in a discharge to a drainage channel or a surface water, the Discharger shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services (telephone 800-852-7550), the local health officers or directors of environmental health with jurisdiction over the affected water bodies, and the Regional Water Board. The notification to the Regional Water Board shall be via the Regional Water Board's online reporting system at www.wbers.net, and shall include the following:

- 1) Incident description and cause;
- 2) Location of threatened or involved waterway(s) or storm drains;
- 3) Date and time the unauthorized discharge started;
- 4) Estimated quantity and duration of the unauthorized discharge (to the extent known), and the estimated amount recovered;

¹ California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

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- 5) Level of treatment prior to discharge (e.g., raw wastewater, primary treated, undisinfected secondary treated, and so on); and
- 6) Identity of the person reporting the unauthorized discharge.

b. 24-hour Certification

Within 24 hours, the Discharger shall certify to the Regional Water Board, at www.wbers.net, that the State Office of Emergency Services and the local health officers or directors of environmental health with jurisdiction over the affected water bodies have been notified of the unauthorized discharge.

c. 5-Day Written Report

Within five business days, the Discharger shall submit a written report, via the Regional Water Board's online reporting system at www.wbers.net, that includes, in addition to the information required above, the following:

- 1) Methods used to delineate the geographical extent of the unauthorized discharge within receiving waters;
- 2) Efforts implemented to minimize public exposure to the unauthorized discharge;
- 3) Visual observations of the impacts (if any) noted in the receiving waters (e.g., fish kill, discoloration of water) and the extent of sampling if conducted;
- 4) Corrective measures taken to minimize the impact of the unauthorized discharge;
- 5) Measures to be taken to minimize the chances of a similar unauthorized discharge occurring in the future;
- 6) Summary of Spill Prevention Plan or O&M Manual modifications to be made, if necessary, to minimize the chances of future unauthorized discharges; and
- 7) Quantity and duration of the unauthorized discharge, and the amount recovered.

d. Communication Protocol

To clarify the multiple levels of notification, certification, and reporting, the current communication requirements for unauthorized discharges from municipal wastewater treatment plants are summarized in Table B that follows.

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Table B
Summary of Communication Requirements for Unauthorized Discharges¹ from
Municipal Wastewater Treatment Plants

Discharger is required to:	Agency Receiving Information	Time frame	Method for Contact
1. Notify	California Emergency Management Agency (Cal EMA)	As soon as possible, but not later than 2 hours after becoming aware of the unauthorized discharge.	Telephone – (800) 852-7550 (obtain a control number from Cal EMA)
	Local health department	As soon as possible, but not later than 2 hours after becoming aware of the unauthorized discharge.	Depends on local health department
	Regional Water Board	As soon as possible, but not later than 2 hours after becoming aware of the unauthorized discharge.	Electronic ² www.wbers.net
2. Certify	Regional Water Board	As soon as possible, but not later than 24 hours after becoming aware of the unauthorized discharge.	Electronic ³ www.wbers.net
3. Report	Regional Water Board	Within 5 business days of becoming aware of the unauthorized discharge.	Electronic ⁴ www.wbers.net

¹ California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

² In the event that the Discharger is unable to provide online notification within 2 hours of becoming aware of an unauthorized discharge, it shall phone the Regional Water Board's spill hotline at (510) 622-2369 and convey the same information contained in the notification form. In addition, within 3 business days of becoming aware of the unauthorized discharge, the Discharger shall enter the notification information into the Regional Water Board's online system in electronic format.

³ In most instances, the 2-hour notification will also satisfy 24-hour certification requirements. This is because the notification form includes fields for documenting that OES and the local health department have been contacted. In other words, if the Discharger is able to complete all the fields in the notification form within 2 hours, certification requirements are also satisfied. In the event that the Discharger is unable to provide online certification within 24 hours of becoming aware of an unauthorized discharge, it shall phone the Regional Water Board's spill hotline at (510) 622-2369 and convey the same information contained in the certification form. In addition, within 3 business days of becoming aware of the unauthorized discharge, the Discharger shall enter the certification information into the Regional Water Board's online system in electronic format.

⁴ If the Discharger cannot satisfy the 5-day reporting requirements via the Regional Water Board's online reporting system, it shall submit a written report (preferably electronically in pdf) to the appropriate Regional Water Board case manager. In cases where the Discharger cannot satisfy the 5-day reporting requirements via the online reporting system, it must still complete the Regional Water Board's online reporting requirements within 15 calendar days of becoming aware of the unauthorized discharge.

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F. Planned Changes – Not supplemented

G. Anticipated Noncompliance – Not supplemented

H. Other Noncompliance – Not supplemented

I. Other Information – Not supplemented

VI. STANDARD PROVISION – ENFORCEMENT – Not Supplemented

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS – Not Supplemented

VIII. DEFINITIONS – This section is an addition to Standard Provisions (Attachment D)

More definitions can be found in Attachment A of this NPDES Permit.

1. Arithmetic Calculations

- a. Geometric mean is the antilog of the log mean or the back-transformed mean of the logarithmically transformed variables, which is equivalent to the multiplication of the antilogarithms. The geometric mean can be calculated with either of the following equations:

$$\text{Geometric Mean} = \text{Antilog} \left(\frac{1}{N} \sum_{i=1}^N \text{Log}(C_i) \right)$$

or

$$\text{Geometric Mean} = (C_1 * C_2 * \dots * C_N)^{1/N}$$

Where “N” is the number of data points for the period analyzed and “C” is the concentration for each of the “N” data points.

- b. Mass emission rate is obtained from the following calculation for any calendar day:

$$\text{Mass emission rate (lb/day)} = \frac{8.345}{N} \sum_{i=1}^N Q_i C_i$$

$$\text{Mass emission rate (kg/day)} = \frac{3.785}{N} \sum_{i=1}^N Q_i C_i$$

In which “N” is the number of samples analyzed in any calendar day and “Q_i” and “C_i” are the flow rate (MGD) and the constituent concentration (mg/L) associated with each of the “N” grab samples that may be taken in any calendar day. If a composite sample is taken, “C_i” is the concentration measured in the composite sample and “Q_i” is the average flow rate occurring during the period over which the samples are composited. The daily concentration of a constituent measured over any calendar day shall be determined from the flow-weighted average of the same constituent in the combined waste streams as follows:

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$$C_d = \text{Average daily concentration} = \frac{1}{Q_t} \sum_{i=1}^N Q_i C_i$$

In which “N” is the number of component waste streams and “Q” and “C” are the flow rate (MGD) and the constituent concentration (mg/L) associated with each of the “N” waste streams. “Q_t” is the total flow rate of the combined waste streams.

- c. Maximum allowable mass emission rate, whether for a 24-hour, weekly 7-day, monthly 30-day, or 6-month period, is a limitation expressed as a daily rate determined with the formulas in the paragraph above, using the effluent concentration limit specified in the permit for the period and the specified allowable flow.
- d. POTW removal efficiency is the ratio of pollutants removed by the treatment facilities to pollutants entering the treatment facilities (expressed as a percentage). The Discharger shall determine removal efficiencies using monthly averages (by calendar month unless otherwise specified) of pollutant concentration of influent and effluent samples collected at about the same time and using the following equation (or its equivalent):

$$\text{Removal Efficiency (\%)} = 100 \times [1 - (\text{Effluent Concentration} / \text{Influent Concentration})]$$

2. Biosolids means the solids, semi-liquid suspensions of solids, residues, screenings, grit, scum, and precipitates separated from or created in wastewater by the unit processes of a treatment system. It also includes, but is not limited to, all supernatant, filtrate, centrate, decantate, and thickener overflow and underflow in the solids handling parts of the wastewater treatment system.
3. Blending is the practice of recombining wastewater that has been biologically treated with wastewater that has bypassed around biological treatment units.
4. Bottom sediment sample is (1) a separate grab sample taken at each sampling station for the determination of selected physical-chemical parameters, or (2) four grab samples collected from different locations in the immediate vicinity of a sampling station while the boat is anchored and analyzed separately for macroinvertebrates.
5. Composite sample is a sample composed of individual grab samples collected manually or by an automatic sampling device on the basis of time or flow as specified in the MRP. For flow-based composites, the proportion of each grab sample included in the composite sample shall be within plus or minus five percent (+/-5%) of the representative flow rate of the waste stream being measured at the time of grab sample collection. Alternatively, equal volume grab samples may be individually analyzed with the flow-weighted average calculated by averaging flow-weighted ratios of each grab sample analytical result. Grab samples comprising time-based composite samples shall be collected at intervals not greater than those specified in the MRP. The quantity of each grab sample comprising a time-based composite sample shall be a set of flow proportional volumes as specified in the MRP. If a particular time-based or flow-based composite sampling protocol is not specified in the MRP, the Discharger shall determine and implement the most representative sampling protocol for the given parameter subject to Executive Officer approval.
6. Depth-integrated sample is defined as a water or waste sample collected by allowing a sampling device to fill during a vertical traverse in the waste or receiving water body being sampled. The Discharger shall collect depth-integrated samples in such a manner that the collected sample will be representative of the waste or water body at that sampling point.

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7. Flow sample is an accurate measurement of the average daily flow volume using a properly calibrated and maintained flow measuring device.
8. Grab sample is an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples represent only the condition that exists at the time the wastewater is collected.
9. Initial dilution is the process that results in the rapid and irreversible turbulent mixing of wastewater with receiving water around the point of discharge.
10. Overflow is the intentional or unintentional spilling or forcing out of untreated or partially treated wastes from a transport system (e.g., through manholes, at pump stations, and at collection points) upstream from the treatment plant headworks or from any part of a treatment plant facility.
11. Priority pollutants are those constituents referred to in 40 CFR Part 122 as promulgated in the Federal Register, Vol. 65, No. 97, Thursday, May 18, 2000, also known as the California Toxics Rule, the presence or discharge of which could reasonably be expected to interfere with maintaining designated uses.
12. Storm water means storm water runoff, snow melt runoff, and surface runoff and drainage. It excludes infiltration and runoff from agricultural land.
13. Toxic pollutant means any pollutant listed as toxic under federal Clean Water Act section 307(a)(1) or under 40 CFR 401.15.
14. Untreated waste is raw wastewater.
15. Waste, waste discharge, discharge of waste, and discharge are used interchangeably in the permit. The requirements of the permit apply to the entire volume of water, and the material therein, that is disposed of to surface and ground waters of the State of California.

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Table C
List of Monitoring Parameters and Analytical Methods

CTR No.	Pollutant/Parameter	Analytical Method ¹⁰	Minimum Levels ¹¹ (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
1.	Antimony	204.2					10	5	50	0.5	5	0.5		1000
2.	Arsenic	206.3				20		2	10	2	2	1		1000
3.	Beryllium						20	0.5	2	0.5	1			1000
4.	Cadmium	200 or 213					10	0.5	10	0.25	0.5			1000
5a.	Chromium (III)	SM 3500												
5b.	Chromium (VI)	SM 3500				10	5							1000
	Chromium (total) ¹²	SM 3500					50	2	10	0.5	1			1000
6.	Copper	200.9					25	5	10	0.5	2			1000
7.	Lead	200.9					20	5	5	0.5	2			10,000
8.	Mercury	1631 (note) ¹³												
9.	Nickel	249.2					50	5	20	1	5			1000
10.	Selenium	200.8 or SM 3114B or C						5	10	2	5	1		1000
11.	Silver	272.2					10	1	10	0.25	2			1000
12.	Thallium	279.2					10	2	10	1	5			1000
13.	Zinc	200 or 289					20		20	1	10			
14.	Cyanide	SM 4500 CN ⁻ C or I				5								
15.	Asbestos (only required for dischargers to MUN waters) ¹⁴	0100.2 ¹⁵												
16.	2,3,7,8-TCDD and 17 congeners (Dioxin)	1613												
17.	Acrolein	603	2.0	5										
18.	Acrylonitrile	603	2.0	2										
19.	Benzene	602	0.5	2										
33.	Ethylbenzene	602	0.5	2										
39.	Toluene	602	0.5	2										
20.	Bromoform	601	0.5	2										
21.	Carbon Tetrachloride	601	0.5	2										
22.	Chlorobenzene	601	0.5	2										
23.	Chlorodibromomethane	601	0.5	2										
24.	Chloroethane	601	0.5	2										

¹⁰ The suggested method is the U.S. EPA Method unless otherwise specified (SM = Standard Methods). The Discharger may use another U.S. EPA-approved or recognized method if that method has a level of quantification below the applicable water quality objective. Where no method is suggested, the Discharger has the discretion to use any standard method.

¹¹ Minimum levels are from the *State Implementation Policy*. They are the concentration of the lowest calibration standard for that technique based on a survey of contract laboratories. Laboratory techniques are defined as follows: GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; LC = High Pressure Liquid Chromatography; Color = Colorimetric; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; ICP = Inductively Coupled Plasma; ICPMS = Inductively Coupled Plasma/Mass Spectrometry; SPGFAA = Stabilized Platform Graphite Furnace Atomic Absorption (i.e., U.S. EPA 200.9); Hydride = Gaseous Hydride Atomic Absorption; CVAA = Cold Vapor Atomic Absorption; DCP = Direct Current Plasma.

¹² Analysis for total chromium may be substituted for analysis of chromium (III) and chromium (VI) if the concentration measured is below the lowest hexavalent chromium criterion (11 µg/l).

¹³ The Discharger shall use ultra-clean sampling (U.S. EPA Method 1669) and ultra-clean analytical methods (U.S. EPA Method 1631) for mercury monitoring. The minimum level for mercury is 2 ng/l (or 0.002 µg/l).

¹⁴ MUN = Municipal and Domestic Supply. This designation, if applicable, is in the Findings of the permit.

¹⁵ Determination of Asbestos Structures over 10 [micrometers] in Length in Drinking Water Using MCE Filters, U.S. EPA 600/R-94-134, June 1994.

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CTR No.	Pollutant/Parameter	Analytical Method ¹⁰	Minimum Levels ¹¹ (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
25.	2-Chloroethylvinyl Ether	601	1	1										
26.	Chloroform	601	0.5	2										
75.	1,2-Dichlorobenzene	601	0.5	2										
76.	1,3-Dichlorobenzene	601	0.5	2										
77.	1,4-Dichlorobenzene	601	0.5	2										
27.	Dichlorobromomethane	601	0.5	2										
28.	1,1-Dichloroethane	601	0.5	1										
29.	1,2-Dichloroethane	601	0.5	2										
30.	1,1-Dichloroethylene or 1,1-Dichloroethene	601	0.5	2										
31.	1,2-Dichloropropane	601	0.5	1										
32.	1,3-Dichloropropylene or 1,3-Dichloropropene	601	0.5	2										
34.	Methyl Bromide or Bromomethane	601	1.0	2										
35.	Methyl Chloride or Chloromethane	601	0.5	2										
36.	Methylene Chloride or Dichlorormethane	601	0.5	2										
37.	1,1,2,2-Tetrachloroethane	601	0.5	1										
38.	Tetrachloroethylene	601	0.5	2										
40.	1,2-Trans-Dichloroethylene	601	0.5	1										
41.	1,1,1-Trichloroethane	601	0.5	2										
42.	1,1,2-Trichloroethane	601	0.5	2										
43.	Trichloroethene	601	0.5	2										
44.	Vinyl Chloride	601	0.5	2										
45.	2-Chlorophenol	604	2	5										
46.	2,4-Dichlorophenol	604	1	5										
47.	2,4-Dimethylphenol	604	1	2										
48.	2-Methyl-4,6-Dinitrophenol or Dinitro-2-methylphenol	604	10	5										
49.	2,4-Dinitrophenol	604	5	5										
50.	2-Nitrophenol	604		10										
51.	4-Nitrophenol	604	5	10										
52.	3-Methyl-4-Chlorophenol	604	5	1										
53.	Pentachlorophenol	604	1	5										
54.	Phenol	604	1	1		50								
55.	2,4,6-Trichlorophenol	604	10	10										
56.	Acenaphthene	610 HPLC	1	1	0.5									
57.	Acenaphthylene	610 HPLC		10	0.2									
58.	Anthracene	610 HPLC		10	2									
60.	Benzo(a)Anthracene or 1,2 Benzanthracene	610 HPLC	10	5										
61.	Benzo(a)Pyrene	610 HPLC		10	2									
62.	Benzo(b)Fluoranthene or 3,4 Benzo(b)fluoranthene	610 HPLC		10	10									
63.	Benzo(ghi)Perylene	610 HPLC		5	0.1									
64.	Benzo(k)Fluoranthene	610 HPLC		10	2									
74.	Dibenzo(a,h)Anthracene	610 HPLC		10	0.1									
86.	Fluoranthene	610 HPLC	10	1	0.05									
87.	Fluorene	610 HPLC		10	0.1									
92.	Indeno(1,2,3-cd) Pyrene	610 HPLC		10	0.05									
100.	Pyrene	610 HPLC		10	0.05									
68.	Bis(2-Ethylhexyl)Phthalate	606 or 625	10	5										

Attachment G
Regional Standard Provisions, and Monitoring and Reporting Requirements (March 2010)

G-26

City of St. Helena
Wastewater Treatment and Reclamation Plant

ORDER No. R2-2016-0003
NPDES No. CA0038016

CTR No.	Pollutant/Parameter	Analytical Method ¹⁰	Minimum Levels ¹¹ (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
70.	Butylbenzyl Phthalate	606 or 625	10	10										
79.	Diethyl Phthalate	606 or 625	10	2										
80.	Dimethyl Phthalate	606 or 625	10	2										
81.	Di-n-Butyl Phthalate	606 or 625		10										
84.	Di-n-Octyl Phthalate	606 or 625		10										
59.	Benzidine	625		5										
65.	Bis(2-Chloroethoxy)Methane	625		5										
66.	Bis(2-Chloroethyl)Ether	625	10	1										
67.	Bis(2-Chloroisopropyl)Ether	625	10	2										
69.	4-Bromophenyl Phenyl Ether	625	10	5										
71.	2-Chloronaphthalene	625		10										
72.	4-Chlorophenyl Phenyl Ether	625		5										
73.	Chrysene	625		10	5									
78.	3,3'-Dichlorobenzidine	625		5										
82.	2,4-Dinitrotoluene	625	10	5										
83.	2,6-Dinitrotoluene	625		5										
85.	1,2-Diphenylhydrazine (note) ¹⁶	625		1										
88.	Hexachlorobenzene	625	5	1										
89.	Hexachlorobutadiene	625	5	1										
90.	Hexachlorocyclopentadiene	625	5	5										
91.	Hexachloroethane	625	5	1										
93.	Isophorone	625	10	1										
94.	Naphthalene	625	10	1	0.2									
95.	Nitrobenzene	625	10	1										
96.	N-Nitrosodimethylamine	625	10	5										
97.	N-Nitrosodi-n-Propylamine	625	10	5										
98.	N-Nitrosodiphenylamine	625	10	1										
99.	Phenanthrene	625		5	0.05									
101.	1,2,4-Trichlorobenzene	625	1	5										
102.	Aldrin	608	0.005											
103.	α-BHC	608	0.01											
104.	β-BHC	608	0.005											
105.	γ-BHC (Lindane)	608	0.02											
106.	δ-BHC	608	0.005											
107.	Chlordane	608	0.1											
108.	4,4'-DDT	608	0.01											
109.	4,4'-DDE	608	0.05											
110.	4,4'-DDD	608	0.05											
111.	Dieldrin	608	0.01											
112.	Endosulfan (alpha)	608	0.02											
113.	Endosulfan (beta)	608	0.01											
114.	Endosulfan Sulfate	608	0.05											
115.	Endrin	608	0.01											
116.	Endrin Aldehyde	608	0.01											
117.	Heptachlor	608	0.01											
118.	Heptachlor Epoxide	608	0.01											

¹⁶ Measurement for 1,2-Diphenylhydrazine may use azobenzene as a screen: if azobenzene is measured at >1 ug/l, then the Discharger shall analyze for 1,2-Diphenylhydrazine.

City of St. Helena
Wastewater Treatment and Reclamation Plant

ORDER No. R2-2016-0003
NPDES No. CA0038016

CTR No.	Pollutant/Parameter	Analytical Method ¹⁰	Minimum Levels ¹¹ (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
119-125	PCBs: Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260	608	0.5											
126.	Toxaphene	608	0.5											

Appendix C – SFBRWQCB Cease and Desist Order
No. R2-2016-0004



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

CEASE AND DESIST ORDER No. R2-2016-0004

**CITY OF ST. HELENA
WASTEWATER TREATMENT AND RECLAMATION PLANT
ST. HELENA, NAPA COUNTY**

WHEREAS the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), finds the following:

1. The City of St. Helena (Discharger) owns and operates the City of St. Helena Wastewater Treatment and Reclamation Plant (Plant), located at 1 Chaix/Thomann Lane, St. Helena. The Plant provides secondary treatment for domestic and commercial wastewater from the City of St. Helena. The Plant has an average dry weather treatment capacity of 0.5 million gallons per day (MGD) and can treat up to 2.8 MGD during wet weather. Plant treatment processes include a comminuter (solids grinder), a series of treatment ponds, chlorine disinfection, and dechlorination (by natural decomposition or ascorbic acid addition).
2. During dry weather conditions, the Plant discharges to spray irrigation fields in accordance with waste discharge requirements (Order No. 87-090). During wet weather, when the irrigation fields are saturated and discharge is necessary, the Plant discharges to the Napa River in accordance with NPDES permit No. CA0038016 (Order No. R2-2016-0003) (hereinafter, the 2016 Permit).
3. Basin Plan Table 4-1, Discharge Prohibition 1, prohibits discharges to non-tidal waters. The Napa River is non-tidal in the vicinity of St. Helena. Basin Plan section 4.2 provides for exceptions to Basin Plan Discharge Prohibition 1 under certain circumstances, including when an inordinate burden would be placed on a discharger relative to the beneficial uses protected, and an equivalent level of environmental protection can be achieved by alternate means. In reissuing the 2016 Permit, the Regional Water Board found that requiring the Discharger to build an outfall to tidal waters (over 40 miles away) or to not discharge under any circumstances, including wet weather, would impose an undue burden. In granting the exception to the discharge prohibition, the Regional Water Board determined that the Discharger must provide equivalent protection when discharging to the Napa River by ensuring that treated effluent meets the limits in Table 1 below. Therefore, the 2016 Permit imposed new, more stringent biochemical oxygen demand (BOD) and total suspended solids (TSS) effluent limits reflective of levels that can be met by implementing advanced secondary treatment:

Table 1: 2016 Permit BOD and TSS Effluent Limits

	Weekly Average	Monthly Average
BOD	25	15
TSS	20	15

Abbreviations:

BOD = biochemical oxygen demand
TSS = total dissolved solids

4. The Plant is currently designed to provide only secondary treatment, not advanced secondary treatment. Plant effluent monitoring data from January 2010 through August 2015 show many instances when the Discharger would not immediately comply with the 2016 Permit's new BOD and TSS effluent limits. Of 66 monthly results, 40 exceed the new monthly BOD limit and 58 exceed the new monthly TSS limit. Because samples were collected roughly weekly, individual results can be compared to the weekly average effluent limits. Of 162 results, 47 exceed the new weekly BOD limit and 95 exceed the new weekly TSS limits.
5. The Plant currently relies on a series of treatment ponds that use aerobic and anaerobic bacteria to reduce organic matter concentrations. To meet the 2016 Permit's new BOD and TSS effluent limits, the Discharger will likely need to incorporate filtration or another process into its treatment system. Such a process could offer an added benefit if the effluent met requirements for unrestricted recycled water use. In its May 2006 "Plant Upgrade and Water Recycling Design Memorandum," the Discharger identified about 65 acres of turf and 4,700 acres of vineyard area that could potentially be irrigated with recycled water. Of these 4,700 acres of vineyard area, 1,148 acres are within City of St. Helena limits.
6. In its March 2015 *Wastewater Facilities Evaluation Update* (Bennett Engineering Services), the Discharger described several potential modifications it could make to improve Plant performance. While the report did not analyze the feasibility of the various options to achieve advanced secondary treatment, it provided three recommendations: (1) construct solids management systems outside the treatment train to manage solids accumulation (in Pond 1) within design recommendations, (2) automate disinfection and dechlorination during river discharges, and (3) construct a rock filter system between Pond 3 and the disinfection facility to improve removal of TSS from algae growth in the ponds. If implemented, the construction of a rock filter system could facilitate compliance with the 2016 Permit's effluent limits.
7. Water Code section 13301 authorizes the Regional Water Board to issue a cease and desist order when it finds that a waste discharge is taking place, or threatening to take place, in violation of requirements or discharge prohibitions prescribed by the Regional Water Board.
8. Because the Discharger will violate or threatens to violate the effluent limits in the 2016 Permit shown in Table 1, this Cease and Desist Order is necessary to ensure that the Discharger achieves compliance. This Order establishes interim requirements and a time schedule for the Discharger to complete necessary actions to address its imminent and threatened violations.
9. Pursuant to Water Code section 13385(j)(3), mandatory minimum penalties required by Water Code sections 13385(h) and (i) do not apply when a discharger complies with a cease and desist order issued pursuant to Water Code section 13301 if the following conditions are met:
 - a. The cease and desist order specifies actions the discharger must take to correct the violations that would otherwise be subject to mandatory minimum penalties;
 - b. The discharger is unable to consistently comply with effluent limits because the effluent limits are new, more stringent, or modified regulatory requirements; new or modified

control measures are necessary to comply with the effluent limits; and the new or modified control measures cannot be designed, installed, and put into operation within 30 calendar days;

- c. The Regional Water Board establishes a time schedule of no more than five years for bringing the discharge into compliance. The time schedule must be as short as possible, taking into account the technological, operational, and economic factors that affect the design, development, and implementation of the control measures necessary to comply with the effluent limits. If the time schedule exceeds one year, it must include interim requirements and the dates for their achievement. The interim requirements must include effluent limits for the pollutants of concern and actions and milestones leading to compliance with the limits; and
- d. The discharger has prepared and is implementing in a timely and proper manner a pollution prevention plan pursuant to Water Code section 13263.3.

10. Based on Water Code section 13385(j)(3), mandatory minimum penalties required by Water Code sections 13385(h) and (i) do not apply for the following reasons:

- a. This Cease and Desist Order (Provisions 1 and 2 below) specifies actions the Discharger must take to correct the violations that would otherwise be subject to mandatory minimum penalties.
- b. As explained in Finding 4, above, the Discharger is unable to consistently comply with the new, more stringent effluent limits in the 2016 Permit. Moreover, any control measures necessary to comply with the effluent limits (described in Findings 5 and 6, above) cannot be designed, installed, and put into operation within 30 calendar days.
- c. This Cease and Desist Order (Provision 2, below) establishes a time schedule of no more than five years for bringing the discharge into compliance. The time schedule is as short as possible because it is the minimum amount of time necessary for the Discharger to modify or rebuild its treatment plant to comply with its effluent limits. As specified in Table 2, the Discharger must evaluate its potential alternatives, and then fund, design, and construct the selected alternative. These tasks are likely to take the allotted time specified in the schedule.

Although the time schedule exceeds one year, this Cease and Desist Order (Provisions 1 and 2, below) imposes interim requirements that include interim BOD and TSS effluent limits and actions and milestones leading to compliance with the limits.

- d. The Discharger has prepared and is implementing a pollution prevention plan pursuant to permit requirements. The Discharger's pollution prevention plan meets the substantive requirements of Water Code section 13263.3. The pollution prevention plan aims to reduce influent concentrations of all pollutants of concern.

11. The interim effluent limits in Table 2 are based on the NPDES permit effluent limits in place prior to adoption of the 2016 Permit (i.e., those in Order No. R2-2010-0105). They are

intended to ensure that the Discharger maintains at least its existing performance while completing all tasks the time schedule requires.

12. This Cease and Desist Order is an enforcement action and, as such, is exempt from the provisions of the California Environmental Quality Act (Public Resources Code § 21000 et seq.) in accordance with Title 14 of the California Code of Regulations, section 15321.
13. The Regional Water Board notified the Discharger and other interested parties of its intent to consider adoption of this Cease and Desist Order and provided an opportunity to submit written comments and appear at a public hearing. The Regional Water Board, in a public hearing, heard and considered all comments.

IT IS HEREBY ORDERED, in accordance with Water Code section 13301, that the Discharger shall cease and desist from discharging and threatening to discharge wastes in violation of its NPDES permit by complying with the following provisions:

1. **Interim Effluent Limitations.** The Discharger shall comply with the following interim effluent limits:

Table 2: Interim BOD and TSS Effluent Limits

	Weekly Average (mg/L)	Monthly Average (mg/L)
BOD	45	30
TSS	45	30

Unit:

mg/L = milligrams per liter

Abbreviations:

BOD = biochemical oxygen demand

TSS = total dissolved solids

2. **Tasks and Time Schedule.** The Discharger shall complete the actions listed in Table 3 in accordance with the time schedule provided therein. The Discharger shall implement all actions set forth for each deliverable. Upon a written request from the Discharger, with justification, the Executive Officer may modify the deadlines for tasks 2.e through 2.g to account for delays beyond the reasonable control of the Discharger, such as permitting delays by other agencies.

Table 3: Tasks and Time Schedule

Task	Deadline
a. Submit a Draft Feasibility Study that analyzes various options to meet the NPDES permit effluent limits in Table 1. The study shall analyze all of the options described in the March 2015 <i>Wastewater Facilities Evaluation Update</i> and include other options that would achieve compliance. For each option considered, evaluate (i) the anticipated effectiveness and reliability of the treatment, (ii) the amount of time it will take to implement, (iii) the ability to produce recycled water (recycled water uses to be considered shall include those that offset local potable water use or provide environmental enhancement, including but not limited to turf and vineyard irrigation) or the additional efforts required to produce such recycled water, and (iv) the costs.	September 1, 2016
b. Submit a Final Feasibility Study that addresses any Executive Officer comments on the Draft Feasibility Study and identifies a preferred option.	December 1, 2016

Task	Deadline
c. Submit a Draft Workplan for implementation of the preferred option identified in task 2.b and a schedule for implementation. Include a plan and schedule for funding the project.	June 1, 2017
d. Submit a Final Workplan that addresses any Executive Officer comments on the Draft Workplan required by task 2.c.	September 1, 2017
e. Submit notification documenting the beginning of implementation of the Final Workplan.	March 1, 2019
f. Submit documentation of the completion of Final Workplan implementation and begin operation of the new or modified treatment system.	September 1, 2020
g. Submit a report evaluating the effectiveness of the new or modified treatment system and whether it is likely to meet the requirements of the NPDES permit. If the system appears unlikely to meet the requirements of the NPDES permit, identify and implement measures to ensure compliance.	December 1, 2020
h. Achieve full compliance with the 2016 Permit effluent limits listed in Table 1 of this Cease and Desist Order.	February 28, 2021

3. **Consequences of Non-Compliance.** If the Discharger fails to comply with the provisions of this Cease and Desist Order, the Executive Officer is hereby authorized to request the Attorney General to take appropriate actions against the Discharger in accordance with Water Code sections 13331 and 13350. Such actions may include judicial injunctive and civil remedies and/or administrative civil liabilities.
4. **Force Majeure.**¹ If the Discharger is delayed, interrupted, or prevented from meeting the provisions and time schedules of this Cease and Desist Order due to a force majeure, the Discharger shall notify the Executive Officer in writing within ten days of the date the Discharger first knows of the force majeure. The Discharger shall demonstrate that timely compliance with the Cease and Desist Order or any affected deadlines will be actually and necessarily delayed, and that it has taken measures to avoid or mitigate the delay by exercising all reasonable precautions and efforts, whether before or after the occurrence of the force majeure.
5. **Mandatory Minimum Penalties.** Violations of the NPDES permit effluent limits listed in Table 1 shall not be subject to the mandatory minimum penalties required by Water Code sections 13385(h) and (i) as long as the Discharger complies with this Cease and Desist Order in its entirety. If the Discharger fails to comply with this Cease and Desist Order in any way, including but not limited to any interim effluent limit in Table 2 or any requirement of Table 3, the Discharger shall be subject to mandatory minimum penalties for all NPDES permit violations for the entire calendar month during which the Cease and Desist Order non-compliance occurs. If the Discharger returns to compliance, violations of the NPDES permit

¹ A “force majeure” is an event that could not have been anticipated by and is beyond the control of the Discharger, such as an act of God; earthquake, flood, or other natural disaster; civil disturbance or strike; fire or explosion; declared war within the United States; embargo; or other event of similar import and character. “Force majeure” does not include delays caused by funding, contractor performance, equipment delivery and quality, weather, permitting, other construction-related issues, CEQA challenges, initiative litigation, adverse legislation, or legal matters (with the exception of an injunction issued by a court of law specifically preventing construction from occurring).

effluent limits in Table 1 shall again not be subject to mandatory minimum penalties as of the first day of the month following the return to full compliance.

- 6. Effective Date.** This Cease and Desist Order shall become effective on the effective date of the 2016 Permit.

I, Bruce H. Wolfe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Cease and Desist Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on January 13, 2016.

Bruce H. Wolfe
Executive Officer

Appendix D – City of St. Helena WWTP – Alternatives Feasibility Technical Memorandum





Memorandum

To: Steve Palmer, City of St. Helena
Michael Sample, City of St. Helena

Ref. No.: 1110776

From: Michelle Trinh, GHD
Alex Culick, GHD
Ladan Holakoo, GHD

Date: June 28, 2016

Re: City of St. Helena WWTP – Alternatives Feasibility Technical Memorandum

1. Introduction

The City of St. Helena (City) owns and operates a Wastewater Treatment and Reclamation Plant (WWTRP), located at 1 Chaix/Thomann Lane in St. Helena, Napa County. The WWTRP and its discharge are permitted through the San Francisco Bay Regional Water Quality Control Board (Regional Board). The City has a current Water Reclamation Requirements (WRR) Order No. 87-090 to regulate effluent discharge to land and a National Pollutant Discharge Elimination System (NPDES) Permit Order No. R2-2016-0003 to regulate discharge to the Napa River. The NPDES permit was renewed in March 2016. A copy of these permits may be found in Appendix A.

The WWTRP was constructed in 1967 and consists of a series of five ponds that provides secondary level treatment, followed by either direct discharge to the Napa River or irrigation disposal on City owned grass fields, redwood/willow trees, and mosquito fish ponds. The WWTRP utilizes Type I and Type 2 Advanced Integrated Pond Systems (AIPS) which include pond anaerobic digesters for waste contact and treatment, followed by natural aerobic and facultative pond treatment processes and storage. The final effluent is chlorinated and dechlorinated prior to disposal. The WWTRP has a design average dry weather flow of 0.5 million gallons per day (MGD) and a peak wet weather flow of nearly 3 MGD. In 2015, the WWTRP discharged approximately 85 MG of reclaimed water for irrigation. No discharge was sent to the Napa River in 2015. Figure 1 shows the existing WWTRP and pond system. Figure 2 shows the existing process flow diagram.

Figure 1. Existing WWTRP and Ponds

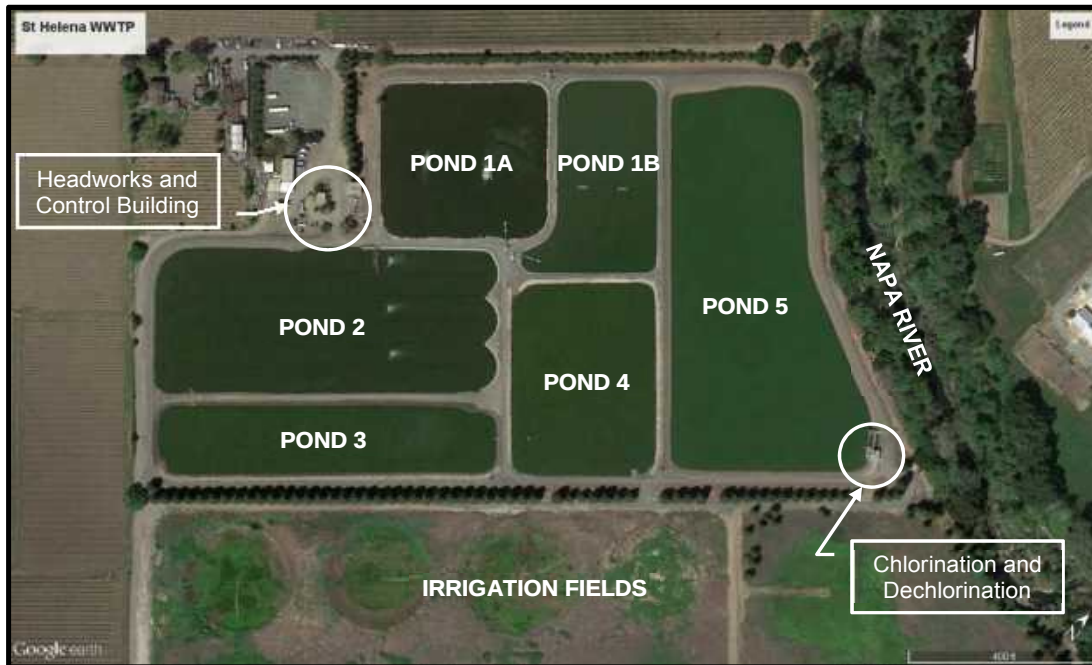
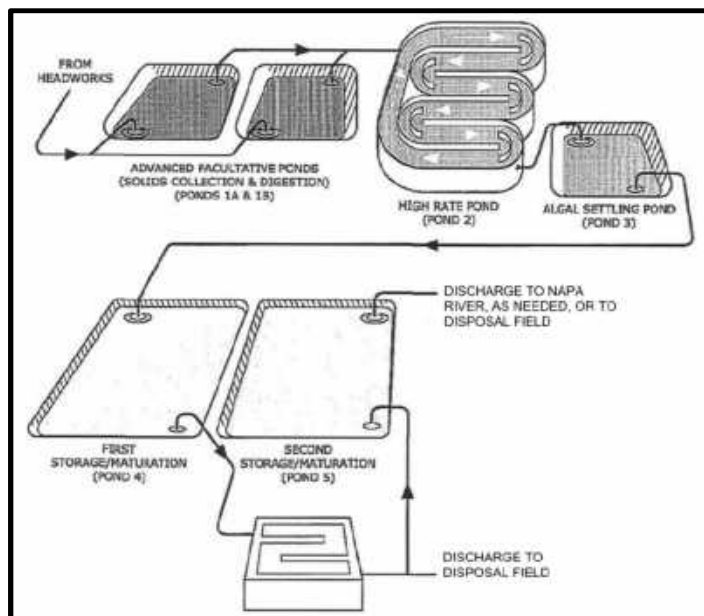


Figure 2. Process Flow Diagram



Reference:

Wastewater Treatment and Reclamation Plant Wastewater Facilities Evaluation Update (Bennett Engineering Services, 2015)

The 2015 NPDES permit contains more stringent effluent limits for biological oxygen demand (BOD) and total suspended solids (TSS), which the WWTRP anticipates that it would have difficulty meeting based on historical testing. As a result, the Regional Board also issued a Cease and Desist Order (CDO) No. R2-2016-0004 to the City containing interim BOD and TSS effluent limits, required report submittals, and a schedule for the City to make modifications to the WWTRP in order to meet the new effluent limits. As a first step, the CDO requires the submittal of a Draft Feasibility Study by September 1, 2016. A copy of the CDO is included in Appendix B.

The City is working towards solving the compliance issues at the WWTRP. The following section describes the initial steps required and the purpose and scope of this Technical Memorandum (TM).

1.1 Purpose and Scope

The purpose of this TM is to briefly reassess the alternatives developed in previous reports (see Section 2.1) and recommend the alternatives that are most likely to meet the new NPDES permit requirements. The information in the TM will be incorporated into the Draft Feasibility Study as the introductory and background information chapters. Only the recommended alternatives will be analyzed further per the CDO requirements and from a pre-design standpoint.

This TM provides a conceptual overview of the following items:

- J Existing effluent discharge compliance issues,
- J Summarize previous alternatives for improvements at the WWTRP and assess the feasibility of those alternatives,
- J Identify new alternatives for improvements at the WWTRP to meet compliance with the current NPDES permit and CDO,
- J Recommend alternatives for further analysis in the Draft Feasibility Study.

2. Background

2.1 Information Review

The following documents were reviewed in order to assess the feasibility of previous alternatives:

- J Wastewater Treatment and Reclamation Plant Wastewater Facilities Evaluation Update (Bennett Engineering Services, 2015), herein referred to as the 2015 Facilities Evaluation,
- J WWTRP Upgrades and Water Recycling Project Design Memorandum (West Yost Associates, 2006), herein referred to as the 2006 WWTRP Design Memo.
- J Wastewater Treatment & Reclamation Plant / Collection System Facilities Status and Planning (City of St. Helena, 2014), herein referred to as the PW Report.

2.2 NPDES and CDO Effluent Limits

The effluent limits for the previous NPDES permit, current NPDES permit, and WRR are summarized in Table 2.1 through Table 2.3. Interim effluent limits from the CDO are included in Table 2.4.

Table 2.1 Waste Discharge Effluent Limits through February 29, 2016

Parameter	Units	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
BOD ₅	mg/L	30	45	-	-	-
TSS	mg/L	30	45	-	-	-
Oil and Grease	mg/L	10	-	20	-	-
pH	s.u.	-	-	-	6.5	8.5
Chlorine, Total Residual	mg/L	-	-	-	-	0.0+
Copper	µg/L	14	-	24	-	-
Cyanide	µg/L	15	-	30	-	-
Bis(2-ethylhexyl)phthalate	µg/L	3.0	-	6.0	-	-
Total Ammonia as N	mg/L	16	-	39	-	-
Dioxin-TEQ	µg/L	1.3×10^{-8}	-	2.6×10^{-8}	-	-

Additional effluent discharge requirements in the NPDES permit include:

-) BOD and TSS - 85 Percent Removal: The concentration-based average monthly percent removal of BOD and TSS shall not be less than 85 percent
-) Total Coliform Bacteria: Treated wastewater shall meet the following limits of bacteriological quality:
 - (1) The five-sample moving median value for the most probable number (MPN) of total coliform bacteria shall not exceed 23 MPN/100 mL; and
 - (2) No single sample shall exceed 240 MPN/100 mL.
-) Whole Effluent Acute Toxicity - survival of organisms in undiluted combined effluent shall be:
 - (1) A three-sample median value of not less than 90 percent survival, and
 - (2) Any single sample not less than 70 percent survival.

Table 2.2 Waste Discharge Effluent Limits through February 28, 2021

Parameter	Units	Average Monthly	Average Weekly	Maximum daily	Instantaneous Minimum	Instantaneous Maximum
BOD ₅	mg/L	15	25	-	-	-
TSS	mg/L	15	20	-	-	-
Oil and Grease	mg/L	10	-	20	-	-
pH	s.u.	-	-	-	6.5	8.5
Chlorine, Total Residual	mg/L	-	-	-	-	0.0
Copper	µg/L	8.3	-	17	-	-
Cyanide	µg/L	15	-	30	-	-
Total Ammonia	mg/L as N	16	-	39	-	-

Table 2.3 WRR Waste Discharge Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Maximum daily	Instantaneous Minimum	Instantaneous Maximum
BOD	mg/L	-	-	-	-	40
Dissolved Oxygen	mg/L	-	-	-	-	1.0
Dissolved Sulfides	mg/L	-	-	-	-	0.1

Additional effluent discharge requirements in the WRR permit include:

-) Total Coliform Bacteria:
 - (1) The median number of total coliform organisms shall not exceed 23 MPN/100 ml as determined from the bacteriological results of the last seven days from which analyses have been completed
 - (2) The number of total coliform organisms shall not exceed 240 MPN/100 ml in any two consecutive samples.

The current NPDES effluent discharge limits for BOD, TSS, and copper decreased compared to the previous limits (shown as bolded and italicized in Table 2.2). All other discharge requirements in the NPDES permit remain the same. No changes were made to the WRR effluent limits. The interim discharge effluent limits from the CDO will remain in effect until February 28, 2021, at which point full compliance with the NPDES permit is required.

Table 2.4 Interim Discharge Effluent Limits

Parameter	Units	Average Monthly	Average Weekly
BOD	mg/L	30	45
TSS	mg/L	30	45

3. Previous Alternatives

Previous studies conducted by West Yost Associates, Wallace Group, Oswald Green, and Bennett Engineering Services from 1985 to 2015 discussed several recommended improvements to WWTRP. These alternatives included:

-) Deepen Fermentation Cell in Pond 1A
-) Convert Entire System to Activated Sludge Treatment
-) Convert Pond 2 to Type 2 AIPS
-) Convert Pond 3 to Aerated Treatment Unit
-) Cover Pond 3
-) Convert Pond 4 to Rock Filter
-) Convert Pond 4 to Constructed Wetlands
-) DAF System
-) Solids Management
-) Split Pond 3 into Two Ponds in Series
-) Disinfection System Improvements and Automation
-) Recycled Water

The alternatives, feasibility of the alternatives, and effectiveness of the alternatives to meet the NPDES and CDO requirements are described below.

3.1 Deepen Fermentation Cell in Pond 1A

Alternative: Deepen the anaerobic fermentation cell in Pond 1A in order to increase the pond's treatment capacity.

Feasibility: The treatment capacity would increase, however, the effluent quality with respect to TSS and BOD would not be improved, so this alternative is not considered feasible.

3.2 Convert Entire System to Activated Sludge Treatment

Alternative: Convert Pond 1A to an activated sludge treatment system. Convert 1B and part of Pond 5 to covered sludge digesters. Convert the remaining ponds to equalization storage. These changes were expected to address capacity and effluent quality issues.

Feasibility: Converting the entire system to an activated sludge process would increase treatment capacity and improve effluent quality; however, this would be a major revision to the system in terms of construction and operation. The construction, operations and maintenance costs for an activated sludge system are significantly higher than for pond systems (exceeding \$20 million for construction, 2015 Facilities Evaluation). Also, a more advanced treatment system, such as activated sludge treatment, is not required in order to meet the new effluent discharge limits for BOD and TSS. Activated sludge treatment is more appropriate for meeting nitrogen and phosphorous limits. This alternative is not considered feasible.

3.3 Convert Pond 2 to Type 2 AIPS

Alternative: Convert Pond 2 into two parallel Type 2 AIPS in order to increase system capacity and improvement effluent quality. These ponds would be mechanically aerated.

Feasibility: Based on the flow projections from the PW Report and 2015 Facilities Evaluation, the WWTRP does not need to increase its rated capacity. Modifications are required only to enhance the effluent quality with respect to TSS and BOD. This alternative would not improve the effluent quality in order to meet the effluent discharge limits for TSS and BOD, and is not recommended.

3.4 Convert Pond 3 to Aerated Treatment Unit

Alternative: Convert Pond 3 to an aerated treatment pond using mechanical aerators or diffused air systems in order to improve effluent quality and increase algae removal.

Feasibility: As described in 2015 Facilities Evaluation, this process has not yet been tested, and therefore, it should not be implemented.

3.5 Cover Pond 3

Alternative: Cover Pond 3 with a synthetic floating liner or floating balls and add diffused aeration in order to improve effluent quality and increase algae removal.

Feasibility: Covering Pond 3 would inhibit sunlight from entering the water and, therefore, prevent algal growth. Algae would ultimately die-off and settle out in the pond. However, finer algae particles may not settle efficiently, so it is uncertain whether this alternative would meet the effluent TSS and BOD limit of 15 mg/L. Adding diffused aeration to the pond may help improve algae digestion, but it would also decrease algae settling. This alternative was estimated to cost up to \$600,000 (2015 Facilities Evaluation). The cost is considered reasonable, and the implementation is considered fast and simple. However, it is uncertain whether this alternative would be effective in achieving sufficient algae removal. Therefore, this alternative is not recommended.

3.6 Convert Pond 4 to Rock Filter

Alternative: Convert Pond 4 into a rock filter in order to remove algae and decrease the TSS. The rock filter would consist of modular cells so that a cell could be taken out of a service without impacting the other cells.

Feasibility: Many studies have proposed using rock filters downstream of pond filters in order to improve the pond effluent quality. However, as presented in the attached paper (Barnard et al., WEFTEC 2010, Appendix C), at least two plants have shown that algae still passes through the rock filters. This results in effluent BOD and TSS levels well beyond the 15 mg/L required in the NPDES permit. A modified version of this alternative has proven to be highly effective at removing algae, BOD and TSS, and is further discussed in Section 4.

3.7 Convert Pond 4 to Constructed Wetlands

Alternative: Convert Pond 4 to a constructed wetland polishing system in order to removal algae and decrease the TSS and nutrient concentrations from the pond effluent.

Feasibility: Per GHD experience, this alternative is a feasible and well proven system to remove solids, carbon, nitrogen, and pathogens. This alternative is further discussed in Section 4.

3.8 DAF System

Alternative: Construct a dissolved air flotation (DAF) unit to reduce TSS in the effluent.

Feasibility: The use of a DAF unit to improve the effluent quality seems feasible and simple to implement. However, a DAF system would require chemical flocculants, dewatering of the continuously generated waste sludge, and waste hauling to a municipal land fill. These items add additional costs and complexity to the operation, maintenance and management of the system and is not recommended.

3.9 Solids Management

Alternative: Construct two solids management ponds outside of the treatment train. One pond would be taken out of service at a time for dewatering, while the other pond remains in service and is not overloaded. Bypass piping from Pond 1B to the new solids management ponds would be constructed for wet weather flows.

Feasibility: Plant staff indicated that it is very difficult to move sludge from one pond to another pond. The sludge is very thick and existing transfer sumps and piping are undersized. Plant staff do not utilize the existing transfer options to move sludge and would prefer options to dewater the sludge in place. This option is not considered feasible for enhancing treatment to meet the new effluent requirements in the NPDES permit. However, it is considered an operational management issue and will be reviewed and evaluated under future work related to the WWTRP.

3.10 Split Pond 3 into Two Ponds in Series

Alternative: Solids and algae are not settling well in Pond 3 and are conveyed downstream into Pond 4. This affects the level of BOD and TSS in the effluent. Splitting Pond 3 into two ponds that are operated in

series may prevent solids from traveling across the entire pond due to wind or currents. Solids removal or maintenance can be done in one pond while the other pond remains in service.

Feasibility: This alternative may help a little to remove solids from the effluent stream; however, it is not considered a significant enough treatment to meet the new effluent requirements in the NPDES permit. This alternative will be reviewed and evaluated under future work related to the WWTRP.

3.11 Disinfection System Improvements and Automation

Alternative: The chlorine disinfection, dechlorination, and monitoring system are manually operated. This is time consuming and doesn't allow for instantaneous chemical dose adjustments based on effluent flow or constituents in the effluent. Plant staff have also recently noted that coliform readings are inconsistent, leading to occasional effluent discharge violations. The alternative includes installing automated chlorine residual monitoring equipment and dechlorination chemical dosing equipment based on effluent flow.

Feasibility: This option is feasible in order to improve system reliability and operations. However, it does not improve effluent quality related to BOD, TSS, and coliform.

3.12 Recycled Water

Alternative: The CDO requires that the City evaluate the ability to produce recycled water in order to offset local potable water use or provide environmental enhancement. Examples of such uses include turf and vineyard irrigation. The 2006 WWTRP Design Memo presented several options to develop Title 22 Tertiary unrestricted recycled water for effluent discharge to the Napa River, spray irrigation to the existing fields, or conveyed offsite. All of the recommended options Title 22 included cloth disk media filtration with or without a combination of other treatment systems, such as wetlands, coagulation and dissolved air flotation. The recycled water would potentially be used for landscape irrigation (turf / non-turf) or agricultural irrigation (vineyards) inside and outside the City limits, however, the City preferred distribution within City limits only. It was assumed that all City owned land receiving irrigation or potentially receiving irrigation would receive recycled water, at a potential demand of 143 AFY. Privately owned properties with landscape irrigation could contribute another 71 AFY of demand. It was assumed that approximately 1/3 of agricultural lands would receive recycled water, at a potential demand of 190 AFY. The total estimated recycled water demand within City limits was approximately 400 AFY.

Feasibility: The potential recycled water demand stated in the 2006 WWTRP Design Memo is likely much higher than actual recycled water demands. Many vineyards have their own groundwater supply sources and use much less water per acre than turf at 0.5 af/ac versus 3.3 af/ac, according to the 2006 WWTRP Design Memo, therefore, they may not have the incentive to pay for recycled water. Additionally, some vineyards have their own onsite treatment system that produces a reusable effluent discharge that is applied onsite. Therefore, these vineyards may already have a sufficient water supply. The privately owned properties are also irrigating using groundwater and may also not have the incentive to pay for recycled water. It would not be cost effective for the City to invest in the treatment and distribution infrastructure required to produce and deliver recycled water to customers within the City limits. It would be more cost effective to continue discharging the secondary effluent to the irrigation fields, or plant a high water demand plant, such as turf, in order to increase the demand for the discharged effluent. Additional cost information will be developed in the Draft Feasibility Study related to potential recycled water use and distribution.

4. New Alternatives

Two new alternatives were developed to specifically address the current NPDES permit requirements. These alternatives include:

-) Rock Filter with Bypass Flow
-) Convert Pond 4 to Constructed Wetlands

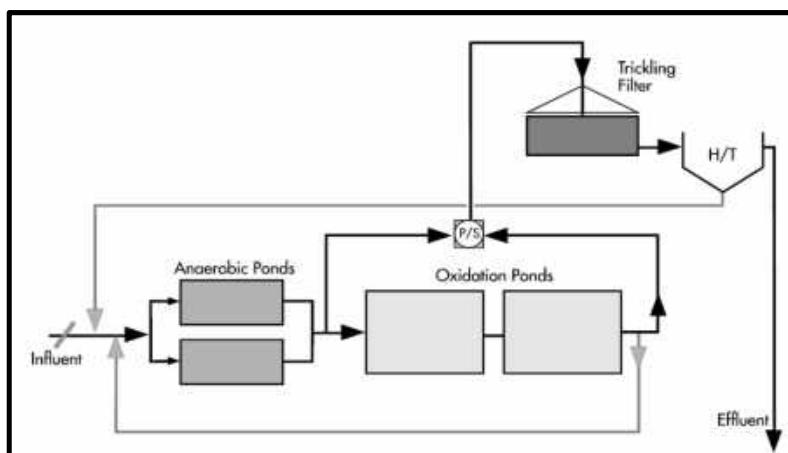
4.1 Rock Filter with Bypass Flow

Based on prior GHD experience and a review of previously constructed rock filters, it is recommended to utilize a hybrid design that continues to use the existing stabilization ponds and is followed by new rock/media filters and a settling tank in order to achieve enhanced biological degradation and polishing of the final effluent. This alternative has low capital costs and low operations and maintenance costs by using the existing facility as part of the treatment process.

The proposed configuration will effectively remove algae, BOD and TSS. While the project scope does not require further nitrogen removal, this process would also achieve significant levels of nitrification. If future standards included more stringent limits on nitrogen in the effluent discharge, then denitrification and up to 85% nitrogen removal may be achieved by recycling filter effluent to the facultative ponds (Ponds 1A and 1B). Preliminary sizing of the rock filter and the settling tank will be completed as part of the Draft Feasibility Study.

The proposed treatment process is shown in Figure 3. The design originates from the patented PETRO process (Pond Enhanced Treatment and Operation), which combines a fermentation pond (Pond 1A and 1B), oxidation ponds (Pond 2), a rock filter and a settling tank. It is critical to bypass between 15% and 50% of the effluent from the facultative ponds (Ponds 1A and 1B) directly to the rock filters in order to effectively remove algae, BOD and TSS. Without the bypass flow, algae would still pass through the rock filters. The bypass flow provides a substrate to stimulate heterotrophic bacterial growth that forms a biofilm on the rock media. The biofilm is able to adsorb, immobilize and retain a significant percentage of the applied algae. The biofilm/algae combination augments the overall purification process. In addition to the enhanced algae, BOD and TSS removal, the bypass from Pond 1A and 1B consists of a readily degradable organic substrate which would oxidize rapidly and result in improved nitrification. Humus sludge from the filters can also be pumped back to the fermentation pit in Pond 1A for stabilization, thus minimizing sludge handling.

Figure 3. Proposed Hybrid Process Based on PETRO Process



Reference: Recovery of Algae from Pond Treatment Systems (Barnard, Holakoo, and Meiring, WEFTEC 2010)

4.2 Convert Pond 4 to Constructed Wetlands

Based on prior GHD experience, it is concluded that constructed wetlands are able to provide improved effluent quality and robustness to the current pond system operation. The wetlands can uptake nutrients, reducing the overall loading and provide a higher quality effluent for disposal. Effluent from the secondary treatment ponds would be diverted into two parallel wetlands potentially located in a modified Pond 4. The required area of the constructed wetland will be determined as part of the Draft Feasibility Study.



Figure 4. Constructed Wetlands

The wetlands would provide additional treatment through a series of physical, chemical, and biological mechanisms. Constructed wetlands are typically fully vegetated, although they may have some open water, and operate within a depth range of one to five feet of slow moving water. Slow moving water promotes settling of fine materials that may not settle in the previous secondary treatment ponds, improving effluent quality to something on the order of 10 mg/l for BOD and TSS. Wetland plants block entering water from sunlight, reducing algal growth. In addition, vegetative growth provides oxygen to the water column and substantial underwater surface area acting as growth media for biological organisms,

which decompose wastewater pollutants. Finally during windy periods, wetland plants shield the water surface, reducing the potential for mixing the water column and churning settled solids. During winter months, the upper portions of wetland plants recede. However, rhizomes will resprout the following spring. Accumulated plant mass, beneath the water surface, continually provides a growing media for bacteria and microorganisms that decompose wastewater. The wetlands can uptake nutrients, reducing the overall loading and provide a higher quality effluent for disposal. In addition, birds, frogs and other aquatic organisms will relocate to the wetland areas, creating rich biological diversity and curb mosquito growth.

5. Summary and Recommendations

The alternatives and recommendations are included below.

5.1 Summary of Alternatives

Table 5.1 includes a summary of the alternatives.

Table 5.1 Alternatives Summary

Alternative	Feasible	Meets NDPES Discharge Limits
Deepen Fermentation Cell in Pond 1A	No	No
Convert Entire System to Activated Sludge Treatment	No	No
Convert Pond 2 to Type 2 AIPS	No	No
Convert Pond 3 to Aerated Treatment Unit	No	No
Cover Pond 3	Yes	No
Convert Pond 4 to Rock Filter	No	No
Convert Pond 4 to Constructed Wetlands	Yes	Yes
DAF System	No	No
Solids Management	No	No
Split Pond 3 into Two Ponds in Series	No	No
Disinfection System Improvements and Automation	Yes	No
Recycled Water	No	No
Rock Filter with Bypass Flow	Yes	Yes

5.2 Recommendations

It is recommended that the following alternatives be further evaluated in the Draft Feasibility Study:

-) Rock Filter with Bypass Flow
-) Convert Pond 4 to Constructed Wetlands

The Draft Feasibility will include pre-design criteria for the proposed alternatives, including sizing, configuration, and estimated costs.

Appendix E – Conceptual Wetland Sizing Calculations



Wastewater Treatment and Reclamation Plant Improvements Feasibility Study

Constructed Wetlands Design - Volumetric Model (Reed et al., 1995)

Project Name/ Site: St. Helena WWTRP - Wetlands Sizing (Volumetric Model) - Reed et al., 1995
 Project No.: 11110776

Date of Analysis: 4/12/2017
 Performed By: JC

Wastewater Characteristics

INFLUENT BOD, mg/L 51 per June 2016 data
 EFFLUENT BOD, mg/L 15 New discharge limit

Free Water Surface Wetlands Design Model (Reed et al., 1995)

Related Constants

First Order Reaction Rate Coefficient, 20 Degrees C	k20	0.678	The space occupied by submerged plant parts acts to reduce detention time compared to an empty basin of the same depth. Plants block a small fraction (0 to 5 percent), and standing dead and litter can add a comparable fraction of blockage, leading to a total of 0 to 10 percent. In combination this can result in wetland porosities from 0.65 to 0.75 where the lower value is associated with dense mature vegetation (Reed et. al. 1995).	In Crites (2014), range of porosity is suggested to be 0.70-0.90
Porosity of Wetland (Void Fraction)	n	0.8		

Design Parameters

Average Day Max (Table 7 in Feasibility Report)	Q	1,460,000 gpd	
Influent Wastewater BOD	Co	51 mg/L	
Effluent BOD Target	Ce	15 mg/L	
Design Temperature	t	4 Degrees C	
Detention Time	DT	4.585 Days	
Reaction Coefficient, Design Temp	kt	0.2669	
Design Depth	d	2 feet (typ range per Crites, 2014 is 0.3-0.6m)	
BOD Loading Rate		48.4 Lb/Ac/Day	Should be less than 89 lb/acre/day (Reed et al., 1995, p226)
		43.2 Kg/Ha/Day	
		621 lb/Day	
Hydraulic Loading Rate		4.3 in/day	

Conversions
7.48 gal/ft^3
43560 ft^2/acre
1000000 mg/kg
2.2046E-06 lb/mg
3.785 L/gal
14.29 (ft^3/Ac/Day)/(m^3/Ha/Day)
1.12 (kg/Ha/Day)/(Lb/Ac/Day)
264.17 gal/m^3
3.28 ft/m
4046.85 m^2/acre
24 hr/day
1.34 hp/kW
10.76 ft^2/m^2
453592.37 mg/lb

Calculated Outcomes

Removal Efficiency	e	70.59%	
Areal Requirement (eq 6.36)	As	12.84 Acres	559,367 square feet
Surface Area with Safety Factor	20%	15.41 Acres	

Wastewater Treatment and Reclamation Plant Improvements Feasibility Study
Constructed Wetlands Design - Volumetric Model - Crites et al., 1998

Project Name/ Site:	St. Helena WWTRP - Wetlands Sizing (Volumetric Model) - Crites et al., 1998	Date of Analysis:	4/12/2017
Project No.:	11110776	Performed By:	JC

Wastewater Characteristics

INFLUENT BOD, mg/L	51	per June 2016 data, effluent from Pond 3
EFFLUENT BOD, mg/L	15	New discharge limit
INFLUENT TSS, mg/L	37	per June 2016 data, effluent from Pond 3
EFFLUENT TSS, mg/L	15	New discharge limit

Free Water Surface Wetlands Design Model - Volumetric Model (Source: Natural Wastewater Treatment Systems 2nd Ed., Crites et al. 2014)

Related Constants

First Order Reaction Rate Coefficient, 20 Degrees C	k20	0.678
Porosity of Wetland (Void Fraction)	n	0.8

Design Parameters

Average Day Max (Table 7 in Feasibility Report)	Q	1,460,000 gpd	
		5527 m^3/d	
Influent Wastewater BOD	Co	51 mg/L	
Effluent BOD Target	Ce	15 mg/L	
Design Temperature	T	4 Degrees C	
Detention Time	DT	4.585 Days	
Temperature Coefficient at 20-deg C	θ	1.06	
Reaction Coefficient, Design Temp	kt	0.2669	
Design Depth	d	2 feet	
Portion of available hydraulic gradient used to provide the necessary head	m	0.2	
Resistance Factor	α	0.4	
Hydraulic Residence Time for BOD	t	4.6 days	
BOD Loading Rate		48.4 Lb/Ac/Day	Should be less than 89 lb/acre/day (Reed et al., 1995, p226)
		43.2 Kg/Ha/Day	
		621 lb/Day	
Hydraulic Loading Rate (HLR)		4.3 in/day	
		108 mm/day	
Estimated TSS Effluent Concentration based on cacluated Surface area and HLR		5.07 mg/L	less than new discharge limit of 15 mg/L

Conversions

7.48 gal/ft^3
43560 ft^2/acre
1000000 mg/kg
2.2046E-06 lb/mg
3.785 L/gal
14.29 (ft^3/Ac/Day)/(m^3/Ha/Day)
1.12 (kg/Ha/Day)/(Lb/Ac/Day)
264.17 gal/m^3
3.28 ft/m
4046.85 m^2/acre
24 hr/day
1.34 hp/kW
10.76 ft^2/m^2
453592.37 mg/lb

Calculated Outcomes

BOD Removal Efficiency	e_BOD	70.59%	
TSS Removal Efficiency	e_TSS	86.30%	
Surface Area Requirement for BOD	As_BOD	12.84 Acres	
Surface Area Requirement for TSS	As_TSS	9.47 Acres	
Surface Area with Safety Factor	20%	15.41 Acres	671,241 square feet
(The parameter that requires the largest treatment area for removal is the limiting design factor and should be selected)			62392.26 m^2
depth, meters	d	0.61 m	
Maximum Length	L	4415 m	
		14481 ft	
Width	W	46 ft	

Wastewater Treatment and Reclamation Plant Improvements Feasibility Study Constructed Wetlands Design - Areal Model (Kadlec and Knight, 1996)					
Project Name/ Site:		St. Helena WWTRP - Wetlands Sizing (Areal Model) - Kadlec and Knight (1996)		Date of Analysis:	4/12/2017
Project No.:		11110776		Performed By:	JC
Wastewater Characteristics					
INFLUENT BOD, mg/L	51	per June 2016 data, effluent from Pond 3			
EFFLUENT BOD, mg/L	15	New discharge limit			
INFLUENT TSS, mg/L	37	per June 2016 data, effluent from Pond 3			
EFFLUENT TSS, mg/L	15	New discharge limit			
Free Water Surface Wetlands Design Model - Areal Model (Source: Natural Wastewater Treatment Systems 2nd Ed., Crites et al. 2014)					
Related Constants					
First Order Reaction Rate Coefficient, 20 Degrees C	k20_BOD	34			
First Order Reaction Rate Coefficient, 20 Degrees C	k20_TSS	1000			
Porosity of Wetland (Void Fraction)	n	0.8			
Design Parameters					
Design Flow	Q	1,460,000 gpd	Conversions 7.48 gal/ft³ 43560 ft²/acre 1000000 mg/kg 2.2046E-06 lb/mg 3.785 L/gal 14.29 (ft³/Ac/Day)/(m³/Ha/Day) 1.12 (kg/Ha/Day)/(lb/Ac/Day) 264.17 gal/m³ 3.28 ft/m 4046.85 m²/acre 24 hr/day 1.34 hp/kW 10.76 ft²/m² 453592.37 mg/lb		
		2017262 m ³ /year			
BOD					
Influent Wastewater BOD	Co	51 mg/L			
Effluent BOD Target	Ce	15 mg/L			
Design Temperature	T	4 Degrees C			
Temperature Coefficient at 20-deg C	θ	1.00			
Reaction Coefficient, Design Temp	kt	34.0000			
Portion of available hydraulic gradient used to provide the necessary head					
Resistance Factor	m	0.2			
	α	0.4			
Background Concentration for Areal Model	C*	6.203			
Safety Factor	z	0.59			
BOD Loading Rate	15.0 Lb/Ac/Day	Should be less than 89 lb/acre/day (Reed et al., 1995, p226)			
	13.4 Kg/Ha/Day				
	621 lb/Day				
Surface Area Requirement	As	167831 m ²			
		41 acres			
Hydraulic Loading Rate (HLR)	1.3 in/day				
	34 mm/day				
TSS					
Influent Wastewater BOD	Co	37 mg/L			
Effluent BOD Target	Ce	21 mg/L			
Design Temperature	T	4 Degrees C			
Temperature Coefficient at 20-deg C	θ	1.00			
Reaction Coefficient, Design Temp	kt	1000.0000			
Background Concentration for Areal Model	C*	11.02			
Safety Factor	z	0.526			
Surface Area Requirement	As	13933 m ²			
		3 acres			
Estimated TSS Effluent Concentration based on calculated Surface area and HLR					
	4.48 mg/L	less than new discharge limit of 15 mg/L			
Calculated Outcomes					
BOD Removal Efficiency	e_BOD	70.59%			
TSS Removal Efficiency	e_TSS	87.90%			
Surface Area Requirement	As	41.47 Acres	1,806,522 square feet		
			167917.31 m ²		

Wastewater Treatment and Reclamation Plant Improvements Feasibility Study Constructed Wetlands Design - Areal Model (EPA, 2000)				
Project Name/ Site:		St. Helena WWTRP - Wetlands Sizing (Areal Model) - EPA, 2000		Date of Analysis: 4/12/2017
Project No.:		11110776		Performed By: JC
Wastewater Characteristics				
INFLUENT BOD, mg/L		51	per June 2016 data, effluent from Pond 3	
EFFLUENT BOD, mg/L		15	New discharge limit	
INFLUENT TSS, mg/L		37	per June 2016 data, effluent from Pond 3	
EFFLUENT TSS, mg/L		15	New discharge limit	
Free Water Surface Wetlands Design Model - Areal Model (Source: EPA Manual on Constructed Wetlands Treatment of Municipal Wastewaters, September 2000)				
Related Constants				
Areal Loading Rate for BOD effluent concentration <20 mg/L	ALR_BOD	45	kg/ha-d	
Areal Loading Rate for TSS effluent concentration <20 mg/L	ALR_TSS	30	kg/ha-d	
Porosity of Wetland (Void Fraction)	n	0.8		
Design Parameters				
Design Flow	Q	1,460,000	gpd	
		2017262	m ³ /year	
BOD				
Influent Wastewater BOD	Co	51	mg/L	
Effluent BOD Target	Ce	15	mg/L	
Surface Area Requirement	As	674134	ft ²	
		15	acres	
BOD Loading Rate		40.1	Lb/Ac/Day	
		35.8	Kg/Ha/Day	
		621	lb/Day	
		Should be less than 89 lb/acre/day (Reed et al., 1995, p226)		
TSS				
Influent Wastewater BOD	Co	37	mg/L	
Effluent BOD Target	Ce	21	mg/L	
Surface Area Requirement	As	733616	ft ²	
		17	acres	
Hydraulic Loading Rate (HLR)		3.3	in/day	
		83	mm/day	
Design Temperature	T	4	Degrees C	
Temperature Coefficient at 20-deg C	θ	1.00		
Reaction Coefficient, Design Temp	kt	30.0000		
Background Concentration for Areal Model	C*	11.02		
Safety Factor	z	0.526		
Estimated TSS Effluent Concentration based on calculated Surface area and HLR		4.87	mg/L less than new discharge limit of 15 mg/L	
Calculated Outcomes				
BOD Removal Efficiency	e_BOD	70.59%		
TSS Removal Efficiency	e_TSS	86.85%		
Surface Area Requirement	As	16.84	Acres	
Surface Area with Safety Factor		20%	20.21 Acres	
			733,616 square feet	
			68190.076 m ²	

Appendix F – Conceptual PETRO Process Trickling Filter and Sedimentation Basin Sizing Calculations

Wastewater Treatment and Reclamation Plant Improvements Feasibility Study Conceptual PETRO Process Sedimentation Basin Sizing Calculations

Project Name/ Site:	St. Helena WWTRP - PETRO Process Trickling Filter Sedimentation Basin Calculations	Date of Analysis:	4/24/2017
Project No.:	11110776	Performed By:	GH/LH/MT

Sedimentation Basins - Humus Tanks or Settling Pond Design Criteria

Humus Tank Criteria

Value	Units	Notes
Humus Tank upflow velocity (overflow rate at ADWF)	0.7 m/h	ADWF, Source: IWA
Humus Tank upflow velocity (overflow rate at Peak)	2 m/h	ADWF, Source: 10-State Standards, 2014.
Detention Time	2-3 hours	

Settling Pond Criteria

Hydraulic Retention Time	<2 days	Source: Metcalf and Eddy, 4th Edition.
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Flows

Buildout Design Flow	0.65 mgd
2014 Design Flow for Solids Accumulation	0.42 mgd
Peaking Factor	2.50
Peak Design Flow	1.63 mgd

Sedimentation Configuration

Number of Humus Tanks (Scenario 1)	2
Number of Settling Ponds (Scenario 2)	1

Conversions
7.48 gal/ft^3
43560 ft^2/acre
1000000 mg/kg
2.2046E-06 lb/mg
3.785 L/gal
14.29 (ft^3/Ac/Day)/(m^3/Ha/Day)
1.12 (kg/Ha/Day)/(Lb/Ac/Day)
264.17 gal/m^3
3.28 ft/m
4046.85 m^2/acre
24 hr/day
1.34 hp/kW
10.76 ft^2/m^2
453592.37 mg/lb
3785 m3/d / mgd

Calculated Outcomes - Humus Tank

Humus Tank Configuration

	One Unit	Two Units (Parallel)	Units	Notes
HT Surface Area	84.0	84.0	m ²	
	904.2	904.2	ft ²	
Sidewall Depth	4.0	4.0	m	
	13.1	13.1	ft	
HT Diameter	10.3	10.3	m	
	33.9	33.9	ft	

Surface Overflow Rate

	0.61	1.2	m/h
	1.5	3.1	m/h

Retention Time

Retention Time per clarifier	3.3	3.3	hr
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Sludge Production and Flow Rate

	Low Scenario	High Scenario	
HT Influent SS (TF EffluentSS)	50	200	mg/L
HT Influent SS Loading	271	1,084	ppd
HT Effluent SS	0	0	mg/L
Humus SS	1,500	1,500	mg/L
Humus Production	136	542	ppd
Humus Production	10,833	43,333	gpd
% of Influent Flow	2%	7%	
Humus Removal Flow Rate	7.5	30.1	gpm

Calculated Outcomes - Settling PondDesign Criteria

	Value	Units	Notes
Target, HRT	< 2	days	Metcalf & Eddy pg. 851
Selected HRT	1.5		At Peak Design Flow

Sed Basin Geometry

Sed Basin Depth	2	m	
Aspect Ratio	3:1		

Mass of sludge accumulated each year

Q	1,590	m ³ /d	2014 Design flow
TSSi	125	g/m ³	
TSSe	5	g/m ³	
Mass of sludge accumulated each year	69,629	kg/yr	$M = Q * (TSSi - TSSe) * (365 \text{ d/yr})$

Mass of Volatile and Fixed Solids each year

VSS	59,185	kg/yr	VSS = 0.85 * TSS
Fixed Solids, FSS	10,444	kg/yr	

Sludge Accumulation

Time between cleanouts	4	yr	
Mass of VSS accumulated at end of time, t			
VSS _t	112,451	kg	$VSS_t = [0.7 + 0.4 * (t-1)] * (VSS \text{ kg/yr})$
Total mass of solids (TSS) accumulated at end of time, t			
TSS _t	154,228	kg	

Required Liquid Volume and Dimensions for Sed Basin

Q	2460	m ³ /d	Buildout Design flow
V	3,690	m ³	$V = HRT * Q$
Surface Area	1,845	m ²	
Length	75	m	Rounded up to the nearest foot
Width	25	m	$\text{Length (Aspect Ratio} * X) * \text{Width (X) = Area} \rightarrow \text{Width (X) = (Area / Aspect Ratio)}^{0.5}$
Aspect Ratio	3		length:width

Depth Required for Sludge Storage

Mass/unit area	83.6	kg/m ²	Mass per unit area = (accumulated sludge/surface area of basin)
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Required depth of sludge blanket

Percent compaction (of initial volume)	0.15	(x100)%	Assumes sludge solids deposited evenly in basin and compact to final value of 15% of initial solids volume
Density accumulated sludge	1.06	kg/m ³	
Sludge blanket depth	0.5	m	$\text{Depth} = (\text{mass/unit area}) / (\text{density} * \text{compaction percentage} * 1000 \text{ kg/m}^3)$

Total Depth

Total Depth	2.5	m	Excludes freeboard
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HRT at other flows

Peak Flow	1.625	MGD	
HRT	0.6	days	

Appendix G – Water Balance Calculations



Agronomic Water Balance

Effective Rainfall and Etc - no alfalfa

2011													
With Pasture							With alfalfa						
Month	Days/Month	Precipitation (in)	Monthly Average Eto (from Larry Walker Assoc.)	Intermediate effective rainfall calculation (in)	Effective Rainfall (in)	Crop Coefficient Kc (pasture)	2011 Monthly ETC Etc=Eto*Kc (in) - pasture	Net Irrigation Requirement (in) - pasture	Gross Irrigation Requirement (in)	Intermediate effective rainfall calculation (in)	Effective Rainfall (in)	Crop Coefficient Kc (with alfalfa)	2011 Monthly ETC Etc=Eto*Kc (in) - with alfalfa
Jan	31	2.70	1.45	1.63	1.63	1.00	1.45	0.00	0.00	1.71	1.71	1.00	1.45
Feb	28	7.50	2.25	4.14	4.14	1.00	2.25	0.00	0.00	4.32	4.32	1.00	2.25
Mar	31	13.53	2.52	6.92	6.92	1.00	2.52	0.00	0.00	7.23	7.23	1.00	2.52
Apr	30	0.32	5.08	0.22	0.22	1.00	5.08	4.86	6.95	0.23	0.23	1.00	5.08
May	31	2.48	5.80	1.93	1.93	1.00	5.80	3.87	5.53	2.02	2.02	1.00	5.80
Jun	30	2.40	5.81	1.88	1.88	1.00	5.81	3.93	5.62	1.96	1.96	1.00	5.81
Jul	31	0.00	7.10	-0.17	0.00	1.00	7.10	7.10	10.14	-0.18	0.00	1.00	7.10
Aug	31	0.00	5.91	-0.16	0.00	1.00	5.91	5.91	8.44	-0.17	0.00	1.00	5.91
Sep	30	0.00	5.10	-0.16	0.00	1.00	5.10	5.10	7.29	-0.16	0.00	1.00	5.10
Oct	31	0.51	3.22	0.35	0.35	1.00	3.22	2.87	4.10	0.37	0.37	1.00	3.22
Nov	30	7.10	1.75	3.84	3.84	1.00	1.75	0.00	0.00	4.01	4.01	1.00	1.75
Dec	31	0.36	1.89	0.21	0.21	1.00	1.89	1.68	2.40	0.22	0.22	1.00	1.89
Total	365	36.90			21.13			35.32	50.46				35.12

Parameter	Value	Unit	Reference
Average root zone depth for pasture	2	Feet	Agrimet (https://www.usbr.gov/pn/agrimet/irrigation.html)
D =	3.2	Inches	calculated with USDA SCS method
SF =	1.01		calculated with USDA SCS method
Average Water Holding Capacity	0.133	in/in	Soil Sampling Data, Agrimet, assuming Sandy loam at 1.6 inches oer foot

Parameter	Value	Unit	Reference
Average root zone depth for alfalfa	4	Feet	Agrimet (https://www.usbr.gov/pn/agrimet/irrigation.html)
D =	6.4	Inches	calculated with USDA SCS method
SF =	1.05		calculated with USDA SCS method
Average Water Holding Capacity	0.133	in/in	Soil Sampling Data, Agrimet, assuming Sandy loam at 1.6 inches oer foot

Notes:

- 1 Irrigated pasture that is 4 to 6 inches tall should use water at the ETo rate thus the crop coefficient is 1.0 (DWR Leaflet 21427) <http://www.cimis.water.ca.gov/Content/PDF/21427-KcAgronomicGrassandVeg.pdf>
- 2 However, turfgrasses have an annual avg of 0.8 for cool months and 0.6 for summer months according to: http://ucanr.edu/sites/UrbanHort/Water_Use_of_Turfgrass_and_Landscape_Plant_Materials/Turfgrass_Crop_Coefficients_Kc/
- 3 For alfalfa, average is 1.0: http://ucanr.edu/sites/irrigation_and_soils/_files/93370.pdf
- 4 2010 and 2011 Monthly ETC taken from Larry Walker's water balance summary

2010													
With Pasture							With alfalfa						
Month	Days/Month	Precipitation (in)	Monthly Average Eto (from Larry Walker Assoc.)	Intermediate effective rainfall calculation (in)	Effective Rainfall (in)	Crop Coefficient Kc (pasture)	2011 Monthly ETC Etc=Eto*Kc (in) - pasture	Net Irrigation Requirement (in) - pasture	Gross Irrigation Requirement (in)	Intermediate effective rainfall calculation (in)	Effective Rainfall (in)	Crop Coefficient Kc (with alfalfa)	2011 Monthly ETC Etc=Eto*Kc (in) - with alfalfa
Jan	31	12.24	0.78	5.77	5.77	1.00	0.78	0.00	0.00	6.03	6.03	1.00	0.78
Feb	28	5.91	1.38	3.22	3.22	1.00	1.38	0.00	0.00	3.36	3.36	1.00	1.38
Mar	31	3.79	3.36	2.45	2.45	1.00	3.36	0.91	1.30	2.56	2.56	1.00	3.36
Apr	30	5.49	3.91	3.48	3.48	1.00	3.91	0.43	0.61	3.63	3.63	1.00	3.91
May	31	2.33	5.21	1.77	1.77	1.00	5.21	3.44	4.92	1.85	1.85	1.00	5.21
Jun	30	0.00	6.69	-0.17	0.00	1.00	6.69	6.69	9.56	-0.18	0.00	1.00	6.69
Jul	31	0.00	6.61	-0.17	0.00	1.00	6.61	6.61	9.44	-0.18	0.00	1.00	6.61
Aug	31	0.00	5.62	-0.16	0.00	1.00	5.62	5.62	8.03	-0.17	0.00	1.00	5.62
Sep	30	0.00	4.79	-0.15	0.00	1.00	4.79	4.79	6.84	-0.16	0.00	1.00	4.79
Oct	31	3.55	2.81	2.24	2.24	1.00	2.81	0.57	0.81	2.34	2.34	1.00	2.81
Nov	30	6.37	1.99	3.55	3.55	1.00	1.99	0.00	0.00	3.71	3.71	1.00	1.99
Dec	31	11.32	0.95	5.46	5.46	1.00	0.95	0.00	0.00	5.70	5.70	1.00	0.95
Total	365	51.00			27.94			29.06	41.51				28.62

4/27/2017

Prepared by GHD Inc.

Baseline Model - Agronomic Water Balance

Agronomic Water Balance- Current Flows
(actual historical data, limited discharge to Napa River, no affalls)

2010 WET YEAR											
Month	Day/Week	Mean Water Flow (MG)	Precipitation (MG)	Discharge (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG) (Storage)	Inflows - Outflows (MG) (Storage)	Volume in Storage (MG)	Flow (MG)
Jan	31	31.17	5.04	0.00	(0.47)	(0.43)	0.00	35.30	72.22		
Feb	28	25.57	2.43	0.00	(0.66)	(0.39)	0.00	25.56	58.11		
Mar	31	24.81	1.56	0.00	(1.17)	(0.43)	(6.20)	18.56	117.73		
Apr	30	23.83	2.93	0.00	(1.86)	(0.42)	0.00	22.22	137.48		
May	31	15.77	0.98	0.00	(2.75)	(0.43)	(23.46)	(5.51)	128.03		
Jun	30	12.69	0.00	0.00	(3.40)	(0.42)	(45.58)	(36.71)	91.32		
Jul	31	12.39	0.00	0.00	(4.08)	(0.43)	(45.34)	(37.56)	54.78		
Aug	31	12.32	0.00	0.00	(3.72)	(0.43)	(38.29)	(20.13)	24.63		
Sep	30	11.70	0.00	0.00	(2.68)	(0.42)	(32.44)	(24.03)	0.00		
Oct	31	13.03	1.48	0.00	(1.77)	(0.43)	(3.86)	8.43	8.43		
Nov	30	13.87	2.62	0.00	(0.77)	(0.42)	0.00	15.30	23.73		
Dec	31	30.64	4.66	0.00	(21.98)	(0.51)	(0.43)	0.00	13.13	26.15	
Total	365	227.87	20.99	(21.98)	(23.77)	(5.11)	(198.00)	(0.00)			
Irrigation Area Requirements											175.7 Acres
Agronomic Rate											1.13 MG/ac/yr
Irrigation system efficiency											0.70
Leaching fraction											0.0 (no crop)
Maximum Storage Volume											137.8 MG

2011 Normal Year											
Month	Day/Week	Mean Water Flow (MG)	Precipitation (MG)	Discharge (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG) (Storage)	Inflows - Outflows (MG) (Storage)	Volume in Storage (MG)	Flow (MG)
Jan	31	21.10	1.11	(7.87)	(0.47)	(0.43)	0.00	13.64	31.24		
Feb	28	23.47	3.09	0.00	(0.66)	(0.39)	0.00	25.50	56.74		
Mar	31	45.01	5.57	(55.13)	(1.17)	(0.43)	0.00	(6.17)	50.87		
Apr	30	18.26	0.13	0.00	(1.86)	(0.42)	(18.03)	(1.84)	48.13		
May	31	14.29	1.02	0.00	(2.75)	(0.43)	(14.34)	(2.22)	46.92		
Jun	30	13.85	0.99	0.00	(3.40)	(0.42)	(14.38)	(3.56)	42.96		
Jul	31	12.33	0.00	0.00	(4.08)	(0.43)	(26.32)	(18.57)	24.40		
Aug	31	12.05	0.00	0.00	(3.72)	(0.43)	(21.91)	(14.02)	10.43		
Sep	30	11.58	0.00	0.00	(2.68)	(0.42)	(18.91)	(10.43)	0.00		
Oct	31	12.34	0.21	0.00	(1.77)	(0.43)	(10.83)	(0.28)	(0.28)		
Nov	30	12.28	2.62	0.00	(0.77)	(0.42)	0.00	14.02	13.74		
Dec	31	10.88	0.15	0.00	(0.51)	(0.43)	(6.22)	3.88	17.80		
Total	365	207.47	15.19	(62.82)	(23.77)	(5.11)	(130.95)	0.00			
Irrigation Area Requirements											95.8 Acres
Agronomic Rate											1.37 MG/ac/yr
Irrigation system efficiency											0.70
Leaching fraction											0.0 (no crop)
Maximum Storage Volume											56.7 MG

Notes

- Wastewater flows obtained from historical Plant Flow Data.
- Precipitation amounts obtained from the University of California's Agriculture and Natural Resources Weather Database for the National Climatic Data Center (NCDC) weather station #7643 at St. Helena.
- Irrigation field is a pasture with grasses 4 to 6 inches tall.
- The capacity of Pond 5 is approximately 24.6 MG.
- Allowable seepage rate for ponds is assumed to be 1x10⁻⁶ centimeters per second.
- Storage is calculated based on emptying storage on or about September 1.

Agronomic Water Balance- Current Flows with assumed discharge and affalls

2010 WET YEAR											
Month	Day/Week	Mean Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG) (Storage)	Inflows - Outflows (MG) (Storage)	Volume in Storage (MG)
Jan	31	31.17	5.04	(28.92)	(2.00)	(0.47)	(0.43)	0.00	4.38	21.64	
Feb	28	25.57	2.43	(17.43)	(15.00)	(0.66)	(0.39)	0.00	4.52	26.16	
Mar	31	24.81	1.56	(16.33)	(14.40)	(1.17)	(0.43)	(1.71)	(7.68)	18.48	
Apr	30	23.83	2.93	(12.52)	(11.80)	(1.86)	(0.42)	0.00	0.77	29.26	
May	31	15.77	0.98	(6.55)	(2.75)	(0.43)	(7.18)	(2.20)	17.05		
Jun	30	12.69	0.00	0.00	(3.40)	(0.42)	(14.27)	(5.39)	11.68		
Jul	31	12.39	0.00	0.00	(4.08)	(0.43)	(14.15)	(6.23)	5.43		
Aug	31	12.32	0.00	0.00	(3.72)	(0.43)	(11.99)	(3.82)	1.61		
Sep	30	11.70	0.00	0.00	(2.68)	(0.42)	(10.22)	(1.61)	0.00		
Oct	31	13.03	1.48	0.00	(1.77)	(0.43)	(1.00)	11.29	11.29		
Nov	30	13.87	2.62	0.00	(0.77)	(0.42)	0.00	15.30	26.98		
Dec	31	30.64	4.66	(20.69)	(15.00)	(0.51)	(0.43)	0.00	(0.53)	12.26	
Total	365	227.87	20.99	(112.54)	(112.54)	(23.77)	(5.11)	(81.05)	(0.00)		
Irrigation Area Requirements											50.0 Acres
Agronomic Rate											1.92 MG/ac/yr
Irrigation system efficiency											0.70
Leaching fraction											0.1
Maximum Storage Volume											26.0 MG

2011 Normal Year											
Month	Day/Week	Mean Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG) (Storage)	Inflows - Outflows (MG) (Storage)	Volume in Storage (MG)
Jan	31	21.10	1.11	(18.34)	(4.00)	(0.47)	(0.43)	0.00	(1.03)	22.87	
Feb	28	23.47	3.09	(23.46)	(11.00)	(0.66)	(0.39)	0.00	1.05	29.91	
Mar	31	45.01	5.57	(46.74)	(11.71)	(1.17)	(0.43)	0.00	2.24	26.15	
Apr	30	18.26	0.13	(18.22)	(1.80)	(0.42)	(11.34)	(13.30)	12.70		
May	31	14.29	1.02	0.00	(2.75)	(0.43)	(8.84)	3.29	16.98		
Jun	30	13.85	0.99	0.00	(3.40)	(0.42)	(8.99)	2.03	18.11		
Jul	31	12.33	0.00	0.00	(4.08)	(0.43)	(18.53)	(8.77)	9.34		
Aug	31	12.05	0.00	0.00	(3.72)	(0.43)	(13.83)	(6.91)	3.43		
Sep	30	11.58	0.00	0.00	(2.68)	(0.42)	(11.91)	(3.43)	0.00		
Oct	31	12.34	0.21	0.00	(1.77)	(0.43)	(6.66)	3.69	3.69		
Nov	30	12.28	2.62	0.00	(0.77)	(0.42)	0.00	14.02	17.71		
Dec	31	10.88	0.15	0.00	(0.51)	(0.43)	(3.89)	6.19	23.89		
Total	365	207.47	15.19	(108.75)	(23.77)	(5.11)	(82.02)	0.00			
Irrigation Area Requirements											54.3 Acres
Agronomic Rate											1.90 MG/ac/yr
Irrigation system efficiency											0.70
Leaching fraction											0.1
Maximum Storage Volume											26.0 MG

Notes

- Wastewater flows obtained from historical Plant Flow Data.
- Precipitation amounts obtained from the University of California's Agriculture and Natural Resources Weather Database for the National Climatic Data Center (NCDC) weather station #7643 at St. Helena.
- Irrigation field is planted with affalls.
- Assumed all treated wastewater effluent can be discharged to the river if the river to effluent ratio is at least 50:1.
- Allowable seepage rate for ponds and wetlands is assumed to be 1x10⁻⁶ centimeters per second.
- Highlighted cells represent optimized discharge. If the river to effluent flow ratio was at least 50:1, then instead of reclaiming the water (which was performed), the City would discharge to the river.
- The capacity of Pond 5 is approximately 24.6 MG.
- Storage is calculated based on emptying storage on or about September 1 annually.

Agronomic Water Balance- Future Design Flows with assumed discharge and affalls

2010 WET YEAR precipitation											
Month	Day/Week	Mean Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG) (Storage)	Inflows - Outflows (MG) (Storage)	Volume in Storage (MG)
Jan	31	37.82	5.04	(28.92)	(20.00)	(0.47)	(0.43)	0.00	(6.96)	41.04	
Feb	28	34.16	2.43	(17.43)	(15.00)	(0.66)	(0.39)	0.00	(1.89)	40.05	
Mar	31	37.82	1.56	(18.23)	(30.31)	(1.17)	(0.43)	(2.40)	(11.26)	28.79	
Apr	30	35.90	2.93	(22.32)	(17.50)	(1.86)	(0.42)	0.00	(4.62)	7.26	
May	31	20.15	0.98	(8.55)	(2.75)	(0.43)	(10.35)	(0.88)	7.16		
Jun	30	15.50	0.00	0.00	(3.40)	(0.42)	(19.96)	(4.30)	2.80		
Jul	31	20.15	0.00	0.00	(4.08)	(0.43)	(19.14)	(4.11)	(1.30)		
Aug	31	20.15	0.00	0.00	(3.72)	(0.43)	(18.79)	(9.79)	(2.10)		
Sep	30	18.60	0.00	0.00	(2.68)	(0.42)	(14.31)	2.10	0.00		
Oct	31	20.15	1.48	0.00	(1.77)	(0.43)	(1.40)	18.02	18.02		
Nov	30	36.60	2.62	0.00	(0.77)	(0.42)	0.00	38.04	36.05		
Dec	31	37.82	4.66	(20.69)	(20.00)	(0.51)	(0.43)	0.00	(7.15)	48.00	
Total	365	323.32	20.99	(112.54)	(112.54)	(23.77)	(5.11)	(85.49)	(0.00)		
Irrigation Area Requirements											70.0 Acres
Agronomic Rate											1.92 MG/ac/yr
Irrigation system efficiency											0.70
Leaching fraction											0.1
Maximum Storage Volume											56.1 MG

2011 Normal Year precipitation											
Month	Day/Week	Inflows				Outflows					
		Mean Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Outflow to Evaporation (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG) (Storage)	Volume in Storage (MG)
Jan	15.5	18.91	0.96	(8.17)	(9.83)	(0.24)	(0.22)	0.00	0.00	(0.01)	25.00
Feb	15.5	18.91	0.06	(9.17)	(9.84)	(0.24)	(0.22)	0.00	0.00	0.00	25.00
Mar	14	17.08	1.84	(11.73)	(9.37)	(0.33)	(0.20)	0.00	(0.00)	25.00	0.00
Apr	15.5	18.91	2.70	(12.37)		(0.69)	(0.22)	0.00	(2.48)	0.00	25.00
May	15.5	18.91	0.00	(0.11)		(0.80)	(0.21)	0.00	(7.85)	0.00	25.00
Jun	15.5	10.00	0.51	0.00		(1.37)	(0.22)	0.00	(5.55)	3.34	8.33
Jul	15.5	10.00	0.51	0.00		(1.37)	(0.22)	0.00	(5.55)	3.34	17.78
Aug	15.5	9.75	0.40	0.00		(1.70)	(0.21)	0.00	(5.75)	2.59	14.44
Sep	15.5	9.75	0.40	0.00		(1.70)	(0.21)	0.00	(5.75)	2.59	14.44
Oct	15.5	10.00	0.00	0.00		(2.04)	(0.22)	0.00	(10.80)	(2.79)	13.33
Nov	10.00	10.00	0.00	0.00		(2.04)	(0.22)	0.00	(10.80)	0.00	16.67
Dec	15.5	10.00	0.00	0.00		(1.86)	(0.22)	0.00	(8.83)	(0.83)	10.00
Total	15.5	10.08	0.00	0.00		(1.86)	(0.22)	(8.33)	(8.33)	(10.00)	0.00
Step	15.5	9.75	0.00	0.00		(1.86)	(0.22)	0.00	(8.33)	0.00	16.67
Jan	15.5	9.75	0.00	0.00		(1.86)	(0.22)	0.00	(8.33)	0.00	0.00
Feb	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	8.33
Mar	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	16.67
Apr	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	25.00
May	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	33.33
Jun	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	41.67
Jul	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	50.00
Aug	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	58.33
Sep	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	66.67
Oct	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	75.00
Nov	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	83.33
Dec	15.5	10.00	0.15	0.00		(1.70)	(0.21)	0.00	(4.58)	4.43	91.67
Total	15.5	18.30	1.46	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	25.00
Step	15.5	18.30	1.46	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Jan	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Feb	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Mar	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Apr	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
May	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Jun	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Jul	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Aug	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Sep	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Oct	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Nov	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Dec	15.5	18.30	0.00	0.00		(3.88)	(0.21)	(19.17)	0.00	0.00	0.00
Total	365	323.32	15.19	(106.75)		(73.77)	(6.11)	(66.55)	(104.89)	0.00	25.00
Irrigation Area Requirements						76.79 Acres					
Agronomic Rate						12.62 cwt/acre					
Irrigation system efficiency						0.70					
Leaching fraction						0.15					
Maximum Storage Volume						25.0 MG					

Additional Disposal Recommendation

Agronomic Water Balance- Future Design Flows with assumed discharge and alfalfa
Includes Outflow to Percolation

2011 Normal Year precipitation

Month	Days/Month	Inflows		Outflows							Volume in Storage (MG)
		Waste Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Outflow to Percolation (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG)	
Jan	15.5	18.91	0.56	(9.17)	(9.85)	(0.24)	(0.22)		0.00	(0.01)	25.00
	15.5	18.91	0.56	(9.17)	(9.84)	(0.24)	(0.22)		0.00	0.00	25.00
Feb	14	17.08	1.54	(11.73)	(6.37)	(0.33)	(0.20)		0.00	(0.00)	25.00
	14	17.08	1.54	(11.73)	(6.37)	(0.33)	(0.20)		0.00	(0.00)	25.00
Mar	15.5	18.91	2.78	(23.37)		(0.59)	(0.22)		0.00	(2.48)	22.52
	15.5	18.91	2.78	(23.37)		(0.59)	(0.22)		0.00	(2.48)	20.05
Apr	15	9.75	0.07	(9.11)		(0.90)	(0.21)		(7.25)	(7.65)	12.39
	15	9.75	0.07	(9.11)		(0.90)	(0.21)		(7.25)	(7.65)	4.74
May	15.5	10.08	0.51	0.00		(1.37)	(0.22)		(5.65)	3.34	8.09
	15.5	10.08	0.51	0.00		(1.37)	(0.22)		(5.65)	3.34	11.43
Jun	15	9.75	0.49	0.00		(1.70)	(0.21)		(5.75)	2.59	14.02
	15	9.75	0.49	0.00		(1.70)	(0.21)		(5.75)	2.59	16.60
Jul	15.5	10.08	0.00	0.00		(2.04)	(0.22)		(10.60)	(2.79)	13.82
	15.5	10.08	0.00	0.00		(2.04)	(0.22)		(10.60)	(2.79)	11.03
Aug	15.5	10.08	0.00	0.00		(1.86)	(0.22)		(8.83)	(0.83)	10.20
	15.5	10.08	0.00	0.00		(1.86)	(0.22)	(9.37)	(8.83)	(10.20)	(0.00)
Sep	15	9.75	0.00	0.00		(1.34)	(0.21)	(0.58)	(7.62)	0.00	0.00
	15	9.75	0.00	0.00		(1.34)	(0.21)		(7.62)	0.58	0.58
Oct	15.5	10.08	0.10	0.00		(0.88)	(0.22)		(4.26)	4.82	5.41
	15.5	10.08	0.10	0.00		(0.88)	(0.22)		(4.26)	4.82	10.23
Nov	15	18.30	1.46	0.00		(0.38)	(0.21)	(4.39)	0.00	14.78	25.00
	15	18.30	1.46	0.00		(0.38)	(0.21)	(19.17)	0.00	(0.00)	25.00
Dec	15.5	18.91	0.07	0.00		(0.26)	(0.22)	(16.02)	(2.49)	0.00	25.00
	15.5	18.91	0.07	0.00		(0.26)	(0.22)	(16.02)	(2.49)	0.00	25.00
Total	365	323.32	15.19	(106.75)		(23.77)	(5.11)	(65.55)	(104.89)	0.00	

Irrigation Area Requirements	70.0	Acres
Agronomic Rate	1.50	MG/ac/yr
Irrigation system efficiency	0.70	
Leaching fraction	0.1	
Maximum Storage Volume	25.0	MG

Average Monthly River Flow, cfs	Average Monthly River Flow, MG	(REC-001) Effluent Flow, MG	River-to-Effluent flow ratio
103.8	2079.574	18.34	113.4
274.6	4969.056	23.46	211.9
706	14144.31	46.74	302.6
77	1492.888	18.22	81.9
24.5	490.8436	10.53	46.6
21.8	422.6619	13.91	30.4
5.94	119.0045	5.20	22.9
1.69	33.85819	9.87	3.4
0.18	3.489869	10.62	0.3
1.8	36.06198	3.60	10.0
2.75	53.31744	14.46	3.7
3.24	64.91156	12.02	5.4

Notes

1. Wastewater flows based on average dry weather flow of 0.65 mgd for April-October. Average wet weather flow of 1.22 mgd was used for November-March.
2. Precipitation amounts obtained from the University of California's Agriculture and Natural Resources Weather Database for the National Climatic Data Center (NCDC) weather station #7643 at St. Helena.
3. Irrigation field is planted with alfalfa.
4. Assumed all treated wastewater effluent can be discharged to the river if the river to effluent ratio is at least 50:1.
5. Allowable seepage rate for wetlands is assumed to be 1x10-6 centimeters per second.
6. Highlighted cells represent optimized discharge. If the river to effluent flow ratio was at least 50:1, then instead of reclaiming the water (which was performed), the City would discharge to the river.
7. The capacity of Pond 5 is approximately 24.6 MG.
8. Storage is calculated based on emptying storage on or about September 1 annually.

Wetlands Model - Agronomic Water Balance

Agronomic Water Balance- Current Flows

(actual historical data, limited discharge to Napa River, no alfalfa)

2010 WET YEAR											
Month	Days/Month	Inflows			Outflows					Inflows - Outflows (MG)	Volume in Storage (MG)
		Waste Water Flow (MG)	Precipitation (MG)	Discharge (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG)			
Jan	31	31.17	12.35	0.00	(1.16)	(1.06)	0.00	41.30	84.84		
Feb	28	25.57	5.96	0.00	(1.63)	(0.96)	0.00	28.94	113.79		
Mar	31	24.81	3.82	0.00	(2.87)	(1.06)	(5.84)	18.88	132.64		
Apr	30	23.93	5.54 (0.83)		(4.40)	(1.03)	(2.76)	20.45	153.09		
May	31	15.77	2.35	0.00	(6.74)	(1.06)	(22.10)	17.85	141.31		
Jun	30	12.69	0.00	0.00	(8.32)	(1.03)	(42.99)	(39.61)	101.70		
Jul	31	12.39	0.00	0.00	(10.00)	(1.06)	(42.44)	(41.12)	60.58		
Aug	31	12.32	0.00	0.00	(9.13)	(1.06)	(36.08)	(33.95)	26.63		
Sep	30	11.70	0.00	0.00	(6.56)	(1.03)	(30.75)	(26.64)	0.00		
Oct	31	13.03	3.58	0.00	(4.33)	(1.06)	(3.64)	7.58	7.58		
Nov	30	13.87	6.43	0.00	(1.88)	(1.03)	0.00	17.39	24.97		
Dec	31	30.64	11.42	(21.16)	(1.26)	(1.06)	0.00	18.58	43.55		
Total	365	227.87	51.46	(21.99)	(58.27)	(12.53)	(186.56)	(0.01)			
Irrigation Area Requirement					165.5		Acres				
Agronomic Rate					1.13		MG/ac/yr				
Irrigation system efficiency					0.70						
Leaching fraction					0.0		(no crop)				
Maximum Storage Volume					153.1		MG				

2011 Normal Year											
Month	Days/Month	Inflows			Outflows					Inflows - Outflows (MG)	Volume in Storage (MG)
		Waste Water Flow (MG)	Precipitation (MG)	Discharge (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG)			
Jan	31	21.10	2.72	(7.67)	(1.16)	(1.06)	0.00	13.94	32.57		
Feb	28	23.47	7.57	0.00	(1.63)	(0.96)	0.00	28.45	61.02		
Mar	31	45.01	13.65	(55.15)	(2.87)	(1.06)	0.00	(0.41)	60.60		
Apr	30	18.28	0.32	0.00	(4.40)	(1.03)	(15.30)	(2.13)	58.47		
May	31	14.29	2.50	0.00	(6.74)	(1.06)	(12.17)	(3.18)	55.30		
Jun	30	13.85	2.42	0.00	(8.32)	(1.03)	(12.37)	(5.45)	49.84		
Jul	31	12.33	0.00	0.00	(10.00)	(1.06)	(22.33)	(21.07)	28.78		
Aug	31	12.05	0.00	0.00	(9.13)	(1.06)	(18.59)	(6.73)	12.05		
Sep	30	11.58	0.00	0.00	(6.56)	(1.03)	(16.04)	(12.05)	0.00		
Oct	31	12.34	0.51	0.00	(4.33)	(1.06)	(9.02)	(1.55)	(1.55)		
Nov	30	12.28	7.16	0.00	(1.88)	(1.03)	0.00	16.54	14.98		
Dec	31	10.88	0.36	0.00	(1.26)	(1.06)	(5.27)	3.65	18.63		
Total	365	207.47	37.23	(62.82)	(58.27)	(12.53)	(111.09)	(0.00)			
Irrigation Area Requirement:					81.1 Acres						
Agronomic Rate:					1.37 MG/ac/yr						
Irrigation system efficiency:					0.70						
Leaching fraction:					0.0 (no crop)						
Maximum Storage Volume:					61.0 MG						

Notes

1. Wastewater flows obtained from historical Plant Flow Data.
2. Precipitation amounts obtained from the University of California's Agriculture and Natural Resources Weather Database for the National Climatic Data Center (NCDC) weather station #7643 at St. Helena.
3. Irrigation field is a pasture with grasses 4 to 6 inches tall.
4. The capacity of Pond 5 is approximately 24.6 MG.
5. Allowable seepage rate for ponds and wetlands is assumed to be 1x10-6 centimeters per second.

Agronomic Water Balance- Current Flows with optimized discharge and alfalfa

2010 WET YEAR											
Month	Days/Month	Inflows				Outflows				Inflows - Outflows (MG)	Volume in Storage (MG)
		Waste Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rate (MG)	Inflows - Outflows (MG) (Storage)		
Jan	31	31.17	12.35	(28.92)	(10.00)	(1.16)	(1.06)	0.00	2.38	16.46	
Feb	28	25.57	5.96	(7.43)	(15.00)	(1.63)	(0.96)	0.00	6.52	22.98	
Mar	31	24.81	3.82	(16.33)	(11.00)	(2.87)	(1.06)	(0.98)	(3.61)	19.37	
Apr	30	23.93	5.54	(22.62)	(4.40)	(1.03)	(0.34)	1.08	20.45		
May	31	15.77	2.35	(8.56)	(6.74)	(1.06)	(4.11)	(2.36)	18.98		
Jun	30	12.69	0.00	0.00	(8.32)	(1.03)	(8.18)	(4.84)	13.25		
Jul	31	12.39	0.00	0.00	(10.00)	(1.06)	(8.08)	(6.76)	6.49		
Aug	31	12.32	0.00	0.00	(9.13)	(1.06)	(6.87)	(4.74)	1.74		
Sep	30	11.70	0.00	0.00	(6.56)	(1.03)	(5.86)	(1.75)	0.00		
Oct	31	13.03	3.58	0.00	(4.33)	(1.06)	(0.57)	10.64	10.64		
Nov	30	13.87	6.43	0.00	(1.88)	(1.03)	0.00	17.39	28.03		
Dec	31	30.64	11.42	(28.68)	(25.00)	(1.26)	(1.06)	0.00	(13.94)	14.06	
Total	365	227.87	51.46	(112.54)		(58.27)	(12.53)	(35.00)			
Irrigation Area Requirement:				28.7 Acres							
Agronomic Rate				1.22 MG/ac/yr							
Irrigation system efficiency:				0.70							
Leaching fraction:				0.1							
Maximum Storage Volume:				28.0 MG							

2011 Normal Year											
Month	Days/Month	Inflows			Outflows					Inflows - Outflows (MG)	Volume in Storage (MG)
		Waste Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG)		
Jan	31	21.10	2.72	(18.34)	(6.00)	(1.16)	(1.06)	0.00	(2.73)	24.00	
Feb	28	23.47	7.57	(23.46)	(6.00)	(1.63)	(0.96)	0.00	(1.01)	22.99	
Mar	31	45.01	13.65	(46.74)	(7.00)	(2.87)	(1.06)	0.00	1.00	23.99	
Apr	30	18.28	0.32	(18.22)	(4.40)	(1.03)	(6.66)	(11.71)	12.28		
May	31	14.29	2.50	0.00	(6.74)	(1.06)	(5.19)	(3.80)	16.08		
Jun	30	13.85	2.42	0.00	(8.32)	(1.03)	(5.28)	(6.4)	17.72		
Jul	31	12.33	0.00	0.00	(10.00)	(1.06)	(9.74)	(8.47)	9.25		
Aug	31	12.05	0.00	0.00	(9.13)	(1.06)	(8.10)	(6.24)	3.00		
Sep	30	11.58	0.00	0.00	(6.56)	(1.03)	(6.99)	(3.00)	0.00		
Oct	31	12.34	0.51	0.00	(4.33)	(1.06)	(3.91)	3.55	3.55		
Nov	30	12.28	7.16	0.00	(1.88)	(1.03)	0.00	16.54	20.09		
Dec	31	10.88	0.36	0.00	(1.26)	(1.06)	(2.29)	6.64	26.73		
Total	365	207.47	37.23	(106.75)		(58.27)	(12.53)	(48.15)			
		Irrigation Area Requirement		32.1 Acres		Agronomic Rate		1.50 MG/ac/yr		Irrigation system efficiency	
				0.70		Leaching fraction		0.1		Maximum Storage Volume	
				26.7 MG							

Notes

1. Wastewater flows obtained from historical Plant Flow Data.
2. Precipitation amounts obtained from the University of California's Agriculture and Natural Resources Weather Database for the National Climatic Data Center (NCDC) weather station #7643 at St. Helena.
3. Irrigation field is planted with alfalfa.
4. Assumed discharge when river to effluent ratio is at least 50:1.
5. Allowable seepage rate for ponds and wetlands is assumed to be 1x10-6 centimeters per second.
6. Highlighted cells represent optimized discharge. If the river to effluent flow ratio was at least 50:1, then instead of reclaiming the water (which was performed), the City would discharge to the river.
7. The capacity of Pond 5 is approximately 24.6 MG.

Agronomic Water Balance- Future Design Flows with optimized discharge and alfalfa

2010 WET YEAR precipitation											
Month	Days/Month	Inflows			Outflows					Inflows - Outflows (MG)	Volume in Storage (MG)
		Waste Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG)		
Jan	31	37.82	12.35	(28.92)	(25.00)	(1.16)	(1.06)	0.00	(5.97)	14.30	
Feb	28	34.16	5.96	(7.43)	(25.00)	(1.63)	(0.96)	0.00	5.11	19.41	
Mar	31	37.82	3.82	(16.33)	(5.00)	(2.87)	(1.06)	(2.28)	14.10	33.51	
Apr	30	19.50	5.54	(22.62)		(4.40)	(1.03)	(0.78)	(3.80)	29.72	
May	31	20.15	2.35	(8.56)		(6.74)	(1.06)	(0.56)	(3.42)	26.29	
Jun	30	19.50	0.00	0.00		(8.32)	(1.03)	(19.02)	(8.87)	17.42	
Jul	31	20.15	0.00	0.00		(10.00)	(1.06)	(18.79)	(9.71)	7.72	
Aug	31	20.15	0.00	0.00		(9.13)	(1.06)	(15.97)	(6.01)	1.70	
Sep	30	19.50	0.00	0.00		(6.56)	(1.03)	(13.61)	(1.71)	0.00	
Oct	31	20.15	3.58	0.00		(4.33)	(1.06)	(1.33)	17.01	17.01	
Nov	30	19.50	6.43	0.00		(1.88)	(1.03)	0.00	23.02	40.03	
Dec	31	37.82	11.42	(28.68)	(38.00)	(1.26)	(1.06)	0.00	(19.76)	20.27	
Total	365	306.22	51.46	(112.54)		(58.27)	(12.53)	(81.35)	(0.00)		
Irrigation Area Requirement:				66.0 Acres		Agronomic Rate		1.22 MG/ac/yr		Irrigation system efficiency	
				0.70		Leaching fraction		0.1		Maximum Storage Volume	
				40.0 MG							

2011 Normal Year precipitation											
Month	Days/Month	Inflows			Outflows					Inflows - Outflows (MG)	Volume in Storage (MG)
		Waste Water Flow (MG)	Precipitation (MG)	Discharge from treatment (MG)	Discharge from Pond 5 (MG)	Pond Evaporation (MG)	Seepage (MG)	Gross Irrigation Potential at Agronomic Rates (MG)	Inflows - Outflows (MG)		
Jan	31	37.82	2.72	(18.34)	(62.00)	(1.16)	(1.06)	0.00	(62.01)	2.08	
Feb	28	34.16	7.57	(23.46)	(6.00)	(1.63)	(0.96)	0.00	15.68	17.76	
Mar	31	37.82	13.65	(46.74)	(2.97)	(2.06)	0.00	0.00	18.34	18.34	
Apr	30	30.15	2.50	(17.82)	(1.03)	(4.40)	(1.16)	(12.25)	(16.43)	3.76	
May	31	20.15	2.50	0.00	0.00	(6.74)	(1.06)	(0.04)	5.81	8.81	
Jun	30	19.50	2.42	0.00	0.00	(8.32)	(1.03)	(9.20)	(3.37)	12.19	
Jul	31	20.15	0.00	0.00	0.00	(10.00)	(1.06)	(16.97)	(7.88)	4.00	
Aug	31	20.15	0.00	0.00	0.00	(9.13)	(1.06)	(14.12)	(4.16)	0.00	
Sep	30	19.50	0.00	0.00	0.00	(6.56)	(1.03)	(12.19)	(0.28)	0.00	
Oct	31	20.15	0.51	0.00	0.00	(4.33)	(1.06)	(6.82)	(8.46)	8.81	
Nov	30	19.50	7.10	0.00	0.00	(1.88)	(1.03)	0.00	(2.76)	32.32	
Dec	31	37.82	0.36	0.00	0.00	(1.26)	(1.06)	(3.98)	(3.18)	64.00	
Total	365	306.22	37.23	(106.75)	(58.27)	(12.53)	(83.91)	0.00			
Irrigation Area Requirement:		56.00 Acres									
Agronomic Rate:		1.50 MG/ac/yr									
Irrigation system efficiency:		0.70									
Leaching fraction:		0.11									
Maximum Storage Volume:		64.1 MG									

Appendix H – Solids Management Calculations



Wastewater Treatment and Reclamation Plant Improvements Feasibility Study
Conceptual Solids Management Calculations

Project Name/ Site:	St. Helena WWTRP - Solids Management Calculations	Date of Analysis:	4/24/2017
Project No.:	11110776	Performed By:	MT

Solids Removal from Pond 1A/1B
Design Criteria

Pond 1A/1B Criteria

	<u>Value</u>	<u>Units</u>	<u>Notes</u>	<u>Conversions</u>
Pond 1A Area	126,324	SF		7.48 gal/ft^3
Pond 1B Area	91,476	SF		43560 ft^2/acre
				1000000 mg/kg
				2.2 lb/kg
				3.785 L/gal
				2000 lbs/ton
				264.17 gal/m^3
				3.28 ft/m
				4046.85 m^2/acre
				24 hr/day
				35.315 ft3/m3
				10.76 ft^2/m^2
				453592.37 mg/lb

Solids Criteria

Time t	20	years	
Screened Solids Volume Influent	50	L/1000m3	Metcalf and Eddy, 4th ed, Table 5-7
Screened Solids Specific Weight	900	kg/m3	Metcalf and Eddy, 4th ed, Table 5-7
Grit Volume Influent	0.0205	m3/1000m3	Metcalf and Eddy, 4th ed, Table 5-19
Grit Specific Weight	1600	kg/m3	Metcalf and Eddy, 4th ed, page 394
TSS Influent	286	mg/L; g/m3	average 2010-2013 WWTRP data
TSS Effluent	78	mg/L; g/m3	average 2015-2016 WWTRP data

Flows

2014 Design Flow	0.42	mgd
2014 Design Flow	1,591	m3/d

Calculated Outcomes Solids Removal from Pond 1A/1B

Mass of Solids after 20 Years

	<u>Value</u>	<u>Units</u>	<u>Notes</u>
Screened solids concentration	0.045	kg/m3	C = volume * specific weight / 1000000
Mass screened solids	522711	kg	Mass = C * Q * 365 * t
Grit solids concentration	0.0328	kg/m3	C = volume * specific weight / 1000
Mass grit	380998	kg	Mass = C * Q * 365 * t
Total solids	120804	kg/yr	TS = Q * (TSSi-TSSe)*365/1000
VSS	84563	kg/yr	VSS = 0.7*TS
FSS (fixed)	36241	kg/yr	FSS = 0.3*TS
VSS t	701873	kg	VSSt=[0.7+0.4(t-1)](VSS kg/yr)
TSS t	1426699	kg	TSSt=VSSt+t*FSS
Total Mass Solids in Pond 1A/1B	2330408	kg	Total Mass Solids = Pond 1A/1B = screened + grit + TSS

Dry and Wet Tons of Solids after 20 Years

Mass	5126897	lb	
Dry Tons	2,563	Ton	
% Solids Dewatered	20%		
Wet Tons	12,817	Ton	Wet Tons = Dry Tons / % solids dewatered

	<u>Value</u>	<u>Value</u>	<u>Units</u>	<u>Notes</u>
<u>Sludge Depth</u>				
Alt 1	Alt 2			
Sludge Density	1023	1050	kg/m3	WEF MOP 8 Table 21.7
% Solids	6%	12%		
Wet Mass	38840128	19420064	kg	Wet Mass = Dry Mass / % Solids
Volume	1340801	653161	ft3	V = Mass / Sludge density
Area	217,800	217,800	ft2	Pond 1A + Pond 1B area
Height	6.2	3.0	ft	H = V / A

	<u>Value</u>	<u>Units</u>	<u>Notes</u>
<u>Volume Solids that Ponds can Assimilate</u>			
Depth Pond 1A sludge blanket after 40 years	5	ft	Per WWTRP staff
Depth Pond 1A sludge blanket after 30 years	3.75	ft	Interpolated
Area Pond 1A	126,324	ft2	Area Pond 1A
Volume Pond 1A	3543388	gallon	

Calculated Outcomes Solids Removal from Tricking Filter

	<u>Value</u>	<u>Units</u>	<u>Notes</u>
<u>Design Criteria</u>			
Flow	31.8	m3/d	2% of design flow
TSS Influent	1500	mg/L; g/m3	
TSS Effluent	78	mg/L; g/m3	

	<u>Value</u>	<u>Units</u>	<u>Notes</u>
<u>Mass of Solids after 20 Years</u>			
Total solids	16518	kg/yr	TS = Q * (TSSi-TSSe)*365/1000
VSS	11562	kg/yr	VSS = 0.7*TS
FSS (fixed)	4955	kg/yr	FSS = 0.3*TS
VSS t	95968	kg	VSSt=[0.7+0.4(t-1)](VSS kg/yr)
TSS t	195074	kg	TSSt=VSSt+t*FSS
Total Mass Solids in Pond 1A/1B	195105	kg	Total Mass Solids = Pond 1A/1B = screened + grit + TSS

	<u>Value</u>	<u>Units</u>	<u>Notes</u>
<u>Dry and Wet Tons of Solids after 20 Years</u>			
Mass	429232	lb	
Dry Tons	215	Ton	
% Solids Dewatered	20%		
Wet Tons	1,073	Ton	Wet Tons = Dry Tons / % solids dewatered

Appendix I – St. Helena Disinfection Study Technical Memorandum (August 2017)





Technical Memorandum

August 29, 2017

To:	Felix Hernandez	Ref. No.:	11110776
From:	Michelle Trinh, P.E.	Tel:	415-296-3642
Reviewed by:	Alex Culick, P.E.		
Subject:	St. Helena Disinfection Study		

The St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) have indicated that they have inconsistent Total Coliform results for the chlorine contact effluent, which occasionally leads to Total Coliform permit violations. Pond 4 effluent is currently disinfected in batches approximately once a week using sodium hypochlorite in the chlorine contact tanks, located at the Effluent Pump Station by Pond 5. The disinfected effluent from the chlorine contact tank is stored in Pond 5 and either discharged to the irrigation spray fields or to the Napa River. When discharging to the Napa River, the chlorinated effluent is dechlorinated using ascorbic acid.

WWTRP staff have indicated that the target sodium hypochlorite dose is 24 mg/L. WWTRP staff also stated that the average flow through the chlorine contact tank is 1,500 gpm, which would result in an average contact time of approximately 47 minutes.

GHD prepared a Disinfection Study with 4 procedures (Attachment 1) to determine what factors might be contributing to the inconsistent readings for Total Coliform and to validate the data results during the disinfection process. Sampling and some field measurements were performed by Larry Walker Associates on July 18, 19, and 20, 2017. Lab testing was conducted by CalTest Analytical Laboratories. The samplings description and results from Larry Walker Associates is included in Attachment 2.

The four procedures and the results are described below.

1. Procedure 1

Procedure 1 involved collecting a sample from the Pond 4 effluent (unchlorinated) and testing it for pH, temperature, Total Coliform, and ammonia. This sample represents the influent into the chlorine contact tanks.

During the study, Pond 4 was being pumped down for maintenance, and flow from Pond 3 effluent was routed to the chlorine contact tanks for disinfection. Therefore, the sample was collected from Pond 3 instead. The results are included in Table 1.1.

**Table 1.1 Procedure 1 Results**

Sample ID	pH (Units)	Temperature (°C)	Total Coliform (MPN/100 mL)	Ammonia-N (mg/L)
Pond 3 Effluent (unchlorinated)	8.7	22.8	>1,600	0.87

The ammonia measurement is low, indicating that almost complete nitrification occurs during the pond treatment process. This ammonia measurement may also be lower than what is typical. Limited data is available for Pond 3 and Pond 4 effluent. However, sampling conducted during May 2017 indicated that Pond 3 effluent ammonia levels ranged from 7.5 to 11 mg/L, and Pond 4 effluent ammonia levels ranged from 7.1 to 8.8 mg/L. Variations in the ammonia levels may impact the disinfection effectiveness.

2. Procedure 2

Procedure 2 involved collecting a sample of Pond 4 effluent, dosing separate samples at varying levels of sodium hypochlorite (5 to 50 mg/L), and testing immediately for chlorine residual and pH. Total Coliform for all samples was tested approximately 8 hours later. As noted previously, Pond 3 effluent was used instead of Pond 4 effluent.

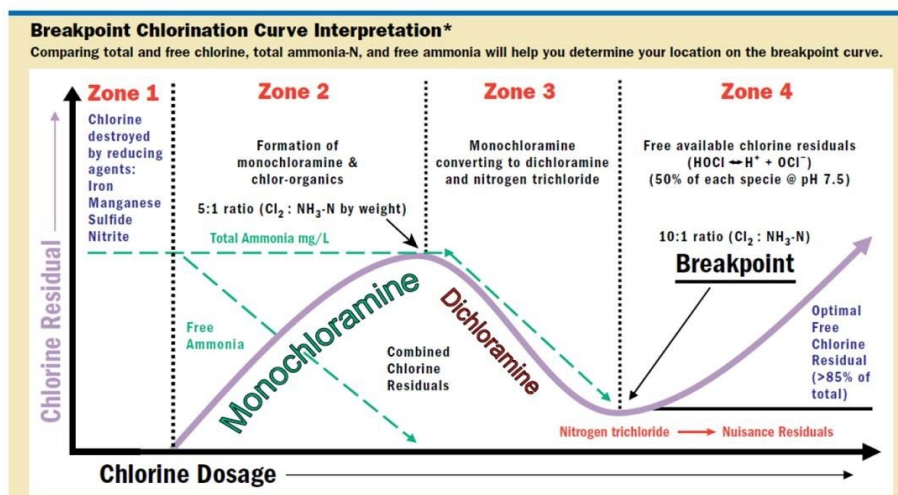
The results indicated that all samples achieved almost complete disinfection at all dose levels, with most of the Total Coliform levels near the detection limit of 1.8 MPN/100 ml. The chlorine residual levels are increasing with the chlorine dose. This indicates that the chlorination likely reached the breakpoint level at one of the lower doses (e.g. between 5 and 10 mg/L) and had sufficient free chlorine residual to reach total disinfection. Based on the chlorine residual levels and low ammonia measurement in the Pond 3 effluent of 0.87 mg/L, the disinfection process was likely to the right of the breakpoint chlorination curve (see Zone 4 in Figure 1).

Table 2.1 Procedure 2 Results

Sample ID	Chlorinated Pond 3 Effluent			Dechlorinated Pond 3 Effluent		
	pH (Units)	TRC (mg/L)	Ammonia-N (mg/L)	Total Coliform (MPN/100 mL)	Time Coliform Sample Collected	Time Coliform Test Started
5 mg/L Cl ₂	8.7	3.6	----	2	9:10	14:30
10 mg/L Cl ₂	8.7	5.2	----	2	9:10	14:32
15 mg/L Cl ₂	8.6	5.1	----	2	9:40	14:34
20 mg/L Cl ₂	8.7	8.3	----	2	9:40	14:36
25 mg/L Cl ₂	8.6	16.2	----	4.5	10:35	14:38
50 mg/L Cl ₂	8.8	38.8	0.34	<1.8	10:35	14:43



Figure 1. Breakpoint Chlorination Curve (Robert Spon, OpFlow, June 2008)



From Bob Spon, OpFlow Article, June 2008

When ammonia levels are low coming into the chlorine contact tank (e.g. <1 mg/L), then it is recommended that the chlorine dose be approximately 2 mg/L greater than the breakpoint required dose in order to maintain a chlorine residual level of approximately 2 mg/L. For example, if ammonia is at 0.87 mg/L, the breakpoint chlorination demand is at a 10:1 ratio, or 8.7 mg/L of chlorine. Assuming an additional 1 mg/L of chlorine is used up by immediate reactions of reducing agents in the water (e.g. iron, manganese, sulfide, nitrite), a total of 9.7 mg/L of chlorine is required to meet the demand of ammonia and reducing agents. At this level, dosing at around 12 mg/L of chlorine is recommended in order to meet the 9.7 mg/L demand and have approximately 2 mg/L of free chlorine residual for disinfection.

When ammonia levels are higher (e.g. >2 mg/L), then chlorine dose should be set to operate in Zone 2 in which chlorine is combining with ammonia to form monochloramine. The target combined chlorine residual should be 5 to 10 mg/L, which is higher than for free chlorine residual because it's not as effective for disinfection.

It is recommended that the disinfection system include continuous monitoring for free ammonia at the chlorine contact tank influent and chlorine residual monitoring at the chlorine contact tank effluent. The chlorine dose would then match the strength of the wastewater on a dynamic basis. The free ammonia levels and chlorine contact tank influent flow rate would be used as the primary control for chlorine dosing levels. The chlorine residual monitoring would be used as a secondary control, in which a low residual would trigger a proper response base on operation zone. Further sampling and testing is required to determine the appropriate chlorine dosage at varying levels of ammonia.



Automating the system would also potentially reduce the chlorine chemical costs because the dose would be matched to the demands of the system. Measured chlorine doses will also result in more efficient dechlorination process. The cost of the automation of the chlorination/dechlorination process is expected to be recovered within 1-3 years based on current chemical usages.

3. Procedure 3

Chlorine contact tank effluent is stored in Pond 5 after disinfection. WWTRP staff stated that some dechlorination occurs while water is stored in Pond 5. Procedure 3 simulates the dechlorination effects of Pond 5 in a controlled environment. A sample was collected from the chlorine contact tank effluent and tested immediately for pH, total chlorine residual, ammonia and temperature. The sample was stored in the shade in an uncovered container. Total chlorine residual was again tested on the sample every 8 hours until 24 hours had elapsed.

The results indicate that dechlorination can occur through evaporation and oxidation, and it is likely that more dechlorination would occur if the sample was in the full sun due to the effects of ultraviolet light.

Table 3.1 Procedure 3 Results

Sample ID	CCT Effluent Samples Collected			
	7/18/2017	7/18/2017	7/19/2017	7/19/2017
	at 14:15	at 22:15	at 06:15	at 14:15
pH (Units)	8.3	----	----	----
Temperature (oC)	25.3	----	----	----
TRC (mg/L)	2.8	1.2	1	0.7
Ammonia-N (mg/L)	0.45	----	----	----

4. Procedure 4

Procedure 4 was performed to determine how much dechlorination occurs in Pond 5. Water is discharged from a pipe outlet at the north end of Pond 5 and then it travels south to the dechlorination channel intake, located at the chlorine contact structure. Six locations were sampled at regular distance intervals from the discharge outlet to the dechlorination channel intake. Samples were collected 8 hours after the initial discharge of chlorinated water, and tested immediately for total chlorine residual. These locations are shown in Attachment D of the Larry Walker Associates Disinfection Study Sampling Plan (Attachment 2).

The total chlorine residual results all ranged from 0.1 to 0.2 mg/L, indicating that very little residual is remaining in the Pond 5 water and that only low quantities of dechlorination chemical should be required to remove the chlorine residual. WWTRP staff have indicated that they have difficulty removing all of the chlorine residual when discharging to the Napa River. Large quantities of ascorbic acid are sometimes required to reach non-detect levels of chlorine residual. It is possible that not enough mixing and contact time



is occurring in the dechlorination channel to effectively remove the chlorine residual. It is recommended that other dechlorination chemicals, such as calcium thiosulfate, be considered for use as well.

Table 4.1 Procedure 4 Results

Sample ID	TRC (mg/L)
Sample #1 (at CCT structure)	0.2
Sample #2	0.2
Sample #3	0.1
Sample #4	0.1
Sample #5	0.1
Sample #6 (at the end of the discharge line into Pond 5)	0.2

5. Conclusions

It is recommended that the disinfection system be automated, in which the chlorine dosing level is flow paced to match influent flows and ammonia levels into the chlorine contact tanks. The chlorine contact tank effluent should also be continuously monitored for chlorine residual, which would also serve as a secondary trigger to adjust the chlorine dose.

Alternative dechlorination chemicals to ascorbic acid should be considered, such as calcium thiosulfate, to increase the reliability of dechlorination of the chlorinated effluent.

Attachment 1

Disinfection Sampling Plan

St. Helena WWTRP
Disinfection Sampling Plan

04/11/17

Sampling conditions: When running water through chlorine contact tanks

1. Procedure 1

- Sample Location: Pond 4 Effluent (unchlorinated)
- Sample Tests:
 - pH
 - Temperature
 - Total Coliform
 - Ammonia

2. Procedure 2:

- Send a sample of sodium hypochlorite to the lab. Test for strength of sodium hypochlorite.
- Sample Location: Pond 4 Effluent (unchlorinated)
- Quantity: approximately 5 gallons
- Lab: Add the following sodium hypochlorite doses to separate samples:
 - 5 mg/L
 - 10 mg/L
 - 15 mg/L
 - 20 mg/L
 - 25 mg/L
 - 50 mg/L
- Sample Tests (immediately):
 - Total Chlorine Residual and pH in all samples
 - Ammonia for 50 mg/L sample only
- Hold samples for 30 minutes (contact time at max flows of 8 MGD)
- Quench chlorine in the samples with dechlorinating agent
- Sample Tests: Total Coliform in all samples after ~8 hours (same amount of time that they usually do after receiving samples from the WWTRP)

3. Procedure 3:

- Sample Location: Chlorine contact tank effluent (before dechlorination and before Pond 5)
- Quantity: approximately 5 gallons per sample
- Sample Tests (immediately):
 - pH
 - Total Chlorine Residual
 - Ammonia
 - Temperature
- Simulate Pond 5 dechlorination effects: Hold samples in buckets outside in shade, without cover for: 8, 16, and 24 hours
- Sample Tests (after 8, 16, and 24 hours): Total Chlorine Residual

4. Procedure 4

- Sample Location: Pond 5, evenly spaced along a line between the effluent discharge into Pond 5 and the intake into the effluent channel
- When: 8 hours after discharge of chlorinated water
- Quantity: 6 samples
- Sample Tests (immediately): Total Chlorine Residual

Attachment 2

Larry Walker Associates Disinfection Study

City of St. Helena
Wastewater Treatment and Reclamation Plant (WWTRP)

Disinfection Study Sampling Plan

LWA Project No. 110.17

Prepared by Larry Walker Associates

August 15, 2017

This project summary presents results from tasks associated with the Disinfection Sampling Plan described in LWA's April 20, 2017 Scope of Work submitted to the City of St. Helena.

Preparing for Plan Implementation

Prior to initiating the Disinfection Study (Study), LWA verified the accuracy of field meters available for lab tests. The City of St. Helena's WWTRP lab maintains two pH meters (Oakton pH Testr 30 and Hanna 991003 field meters) and one field meter for measuring chlorine residual (Hach Pocket Colorimeter II). Quality control data indicate that the Hanna pH meter (maintained as a benchtop meter in the lab) is more accurate than the Oakton pH meter, so the Hanna meter was selected for the Study. Accuracy of the Hach chlorine meter was verified at the Low Range setting (0 to 2 mg/L total chlorine) using a Hach chlorine standard diluted down to 2 mg/L. Calibration verification results for both the Hanna and Hach meters demonstrated accuracy that is sufficient for regulatory reporting. Calibration records are included in **Attachment A** (pages A-1 through A-3).

The chlorine standard and pH buffers used for instrument calibration and calibration verification were obtained from a local laboratory. The local laboratory also provided a 0.025N solution of sodium thiosulfate, used for dechlorinating samples for Procedure 2. The color reagent used for the total chlorine analysis (N, N-diethyl-p-phenylenediamine, or DPD) was obtained from the WWTRP laboratory. The purity of all reagents used for the Study were reagent grade or higher. A supply of high purity laboratory reagent water was provided in several priority-cleaned 4-liter amber glass bottles by Caltest Laboratory in Napa. Prior to and throughout the Study, labware was cleaned using a dilute Liquinox® detergent solution, rinsed with tap water, then triple-rinsed with lab reagent water. Clean sample bottles containing the appropriate preservative were supplied by Caltest Laboratory.

Concentration of WWTRP's Sodium Hypochlorite Solution and Procedure 2 Trial Run

On Tuesday, July 18, 2017, a sample of sodium hypochlorite (hypochlorite) was diluted and analyzed to determine the actual concentration. The concentration was determined to be 12.8%, which is the concentration listed by the manufacturer. Serial dilutions of the 12.8% solution were used to prepare a dosing solution of approximately 5,000 mg/L hypochlorite. The concentration of the dosing solution was verified by further diluting it down to 2 mg/L and analyzing it for total chlorine residual (TRC) with the Hach chlorine meter. This dosing solution was used for a successful trial run of an abbreviated version of Procedure 2, conducted to determine the approximate concentration of sodium thiosulfate required to neutralize 1 mg/L of chlorine in spiked samples of pond effluent. The trial run established that 2 parts of sodium thiosulfate are required to neutralize 1 part of chlorine in Pond 3 effluent. This procedure was repeated on Wednesday, July 19 prior to running Procedure 2 in its entirety, and the concentration of the dosing solution was verified again after Procedure 2 was completed. Raw data for this procedure are included on bench sheets in **Attachment A** (pages A-5 and A-6).

Attachment B provides the status of WWTRP operations throughout the Study and summarizes each day's activities.

Procedures 1 and 2. Pond 3 Effluent Baseline Conditions and Dosing Study

Procedures 1 and 2 were performed on Wednesday, July 19. Pond 3 Effluent (unchlorinated) was used for these procedures because Pond 4 was pumped down too low on the previous day. Prior to collecting Pond 3 Effluent samples, a fresh sample of hypochlorite was collected from the storage tank to prepare a fresh ~5,000 mg/L chlorine dosing solution.

Samples of Pond 3 Effluent were collected for Procedures 1 and 2, including a sample for ammonia-N (250-mL HDPE bottle with H₂SO₄ preservative), a sample for total coliform (sterile 100-mL bottle with sodium thiosulfate preservative), and 2.5 gallons for running pH, temperature, TRC and the dosing study. Sample containers for ammonia-N and total coliform were labeled and stored in the WWTRP refrigerator until the Caltest courier picked samples up at noon on the same day. pH, temperature and TRC were analyzed immediately in the lab.

For Procedure 2, six aliquots of Pond 3 Effluent were spiked with dosing solution to 5, 10, 15, 20, 25 and 50 mg/L chlorine. Each aliquot was thoroughly mixed and then analyzed immediately for TRC and pH, and a portion of the 50 mg/L chlorine aliquot was poured off into a separate container for ammonia-N analysis (250-mL HDPE with H₂SO₄ preservative). The container was labeled and stored in the WWTRP lab refrigerator until picked up by the Caltest courier at noon that same day. Spiked aliquots were allowed to sit for 30 minutes, after which chlorine was neutralized with 0.025N (3,950 mg/L) sodium thiosulfate. Based on results from the Procedure 2 trial run performed on the previous day, 2 parts of sodium thiosulfate were added for each part of chlorine dosed, so that sodium thiosulfate was spiked to 10 mg/L in the 5 mg/L chlorine aliquot, to 20 mg/L in the 10 mg/L chlorine aliquot, and so on. Neutralized samples were thoroughly mixed and immediately poured off into sterile 100-mL coliform bottles containing the required sodium thiosulfate preservative. Sample containers were labeled and stored in the WWTRP refrigerator until the Caltest courier picked them up at noon the same day. Sample receiving staff at Caltest was notified that coliform tests should be started as close to 8 hours after samples were collected as possible.

Analytical results for Procedure 1 (Pond 3 Effluent baseline conditions) are presented in Table 1, below. Results for Procedure 2 (dosing study) are presented in Table 2 on the following page. The field log and bench sheets for both Procedures are included in **Attachment A** (pages A-4 through A-7). Caltest Laboratory's report of results is included as **Attachment C**, and an electronic data deliverable (EDD) prepared by Caltest is included in the electronic submittal of this report.

Table 1. Procedure 1 test results.

Sample ID	pH (Units)	Temperature (°C)	Total Coliform (MPN/100 mL)	Ammonia-N (mg/L)
Pond 3 Effluent (unchlorinated)	8.7	22.8	>1,600	0.87

Table 2. Procedure 2 test results.

Sample ID	Chlorinated Pond 3 Effluent			Dechlorinated Pond 3 Effluent		
	pH (Units)	TRC (mg/L)	Ammonia-N (mg/L)	Total Coliform (MPN/100 mL)	Time Coliform Sample Collected	Time Coliform Test Started
5 mg/L Cl ₂	8.7	3.6	----	2	09:10	14:30
10 mg/L Cl ₂	8.7	5.2	----	2	09:10	14:32
15 mg/L Cl ₂	8.6	5.1	----	2	09:40	14:34
20 mg/L Cl ₂	8.7	8.3	----	2	09:40	14:36
25 mg/L Cl ₂	8.6	16.2	----	4.5	10:35	14:38
50 mg/L Cl ₂	8.8	38.8	0.34	<1.8	10:35	14:43

TRC: Total Residual Chlorine

Procedure 3. Chlorine Contact Tank Effluent / Pond 5 Dechlorination Simulation

Procedure 3 was performed on Tuesday, July 18 through Wednesday, July 19; samples of chlorinated CCT Effluent were collected on July 18 while Pond 3 Effluent was being disinfected.

CCT Effluent was collected into three new plastic pre-cleaned 5-gallon buckets. Additional sample volume was collected into a 4-L amber glass bottle for pH, temperature and TRC, and a sample was collected for ammonia-N analysis into a 250-mL HDPE container with H₂SO₄ preservative. The ammonia-N container was labeled and stored in the WWTRP lab refrigerator until the Caltest courier picked samples up at noon on July 19. CCT Effluent was immediately analyzed for pH, temperature and TRC, and the three 5-gallon buckets were placed outside in the shade, uncovered, where they remained for the duration of the procedure. A sample from each 5-gallon bucket was analyzed for TRC at 8-hour intervals: bucket #1 at 22:15 on Tuesday, July 18, and bucket #2 and bucket #3 at 06:15 and 14:15, respectively, on Wednesday, July 19.

Analytical results for Procedure 3 are presented in Table 3, below. The field log and bench sheets for Procedure 3 are included in Attachment A (pages A-4 and A-8). The result for ammonia-N and associated quality control data are included in Caltest Laboratory's analytical report in **Attachment C**; the EDD prepared by Caltest is included with the electronic submittal of this report.

Table 3. Procedure 3 test results.

Sample ID	CCT Effluent Samples Collected:			
	7/18/17 at 14:15	7/18/17 at 22:15	7/19/17 at 06:15	7/19/17 at 14:15
pH (Units)	8.3	----	----	----
Temperature (°C)	25.3	----	----	----
TRC (mg/L)	2.8	1.2	1.0	0.7
Ammonia-N (mg/L)	0.45	----	----	----

TRC: Total Residual Chlorine

Procedure 4. Pond 5 Chlorine Profile

Procedure 4 was performed on Thursday, July 20 while Pond 4 Effluent was being disinfected. Pond 4 Effluent disinfection began at approximately 10:30 on July 19, approximately 21.5 hours before Pond 5 samples were collected. Procedure 4 was completed just before the pump started to lose suction, as the water level in Pond 4 was low.

Six samples were collected from Pond 5 along the length of the CCT Effluent discharge line: at the intake into the Final Effluent channel (i.e., at the CCT structure), at the end of the CCT Effluent discharge line into Pond 5, and at 4 evenly-spaced points in between, approximately 115 feet apart. Approximate sampling locations (illustrated in **Attachment D**) were marked off on the northeast levee / fence line prior to sampling so that the sampler, sitting in a boat, could be guided to each sampling location from the levee. Samples were collected at approximately 1 foot beneath the pond surface into clean, unused 50-mL HDPE bottles and transported to the water's edge, where they were analyzed immediately for TRC.

Analytical results for Procedure 4 are presented in Table 4, below. The field log and bench sheets for Procedure 4 are included in **Attachment A** (pages A-4 and A-8).

Table 4. Procedure 4 test results.

Sample ID	TRC (mg/L)
Sample #1 (at CCT structure)	0.2
Sample #2	0.2
Sample #3	0.1
Sample #4	0.1
Sample #5	0.1
Sample #6 (at the end of the discharge line into Pond 5)	0.2

TRC: Total Residual Chlorine

It is worth noting here that sampling personnel observed evidence of a hole in the discharge line (i.e., significant upward swell at the water surface) between sample locations #3 and #4, possibly indicative of short-circuiting in the pond.

Attachment A
Calibration Logs, Field Logs and Bench Sheets

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St. Helena WWTRF Meter Calibration Log

OAKTON pH Testr 30 (3 pt CAL (ATC))

	Date	Time	Init	Calibration Buffers [1]			mv	Slope [2]	ICV Buffers [3]		CCV Buffers [4]	
				pH 4	pH 7	pH 10			pH 6	pH 8	pH 6	pH 8
MON	7/17/17	1404	SS	X	X	X	unavailable		6.09	8.11		
TUE	7/18/17	1415	SS						SS	8.09		8.09

Notes:

[1] Buffer ID / Expiration Date:

Source:
Caltest
↓
NSD

Buffer	Manuf.	Lot No.	Exp. Date
4	Hach	A7060	5/2021
7	Hach	A7072	3/2019
10	Hach	A7053	2/2018
6	BDH	1701896	12/2018
8	Fisher	168365	7/2018

[2] The slope is calculated as the higher pH mv minus the lower pH mv. The theoretical slope value is -58 ± 3 mv; the slope acceptance range is -55 mv to -60 mv. If the slope fails to meet acceptance criteria, the meter must be recalibrated. If the calibration fails again, the instrument must be serviced. A successful calibration must be obtained prior to analysis of the ICV or any environmental samples.

[3] ICV = Initial Calibration Verification. After an acceptable calibration (slope meets acceptance criteria), pH 6 and pH 8 buffers are analyzed to verify calibration accuracy. Acceptance limits for ICVs: ± 0.2 pH units. If the ICV fails to meet acceptance limits, the meter must be recalibrated and the ICV rerun. If the ICV fails again, the meter must be serviced.

[4] CCV = Continuing Calibration Verification. After all environmental samples are analyzed, a final calibration verification (CCV) must be successfully analyzed to demonstrate that the calibration is still valid. Acceptance criteria are the same as those in footnote [3] above.

7/17 @ 1350:

- rehydrated the sponge in the cap
- per manuf instructions, soaked in pH 10 buffer for 10 min
- In 4 buffer, read 4.15 (temp = 25°C) → calibrated.
- In CAL mode, top reading = 4.77 (based on last calibr. → CAL)
- In 7 buffer, read 8.0 (→ pressed CAL)
- In 10 buffer, read 9.91 (→ pressed CAL)

LWA
7/14/17

A-1

**St. Helena WWTRF
Meter Calibration Log**

*JR calibrated daily /
I didn't calibrate.*

BENCHTOP METER *Hanna 991003*

*(2 pt cal)
+ ATC*

Date	Time	Init	Calibration Buffers [1]			mv	Slope [2]	ICV Buffers [3]		CCV Buffers [4]	
			pH 4	pH 7	pH 10			pH 6	pH 8	pH 6	pH 8
7/17/17	1429	SS	—	—	—	—	—	5.9	—	5.96	7.93
7/19/17	1145	SS	—	—	—	—	—	—	—	—	7.92
7/19/17	0655	SS	—	—	—	—	—	—	—	—	7.93

Notes:

[1] Buffer ID / Expiration Date:

Buffer	Manuf.	Lot No.	Exp. Date
4			
7			
10			
6			
8			

*See buffer
info on
OAKTON
calibr. page*

[2] The slope is calculated as the higher pH mv minus the lower pH mv. The theoretical slope value is -58 ± 3 mv; the slope acceptance range is -55 mv to -60 mv. If the slope fails to meet acceptance criteria, the meter must be recalibrated. If the calibration fails again, the instrument must be serviced. A successful calibration must be obtained prior to analysis of the ICV or any environmental samples.

[3] ICV = Initial Calibration Verification. After an acceptable calibration (slope meets acceptance criteria), pH 6 and pH 8 buffers are analyzed to verify calibration accuracy. Acceptance limits for ICVs: ± 0.2 pH units. If the ICV fails to meet acceptance limits, the meter must be recalibrated and the ICV rerun. If the ICV fails again, the meter must be serviced.

[4] CCV = Continuing Calibration Verification. After all environmental samples are analyzed, a final calibration verification (CCV) must be successfully analyzed to demonstrate that the calibration is still valid. Acceptance criteria are the same as those in footnote [3] above.

*7/17: pH 7 reads 6.95
pH 4 " 3.94
pH 10 " 9.95*

LWA
7/14/17

A-2

**St Helena WWTRF
Disinfection Study Field Log**

Station ID / Procedure No.	Date	Time	Init	pH ¹ (units)	Temp ¹ (°C)	Cl ₂ -Tot ² (mg/L)	Ammonia-N ³ Time Sampled	Total Coliform ⁴ Time Sampled	Additional Sample Vol ⁵ Time Sampled	Disinfection Status
Pond 3 EFF PROC 2 TRIAL RUN	7/18/17	1130	JR	—	—	—	—	—	~2.5 gal	Pumping Pond 3 to CCT since 0715
CCT EFF PROC 3	7/18/17	1415	JR	—	—	—	1415	—	3x5-gal 1x4-L amber glass	Still pumping Pond 3 EFF to CCT
Pond 3 EFF PROC 2	7/19/17	0645	SS	8.71	22.8	—	0645	0645	2.5 gal	Still disinfecting Pond 3 EFF (switched to P4 ~1015-1030)

¹ Measured w/Hanna 991003 pH meter.

² Measured using a Hach Pocket Colorimeter II / DPD method.

³ Collected in a 250-mL HDPE container (H₂SO₄ to pH <2).

⁴ Collected in a 120-mL HDPE container w/Na₂S₂O₃ powder.

⁵ Unpreserved sample for further testing in lab; collected in clean cubitainers or 5-gal buckets.

Field meters not used in field — used in lab.

7/18/17: 0700 - ops found that pumps @ P4 EFF lost suction - only cl₂ = being pumped into Pond 5
 → 0715 ops started pumping P3 EFF to CCT. collected sample for
 PROC. 2 Trial Run @ 1130.
 7/19/17 Disinfecting P3 EFF (still) — until 1015-1030 → switched back to P4 EFF to CCT

St Helena WWTRP
Disinfection Study Bench Sheet

7/17/17 Chlorinating P4 eff ^{started} @ 1022
7/18/17 early am P4 1st suction
→ chlorinating P4 eff @ 0715

Procedures 1 & 2: Hypo Concentration and Dosing Study

Date	Time	Init	mL Std	Std Conc or Sample (mg/L)	Final Vol (mL)	Theoret. Final A ₂ Conc (mg/L)	Time Spiked	Cl ₂ -Tot ¹ (mg/L)	pH ² (units)	NH ₃ -N ³ Time Sampled	Time Spiked + 30 min.	mL Na Thio	Conc Na Thio (mg/L)	Final NaThio Conc (mg/L)	Cl ₂ -Tot ¹ (mg/L) (dechlor)	Total Coliform ⁴ Time Sampled
7/18/17	0915	SS	19.5	12,800	500	4992										
	1020	SS	0.5	4992	50	49.92										
	1025	↓	1.0	49.92	25	2.0		2.14	1.54	100% over						
	1030	↓	1.0	49.92	25	2.0		2.18	1.09	100% over						
7/18/17 * 1130 JP [Pond 3 EFF: PREC 2 TRIAL] 2.52 / 9.06																
			1.0	4992	1000	5	1343.5	9.68	9.03		1415	0.51	3950	200/10	0.07	
			2.0	4992	500	20	1343.5	14.25	9.06		1400	0.25	3950	25/40	0.57	
			5.0	4992	500	50	1343.5	44.5	9.15		1215	0.63	3950	25/100	0.02	

¹ Measured using a Hach Pocket Colorimeter II / DPD.

² Measured the benchtop meter, calibrated daily. Hanna 991003

³ Collected in a 250-mL HDPE container (H₂SO₄ to pH <2).

⁴ Collected in a 120-mL HDPE container w/Na₂S₂O₃ tablet.

7/18/17 Hypo = 12.8% - new delivery (per JP). Sample collected by JP ~ 0915

**St Helena WWTRP
Disinfection Study Bench Sheet**

Procedure 1 & 2

Procedure 1 & 2																		
	Date	Time	Init	mL Std	Std Conc	Final	Final	Time Spiked	Cl ₂ -Tot ¹	pH ²	NH ₃ -N ³	Time	mL Na Thio	Conc	Final	Cl ₂ -Tot ¹	Total	
					or Sample (mg/L)	Vol (mL)	Conc (mg/L)		(mg/L)	(units)	Time Sampled	+ 30 min.		Na Thio (mg/L)	NaThio Conc (mg/L)	(mg/L) (dechlor)	Time Sampled	
Hypo CF	7/19/17	0741	SS	19.5	12,800	500	4992											
		0743	SS	0.5	4992	50	4992											
		0745	SS	1.0	49.92	25	2.0		2.10	(105% rec.)								
				1.0	49.92	25	2.0											
				~ PROCEDURE 2 RUN ON POND 3 EFF ~														
Procedure 2	7/19/17		SS	1.0	4992	1000	5 ppm	0830	0.86**	8.75	22.9°C	0900	0.51	3950	200/10		0910	
				1.0	4992	500	10		0.63	8.71	22.7°C	0900	1.1	3950	200/22		0910	
				1.5	4992	500	15	0900	0.41	8.64		0930	1.6	3950	200/32		0940	
				2.0	4992	500	20		0.66	8.65		0930	2.1	3950	200/41		0940	
				2.5	4992	500	25	1000	0.97	8.61		1030	2.6	3950	200/51		1035	
				10	4992	1000	50		1.24	8.75	1020	1030	5.1	3950	200/101		1035	
		1045	SS	0.5	4992	50	4992											
			SS	1.0	49.92	25	2.0		2.05	(103% recovery)								
													</					

¹ Measured using a Hach Pocket Colorimeter II / DPD.

² Measured the benchtop meter, calibrated daily. (Calibration verified (Hamra 491003))

³ Collected in a 250-mL HDPE container (H₂SO₄ to pH <2).

⁴ Collected in a 120-mL HDPE container w/Na₂S₂O₃ tablet. powder.

0.025 N Na₂S₂O₃; (3950 ppm)

** water resistant; before dilution factor applied -

see "Procedure 2: Dosing study sheet for results, DFs, etc."

7/19/17: Disinfecting Pond 3 EFF for this ~~study~~ Procedure/ops switched to P4 ~ 1015-1030.

Procedure 2 Dosing Study
Summary of Sample Prep Details and Lab Results

7/18/17: Pumping P3 Eff to CT
from 0715 on...
7/19/17: Still disinfecting P3 Eff
for procedure 2
(switched to P4 Eff around
1015-1030)

Procedure 2: Dosing Study

Pond 3 Sampled Date & Time: 7/19/17 @ 0645

pH (units): 8.71

Temp (°C): 22.8

Ammonia-N (mg/L): 0.87

Total Coliform (MPN/100 mL) > 1,600 MPN/100 mL

Dosing Study Data

Parameter	5 ppm Cl ₂ in Pond Eff	10 ppm Cl ₂ in Pond Eff	15 ppm Cl ₂ in Pond Eff	20 ppm Cl ₂ in Pond Eff	25 ppm Cl ₂ in Pond Eff	50 ppm Cl ₂ in Pond Eff
mL 4992 ppm hypo	1.0	1.0	1.5	2.0	2.5	10
V _f P3 Eff (mL)	1000	500	500	500	500	1000
Theoretical ppm Cl ₂	5	10	15	20	25	50
Start Time	0830	0830	0900	0900	1000	1000
pH (Units) after dosed	8.70	8.71	8.64	8.65	8.61	8.75
mL spiked sample	6	3	2	2	2.5	0.8
V _f spiked sample (mL)	25	25	25	25	25	25
Cl ₂ (after dosed-readout)	0.86	0.63	0.41	0.66	0.97	1.24
Dilution Factor	4.17	8.33	12.5	12.5	16.7	31.25
mg/L Cl ₂ (after dosed)	3.6	5.2	5.1	8.3	16.2	38.8
Ammonia (after dosed)						0.34
End Time	0900	0900	0930	0930	1030	1030
mL 3950 ppm NaThio	0.51	1.1	1.6	2.1	2.6	5.1
V _f P3 Eff	200	200	200	200	200	200
Theoretical ppm NaThio	10	20	30	40	50	100
Cl ₂ after dechlor (no dil'n)	—	—	—	—	—	—
Total coliform (MPN/100 mL)	2	2	2	2	4.5	<1.8

[Verified conc. of dosing solution before and after the Dosing Study.]

St Helena WWTRP
Disinfection Study Bench Sheet *Field Log*

Procedure 3: CCT - start after 9:30 am

POND 3 ~~FF~~ being
disinfected

[illegible]¹ Measured with a field meter, calibrated daily.

² Measured using a Hach Pocket Colorimeter II / DPD.

³ Collected in a 250-mL HDPE container (H_2SO_4 to pH <2).

⁴ Unpreserved sample for further testing in lab.

10 μ L CCF eff in 25 μ L DI (1:2.5 dilution)

Procedure 4: Pond 5 Chlorine Profile

Hach Pocket Colorimeter II
used in field - boat

Date	Time	Init	Station ID	Cl ₂ -Tot ¹ (mg/L)
7/20/17	0754	SS	#1 - @ CCT structure	0.18
	0758	SS	#2	0.22
	0800		#3	0.08
	0812		#4	0.10
	0824		#5	0.09
	0827	✓	#6 Above end of Pond 5 INF pipe	0.22
			(see Google Earth image)	don

Pond 4 EFF
= being
disinfected

¹ Measured using a Hach Pocket Colorimeter II / DPD.

7/20 ^{ss} ~~SS~~ P5 U₂:
started w/ 1:5 dil'n (10 mL P5 EFF in 25 mL DI) —
1:2.5 light color → very
undiluted
7/20 am: Pond 4 went hold suction long

7/19/17 started disinfecting Pond 4 off around
1015-1030

2/1/9 CKM JH want to: going
to on PS tomorrow

Attachment B

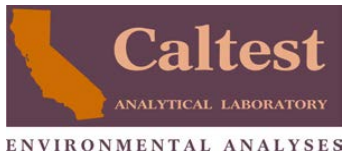
WWTRP Operational Status and Activity Log

Attachment B
Disinfection Study: Operations Status and Activity Log

Date	WWTRP Status / Procedure Performed / Notes
7/17/17 Monday	Chlorine dosing started at 10:22 on Pond 4 Effluent. CCT Effluent pH at ~12:30: 9.03 (measured by WWTRP operators) CCT Eff Free Chlorine: >2.2 mg/L (over range)
7/17/17 Monday	- Calibrated Oakton field pH/temp meter (ATC, 3-pt cal) - Buffer to verify 4-7 calibration (pH 6) read 6.09 - Buffer to verify 7-10 calibration (pH 8) read 8.11 (should be w/in ± 0.1 units) - Ran mid-range buffers on Hanna benchtop meter (ATC, 2-pt cal). pH 6 read 5.96; pH 8 read 7.93. <i>Decided to use the Hanna meter for the Disinfection Study.</i> - Did not run any of the Disinfection Study procedures. Prepared the lab for Tuesday.
7/18/17 Tuesday	- Pond 4 had lost suction when operators arrived, so only 12.8% hypochlorite was being pumped into Pond 5. Decided not to do Procedure 4 (Pond 5 Sampling) on 7/18/17. - Operators started pumping Pond 3 effluent to the CCT at 07:15 / Procedure 3 run on Pond 3 Effluent.
7/18/17 Tuesday	- Prepared Chlorine standard to verify the Hach Pocket Colorimeter II. Low Range (LR) setting worked great (2.03 mg/L for 94% recovery), but High Range (HR) setting was way off (4.9 mg/L; 227 % recovery). Prepared / analyzed a second aliquot of the standard and obtained the same results (LR 96% recovery; HR 236 % recovery). <i>Decided to use the Hach meter at LR setting (0 to 2 ppm) for the Study & dilute any samples at > 2 ppm chlorine.</i> Performed Procedure 1: verified sodium hypochlorite (hypo) concentration at 12.8%. - Prepared a hypo dosing solution and did a trial run of Procedure 2 (spiked aliquots of Pond 3 Effluent to 5, 20 and 50 mg/L chlorine). - Determined that it took 2 parts sodium thiosulfate to neutralize 1 part chlorine in spiked samples of Pond 3 Effluent, with a slight residual remaining. Performed Procedure 3: ran pH/temp, chlorine on CCT Eff and collected a sample for ammonia-N. Collected 3 x 5-gallon buckets of CCT Eff for chlorine analysis at 8 hours, 16 hours, and 24 hours. Analyzed the 8-hour sample at ~22:15.
7/19/17 Wednesday	- Disinfecting Pond 3 Effluent until 1015 – 1030 / Procedure 2 run on Pond 3 Effluent. - Operators began disinfecting Pond 4 effluent again around 1015-1030.
7/19/17 Wednesday	- Continued with Procedure 3: analyzed CCT Eff in the 2nd 5-gallon bucket at ~0615. - Prepared a new hypo dosing solution with fresh 12.8% hypo sample and verified the concentration. Performed Procedure 2 (Dosing Study) on Pond 3 Effluent (samples collected at 0645). - Labeled sample containers, filled out the COC & handed off samples to the Caltest courier. - Analyzed the dosing solution after completing the study; concentration was still valid. - Completed Procedure 3: analyzed CCT Eff in the 3rd 5-gallon bucket at ~1415. - Prepared glassware and equipment for Procedure 4 (Pond 5 samples); marked Pond 5 sampling locations along the northeast levee/fence line.
7/20/17 Thursday	Still disinfecting Pond 4 Effluent / Procedure 4 run while disinfecting Pond 4 Effluent.
7/20/17 Thursday	Performed Procedure 4 (collected 6 samples of Pond 5 Effluent equally spaced between the Pond 5 discharge point (~@CCT structure) and the Pond 5 influent point. - Analyzed the hypo dosing solution at the end of the procedure (3 hours after it was prepared); concentration remained the same.

Attachment C
Caltest Laboratory Analytical Results

NELAP/ORELAP Certification 4036



CA-ELAP Certification 1664

Friday, August 04, 2017

Shelli St Clair
Larry Walker Associates
1480 Drew Avenue, Suite 100
Davis, CA 95618

Re Lab Order: S070713
Project ID: ST HELENA WWTP DISINFECTION

Collected By: J.ROSSINI/SHELLI ST. CLAIR
PO/Contract #:

Dear Shelli Clair:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, July 19, 2017. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Enclosures


Project Manager: Greg Martindale

8/4/2017 16:23

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Lab Order: S070713
 Project ID: ST HELENA WWTP DISINFECTION

Lab ID	Sample ID	Matrix	Date Collected	Date Received
S070713001	POND 3	Water	07/19/2017 06:45	07/19/2017 12:45
S070713002	POND 3-5	Water	07/19/2017 09:10	07/19/2017 12:45
S070713003	POND 3-10	Water	07/19/2017 09:10	07/19/2017 12:45
S070713004	POND 3-15	Water	07/19/2017 09:40	07/19/2017 12:45
S070713005	POND 3-20	Water	07/19/2017 09:40	07/19/2017 12:45
S070713006	POND 3-25	Water	07/19/2017 10:35	07/19/2017 12:45
S070713007	POND 3-50	Water	07/19/2017 10:35	07/19/2017 12:45
S070713008	CCT EFFLUENT	Water	07/18/2017 14:15	07/19/2017 12:45

8/4/2017 16:23

REPORT OF LABORATORY ANALYSIS

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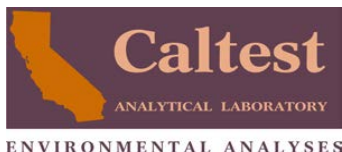
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NARRATIVE

Lab Order: S070713
Project ID: ST HELENA WWTP DISINFECTION

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis are not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

8/4/2017 16:23

REPORT OF LABORATORY ANALYSIS

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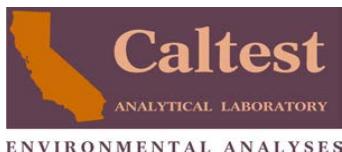
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ANALYTICAL RESULTS

Lab Order: S070713
Project ID: ST HELENA WWTP DISINFECTION

Lab ID	S070713001	Date Collected	7/19/2017 06:45	Matrix	Water			
Sample ID	POND 3	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	MYS	
Total Coliform	>1600 MPN/100mL	1.8	1.8	1	07/19/17 13:44	BML 13762	07/21/17 13:13	BML 13763
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-97				Analyzed by:	JDC	
Ammonia (as N)	0.87 mg/L	0.1	0.040	1		08/03/17 00:00	WAT 4367	
Lab ID	S070713002	Date Collected	7/19/2017 09:10	Matrix	Water			
Sample ID	POND 3-5	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	MYS	
Total Coliform	2 MPN/100mL	1.8	1.8	1	07/19/17 14:30	BML 13762	07/21/17 13:15	BML 13763
Lab ID	S070713003	Date Collected	7/19/2017 09:10	Matrix	Water			
Sample ID	POND 3-10	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	BCP	
Total Coliform	2 MPN/100mL	1.8	1.8	1	07/19/17 14:32	BML 13762	07/22/17 12:49	BML 13763
Lab ID	S070713004	Date Collected	7/19/2017 09:40	Matrix	Water			
Sample ID	POND 3-15	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	2 MPN/100mL	1.8	1.8	1	07/19/17 14:34	BML 13762	07/23/17 13:23	BML 13763
Lab ID	S070713005	Date Collected	7/19/2017 09:40	Matrix	Water			
Sample ID	POND 3-20	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	2 MPN/100mL	1.8	1.8	1	07/19/17 14:36	BML 13762	07/23/17 13:24	BML 13763

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REPORT OF LABORATORY ANALYSIS

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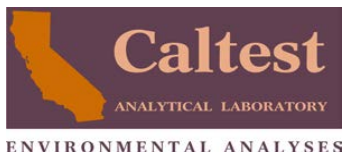
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ANALYTICAL RESULTS

Lab Order: S070713
Project ID: ST HELENA WWTP DISINFECTION

Lab ID	S070713006	Date Collected	7/19/2017 10:35	Matrix	Water			
Sample ID	POND 3-25	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	4.5 MPN/100mL	1.8	1.8	1 07/19/17 14:38	BML 13762	07/23/17 13:28	BML 13763	
Lab ID	S070713007	Date Collected	7/19/2017 10:35	Matrix	Water			
Sample ID	POND 3-50	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Coliform Analysis (MPN 25-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	BCP	
Total Coliform	ND MPN/100mL	1.8	1.8	1 07/19/17 14:43	BML 13762	07/22/17 12:51	BML 13763	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-97				Analyzed by:	JDC	
Ammonia (as N)	0.34 mg/L	0.1	0.040	1		08/03/17 00:00	WAT 4367	
Lab ID	S070713008	Date Collected	7/18/2017 14:15	Matrix	Water			
Sample ID	CCT EFFLUENT	Date Received	7/19/2017 12:45					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-97				Analyzed by:	JDC	
Ammonia (as N)	0.45 mg/L	0.1	0.040	1		08/03/17 00:00	WAT 4367	

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QUALITY CONTROL DATA

Lab Order: S070713
Project ID: ST HELENA WWTP DISINFECTION

Analysis Description:	Nitrogen, Ammonia (as N)	QC Batch:	WAT/4367
Analysis Method:	SM 4500-NH3 C-97	QC Batch Method:	SM 4500-NH3 C-97

METHOD BLANK: 772563

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Ammonia (as N)	ND	0.1	.04	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 772564 772565

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Ammonia (as N)	mg/L	5	4.94	4.94	99	99	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 772577 772578

Parameter	Units	S070695001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Ammonia (as N)	mg/L	0.13	5	5.11	5.1	100	99	70-130	0.2	20	

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REPORT OF LABORATORY ANALYSIS

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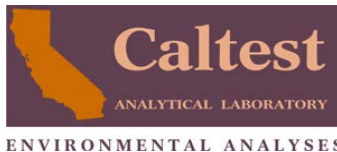
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QUALITY CONTROL DATA QUALIFIERS

Lab Order: S070713
 Project ID: ST HELENA WWTP DISINFECTION

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: S070713
 Project ID: ST HELENA WWTP DISINFECTION

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
S070713001	POND 3	SM 9221 B/E-06	BML/13762	SM 9221 B/E-06	BML/13763
S070713002	POND 3-5	SM 9221 B/E-06	BML/13762	SM 9221 B/E-06	BML/13763
S070713003	POND 3-10	SM 9221 B/E-06	BML/13762	SM 9221 B/E-06	BML/13763
S070713004	POND 3-15	SM 9221 B/E-06	BML/13762	SM 9221 B/E-06	BML/13763
S070713005	POND 3-20	SM 9221 B/E-06	BML/13762	SM 9221 B/E-06	BML/13763
S070713006	POND 3-25	SM 9221 B/E-06	BML/13762	SM 9221 B/E-06	BML/13763
S070713007	POND 3-50	SM 9221 B/E-06	BML/13762	SM 9221 B/E-06	BML/13763
S070713001	POND 3	SM 4500-NH3 C-97	WAT/4367		
S070713007	POND 3-50	SM 4500-NH3 C-97	WAT/4367		
S070713008	CCT EFFLUENT	SM 4500-NH3 C-97	WAT/4367		

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REPORT OF LABORATORY ANALYSIS

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PAGE 1 OF 1

LAB ORDER #:

5070713

CLIENT:

Larry Walker Assoc

PROJECT # / PROJECT NAME
St. Helena WWTP Disinfection Study

REPORT ATTN: Michelle Trish @ GAD com
Kstinec@mh.com; Shellis@hva.com

TURN-AROUND TIME

BILLING ADDRESS:

1480 Drew Ave, Suite 100
DAMS, CA 95618

PHONE # (530) 753-6470

FAX PHONE:

SAMPLE (PRINT & SIGN NAME): Larry Walker

Stella Walker

DUE DATE:

☐ STANDARD
☐ RUSH

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. OF GRAB	REMARKS
-8	7/18/17	1415	WW	1X 250 mL	H2SO4	CCT EFFLUENT		G	
-1	7/19/17	0645	WW	1X 250 mL	H2SO4	Pond 3		G	
-1	7/19/17	0645	WW	1X 250 mL	H2SO4	Pond 3		G	
-2	7/19/17	0910	WW	1X 250 mL	H2SO4	Pond 3-5		G	
-3	7/19/17	0910	WW	1X 250 mL	H2SO4	Pond 3-10		G	
-4	7/19/17	0940	WW	1X 250 mL	H2SO4	Pond 3-15		G	
-5	7/19/17	0940	WW	1X 250 mL	H2SO4	Pond 3-20		G	
-6	7/19/17	1035	WW	1X 250 mL	H2SO4	Pond 3-25		G	
-7	7/19/17	1035	WW	1X 250 mL	H2SO4	Pond 3-50		G	
-7	7/19/17	1020	WW	1X 250 mL	H2SO4	Pond 3-50		G	

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY		DATE/TIME		RECEIVED BY		DATE/TIME		RECEIVED BY	
Stella Walker		7/19/17		Larry Walker		7-19-17		6/15/17	
RELINQUISHED BY		DATE/TIME		RELINQUISHED BY		DATE/TIME		RECEIVED BY	

Samples: WC	MICRO	BIO	MET	SV	VOA	TEMP: 4.4 °C	SEALED: ☒ / ☐ / ☐	INTACT: ☒ / ☐ / ☐
BD: BIO	WC	MET						
CC: AA	SV	VOA						
SIL: HP	PT	OT	VOA					
W/HNO ₃	H ₂ SO ₄	NaOH						
PIL: HNO ₃	H ₂ SO ₄	NaOH	HCL					

COMMENTS

MATRIX: W = Aqueous Nondrinking Water, Digested Metals;
ML = Low R.L.s, Aqueous Nondrinking Water, Digested Metals;
DW = Drinking Water, SL = Soil, Sludge, Solid, FP = Free Product
CONTAINER TYPES: AL = Amber Litrer, AHL = 500 ml
Amber, PT = Pint (Plastic), QT = Quart (Plastic), HG = Half Gallon
(Plastic), SJ = Soil Jar, B4 = 4 oz. BACT, BT = Brass Tube, VOA =
40 mL VOA, OT = Other Type Container

Attachment D
Pond 5 Sampling Locations

Attachment D
Pond 5 Sampling Locations



D-1

Appendix J – Initial Infiltration Assessment (October 2017)





Memorandum

October 27, 2017

To: Erica Ahmann Smithies, P.E., Director of Public Works
Felix Hernandez, Utilities Operations Manager

From: Christopher D. Trumbull, P.E., G.E., D.GE

Project: 11110776 St. Helena-WWTP Feasibility Study

Subject: Initial Infiltration Assessment

1. Introduction

The City of St. Helena is currently completing the necessary technical work to develop recommendations for modifications to the Wastewater Treatment and Reclamation Plant in order to obtain recommendations for improvements to meet future permit requirements.

As part of the efforts, GHD recently completed a preliminary infiltration testing program within the City's irrigation fields. The preliminary testing was conducted in accordance with our proposal in Memorandum format dated May 24, 2017.

The objective of our preliminary infiltration investigation is to evaluate and understand the soil, groundwater, and infiltration properties of the site to provide an estimate of initial infiltration for planning purposes. The results of our testing are presented below, while the site location map illustrating the test locations as well as detailed laboratory test results are attached to this memorandum.

2. Field and Laboratory Testing

Between July 31 and August 2, 2017, GHD performed seven percolation tests across the investigated site. The percolation tests were completed in Borings B-1, B-3, B-4 and B-7 through B-10 at depths ranging approximately from 2 to 3½ feet below existing site grade in general accordance with the County of Napa percolation guidelines. The drill holes were augured using a one man handheld gas powered auger.

It should be noted that the percolation tests were not completed in Borings B-2, B-5 and B-6 due to shallow refusals on hard soil within the first foot of the holes.

Following the auguring and percolation testing, grab samples were collected at each boring location and brought back to GHD's geotechnical laboratory for visual inspection and identification. Furthermore, a total of 4 representative soil samples were submitted for sieve analyses. This testing was completed in order to obtain the grain size distribution for classification purposes and to confirm the permeability obtained during



the field testing operations. The grain size distribution results are presented in the infiltration values table presented below.

Based on the laboratory test results as well as the visual observations completed on site, the subsoils across the site can be clayey sand (SC) to a sandy clay (CL) in accordance with the United Soil Classification System. In addition, it should be noted that cementation within the sandy clay to clayey sand was noted in borings B-1 and B-2.

3. Infiltration

The results of the percolation tests indicate similar permeability rates across the site. Sieve analyses were also performed to correlate grain size to published permeability values. Considering the field test results, correlated values, and the variability of materials encountered across the site, preliminary design infiltration values are presented below in Table 3.1.

Table 3.1 Preliminary Infiltration Values

Parameter	B-1	B-3	B-4	B-7	B-8	B-9	B-10
USCS Classification	SC/CL	CL	CL	SC/CL	SC/CL	CL	CL
Passing No. 4 Sieve (%)	89	--	98	85	--	--	100
Passing No. 200 Sieve (%)	49	--	64	48	--	--	80
Field Infiltration Rate (cm/sec)	NC	1.3×10^{-3}	6.6×10^{-3}	1.2×10^{-3}	NC	1.3×10^{-3}	1.8×10^{-3}
Average Correlated Permeability (cm/sec)	2.5×10^{-6}	2.5×10^{-6}	2.5×10^{-6}	2.5×10^{-6}	2.5×10^{-6}	2.5×10^{-6}	2.5×10^{-6}
Design Infiltration Rate (cm/sec)	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}
Design Infiltration Rate (in/hr)	.015	.015	.015	.015	.015	.015	.015

NC=Non Conclusive

The infiltration values were based on the field and laboratory data obtained at the boring locations and depths. If the location and depth of the bottom of the infiltration detention basin is different in location or depth (2 to 3½ feet), the subsurface materials may change and the actual infiltration rates may vary. In addition, the infiltration tests were performed in a dry time of year when the soil mass below the test was not saturated; infiltration rates tend to be higher in unsaturated soil. Based on the potential need to include sub surface disposal in the project we recommend that additional infiltration testing be completed during wet weather conditions to develop additional data that can be used for design.



4. Closing

If you have any questions regarding the information contained in this report, or if we may be of further assistance, please do not hesitate to contact us.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "Alex Fiorilli".

Alex Fiorilli
Staff Engineer

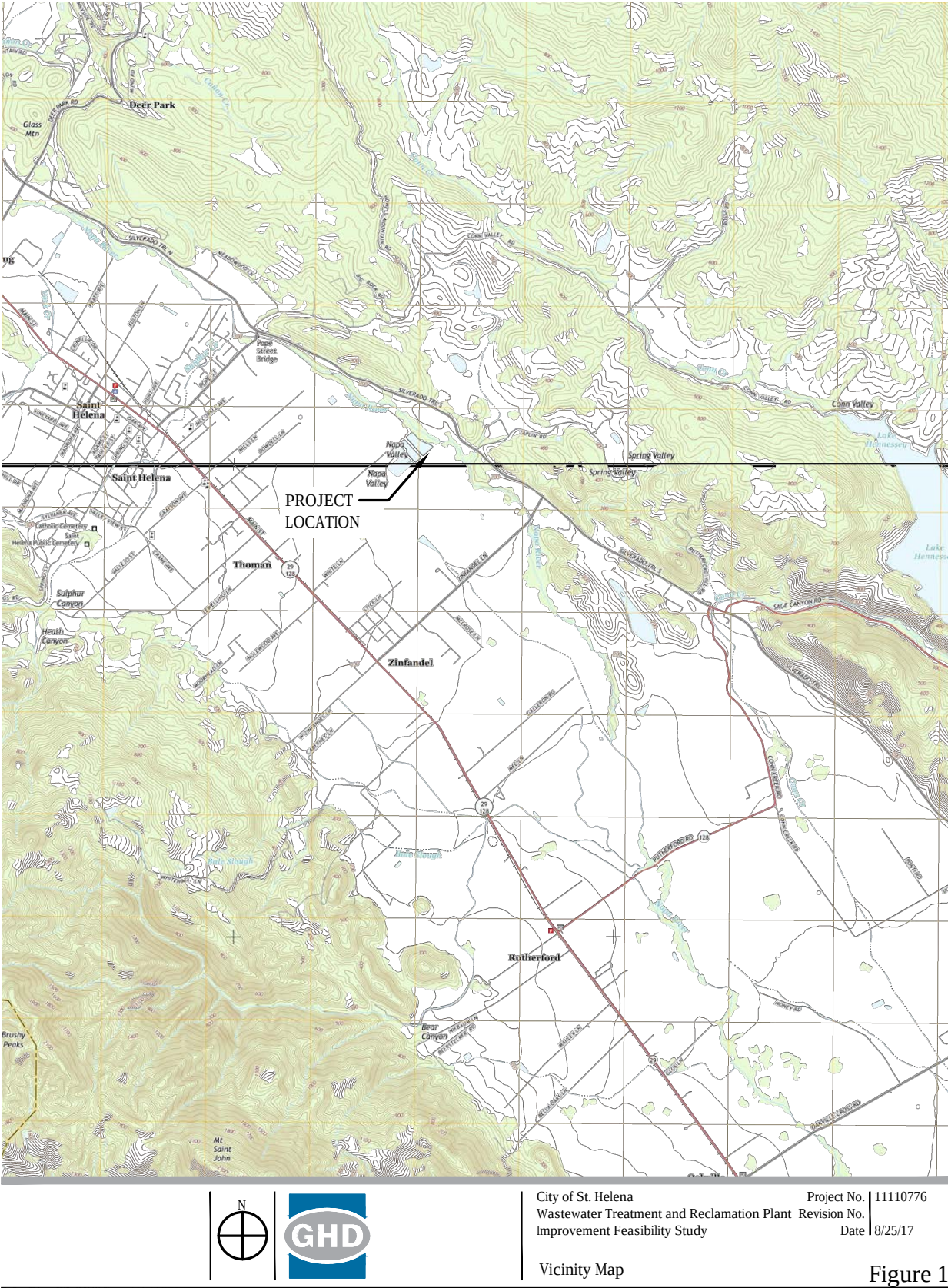
A handwritten signature in blue ink, appearing to read "Christopher D. Trumbull".

Christopher D. Trumbull, P.E., G.E., D.GE
Senior Geotechnical Engineer



Attachments:

- Vicinity Map
- Site Map
- Logs of Borings
- Laboratory Testing Results



File Path: \\g:\projects\GIS\St Helena\GIS\St Helena\111110776\St Helena\WTP Feasibility Study\GIS\Technical\Map\VicinityMap\CD\St Helena Figures.dwg



EMPIRICAL CORRELATIONS WITH STANDARD PENETRATION RESISTANCE N VALUES*							
	N Value * (Blows/ft)	Consistency	Unconfined Compressive Strength (tons/sq ft)		N Value * (Blows/ft)	Relative Density	
FINE GRAINED SOIL	0 - 2	Very Soft	<0.25	COARSE GRAINED SOIL	0 - 4	Very Loose	
	3 - 4	Soft	0.25 - 0.50		5 - 10	Loose	
	5 - 8	Medium Stiff	0.50 - 1.00		11 - 30	Medium Dense	
	9 - 15	Stiff	1.00 - 2.00		31 - 50	Dense	
	16 - 30	Very Stiff	2.00 - 4.00		>50	Very Dense	
	>30	Hard	>4.00				
*ASTM D 1586; number of blows of 140 pound hammer falling 30 inches to drive a 2-inch-O.D., 1.4-inch-I.D. sampler one foot.							
UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART				PARTICLE SIZE IDENTIFICATION			
MAJOR DIVISIONS		SYMBOLS	DESCRIPTIONS				
COARSE GRAINED SOIL	GRAVEL AND GRAVELLY SOIL	CLEAN GRAVELS	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	BOULDERS >12 in		
		LITTLE OR NO FINES	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	COBBLES 3 - 12 in		
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES	GRAVEL: COARSE 3/4 - 3 in		
		APPRECIABLE AMOUNT OF FINES	GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES	GRAVEL: FINE No.4 - 3/4 in		
	SAND AND SANDY SOIL	CLEAN SANDS	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	SAND: COARSE No.10 - No.4		
		LITTLE OR NO FINES	SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES	SAND: MEDIUM No.40 - No.10		
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES	SM	SILTY SANDS, SAND - SILT MIXTURES	SAND: FINE No.200 - No.40		
		APPRECIABLE AMOUNT OF FINES	SC	CLAYEY SANDS, SAND - CLAY MIXTURES	SILT 0.002 mm - No.200		
	FINE GRAINED SOIL	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	CLAY <0.002 mm	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS		
	MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY		
				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SANDS		
HIGHLY ORGANIC SOIL		CH	INORGANIC CLAYS OF HIGH PLASTICITY				
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS				
		PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS				
NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS							
SAMPLE SYMBOLS		WELL SYMBOLS		WATER LEVEL SYMBOLS			
	SPT (1.375 I.D.)		Cement Grout		Water level at time of drilling.		
	California (2.0-inch I.D.)		Bentonite		Water level measured at a specified time after drilling and sampling or well completion.		
	California Modified (2.5-inch I.D.)		Filter Sand	GENERAL NOTES			
	No Recovery		Screen in filter sand				
	Shelby Tube		Slough				
	Auger Sample		RX (Bedrock)				
1. Soil classifications are based on the Unified Soil Classification System. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual. Field descriptions may have been modified to reflect results of laboratory tests.							
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations.							
3. Abbreviations: CD = TX-CD CN = Consolidation CR = Corrosivity CU = TX-CU DS = Direct Shear EI = Expansion Index MDD = Maximum Density							
NR = No Recovery PR = Permeability RV = R-Value TC = Cyclic Triaxial UC = Unconfined Compression UU = TX-UU (quick) ATD= At Time of Drilling							



City of St. Helena
Initial Infiltration Study
St. Helena, CA

Project No. 11110776
Revision No. 0
Date 9/6/2017

Soil Boring Key

SOIL KEY 11110776 ST HELENA INFILTRATION.GPJ

Start Date: 8/01/17		Total Depth Drilled (ft bgs): 2.3							
Drilling Method: 6 inch auger		Drilling Contractor: GHD							
Drill Rig: Fence Post Auger		Arbitrary Ground Surface Elevation (ft MSL):							
Logged By: Ryan Henry		Hammer Type/ Efficiency: / %							
Reviewed By: C. Trumbull		Hammer Weight / Drop: 140# / 30"							
Borehole Backfill: spoils		Groundwater Depth (ft): Not Encountered ATD							
Remarks:									
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Type	Sample/Run No.	Blows/6"	N ₆₀	% Passing No. 4 Sieve	% Passing No. 200 Sieve
		Brown clayey SAND (SC/CL), slight cementation, dry							
	0.5								
	1.0								
	1.5								
	2.0								
	2.5	Boring terminated at 2'-4" bgs							
	3.0								
	3.5								



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Log of Boring

B-1

Start Date: 8/01/17		Total Depth Drilled (ft bgs): 3.6					
Drilling Method: 6 inch auger		Drilling Contractor: GHD					
Drill Rig: Fence Post Auger		Arbitrary Ground Surface Elevation (ft MSL):					
Logged By: Ryan Henry		Hammer Type/ Efficiency: / %					
Reviewed By: C. Trumbull		Hammer Weight / Drop: 140# / 30"					
Borehole Backfill: spoils		Groundwater Depth (ft): Not Encountered ATD					
Remarks:							
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Type	Sample/Run No.	Blows/6"	N ₆₀
		Dark brown sandy CLAY (CL), low plasticity, moist					
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
		Boring terminated at 3'-7" bgs					



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Log of Boring

B-3

Start Date: 8/01/17		Total Depth Drilled (ft bgs): 2.8							
Drilling Method: 6 inch auger		Drilling Contractor: GHD							
Drill Rig: Fence Post Auger		Arbitrary Ground Surface Elevation (ft MSL):							
Logged By: Ryan Henry		Hammer Type/ Efficiency: / %							
Reviewed By: C. Trumbull		Hammer Weight / Drop: 140# / 30"							
Borehole Backfill: spoils		Groundwater Depth (ft): Not Encountered ATD							
Remarks:									
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Type	Sample/Run No.	Blows/6"	N ₆₀	% Passing No. 4 Sieve	% Passing No. 200 Sieve
		Dark brown sandy CLAY (CL), low plasticity, moist							
	0.5								
	1.0								
	1.5			BK				98	64
	2.0								
	2.5								
	3.0	Boring terminated at 2'-10" bgs							
	3.5								



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Revision No. 0
Date 9/6/2017

Log of Boring

B-4

Start Date: 8/02/17		Total Depth Drilled (ft bgs): 2.3							
Drilling Method: 6 inch auger		Drilling Contractor: GHD							
Drill Rig: Fence Post Auger		Arbitrary Ground Surface Elevation (ft MSL):							
Logged By: Ryan Henry		Hammer Type/ Efficiency: / %							
Reviewed By: C. Trumbull		Hammer Weight / Drop: 140# / 30"							
Borehole Backfill: spoils		Groundwater Depth (ft): Not Encountered ATD							
Remarks:									
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Type	Sample/Run No.	Blows/6"	N ₆₀	% Passing No. 4 Sieve	% Passing No. 200 Sieve
		Dark brown clayey SAND (SC/CL), low plasticity, moist							
	0.5								
	1.0								
	1.5								
	2.0								
	2.5	Boring terminated at 2'-4" bgs							
	3.0								
	3.5								



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Revision No. 0
Date 9/6/2017

Log of Boring

B-7

Start Date: 8/02/17		Total Depth Drilled (ft bgs): 2.6					
Drilling Method: 6 inch auger		Drilling Contractor: GHD					
Drill Rig: Fence Post Auger		Arbitrary Ground Surface Elevation (ft MSL):					
Logged By: Ryan Henry		Hammer Type/ Efficiency: / %					
Reviewed By: C. Trumbull		Hammer Weight / Drop: 140# / 30"					
Borehole Backfill: spoils		Groundwater Depth (ft): Not Encountered ATD					
Remarks:							
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Type	Sample/Run No.	Blows/6"	N ₆₀
	0.5	Dark brown clayey SAND (SC/CL), low plasticity, moist					
	1.0						
	1.5						
	2.0						
	2.5						
	2.5	Boring terminated at 2'-7" bgs					
	3.0						
	3.5						



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Date 9/6/2017

Log of Boring

B-8

Start Date: 8/02/17		Total Depth Drilled (ft bgs): 2.1					
Drilling Method: 6 inch auger		Drilling Contractor: GHD					
Drill Rig: Fence Post Auger		Arbitrary Ground Surface Elevation (ft MSL):					
Logged By: Ryan Henry		Hammer Type/ Efficiency: / %					
Reviewed By: C. Trumbull		Hammer Weight / Drop: 140# / 30"					
Borehole Backfill: spoils		Groundwater Depth (ft): Not Encountered ATD					
Remarks:							
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Type	Sample/Run No.	Blows/6"	N ₆₀
	0.5	Dark brown sandy CLAY (CL), low plasticity, moist					
	1.0						
	1.5						
	2.0						
	2.5						
	2.0	Boring terminated at 2'-1" bgs					
	2.5						
	3.0						
	3.5						



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Date 9/6/2017

Log of Boring

B-9

Start Date: 8/02/17		Total Depth Drilled (ft bgs): 2.0	
Drilling Method: 6 inch auger		Drilling Contractor: GHD	
Drill Rig: Fence Post Auger		Arbitrary Ground Surface Elevation (ft MSL):	
Logged By: Ryan Henry		Hammer Type/ Efficiency: / %	
Reviewed By: C. Trumbull		Hammer Weight / Drop: 140# / 30"	
Borehole Backfill: spoils		Groundwater Depth (ft): Not Encountered ATD	
Remarks:			

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Type	Sample/Run No.	Blows/6"	N ₆₀	% Passing No. 4 Sieve	% Passing No. 200 Sieve
		Dark brown sandy CLAY (CL), low plasticity, moist							
	0.5								
	1.0			BK				100	80
	1.5								
	2.0	Boring terminated at 2 ft bgs							
	2.5								
	3.0								
	3.5								



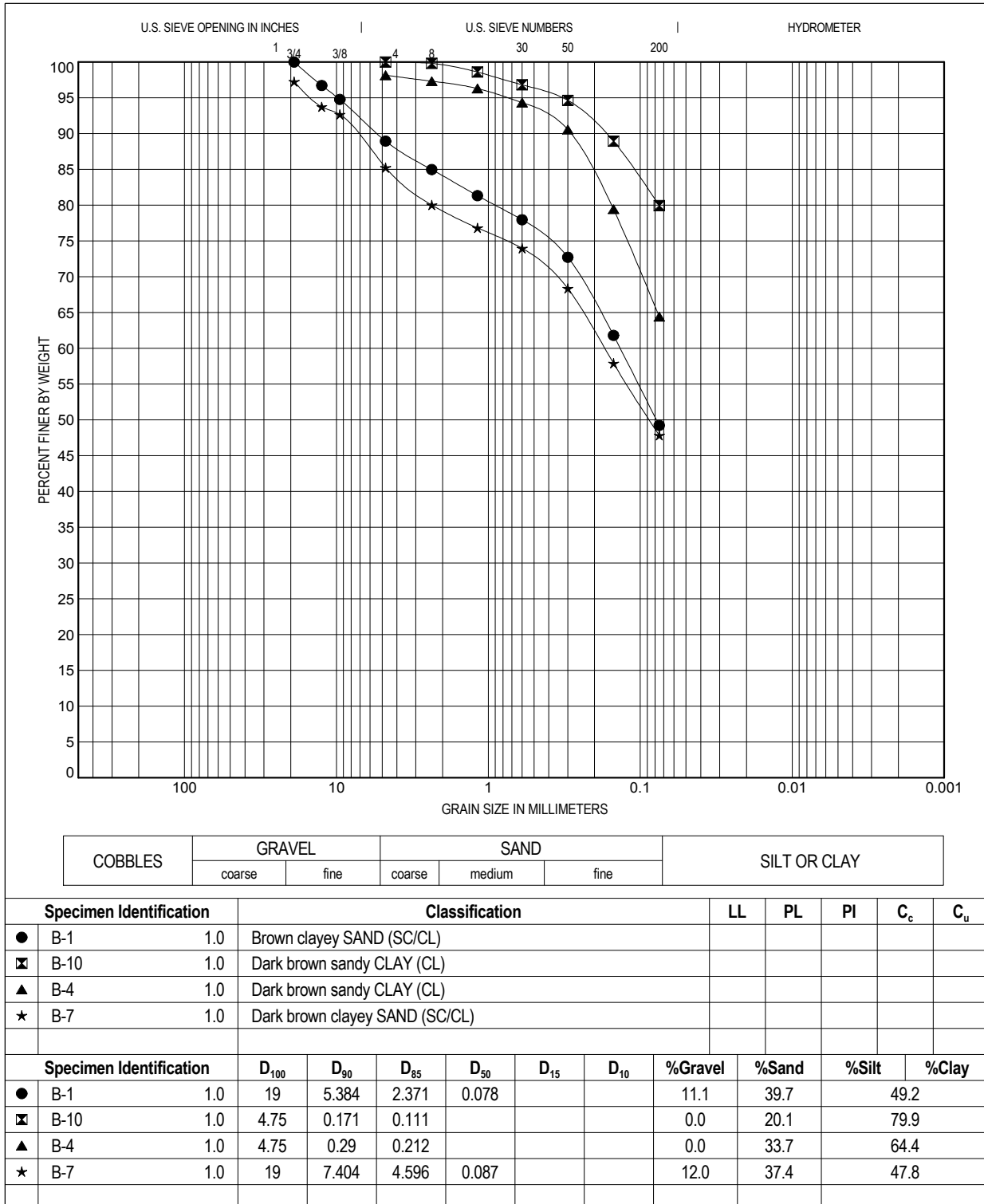
City of St. Helena
Initial Infiltration Study
St. Helena, CA

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Revision No. 0
Date 9/6/2017

Log of Boring

B-10

Boring ID	Depth (ft)	Description	Water Content (%)	Dry Density (pcf)	Maximum Size (mm)	%<#200 Sieve	Liquid Limit	Plastic Limit	Plasticity Index	Other Tests
B-1	1.0	Brown clayey SAND (SC/CL)			19	49				
B-10	1.0	Dark brown sandy CLAY (CL)			4.75	80				
B-4	1.0	Dark brown sandy CLAY (CL)			4.75	64				
B-7	1.0	Dark brown clayey SAND (SC/CL)			19	48				



City of St. Helena
Initial Infiltration Study
St. Helena, CA

Project No. 11110776
Revision No. 0
Date 9/6/2017

Sieve Analysis

C-3

SIEVE MOD 11110776 ST HELENA INFILTRATION.GPJ

Appendix K – St. Helena WWTRP: Groundwater
Investigation / Fate and Transport Modeling Report (June
2018)



JUNE 2018

CITY OF ST. HELENA

St. Helena WWTRP: Groundwater Investigation / Fate and Transport Modeling Report

Submitted to:

CITY OF ST. HELENA

Prepared by:

LARRY WALKER ASSOCIATES



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Appendix A. Standard Operating Procedure for Monitoring Well Purging, Sampling, and Equipment Decontamination

Appendix B. Water Quality Sampling Results

Appendix C. Effluent Water Quality Data For Nitrogen Compounds

Appendix D. St. Helena Monitoring Well Installation and Monitoring Network Report (GEI)

Appendix E. Groundwater Monitoring Well Installation and Monitoring Network Workplan (GEI)

Chapter 1 Introduction

The St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) is a municipal wastewater treatment facility that produces disinfected secondary effluent. During dry weather, the City's Water Reclamation Requirements (Order No. 87-090) (WRR) allows the discharge of treated effluent to an 88-acre land application area adjacent to the treatment plant. Multiple monitoring wells have been installed on-site for the purposes of groundwater monitoring.

In a letter dated November 7, 2016, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) provided notice that the City violated the WRR by applying reclaimed wastewater to its land application area at greater than agronomic rates. This may have resulted in adverse water quality impacts, including elevated groundwater nutrient concentrations and elevated groundwater levels. The Regional Water Board's letter included the requirement to develop a groundwater monitoring plan to characterize groundwater elevation, quality, and movement, and any potential changes that may occur as a result of the land application practices.

This report describes: 1) the groundwater monitoring activity to collect samples in compliance with the Regional Water Board's November 7, 2016 letter and monitoring of the St. Helena WWTRP effluent and nearby groundwater monitoring wells (details on well installation and development are provided in the *St. Helena Monitoring Well Installation and Monitoring Network Report (Appendix D)*, and 2) the model that has been developed to simulate flow and transport in the area of the WWTRP.

Chapter 2 Groundwater Monitoring

The monitoring network consists of seven newly constructed groundwater monitoring wells adjacent to the City of St. Helena WWTRP and one WWTRP effluent grab. An upgradient monitoring well was constructed near the northwest portion of the WWTRP property by Chaix Lane. Six shallow aquifer monitoring wells were constructed along the perimeter of the land application fields (**Figure 1**). Monitoring wells were located around the site due to the unknown and potentially variable groundwater gradient. A table describing the well construction details including depth and screen lengths is provided in **Table 1**. Monitoring well installation and well development was completed on November 7, 2017, and additional details on construction and development are provided in the *St. Helena Monitoring Well Installation and Monitoring Network Report* which accompanies this report (**Appendix D**).

Table 1. St. Helena WWTRP groundwater monitoring locations.

Well Name	Well Diameter (inches)	Total Depth (feet bgs)	Screen Interval (feet bgs)	Casing Stick-Up (feet above ground surface)
MW-1	2	51.5	36.5 - 46.5	2.30
MW-2	2	40.5	30.5 - 40.5	2.75
MW-3	2	60.6	40.6 - 60.6	2.80
MW-4	2	40.2	25.2 - 40.2	2.80
MW-5	2	41.0	26.0 - 41.0	2.75
MW-6	2	43.3	28.3 - 43.3	2.56
MW-7	2	44.7	24.7 - 44.7	2.96

ft bgs – feet below ground surface

One effluent monitoring location (REC-001) in the facility was also selected to compare effluent results to field results. A schematic of the treatment facility showing the effluent monitoring location is in **Figure 2**.

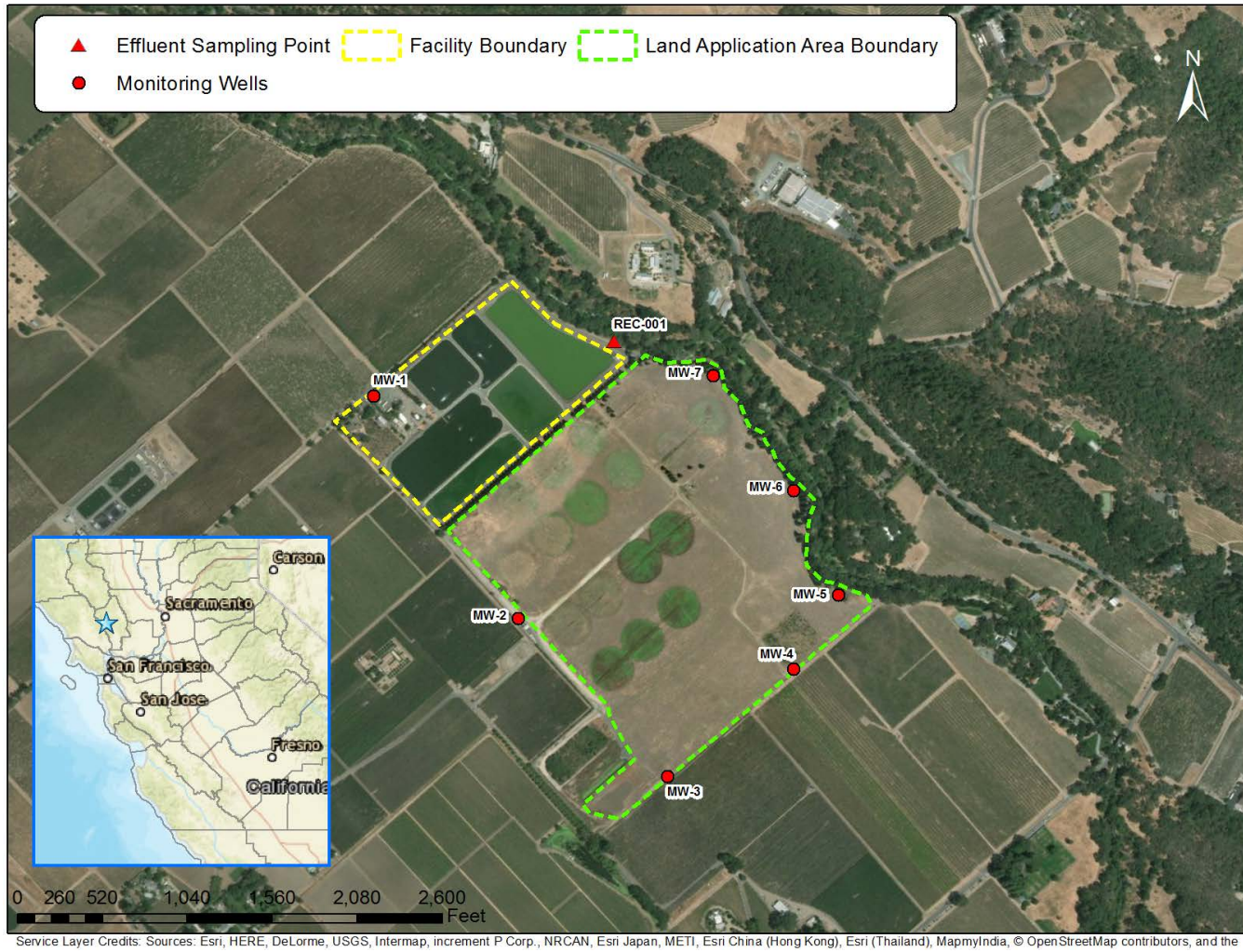


Figure 1. Groundwater Monitoring Well Locations

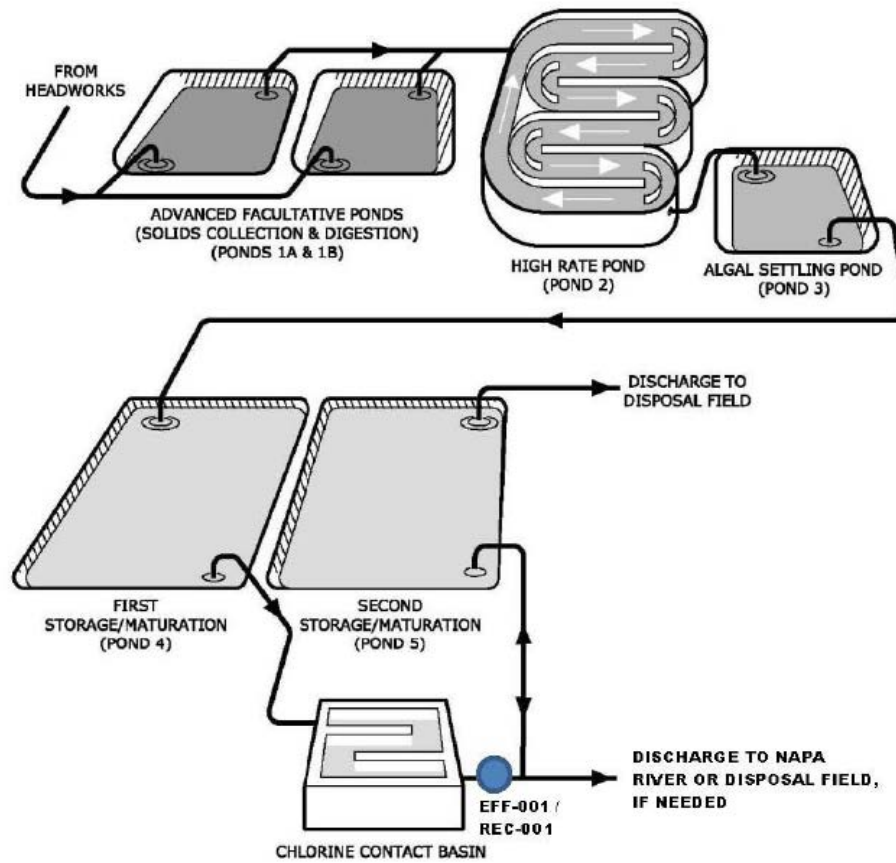


Figure 2. WWTRP Process Flow Diagram and REC-001 Monitoring Location

Sampling Methods and Constituents for Groundwater Monitoring Wells

LWA staff measured groundwater levels and collected groundwater samples from the monitoring wells on November 17, 2017; December 15, 2017; January 17, 2018; February 13, 2018; March 19, 2018; and April 19, 2018. Starting in April of 2018, quarterly sampling will be conducted in January, April, July, and October each year.

Prior to sampling a monitoring well, the static water level was measured. An electronic sounder was used to measure the depth to groundwater from the top of the well casing. Measurements are recorded at each well with an electric water-level sounder accurate to 0.01-foot. The measurements were made at the reference point marked on the top of each well casing which were referenced to surveyed elevations using NAVD88 datum. The surveyed elevations of the top of casings were used along with the measured casing stick-up height above ground surface to calculate the ground surface elevations and the water surface elevations.

Groundwater monitoring was performed using low flow purge methods (refer to **Appendix A** for groundwater purging and sampling procedures). During the sampling event, an in-line flow cell and multi-parameter meter were used to collect water quality indicating parameters during purging, including temperature, pH, conductivity, dissolved oxygen, and turbidity. Monitoring wells were purged until indicator parameters have stabilized, defined as three consecutive readings at 3- to 5-minute intervals where parameters do not vary by more than 5 percent. The volume purged from the monitoring wells ranged from 2.4 liters to about 9.2 liters and purge water was contained and disposed of at the WWTRP headworks for treatment.

When water quality parameters stabilized, water quality samples were collected using a peristaltic pump low-flow purging method involving pumping at a rate between 250 and 500 milliliters per minute (ml/min). Water quality samples were collected directly into sample containers provided by California-certified Caltest Analytical Laboratory of Napa, California. The in-line flow cell and its tubing were disconnected from the discharge tubing prior to sample collection. Sampling information was recorded on container labels and on the Field Log, and filled containers were immediately placed on ice and kept in an ice chest or laboratory sample refrigerator until LWA staff delivered them directly to Caltest Analytical Laboratory. Sampling equipment was decontaminated between monitoring wells to prevent cross-contamination and carryover (refer to **Appendix A** for equipment decontamination procedures). Decontamination water was combined with purge water and discharged to the St. Helena WWTRP for treatment.

Constituents and analytical methods for groundwater well samples are listed in **Table 2**.

Table 2. Constituents Monitored: St. Helena WWTRP monitoring wells

Constituent	Sample Type	Analytical Method	MDL	RL
Depth to Groundwater	Field Measurement	Water level meter	n/a	n/a
Static Water Level and Direction of Gradient	n/a	n/a	n/a	n/a
Color	Grab	Visual observation	n/a	n/a
pH	Field Measurement	SM 4500-H*B	n/a	n/a
Conductivity	Field Measurement	SM 2510B	n/a	10 uS/cm
Dissolved Oxygen	Field Measurement	SM 4500-O G	n/a	0.5 mg/L
Temperature	Field Measurement	SM 2550B	n/a	n/a
Turbidity	Field Measurement	SM 2130B	n/a	
Total Coliform	Grab	SM 9221B	n/a	1.8 MPN/100mL
Biochemical oxygen demand (BOD ₅) (20°C)	Grab	SM 5210B	n/a	5 mg/L
Total Dissolved Solids (TDS)	Grab	SM 2540C	4 mg/L	10 mg/L
Total Suspended Solids (TSS)	Grab	SM 2540D	2 mg/L	3 mg/L
Chloride	Grab	EPA 300.0	0.2 mg/L	1 mg/L
Total Kjeldahl Nitrogen (TKN)	Grab	SM 4500Norg + SM 4500NH3B	0.07 mg/L	0.1 mg/L
Ammonia-N	Grab	SM 4500-NH3-B/C	0.04 mg/L	0.1 mg/L
Nitrate-N	Grab	EPA 300.0	0.02 mg/L	0.1 mg/L

n/a: not applicable

GROUNDWATER LEVEL MONITORING RESULTS

The depth to water for the upgradient monitoring well, MW-1, is deeper than the monitoring wells to the southeast of the WWTRP. However, the ground surface elevation to the northwest of the site is also higher than the ground surface to the southeast. Over four monitoring events, the depth to water in all wells has been decreasing, with the exception of MW-6 and MW-7. The observed increase in the water table is likely due to seasonal variation with the four monitoring events occurring over the wetter half of the calendar year. The lack of decreased depth observed in MW-6 and MW-7 may be due to the proximity of the Napa River. Groundwater surface elevation contours were made using water levels as shown in **Figure 7** and **Figure 8**. The general flow direction is to the east/southeast towards the Napa River. Water level measurement results for different events are summarized in **Table 3**.

Table 3. St Helena measured groundwater elevations.

Monitoring Location	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Depth to water (feet bgs)							
11/17/2017	24.36	17.76	14.82	14.98	16.83	17.35	16.79
12/15/2017	22.23	15.81	13.53	13.81	16.00	16.91	16.56
1/17/2018	20.89	13.80	12.40	12.91	15.68	17.66	16.97
2/13/2018	19.62	12.15	11.67	12.30	15.33	17.52	16.97
3/19/2018	18.11	10.46	10.9	11.47	14.87	16.72	16.12
4/19/2018	14.71	5.6	7.38	8.45	NA	16.97	16.33
Total Well Depth (feet bgs)							
11/17/2017	51.52	40.51	60.6	40.18	41.00	43.32	41.20
12/15/2017	NA	NA	NA	NA	NA	NA	NA
1/17/2018	51.49	40.48	60.6	40.11	41.00	43.32	41.09
2/13/2018	51.49	40.48	60.6	40.11	41.00	43.32	41.09
3/19/2018	51.49	40.51	60.6	40.1	41.00	43.32	41.09
4/19/2018	51.49	40.49	60.6	40.1	NA	43.32	41.12

WATER QUALITY SAMPLING RESULTS

A complete summary of all current water quality results is provided in **Appendix B**.

The water quality results indicate that all monitoring wells sampled were below the maximum contaminant limit (MCL) for chloride, nitrogen, nitrate (as N) and TDS. Dissolved oxygen levels in MW-7 were notably higher than in other monitoring wells. The TSS and turbidity measurements for the November sampling event were higher than the results for samples collected in later events. The November samples may have had residual sediment within the water column from well development and was also agitated by the installation of new dedicated tubing in each well. Dedicated tubing was left in each well such that the water column would be less disturbed during later events.

TKN was detected at low levels in all the monitoring wells except MW-6 during the November sampling event and in MW-1, MW-2 and MW-3 during the December sampling event. For the last two sampling events in March and April, TKN values were either not detected or were detected at amounts between the detection and reporting limits (aka did not quantify). Ammonia

results were non-detect in all wells during all events with the exception of MW-1, MW-6 and MW-7, which had low level detections during the April, December and January sampling events. The BOD results were non-detect for all of the samples on all five sampling dates. Total coliform was detected at MW-4 during the November, in MW-7 in all five events, in well MW-5 during the December, and in well MW-2 during the January and April, and in well MW-3 during the January sampling event. An MCL doesn't exist for total coliform but the State Water Resources Control Board indicates that any positive result is over the MCL. Total coliform results from MW-7 were the highest and were the 1,600 MPN/100ml (most probable number of coliform in 100 milliliters in November and dropped to 79 MPN/100ml in April).

In summary, the newly constructed monitoring network is adequate for monitoring upgradient and downgradient groundwater levels and water quality. Groundwater water quality seems to indicate minimal impacts to groundwater from the wastewater discharge land application. However, additional data and intra-well analysis is necessary to make confident conclusions; particularly measurements obtained during the drier half of the year. The water quality within each of the seven monitoring wells were of reasonable water quality except for the total coliform detections in MW-4 during the November, in MW-7 in all five events, in MW-5 during the December, and in MW-2 during the January and April, and in MW-3 during the January sampling event. The monitoring well closest to the aeration ponds, MW-7, is showing consistent detections in total coliform, low level ammonia detections below the reporting limit, the lowest nitrate as nitrogen concentrations, and higher dissolved oxygen levels. This may be due to the vicinity of the monitoring well to the aerations ponds, rather than treated wastewater land application.

Chapter 3 Groundwater Fate and Transport Model

Larry Walker Associates (LWA) has developed a groundwater flow simulation model for numerical assessment of groundwater movement and fate. Here we provide information regarding the development of the groundwater simulation model for the WWTRP. This document will serve as the reference document for the procedure and assumptions that were used during the model development. It is hoped that providing such background helps ease interaction with and future improvement of the model. Refinement and calibration will be performed on as needed basis during application of model as additional data and information becomes available.

The WWTRP received a Notice of Violation (NOV) letter from the Board dated November 7, 2016, that presented the City with four tasks to be performed with respect to its prospective Report of Waste Discharge Application (ROWD):

1. Water balance evaluation for the proposed discharge practices
2. Evaluation of groundwater movement and fate
3. Nutrient balance evaluation of nitrogen discharges to the land application area
4. Groundwater monitoring plan

This chapter is in response to the second task mentioned in the NOV.

In August 2017, and in response to the fourth task indicated in the NOV letter, LWA with support from GEI Consultants, Inc. (GEI), proposed an updated monitoring well system to be used in the Groundwater Monitoring Plan. The geological findings provided by GEI in response to Task 4 of the NOV (Produced by NorCal Geophysics, **Appendix D**) were used as the main resource through the development of the groundwater model for estimating the stratigraphy of the shallow aquifer, performing the geostatistical analysis, and assigning hydrogeological properties of the aquifer.

The groundwater model has been updated based on some of the findings obtained during the preliminary study, and includes a proper model calibration and a refined particle-tracking simulation. The post-processed combination will be the final deliverable to respond to the Task 2 indicated in the NOV letter. The final report assesses the groundwater movement and fate and is capable of estimating the direction, speed, and volumetric flow of groundwater beneath and downgradient of the land application area. It also helps characterize possible impacts of wastewater discharges on groundwater flow and quality.

HYDROGEOLOGICAL SETTING AND GROUNDWATER CONDITIONS

The WWTRP and its land application area (recharge area) is located within Napa Valley Subbasin (**Figure 1**), which is a geologically active zone of complex tectonic deformation and down warping generally associated with the San Andreas Fault (Basin Analysis Report, 2016). As indicated in the LWA and GEI *Groundwater Monitoring Well Installation and Monitoring Network Workplan* (**Appendix E**), the project site is underlain by the Tertiary (Pliocene and Miocene) Sonoma Volcanics Lower Member tuff, Tertiary sedimentary sands and clays, and Quaternary alluvial sediments.

The Pliocene and late Miocene Sonoma Volcanics Formation in the project area consists primarily of pumiceous ash-flow tuff deposits, with interbedded volcanic sands and gravel overlying the volcanic bedrock of the Napa Valley Subbasin (Graymer, 2007). The Quaternary alluvial sediments and terrace deposits overlay the Sonoma Volcanics Formation around the

Napa River. The Quaternary alluvial deposits and sand and clay deposits around the project area have a thickness of approximately 300 feet bgs, thickening toward the center of the valley, and thinning towards the mountain front area to the east. The deepest aquifer is the Sonoma Volcanics, which is below the alluvial sediments and has a thickness of at least 400 feet starting at approximately 300 feet below ground surface (bgs) near the project area.

Based on the data from DWR GICIMA database, the depth to groundwater in the project area is estimated to be between 10 to 15 feet bgs.

MODEL DEVELOPMENT

The USGS MODFLOW-2005 software (MODFLOW; Harbaugh, 2005) is used to simulate flow in the upper shallow aquifer beneath the WWTRP. USGS MODPATH (MODPATH; Pollock, 2016) will be used to perform particle tracking as the post-processing module of MODFLOW. This report solely discusses the development of the groundwater flow simulation using MODFLOW for the upper shallow aquifer. Additional documents will be prepared for any further modeling effort or future revisions and updates. The groundwater modeling setup as for geological characteristics, boundary conditions, etc., is mainly based on the available geological and groundwater level information in the literature with regards to the Napa Valley Subbasin within the study area, on the groundwater monitoring network workplan (**Appendix E**), and on the available sampling and monitoring data available up to date and clearly detailed in the monitoring network report (**Appendix D**).

GROUNDWATER MODEL GRID

Spatial Discretization

The current state of the groundwater model focuses only on the upper shallow aquifer that underlies the WWTRP and its respective land application area. The draft memorandum, City of St. Helena Wastewater Treatment and Reclamation Plant Groundwater Investigation (LSCE, 2015), indicated sand and gravel are found between 20 and 80 feet deep beneath the property near the ponds, and the depth to water may be about 10 to 15 ft bgs. The groundwater monitoring network workplan (**Appendix E**) includes three lines of electrical resistivity surveys that contain most of the land application area, shown in **Figure 3**. There are also seven new monitoring wells drilled in this area to the date of this report that provide geological data by their driller's logs. The surveyed electrical resistivity results and available driller's logs are the main sources of geological information that are used for the development of the groundwater model, from spatial discretization and layer properties to hydrogeological attributes and soil parameters.

Surface cell dimensions and modeling area are defined according to four criteria: (1) areal coverage of model must include the WWTRP facility and its land application area (2) spatial extent of the model should provide sufficient space to define meaningful boundary conditions (3) modeling area must include Napa River and address possible river-aquifer connections (4) cell dimensions should be less than or equal to 200 ft due to the Board's recommendation in the NOV letter, and cells should not preferably contain multiple wells.

Based on the four criteria mentioned above the modeling grid shown in **Figure 3** was generated and extends over 191 acres and provides sufficient coverage of the Napa River. Cells are defined as 200 ft by 200 ft squares and the areal extent is divided into 208 cells. The grid is bounded from south and west by electrical resistivity lines 1 and 2 provided in the groundwater monitoring network workplan (**Appendix E**). These two boundaries also contain three

monitoring wells (two wells on each border). As is elaborated later in this document, resistivity lines and monitoring wells are the main sources of real data available throughout the development of the model. Having them on the boundaries increases the accuracy of the defined boundary conditions and reduces projection errors resulting from the interpolation of geological properties. The northern boundary is also defined to include one monitoring well, while also providing enough areal coverage to contain the whole facility. The aquifer is represented using a single unconfined layer with a thickness ranging from 20 ft to 100 ft. The top and bottom of the layer and its resulting thickness at each cell is estimated by applying the geostatistical analysis discussed below.

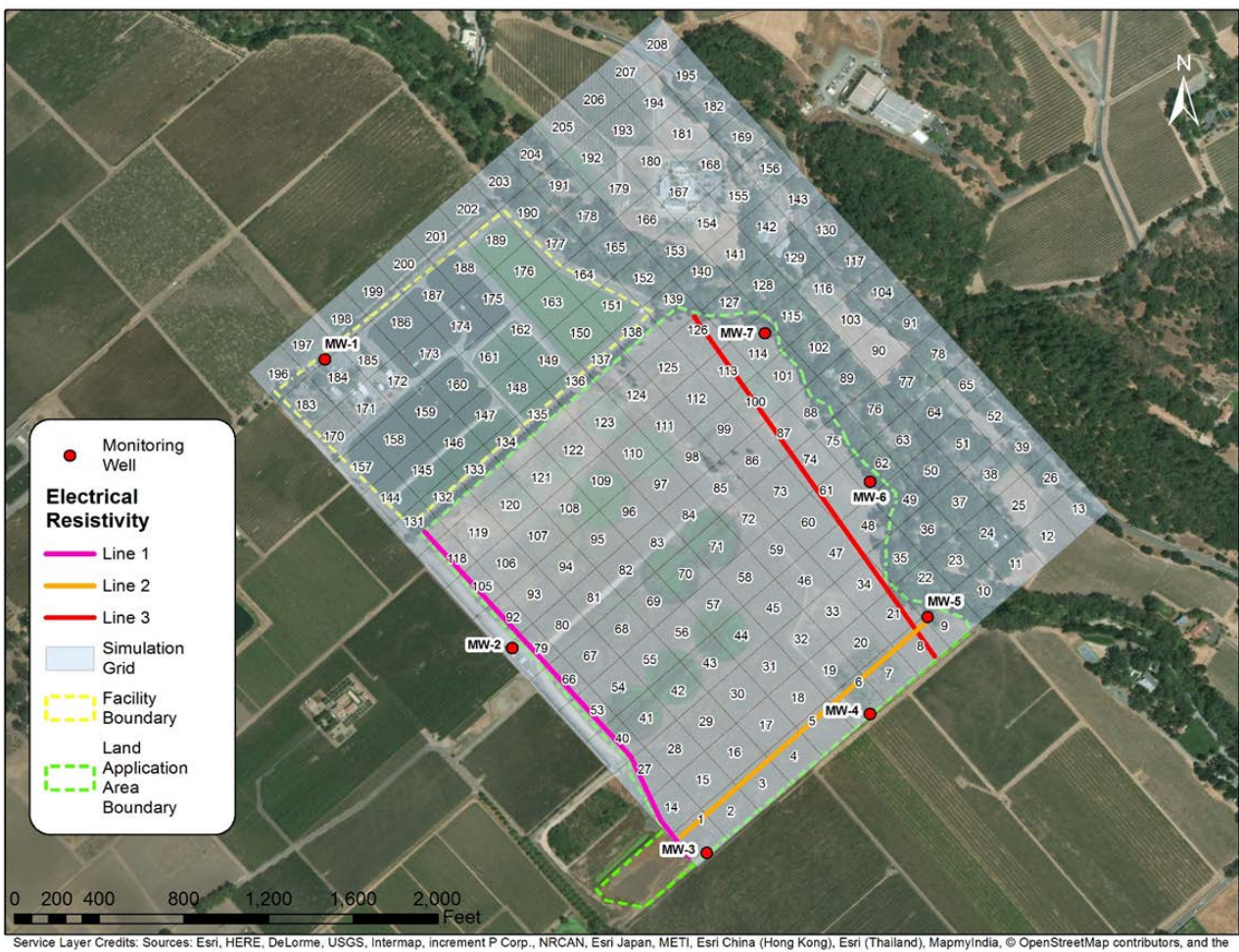


Figure 3. Groundwater model grid, surveyed resistivity lines and monitoring wells

Geostatistical analysis

Geostatistical modeling was conducted using Stanford Geostatistical Modeling Software (SGeMS). A grid of 13×16×6 was selected with cell blocks of 200×200×20 ft³. Dimension in z direction was assigned in a way to increase the accuracy of the geostatistical analysis in depth (i.e. $z=0.1x=0.1y$).

Resistivity data on lines 1, 2, and 3 (**Figure 4**) as well as well-log information from monitoring wells were applied to the model as hard data. Grid cells with known well-log information were also introduced to the model and in case of discrepancies at locations with both resistivity and well-log data, information from well-log were used.

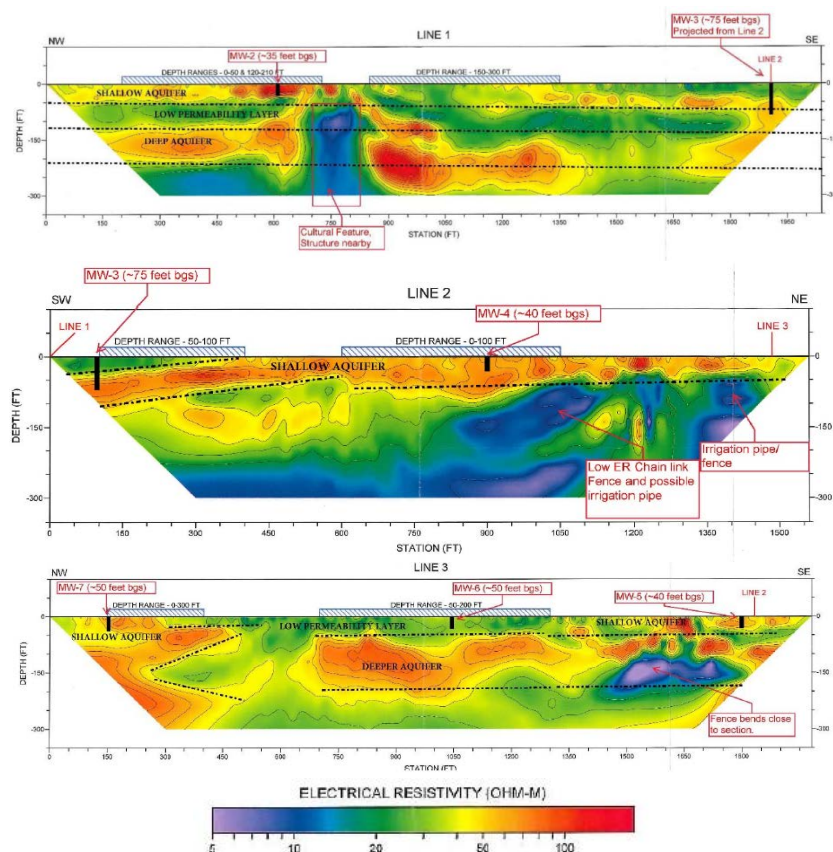


Figure 4. Electrical resistivity line profiles used as hard data in the geostatistical model

Once the grid was built in SGeMS and hard data were introduced, a variogram was estimated based on the observed data. Kriging algorithm, was then, implemented to develop a volume of resistivity numbers for the entire region (See **Figure 5**).

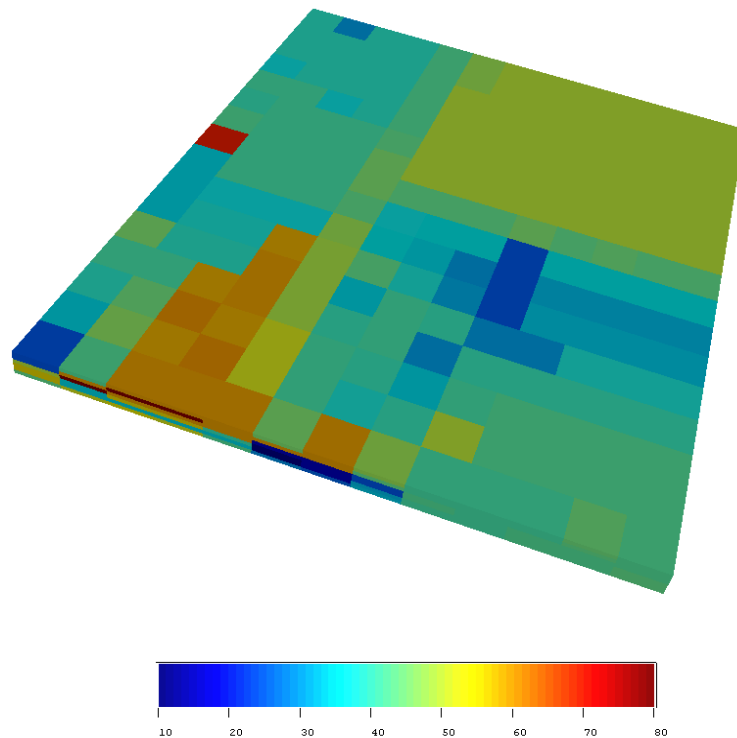


Figure 5. Kriged volume of electrical resistivity – values are in OHM-M

Resistivity values were then linked to sand or clay (i.e. pervious and impervious) layers based on a selected resistivity threshold number of 40 OHM-M. Resistivity numbers above and below 40 were deemed as sand and clay layers, respectively. As listed in **Table 6**, sand layers were further divided into 3 categories and geological parameters were defined based upon.

Napa River

One of the main criteria for grid generation was to provide the capability to simulate the interaction between the Napa River and the aquifer. Due to the relatively low depth to water in this area, seasonal changes in the river elevation can impact groundwater levels and connections between river and the aquifer can reverse direction for example based on climate condition (drought versus wet season). Unfortunately, no streamflow data are available in the area in the proximity of the WWTRP and this limits our capability to fully represent and check the results of the model with respect to river/aquifer interaction. Modeling grid has been in any case extended to the east and includes the neighboring section of the river to the WWTRP and can be refined as needed if new data become available. Napa River will be represented as a head-dependent flux boundary condition through MODFLOW river package. Grid cells on the eastern side of the river are made inactive throughout the simulation and the spatial extent is constrained by the river from the east. River stage at each stress period is estimated using the closest USGS streamflow gage to the WWTRP. **Table 4** shows the geographical properties of the streamflow gage located upstream of the facility.

Table 4. USGS Streamflow Gage description used to estimate Napa River stage

Name	Site ID	Location	Datum	Drainage Area (Sq. Miles)
NAPA R NR ST HELENA CA	11456000	38°30'41" 122°27'17" (NAD27)	191.37 ft (NAVD88)	78.8

TEMPORAL DISCRETIZATION

The model is temporally discretized to show enough flexibility in implementing changes to the recycled water application rates and groundwater monitoring results. Monitoring events are scheduled to be performed monthly and recycled water application rates are not highly variable within each month. Therefore, the maximum length of each stress is considered as bi-weekly (15 days on average), while the length is modified to have monitoring events as the start or the end of the stress period. Independent of the stress period length, daily timesteps are defined within each stress period to yield detailed results in case of need. **Table 5** shows the currently specified stress periods included in the model.

Table 5. Definition of stress periods

Stress Period	Starting Time (Days)	Ending Time (Days)	Length (Days)	Number of timesteps
1	0 (11/17/2017)	14 (11/30/2017)	14	14
2	15 (12/1/2017)	28 (12/15/2017)	15	15
3	29 (12/16/2017)	44 (1/1/2018)	16	16
4	45 (1/2/2018)	61 (1/17/2018)	16	16
5	62 (1/18/2018)	74 (1/30/2018)	14	14
6	75 (1/31/2018)	88 (2/13/2018)	14	14
7	89 (2/14/2018)	105 (3/2/2018)	17	17
8	106 (3/3/2018)	122 (3/19/2018)	17	17
9	123 (3/20/2018)	138 (4/4/2018)	16	16
10	139 (4/5/2018)	153 (4/19/2018)	15	15

GROUNDWATER FLOW PROCESS

In order to simulate groundwater flow, MODFLOW requires several hydrogeological data to be inputted, in addition to initial and boundary conditions. This section discusses individual datasets generated and used as input to MODFLOW.

Soil Properties (Hydraulic Conductivity, Specific Yield, and Specific Storage)

Resistivity results of the geostatistical analysis were combined with individual driller geologic logs for the seven newly drilled monitoring wells to form a basis for estimating soil parameters. While we agree that the descriptive and subjective nature of geologic logs along with the imperfect relationship of electrical resistivity and soil type increases inaccuracies and uncertainties in our estimations, in the absence of sufficient and/or additional data they are our best means of evaluation. Due to the mentioned nature of our predictive factors, we faced

overlapping ranges of electrical resistivity for several logged soil types. **Table 6** presents what is used in the model: adjusted values based on engineering judgment and stronger statistical relationships. Four overall types of soils are defined for the modeling spatial extent. This soil classification is the basis for determining top and bottom of the layer, hydraulic conductivity, specific yield and storage parameters, and active and inactive cells. These soils in a descending order of permeability (or electrical resistivity) are: (1) well-sorted gravel (2) coarse sand (3) fine sand, and (4) clay. Clay cells are basically inactive cells of the grid. Any cell column that includes a portion of coarse or fine sand or well-sorted gravel has a respective thickness of aquifer defined within. Hydraulic conductivity ranged for the defined soil types according to the literature is shown in **Table 6**. These values are used as initial estimates and Soil parameters will be adjusted and calibrated during model calibration.

Specific yield and specific storage parameters are defined similar to hydraulic conductivity based on the four categories of soil types. In the current status of the model only specific yield is relevant due to the single unconfined layer setting. Values proposed in **Table 6** to be used as the initial estimation are extracted from Robson (1993).

Table 6. Aquifer properties of the defined soil types and their respective range of electrical resistivity

Soil Type	Range of Electrical Resistivity (ohm-m)	Range of hydraulic conductivity in literature (m/s)	Specific Yield (Robson, 1993)	Specific Storage (ft ⁻¹ ; Robson, 1993)
Clay (including silt, clay, and fines)	<40	<1.0E-07	1.50E-01	7.00E-04
Fine Sand	40-50	1.0E-04 - 1.0E-06	3.50E-01	2.00E-04
Coarse Sand	50-60	1.0E-02 - 1.0E-05	3.40E-01	5.00E-05
Well-sorted Gravel	>60	> 1.0E-03	2.50E-01	2.00E-05

Groundwater Recharge Due to Recycled Water Land Application

As stated above, one of the final goals of the groundwater model is to assess the possible impacts of discharged wastewater in the underlying aquifer. Therefore, land applied recycled water from the WWTRP is inputted as a recharge to the aquifer. Defined land application area currently overlays 34 grid cells equivalent to more than 31 acres. Recycled water application rate has been relatively constant in the course of a month. **Table 7** shows average land application rates and their respective recharge flux for each stress period of the model. At the time of writing, recycled water application rates for the month of April was not available. Results will be updated when average application rate becomes available for the month of April.

Table 7. Bi-weekly average land application rate and recharge flux

Stress Period	Date Range	Average Land Application Rate (MGD)	Recharge Flux (ft/sec)
1	11/17/2017 – 11/30/2017	0.10	1.13E-07
2	12/1/2017 – 12/14/2017	0.07	8.25E-08
3	12/15/2017 – 12/31/2017	0.06	6.89E-08
4	1/1/2018 – 1/16/2018	0.08	9.27E-08

Stress Period	Date Range	Average Land Application Rate (MGD)	Recharge Flux (ft/sec)
5	1/17/2017 – 1/30/2018	0.11	1.25E-07
6	1/31/2018 – 2/13/2018	0.09	1.07E-07
7	2/14/2018 – 3/2/2018	0.10	1.12E-07
8	3/3/2018 – 3/19/2018	0.64	7.28E-07
9	3/20/2018 – 4/4/2018	0.85	9.68E-07
10	4/5/2018 – 4/19/2018	--	--

Boundary Conditions

Defining accurate and representative boundary conditions is crucial to obtain correct results from the MODFLOW groundwater flow software. Effort was made to increase our ability to define such boundary conditions by balancing available data with the spatial extent modeled and the sought outcomes of the model. We acknowledge that a future version of the model should extend the model domain towards South and East directions following the results provided in this report.

Constant head boundaries are defined on the northern and western boundaries using MODFLOW Time-Variant Specified-Head (CHD) package. There are two monitoring wells located on the western boundary (MW-2 and MW-3) and one located on the northern boundary (MW-1) close to the western edge of the model (See **Figure 3**). For the western boundary, due to the existing of multiple wells, a linear change in groundwater levels is considered and implemented as the boundary condition. The northern boundary is considered to maintain similar linear groundwater level decline with respect to MW-1 groundwater level and ground surface elevation.

Head-dependent flux is assumed for eastern and southern boundaries. On the eastern boundary, as mentioned above, Napa River dictates the boundary location. MODFLOW River package (RIV) is used to define this boundary. All grid cells that fall on the eastern side of the river cells are made inactive in the model. There exist three monitoring wells on the southern boundary (MW-3, MW-4, and MW-5) that are used to define the boundary condition using MODFLOW General Head Boundary (GHB) package. Minimum of these wells' groundwater levels is considered as the referenced boundary head.

Initial Conditions

Groundwater elevations at the start of the model (initial heads) are required by MODFLOW for solving groundwater flow equation. Groundwater elevation at the start of the model was accounted for considering that in general, groundwater surface is 10 to 15 ft bgs in the area that the WWTRP is located. Therefore, unless groundwater elevation data was available for a specific cell, it was calculated as 10 ft below surface elevation.

Model Calibration

Hydraulic conductivity of soil types and river were calibrated using MODFLOW parameter estimation code (UCODE) and adjusted based on engineering judgment. As shown in **Figure 6**, groundwater model provides a very good representation of actual groundwater elevation at all wells. Largest residuals are shown in the eastern boundary of the model, where MW-5, MW-6, and MW-7 are located. This is expected to some extent since limited data were available with regards to hydrological and hydrogeological properties in the eastern side of WWTRP. Observed groundwater elevation at these three wells do not generate a similar flow movement as is expected overall for the extent of modeling area. In particular, MW-7 shows a local drop in groundwater elevation which leads to a local gradient towards the well. As described previously, MW-7 shows high values of bacteria that are not noticed in other wells. Moreover, all three wells show unexpectedly low concentrations of Nitrate in their samples compared to the other 4 wells that are being monitored, despite being the closest wells to the land application site. Strong connection to the river, possible issues with the data collected for these wells, different geological characteristic of the aquifer in the proximity of MW-7 (this has been noticed while performing a preliminary calibration: calibration tends to significantly alter the hydraulic conductivity value for the area of MW-7), or construction problems could be the impacting factors leading to the discrepancy observed. As a result of what is mentioned above, MW-7 is currently left out of the simulation, due to the strong technical belief that the well does not represent aquifer conditions and has strong correlation with river conditions. While the model in its current form provides accurate simulation of groundwater conditions (**Table 8**), we are hoping it can be calibrated and improved further by inspecting possible causes of errors in the eastern boundary.

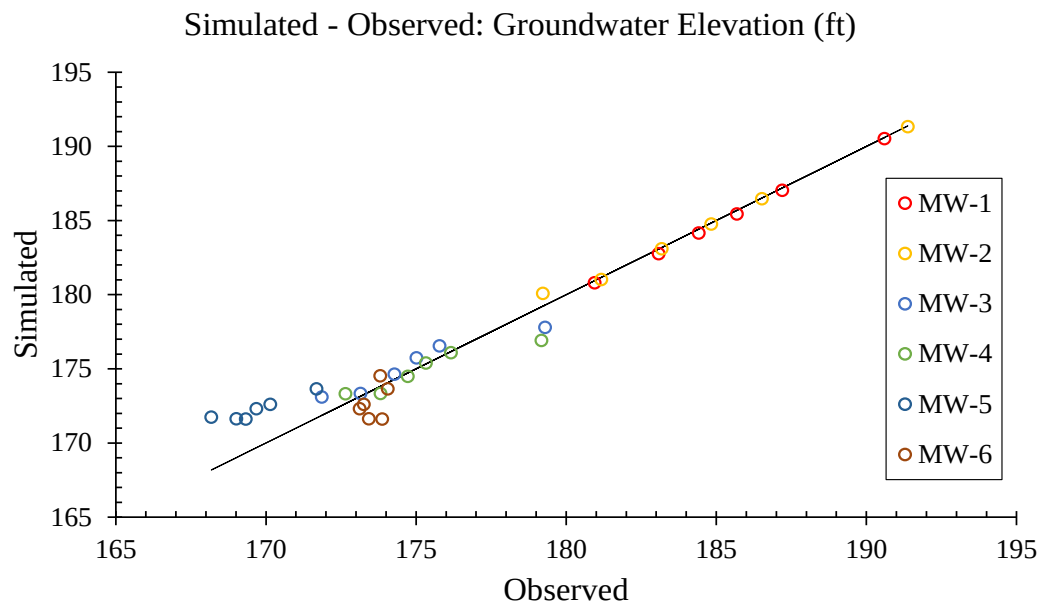


Figure 6. Model performance in simulating groundwater elevation

Table 8. Observed and Simulated groundwater elevations at monitoring wells on sampling dates

Well	Date	Observed Groundwater Elevation (NAVD 88; ft)	Simulated Groundwater Elevation (NGVD 88; ft)	Residual (ft)
MW-1	11/17/2017	180.95	180.79	0.16
	12/15/2017	183.08	182.76	0.32
	1/17/2018	184.42	184.15	0.27
	2/13/2018	185.69	185.44	0.25
	3/19/2018	187.20	187.03	0.17
	4/19/2018	190.60	190.51	0.09
MW-2	11/17/2017	179.22	180.09	-0.87
	12/15/2017	181.17	181.02	0.15
	1/17/2018	183.18	183.08	0.10
	2/13/2018	184.83	184.76	0.07
	3/19/2018	186.52	186.47	0.05
	4/19/2018	191.38	191.33	0.05
MW-3	11/17/2017	171.86	173.10	-1.24
	12/15/2017	173.15	173.34	-0.19
	1/17/2018	174.28	174.64	-0.36
	2/13/2018	175.01	175.74	-0.73
	3/19/2018	175.78	176.54	-0.76
	4/19/2018	179.30	177.79	1.51
MW-4	11/17/2017	172.65	173.32	-0.67
	12/15/2017	173.82	173.34	0.48
	1/17/2018	174.72	174.49	0.23
	2/13/2018	175.33	175.38	-0.05
	3/19/2018	176.16	176.08	0.08
	4/19/2018	179.18	176.91	2.27
MW-5	11/17/2017	168.18	169.58	-1.40
	12/15/2017	169.01	169.57	-0.56
	1/17/2018	169.33	170.39	-1.06
	2/13/2018	169.68	170.67	-0.99
	3/19/2018	170.14	171.20	-1.06
	4/19/2018	171.68	171.74	-0.06
MW-6	11/17/2017	173.43	171.63	1.80
	12/15/2017	173.87	171.61	2.26
	1/17/2018	173.12	172.31	0.81

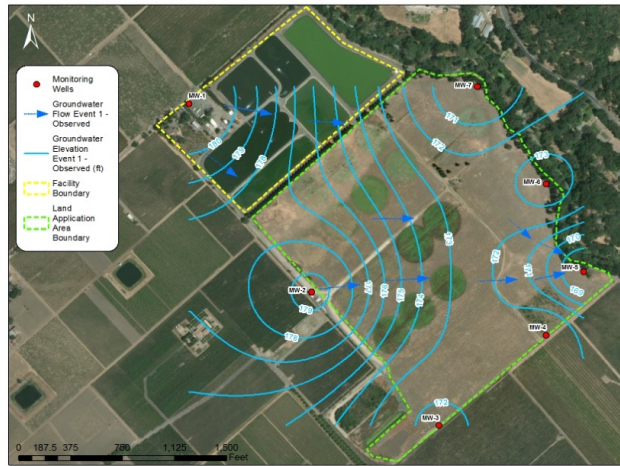
Well	Date	Observed Groundwater Elevation (NAVD 88; ft)	Simulated Groundwater Elevation (NGVD 88; ft)	Residual (ft)
	2/13/2018	173.26	172.61	0.65
	3/19/2018	174.06	173.64	0.42
	4/19/2018	173.81	174.52	-0.71
MAE (ft)		0.64		
RMSE (ft)		0.87		

MODELING RESULTS

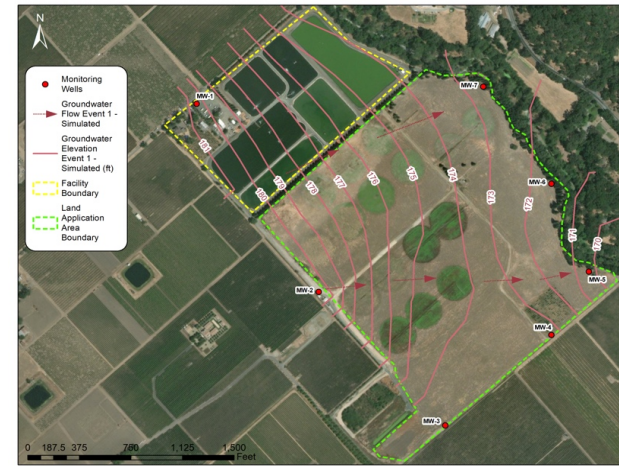
The groundwater model is utilized to simulate groundwater flow and facilitate the assessment of flow direction, speed, and volume, and ultimately, help determine the impact of wastewater discharges on the underlying aquifer.

Groundwater Flow Direction

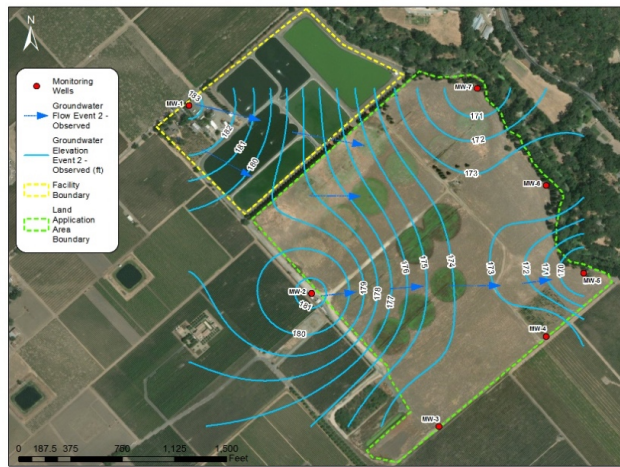
As shown in **Figure 7**, **Figure 8**, and **Figure 9**, a side-by-side comparison of the groundwater elevation contours simulated by the model and interpolated from the measured elevations at wells during the groundwater monitoring events are in agreement and show that the groundwater generally flows from East and Southeastward. This flow direction from the contour maps agree with the findings of the previous study performed by L&S Consulting Engineers. While the overall direction warrants the interaction between the aquifer and river, observed groundwater elevations show a relatively strong gradient towards the groundwater well MW-7, encouraging further evaluation of this specific well as mentioned above. This locally different gradient would generate groundwater flow towards the river, which does not conform to the overall dip of the aquifer. However, as our prior discussion points out to, strong technical belief exists that MW-7 does not represent accurate groundwater conditions and the monitoring results are currently left out of the calibrated model.



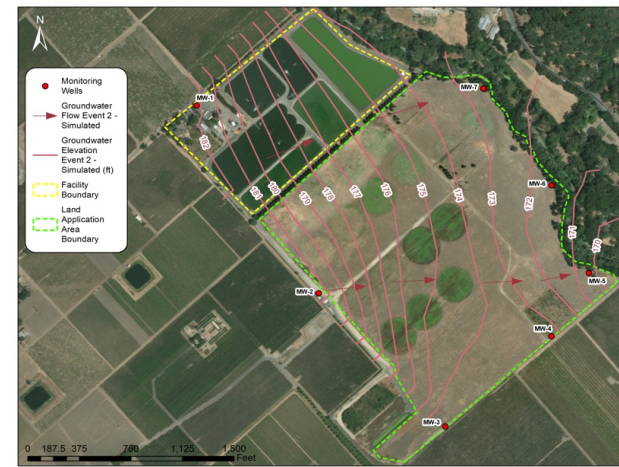
(a) Interpolated from Observed Well Elevations; 17 November 2017



(b) Simulated; 17 November 2017

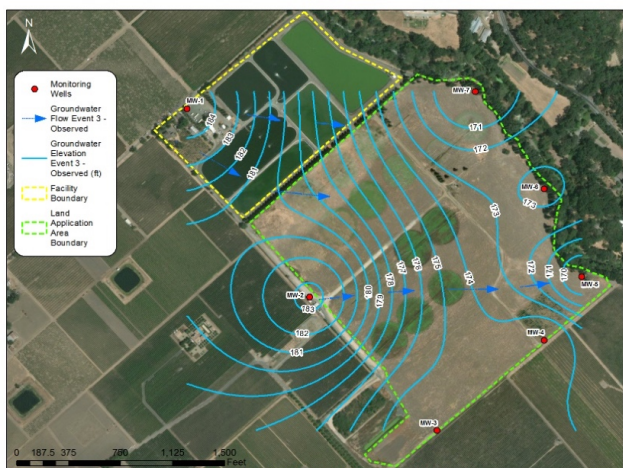


(c) Interpolated from Observed Well Elevations; 15 December 2017



(d) Simulated; 15 December 2017

Figure 7. Groundwater elevation contours (ft) from interpolated well elevation observation and simulated results for monitoring events 1 (11/17/2017) and 2 (12/15/2017)



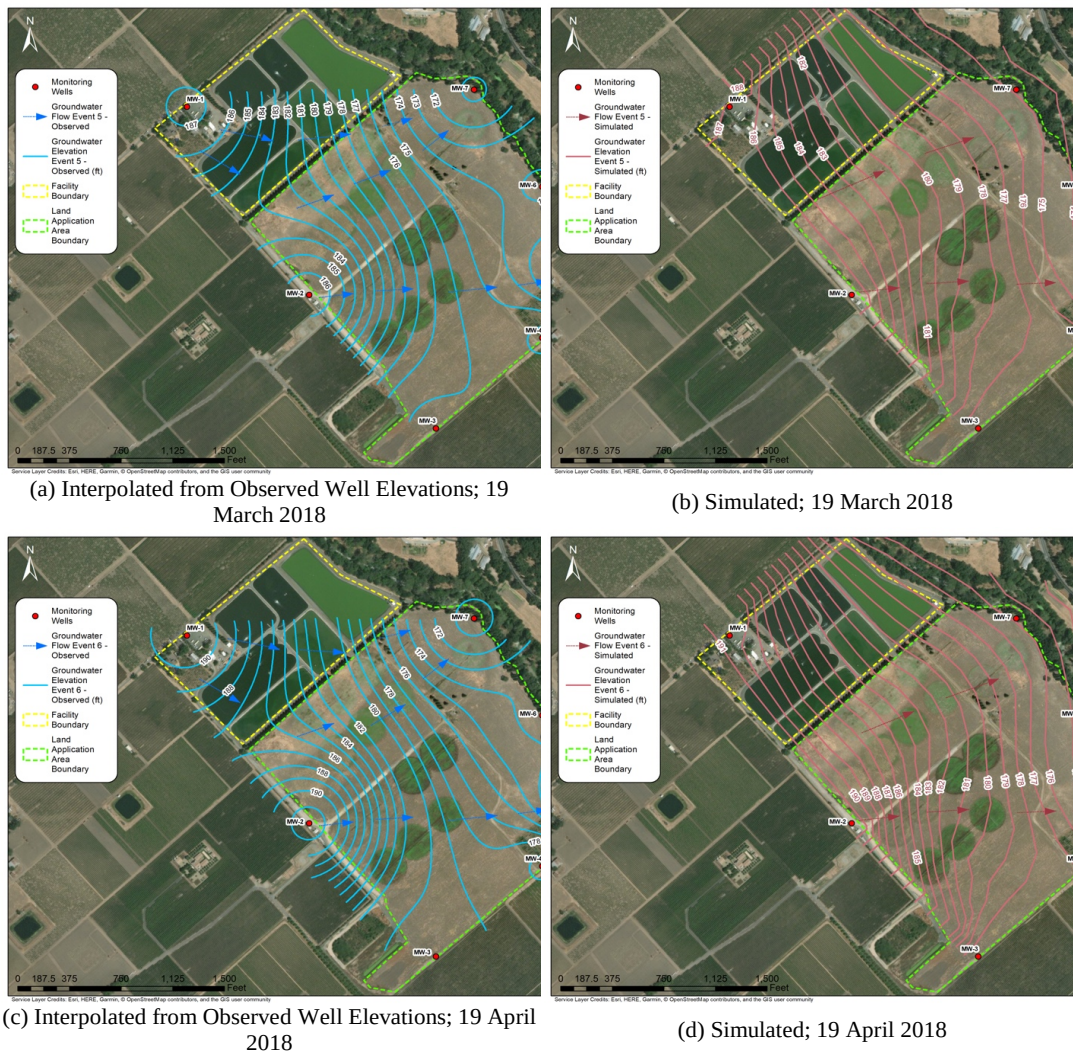


Figure 9. Groundwater elevation contours (ft) from interpolated well elevation observation and simulated results for monitoring events 5 (3/19/2018) and 6 (4/19/2018).

MOVEMENT OF RECHARGED RECLAIMED WATER

A MODPATH simulation based on the results of the flow model presented was performed to better illustrate the fate of recharged reclaimed water in the underlying aquifer. Particles were dropped on the land application area on the day of the first monitoring event (November 17, 2017) and the groundwater model was used to simulate their transport up to the end of the simulation period (April 19, 2018). As shown in **Figure 10**, particles show a relatively slow movement mostly towards the southern and eastern boundaries: this might be due to relatively low values of hydraulic conductivity.



Figure 10. Recharged particle pathlines from irrigation on November 17, 2017, to April 19, 2018

CONCLUSIONS AND RECOMMENDATIONS

Based on the inconsistency that we see in Nitrate concentrations in MW-7 and MW-6 with the background concentration at MW-1, and some discrepancy between simulated and observed flow directions and the actual nitrate values measured at MW-3, MW-4 and MW-5, we conclude that a longer period of sampling and observations (dry weather groundwater data as well as Napa River samples) is needed to be able to provide more reliable simulated results. This is even more important when we want to make predictions regarding groundwater into the future. It is recommended that during the first year of quarterly groundwater monitoring Napa River samples be collected as well to best understand how and where the river is more consistently connected to the groundwater and to evaluate the full dynamic of river/aquifer interaction in the model area.

Furthermore, based on measured nitrate, dissolved oxygen, temperature, and bacteria concentrations, it is believed that MW-7 is strongly connected to the Napa River. To increase the reliability of the flow and transport model results in this preliminary phase of the development, MW-7 was not be included in the model calibration, and it will be reconsidered after more data on the quality of both groundwater and surface water is collected.

Chapter 4 Nutrient Balance

The November 7, 2016 letter from the Regional Water Board included the request for an analysis of potential effects to groundwater and surface water quality with respect to nutrients from land application to irrigation fields and other proposed land disposal practices. The analysis below considers the nitrogen loading based on effluent water quality, nutrient uptake capacity of the vegetation in the land application area, and potential for degradation of groundwater and surface water quality. This analysis also considers the nitrogen uptake capacity.

EFFLUENT WATER QUALITY

Effluent monitoring for nitrogen compounds is required by the City's NPDES Permit (currently implemented as Order No. R2-2016-0003) when discharge to the Napa River occurs, and during effluent characterization once per permit term. The available data for nitrate plus nitrite nitrogen¹ from 2011 through 2018 was used to characterize the quality of effluent applied to the irrigation fields and is presented in **Table 9**. Additional monitoring results for all nitrogen compounds are presented in **Appendix C**. Effluent nitrogen concentrations are expected to improve or remain relatively the same with implementation of a trickling filter process.

Table 9. Historic Effluent Water Quality Data

Period		Nitrate Plus Nitrite Nitrogen (mg/L)
2011	January 13	2.6
	March 4	9.9
	Annual Average	6.25
2012	December 27	0.25
	December 28	0.31
	Annual Average	0.28
2014	December 22	1.30
	Annual Average	1.30
2016	January 20	4.00
	March 9	4.30
	Annual Average	4.15
2017	November 17	1.1
	December 15	2.6
	Annual Average	1.85
2018	January 17	8.8
	February 13	7.6
	March 19	9.3
	April 19	3.5
	Annual Average	7.3
2011-2018 Average		3.52

Note: Monitoring data for REC001 only include Nitrate for 2017 and 2018.

¹ Nitrate is usually the predominant form of nitrogen in soils that is absorbed by plants, therefore nitrate plus nitrite nitrogen was determined to be more appropriate than total nitrogen or total Kjeldahl nitrogen for use in comparing nitrogen loading to plant nitrogen uptake rates (Xu, et. al., 2012).

IRRIGATION NUTRIENT LOADING

The irrigation area is currently vegetated with an assortment of natural growth, dominated by hemlock, vetch, mustard and wild onion. Based on a literature review of fertilization recommendation for these plants, nitrogen fertilization is not recommended to increase the yield of hemlock (McClure, 1991) vetch (Gardner, et. al., 2000). For mustard, an initial application of 180 pounds of nitrogen per acre is recommended (Alberta Department of Agriculture and Forestry, 2010). For the wild onion, nitrogen application rates should range from 1.4 to 3.5 pounds of nitrogen per acre per day (CDFA, 2017).

Treatment plant upgrades may include planting of alfalfa on the irrigation area. An initial application of 20 to 60 pounds of nitrogen per acre is recommended for alfalfa (L&S, 2015). This corresponds to an application rate of 20 to 60 pounds per acre per year assuming alfalfa is harvested once per year.

The nitrogen loading rates resulting from irrigation at recommended hydraulic agronomic rates are presented in **Table 10**. The loading rates are calculated based on available effluent water quality data for nitrate plus nitrite nitrogen. The nitrogen loading rates corresponding to the recommended irrigation rates per acre are within or below the range of nitrogen uptake rates for the current vegetation and alfalfa.

Table 10. Nitrogen loading rates based on hydraulic agronomic rates

Rainfall Condition	Effluent water quality data	
	Average Loading Rate (lb N/day/acre)	Annual Loading Rate (lb N/acre)
Nitrate Plus Nitrite Nitrogen		
Current vegetation		
10-year return period	0.08	28
Average	0.09	34
Alfalfa		
10-year return period	0.08	31
Average	0.10	38

IMPACT TO GROUNDWATER QUALITY

Locations of the old groundwater quality monitoring wells are shown in **Figure 11**. Groundwater quality monitoring data from 2012 through 2016 required by Order No. 87-090 is presented in **Figure 12**. Groundwater quality monitoring with respect to nitrate is conducted at the GRD-002 well only, which is considered a deep aquifer well. Though water quality data from this well indicates the Primary Maximum Contaminant Limit (MCL) of 10 mg/L (from California Code of Regulations Title 22) for nitrate as nitrogen is exceeded in groundwater below the irrigation field, up-gradient background data are not available to assess the degree of degradation of groundwater quality due to irrigation activity. Using the new wells, it is possible to compare what is happening to groundwater nitrate concentrations due to irrigation.



Figure 11. Location of old monitoring wells in vicinity of the land discharge area

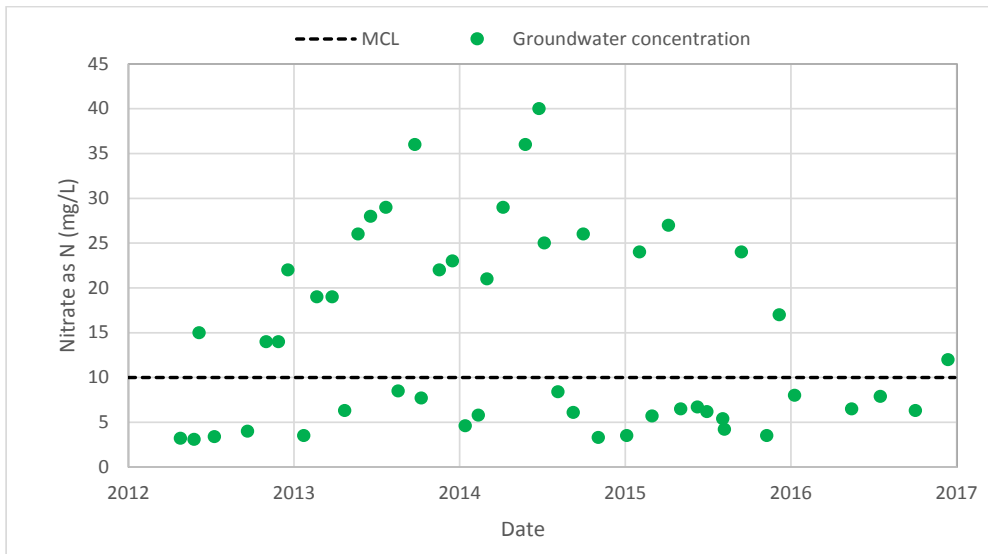


Figure 12. Groundwater nitrate concentrations measured at GRD-002

Results from new monitoring wells sampled in 2017 and 2018 are listed in **Table 11**. No exceedances were observed for 2017 and 2018 data and concentrations do not consistently increase in downgradient wells.

Table 11. Effluent Water Quality Data

Well ID	Nitrate as N (mg/L)					
	Event 1 - 11/17/2017	Event 2 - 12/17/2017	Event 3 - 01/17/2018	Event 4 - 02/13/2018	Event 5 - 03/19/2018	Event 6 - 04/19/2018
MW-001 (bkgnd)	3.6	5.7	10	10	9	7.6
MW-002	2.8	2.9	3	2.8	2.9	3.1
MW-003	3.8	3.6	3.7	3.5	3.6	3.6
MW-004	6.4	5.7	4.7	3.2	4.6	6
MW-005	1.8	1.7	1.7	1.6	2.2	-
MW-006	1.7	0.55	0.4	0.11	0.21	0.23
MW-007	0.2	0.32	0.79	0.64	0.77	0.87

IMPACT OF VINEYARD IRRIGATION

The November 7, 2016 letter from the Regional Water Board required the City to evaluate the potential demand for recycled water at local vineyards. Irrigation requirements for vineyards range from 10 to 30% of reference evapotranspiration rates (UC, 2000). Based on reference evapotranspiration rates from water balance section, this equates to approximately 0.4-1.2 acre-feet per acre per year. If vineyards were irrigated at agronomic rates solely with recycled water at the current effluent quality, the annual nitrogen loading would range from 3.3 to 9.8 lbs per acre per year, which is below the recommended range for vineyard irrigation of 22 to 45 lbs per acre per year (Peacock, et. al.). However, City staff reached out to local vineyards to assess interest in recycled water use and received little interest in response.

City staff also contacted the Napa Valley Farm Bureau regarding need for recycled water elsewhere within the City. The Farm Bureau indicated that there may be demand for recycled water for agriculture and frost protection on the west side of St. Helena, but, at this time, information regarding specific users is not available. The impact of these recycled water uses on groundwater will be assessed in the future if users can be identified.

IMPACT TO SURFACE WATER QUALITY

Monitoring for receiving water concentrations of nitrogen compounds is required by the City's NPDES permit (currently implemented as Order No. R2-2016-0003) when discharge to the Napa River occurs. River nitrate and nitrate plus nitrite concentrations compared to the Primary MCLs are shown in **Figure 13** and **Figure 14**, respectively, showing that river concentrations are well below the MCLs.

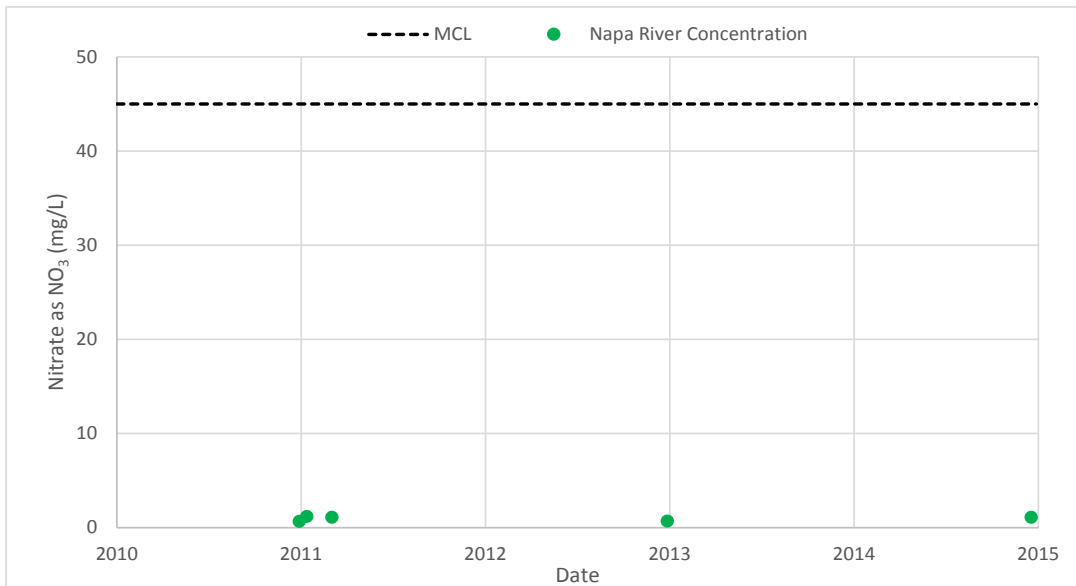


Figure 13. Napa River nitrate concentrations

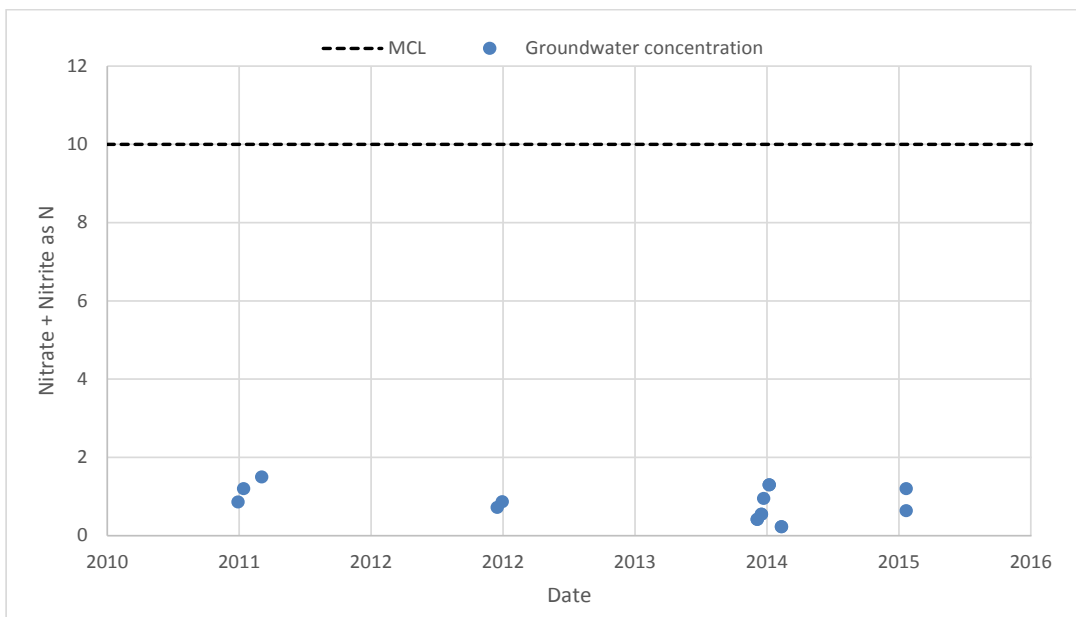


Figure 14. Napa River nitrate plus nitrite concentrations

MODELED FUTURE IRRIGATION SCENARIOS

In order to plan for future operations of the irrigation field, scenarios were modeled to simulate how different effluent nitrate concentrations and irrigation rates may affect the groundwater. Irrigation flows were based on the amount of water that would be applied to the field during a “normal” year (based on average rainfall) and a “dry” year (based on 2015 rainfall) (**Table 12**). Under “wet” year scenarios, the volume of water needing disposal would not exceed agronomic rates, due to the increased ability to discharge treated effluent to the Napa River. The results of this analysis (**Table 13**) indicate that during a normal year, effluent concentrations may reach 45 mg/L of nitrate and the groundwater concentrations of nitrate will not exceed the state and Federal maximum contaminant level (MCL) of 10 mg/L in the southeastern wells. During a dry year, effluent concentrations can reach 20 mg/L and have no adverse impact on groundwater concentrations at the south eastern edge of the well at any point in the year. For much of a dry year, effluent concentrations of 35 mg/L and 45 mg/L will also keep groundwater concentrations below the 10 mg/L MCL.

Table 12. Outflow to Percolation (MG)

	Normal Year	Dry Year
Jan	AR	AR
	AR	AR
Feb	AR	AR
	AR	AR
Mar	AR	18.13
	AR	18.13
Apr	AR	2.31
	AR	2.32
May	AR	2.94
	AR	2.94
Jun	AR	2.13
	AR	2.14
Jul	AR	AR
	AR	AR
Aug	AR	AR
	9.37	17.84
Sep	0.58	0.67
	AR	AR
Oct	AR	AR
	AR	AR
Nov	4.39	3.73
	19.17	18.37
Dec	16.02	18.41
	16.02	18.39
Total	65.55	128.45

AR = irrigation water applied at calculated agronomic rates

Table 13. Modeled Irrigation Scenario Results

Normal Year	Nitrate Concentrations (mg/L)							
	Current Effluent		Effluent = 20 mg/L		Effluent = 35 mg/L		Effluent = 45 mg/L	
Well	min	max	min	max	min	max	min	max
MW-4	3.1	6.3	3.1	6.3	3.1	6.3	3.1	6.3
MW-5	1.6	2.2	1.6	2.2	1.6	2.2	1.6	2.2
MW-6	0.5	1.8	1.7	4.4	1.7	7.5	1.7	9.6

Dry Year	Nitrate Concentrations (mg/L)							
	Current Effluent		Effluent = 20 mg/L		Effluent = 35 mg/L		Effluent = 45 mg/L	
Well	min	max	min	max	min	max	min	max
MW-4	3.1	6.3	3.1	6.3	3.1	6.3	3.1	6.3
MW-5	1.6	2.2	1.6	2.2	1.6	2.2	1.6	2.2
MW-6	0.5	1.8	1.7	9.9	1.7	17.5	1.7	22.6

Chapter 5 Draft Interim Wastewater Discharge Management Plan

In order for City to manage treated wastewater to protect groundwater from nutrient impacts while the Phase I WWTRP improvements are being completed the City has come up with the following approach as an Interim Wastewater Discharge Management Plan. The plan includes completing the following preliminary improvements and operational procedures:

1. The City is currently expanding the spray irrigation disposal system to maximize the area under spray irrigation. This will allow the City to reliably increase the disposal of effluent at agronomic rates that will minimize the volume of effluent required to discharge to the river or that which needs to be infiltrated into the groundwater.
2. The City will regularly discharge treated wastewater to the Napa River as allowed under the permit when the 50:1 dilution ratio can be met. In the past the City has not fully discharged when the dilution ratio can be met for a variety of reasons but under current management the City will discharge under allowable conditions in order to discharge treated effluent which will minimize stored effluent. The main chlorine supply line is scheduled as part of the Phase I WWTRP upgrades. However, the City is exploring conducting repairs on an accelerated timeline and has requested a separate scope of work for this item from GHD.
3. As shown in **Table 11**, current effluent concentrations of nitrate applied to the irrigation field are not adversely impacting the downgradient groundwater well concentrations of nitrate.
4. Based on current flows and dependent on precipitation and river flows there are times the City has had to discharge to the spray irrigation field in winter months. Based on the groundwater modeling results presented in the sections above, current discharge practices do not appear to be adversely affecting the groundwater.

This approach to being proactive in managing the discharges to the irrigation field and the Napa River will protect groundwater from any potential nutrient impacts.

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Appendix A. Procedure for Monitoring Well Purging, Sampling, and Equipment Decontamination

Purpose

This document presents standard field methods for groundwater monitoring, groundwater purging, and groundwater sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Groundwater Elevation Monitoring

Groundwater monitoring should not be performed when the potential exists for surface water to enter the well (i.e. flooding during a rainstorm). Prior to monitoring, each well shall be opened and the well cap removed to allow water levels to stabilize and equilibrate. The condition of the well box and well cap shall be observed and any recommended repairs noted. Any surface water that may have entered and flooded the well box should be evacuated prior to removing the well cap. The static water level and total well depth shall be measured to the nearest 0.01 foot with an electronic water level meter and recorded on the *Groundwater Monitoring Field Sheet*. The water level meter and/or interface probe shall be thoroughly cleaned and decontaminated at the beginning of the monitoring event and between each well. Monitoring equipment shall be washed using soapy water consisting of Liquinox™ followed by one rinse of clean tap water and then two rinses of distilled/deionized water.

Groundwater Sampling

Wells shall be monitored and sampled in order, beginning with the cleanest well (background – upgradient) and proceeding to the most heavily impacted (lateral or downgradient). Evacuation of a predetermined minimum volume of water from a well (purging) while simultaneously measuring water quality parameters is typically required prior to sampling. Between each sampling site location, all sampling equipment shall be washed using soapy water consisting of Liquinox™ followed by one rinse of clean tap water and then two rinses of distilled water.

Defining Casing Volumes

The predetermined minimum quantity of water to be purged is based on the well's casing volume. A casing volume is the volume of water presently standing within the casing of the well. This is calculated as follows:

$$\text{Casing Volume} = (\text{TD} - \text{DTW}) \text{ VCF}$$

1. Subtract the well's depth to water (DTW) measurement from its total depth (TD) measurement. This is the height of the water column in feet.
2. Determine the well casing's volume conversion factor (VCF). The VCF is based on the diameter of the well casing and represents the volume, in gallons, that is contained in one (1) foot of a particular diameter of well casing. The common VCFs are listed on the Well Purge Data Sheets.
3. Multiply the VCF by the calculated height of the water column. This is the casing volume, the amount of water in gallons standing in the well.

Three to Five Casing Volume Purge

Monitoring wells are purged of at least three well-casing volumes or until indicator parameters have stabilized, defined as three consecutive readings at 3- to 5-minute intervals where parameters do not vary by more than 5 percent. Indicator parameters include temperature, pH, conductivity, dissolved oxygen, and turbidity. Purge water will be contained and discharged to the St. Helena WWTRP for treatment.

Indicator parameters will be measured on the first casing volume and recorded on the Well Sampling Form initially, and then on every one-half casing volume removed thereafter. For wells that appear to be cloudy, turbidity will be measured and recorded, with the change in relation to the purge volume monitored. The total volume of groundwater removed shall be recorded on the Well Sampling Form along with any other notable physical characteristics, such as color and odor of groundwater.

If the well dewater before three casing volumes are purged or before the groundwater parameters stabilize, allow the groundwater to recharge for at least 1 hour. After 30 minutes, return to the well and determine how much groundwater has recharged. If there is a sufficient amount of groundwater (usually 80% recharge), continue purging the well until the groundwater parameters stabilize or until it dewater again. If there is not a sufficient amount of groundwater, the well is sufficiently purged.

Low Flow Purge

Once all elevation data are collected and the equipment has been decontaminated, begin the assembly of the pump. To purge the well, the pump shall be lowered to approximately the middle of the well screen. If the pump is lowered too deep, pumping of accumulated silt in the well will occur. Begin purging the well at a pumping rate of 100-300 mL/minute until indicator parameters (temperature, pH, conductivity, dissolved oxygen, and turbidity) have stabilized, defined as three consecutive readings at 3- to 5-minute intervals where parameters do not vary by more than 5 percent. The water level is monitored continuously for any change from the original measurement and the discharge rate is adjusted until an optimum discharge rate is determined. Indicator parameter measurements should be obtained using a flow-through-cell. The flow can be determined using a 5-gallon bucket (graduated in 1-gallon increments) or a 1-L graduated cylinder and timing how long it takes to fill the desired volume using a stopwatch. The flow rate, controller setting and depth of the pump should be documented on the Well Sampling Form. For a non-dedicated pump, both the inside and outside of the pump and discharge tubing shall be decontaminated as described above with soapy water, tap water, and distilled water.

Appendix B. Water Quality Sampling Results

Monitoring Well Number	Sample Collection Date	pH STU	Conductivity uS	Dissolved Oxygen mg/L	Temperature degrees C	Turbidity NTU	Total Coliform MPN/100mL	Biochemical oxygen demand (BOD5) (20°C)	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Chloride mg/L	Total Kjeldahl Nitrogen (TKN)	Ammonia-N mg/L	Nitrate-N mg/L
								mg/L	mg/L	mg/L		mg/L		
MW-1	11/17/2017	6.41	342.6	3.35	16.6	6.32	ND	ND	230	178	14	0.13	ND	3.6
MW-1	12/15/2017	6.25	357.7	5.61	16.63	6.38	ND	ND	230	ND	13	ND	ND	5.7
MW-1	1/17/2018	6.30	426.5	5.03	17.49	0.59	ND	ND	290	ND	16	0.48	ND	10
MW-1	2/13/2018	6.48	527.2	5.11	17.21	0.24	--	--	--	--	--	--	--	--
MW-1	3/19/2018	6.39	464.4	5.26	16.72	0.65	ND	ND	270	ND	16	ND	ND	9
MW-1	4/19/2018	6.32	449.0	4.99	17.26	0.98	ND	ND	280	ND	16	J0.088	J0.055	7.6
MW-2	11/17/2017	6.46	650.3	1.61	17.7	3.79	ND	ND	240	ND	17	0.13	ND	2.8
MW-2	12/15/2017	6.25	339.8	1.89	17.44	2.89	ND	ND	220	ND	15	ND	ND	2.9
MW-2	1/17/2018	6.21	351.6	2.35	17.75	0.95	14	ND	230	ND	14	0.26	ND	3
MW-2	2/13/2018	6.36	376.9	2.70	18.04	0.64	--	--	--	--	--	--	--	--
MW-2	3/19/2018	6.25	330.7	3.18	16.90	0.84	ND	ND	220	ND	12	J0.088	ND	2.9
MW-2	4/19/2018	6.24	336.4	3.48	16.62	0.84	2	ND	220	ND	12	J0.088	ND	3.1
MW-3	11/17/2017	6.48	411.1	0.80	16.2	3.76	ND	ND	280	ND	32	0.22	ND	3.8
MW-3	12/15/2017	6.38	399.8	1.09	16.02	0.25	ND	ND	280	ND	30	ND	ND	3.6
MW-3	1/17/2018	6.34	409.2	1.04	16.54	1.19	4.5	ND	290	ND	25	0.44	ND	3.7
MW-3	2/13/2018	6.49	470.0	0.90	16.81	1.02	--	--	--	--	--	--	--	--
MW-3	3/19/2018	6.42	414.8	1.15	15.95	0.51	ND	ND	260	ND	23	0.18	ND	3.6
MW-3	4/19/2018	6.34	419.6	1.26	15.81	0.49	ND	ND	270	ND	23	J0.088	ND	3.6
MW-4	11/17/2017	6.44	485.6	0.71	17.2	3.02	2	ND	330	3	32	0.35	ND	6.4
MW-4	12/15/2017	6.38	467.4	1.26	17.02	12.8	ND	ND	310	ND	27	J0.088	ND	5.7
MW-4	1/17/2018	6.30	462.0	1.40	17.75	1.68	ND	ND	310	ND	27	0.31	ND	4.7
MW-4	2/13/2018	6.50	551.4	1.66	17.70	2.13	--	--	--	--	--	--	--	--
MW-4	3/19/2018	6.41	476.1	1.90	16.79	0.48	ND	ND	290	ND	24	0.13	ND	4.6
MW-4	4/19/2018	6.35	480.4	2.10	17.12	0.49	ND	ND	300	ND	27	ND	ND	6
MW-5	11/17/2017	6.75	572.0	0.41	17.4	12.1	ND	ND	410	27	54	J0.088	ND	1.8
MW-5	12/15/2017	6.67	580.5	0.18	17.21	0.91	2	ND	420	ND	47	0.26	ND	1.7
MW-5	1/17/2018	6.65	589.8	0.73	18.15	2.8	ND	ND	430	6	47	0.62	ND	1.7
MW-5	2/13/2018	6.75	702.9	0.24	17.76	1.10	--	--	--	--	--	--	--	--
MW-5	3/19/2018	6.64	614.8	0.31	16.81	1.15	ND	ND	400	ND	45	ND	ND	2.2
MW-5	4/19/2018*	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	11/17/2017	6.64	488.1	0.34	17.0	6.36	ND	ND	330	4	50	ND	ND	1.7
MW-6	12/15/2017	7.08	652.9	0.58	16.93	0.62	ND	ND	430	ND	83	0.35	0.12	0.55
MW-6	1/17/2018	6.88	518.3	0.34	17.17	1.56	ND	ND	340	ND	32	0.35	J0.066	0.4
MW-6	2/13/2018	7.01	448.4	0.44	17.23	0.61	--	--	--	--	--	--	--	--
MW-6	3/19/2018	6.93	398.7	0.33	16.23	0.48	ND	ND	300	ND	16	0.13	ND	0.21
MW-6	4/19/2018	6.81	371.6	0.25	17.44	5.09	ND	ND	310	ND	16	0.26	J0.088	0.23

Monitoring Well Number	Sample Collection Date	pH	Conductivity	Dissolved Oxygen	Temperature	Turbidity	Total Coliform	Biochemical oxygen demand (BOD5) (20°C)	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Chloride	Total Kjeldahl Nitrogen (TKN)	Ammonia-N	Nitrate-N
MW-7	11/17/2017	6.77	486.1	1.6	18.3	7.20	1600	ND	310	6	79	0.35	ND	B0.2
MW-7	12/15/2017	6.94	643.4	5.83	13.7	1.57	240	ND	250	ND	54	0.26	J0.044	0.32
MW-7	1/17/2018	6.89	382.5	4.36	13.85	2.26	240	ND	220	ND	35	0.4	J0.044	0.79
MW-7	2/13/2018	6.96	367.5	5.42	14.88	1.72	--	--	--	--	--	--	--	--
MW-7	3/19/2018	6.95	253.8	4.48	13.25	7.75	240	ND	170	ND	18	0.18	ND	0.77
MW-7	4/19/2018	6.83	262.7	3.88	14.93	3.91	79	ND	180	ND	17	J0.088	ND	0.87
REC-001	11/17/2017	7.56	755.0	2.46	17.2	6.16	ND	ND	510	6	140	2.5	0.29	1.1
REC-001	12/15/2017	7.11	672.2	3.86	12.1	23.6	ND	ND	560	8	130	2.8	0.38	2.6
REC-001	1/17/2018	6.93	692.9	4.87	16.59	18.8	170	18	530	12	150	4.3	0.34	8.8
REC-001	2/13/2018	6.53	1020.5	6.87	17.88	22.0	--	--	--	--	--	--	--	--
REC-001	3/19/2018	8.04	525.7	7.69	14.88	22.3	ND	ND	430	25	90	4.3	0.29	9.3
REC-001	4/19/2018	8.39	572.8	9.46	18.42	17.6	ND	ND	410	10	100	2.6	0.34	3.5

ND - Non Detect - indicates analytical result has not been detected.

B - indicates the analyte has been detected in the blank associated with the sample.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

* Not sampled due to hornet nest in the well casing. Measure have been taken to prevent nest development in the wells.

Appendix C. Effluent Water Quality Data for Nitrogen Compounds

Period	Concentration (mg/L)			
	Nitrate Plus Nitrite Nitrogen	Total Kjeldahl Nitrogen	Total Nitrogen	Total Ammonia
2011	January 13	2.60	--	--
	January (average)	--	--	8.1
	March 4	9.90	--	--
	April (average)	--	--	5.8
	May (average)	--	--	8.5
	June (average)	--	--	10.1
	July (average)	--	--	4.6
	August (average)	--	--	3.4
	September (average)	--	--	6.1
	October (average)	--	--	1.4
	November (average)	--	--	0.6
	December (average)	--	--	0.4
2012	January (average)	--	--	10.8
	February (average)	--	--	6.3
	March (average)	--	--	2.6
	April (average)	--	--	2.7
	May (average)	--	--	9.8
	June (average)	--	--	11.6
	August (average)	--	--	10.3
	September (average)	--	--	7.7
	October (average)	--	--	7.8
	November (average)	--	--	14.0
	December (average)	--	--	15.4
	December 27	0.25	--	--
	December 28	0.31	--	--
2013	January (average)	--	--	12.0
	February (average)	--	--	18.3
	March (average)	--	--	14.5
	April (average)	--	--	10.4
	May (average)	--	--	6.7
	June (average)	--	--	13.9
	July (average)	--	--	23.1
	August (average)	--	--	29.1
	September (average)	--	--	34.7
	October (average)	--	--	24.6
	November (average)	--	--	31.5
	December (average)	--	--	35.7
2014	January (average)	--	--	42.1
	March (average)	--	--	13.6
	April (average)	--	--	14.4
	May (average)	--	--	6.2
	June (average)	--	--	20.6
	July (average)	--	--	18.9
	August (average)	--	--	3.2
	September (average)	--	--	4.4
	November (average)	--	--	8.7
	December (average)	--	--	21.0

Period	Concentration (mg/L)			
	Nitrate Plus Nitrite Nitrogen	Total Kjeldahl Nitrogen	Total Nitrogen	Total Ammonia
December 22	1.30	--	--	--
January 15	--	--	--	16.7
January 20	--	--	--	17.7
January 21	--	--	--	14.2
January 27	--	--	--	15.3
February 8	--	--	--	10.4
February 9	--	--	--	11.6
February 10	--	--	--	11.9
February 11	--	--	--	10.7
February 26	--	--	--	7.3
March 5	--	--	--	8.3
March 12	--	--	--	9.4
March 19	--	--	--	10.8
March 25	--	--	--	10.4
April 2	--	--	--	12.4
April 9	--	--	--	11.3
April 22	--	--	--	12.4
May 1	--	--	--	7.3
May 8	--	--	--	3.6
May 20	--	--	--	3.5
May 28	--	--	--	3.8
2015 June 2	--	--	--	4.0
June 3	--	--	--	4.8
June 4	--	--	--	5.4
June 5	--	--	--	5.3
June 19	--	--	--	9.9
June 26	--	--	--	12.8
September 2	--	--	--	12.2
September 9	--	--	--	6
October 6	--	--	--	7.5
October 16	--	--	--	6.7
October 23	--	--	--	6.1
October 30	--	--	--	2.8
November 4	--	--	--	1.6
November 10	--	--	--	2.3
November 17	--	--	--	1.5
November 18	--	--	--	1.6
November 24	--	--	--	2.1
December 2	--	--	--	1.2
December 10	--	--	--	0.4
December 17	--	--	--	2.0
December 23	--	--	--	2.0
December 29	--	--	--	2.2
January 1	--	--	--	1.6
January 2	--	--	--	2
January 3	--	--	--	2
2016 January 10	--	--	--	2.2
January 17	--	--	--	1.4
January 18	--	--	--	1.7
January 20	4.00	0.01	10.00	

Period	Concentration (mg/L)			
	Nitrate Plus Nitrite Nitrogen	Total Kjeldahl Nitrogen	Total Nitrogen	Total Ammonia
January 22	--	--	--	2.4
January 23	--	--	--	2.5
January 30	--	--	--	4.3
February 3	--	--	--	10.6
February 4	--	--	--	10.2
February 11	--	--	--	9.5
February 17	--	--	--	28.2
February 18	--	--	--	5.8
February 26	--	--	--	7.0
March 3	--	--	--	5.6
March 9	4.30	9.10	13.00	2.6
March 12	--	--	--	5.7
March 23	--	--	--	5.9
March 24	--	--	--	5.8
March 29	--	--	--	8.4
March 30	--	--	--	4.6
April 8	--	--	--	4.8
April 14	--	--	--	4.4
April 22	--	--	--	4.0
May 3	--	--	--	4.6
May 11	--	--	--	4.1
May 20	--	--	--	1.1
May 26	--	--	--	2.8
June 2	--	--	--	3.8
June 9	--	--	--	4.9
June 16	--	--	--	1.2
June 17	--	--	--	1.4
June 23	--	--	--	2.5
June 24	--	--	--	1.0
July 1	--	--	--	2.7
July 7	--	--	--	3.9
July 14	--	--	--	0.45
July 21	--	--	--	1.8
July 28	--	--	--	4.2
August 4	--	--	--	2
August 12	--	--	--	2.2
August 19	--	--	--	2.4
August 29	--	--	--	0.41
September 8	--	--	--	2.4
September 15	--	--	--	3.3
September 22	--	--	--	1.2
September 23	--	--	--	1.1
October 5	--	--	--	1.3
October 13	--	--	--	1.5
October 18	--	--	--	1.8
October 19	--	--	--	1.1
October 20	--	--	--	1.8
October 21	--	--	--	1.7
November 1	--	--	--	1.6
November 2	--	--	--	2

Period	Concentration (mg/L)			
	Nitrate Plus Nitrite Nitrogen	Total Kjeldahl Nitrogen	Total Nitrogen	Total Ammonia
November 3	--	--	--	2
November 10	--	--	--	2.2
November 17	--	--	--	1.4
November 18	--	--	--	1.7
November 22	--	--	--	2.4
November 23	--	--	--	2.5
November 30	--	--	--	4.3
December 15	--	--	--	1.4
2017 February 6	--	--	--	0.12
April 19	--	--	--	0.007
June 7	--	--	--	3.4
June 14	--	--	--	1.9
June 15	--	--	--	1.7
June 21	--	--	--	1.7
June 30	--	--	--	1.5
July 7	--	--	--	3
July 11	--	--	--	0.9
July 12	--	--	--	1.4
July 13	--	--	--	2.7
July 14	--	--	--	1.4
July 18	--	--	--	1.4
July 19	--	--	--	1.1
July 20	--	--	--	3.4
August 10	--	--	--	1
August 11	--	--	--	2.6
August 29	--	--	--	1
August 30	--	--	--	0.5
August 31	--	--	--	0.8
September 1	--	--	--	1.6
September 2	--	--	--	1.5
September 3	--	--	--	1.2
September 4	--	--	--	1.4
September 5	--	--	--	1.1
September 6	--	--	--	1.5
September 7	--	--	--	1
September 8	--	--	--	0.7
September 9	--	--	--	0.09
September 10	--	--	--	0.06
September 11	--	--	--	3.7
September 12	--	--	--	0.8
September 13	--	--	--	1.2
September 14	--	--	--	0.5
September 15	--	--	--	0.7
September 16	--	--	--	0.001
September 17	--	--	--	1.1
September 18	--	--	--	1
September 19	--	--	--	0.13
September 20	--	--	--	0.9
September 21	--	--	--	0.4
September 22	--	--	--	0.001

Period	Concentration (mg/L)			
	Nitrate Plus Nitrite Nitrogen	Total Kjeldahl Nitrogen	Total Nitrogen	Total Ammonia
September 23	--	--	--	0.02
September 24	--	--	--	0.001
September 25	--	--	--	0.14
September 26	--	--	--	0.11
September 27	--	--	--	0.08
September 28	--	--	--	0.45
September 29	--	--	--	0.001
September 30	--	--	--	0.001
October 1	--	--	--	0.02
October 2	--	--	--	0.07
October 3	--	--	--	ND
October 4	--	--	--	0.1
October 5	--	--	--	ND
October 6	--	--	--	ND
October 7	--	--	--	ND
October 8	--	--	--	ND
October 9	--	--	--	ND
October 10	--	--	--	ND
October 11	--	--	--	ND
October 12	--	--	--	ND
October 13	--	--	--	ND
October 14	--	--	--	ND
October 15	--	--	--	ND
October 16	--	--	--	ND
October 18	--	--	--	0.03
October 23	--	--	--	
October 24	--	--	--	



St. Helena Monitoring Well Installation and Monitoring Network Report

City of St. Helena, California

Submitted to:
Larry Walker Associates

Date: March 1, 2018
Project No: 1703092.3

Monitoring Well Construction and Testing



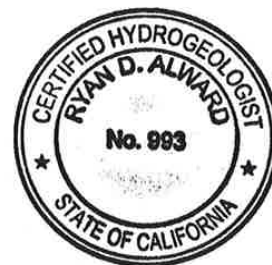
ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

Certifications and Seals

This report and analysis were prepared by the following GEI Consultants, Inc. certified hydrogeologists:

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ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

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1 Introduction

1.1 Introduction

This report has been prepared by GEI Consultants, Inc. (GEI) to describe the construction and development of seven monitoring wells adjacent to the City of St. Helena (City) wastewater treatment and reclamation plant (WWTRP). The monitoring wells were installed as part of an effort to update the City's Report of Waste Discharge (ROWD) and bring the WWTRP into compliance with Water Reclamation Requirements (WRR) (Order No. 87-090), addressing the San Francisco Bay Regional Water Quality Control Board (RWQCB) Notice of Violation (NOV) issued to the City in November 2016. The NOV stated the City was in violation of their WRR by applying reclaimed wastewater to its land application area at greater than agronomic rates. The NOV (RWQCB, November 7, 2016) provided comments regarding the City's August 16, 2016 *Draft Feasibility Study for Wastewater Treatment Plant Improvements* (Draft Feasibility Study), required by the Cease and Desist Order No. R2-2016-0004 (CDO). Larry Walker Associates (LWA), under contract with the City, requested the assistance of GEI for the design and installation of a monitoring well system for the WWTRP.

1.2 Background

The WWTRP provides secondary treatment for about 0.5 million gallons per day of domestic wastewater through a series of facultative and aerobic treatment ponds, followed by disinfection with chlorine and dechlorination with ascorbic acid or by natural decomposition. The treated wastewater is applied to the 88-acre land application area adjacent to the WWTRP ponds. During high flow conditions when the influent flows exceed the capacity of the treatment plant storage and land application discharge systems, and ambient river flow affords adequate dilution, the City's National Pollution Discharge Elimination System (NPDES) (No. CA0038016, currently implemented as Order No. R2-2016-0003) permit allows treated wastewater to discharge to the Napa River.

There were three wells in the vicinity of the WWTRP prior to the installation of the monitoring wells. However, these wells do not discretely monitor the shallow aquifer where the WWTRP ponds could have an effect on groundwater levels and quality. Sand and gravel are found between 20 and 80 feet deep in the vicinity of the WWTRP (LSCE, 2015) and the wells have screen intervals from 26 feet below ground surface (bgs) to 458 feet bgs. These wells are labeled on **Figure 1**. Due to the relatively shallow depths of the sand and gravel that form the shallow aquifer, the wells currently located near the site are insufficient to be used as monitoring wells for the shallow aquifer.

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To further characterize the site and to determine the appropriate monitoring well depths, the City contracted NorCal Geophysics of Cotati, California to perform a high resolution electrical resistivity survey.

1.3 Monitoring Objectives

The monitoring objectives are to evaluate the first available groundwater beneath and downgradient of the land application area adjacent to the WWTRP to assess how the groundwater is affected by the discharges, and to determine the direction of groundwater migration relative to adjacent properties and the Napa River.

1.4 Location

The WWTRP is in the southern portion of the City of St. Helena with vineyards to the north, south, and west. The land application area is directly adjacent to the southeastern boundary of the aeration ponds. The Napa River is adjacent to the eastern boundary of the aeration ponds and the land application fields. The location of the WWTRP is shown on **Figure 1**.

ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

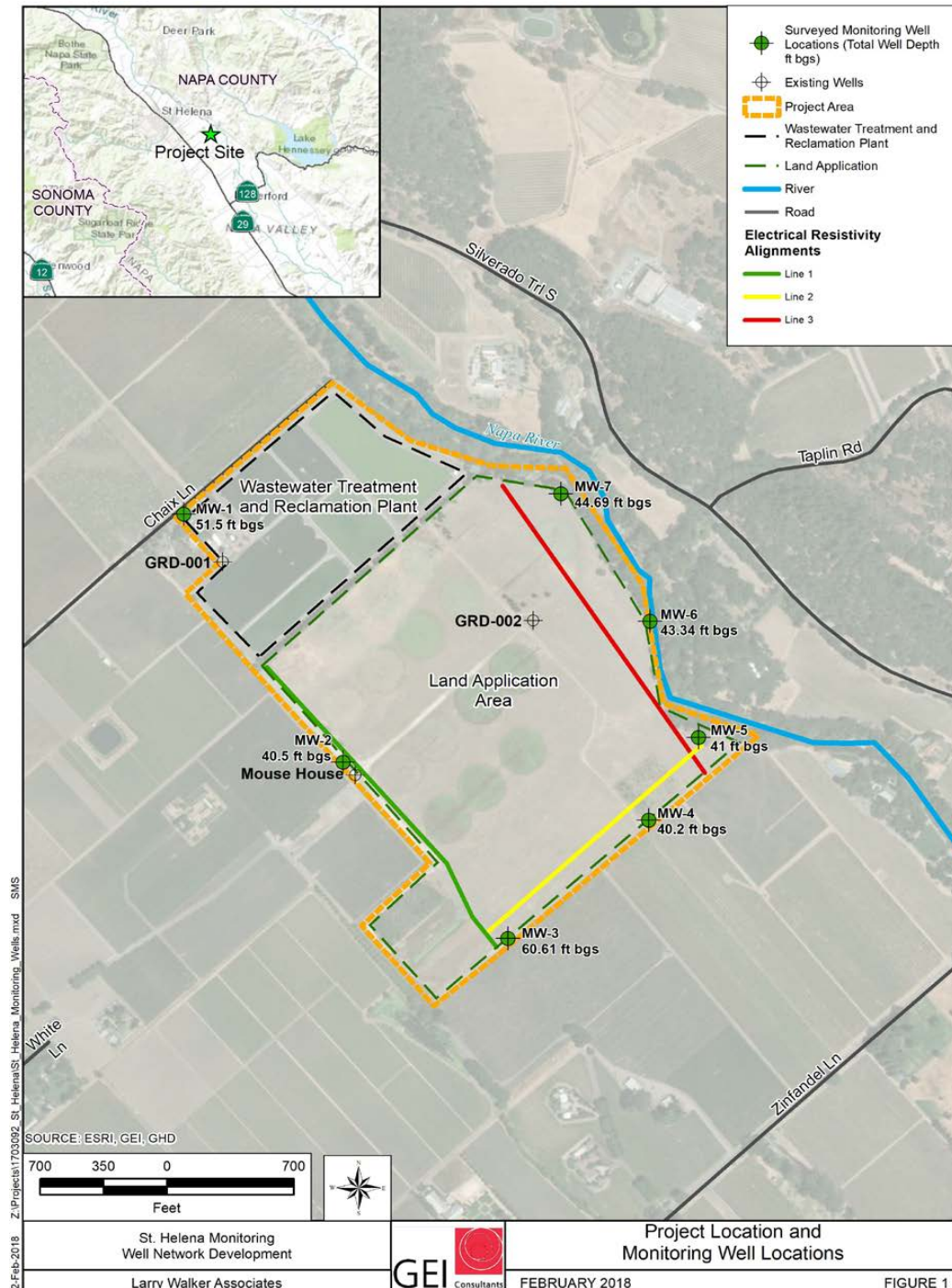


Figure 1. Project Location and Monitoring Well Locations



2 Site Conditions

The results of the electrical resistivity survey were used to select locations for seven monitoring wells. The regional hydrogeology and groundwater level conditions are described below.

2.1 Hydrogeologic Setting

The project site is in Napa Valley Subbasin which is part of the larger Napa-Sonoma Valley Groundwater Basin. The project site is underlain by the Tertiary (Pliocene and Miocene) Sonoma Volcanics Lower Member tuff, Tertiary sedimentary sands and clays, and Quaternary alluvial sediments which include terrace deposits from the Napa River (Graymer, 2007).

The Pliocene and late Miocene Sonoma Volcanics Formation in the project area consists primarily of pumiceous ash-flow tuff deposits, with interbedded volcanic sands and gravel overlying the volcanic bedrock of the Napa Valley Subbasin (Graymer, 2007). The Quaternary alluvium and terrace deposits overlay the Sonoma Volcanics Formation around the Napa River and comprise the shallow aquifer. The alluvium has a thickness around the project area of approximately 300 feet bgs, thickening toward the center of the valley, and thinning towards the mountain front area to the east. The deep aquifer is about 400 feet thick and lies beneath the alluvium in the Sonoma Volcanics.

2.1.1 Groundwater Level Conditions

A review of California Department of Water Resources (DWR) Groundwater Information Center Interactive Map Application (GICIMA) database shows the depth to groundwater in the project area is estimated to be between 10 to 15 feet bgs. The proximity of the Napa River right next to the project site may cause the groundwater in the shallow aquifer comprised of the alluvium and terrace deposits to fluctuate seasonally which may also change the groundwater gradient at different times of the year. Due to the potential of the groundwater gradient fluctuating seasonally, the monitoring well system was designed based on the electrical resistivity data, to monitor groundwater flowing in any direction away from the land application fields.

3 Field Activities

GEI developed a monitoring well installation and monitoring network workplan that was approved by the RWQCB on September 18, 2017. The City contracted with Cascade Drilling of West Sacramento, California, to construct seven monitoring wells. The drilling was scheduled to commence on October 10, 2017 to meet the November 1 deadline set by the RWQCB for water quality sampling reporting. Due to the wildfires that affected the Napa region in October, an extension of the deadline was granted on October 12 by the RWQCB. The drilling commenced on October 25, 2017 and GEI provided full-time, on-site technical monitoring of the drilling, well construction activities, and the well development which were completed on November 7, 2017. The seven monitoring wells (MW) were named MW-1 through MW-7.

3.1 Electrical Resistivity Survey

The survey was conducted by gathering electrical resistivity data along the three transect lines shown on **Figure 1**. This work was completed to characterize the texture of sediments from surface to 300 feet bgs. The resistivity data were interpreted by NorCal Geophysics and GEI to select locations, preliminary depths, and screen zones for the monitoring well system. **Appendix A** contains the NorCal Geophysics report.

3.2 Well Permits and Approvals

Monitoring well drilling permits were acquired from the Napa County Environmental Health Division – Planning, Building & Environmental Services (EHD) for each monitoring well and are provided in **Appendix B**. The project location is located just to the south of the St. Helena city limits; therefore, a permit from the City is not required for the monitoring wells.

3.3 Well Drilling and Construction

The monitoring wells were constructed between October 25, 2017 and November 1, 2017, using a CME-85 drill-rig to perform hollow-stem auger drilling. Samples were collected every five feet by driving a sample tube 18-inches for sample collection and logging. After samples were collected to a depth determined to be sufficient, the well design was finalized. Each of the 8-inch diameter boreholes were drilled to accommodate 2-inch diameter schedule 40 PVC well casing and 2-inch diameter 0.030-slot PVC well screen. Prior to well construction, the materials were checked for conformance to the workplan. After the well casing and well screen were installed, a #3 sand filter pack was placed into the annulus to surround the well casing and screen. Approximately three-feet of bentonite was placed as a transition seal on top of the filter pack extending at least 1.5 feet above the top of well screen. A cement grout annular seal was then placed from the top of the bentonite seal, a minimum

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of 20 feet below ground surface (as per Napa County's requirements). Napa County was notified prior to placing the first annular seal, and subsequently before each day of grouting. Table 1 summarizes the monitoring well construction details and the as-built well drawings and well completion photos are presented in **Appendix B – Monitoring Well As-Built**s, Lithologic Logs, Photolog, Well Permits, DWR well completion reports.

Table 1. Monitoring Well Construction Details

Well	Borehole Diameter (inches)	Well Dia. (inches)	Total Depth (feet bgs)	Screen Interval (feet bgs)	Gravel Pack Interval (feet bgs)	Depth of Annular Seal (feet bgs)
MW-1	8	2	51.5	36.5 – 46.5	33 – 52	31
MW-2	8	2	40.5	30.5 – 40.5	28 – 41	26
MW-3	8	2	60.6	40.6 – 60.6	38 – 61	36
MW-4	8	2	40.2	25.2 – 40.2	22 – 40	20
MW-5	8	2	41.0	26.0 – 41.0	23 – 44	21
MW-6	8	2	43.3	28.3 – 43.3	26 – 44	23
MW-7	8	2	44.7	24.7 – 44.7	23 – 50	21

3.4 Well Development

Well development for MW-1 through MW-7 was completed between November 6, 2017 and November 7, 2017. Water generated during well development and water quality sampling was applied to the adjacent land at the sites, where it percolated into the soils.

Preliminary well development consisted of bailing sediment from the bottom of the wells followed by using a surge block and pumping the wells. After the surging and pumping were completed the bailer was used again to clear out sediment from the bottom of the well. This process was completed across the entire screen interval of each well. During the pumping the GEI inspector recorded the temperature, pH, total dissolved solids (TDS), turbidity, and electrical conductivity at the well head using a portable calibrated meter.

Throughout the pumping period the water samples were observed and the degree of opacity was noted ranging from opaque to clear. The development goal was to achieve a turbidity below 5 nephelometric units (NTU). Due to time and budget constraints, the wells were developed as much as possible but a turbidity below 5 NTU could not be achieved at all sites.

3.5 Well Survey

After the wells were constructed a survey reference point was cut into the top of each of the monitoring well casings. LWA hired GHD, a licensed California Professional Land Surveyor, to survey the location and the top of casing elevations at each of the reference points. GEI used the elevation data and the casing stick-up in feet above ground surface that

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was measured in the field to calculate the ground surface elevation at each well. These elevations were used to create the groundwater contours presented in **Figures 2 and 3**. **Appendix C** contains the monitoring well survey results.

3.6 Well Pads and Bollards

Cascade Drilling installed lockable well enclosures, well pads, and crash posts (bollards) in accordance with the work plan. Three bollards were installed surrounding each well pad. All enclosures and bollards were painted bright yellow for visibility. Images of the constructed monitoring wells are presented in **Appendix B**.

3.7 Final Well Inspection

Upon completion of the development, GEI measured the total depth of each well and confirmed that the wells were free of fill. The City of St. Helena supplied locks and keys for the monitoring wells. The site was returned to suitable conditions by Cascade Drilling and the drill cuttings were spread onsite as approved by the City.

4 Findings

The following sections describe the findings from geophysical surveying, drilling, construction, and sampling of monitoring wells MW-1 through MW-7.

4.1 Lithology Encountered During Drilling

Soil samples were collected every five feet from ground surface to a total depth drilled, between 40 and 61 feet bgs from the seven monitoring well sites. The samples were collected during drilling using the direct push method using (16-inch sample) and the samples were logged using the Unified Soil Classification System (USCS). The results for the boreholes had a close correlation to the NorCal Geophysics resistivity lines (shown in **Figure 1**). These three electrical resistivity profiles determined that there were suitable sediments with high resistivity in the shallow aquifer for MW-2 through MW-7.

The borehole for MW-1, located north of the WWTRP in the parking lot, was not located along any of the resistivity profiles. The lithology encountered at MW-1 was lean clay to about 35 feet bgs with a one-foot thick gravel lens from 24-25 feet bgs. From 35 feet bgs to the total depth of 52 feet bgs wet sand was observed with thin interfingering gravel beds. The samples collected from the MW-2 borehole showed similar lean clays for the upper 9 feet overlying coarse gravels and sands to a depth of 29 feet bgs. A seven-foot-thick clay layer was encountered from about 29 to 36 feet bgs that may behave as a confining layer, below which saturated sand and gravels were encountered. The well screens were installed between 32 to 42 feet bgs to monitor water quality below the clay. MW-2 is the only well drilled within NorCal Geophysics' first (Line 1) resistivity profile and the lithology encountered correlates with their assessment.

The second (Line 2) resistivity profile conveyed a sloping conductive area in the southwest portion of the transect indicating that coarse sediments are deeper than at the other transect locations. Clay was present to a depth of about 19 feet at the MW-3 borehole and dry lean clay with sand and gravelly lean clay were present to about 35 feet bgs. Below 35 feet bgs, wet gravel and sand lenses coarsened and were present to the total depth of 60 feet bgs, at which depth the drill rig was no longer able to penetrate.

Samples collected from MW-4 through MW-7 indicated the presence of a 5 to 10-foot-thick clay layer at ground surface with increasing thickness with closer proximity to the Napa River. These clay and silt sediments are underlayed by poorly graded sands and gravels. A gravel layer from approximately 20 to 35 feet bgs was the first water bearing layer in each four boreholes.

4.2 Groundwater Levels

Groundwater levels were measured in the newly installed monitoring wells on November 17, 2017; December 15, 2017; and January 17, 2018. The depth to water for MW-1, the furthest northwest well at the site, is deeper than the monitoring wells to the southeast of the WWTRP. The ground surface elevation to the northwest of the site is also higher than the ground surface to the southeast. The static water levels as measured by LWA staff are listed in Table 2. The surveyed elevations of the top of casings were used along with the measured casing stick-up height above ground surface to calculate the ground surface elevations and the water surface elevations.

Groundwater surface elevation contours were made using water levels measured in November 2017, as shown on Figure 2, and January 2018, as shown on **Figure 3**. The general flow direction is to the east/southeast and the gradient is relatively flat but increased slightly in January when compared to November. The gradient measured in November was about -0.003 and in January it was about -0.005. The water surface elevation at the site raised several feet between the two measurement dates and the general flow path was more east towards the Napa River in January.

ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

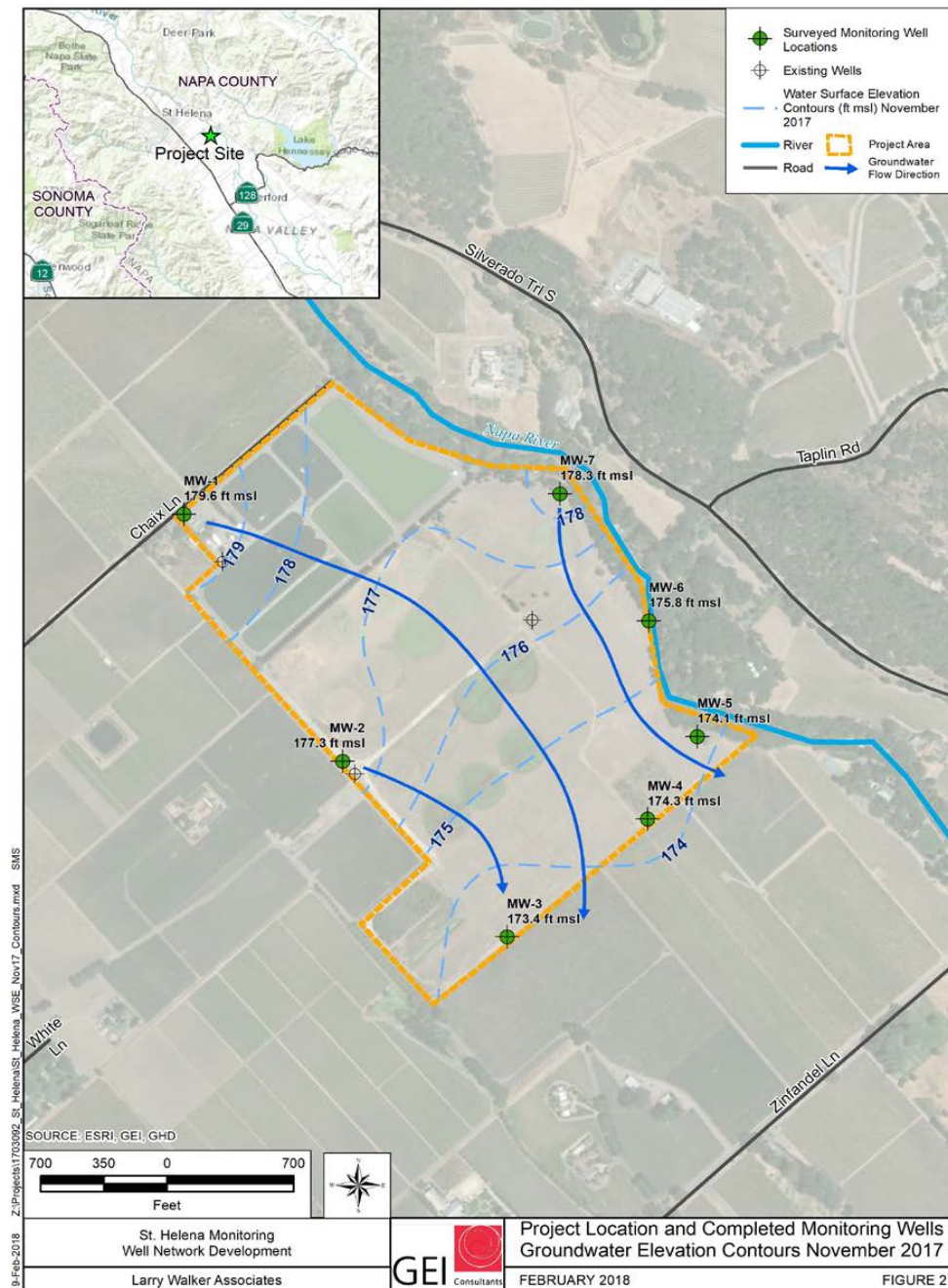


Figure 2. Groundwater Contours November 2017

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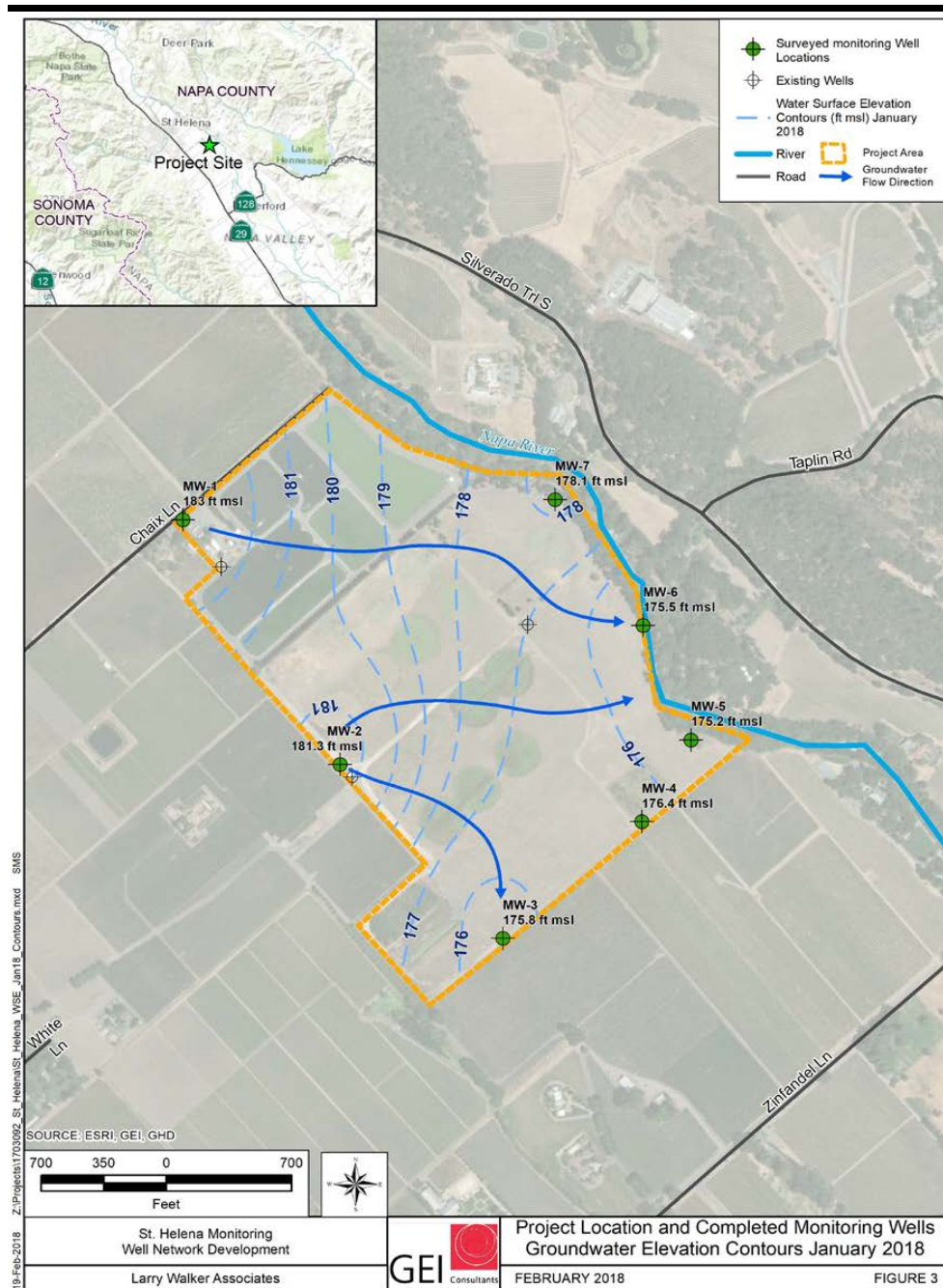


Figure 3. Groundwater Contours January 2018

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Table 2. Groundwater Levels

Measurement	Date of Sampling	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Casing Stick Up - Feet above ground surface		2.30	2.75	2.80	2.80	2.75	2.56	2.96
Well diam. (inches)		2	2	2	2	2	2	2
Depth to Water (ft bgs)	11/17/2017	24.36	17.76	14.82	14.98	16.83	17.35	16.79
pH		6.41	6.46	6.48	6.44	6.75	6.64	6.77
Conductivity (µS)		342.6	350.3	411.1	485.6	572.0	488.1	486.1
Temperature (°C)		16.6	17.7	16.2	17.2	17.4	17.0	18.3
Turbidity (NTU)		6.32	3.79	3.76	3.02	12.1	6.36	7.2
Depth to Water (ft bgs)	12/15/2017	22.23	15.81	13.53	13.81	16.00	16.91	16.56
pH		6.25	6.25	6.38	6.38	6.67	7.08	6.94
Conductivity (µS)		357.7	339.8	399.8	467.4	580.5	652.9	343.4
Temperature (°C)		16.63	17.44	16.02	17.02	17.21	16.93	13.70
Turbidity (NTU)		6.38	2.89	0.25	12.80	0.91	0.62	1.57
Depth to Water (ft bgs)	1/17/2018	20.89	13.80	12.40	12.91	15.68	17.66	16.97
pH		6.30	6.21	6.34	6.30	6.65	6.88	6.89
Conductivity (µS)		426.5	351.6	409.2	462.0	589.8	518.3	382.5
Temperature (°C)		17.49	17.75	16.54	17.75	18.15	17.17	13.85
Turbidity (NTU)		0.59	0.95	1.19	1.68	2.80	1.56	2.26

4.3 Water Quality

Water quality samples were collected by LWA staff and delivered to California-certified Caltest Analytical Laboratory of Napa, California. The water quality analyses for all seven monitoring wells included chloride, nitrogen, nitrate (as N), total dissolved solids (TDS), total suspended solids (TSS), total kjeldahl nitrogen (TKN), ammonia (as N), biochemical oxygen demand (BOD), and total coliform.

Water quality samples were collected using a Peri pump low-flow purging method involving pumping at a rate of 250 milliliters per minute (ml/min). During the sampling event the depth to water, temperature, pH, conductivity, turbidity, dissolved oxygen, and oxidation-reduction potential (ORP) were measured at each well. The volume purged from the monitoring wells ranged from 2.4 liters to about 9.2 liters. Well pumping continued until the field parameters stabilized, then samples were collected. A summary of water quality results is provided in Table 3.

The water quality results indicate that all monitoring wells sampled were below the maximum contaminant limit (MCL) for chloride, nitrogen, nitrate (as N) and TDS. The TSS for the November 17 sampling event were higher than the results for samples collected in December 15. The November 17 samples may have had residual sediment from well development that was not present at the time of the December sampling event. TKN was present in all the monitoring wells except MW-6 during the November sampling event but

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read as non-detect for MW-1, MW-2 and MW-3 during the December sampling event and was detected at low levels in the remaining four wells. Ammonia results were non-detect in all wells for the November sampling event but were detected at low levels in MW-6 and MW-7 during the December sampling event. The BOD results were non-detect for all of the samples on both sampling dates. Coliform was detected at MW-4 and MW-7 during the November sampling event and in wells MW-5 and MW-7 during the December sampling event. An MCL doesn't exist for total coliform but the State Water Resources Control Board indicates that any positive result is over the MCL. Total coliform results from MW-7 were the highest and were the 1,600 MPN/100ml (most probable number of coliform in 100 milliliters in November and dropped to 240 MPN/100ml in December). MW-7 is also the closest monitoring well to the aeration ponds. **Appendix D** has the water quality sampling field notes and laboratory results.

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Table 3. Summary of Water Quality Results

Analytical Method	Parameter	Date of Sample	CAS ID.	CA Maximum Contaminant Level Ranges			Reporting Limit	Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
				Recommended	Upper	Short Term									
EPA 300.0															
	Chloride	11/17/2017	16887-00-6	250	500	600	10	mg/L	14	17	32	32	54	50	79
		12/15/2017	16887-00-6				10	mg/L	13	15	30	27	47	83	54
	Nitrogen, Nitrate (as N)	11/17/2017	14797-55-8	10	---	---	0.1	mg/L	3.6	2.8	3.8	6.4	1.8	1.7	1.1
		12/15/2017	14797-55-8				0.1	mg/L	5.7	2.9	3.6	5.7	1.7	0.55	0.32
SM 2540 C-97/-11															
	Total Dissolved Solids	11/17/2017	10052	500	1000	1500	10	mg/L	230	240	280	330	410	330	310
		12/15/2017	10052				10	mg/L	230	220	280	310	420	430	250
SM 2540 D-11															
	Total Suspended Solids	11/17/2017	10053	---	---	---	3	mg/L	177	ND	ND	3	27	4	6
		12/15/2017	10053				3	mg/L	ND	ND	ND	ND	ND	ND	ND
SM 4500-NH3 C-11															
	Total Kjeldahl Nitrogen	11/17/2017	7727-37-9	---	---	---	0.1	mg/L	0.13	0.13	0.22	0.35	J0.088	ND	0.35
		12/15/2017	7727-37-9				0.1	mg/L	ND	ND	ND	J0.088	0.26	0.35	0.26
	Ammonia (as N)	11/17/2017	7664-41-7	---	---	---	0.1	mg/L	ND	ND	ND	ND	ND	ND	ND
		12/15/2017	7664-41-7				0.1	mg/L	ND	ND	ND	ND	ND	0.12	J0.044
SM 5210 B-11															
	Biochemical Oxygen Demand	11/17/2017	10003	---	---	---	5	mg/L	ND	ND	ND	ND	ND	ND	ND
		12/15/2017	10003				5	mg/L	ND	ND	ND	ND	ND	ND	ND
SM 9221 B/E-06															
	Total Coliform	11/17/2017	10008	--- ¹	--- ¹	--- ¹	1.8	MPN/100mL	ND	ND	ND	2	ND	ND	1600
		12/15/2017	10008				1.8	MPN/100mL	ND	ND	ND	ND	2	ND	240

Notes:

mg/L - milligrams per liter

MPN/100mL - most probable number of coliform per 100 milliliters

J = The reported value was obtained from a reading that was less than the Contract Required Quantitation Limit but greater than or equal to the Method Detection Limit.

ND - Not Detected

--- = None

¹ - MCL is not applicable to the individual results because any positive result is considered over the Maximum Contaminant Levels (https://www.waterboards.ca.gov/gama/docs/coc_bacteria_indicators.pdf)

5 Conclusions

The seven monitoring wells were constructed in accordance with the work plan, with slight borehole depth modifications to place the screen zones at the appropriate depths to monitor the first available groundwater as determined through field lithologic logging.

The water quality within each of the seven monitoring wells were of reasonable water quality except for the total coliform detected in MW-4 and MW-7 during the November sampling event and in MW-5 and MW-7 in December. The groundwater contours indicate that the groundwater gradient ranges from -0.003 to -0.005 east/southeast towards the Napa River. The monitoring network as constructed is suitable to monitor the groundwater levels and water quality upgradient of the WWTRP and throughout the site as shallow groundwater migrates off-site.

6 References

California Regional Water Quality Control Board San Francisco Bay Region, Order No. 87-090, *Water Reclamation Requirements for: City of St. Helena, Napa County*

DWR CASGEM Water level database:

http://www.water.ca.gov/groundwater/casgem/online_system.cfm

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ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

Appendix A – NorCal Geophysics Report



August 11, 2017

Larry Walker Associates
1405 South Bascom Avenue
San Jose, California 95128

Subject: Electrical Resistivity Profiling Survey
St. Helena Water Treatment Plant
St. Helena, California

Terracon Job No. NS175031

Attention: Kristine Corneillie

This report presents the findings of an Electrical Resistivity Profiling (ERP) survey performed by NORCAL Geophysical Consultants (a Terracon company) for Larry Walker Associates (LWA) at the St. Helena Water Treatment Plant in St. Helena, California. The work was authorized under the Standard Subconsultant Agreement LWA Project No: 110.19 dated July 6, 2017. NORCAL California Professional Geophysicists David T. Hagin and Donald J Kirker, Staff Geophysicist Hunter S. Philson and Senior Geophysical Technician Travis W. Black conducted the ER survey during the period of July 12 through July 14, 2017. Background information and site logistics were provided onsite by Mr. Ryan Alward of GEI Consultants; GEI is a subconsultant to LWA, and is directing our investigation for this project.

1.0 SITE DESCRIPTION and PURPOSE

The site is an approximately square lot to the southeast of the wastewater ponds, as shown on Plate 1. The flat, grass-covered field is approximately 82 acres in size and is bordered on the northeast by the Napa River. Based on information supplied by GEI, groundwater flow is toward the southeast; therefore, water leaching from the ponds is thought to migrate beneath the field.

In an effort to assess the possible impact of wastewater on the local groundwater, GEI is currently implementing a groundwater monitoring and reporting plan. According to GEI, the installation of both shallow and deep groundwater monitoring wells situated around the downgradient perimeter of the property is a key part of the plan. As the placement of wells into

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Environmental



Facilities



Geotechnical



Materials



Larry Walker Associates
August 11, 2017
Page 2

areas with relatively high groundwater permeability is desired, ER Lines are situated along the downgradient perimeter of the property, as specified by GEI (Plate 1).

By quantifying electrical resistivity (ER) values, it is possible to differentiate between geologic units with greater or lesser permeability. The purpose of the ERP survey is to identify areas around the downgradient perimeter of the property where ER values indicate geologic formations that may be more coarse-grained and therefore more permeable.

2.0 CULTURAL FEATURES

Cultural features that may have affected the measured ER values include a structure and associated electric lines on Line 1, grounded fencing and suspected underground piping on Line 2 and a grounded fence that is locally in close proximity to Line 3. Such features can create electrical pathways and cause low ER zones to appear on the resulting profile.

The ER lines were situated to minimize the influence of these features. However, limited access forced portions of the lines to be in proximity to some of these cultural features in some locations.

3.0 RATIONALE

Electrical resistivity is a measure of the resistance to the flow of electrical current through a volume of earth material. Measuring subsurface variations in the ER values can be useful in evaluating the relative permeability of unconsolidated materials. This is because (saturation aside) coarse-grained sediments such as sands and gravels are typically more electrically resistive (higher ER values) than fine-grained sediments such as clays and silts.

4.0 SCOPE OF WORK

In order to characterize the electrical properties of the subsurface we conducted 2D electrical resistivity profiling (ERP) along three traverses designated as Lines 1 through 3, as shown on Plate 1. Appendix A describes the ERP methodology, data acquisition and analysis procedures and limitations.



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August 11, 2017
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5.0 RESULTS and INTERPRETATIONS

The results of the ERP surveys conducted along Lines 1 through 3 are illustrated by the ER profiles shown on Plates 2 and 3. These profiles depict variations of the electrical resistivity values both laterally and with depth along each line. On each profile, the black line at the top represents ground surface, the horizontal axis represents the stationing (distance in feet) and the vertical axis represents depth (in feet). The locations of intersecting lines are annotated on each plate. The ER values are in ohm-meters (ohm-m), and are represented by color-shaded contours according to the scale shown beneath each profile. The same range of ER values and scale has been used on all of the lines for ease of comparison.

5.1 ER VALUES

The ER values depicted by the three profiles range from about 5 ohm-m to 180 ohm-m, as indicated by the electrical resistivity scale shown on each plate. For the purposes of this study, ER values above approximately 50 to 75 (orange to red) are interpreted to present the best available targets for higher groundwater permeability zones. Within the selected target zones, the highest ER values likely represent the most coarse-grained materials.

5.2 LINE 1

The distinct low ER zone near station 750 coincides with the location of a structure and associated electrical lines. Therefore, it is likely that the low ER zone is due to cultural features, and is not reflective of subsurface conditions.

Between stations 200 and 700, we note a shallow target zone within the upper 50 feet and a deeper zone between approximately 120 and 210 feet in depth. Another deep target zone is apparent between station 850 and station 1350; this zone ranges in depth from 150 to 300 feet and has the highest ER values near station 925 at a depth of 225 feet. The deeper target zones are separated by the suspect low ER zone, which may obscure a connection between the two target zones. In addition, they are situated below a thick low ER layer (likely fine grained), which suggests some degree of confinement in the interpreted aquifer.



Larry Walker Associates
August 11, 2017
Page 4

5.3 LINE 2

Although Line 2 was oriented to minimize the effects of cultural features, the relative proximity of a chain-link fence to the southeast and suspected sub-surface irrigation piping to the northwest likely affected the data. The low ER zone extending across the bottom of the profile and upward to relatively shallow depths on the northeast portion is interpreted as due to these cultural features and not due to lithologic changes.

A shallow higher ER layer extends across a majority of the profile, and presents a likely target between stations 600 and 1050, where it is thickest. This target zone ranges in depth from ground surface to approximately 100 feet. We have also selected a target zone between stations 100 and 400, at depths ranging from 50 to 100 feet. Part of this zone is situated beneath a low ER layer, again suggesting some degree of confinement.

5.4 LINE 3

The distinct low ER zone between stations 1475 and 1775 coincides with the location where a chain link fence bends into close proximity to the line. This consideration makes the zone suspect as a culturally induced feature.

A relatively large target zone is noted between station 700 and station 1300, ranging in depth from approximately 50 to 200 feet. This target zone is situated beneath a lower ER zone, suggesting that it may represent a confined aquifer. We have identified another target zone between stations 150 and 400 that appears to extend beyond the northwest end of the profile. The zone appears to be somewhat inter-fingered with low ER zones, and extends from ground surface to the bottom of the profile at 300 feet.

6.0 STANDARD CARE AND WARRANTY

The scope of NORCAL's services for this project consisted of using the electrical resistivity profiling (ERP) method to characterize the shallow subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to this technique. We performed our services in a manner consistent with the level of skill ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.



Larry Walker Associates
August 11, 2017
Page 5

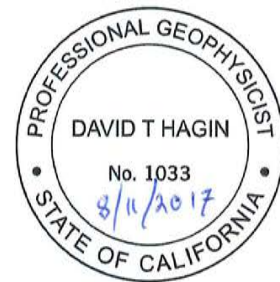
We appreciate the opportunity to provide our services for this project. Should you require additional geophysical services or have questions regarding this survey, please do not hesitate to call.

Sincerely,

NORCAL Geophysical Consultants, Inc.

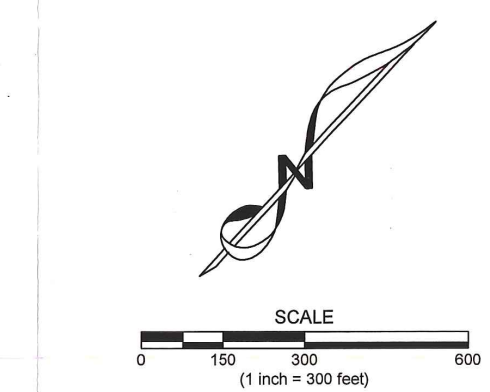
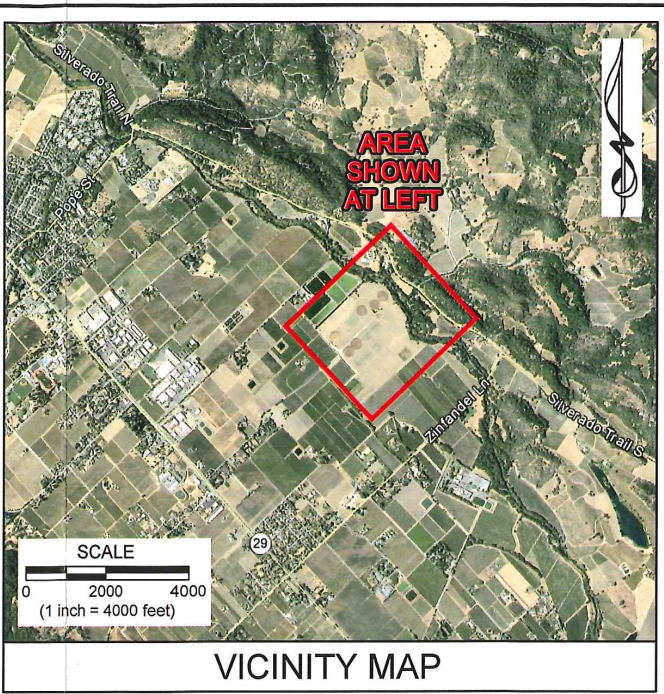
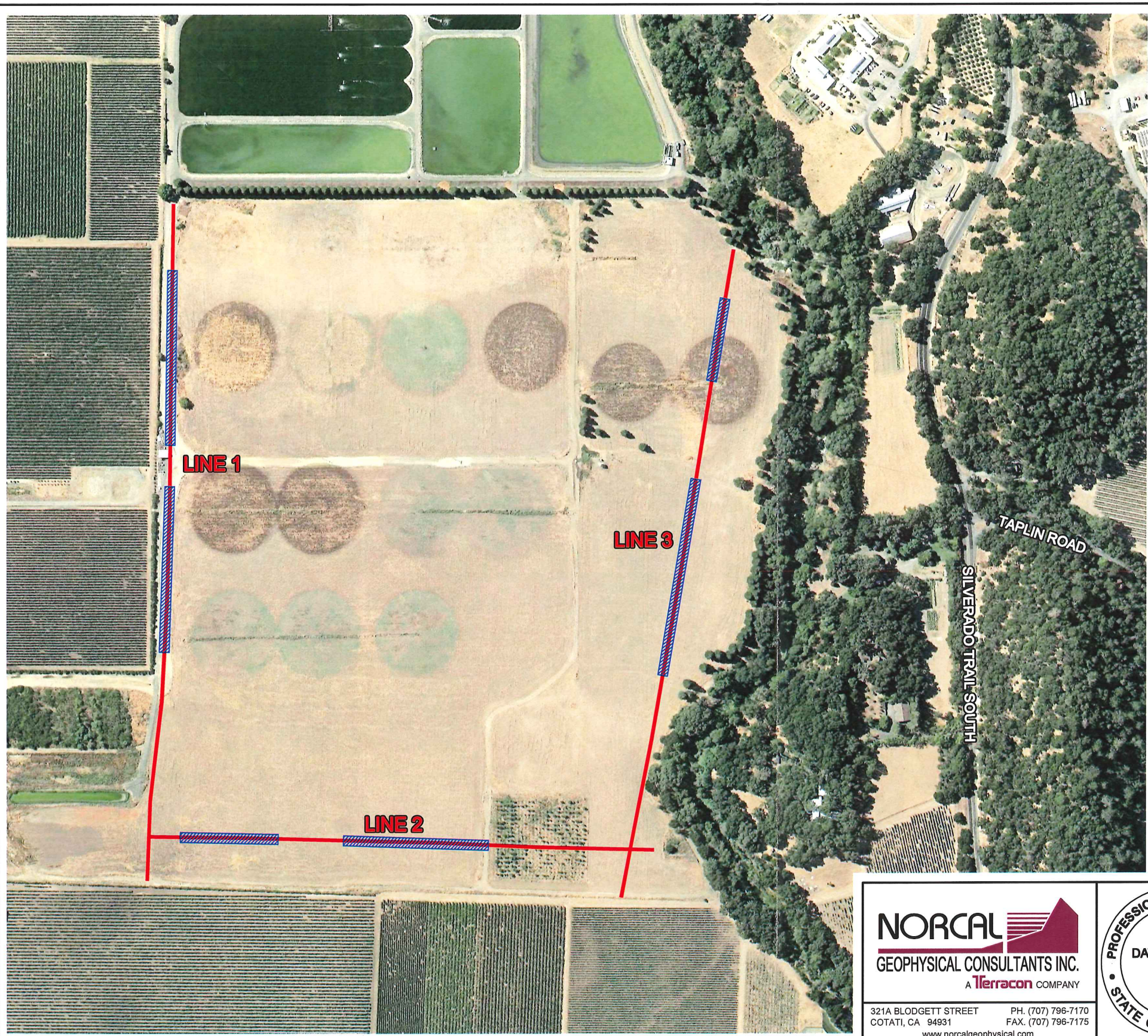
A handwritten signature in blue ink that reads "David T. Hagin". The signature is fluid and cursive.

David T. Hagin
California Professional Geophysicist, PGp 1033



DTH/KGB/tt

Enclosures: Plates 1 through 3
Appendix A – Electrical Resistivity Survey



LEGEND	
	ELECTRIC RESISTIVITY LINE
	TARGET ZONE

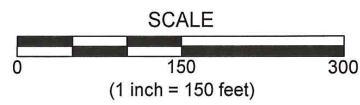
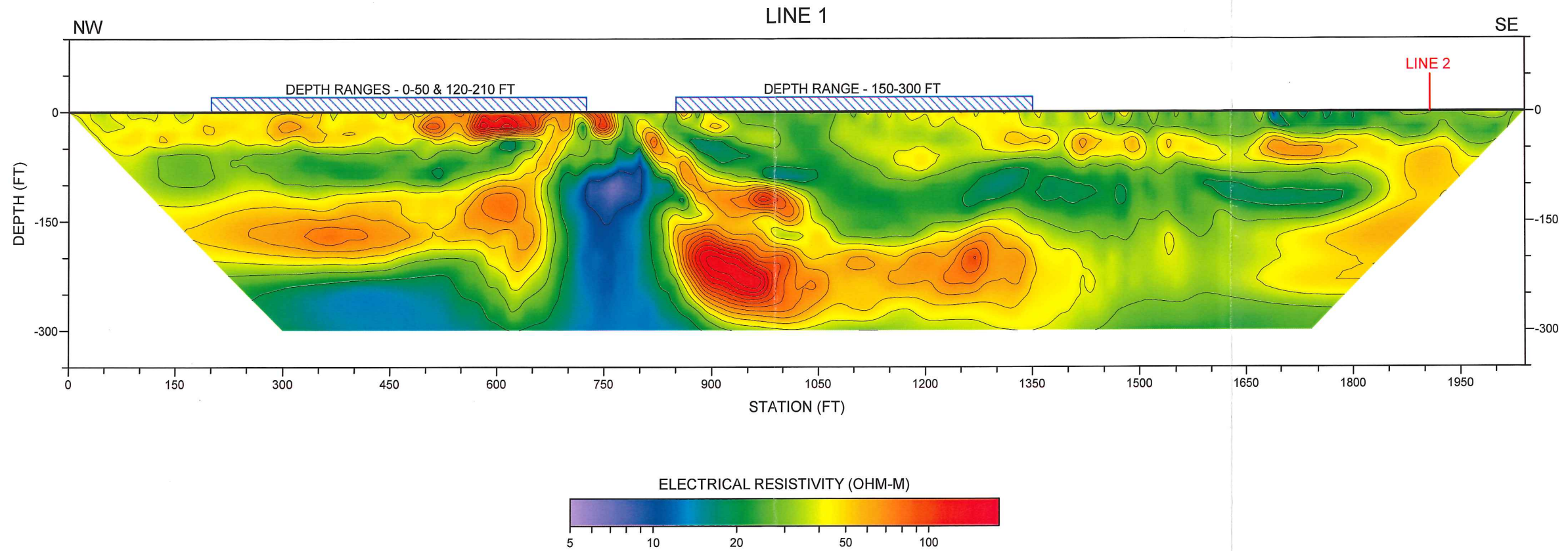
NORCAL
GEOPHYSICAL CONSULTANTS INC.
A Terracon COMPANY

321A BLODGETT STREET
COTATI, CA 94931
www.norcalgeophysical.com

PH. (707) 796-7170
FAX. (707) 796-7175

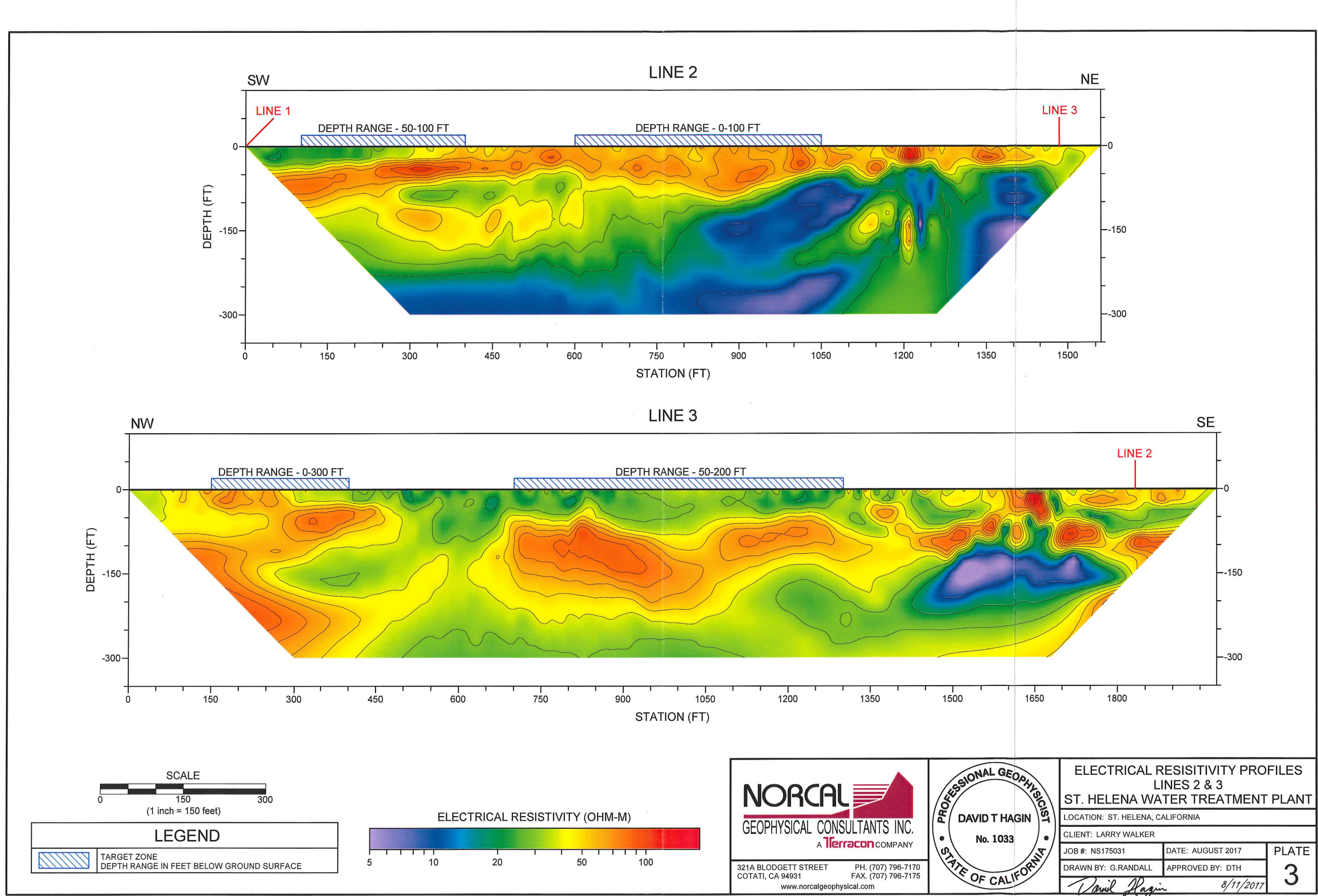
PROFESSIONAL GEOPHYSICIST
DAVID T HAGIN
No. 1033
STATE OF CALIFORNIA

SITE LOCATION MAP ELECTRICAL RESISTIVITY SURVEY ST. HELENA WATER TREATMENT PLANT			
LOCATION: ST. HELENA, CALIFORNIA			
CLIENT: LARRY WALKER			
JOB #: NS175031	DATE: AUGUST 2017	PLATE 1	
DRAWN BY: G.RANDALL	APPROVED BY: DTH		
<i>David Hagin</i>		8/11/2017	



LEGEND	
	TARGET ZONE DEPTH RANGE IN FEET BELOW GROUND SURFACE

 NORCAL GEOPHYSICAL CONSULTANTS INC. A Terracon COMPANY				ELECTRICAL RESISTIVITY PROFILE LINE 1 ST. HELENA WATER TREATMENT PLANT	
	LOCATION: ST. HELENA, CALIFORNIA				
	CLIENT: LARRY WALKER				
	JOB #: NS175031		DATE: AUGUST 2017		PLATE 2
	DRAWN BY: G.RANDALL		APPROVED BY: DTH		
 www.norcalgeophysical.com		 8/11/2017			





Appendix A

GEOPHYSICAL METHODOLOGY



Appendix A

ELECTRICAL RESISTIVITY SURVEYS

Rational

Electrical resistivity is the physical property of a material that resists the flow of electrical current. The electrical resistivity of earth materials is directly affected by moisture content and permeability. Typically, in a sedimentary environment, electrical resistivity decreases as moisture content increases. Thus, fine-grained materials such as clays have a lower electrical resistivity than coarse grained materials such as sands and gravels. The resistivity of earth materials is also greatly affected by the concentration of dissolved salts or free ions in the saturating fluid. The presence of fluids that have a high concentration of dissolved salts or free ions can significantly decrease the electrical resistivity of both fine and coarse-grained materials.

Electrical properties of rock can vary greatly depending upon the degree of weathering and fracturing, as well as composition. Rock formations that are deeply buried and not exposed to chemical weathering are generally impermeable, contain little water, and have a relatively high electrical resistivity. Conversely, highly weathered and fractured rock that contains moisture typically has lower resistivity values.

Based on the above relationships, geophysical methods that measure the electrical resistivity of the subsurface can be used to determine the depth and/or lateral extent of permeable materials, possible water-bearing formations, and the depth to bedrock.

Methodology

The electrical resistivity of the subsurface is measured using a galvanic resistivity method. This consists of transmitting electrical current into the earth through a pair of grounded metal electrodes, and measuring the resulting potential drop across the second pair of grounded metal electrodes. There are a variety of electrode arrangements (arrays) that can be used. The dipole-dipole electrode configuration is typically used because it provides information on both the depth and lateral extent of subsurface electrical properties.

The dipole-dipole array consists of four electrodes that are placed in the ground in a collinear arrangement. One pair of adjacent electrodes is used to transmit current into the earth and is referred to as the current dipole. The second pair of electrodes is used to measure the resulting potential drop, and is referred to as the potential dipole. Both dipoles have the same length.



To begin a profile, a reading is taken with the dipoles separated by their common length. Subsequent readings are taken as the potential dipole is moved along the profile while the current dipole remains stationary. The separation between dipoles is always a multiple of the dipole length. As the separation between dipoles increases, so does the depth of investigation. Once the maximum separation is reached, the current dipole is moved along the profile one dipole length and the entire procedure is repeated.

For each reading, a value is calculated that represents the apparent resistivity of the volume of earth that the current flows through. The term, apparent, is used because the value represents the resistivity of a volume rather than an individual layer. The apparent resistivity values are then plotted in cross-section and contoured to form what is referred to as a "pseudo-section". The term "pseudo" is used because the vertical scale is not scalar but is proportional to the dipole separation. In addition, the resistivities are apparent rather than true. However, the pseudo-section can be inverted to generate a 2-D model showing the depth and true resistivity of subsurface layers.

Instrumentation

Apparent resistivity data is typically acquired using a SuperSting R1 Resistivity meter with the Swift automatic multi-electrode system. Both systems are manufactured by Advanced Geosciences Incorporated (AGI). The Sting is a self-contained unit that transmits current at outputs ranging from 1 to 500 milliAmps (mA). The unit also measures the potential drop and converts the data to values of apparent resistivity for a number of electrode arrays. The data are stored in internal memory and can be downloaded to a computer for processing. The Swift consists of an electrode interface console, four cables, and 56 stainless steel electrodes. Each cable has 14 individual take-outs that can be connected to electrodes at intervals up to 10 meters. Depending on the objective of the survey, the Swift can operate using 28 to 56 electrodes.

Data Acquisition

ER surveys using the Sting/Swift resistivity system are initiated by laying out the cables, end-to-end, along each profile. The Swift console is then connected between the two cables and to the Sting ER meter. At each take-out in the cable, stainless steel electrodes are driven into the ground and then fastened to the respective take-out. To begin the survey, the ER meter tests the contact resistance of each electrode. If any of the values are abnormally high, the electrode plant as well as the connection between the electrode and the switch is inspected, and if necessary, improved. The survey is begun once all of the electrode contacts tested satisfactory. To start out, readings are taken with the dipoles separated by their common length and moved along the length of the array. For example, if the length between two electrodes (referred to as a dipole) is



10 meters, then the distance between the current and potential dipoles (two electrodes each) will also be 10 meters. Since each of the switches are individually addressable by the Sting, the instrument is able to move this configuration down the array by turning the appropriate switches on and off, as necessary, to switch from one dipole to another. Subsequent readings are then taken by increasing the distance between dipoles, up to eight times the dipole separation, along the array. It then repeats the entire procedure using dipole lengths typically two to three times the length of the initial dipole. For example, if the initial dipole was 10 meters, then the Sting/Swift system repeats the process using dipole lengths of 20 and 30 meters.

Data Analysis

Upon completion of a dipole-dipole survey, apparent resistivity data are downloaded from the Sting to a lap-top computer using the program STINGDMP. The data are inverted to true resistivity versus depth and distance using the program EARTHIMAGER 2D. Both programs are written by AGI. The data generated by the EARTHIMAGER 2D program are then gridded and contoured using the computer program Surfer 11.0 by Golden Software to produce 2-D models.

Limitations

A common feature of all electrical methods is that the models derived from the electric profiling are not unique. That is, depending on the subsurface geo-electric structure, there may be many models that will produce essentially the same apparent resistivities. This is known as the *principal of equivalence*. To overcome this limitation, computer software programs include routines for evaluating the equivalence of a given model relative to the observed resistivity values, resulting in a model that provides the closest fit to the observed data.

ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

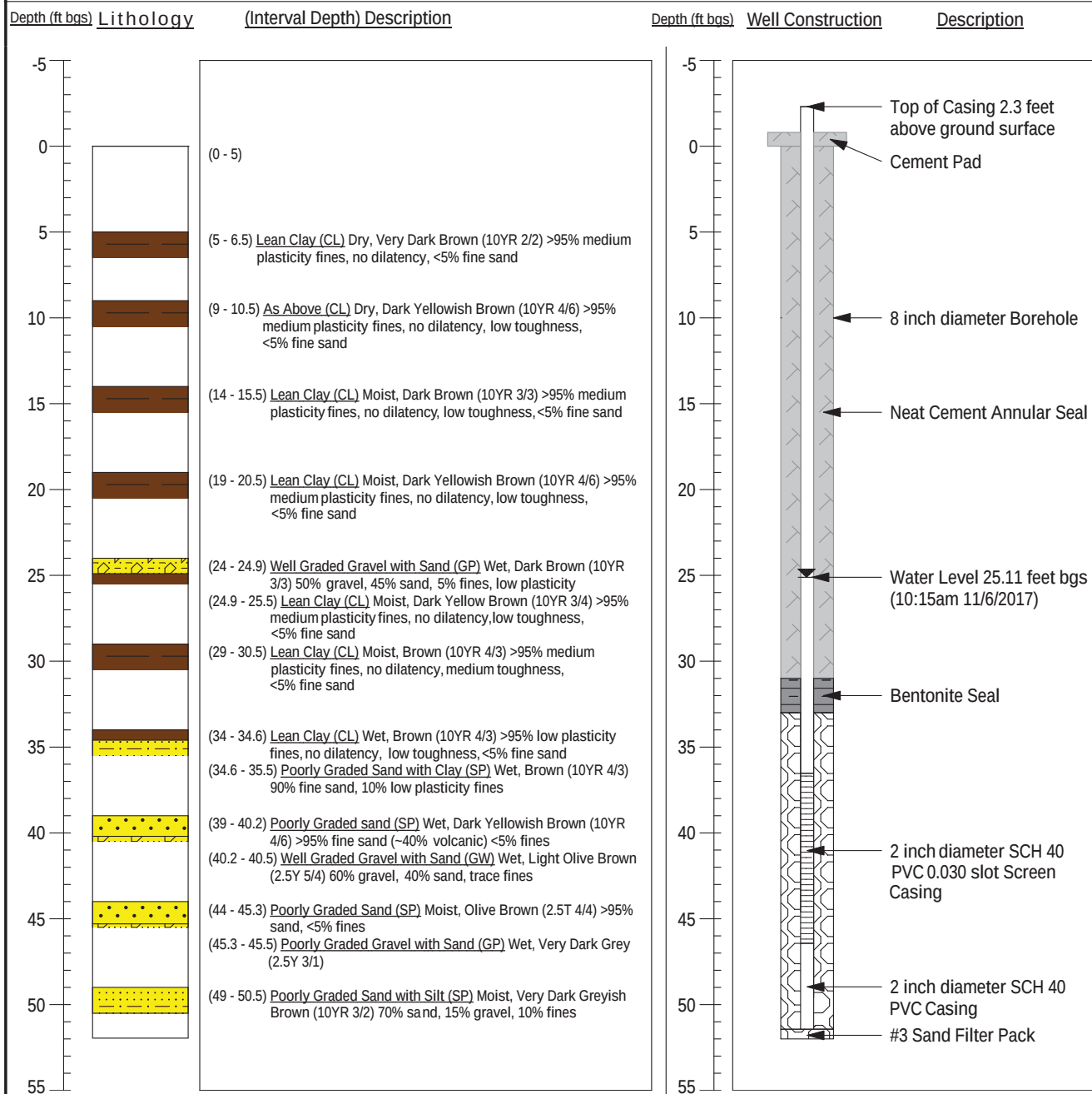
Appendix B – Monitoring Well As-Builts, Lithologic Logs, Photolog, Well Permits, DWR Well Completion Reports



Logger: Sean S. Checked: Justin C.
 Drilling Company: Cascade Drilling
 Date Drilled: 10/25/2017
 Date Completed: 10/31/2017
 Well Name: MW-1

Location: St Helena, CA
 Latitude: N038° 30' 03.5248"
 Longitude: W122° 26' 30.7583"
 Total Bore Depth: 52 feet bgs
 Total Well Depth: 51.5 feet bgs

Notes: All measurements and descriptions are based on field notes taken at time of drilling and development.
 Lat/Long location surveyed by GHD and measured "Black Mark" Top of Casing elevation at 206.212 ft msl
 Soil sampling was conducted by pushing a sample barrel 18-inches within the hollow-stem auger after every five feet of drilling.

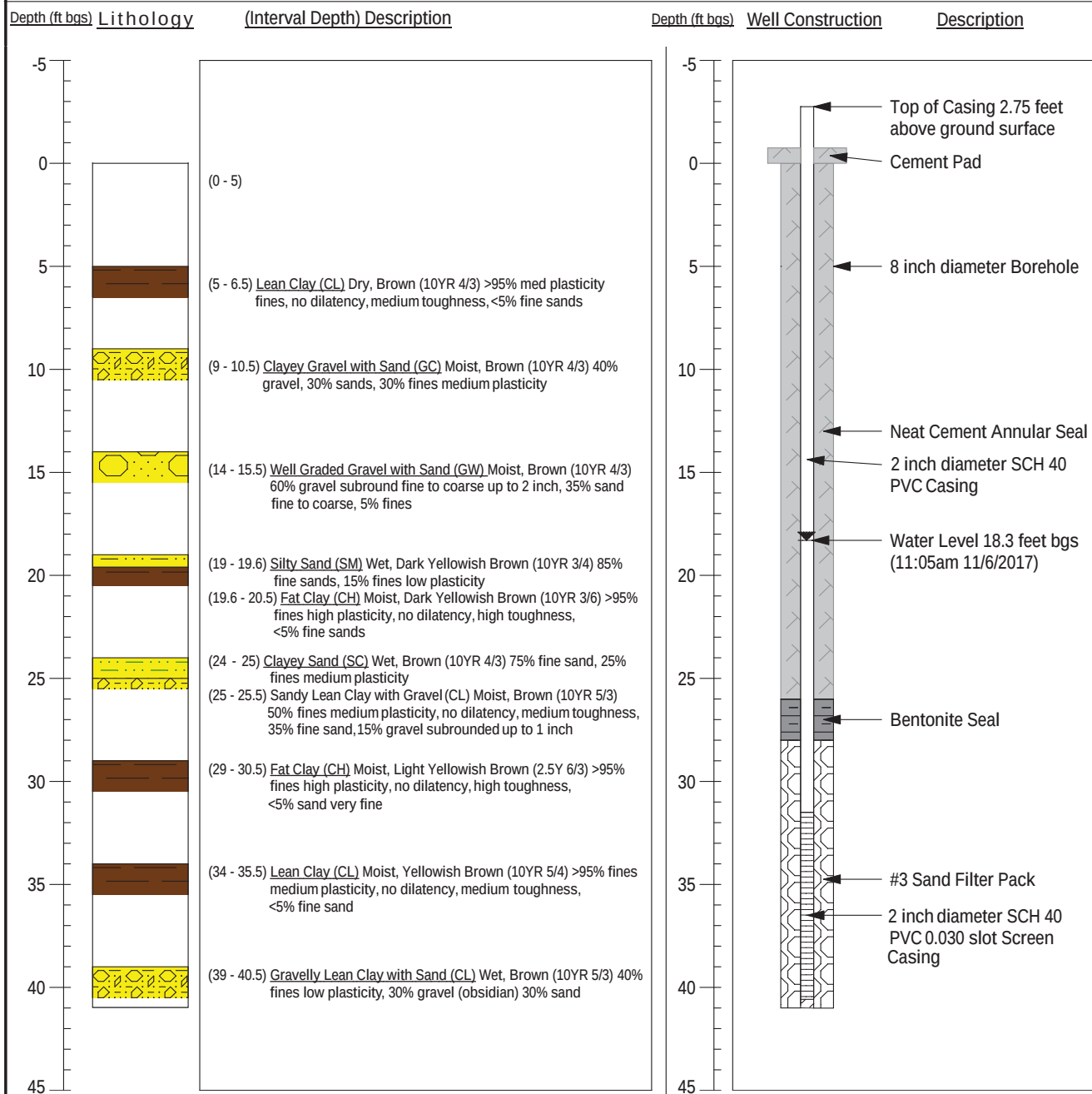




Logger: Sean S. Checked: Justin C.
 Drilling Company: Cascade Drilling
 Date Drilled: 10/26/2017
 Date Completed: 10/26/2017
 Well Name: MW-2

Location: St Helena, CA
 Latitude: N038° 29' 49.9138"
 Longitude: W122° 26' 19.2556"
 Total Bore Depth: 41 feet bgs
 Total Well Depth: 40.5 feet bgs

Notes: All measurements and descriptions are based on field notes taken at time of drilling and development.
 Lat/Long location surveyed by GHD and measured "Black Mark" Top of Casing elevation at 197.837 ft msl
 Soil sampling was conducted by pushing a sample barrel 18-inches within the hollow-stem auger after every five feet of drilling.

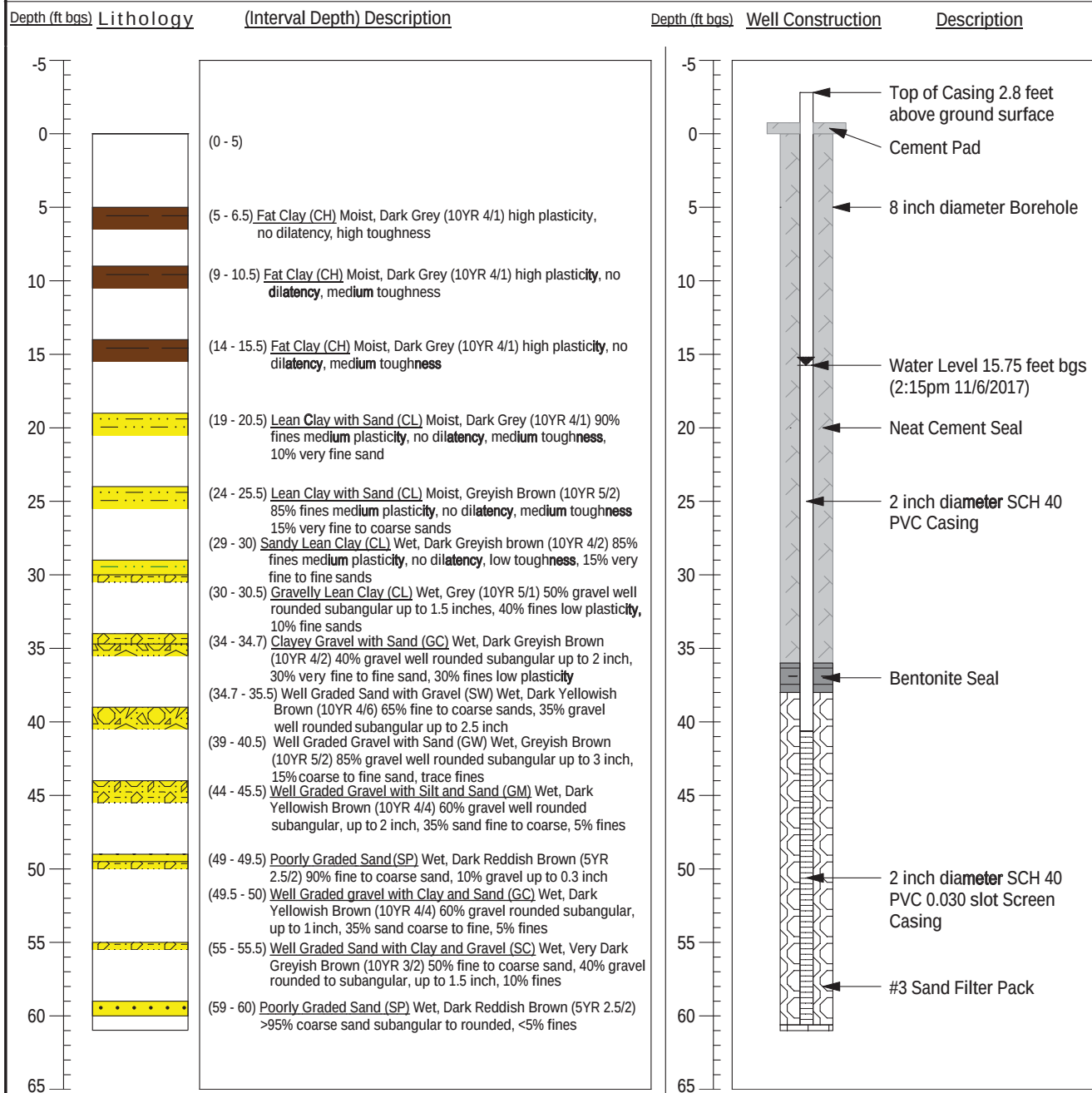




Logger: Sean S. Checked: Justin C.
 Drilling Company: Cascade Drilling
 Date Drilled: 10/26/2017
 Date Completed: 10/27/2017
 Well Name: MW-3

Location: St Helena, CA
 Latitude: N038° 29' 40.3143"
 Longitude: W122° 26' 07.4615"
 Total Bore Depth: 61 feet bgs
 Total Well Depth: 60.61 feet bgs

Notes: All measurements and descriptions are based on field notes taken at time of drilling and development.
 Lat/Long location surveyed by GHD and measured "Black Mark" Top of Casing elevation at 190.972 ft msl
 Soil sampling was conducted by pushing a sample barrel 18-inches within the hollow-stem auger after every five feet of drilling.

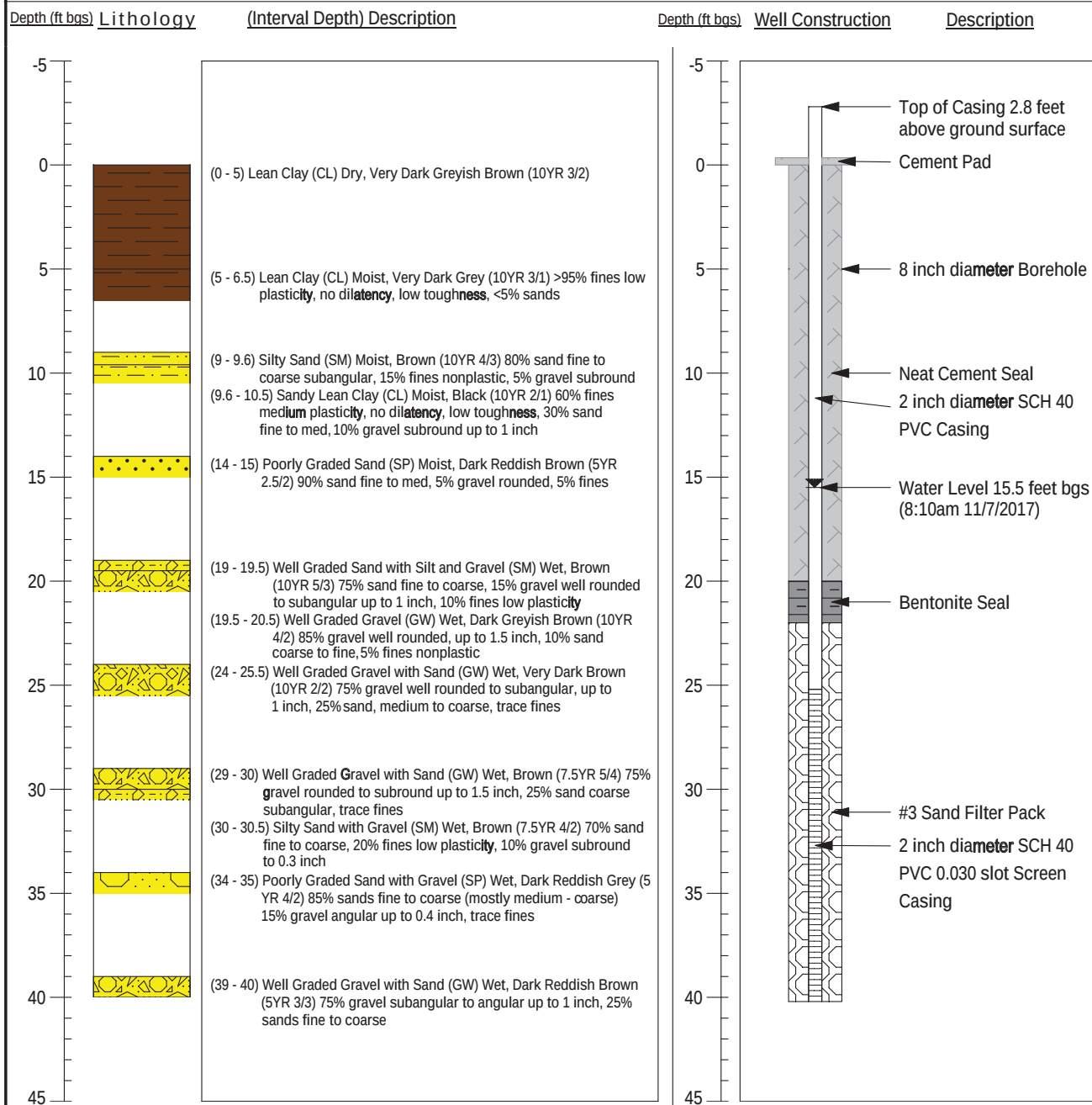




Logger: Sean S. Checked: Justin C.
 Drilling Company: Cascade Drilling
 Date Drilled: 10/27/2017
 Date Completed: 10/27/2017
 Well Name: MW-4

Location: St Helena, CA
 Latitude: N038° 29' 47.1097"
 Longitude: W122° 25' 57.8992"
 Total Bore Depth: 40.2 feet bgs
 Total Well Depth: 40.2 feet bgs

Notes: All measurements and descriptions are based on field notes taken at time of drilling and development.
 Lat/Long location surveyed by GHD and measured "Black Mark" Top of Casing elevation at 192.084 ft msl
 Soil sampling was conducted by pushing a sample barrel 18-inches within the hollow-stem auger after every five feet of drilling.

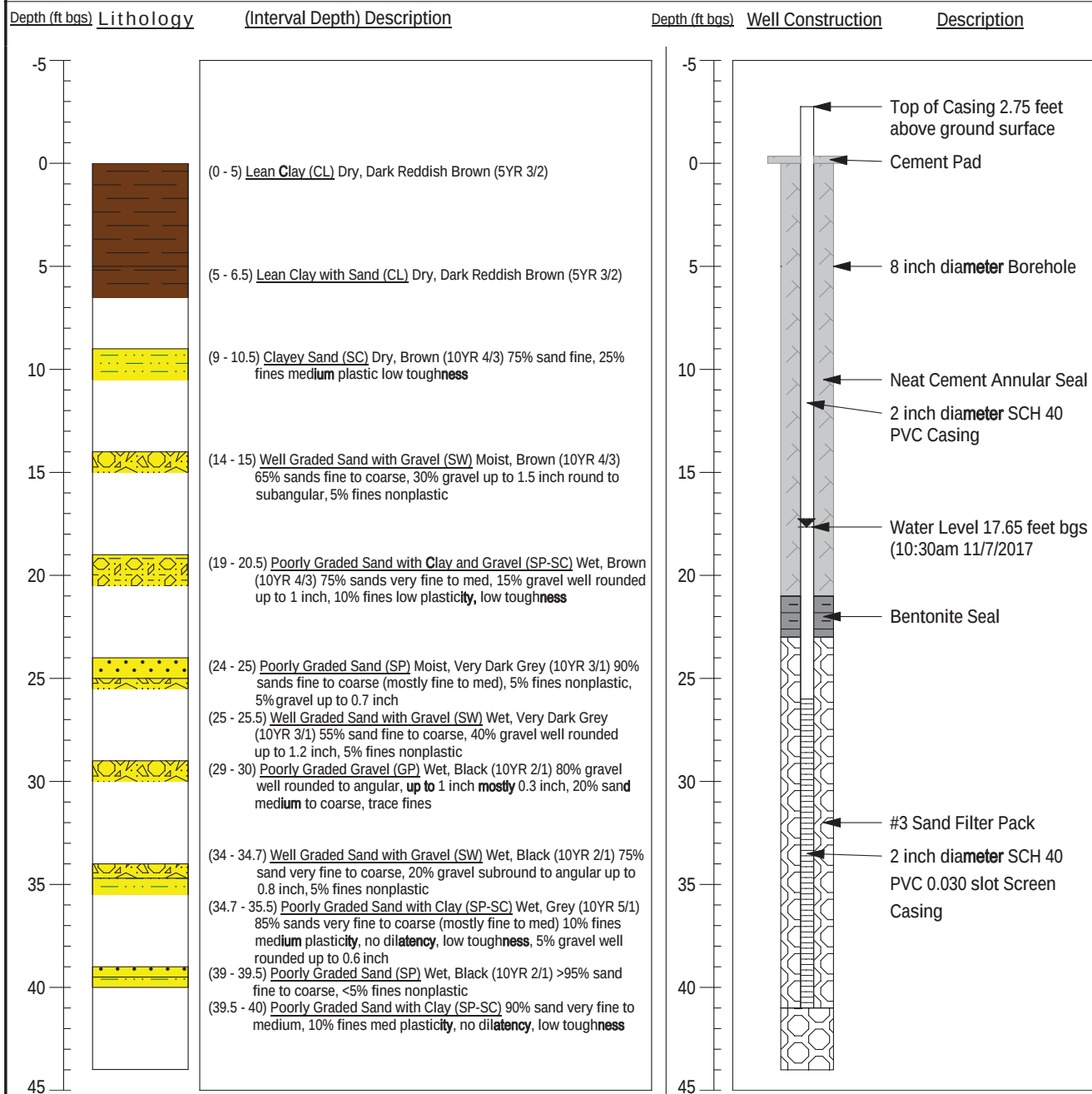




Logger: Sean S. Checked: Justin C.
 Drilling Company: Cascade Drilling
 Date Drilled: 10/30/2017
 Date Completed: 10/30/2017
 Well Name: MW-5

Location: St Helena, CA
 Latitude: N038° 29' 51.7961"
 Longitude: W122° 25' 54.6019"
 Total Bore Depth: 44 feet bgs
 Total Well Depth: 41 feet bgs

Notes: All measurements and descriptions are based on field notes taken at time of drilling and development.
 Lat/Long location surveyed by GHD and measured "Black Mark" Top of Casing elevation at 193.636 ft msl
 Soil sampling was conducted by pushing a sample barrel 18-inches within the hollow-stem auger after every five feet of drilling.

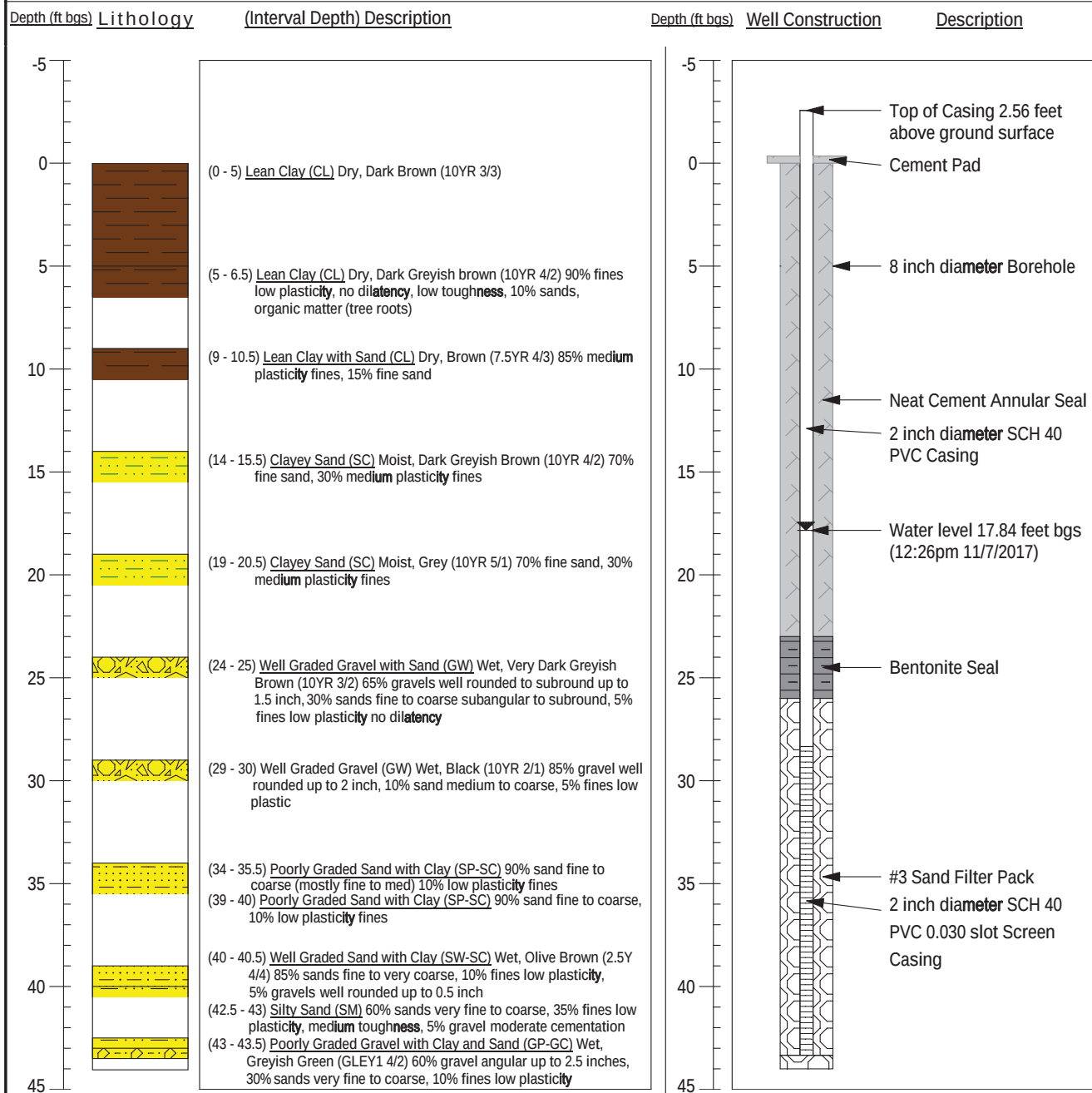




Logger: Sean S. Checked: Justin C.
 Drilling Company: Cascade Drilling
 Date Drilled: 10/30/2017
 Date Completed: 10/31/2017
 Well Name: MW-6

Location: St Helena, CA
 Latitude: N038° 29' 58.1994"
 Longitude: W122° 25' 58.1752"
 Total Bore Depth: 44 feet bgs
 Total Well Depth: 43.34 feet bgs

Notes: All measurements and descriptions are based on field notes taken at time of drilling and development.
 Lat/Long location surveyed by GHD and measured "Black Mark" Top of Casing elevation at 195.721 ft msl
 Soil sampling was conducted by pushing a sample barrel 18-inches within the hollow-stem auger after every five feet of drilling.

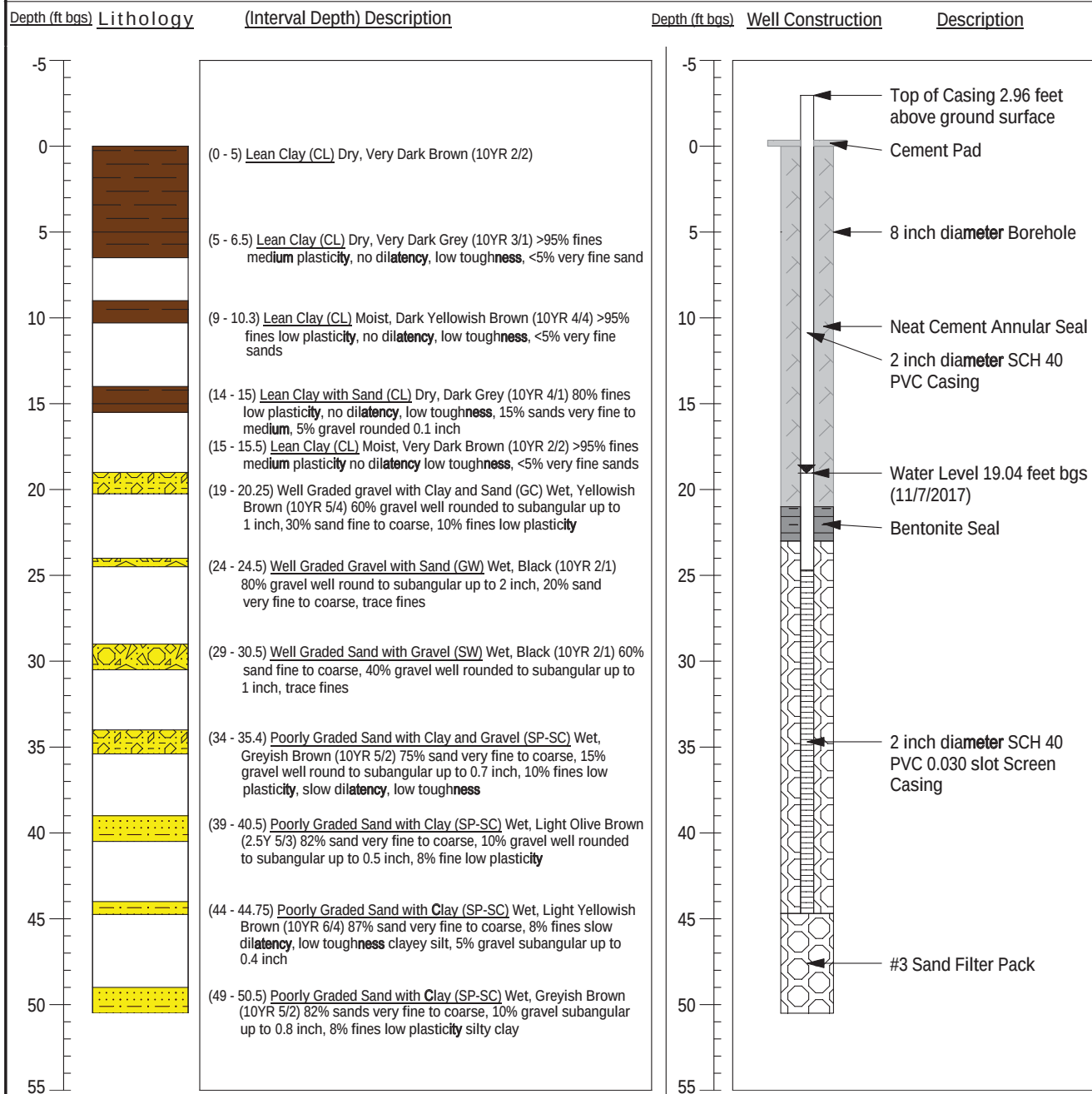




Logger: Sean S. Checked: Justin C.
 Drilling Company: Cascade Drilling
 Date Drilled: 10/31/2017
 Date Completed: 10/31/2017
 Well Name: MW-7

Location: St Helena, CA
 Latitude: N038° 30' 05.1987"
 Longitude: W122° 26' 04.6046"
 Total Bore Depth: 50.5 feet bgs
 Total Well Depth: 44.69

Notes: All measurements and descriptions are based on field notes taken at time of drilling and development.
 Lat/Long location surveyed by GHD and measured "Black Mark" Top of Casing elevation at 198.064 ft msl
 Soil sampling was conducted by pushing a sample barrel 18-inches within the hollow-stem auger after every five feet of drilling.



	
MW-1 – Upgradient well, looking northwest	MW-2 – Looking west
	
MW-3 – Looking west	MW-4 – Looking east/southeast

	
MW-5	MW-6 – Looking southeast
	
MW-7 – Looking south	



A Tradition of Stewardship
A Commitment to Service

Date / Time 9/27/2017 1:44:55 PM

Cashier

cworthi2

Transaction ID 54954981

\$186.11

Base

\$4.35

Conv. Fee

\$190.46

Total

Account No. E17-00589

Receipt No. 123185

Record Type Record

Payment Summary : Visa payment for \$190.46.

Billing Name : ALWARD/Ryan

Billing Address :
, 95670

Phone Number :

Email Address :

Signature



Note: The convenience fee is collected by Heartland Payment Systems.

A Commitment to Service

RECEIPT

THIS IS NOT A PERMIT

Receipt Number:	123185	Parcel No:	030-240-013-000
Permit Number:	E17-00589	Date:	9/27/2017
Application Type:	Environmental / EM Permits / Water Wells / Monitoring Wells		
Site Address:	25 Chaix Ln, St Helena		
Applicant:	Ryan Alward	Phone:	() -
Owner:	ST HELENA CITY OF	Phone:	() -

Deposit/Payment List:

Receipt No.	Payor	Method	Date	Reference No.	Comments	Cashier	Payment Amount
123185	RYAN D ALWARD CHRISTINE THE PHOTOGRAPHER	Credit Card	9/27/2017	E17-00589	530-680-5756	CWORTH12	\$186.11

Fees:

Fee	Invoice Number	Account	Fee Amount	Payment	Balance Due
General Plan Surcharge*	141313	1000-1700004-42301-170/PERMITS 1-PERMIT NOFND GENRL	\$3.11	\$3.11	\$0.00
Monitoring, Extraction and Cathodic Protection Wells (1st) (\$183.00)*	141313	1000-1702000-42303-170/EH-PERMITS 1-EHDP NOFND GENRL	\$183.00	\$183.00	\$0.00
		Total:	\$186.11	\$186.11	\$0.00

* Fees that represent the General Plan Surcharge of 1.7% are denoted with an asterisk (*).



A Tradition of Stewardship
A Commitment to Service

Date / Time 9/27/2017 1:49:19 PM

Cashier

cworthi2

Transaction ID 54955194

\$211.54

Base

\$4.95

Conv. Fee

\$216.49

Total

Account No. E17-00590
Receipt No. 123186
Record Type Record

Payment Summary : Visa payment for \$216.49.

Billing Name : ALWARD/RYAN

Billing Address :
, 95670

Phone Number :

Email Address :

Signature

A handwritten signature in black ink, appearing to read "Ryan", written over a horizontal line.

Note: The convenience fee is collected by Heartland Payment Systems.

A Tradition of Stewardship
A Commitment to Service

DAVID MORRISON
Director

RECEIPT

THIS IS NOT A PERMIT

Receipt Number:	123186	Parcel No:	030-240-017-000
Permit Number:	E17-00590	Date:	9/27/2017
Application Type:	Environmental / EM Permits / Water Wells / Monitoring Wells		
Site Address:			
Applicant:	Ryan Alward	Phone:	() -
Owner:	ST HELENA CITY OF	Phone:	() -

Deposit/Payment List:

Receipt No.	Payor	Method	Date	Reference No.	Comments	Cashier	Payment Amount
123186		Credit Card	9/27/2017	E17-00590		CWORTH12	\$211.54

Fees:

Fee	Invoice Number	Account	Fee Amount	Payment	Balance Due
General Plan Surcharge*	141315	1000-1700004-42301-170/PERMITS 1-PERMIT NOFND GENRL	\$3.54	\$3.54	\$0.00
Monitoring, Extraction and Cathodic Protection Wells Additional (2 or more)*	141315	1000-1702000-42303-170/EH-PERMITS 1-EHDP NOFND GENRL	\$25.00	\$25.00	\$0.00
Monitoring, Extraction and Cathodic Protection Wells (1st) (\$183.00)*	141315	1000-1702000-42303-170/EH-PERMITS 1-EHDP NOFND GENRL	\$183.00	\$183.00	\$0.00
		Total:	\$211.54	\$211.54	\$0.00

* Fees that represent the General Plan Surcharge of 1.7% are denoted with an asterisk (*).



A Tradition of Stewardship
A Commitment to Service

Date / Time 9/27/2017 1:56:17 PM

Cashier cworthi2

Transaction ID 54955525

\$262.39	Base
\$6.14	Conv. Fee
\$268.53	Total

Account No. E17-00591
Receipt No. 123187
Record Type Record

Payment Summary : Visa payment for \$268.53.

Billing Name : ALWARD/RYAN

Billing Address :
, 95670

Phone Number :
Email Address :

Signature

A handwritten signature in black ink, appearing to read "Ryan", written over a horizontal line. The signature is stylized with a large loop at the end.

Note: The convenience fee is collected by Heartland Payment Systems.

A Tradition of Stewardship
A Commitment to Service

Director

RECEIPT

THIS IS NOT A PERMIT

Receipt Number:	123187	Parcel No:	030-250-018-000
Permit Number:	E17-00591	Date:	9/27/2017
Application Type:	Environmental / EM Permits / Water Wells / Monitoring Wells		
Site Address:			
Applicant:	Ryan Alward	Phone:	() -
Owner:	ST HELENA CITY OF	Phone:	() -

Deposit/Payment List:

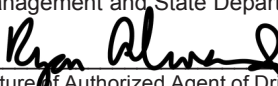
Receipt No.	Payor	Method	Date	Reference No.	Comments	Cashier	Payment Amount
123187	RYAN D ALWARD CHRISTINE THE PHOTOGRAPHER	Credit Card	9/27/2017	E17-00591	530-680-5756	CWORTH12	\$262.39

Fees:

Fee	Invoice Number	Account	Fee Amount	Payment	Balance Due
General Plan Surcharge*	141316	1000-1700004-42301-170/PERMITS 1-PERMIT NOFND GENRL	\$4.39	\$4.39	\$0.00
Monitoring, Extraction and Cathodic Protection Wells Additional (2 or more)*	141316	1000-1702000-42303-170/EH-PERMITS 1-EHDP NOFND GENRL	\$75.00	\$75.00	\$0.00
Monitoring, Extraction and Cathodic Protection Wells (1st) (\$183.00)*	141316	1000-1702000-42303-170/EH-PERMITS 1-EHDP NOFND GENRL	\$183.00	\$183.00	\$0.00
		Total:	\$262.39	\$262.39	\$0.00

* Fees that represent the General Plan Surcharge of 1.7% are denoted with an asterisk (*).

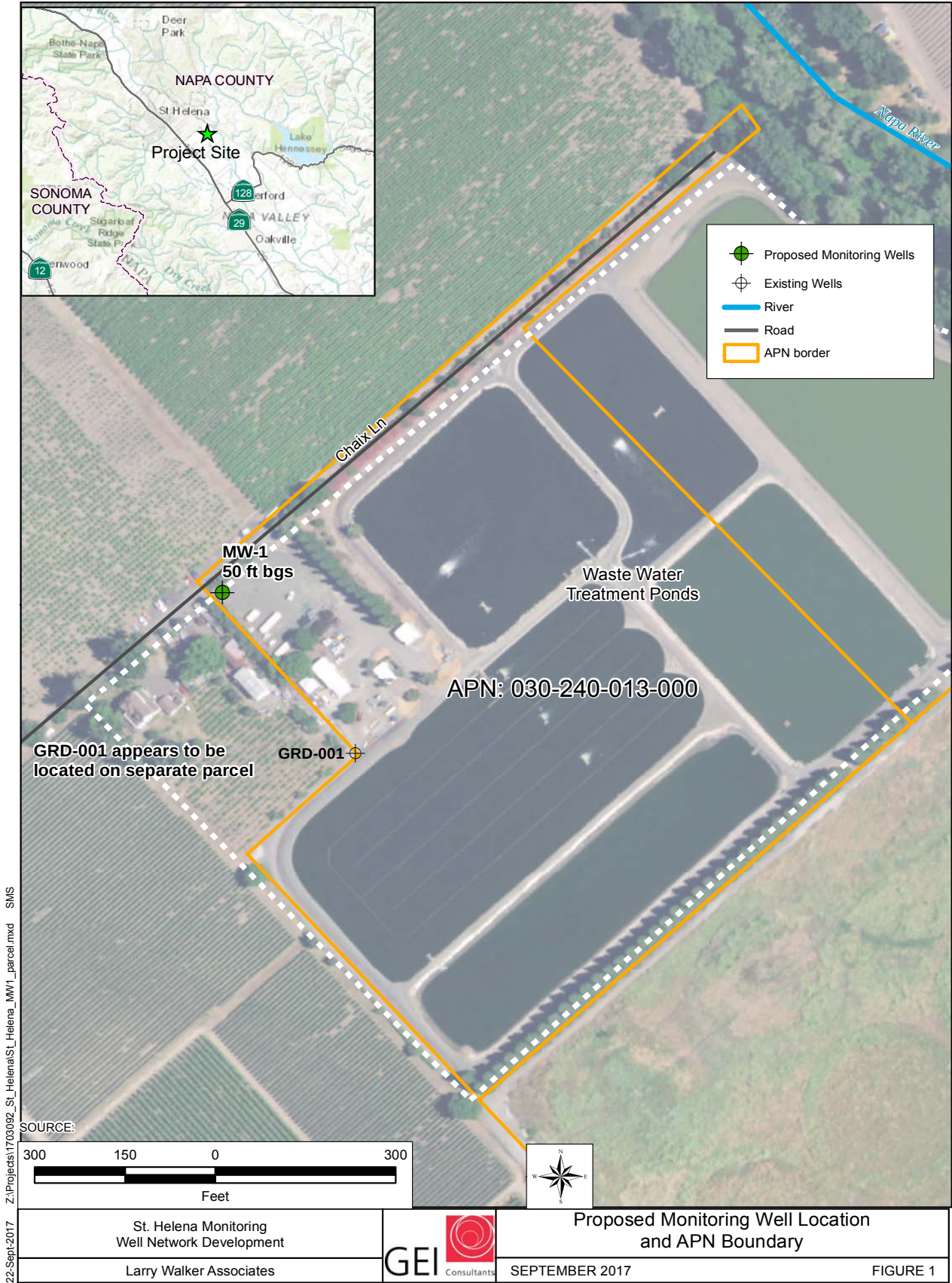
For MW-1 PERMIT APPLICATION NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT			
Napa County Use Only FEE EXEMPT SITE: Y / N If NO, FEE \$ _____ Date _____ By _____ Receipt # _____		Application for: Monitoring Wells <u> X </u> Extraction Wells _____ Other _____ Cathodic Protection Wells _____ Exploratory Hole (boring) _____ (Please check one) 030-240-013-000 NCDEM SITE NUMBER _____ ASSESSOR'S PARCEL NUMBER _____	
The following MUST be included before this permit application can be processed: 1. Assessor's Parcel Number 2. Well location map (showing both proposed and existing wells) 3. Permission document(s) (if required) Not required 4. Encroachment permit(s) (if required) Not required 5. Clearance from public agency(ies) (if required) Not required			
Site Name: WWTP Land Application Field		Property Owner: City of St. Helena (Felix Hernandez)	
Site Address: 25 Chaix Lane		City: St. Helena	Zip: 94574
Owner's Mailing Address: 1480 Main Street		City: St. Helena	Zip: 94574
Drilling Contractor: Cascade Drilling		Type of License: Well Drillers License	
Mailing Address: 3000 Duluth Street		License #: 938110	
City: West Sacramento	State: California	Zip: 95691	
Consultant: GEI Consultants		Telephone #: (916) 631 - 4500	
Address: 2868 Prospect Park Dr. Suite 400		City: Rancho Cordova	State: CA Zip: 95670-6065
Responsible Person at Site: Ryan Alward			
Type of Work			
New Construction of wells - <u> Yes </u> - # of wells <u> 1 </u> Destruction of wells - _____ # of wells _____ Reconditioning of wells (reconstruct or repair) - _____ - # of wells _____ Wells currently on Site? - <u> No </u> - # of wells _____			
Reason for Well Installation (Check as many as apply):			
Underground tank site:		Surface Impoundment:	
Tanks Still Present:		Landfill Site:	
Spill or Discharge Site:		Cathodic Protection:	
Baseline Study:		Other: Treated Water Application Site	
Other Site Information:			
Closest Distance to:			
Septic System: Unknown	Sewer Line: Unknown	Water Wells: 350'	Rivers, Creeks, or Lakes: 1,200'
Unknown Underground Utilities:	Underground Storage Tanks: Unknown		
Riparian Cover Permit Required? Yes _____ No <u> X </u>			
Issued by the County Public Works Dept. (Attach Copy)			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2 Permit Application White – Office Yellow – Owner Pink – Consultant/Contractor			

Permit Application Page 2 of 2			
Well Location: Are all wells covered by this application on a single parcel and not on adjoining Parcels or public or utility rights-of-way? Yes ☒ No ☐ If no , list other parcels, public rights-of-way or utility rights-of-way.			
1. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
2. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
3. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany this application.			
Well Construction			
Bore Hole Diameter: 8"		Maximum Depth: 50'	
Annular Space: 3"			
Casing: Diameter: 2"		Gauge: SCH 40	
Material: PVC			
Grout: Depth of Seal: 23'		Type of Grout: Bentonite	
Conductor Casing: Yes ☐ No ☒ X			
_____ Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.			
Well reconstruction and destruction applications must include a written description of work proposed And existing well information.			
Disposal Methods			
Soil Cuttings Spread on-site		Development/Rinsate Water Development water: Allowed to percolate	
		Rinsate: Disposed at treatment plant	
In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:			
1) Compliance with the State of California Worker's Compensation Laws; 2) Compliance with the State and Federal Worker Health and Safety Laws; 3) Location of all underground and aboveground utilities which might be impacted by the proposed work; 4) Compliance with the Napa County and State of California well requirements; 5) Notification of the Department of Environmental Management at least two (2) workdays before work is initiated, and 6) Filing a completed well log for each well within four (4) months of completion to Napa County Department of Environmental Management and State Department of Water Resources.			
 _____ Signature of Authorized Agent of Drilling Contractor Or Site Consultant		9-25-17 _____ Date	
FOR OFFICIAL USE ONLY: _____ Required certificate of current worker's compensation insurance is on file with DEM; Consultant: Exp. Date: _____ Confirmed: _____ Contractor: Exp. Date: _____ Confirmed: _____			
Permit Issued by: _____ Date: _____			
Permit is valid for two (2) years from date of issuance.			

White – Office

Yellow – Owner

Pink – Consultant/Contractor



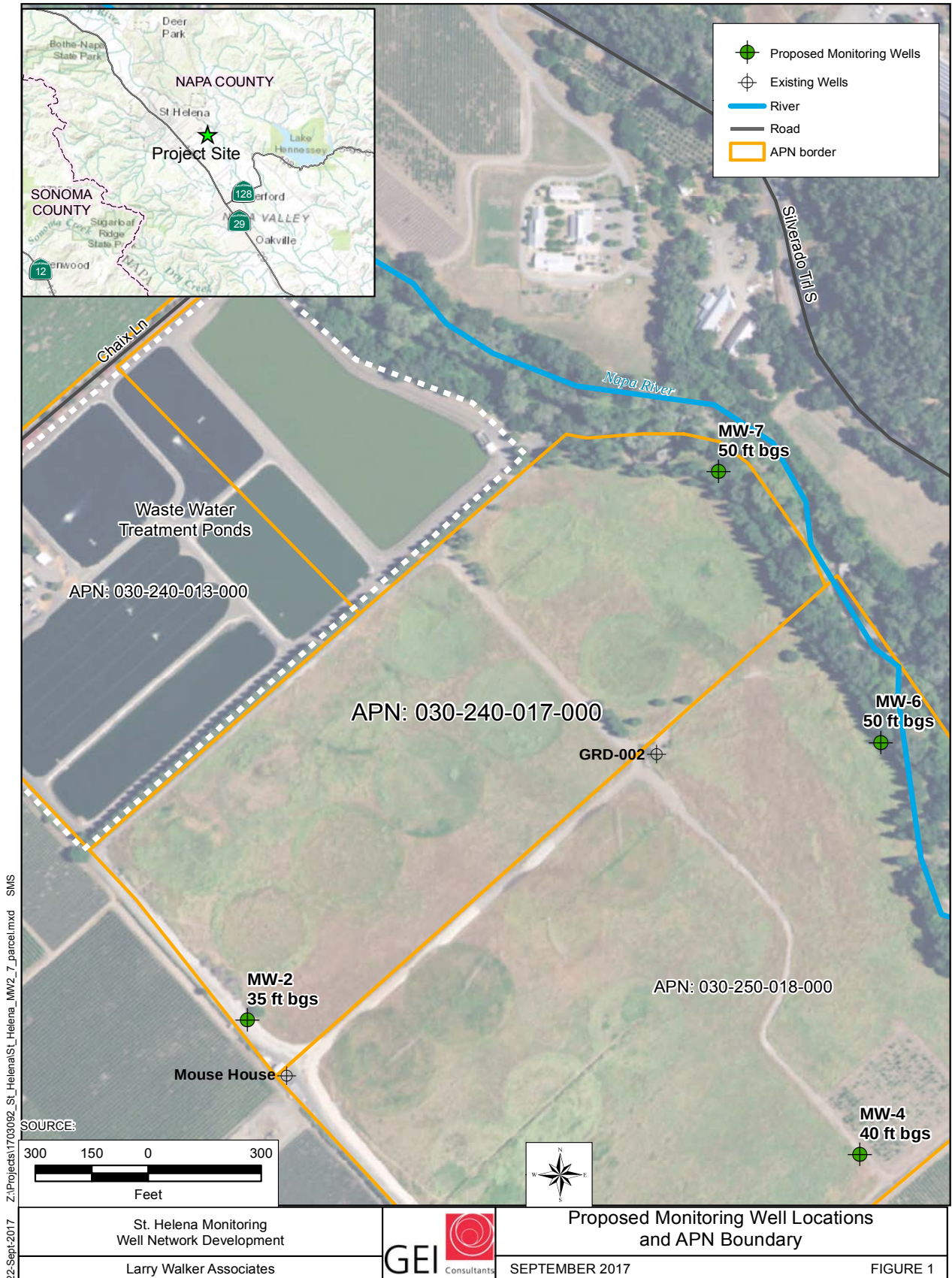
PERMIT APPLICATION NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT			
For MW-2			
Napa County Use Only FEE EXEMPT SITE: Y / N If NO, FEE \$ _____ Date _____ By _____ Receipt # _____		Application for: Monitoring Wells <u> X </u> Extraction Wells _____ Other _____ Cathodic Protection Wells _____ Exploratory Hole (boring) _____ (Please check one) 030-240-017-000 NCDEM SITE NUMBER _____ ASSESSOR'S PARCEL NUMBER _____	
The following MUST be included before this permit application can be processed: 1. Assessor's Parcel Number 2. Well location map (showing both proposed and existing wells) 3. Permission document(s) (if required) Not required 4. Encroachment permit(s) (if required) Not required 5. Clearance from public agency(ies) (if required) Not required			
Site Name: WWTP Land Application Field		Property Owner: City of St. Helena (Felix Hernandez)	
Site Address: 25 Chaix Lane		City: St. Helena	Zip: 94574
Owner's Mailing Address: 1480 Main Street		City: St. Helena	Zip: 94574
Drilling Contractor: Cascade Drilling		Type of License: Well Drillers License	
Mailing Address: 3000 Duluth Street		License #: 938110	
City: West Sacramento	State: California	Zip: 95691	
Consultant: GEI Consultants		Telephone #: (916) 631 - 4500	
Address: 2868 Prospect Park Dr. Suite 400		City: Rancho Cordova	State: CA Zip: 95670-6065
Responsible Person at Site: Ryan Alward			
Type of Work			
New Construction of wells - <u> Yes </u> - # of wells <u> 2 </u> Destruction of wells - _____ # of wells _____ Reconditioning of wells (reconstruct or repair) - _____ - # of wells _____ Wells currently on Site? - <u> No </u> - # of wells _____			
Reason for Well Installation (Check as many as apply):			
Underground tank site:		Surface Impoundment:	
Tanks Still Present:		Landfill Site:	
Spill or Discharge Site:		Cathodic Protection:	
Baseline Study:		Other: Treated Water Application Site	
Other Site Information:			
Closest Distance to:			
Septic System: Unknown	Sewer Line: Unknown	Water Wells: 200'	Rivers, Creeks, or Lakes: 1,800'
Unknown	Underground Storage Tanks: Unknown		
Riparian Cover Permit Required? Yes _____ No <u> X </u>			
Issued by the County Public Works Dept. (Attach Copy)			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2			
Permit Application			
White – Office		Yellow – Owner	
		Pink – Consultant/Contractor	

Permit Application Page 2 of 2			
Well Location: Are all wells covered by this application on a single parcel and not on adjoining Parcels or public or utility rights-of-way? Yes ☒ No ☐ If no , list other parcels, public rights-of-way or utility rights-of-way.			
1. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
2. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
3. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany this application.			
Well Construction			
Bore Hole Diameter: 8"		Maximum Depth: 35'	
Annular Space: 3"			
Casing: Diameter: 2"		Gauge: SCH 40	
Material: PVC			
Grout: Depth of Seal: 8'		Type of Grout: Bentonite	
Conductor Casing: Yes ☐ No ☒ X			
_____ Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.			
Well reconstruction and destruction applications must include a written description of work proposed And existing well information.			
Disposal Methods			
Soil Cuttings Spread on-site		Development/Rinsate Water Development water: Allowed to percolate	
		Rinsate: Disposed at treatment plant	
In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:			
1) Compliance with the State of California Worker's Compensation Laws; 2) Compliance with the State and Federal Worker Health and Safety Laws; 3) Location of all underground and aboveground utilities which might be impacted by the proposed work; 4) Compliance with the Napa County and State of California well requirements; 5) Notification of the Department of Environmental Management at least two (2) workdays before work is initiated, and 6) Filing a completed well log for each well within four (4) months of completion to Napa County Department of Environmental Management and State Department of Water Resources.			
 _____ Signature of Authorized Agent of Drilling Contractor Or Site Consultant		9-25-17 _____ Date	
FOR OFFICIAL USE ONLY: _____ Required certificate of current worker's compensation insurance is on file with DEM; Consultant: Exp. Date: _____ Confirmed: _____ Contractor: Exp. Date: _____ Confirmed: _____			
Permit Issued by: _____ Date: _____			
Permit is valid for two (2) years from date of issuance.			

White – Office

Yellow – Owner

Pink – Consultant/Contractor



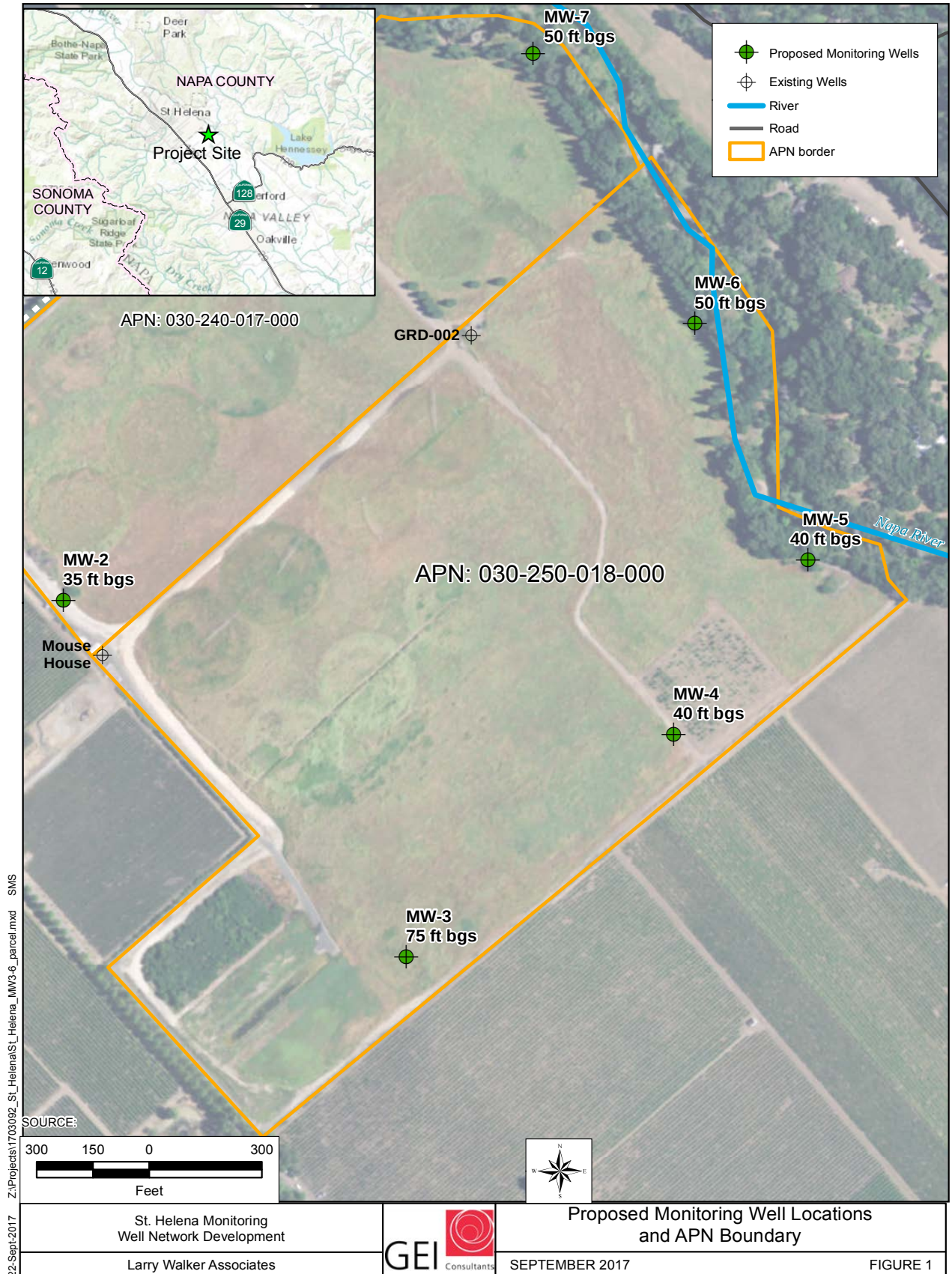
For MW-3 PERMIT APPLICATION NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT			
Napa County Use Only FEE EXEMPT SITE: Y / N If NO, FEE \$ _____ Date _____ By _____ Receipt # _____		Application for: Monitoring Wells <u> X </u> Extraction Wells _____ Other _____ Cathodic Protection Wells _____ Exploratory Hole (boring) _____ (Please check one) 030-250-018-000 NCDEM SITE NUMBER _____ ASSESSOR'S PARCEL NUMBER _____	
The following MUST be included before this permit application can be processed: 1. Assessor's Parcel Number 2. Well location map (showing both proposed and existing wells) 3. Permission document(s) (if required) Not required 4. Encroachment permit(s) (if required) Not required 5. Clearance from public agency(ies) (if required) Not required			
Site Name: WWTP Land Application Field		Property Owner: City of St. Helena (Felix Hernandez)	
Site Address: 25 Chaix Lane		City: St. Helena	Zip: 94574
Owner's Mailing Address: 1480 Main Street		City: St. Helena	Zip: 94574
Drilling Contractor: Cascade Drilling		Type of License: Well Drillers License	
Mailing Address: 3000 Duluth Street		License #: 938110	
City: West Sacramento	State: California	Zip: 95691	
Consultant: GEI Consultants		Telephone #: (916) 631 - 4500	
Address: 2868 Prospect Park Dr. Suite 400		City: Rancho Cordova	State: CA Zip: 95670-6065
Responsible Person at Site: Ryan Alward			
Type of Work			
New Construction of wells - <u> Yes </u> - # of wells <u> 4 </u> Destruction of wells - _____ # of wells _____			
Reconditioning of wells (reconstruct or repair) - _____ - # of wells _____			
Wells currently on Site? - <u> Yes </u> - # of wells <u> 2 </u>			
Reason for Well Installation (Check as many as apply):			
Underground tank site:		Surface Impoundment:	
Tanks Still Present:		Landfill Site:	
Spill or Discharge Site:		Cathodic Protection:	
Baseline Study:		Other: Treated Water Application Site	
Other Site Information:			
Closest Distance to:			
Septic System: Unknown	Sewer Line: Unknown	Water Wells: 1,200'	Rivers, Creeks, or Lakes: 1,500'
Unknown	Underground Storage Tanks: Unknown		
Riparian Cover Permit Required? Yes _____ No <u> X </u>			
Issued by the County Public Works Dept. (Attach Copy)			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2 Permit Application			
White – Office		Yellow – Owner	
		Pink – Consultant/Contractor	

Permit Application Page 2 of 2			
Well Location: Are all wells covered by this application on a single parcel and not on adjoining Parcels or public or utility rights-of-way? Yes ☒ No ☐ If no , list other parcels, public rights-of-way or utility rights-of-way.			
1. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
2. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
3. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany this application.			
Well Construction			
Bore Hole Diameter: 8"		Maximum Depth: 75'	
Annular Space: 3"			
Casing: Diameter: 2"		Gauge: SCH 40	
Material: PVC			
Grout: Depth of Seal: 48'		Type of Grout: Bentonite	
Conductor Casing: Yes ☐ No ☒ X			
_____ Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.			
Well reconstruction and destruction applications must include a written description of work proposed And existing well information.			
Disposal Methods			
Soil Cuttings Spread on-site		Development/Rinsate Water Development water: Allowed to percolate	
		Rinsate: Disposed at treatment plant	
In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:			
1) Compliance with the State of California Worker's Compensation Laws; 2) Compliance with the State and Federal Worker Health and Safety Laws; 3) Location of all underground and aboveground utilities which might be impacted by the proposed work; 4) Compliance with the Napa County and State of California well requirements; 5) Notification of the Department of Environmental Management at least two (2) workdays before work is initiated, and 6) Filing a completed well log for each well within four (4) months of completion to Napa County Department of Environmental Management and State Department of Water Resources.			
 Signature of Authorized Agent of Drilling Contractor Or Site Consultant		9-25-17 Date	
FOR OFFICIAL USE ONLY: _____ Required certificate of current worker's compensation insurance is on file with DEM; Consultant: Exp. Date: _____ Confirmed: _____ Contractor: Exp. Date: _____ Confirmed: _____			
Permit Issued by: _____ Date: _____			
Permit is valid for two (2) years from date of issuance.			

White – Office

Yellow – Owner

Pink – Consultant/Contractor



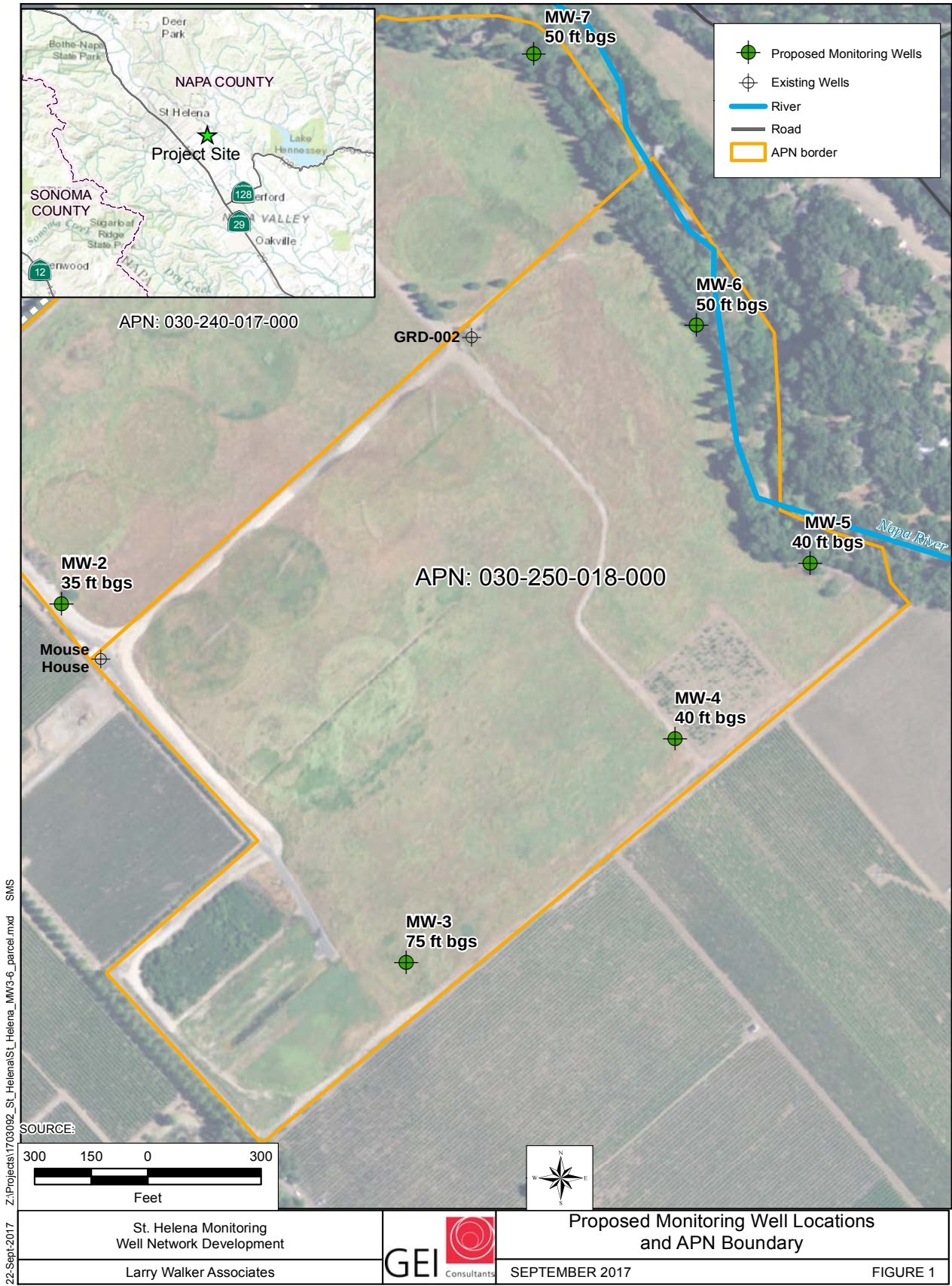
PERMIT APPLICATION NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT			
For MW-4			
Napa County Use Only FEE EXEMPT SITE: Y / N If NO, FEE \$ _____ Date _____ By _____ Receipt # _____		Application for: Monitoring Wells <u> X </u> Extraction Wells _____ Other _____ Cathodic Protection Wells _____ Exploratory Hole (boring) _____ (Please check one) _____ 030-250-018-000 NCDEM SITE NUMBER ASSESSOR'S PARCEL NUMBER	
The following MUST be included before this permit application can be processed: 1. Assessor's Parcel Number 4. Encroachment permit(s) (if required) Not required 2. Well location map (showing both proposed and existing wells) 5. Clearance from public agency(ies) (if required) Not required 3. Permission document(s) (if required) Not required			
Site Name: WWTP Land Application Field		Property Owner: City of St. Helena (Felix Hernandez)	
Site Address: 25 Chaix Lane		City: St. Helena	Zip: 94574
Owner's Mailing Address: 1480 Main Street		City: St. Helena	Zip: 94574
Drilling Contractor: Cascade Drilling		Type of License: Well Drillers License	
Mailing Address: 3000 Duluth Street		License #: 938110	
City: West Sacramento	State: California	Zip: 95691	
Consultant: GEI Consultants		Telephone #: (916) 631 - 4500	
Address: 2868 Prospect Park Dr. Suite 400		City: Rancho Cordova	State: CA Zip: 95670-6065
Responsible Person at Site: Ryan Alward			
Type of Work			
New Construction of wells - <u> Yes </u> - # of wells <u> 4 </u> Destruction of wells - _____ # of wells _____ Reconditioning of wells (reconstruct or repair) - _____ - # of wells _____ Wells currently on Site? - <u> Yes </u> - # of wells <u> 2 </u>			
Reason for Well Installation (Check as many as apply):			
Underground tank site:		Surface Impoundment:	
Tanks Still Present:		Landfill Site:	
Spill or Discharge Site:		Cathodic Protection:	
Baseline Study:		Other: Treated Water Application Site	
Other Site Information:			
Closest Distance to:			
Septic System: Unknown	Sewer Line: Unknown	Water Wells: 1,200'	Rivers, Creeks, or Lakes: 550'
Unknown	Underground Storage Tanks: Unknown		
Riparian Cover Permit Required? Yes _____ No <u> X </u>			
Issued by the County Public Works Dept. (Attach Copy)			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2			
Permit Application			
White – Office		Yellow – Owner	
		Pink – Consultant/Contractor	

Permit Application Page 2 of 2			
Well Location: Are all wells covered by this application on a single parcel and not on adjoining Parcels or public or utility rights-of-way? Yes ☒ No ☐ If no , list other parcels, public rights-of-way or utility rights-of-way.			
1. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
2. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
3. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany this application.			
Well Construction			
Bore Hole Diameter: 8"		Maximum Depth: 40'	
Annular Space: 3"			
Casing: Diameter: 2"		Gauge: SCH 40	
Material: PVC			
Grout: Depth of Seal: 13'		Type of Grout: Bentonite	
Conductor Casing: Yes ☐ No ☒ X			
_____ Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.			
Well reconstruction and destruction applications must include a written description of work proposed And existing well information.			
Disposal Methods			
Soil Cuttings Spread on-site _____		Development/Rinsate Water Development water: Allowed to percolate	
		Rinsate: Disposed at treatment plant	
In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:			
1) Compliance with the State of California Worker's Compensation Laws; 2) Compliance with the State and Federal Worker Health and Safety Laws; 3) Location of all underground and aboveground utilities which might be impacted by the proposed work; 4) Compliance with the Napa County and State of California well requirements; 5) Notification of the Department of Environmental Management at least two (2) workdays before work is initiated, and 6) Filing a completed well log for each well within four (4) months of completion to Napa County Department of Environmental Management and State Department of Water Resources.			
 _____ Signature of Authorized Agent of Drilling Contractor Or Site Consultant		9-25-17 _____ Date	
FOR OFFICIAL USE ONLY: _____ Required certificate of current worker's compensation insurance is on file with DEM; Consultant: Exp. Date: _____ Confirmed: _____ Contractor: Exp. Date: _____ Confirmed: _____			
Permit Issued by: _____ Date: _____			
Permit is valid for two (2) years from date of issuance.			

White – Office

Yellow – Owner

Pink – Consultant/Contractor



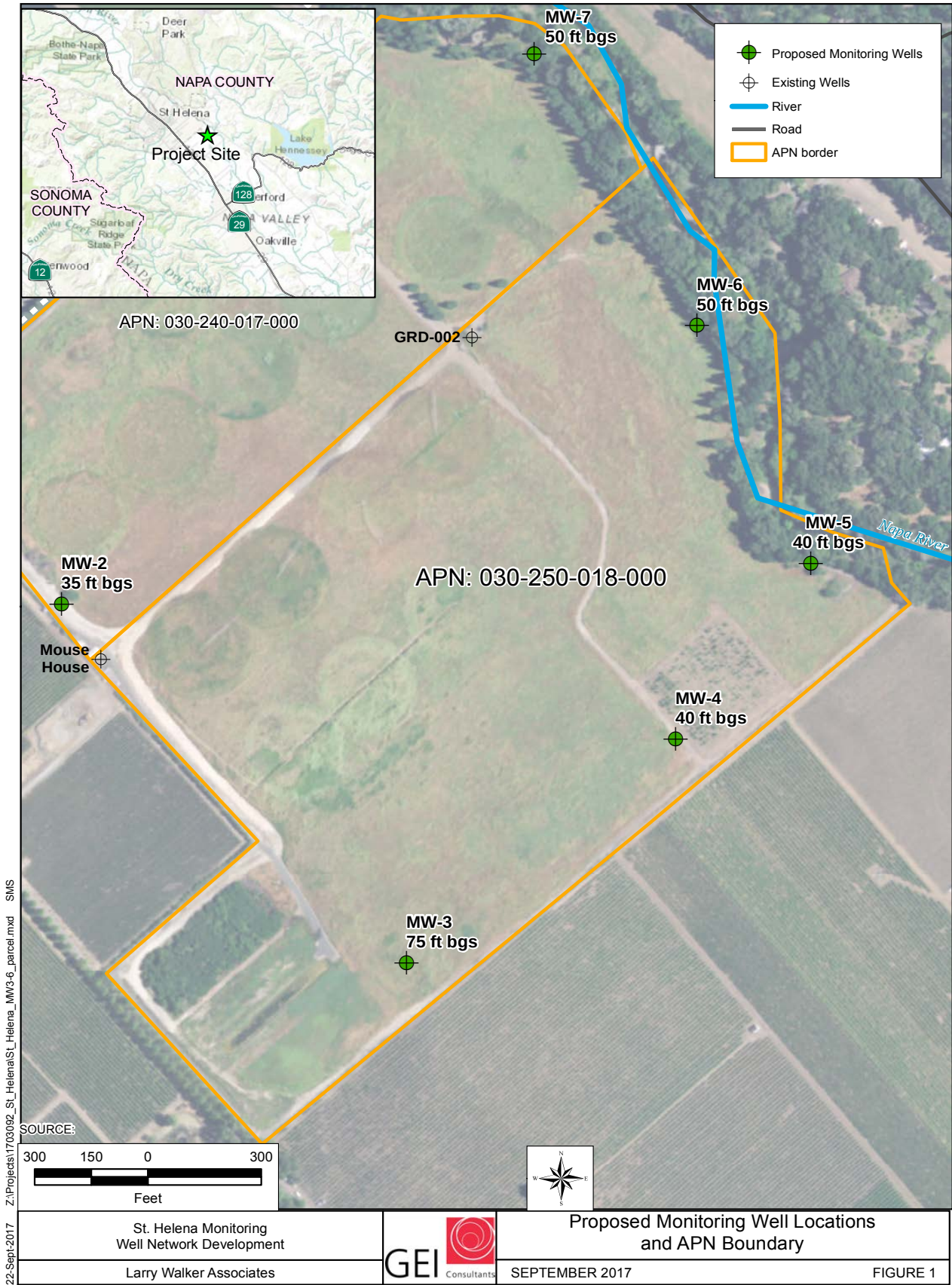
PERMIT APPLICATION NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT			
For MW-5			
Napa County Use Only FEE EXEMPT SITE: Y / N If NO, FEE \$ _____ Date _____ By _____ Receipt # _____		Application for: Monitoring Wells <u> X </u> Extraction Wells _____ Other _____ Cathodic Protection Wells _____ Exploratory Hole (boring) _____ (Please check one) 030-250-018-000 NCDEM SITE NUMBER _____ ASSESSOR'S PARCEL NUMBER _____	
The following MUST be included before this permit application can be processed: 1. Assessor's Parcel Number 2. Well location map (showing both proposed and existing wells) 3. Permission document(s) (if required) Not required 4. Encroachment permit(s) (if required) Not required 5. Clearance from public agency(ies) (if required) Not required			
Site Name: WWTP Land Application Field		Property Owner: City of St. Helena (Felix Hernandez)	
Site Address: 25 Chaix Lane		City: St. Helena	Zip: 94574
Owner's Mailing Address: 1480 Main Street		City: St. Helena	Zip: 94574
Drilling Contractor: Cascade Drilling		Type of License: Well Drillers License	
Mailing Address: 3000 Duluth Street		License #: 938110	
City: West Sacramento	State: California	Zip: 95691	
Consultant: GEI Consultants		Telephone #: (916) 631 - 4500	
Address: 2868 Prospect Park Dr. Suite 400		City: Rancho Cordova	State: CA Zip: 95670-6065
Responsible Person at Site: Ryan Alward			
Type of Work			
New Construction of wells - <u> Yes </u> - # of wells <u> 4 </u> Destruction of wells - _____ # of wells _____ Reconditioning of wells (reconstruct or repair) - _____ - # of wells _____ Wells currently on Site? - <u> Yes </u> - # of wells <u> 2 </u>			
Reason for Well Installation (Check as many as apply):			
Underground tank site:		Surface Impoundment:	
Tanks Still Present:		Landfill Site:	
Spill or Discharge Site:		Cathodic Protection:	
Baseline Study:		Other: Treated Water Application Site	
Other Site Information:			
Closest Distance to:			
Septic System: Unknown	Sewer Line: Unknown	Water Wells: 1,100'	Rivers, Creeks, or Lakes: 60-100'
Unknown	Underground Storage Tanks: Unknown		
Riparian Cover Permit Required? Yes _____ No <u> X </u>			
Issued by the County Public Works Dept. (Attach Copy)			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2			
Permit Application			
White – Office		Yellow – Owner	
		Pink – Consultant/Contractor	

Permit Application Page 2 of 2			
Well Location: Are all wells covered by this application on a single parcel and not on adjoining Parcels or public or utility rights-of-way? Yes ☒ No ☐ If no , list other parcels, public rights-of-way or utility rights-of-way.			
1. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
2. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
3. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany this application.			
Well Construction			
Bore Hole Diameter: 8"		Maximum Depth: 40'	
Annular Space: 3"			
Casing: Diameter: 2"		Gauge: SCH 40	
Material: PVC			
Grout: Depth of Seal: 13'		Type of Grout: Bentonite	
Conductor Casing: Yes ☐ No ☒ X			
_____ Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.			
Well reconstruction and destruction applications must include a written description of work proposed And existing well information.			
Disposal Methods			
Soil Cuttings Spread on-site		Development/Rinsate Water Development water: Allowed to percolate	
		Rinsate: Disposed at treatment plant	
In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:			
1) Compliance with the State of California Worker's Compensation Laws; 2) Compliance with the State and Federal Worker Health and Safety Laws; 3) Location of all underground and aboveground utilities which might be impacted by the proposed work; 4) Compliance with the Napa County and State of California well requirements; 5) Notification of the Department of Environmental Management at least two (2) workdays before work is initiated, and 6) Filing a completed well log for each well within four (4) months of completion to Napa County Department of Environmental Management and State Department of Water Resources.			
 _____ Signature of Authorized Agent of Drilling Contractor Or Site Consultant		9-25-17 _____ Date	
FOR OFFICIAL USE ONLY: _____ Required certificate of current worker's compensation insurance is on file with DEM; Consultant: Exp. Date: _____ Confirmed: _____ Contractor: Exp. Date: _____ Confirmed: _____			
Permit Issued by: _____ Date: _____			
Permit is valid for two (2) years from date of issuance.			

White – Office

Yellow – Owner

Pink – Consultant/Contractor



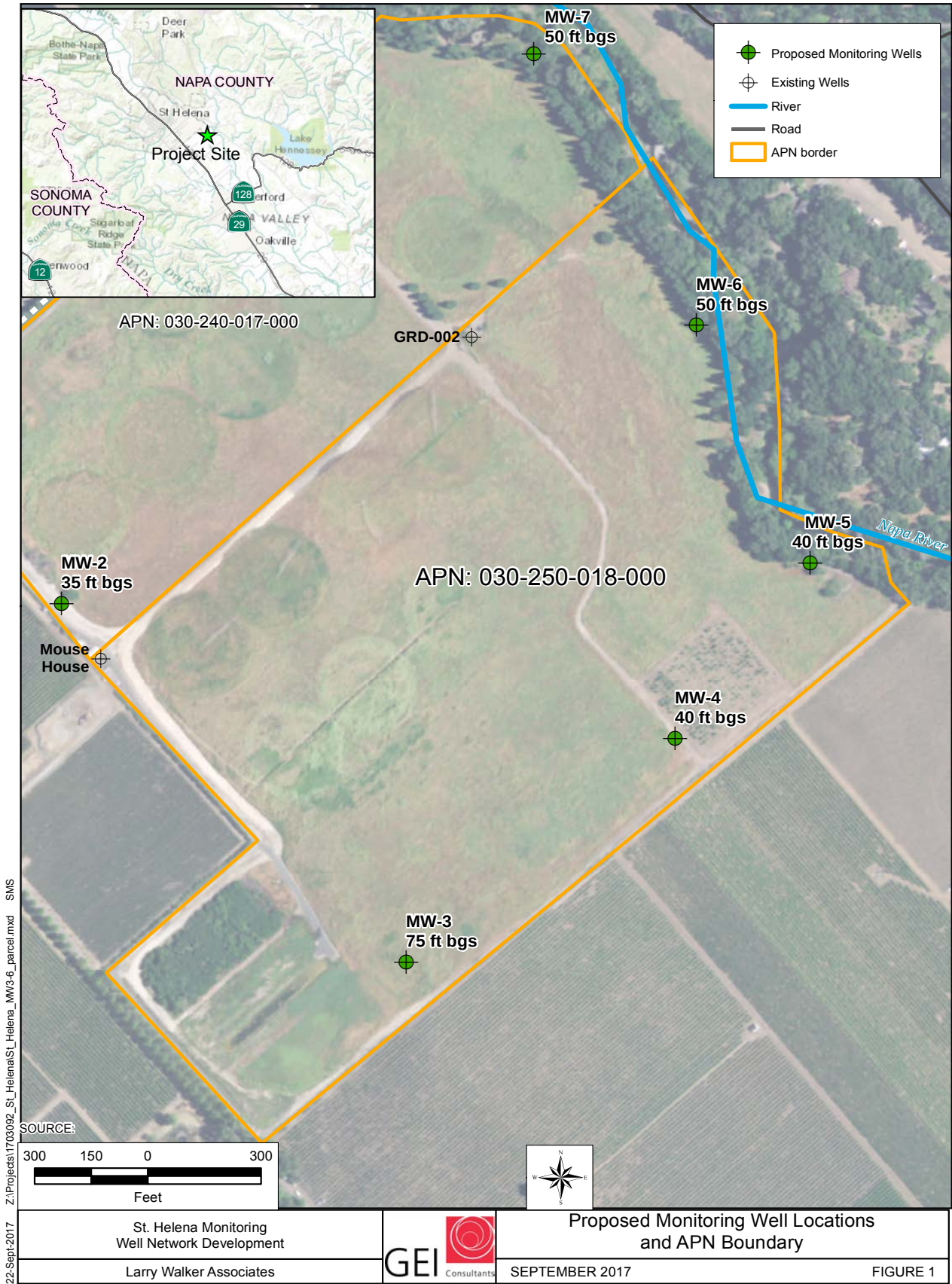
For MW-6 PERMIT APPLICATION NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT			
Napa County Use Only FEE EXEMPT SITE: Y / N If NO, FEE \$ _____ Date _____ By _____ Receipt # _____		Application for: Monitoring Wells <u> X </u> Extraction Wells _____ Other _____ Cathodic Protection Wells _____ Exploratory Hole (boring) _____ (Please check one) _____ 030-250-018-000 NCDEM SITE NUMBER ASSESSOR'S PARCEL NUMBER	
The following MUST be included before this permit application can be processed: 1. Assessor's Parcel Number 4. Encroachment permit(s) (if required) Not required 2. Well location map (showing both proposed and existing wells) 5. Clearance from public agency(ies) (if required) Not required 3. Permission document(s) (if required) Not required			
Site Name: WWTP Land Application Field		Property Owner: City of St. Helena (Felix Hernandez)	
Site Address: 25 Chaix Lane		City: St. Helena	Zip: 94574
Owner's Mailing Address: 1480 Main Street		City: St. Helena	Zip: 94574
Drilling Contractor: Cascade Drilling		Type of License: Well Drillers License	
Mailing Address: 3000 Duluth Street		License #: 938110	
City: West Sacramento	State: California	Zip: 95691	
Consultant: GEI Consultants		Telephone #: (916) 631 - 4500	
Address: 2868 Prospect Park Dr. Suite 400		City: Rancho Cordova	State: CA Zip: 95670-6065
Responsible Person at Site: Ryan Alward			
Type of Work			
New Construction of wells - <u> Yes </u> - # of wells <u> 4 </u> Destruction of wells - _____ # of wells _____ Reconditioning of wells (reconstruct or repair) - _____ - # of wells _____ Wells currently on Site? - <u> Yes </u> - # of wells <u> 2 </u>			
Reason for Well Installation (Check as many as apply):			
Underground tank site:		Surface Impoundment:	
Tanks Still Present:		Landfill Site:	
Spill or Discharge Site:		Cathodic Protection:	
Baseline Study:		Other: Treated Water Application Site	
Other Site Information:			
Closest Distance to:			
Septic System: Unknown	Sewer Line: Unknown	Water Wells: 650'	Rivers, Creeks, or Lakes: 60-100'
Unknown	Underground Storage Tanks: Unknown		
Riparian Cover Permit Required? Yes _____ No <u> X </u>			
Issued by the County Public Works Dept. (Attach Copy)			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2 Permit Application White – Office Yellow – Owner Pink – Consultant/Contractor			

Permit Application Page 2 of 2			
Well Location: Are all wells covered by this application on a single parcel and not on adjoining Parcels or public or utility rights-of-way? Yes ☒ No ☐ If no , list other parcels, public rights-of-way or utility rights-of-way.			
1. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
2. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
3. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany this application.			
Well Construction			
Bore Hole Diameter: 8"		Maximum Depth: 50'	
Annular Space: 3"			
Casing: Diameter: 2"		Gauge: SCH 40	
Material: PVC			
Grout: Depth of Seal: 23'		Type of Grout: Bentonite	
Conductor Casing: Yes ☐ No ☒ X			
_____ Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.			
Well reconstruction and destruction applications must include a written description of work proposed And existing well information.			
Disposal Methods			
Soil Cuttings Spread on-site		Development/Rinsate Water Development water: Allowed to percolate	
		Rinsate: Disposed at treatment plant	
In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:			
1) Compliance with the State of California Worker's Compensation Laws; 2) Compliance with the State and Federal Worker Health and Safety Laws; 3) Location of all underground and aboveground utilities which might be impacted by the proposed work; 4) Compliance with the Napa County and State of California well requirements; 5) Notification of the Department of Environmental Management at least two (2) workdays before work is initiated, and 6) Filing a completed well log for each well within four (4) months of completion to Napa County Department of Environmental Management and State Department of Water Resources.			
 Signature of Authorized Agent of Drilling Contractor Or Site Consultant		9-25-17 Date	
FOR OFFICIAL USE ONLY: _____ Required certificate of current worker's compensation insurance is on file with DEM; Consultant: Exp. Date: _____ Confirmed: _____ Contractor: Exp. Date: _____ Confirmed: _____			
Permit Issued by: _____ Date: _____			
Permit is valid for two (2) years from date of issuance.			

White – Office

Yellow – Owner

Pink – Consultant/Contractor



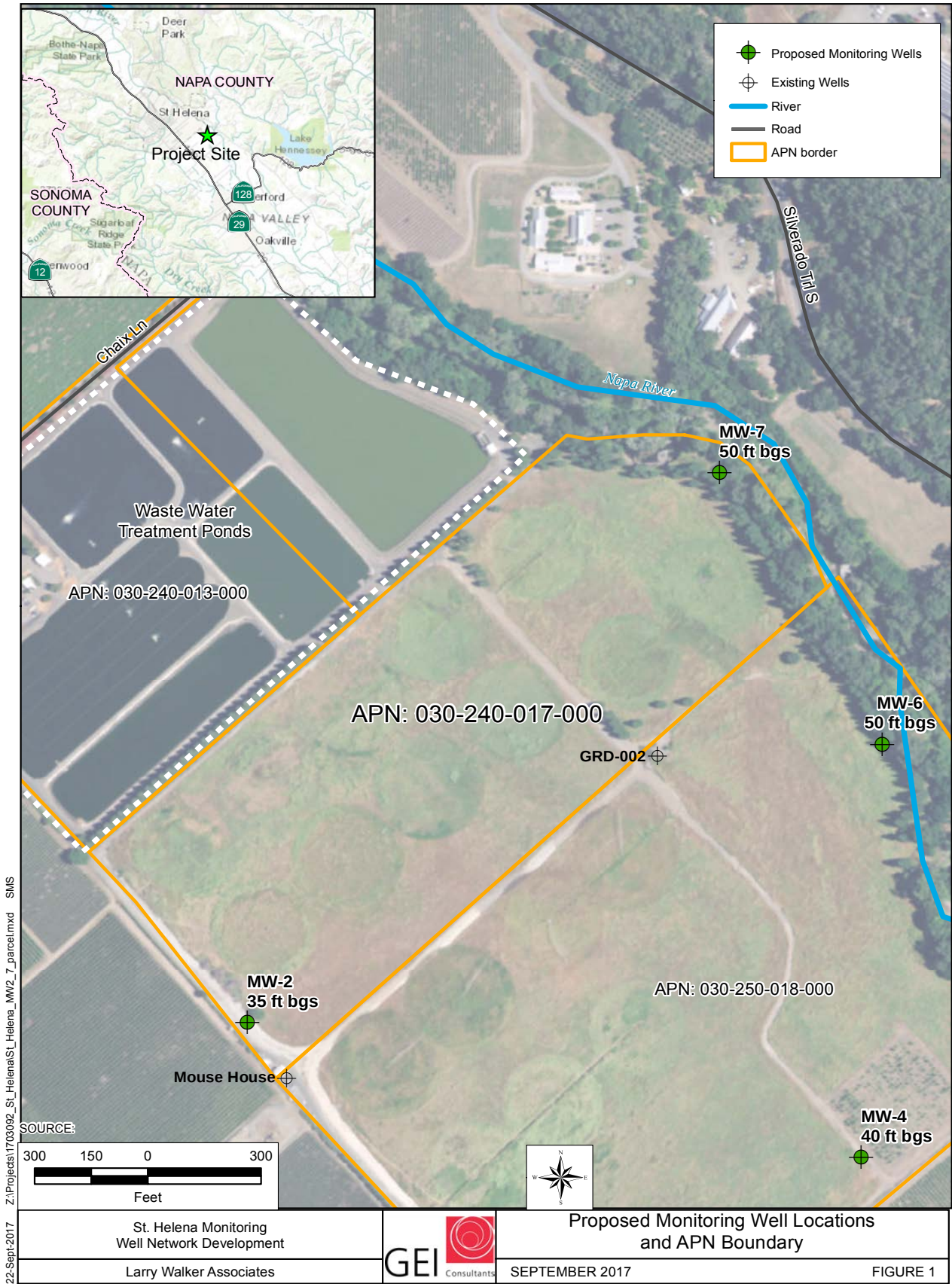
PERMIT APPLICATION NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT			
For MW-7			
Napa County Use Only FEE EXEMPT SITE: Y / N If NO, FEE \$ _____ Date _____ By _____ Receipt # _____		Application for: Monitoring Wells <u> X </u> Extraction Wells _____ Other _____ Cathodic Protection Wells _____ Exploratory Hole (boring) _____ (Please check one) 030-240-017-000 NCDEM SITE NUMBER _____ ASSESSOR'S PARCEL NUMBER _____	
The following MUST be included before this permit application can be processed: 1. Assessor's Parcel Number 2. Well location map (showing both proposed and existing wells) 3. Permission document(s) (if required) Not required 4. Encroachment permit(s) (if required) Not required 5. Clearance from public agency(ies) (if required) Not required			
Site Name: WWTP Land Application Field		Property Owner: City of St. Helena (Felix Hernandez)	
Site Address: 25 Chaix Lane		City: St. Helena	Zip: 94574
Owner's Mailing Address: 1480 Main Street		City: St. Helena	Zip: 94574
Drilling Contractor: Cascade Drilling		Type of License: Well Drillers License	
Mailing Address: 3000 Duluth Street		License #: 938110	
City: West Sacramento	State: California	Zip: 95691	
Consultant: GEI Consultants		Telephone #: (916) 631 - 4500	
Address: 2868 Prospect Park Dr. Suite 400		City: Rancho Cordova	State: CA Zip: 95670-6065
Responsible Person at Site: Ryan Alward			
Type of Work			
New Construction of wells - <u> Yes </u> - # of wells <u> 2 </u> Destruction of wells - _____ # of wells _____ Reconditioning of wells (reconstruct or repair) - _____ - # of wells _____ Wells currently on Site? - <u> No </u> - # of wells _____			
Reason for Well Installation (Check as many as apply):			
Underground tank site:		Surface Impoundment:	
Tanks Still Present:		Landfill Site:	
Spill or Discharge Site:		Cathodic Protection:	
Baseline Study:		Other: Treated Water Application Site	
Other Site Information:			
Closest Distance to:			
Septic System: Unknown	Sewer Line: Unknown	Water Wells: 780'	Rivers, Creeks, or Lakes: 60-100'
Unknown Underground Utilities:	Underground Storage Tanks: Unknown		
Riparian Cover Permit Required? Yes _____ No <u> X </u>			
Issued by the County Public Works Dept. (Attach Copy)			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2			
Permit Application			
White – Office		Yellow – Owner	
		Pink – Consultant/Contractor	

Permit Application Page 2 of 2			
Well Location: Are all wells covered by this application on a single parcel and not on adjoining Parcels or public or utility rights-of-way? Yes ☒ No ☐ If no , list other parcels, public rights-of-way or utility rights-of-way.			
1. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
2. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
3. Owner or R/W Owner:		Site Address: APN:	
Owner address:		City: State: Zip:	
Number of Wells:		Permission Document Attached:	
NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany this application.			
Well Construction			
Bore Hole Diameter: 8"		Maximum Depth: 50'	
Annular Space: 3"			
Casing: Diameter: 2"		Gauge: SCH 40	
Material: PVC			
Grout: Depth of Seal: 23'		Type of Grout: Bentonite	
Conductor Casing: Yes ☐ No ☒ X			
_____ Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.			
Well reconstruction and destruction applications must include a written description of work proposed And existing well information.			
Disposal Methods			
Soil Cuttings Spread on-site		Development/Rinsate Water Development water: Allowed to percolate	
		Rinsate: Disposed at treatment plant	
In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:			
1) Compliance with the State of California Worker's Compensation Laws; 2) Compliance with the State and Federal Worker Health and Safety Laws; 3) Location of all underground and aboveground utilities which might be impacted by the proposed work; 4) Compliance with the Napa County and State of California well requirements; 5) Notification of the Department of Environmental Management at least two (2) workdays before work is initiated, and 6) Filing a completed well log for each well within four (4) months of completion to Napa County Department of Environmental Management and State Department of Water Resources.			
 _____ Signature of Authorized Agent of Drilling Contractor Or Site Consultant		9-25-17 _____ Date	
FOR OFFICIAL USE ONLY: _____ Required certificate of current worker's compensation insurance is on file with DEM; Consultant: Exp. Date: _____ Confirmed: _____ Contractor: Exp. Date: _____ Confirmed: _____			
Permit Issued by: _____ Date: _____			
Permit is valid for two (2) years from date of issuance.			

White – Office

Yellow – Owner

Pink – Consultant/Contractor



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Owner's Well Number MW-1

Date Work Began 10/25/2017

Date Work Ended 10/31/2017

Local Permit Agency Napa County Department Environmental Management

Permit Number E17-00590

Permit Date 9/27/17

Geologic Log		
Orientation ☒ Vertical ☐ Horizontal ☐ Angle Specify _____		
Drilling Method _____		Drilling Fluid _____
Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc	
0	5	No recovery
5	10	Lean clay, dry, very dark brown, medium plastic fines, no dilatancy, fine sand, no recovery
10	15	As above, dark yellowish brown, med plastic fines no dilatancy, low tough, fine sand, no recovery
15	20	Lean clay, moist, dark brown, med plastic fines, no dila. low tough, fine sand, no recovery
20	25	Lean clay, moist, dark yellowish brown, med plastic, fines, no dil, low tough, fine sand
25	30	Well graded gravel with sand, wet, dark brown, gravel, sand, fines, low plasticity, lean clay, moist dark yellow brown, med plastic fines, no dil, low tough, fine sand
30	35	Lean clay, moist, brown, med plastic fines, no dil, med toughness
35	40	Lean clay, wet, brown, no dil, low toughn fine sand poorly graded sand w/clay, wet, brown, fine sand low plastic fines
40	45	Poorly graded sand, wet, dark yellowish brown, fine sand, well graded gravel w/sand, wet, light olive brown, no recovery
45	50	Poorly graded sand, moist, olive brown, sand, fines Poorly graded gravel w/sand, wet, very dark grey
50	52	Poorly graded sand w/silt, moist, very dark greyish brown, sand, gravel, fines, no recovery
Total Depth of Boring		<u>52</u> Feet
Total Depth of Completed Well		<u>50</u> Feet

Well Owner	
Name	<u>City of St. Helena (Felix Hernandez)</u>
Mailing Address	<u>1480 Main Street</u>
City	<u>St. Helena</u> State <u>CA</u> Zip <u>94574</u>
Well Location	
Address <u>25 Chaix Lane</u>	
City	<u>St. Helena</u> County <u>Napa</u>
Latitude	_____ N Longitude _____ W
Datum	_____ Dec. Lat. _____ Dec. Long. _____
APN Book	<u>030</u> Page <u>240-017</u> Parcel <u>000</u>
Township	_____ Range _____ Section _____
Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.	
Activity	
☒ New Well ☐ Modification/Repair ☐ Deepen ☐ Other _____ ☐ Destroy Describe procedures and materials under "GEOLOGIC LOG"	
Planned Uses	
☐ Water Supply ☐ Domestic ☐ Public ☐ Irrigation ☐ Industrial ☐ Cathodic Protection ☐ Dewatering ☐ Heat Exchange ☐ Injection ☐ Monitoring ☐ Remediation ☐ Sparging ☐ Test Well ☐ Vapor Extraction ☐ Other _____	
Water Level and Yield of Completed Well	
Depth to first water _____ (Feet below surface)	
Depth to Static _____	
Water Level	<u>25</u> (Feet) Date Measured _____
Estimated Yield *	_____ (GPM) Test Type _____
Test Length	_____ (Hours) Total Drawdown _____ (Feet)
*May not be representative of a well's long term yield.	

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	35	8	Blank	PVC Sch. 40	2			0	31	Cement	
35	45	8	Screen	PVC Sch. 40	2	Milled Slots	0.030	31	33	Bentonite	
45	50	8	Blank	PVC Sch. 80	2			33	52	Filter Pack	#3

Attachments		Certification Statement	
☐ Geologic Log ☐ Well Construction Diagram ☐ Geophysical Log(s) ☐ Soil/Water Chemical Analyses ☒ Other <u>Site Map</u>		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief Name <u>Cascade Drilling, LP - Bryan Cook</u> Person, Firm or Corporation <u>1961 Meeker Avenue</u> <u>Richmond</u> <u>CA</u> <u>94804</u> Address City State Zip Signed _____ Date Signed <u>11/29/17</u> C-57 Licensed Water Well Contractor C-57 License Number <u>938110</u>	

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Refer to Instruction Pamphlet

No. **e0358203**

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Page 1 of 1

Owner's Well Number MW-1

Date Work Began 10/25/2017

Date Work Ended 10/31/2017

Local Permit Agency Napa County Department Environmental Management

Permit Number E17-00590

Permit Date 9/27/17

Geologic Log		
Orientation ☒ Vertical ☐ Horizontal ☐ Angle Specify _____		
Drilling Method _____		Drilling Fluid _____
Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc	
0	5	No recovery
5	10	Lean clay, dry, very dark brown, medium plastic fines, no dilatancy, fine sand, no recovery
10	15	As above, dark yellowish brown, med plastic fines no dilatancy, low tough, fine sand, no recovery
15	20	Lean clay, moist, dark brown, med plastic fines, no dila. low tough, fine sand, no recovery
20	25	Lean clay, moist, dark yellowish brown, med plastic, fines, no dil, low tough, fine sand
25	30	Well graded gravel with sand, wet, dark brown, gravel, sand, fines, low plasticity, lean clay, moist dark yellow brown, med plastic fines, no dil, low tough, fine sand
30	35	Lean clay, moist, brown, med plastic fines, no dil, med toughness
35	40	Lean clay, wet, brown, no dil, low toughn fine sand poorly graded sand w/clay, wet, brown, fine sand low plastic fines
40	45	Poorly graded sand, wet, dark yellowish brown, fine sand, well graded gravel w/sand, wet, light olive brown, no recovery
45	50	Poorly graded sand, moist, olive brown, sand, fines Poorly graded gravel w/sand, wet, very dark grey
50	52	Poorly graded sand w/silt, moist, very dark greyish brown, sand, gravel, fines, no recovery
Total Depth of Boring		<u>52</u> Feet
Total Depth of Completed Well		<u>50</u> Feet

Well Owner	
Name	<u>City of St. Helena (Felix Hernandez)</u>
Mailing Address	<u>1480 Main Street</u>
City	<u>St. Helena</u> State <u>CA</u> Zip <u>94574</u>
Well Location	
Address <u>25 Chaix Lane</u>	
City	<u>St. Helena</u> County <u>Napa</u>
Latitude	____ Deg. ____ Min. ____ Sec. N Longitude ____ Deg. ____ Min. ____ Sec. W
Datum	____ Dec. Lat. ____ Dec. Long. ____
APN Book	<u>030</u> Page <u>240-017</u> Parcel <u>000</u>
Township	____ Range ____ Section ____
Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.	
Activity	
☒ New Well ☐ Modification/Repair ☐ Deepen ☐ Other _____ ☐ Destroy Describe procedures and materials under "GEOLOGIC LOG"	
Planned Uses	
☐ Water Supply ☐ Domestic ☐ Public ☐ Irrigation ☐ Industrial ☐ Cathodic Protection ☐ Dewatering ☐ Heat Exchange ☐ Injection ☒ Monitoring ☐ Remediation ☐ Sparging ☐ Test Well ☐ Vapor Extraction ☐ Other _____	
Water Level and Yield of Completed Well	
Depth to first water _____ (Feet below surface)	
Depth to Static _____	
Water Level	<u>25</u> (Feet) Date Measured _____
Estimated Yield *	_____ (GPM) Test Type _____
Test Length	_____ (Hours) Total Drawdown _____ (Feet)
*May not be representative of a well's long term yield.	

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	35	8	Blank	PVC Sch. 40	2			0	31	Cement	
35	45	8	Screen	PVC Sch. 40	2	Milled Slots	0.030	31	33	Bentonite	
45	50	8	Blank	PVC Sch. 80	2			33	52	Filter Pack	#3

Attachments		Certification Statement	
☐ Geologic Log ☐ Well Construction Diagram ☐ Geophysical Log(s) ☐ Soil/Water Chemical Analyses ☒ Other <u>Site Map</u>		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief Name <u>Cascade Drilling, LP - Bryan Cook</u> Person, Firm or Corporation <u>1961 Meeker Avenue</u> <u>Richmond</u> <u>CA</u> <u>94804</u> Address City State Zip Signed _____ Date Signed <u>11/29/17</u> C-57 Licensed Water Well Contractor	
Attach additional information, if it exists.		C-57 License Number <u>938110</u>	

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Owner's Well Number MW-1

Date Work Began 10/25/2017

Date Work Ended 10/31/2017

Local Permit Agency Napa County Department Environmental Management

Permit Number E17-00590

Permit Date 9/27/17

Geologic Log		
Orientation ☐ Vertical ☐ Horizontal ☐ Angle Specify _____		
Drilling Method _____		Drilling Fluid _____
Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc	
0	5	No recovery
5	10	Lean clay, dry, very dark brown, medium plastic fines, no dilatancy, fine sand, no recovery
10	15	As above, dark yellowish brown, med plastic fines no dilatancy, low tough, fine sand, no recovery
15	20	Lean clay, moist, dark brown, med plastic fines, no dila. low tough, fine sand, no recovery
20	25	Lean clay, moist, dark yellowish brown, med plastic, fines, no dil, low tough, fine sand
25	30	Well graded gravel with sand, wet, dark brown, gravel, sand, fines, low plasticity, lean clay, moist dark yellow brown, med plastic fines, no dil, low tough, fine sand
30	35	Lean clay, moist, brown, med plastic fines, no dil, med toughness
35	40	Lean clay, wet, brown, no dil, low toughn fine sand poorly graded sand w/clay, wet, brown, fine sand low plastic fines
40	45	Poorly graded sand, wet, dark yellowish brown, fine sand, well graded gravel w/sand, wet, light olive brown, no recovery
45	50	Poorly graded sand, moist, olive brown, sand, fines Poorly graded gravel w/sand, wet, very dark grey
50	52	Poorly graded sand w/silt, moist, very dark greyish brown, sand, gravel, fines, no recovery
Total Depth of Boring		<u>52</u> Feet
Total Depth of Completed Well		<u>50</u> Feet

Well Owner	
Name	<u>City of St. Helena (Felix Hernandez)</u>
Mailing Address	<u>1480 Main Street</u>
City	<u>St. Helena</u> State <u>CA</u> Zip <u>94574</u>
Well Location	
Address <u>25 Chaix Lane</u>	
City	<u>St. Helena</u> County <u>Napa</u>
Latitude	_____ N Longitude _____ W
Datum	_____ Dec. Lat. _____ Dec. Long. _____
APN Book	<u>030</u> Page <u>240-017</u> Parcel <u>000</u>
Township	_____ Range _____ Section _____
Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
West	
East	
South	
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.	
Activity	
☐ New Well ☐ Modification/Repair ☐ Deepen ☐ Other _____ ☐ Destroy Describe procedures and materials under "GEOLOGIC LOG"	
Planned Uses	
☐ Water Supply ☐ Domestic ☐ Public ☐ Irrigation ☐ Industrial ☐ Cathodic Protection ☐ Dewatering ☐ Heat Exchange ☐ Injection ☐ Monitoring ☐ Remediation ☐ Sparging ☐ Test Well ☐ Vapor Extraction ☐ Other _____	
Water Level and Yield of Completed Well	
Depth to first water _____ (Feet below surface)	
Depth to Static _____	
Water Level	<u>25</u> (Feet) Date Measured _____
Estimated Yield *	_____ (GPM) Test Type _____
Test Length	_____ (Hours) Total Drawdown _____ (Feet)
*May not be representative of a well's long term yield.	

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	35	8	Blank	PVC Sch. 40	2			0	31	Cement	
35	45	8	Screen	PVC Sch. 40	2	Milled Slots	0.030	31	33	Bentonite	
45	50	8	Blank	PVC Sch. 80	2			33	52	Filter Pack	#3

Attachments		Certification Statement	
☐ Geologic Log ☐ Well Construction Diagram ☐ Geophysical Log(s) ☐ Soil/Water Chemical Analyses ☒ Other <u>Site Map</u>		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief Name <u>Cascade Drilling, LP - Bryan Cook</u> Person, Firm or Corporation <u>1961 Meeker Avenue</u> <u>Richmond</u> <u>CA</u> <u>94804</u> Address City State Zip Signed _____ Date Signed <u>11/29/17</u> C-57 Licensed Water Well Contractor	
Attach additional information, if it exists.		C-57 License Number	

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Owner's Well Number MW-1

Date Work Began 10/25/2017

Date Work Ended 10/31/2017

Local Permit Agency Napa County Department Environmental Management

Permit Number E17-00590

Permit Date 9/27/17

Geologic Log		
Orientation ☐ Vertical ☐ Horizontal ☐ Angle Specify _____		
Drilling Method _____		Drilling Fluid _____
Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc	
0	5	No recovery
5	10	Lean clay, dry, very dark brown, medium plastic fines, no dilatancy, fine sand, no recovery
10	15	As above, dark yellowish brown, med plastic fines no dilatancy, low tough, fine sand, no recovery
15	20	Lean clay, moist, dark brown, med plastic fines, no dila. low tough, fine sand, no recovery
20	25	Lean clay, moist, dark yellowish brown, med plastic, fines, no dil, low tough, fine sand
25	30	Well graded gravel with sand, wet, dark brown, gravel, sand, fines, low plasticity, lean clay, moist dark yellow brown, med plastic fines, no dil, low tough, fine sand
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35	40	Lean clay, wet, brown, no dil, low toughn fine sand poorly graded sand w/clay, wet, brown, fine sand low plastic fines
40	45	Poorly graded sand, wet, dark yellowish brown, fine sand, well graded gravel w/sand, wet, light olive brown, no recovery
45	50	Poorly graded sand, moist, olive brown, sand, fines Poorly graded gravel w/sand, wet, very dark grey
50	52	Poorly graded sand w/silt, moist, very dark greyish brown, sand, gravel, fines, no recovery
Total Depth of Boring		<u>52</u> Feet
Total Depth of Completed Well		<u>50</u> Feet

Well Owner	
Name	<u>City of St. Helena (Felix Hernandez)</u>
Mailing Address	<u>1480 Main Street</u>
City	<u>St. Helena</u> State <u>CA</u> Zip <u>94574</u>
Well Location	
Address <u>25 Chaix Lane</u>	
City	<u>St. Helena</u> County <u>Napa</u>
Latitude	____ Deg. ____ Min. ____ Sec. N Longitude ____ Deg. ____ Min. ____ Sec. W
Datum	____ Dec. Lat. ____ Dec. Long. ____
APN Book	<u>030</u> Page <u>240-017</u> Parcel <u>000</u>
Township	____ Range ____ Section ____
Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
South	
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.	
Activity	
☐ New Well ☐ Modification/Repair ☐ Deepen ☐ Other _____ ☐ Destroy Describe procedures and materials under "GEOLOGIC LOG"	
Planned Uses	
☐ Water Supply ☐ Domestic ☐ Public ☐ Irrigation ☐ Industrial ☐ Cathodic Protection ☐ Dewatering ☐ Heat Exchange ☐ Injection ☐ Monitoring ☐ Remediation ☐ Sparging ☐ Test Well ☐ Vapor Extraction ☐ Other _____	
Water Level and Yield of Completed Well	
Depth to first water _____ (Feet below surface)	
Depth to Static _____	
Water Level	<u>25</u> (Feet) Date Measured _____
Estimated Yield *	_____ (GPM) Test Type _____
Test Length	_____ (Hours) Total Drawdown _____ (Feet)
*May not be representative of a well's long term yield.	

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	35	8	Blank	PVC Sch. 40	2			0	31	Cement	
35	45	8	Screen	PVC Sch. 40	2	Milled Slots	0.030	31	33	Bentonite	
45	50	8	Blank	PVC Sch. 80	2			33	52	Filter Pack	#3

Attachments		Certification Statement	
☐ Geologic Log ☐ Well Construction Diagram ☐ Geophysical Log(s) ☐ Soil/Water Chemical Analyses ☒ Other <u>Site Map</u>		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief Name <u>Cascade Drilling, LP - Bryan Cook</u> Person, Firm or Corporation <u>1961 Meeker Avenue</u> <u>Richmond</u> <u>CA</u> <u>94804</u> Address City State Zip Signed _____ Date Signed <u>11/29/17</u> C-57 Licensed Water Well Contractor	
Attach additional information, if it exists.		938110 C-57 License Number	

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Refer to Instruction Pamphlet

No. **e0358203**

Click to Get a New Log Number

Page 1 of 1

Owner's Well Number MW-1

Date Work Began 10/25/2017

Date Work Ended 10/31/2017

Local Permit Agency Napa County Department Environmental Management

Permit Number E17-00590

Permit Date 9/27/17

Geologic Log		
Orientation ☐ Vertical ☐ Horizontal ☐ Angle Specify _____		
Drilling Method _____		Drilling Fluid _____
Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc	
0	5	No recovery
5	10	Lean clay, dry, very dark brown, medium plastic fines, no dilatancy, fine sand, no recovery
10	15	As above, dark yellowish brown, med plastic fines no dilatancy, low tough, fine sand, no recovery
15	20	Lean clay, moist, dark brown, med plastic fines, no dila. low tough, fine sand, no recovery
20	25	Lean clay, moist, dark yellowish brown, med plastic, fines, no dil, low tough, fine sand
25	30	Well graded gravel with sand, wet, dark brown, gravel, sand, fines, low plasticity, lean clay, moist dark yellow brown, med plastic fines, no dil, low tough, fine sand
30	35	Lean clay, moist, brown, med plastic fines, no dil, med toughness
35	40	Lean clay, wet, brown, no dil, low toughn fine sand poorly graded sand w/clay, wet, brown, fine sand low plastic fines
40	45	Poorly graded sand, wet, dark yellowish brown, fine sand, well graded gravel w/sand, wet, light olive brown, no recovery
45	50	Poorly graded sand, moist, olive brown, sand, fines Poorly graded gravel w/sand, wet, very dark grey
50	52	Poorly graded sand w/silt, moist, very dark greyish brown, sand, gravel, fines, no recovery
Total Depth of Boring		<u>52</u> Feet
Total Depth of Completed Well		<u>50</u> Feet

Well Owner	
Name	<u>City of St. Helena (Felix Hernandez)</u>
Mailing Address	<u>1480 Main Street</u>
City	<u>St. Helena</u> State <u>CA</u> Zip <u>94574</u>
Well Location	
Address <u>25 Chaix Lane</u>	
City	<u>St. Helena</u> County <u>Napa</u>
Latitude	_____ N Longitude _____ W
Datum	_____ Dec. Lat. _____ Dec. Long. _____
APN Book	<u>030</u> Page <u>240-017</u> Parcel <u>000</u>
Township	_____ Range _____ Section _____
Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
West	
East	
South	
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.	
Activity	
☐ New Well ☐ Modification/Repair ☐ Deepen ☐ Other _____ ☐ Destroy Describe procedures and materials under "GEOLOGIC LOG"	
Planned Uses	
☐ Water Supply ☐ Domestic ☐ Public ☐ Irrigation ☐ Industrial ☐ Cathodic Protection ☐ Dewatering ☐ Heat Exchange ☐ Injection ☐ Monitoring ☐ Remediation ☐ Sparging ☐ Test Well ☐ Vapor Extraction ☐ Other _____	
Water Level and Yield of Completed Well	
Depth to first water _____ (Feet below surface)	
Depth to Static _____	
Water Level	<u>25</u> (Feet) Date Measured _____
Estimated Yield *	_____ (GPM) Test Type _____
Test Length	_____ (Hours) Total Drawdown _____ (Feet)
*May not be representative of a well's long term yield.	

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	35	8	Blank	PVC Sch. 40	2			0	31	Cement	
35	45	8	Screen	PVC Sch. 40	2	Milled Slots	0.030	31	33	Bentonite	
45	50	8	Blank	PVC Sch. 80	2			33	52	Filter Pack	#3

Attachments		Certification Statement	
☐ Geologic Log ☐ Well Construction Diagram ☐ Geophysical Log(s) ☐ Soil/Water Chemical Analyses ☒ Other <u>Site Map</u>		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief Name <u>Cascade Drilling, LP - Bryan Cook</u> Person, Firm or Corporation <u>1961 Meeker Avenue</u> <u>Richmond</u> <u>CA</u> <u>94804</u> Address City State Zip Signed _____ Date Signed <u>11/29/17</u> C-57 Licensed Water Well Contractor	
Attach additional information, if it exists.		C-57 License Number _____	

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Reset Form

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California
Well Completion Report
Refer to Instruction Pamphlet

No. **e0358203**

Click to Get a New Log Number

Page 1 of 1

Owner's Well Number MW-1

Date Work Began 10/25/2017

Date Work Ended 10/31/2017

Local Permit Agency Napa County Department Environmental Management

Permit Number E17-00590

Permit Date 9/27/17

Geologic Log		
Orientation ☐ Vertical ☐ Horizontal ☐ Angle Specify _____		
Drilling Method _____		Drilling Fluid _____
Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc	
0	5	No recovery
5	10	Lean clay, dry, very dark brown, medium plastic fines, no dilatancy, fine sand, no recovery
10	15	As above, dark yellowish brown, med plastic fines no dilatancy, low tough, fine sand, no recovery
15	20	Lean clay, moist, dark brown, med plastic fines, no dila. low tough, fine sand, no recovery
20	25	Lean clay, moist, dark yellowish brown, med plastic, fines, no dil, low tough, fine sand
25	30	Well graded gravel with sand, wet, dark brown, gravel, sand, fines, low plasticity, lean clay, moist dark yellow brown, med plastic fines, no dil, low tough, fine sand
30	35	Lean clay, moist, brown, med plastic fines, no dil, med toughness
35	40	Lean clay, wet, brown, no dil, low toughn fine sand poorly graded sand w/clay, wet, brown, fine sand low plastic fines
40	45	Poorly graded sand, wet, dark yellowish brown, fine sand, well graded gravel w/sand, wet, light olive brown, no recovery
45	50	Poorly graded sand, moist, olive brown, sand, fines Poorly graded gravel w/sand, wet, very dark grey
50	52	Poorly graded sand w/silt, moist, very dark greyish brown, sand, gravel, fines, no recovery
Total Depth of Boring		<u>52</u> Feet
Total Depth of Completed Well		<u>50</u> Feet

Well Owner	
Name <u>City of St. Helena (Felix Hernandez)</u>	
Mailing Address <u>1480 Main Street</u>	
City <u>St. Helena</u> State <u>CA</u> Zip <u>94574</u>	
Well Location	
Address <u>25 Chaix Lane</u>	
City <u>St. Helena</u> County <u>Napa</u>	
Latitude _____ N Longitude _____ W	
Datum _____ Dec. Lat. _____ Dec. Long. _____	
APN Book <u>030</u> Page <u>240-017</u> Parcel <u>000</u>	
Township _____ Range _____ Section _____	
Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
West	
East	
South	
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.	
Activity	
☐ New Well ☐ Modification/Repair ☐ Deepen ☐ Other _____ ☐ Destroy Describe procedures and materials under "GEOLOGIC LOG"	
Planned Uses	
☐ Water Supply ☐ Domestic ☐ Public ☐ Irrigation ☐ Industrial ☐ Cathodic Protection ☐ Dewatering ☐ Heat Exchange ☐ Injection ☐ Monitoring ☐ Remediation ☐ Sparging ☐ Test Well ☐ Vapor Extraction ☐ Other _____	
Water Level and Yield of Completed Well	
Depth to first water _____ (Feet below surface)	
Depth to Static _____	
Water Level <u>25</u> (Feet)	Date Measured _____
Estimated Yield * _____ (GPM)	Test Type _____
Test Length _____ (Hours)	Total Drawdown _____ (Feet)
*May not be representative of a well's long term yield.	

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	35	8	Blank	PVC Sch. 40	2			0	31	Cement	
35	45	8	Screen	PVC Sch. 40	2	Milled Slots	0.030	31	33	Bentonite	
45	50	8	Blank	PVC Sch. 80	2			33	52	Filter Pack	#3

Attachments		Certification Statement	
☐ Geologic Log ☐ Well Construction Diagram ☐ Geophysical Log(s) ☐ Soil/Water Chemical Analyses ☒ Other <u>Site Map</u>		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief Name <u>Cascade Drilling, LP - Bryan Cook</u> Person, Firm or Corporation <u>1961 Meeker Avenue</u> <u>Richmond</u> <u>CA</u> <u>94804</u> Address City State Zip Signed _____ Date Signed <u>11/29/17</u> C-57 Licensed Water Well Contractor	
Attach additional information, if it exists.		C-57 License Number _____	

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Reset Form

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California
Well Completion Report
Refer to Instruction Pamphlet

No. **e0358203**

Click to Get a New Log Number

Page 1 of 1

Owner's Well Number MW-1

Date Work Began 10/25/2017

Date Work Ended 10/31/2017

Local Permit Agency Napa County Department Environmental Management

Permit Number E17-00590

Permit Date 9/27/17

Geologic Log		
Orientation ☐ Vertical ☐ Horizontal ☐ Angle Specify _____		
Drilling Method _____		Drilling Fluid _____
Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc	
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10	15	As above, dark yellowish brown, med plastic fines no dilatancy, low tough, fine sand, no recovery
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40	45	Poorly graded sand, wet, dark yellowish brown, fine sand, well graded gravel w/sand, wet, light olive brown, no recovery
45	50	Poorly graded sand, moist, olive brown, sand, fines Poorly graded gravel w/sand, wet, very dark grey
50	52	Poorly graded sand w/silt, moist, very dark greyish brown, sand, gravel, fines, no recovery
Total Depth of Boring		<u>52</u> Feet
Total Depth of Completed Well		<u>50</u> Feet

Well Owner	
Name <u>City of St. Helena (Felix Hernandez)</u>	
Mailing Address <u>1480 Main Street</u>	
City <u>St. Helena</u> State <u>CA</u> Zip <u>94574</u>	

Well Location	
Address <u>25 Chaix Lane</u>	
City <u>St. Helena</u>	County <u>Napa</u>
Latitude _____ Deg. Min. Sec. N	Longitude _____ Deg. Min. Sec. W
Datum _____	Dec. Lat. _____ Dec. Long. _____
APN Book <u>030</u> Page <u>240-017</u>	Parcel <u>000</u>
Township _____ Range _____	Section _____

Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
West	East
South	
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.	

Activity	
☐ New Well ☐ Modification/Repair ☐ Deepen ☐ Other _____ ☐ Destroy Describe procedures and materials under "GEOLOGIC LOG"	

Planned Uses	
☐ Water Supply ☐ Domestic ☐ Public ☐ Irrigation ☐ Industrial ☐ Cathodic Protection ☐ Dewatering ☐ Heat Exchange ☐ Injection ☐ Monitoring ☐ Remediation ☐ Sparging ☐ Test Well ☐ Vapor Extraction ☐ Other _____	

Water Level and Yield of Completed Well	
Depth to first water _____ (Feet below surface)	
Depth to Static _____	
Water Level <u>25</u> (Feet)	Date Measured _____
Estimated Yield * _____ (GPM)	Test Type _____
Test Length _____ (Hours)	Total Drawdown _____ (Feet)
*May not be representative of a well's long term yield.	

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
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35	45	8	Screen	PVC Sch. 40	2	Milled Slots	0.030	31	33	Bentonite	
45	50	8	Blank	PVC Sch. 80	2			33	52	Filter Pack	#3

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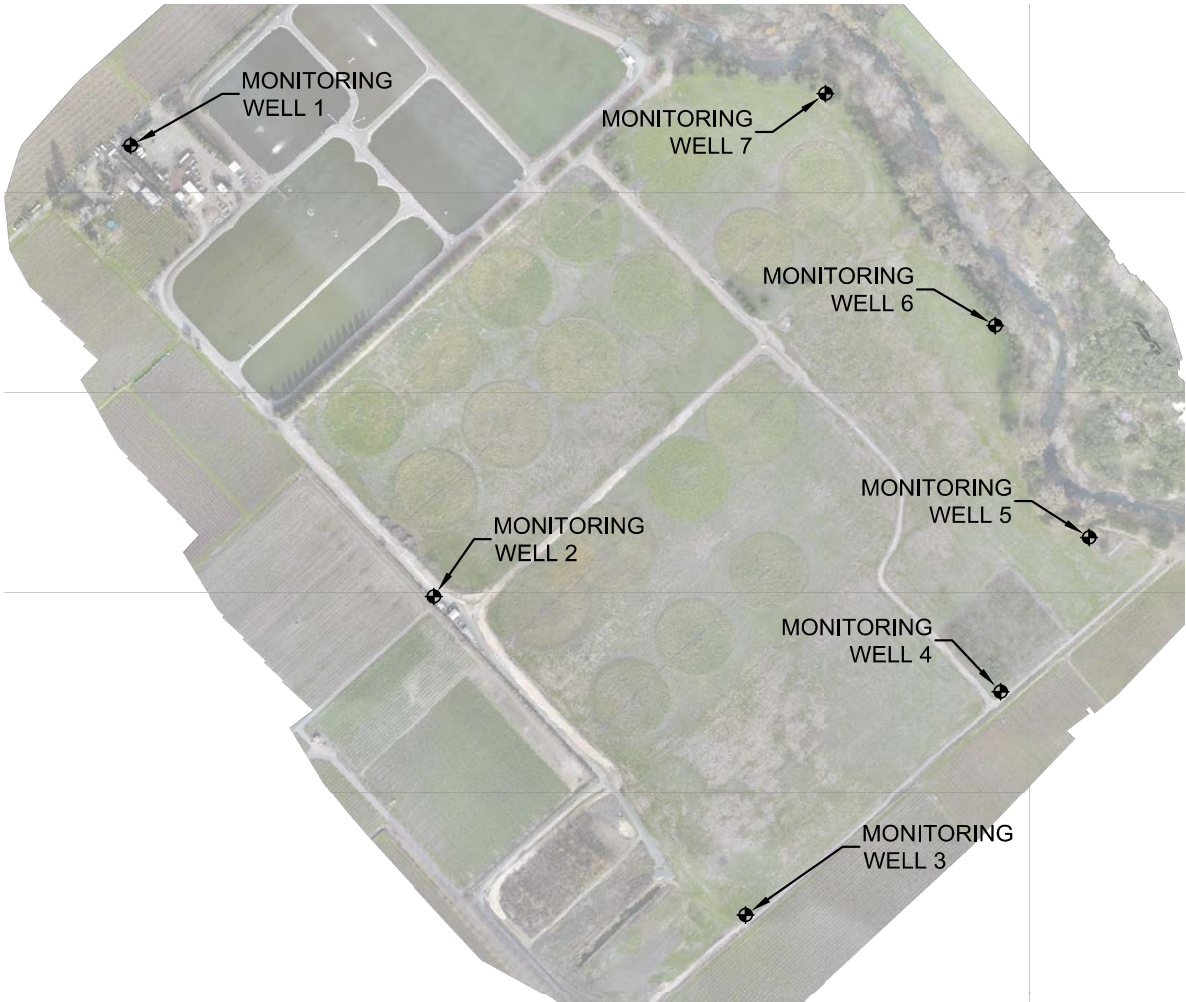
DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

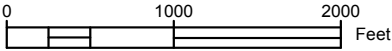
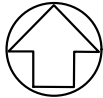
Reset Form

ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

Appendix C – Monitoring Well Survey Results



Point Table		
Raw Description	Lat	Long
WELL 1	N038° 30' 03.5248"	W122° 26' 30.7583"
WELL 2	N038° 29' 49.9138"	W122° 26' 19.2556"
WELL 3	N038° 29' 40.3143"	W122° 26' 07.4615"
WELL 4	N038° 29' 47.1097"	W122° 25' 57.8992"
WELL 5	N038° 29' 51.7961"	W122° 25' 54.6019"
WELL 6	N038° 29' 58.1994"	W122° 25' 58.1752"
WELL 7	N038° 30' 05.1987"	W122° 26' 04.6046"



CITY OF ST HELENA
WASTEWATER TREATMENT AND
RECLAMATION PLANT
MONITORING WELL LOCATIONS
LAT & LONG

Job Number 11152151
Revision -
Date FEB 2018
EXHIBIT 1



January 10, 2018

Kristine Cornellie
Senior Engineer
Larry Walker Associates
1405 S. Bascom Avenue
San Jose, CA 95128

RE: St. Helena WWTRP Monitoring Well Head Elevations

Dear Kristine:

Per your direction GHD completed a digital level loop of the existing monitoring wells installed on the Waste Water Treatment and Recycling Plant (WWTRP) located at 1 Chaix Lane in St Helena, California. The well heads elevations were measured to the "BLACK MARK" on the top of the PVC well pipe. A Leica DNA 10 digital level was utilized for the project. A calibration of the digital level was performed on site prior to running the level loop. The original Level Loop had a vertical error of 0.013 feet, the total run length was 10,065.145 feet. Elevations are based on GPS observations on the North American Vertical Datum of 1988. See the attached map for well locations.

Adjusted Top of Pipe Elevations at "BLACK MARK"

Well	Black Mark (Elevation in feet)
1	206.212
2	197.837
3	190.972
4	192.084
5	193.636
6	195.721
7	198.064

This report was created by me or under my direction in January 2018. We look forward to continuing to work with you on this project. If you have any questions, please feel free to contact me or Alex Culick at (707) 523-1010.

Sincerely,
GHD Inc.



Richard A. Maddock,
PLS 8131, Exp 12-31-18



Enclosures: Well Head Map



Legend		0 225 450 900 ft		Figure 1	
		1 inch = 500 feet printed at 11x17			
				Sources: USDA: Aerial NAIP 2009 1 meter resolution; Humboldt County GIS: Parcels, BlueLine Streams.	
Cartography RAM		Date 1/9/2018		© Winkler & Kelly	

ST HELENA MONITORING WELL INSTALLTION AND MONITORING NETWORK REPORT

Appendix D – Water Quality Sampling Field Notes and Laboratory Results

Meter Calibration Log

[illegible]

Confluence Environmental, Inc.

ORP Values (degrees in C then value): 5:257.0 10:250.5 15:244.0 20:237.5 25:231.0 30:224.5 35:218.0 40:211.5

Well Maintenance Inspection Form

Client: LWA

Site: St. Helena WWTP

Date: 11/17/17

Job #: 11-171117

Technician: Zach H

Page 1 of 1

Inspection Point	Entry Indicates Deficiency													Notes (Note any repairs made while on site)	
	Well Inspected - No Corrective Action Required	Cap non-functional	Lock non-functional	Lock missing	Bolts missing (# missing / # total tabs)	Tabs stripped (# stripped / # total tabs)	Tabs broken (# broken / # of total tabs)	Annular seal incomplete	Apron damaged	Rim / Lid broken	Trip Hazard	Below Grade	Other (explain in notes)		Well Not Inspected (explain in notes)
MW-001				X											NO ID
MW-002				X											I
MW-003				X											
MW-004				X											
MW-005				X											
MW-006				X											
MW-007				X											
REC-001															

Notes: ID written w/in SIMUD, County will place locks after survey, all wells located sufficiently on map

Repair codes: **rt**=retap/ bolts added or replaced **as**=annular seal repair,

Site: St. Helena WWTP

[illegible]

Purging And Sampling Data Sheet

40' tub
6" size

Job#: H1-171117		Sampler: Z. Houseworth		Client: LWA						
Well ID: MW-001		Date: 11/17/17		Site: St. Helena WWTP						
Well diam: 1/4" 1" <u>2"</u> 3" 4" 6" Other:		DTW: 26.66		Total Depth: 53.82						
Purge equip: ES - diam: Bladder <u>Peri</u> Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: Tubing: OD: <u>New</u> Dedicated NA										
Purge method: 3-5 Case Volume <u>Micro/Low-Flow</u> Extraction Other:										
Pump depth/ intake: 35		Multipliers: 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"= 1.02 6"= 1.47 Radius ² X 0.163								
(TD - DTW X Multiplier = 1 Volume 80% Recovery (TD - DTW X 0.20 + DTW))										
1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____										
Time	Temp (°C / °F)	pH	Cond (mS / <u>µS</u>)	Turbidity (NTU)	Purge Rate (gal or mty / min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0903	16.5	6.31	341.8	7.80	200	0.6	3.67	216.0	26.66	clear
0906	16.4	6.35	342.8	6.20	↓	1.2	3.45	211.9	26.66	clear
0909	16.5	6.38	342.6	6.61	↓	1.8	3.38	210.1	26.66	clear
0912	16.6	6.41	342.6	6.32	↓	2.4	3.35	207.7	26.66	clear
Did well dewater? YES <u>NO</u>						Total volume removed: <u>2.4</u> (gal / L)				
Sample method: Disp Bailer Ded. Tubing <u>New Tubing</u> Ext. Port Other:										
Sample date: 11/17/17		Sample time: 0915			DTW at sample: 26.66					
Sample ID: MW-1-171117			Lab: CalTest			Number of bottles: 5				
Analysis: see COC										
Equipment blank ID @					Field blank ID @					
Duplicate ID:					Pre-purge DO:			Post purge DO:		
Fe ²⁺ :					Pre-purge ORP:			Post purge ORP:		
NAPL depth:		Volume of NAPL:				Volume removed: ml				

Purging And Sampling Data Sheet

Job#: H1-171117		Sampler: Z. Houseworth		Client: LWA						
Well ID: MW-002		Date: 11/17/17		Site: St. Helena WWTP						
Well diam: 1/4" 1" 2" 3" 4" 6" Other:		DTW: 20.51		Total Depth: 43.26						
Purge equip: ES - diam: Bladder <u>Peri</u> Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: Tubing: OD: <u>New</u> Dedicated NA										
Purge method: 3-5 Case Volume <u>Micro/Low-Flow</u> Extraction Other:										
Pump depth/ intake: 30' Multipliers: 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius ² X 0.163										
(TD - DTW X Multiplier = 1 Volume <u>324</u> 80% Recovery (TD - DTW X 0.20 + DTW)										
1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____										
Time	Temp (°C / °F)	pH	Cond (mS / <u>µS</u>)	Turbidity (NTU)	Purge Rate (gal or mly min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
0944	17.5	6.31	322.6	8.79	300	0.9	1.79	196.1	20.55	clear
0947	17.4	6.42	335.4	5.61	↓	1.8	1.62	194.3	20.54	clear
0950	17.7	6.45	340.9	3.93	↓	2.7	1.57	194.0	20.54	clear
0953	17.7	6.48	348.6	4.01	↓	3.6	1.63	195.4	20.54	clear
0956	17.7	6.46	350.3	3.79	↓	4.5	1.61	196.6	20.54	clear
Did well dewater? YES <u>NO</u>					Total volume removed: <u>4.5</u> (gal / L)					
Sample method: Disp Bailer Ded. Tubing <u>New Tubing</u> Ext. Port Other:										
Sample date: 11/17/17		Sample time: 1000		DTW at sample: 20.54						
Sample ID: MW-2-171117		Lab: CalTest		Number of bottles: 5						
Analysis: see COC										
Equipment blank ID @			Field blank ID @							
Duplicate ID:			Pre-purge DO:		Post purge DO:					
Fe2 ⁺ :			Pre-purge ORP:		Post purge ORP:					
NAPL depth:		Volume of NAPL:		Volume removed: ml						

35'
6" screen

Purging And Sampling Data Sheet

Job#: H1-171117		Sampler: Z. Houseworth		Client: LWA						
Well ID: MW-003		Date: 11/17/17		Site: St. Helena WWTP						
Well diam: 1/4" 1" 2" 3" 4" 6" Other:		DTW: 17.62		Total Depth: 63.40						
Purge equip: ES - diam: 2 Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:										
Tubing: OD: New Dedicated NA										
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:										
Pump depth/ intake: 45' Multipliers: 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"= 1.02 6"= 1.47 Radius ² X 0.163										
(TD - DTW X Multiplier = 1 Volume) 80% Recovery (TD - DTW X 0.20 + DTW)										
1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____										
Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or ml/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1025	16.1	6.46	411.9	4.88	300	0.9	0.95	198.1	17.70	clear
1028	16.0	6.47	413.6	3.76	200	1.5	0.80	196.9	17.69	clear
1031	16.0	6.49	412.2	3.73	200	2.1	0.74	196.2	17.69	clear
1034	16.0	6.48	410.5	3.82	200	2.7	0.77	196.2	17.69	clear
1037	16.2	6.48	411.1	3.76	200	3.3	0.80	195.8	17.69	clear
Did well dewater? YES NO						Total volume removed: 3.3 (gal/L)				
Sample method: Disp Bailer Ded. Tubing New Tubing Ext. Port Other:										
Sample date: 11/17/17		Sample time: 1040			DTW at sample: 17.69					
Sample ID: MW-3-171117		Lab: CalTest				Number of bottles: 5				
Analysis: see COC										
Equipment blank ID @					Field blank ID @					
Duplicate ID:					Pre-purge DO:			Post purge DO:		
Fe ²⁺ :					Pre-purge ORP:			Post purge ORP:		
NAPL depth:		Volume of NAPL:				Volume removed: ml				

55'
6" silicone

Purging And Sampling Data Sheet

Job#: H1-171117	Sampler: Z. Houseworth	Client: LWA
Well ID: MW-4	Date: 11/17/17	Site: St. Helena WWTP
Well diam: 1/4" 1" <u>2"</u> 3" 4" 6" Other:	DTW: 17.78 Total Depth: 42.98	
Purge equip: ES - diam: Bladder <u>Peri</u> Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:		
Tubing: OD: <u>New</u> Dedicated NA		
Purge method: 3-5 Case Volume <u>Micro/Low-Flow</u> Extraction Other:		
Pump depth/ intake: 35' Multipliers: 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius ² X 0.163		
(TD - DTW X Multiplier = 1 Volume		80% Recovery (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____

Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or ml/ min)	Volume Removed (gal/L)	DO (mg/l)	ORP (mv)	DTW	Notes
1107	17.0	6.44	486.2	10.12	200	0.6	1.01	194.9	17.80	clear
1110	17.1	6.43	485.3	4.18	1	1.2	0.67	195.4	17.80	clear
1113	17.2	6.44	486.0	4.70	1	1.8	0.68	195.2	17.80	clear
1116	17.0	6.43	485.6	2.93	1	2.4	0.70	195.4	17.80	clear
1119	17.2	6.44	485.6	3.02	1	3.0	0.71	195.0	17.80	clear

Did well dewater? YES NO Total volume removed: 3.0 (gal/L)

Sample method: Disp Bailer Ded. Tubing New Tubing Ext. Port Other:

Sample date: 11/17/17 Sample time: 1125 DTW at sample: 17.80

Sample ID: MW-4-171117 Lab: CalTest Number of bottles: 5

Analysis: see COC

Equipment blank ID @	Field blank ID @	
Duplicate ID:	Pre-purge DO:	Post purge DO:
Fe ²⁺ :	Pre-purge ORP:	Post purge ORP:
NAPL depth:	Volume of NAPL:	Volume removed: ml

Purging And Sampling Data Sheet

Job#: H1-171117		Sampler: Z. Houseworth		Client: LWA	
Well ID: mw-5		Date: 11/17/17		Site: St. Helena WWTP	
Well diam: 1/4" 1" 2" 3" 4" 6" Other:		DTW: 19.58		Total Depth: 43.75	
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other:					
Tubing: OD: New Dedicated NA					
Purge method: 3-5 Case Volume Micro/Low-Flow Extraction Other:					
Pump depth/ intake: 35		Multipliers: 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"= 1.02 6"= 1.47 Radius ² X 0.163			
(TD - DTW X Multiplier = 1 Volume 80% Recovery (TD - DTW X 0.20 + DTW))					
1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____					

Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1200	17.3	6.77	564.8	17.3	300	0.9	0.62	191.4	19.72	clear
1203	17.4	6.74	565.9	19.7	200	1.5	0.38	194.3	19.72	clear
1206	17.2	6.75	569.3	18.7	200	2.1	0.31	195.2	19.72	clear
1209	17.3	6.74	569.9	17.1	↓	2.7	0.32	195.7	19.72	clear
1212	17.4	6.74	570.2	15.8	↓	3.3	0.38	195.9	19.72	clear
1215	17.3	6.75	571.3	11.9	↓	3.9	0.40	195.7	19.72	clear
1218	17.4	6.75	572.0	12.1	↓	4.5	0.41	195.7	19.72	clear
1224										

Did well dewater? YES ☒ NO ☐	Total volume removed: 4.5 (gal/L)
Sample method: Disp Bailer Ded. Tubing ☒ New Tubing Ext. Port Other:	
Sample date: 11/17/17	Sample time: 1220 DTW at sample: 19.72
Sample ID: mw-5-171117	Lab: CalTest Number of bottles: 5
Analysis: see COC	
Equipment blank ID @	Field blank ID @
Duplicate ID:	Pre-purge DO: Post purge DO:
Fe ²⁺ :	Pre-purge ORP: Post purge ORP:
NAPL depth:	Volume of NAPL: Volume removed: ml

40'
6" Silizone

Purging And Sampling Data Sheet

Job#: H1-171117		Sampler: Z. Houseworth		Client: LWA						
Well ID: MW-6		Date: 11/17/17		Site: St. Helena WWTP						
Well diam: 1/4" 1" <u>2"</u> 3" 4" 6" Other:		DTW: 19.91		Total Depth: 45.88						
Purge equip: ES - diam: Bladder <u>Peri</u> Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: Tubing: OD: <u>New</u> Dedicated NA										
Purge method: 3-5 Case Volume <u>Micro/Low-Flow</u> Extraction Other:										
Pump depth/ intake: 30' Multipliers: 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius ² X 0.163										
(TD - DTW X Multiplier = 1 Volume 80% Recovery (TD - DTW X 0.20 + DTW))										
1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____										
Time	Temp (°C/°F)	pH	Cond (mS/µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal (L))	DO (mg/l)	ORP (mv)	DTW	Notes
1245	17.0	6.69	496.0	12.3	200	0.6	0.54	191.0	19.93	clear
1248	17.1	6.68	493.9	15.4	1	1.2	0.40	191.2	19.93	clear
1251	17.0	6.67	492.1	13.1	1	1.8	0.30	191.5	19.94	clear
1254	17.0	6.66	499.8	8.69	1	2.4	0.31	192.3	19.94	clear
1257	17.0	6.64	486.8	8.42	1	3.0	0.33	192.4	19.94	clear
1300	17.0	6.64	488.1	6.36	1	3.6	0.34	192.4	19.94	clear
Did well dewater? YES <u>NO</u>						Total volume removed: 3.6 (gal (L))				
Sample method: Disp Bailer Ded. Tubing <u>New Tubing</u> Ext. Port Other:										
Sample date: 11/17/17		Sample time: 1305		DTW at sample: 19.94						
Sample ID: MW-6-171117		Lab: CalTest		Number of bottles: 5						
Analysis: see COC										
Equipment blank ID @		Field blank ID @								
Duplicate ID:		Pre-purge DO:		Post purge DO:						
Fe ²⁺ :		Pre-purge ORP:		Post purge ORP:						
NAPL depth:		Volume of NAPL:		Volume removed: ml						

35'
6" Silicone

Purging And Sampling Data Sheet

Job#: H1-171117		Sampler: Z. Houseworth		Client: LWA						
Well ID: MW-7		Date: 11/14/17		Site: St. Helena WWTP						
Well diam: 1/4" 1" (2)" 3" 4" 6" Other:		DTW: 19.75		Total Depth:						
Purge equip: ES - diam: Bladder Peri Waterra Positive Air Displacement Ext. System disp bailer teflon bailer other: Tubing: OD: New Dedicated NA 44.16										
Purge method: 3-5 Case Volume (Micro/Low-Flow) Extraction Other:										
Pump depth/ intake: 30 Multipliers: 1"= 0.04 2"= 0.16 3"= 0.37 4"= 0.65 5"=1.02 6"= 1.47 Radius ² X 0.163										
(TD - DTW X Multiplier = 1 Volume 80% Recovery (TD - DTW X 0.20 + DTW)										
1 Volume = _____ X _____ = _____ (Total Purge) 80%= _____										
Time	Temp (°C/°F)	pH	Cond (mS /µS)	Turbidity (NTU)	Purge Rate (gal or mL/ min)	Volume Removed (gal / L)	DO (mg/l)	ORP (mv)	DTW	Notes
1341	18.5	6.78	492.0	58.9	200	0.6	1.62	179.9	19.76	cloudy
1344	18.5	6.77	490.3	28.1	1	1.2	1.63	180.7	19.76	cloudy
1347	18.5	6.77	490.6	10.42	1	1.8	1.59	180.8	19.76	clear
1350	18.3	6.75	485.3	10.64	1	2.4	1.57	181.4	19.76	clear
1353	18.3	6.77	486.1	7.2	1	3.0	1.60	181.2	19.76	clear
Did well dewater? YES (NO)					Total volume removed: 3.0 (gal / L)					
Sample method: Disp Bailer Ded. Tubing (New Tubing) Ext. Port Other:										
Sample date: 11/17/17		Sample time: 1355				DTW at sample: 19.76				
Sample ID: MW-7-171117			Lab: CalTest				Number of bottles: 5			
Analysis: see COC										
Equipment blank ID @				Field blank ID @						
Duplicate ID:				Pre-purge DO:				Post purge DO:		
Fe2+:				Pre-purge ORP:				Post purge ORP:		
NAPL depth:		Volume of NAPL:				Volume removed: ml				

Purging And Sampling Data Sheet

[illegible]



Groundwater Monitoring Field Log

Water Level Measurements

Field Crew: Danielle M.

Client/Site: St. Helena WWTP

Date: 12/15/17

Project & task number: 110.18 T4

Well I.D.	Time	Dia (in)	Ref Point TOC/BGS	Depth to Water	Total Depth [measured]	Total Depth [historical]	Units		Notes
MW-1	7:40	2	TOC	24.53	53.81	53.82	ft		
MW-2	9:05	2	TOC	18.56	—	43.26	ft		
MW-3	10:00	2	TOC	16.33	—	63.40	ft		
MW-4	11:00	2	TOC	16.61	—	42.98	ft		
MW-5	12:00	2	TOC	18.75	—	43.75	ft		
MW-6	12:35	2	TOC	19.47	—	45.88	ft		
MW-7	13:40	2	TOC	19.52	—	44.16	ft		
REC-001	14:30	NA	NA	NA	NA	NA	NA		Sample w/ bailer in REC-001 pond

Comments: _____



Groundwater Monitoring Field Log

Well Maintenance Inspection Form

Field Crew: Danielle M

Client/Site: St. Helena WWTP Date: 12/15/17

Project & task number: 110.18 T4

Well I.D.	Time	Well Inspected - No Corrective Action Required	Entry Indicates Deficiency									Well Not Inspected (see notes)	Notes & On-site Repairs
			Non-functional Cap	Non-functional Lock	Missing Lock	Annular Seal Incomplete	Apron Damaged	Rim/Lid Broken	Trip Hazard	Below Grade	Other (see notes)		
MW-1	7:35				X								No external ID
MW-2	9:05				X								" "
MW-3	10:00				X								" "
MW-4	11:00				X								" "
MW-5	12:00				X								" "
MW-6	12:35				X								" "
MW-7	13:40				X								" "
REC-001	14:30	N/A											N/A

Comments:

ID written w/in Stand, county to still place locks, all
wells located sufficiently on map

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 12/15/17
Client/Site: St. Helena WWTRP Project & task number: 110.18 T4

Well ID: MW-1	Well Diam: 2"	Pump Depth / intake: 35 ft
DTW: 24.53	Total Depth: 53.81	
Purge Equipment: Bladder <u>Peri</u> Waterra Positive Air Displacement Other: disp bailer teflon bailer Ext. system Tubing: New <u>Dedicated</u> NA		
Sampling Method: 3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:		

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = X = (Total Purge) 80% =

[illegible]

Did well dewater?	YES	NO	Total Volume Removed (gal)	(L): 3.0
Sample Method:	Disp Bailer	Ded. Tubing	New Tubing	Ext. Port Other:
Date:	12/15/17	Time:	08:25	DTW (ft): 24.52
Number of Bottles:	4			
Sample ID:	MW-1-171215		Lab:	Caltest
Analysis:	see COC			
Field Duplicate ID:			Time:	
Field Blank ID:			Time:	

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M Date: 12/15/17
 Client/Site: St. Helena W/WRP Project & task number: 110.1974

Well ID: <u>MW-2</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>30ft</u>
DTW: <u>18.56</u>	Total Depth: <u>43.26</u>	
Purge Equipment: <u>Bladder</u> <u>Peri</u> <u>Watterra</u> <u>Positive Air Displacement</u> <u>Other:</u>		
<u>disp bailer</u> <u>teflon bailer</u> <u>Ext. system</u>		Tubing: <u>New</u> <u>Dedicated</u> <u>NA</u>
Sampling Method: <u>3-5 case volume</u> <u>micro/low-flow</u> <u>Passive diffusion</u> <u>Other:</u>		

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal (ml/min))	Volume Removed (gal (L))	Temp (°C (°F))	pH	Cond (ms (µS))	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
9:10	300	0.9	15.29	6.29	337.0	8.80	2.20	61.4	18.62	clear
9:13		1.8	17.21	6.22	337.6	15.90	1.98	50.9	18.62	
9:16		2.7	17.30	6.22	337.2	8.56	1.94	48.4	18.62	
9:19		3.6	17.35	6.22	338.3	2.53	1.95	47.3	18.61	
9:21		4.5	17.36	6.23	338.9	2.85	1.90	47.3	18.61	
9:24		5.4	17.44	6.25	339.8	2.89	1.89	47.5	18.61	↓

Did well dewater? YES <u>NO</u>	Total Volume Removed (gal (L)): <u>5.4</u>
Sample Method: <u>Disp Bailer</u> <u>Ded. Tubing</u> <u>New Tubing</u> <u>Ext. Port</u> <u>Other:</u>	
Date: <u>12/15/17</u> Time: <u>09:30</u>	DTW (ft): <u>18.61</u> Number of Bottles: <u>4</u>
Sample ID: <u>MW-2-171215</u>	Lab: <u>Caltest</u> Analysis: <u>see C06</u>
Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:

Well Monitoring Data Sheet

Field Crew: Danielle M Date: 12/15/17
Client/Site: St. Helena WWTP Project & task number: 110.18 T4

Well ID: MW-3	Well Diam: 2"	Pump Depth / intake: 45 ft
DTW: 16.33 16.33	Total Depth: 63.40	
Purge Equipment:	Bladder <u>Peri</u> Waterra Positive Air Displacement Other:	
	disp bailer teflon bailer Ext. system	Tubing: New <u>Dedicated</u> NA
Sampling Method:	3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:	

Multipliers : 1"= 0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X0.163

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = X = (Total Purge) 80% = _____

[illegible]

Did well dewater?	YES	<u>NO</u>	Total Volume Removed (gal)	<u>①: 3.84</u>
Sample Method:	Disp Bailer	<u>Ded. Tubing</u>	New Tubing	Ext. Port Other:
Date:	<u>12/15/17</u>	Time:	<u>10:25</u>	DTW (ft): <u>16.46</u> Number of Bottles: <u>4</u>
Sample ID:	<u>MW-3-171215</u>		Lab:	<u>Caltest</u> Analysis: <u>see COC</u>
Field Duplicate ID:			Time:	
Field Blank ID:			Time:	

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M.Date: 12/15/17Client/Site: St. Helena WWTRPProject & task number: 110.19 T

Well ID: <u>MW-4</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>35 ft</u>
DTW: <u>16.61</u>	Total Depth: <u>42.98</u>	
Purge Equipment: <u>Bladder</u> <u>Peri</u> <u>Waterra</u> <u>Positive Air Displacement</u> <u>Other:</u> <u>disp bailer</u> <u>teflon bailer</u> <u>Ext. system</u>		
Sampling Method: <u>3-5 case volume</u> <u>micro/low-flow</u> <u>Passive diffusion</u> <u>Other:</u>		Tubing: <u>New</u> <u>Dedicated</u> <u>NA</u>

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal (ml/min))	Volume Removed (gal (L))	Temp (°C (°F))	pH	Cond (ms (µS))	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
11:05	310	0.93	17.03	6.37	466.3	114	1.57	43.2	16.61	light brown
11:08		1.86	16.94	6.37	465.2	79.4	1.46	40.6	16.61	
11:11		2.79	16.98	6.38	468.2	49.3	1.45	39.2	16.61	
11:14		3.72	17.03	6.37	467.4	31.5	1.39	39.4	16.61	
11:17		4.65	17.01	6.37	467.1	26.5	1.26	39.3	16.61	↓
11:20		5.58	17.04	6.37	467.0	19.6	1.26	39.4	16.61	clear
11:23		6.51	16.95	6.37	465.1	16.6	1.24	39.3	16.61	
11:26		7.44	17.01	6.38	465.9	14.8	1.26	39.1	16.61	
11:29		8.37	17.02	6.38	467.7	10.6	1.26	39.6	16.61	
11:31		9.30	17.02	6.38	467.4	12.8	1.26	39.9	16.61	↓

Did well dewater? YES <u>NO</u>		Total Volume Removed (gal (L)): <u>9.30</u>	
Sample Method: <u>Disp Bailer</u> <u>Ded. Tubing</u> <u>New Tubing</u> <u>Ext. Port</u> <u>Other:</u>			
Date: <u>12/15/17</u>	Time: <u>11:35</u>	DTW (ft): <u>16.61</u>	Number of Bottles: <u>4</u>
Sample ID: <u>MW-4-171215</u>		Lab: <u>Caltest</u>	Analysis: <u>see COC</u>

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments: hit bottom of well with tubing repeatedly, suspected cause of higher turbidity



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M Date: 12/15/17
 Client/Site: St. Helena WWTRP Project & task number: 110.18 T

Well ID: <u>MW-5</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>35 ft</u>
DTW: <u>18.75</u>	Total Depth: <u>43.75</u>	
Purge Equipment: Bladder ☐ Peri ☒ Waterra ☐ Positive Air Displacement ☐ Other: ☐		
disp bailer ☐ teflon bailer ☐ Ext. system ☐		Tubing: New ☒ Dedicated ☐ NA ☐
Sampling Method: 3-5 case volume ☐ micro/low-flow ☒ Passive diffusion ☐ Other: ☐		

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal <u>ml</u> /min)	Volume Removed (gal <u>L</u>)	Temp (°C °F)	pH	Cond (ms <u>µS</u>)	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
12:05	300	0.9	17.55	6.60	585.1	2.69	0.64	46.0	18.93	clear
12:08	1	1.8	17.26	6.65	579.2	1.76	0.28	42.3	18.93	1
12:11	1	2.7	17.21	6.66	579.9	0.99	0.22	41.3	18.93	1
12:14	1	3.6	17.21	6.66	579.6	0.95	0.19	39.8	18.93	1
12:17	1	4.5	17.21	6.67	580.5	0.91	0.18	39.1	18.93	↓

Did well dewater? YES ☐ NO ☒	Total Volume Removed (gal <u>0</u>): <u>4.5</u>
Sample Method: Disp Bailer ☐ Ded. Tubing ☒ New Tubing ☐ Ext. Port ☐ Other: ☐	
Date: <u>12/15/17</u> Time: <u>12:25</u> DTW (ft): <u>18.93</u>	Number of Bottles: <u>4</u>
Sample ID: <u>MW-5-171215</u>	Lab: <u>Caltest</u> Analysis: <u>see C0C</u>

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M Date: 12/15/17
 Client/Site: St. Helena WWTRP Project & task number: 110.18 T

Well ID: <u>MW-6</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>35 ft</u>
DTW: <u>19.47</u>	Total Depth: <u>45.88</u>	
Purge Equipment: Bladder <u>Peri</u> Waterra Positive Air Displacement Other:		
disp bailer teflon bailer Ext. system		Tubing: New <u>Dedicated</u> NA
Sampling Method: 3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:		

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal <u>ml/min</u>)	Volume Removed (gal <u>L</u>)	Temp (°C °F)	pH	Cond (ms <u>µS</u>)	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
12:43	300	0.9	17.51	7.06	774.5	0.78	0.78	25.5	19.51	clear
12:46		1.8	16.99	7.15	764.2	0.66	0.78	27.7	19.51	
12:49		2.7	16.90	7.17	744.0	0.30	0.71	28.1	19.51	
12:52		3.6	16.95	7.18	720.8	0.28	0.52	28.5	19.51	
12:55		4.5				0.66				
12:55		5.4	16.92	7.18	698.6	0.58	0.86	28.8	19.51	
12:58		6.3	16.92	7.14	676.1	0.60	0.57	29.0	19.51	
13:01		7.2	16.93	7.08	652.9	0.62	0.58	29.4	19.51	

Did well dewater? YES <u>NO</u>	Total Volume Removed (gal <u>L</u>): <u>7.2</u>
Sample Method: Disp Bailer <u>Ded. Tubing</u> New Tubing Ext. Port Other:	
Date: <u>12/15/17</u> Time: <u>13:10</u>	DTW (ft): <u>19.51</u> Number of Bottles: <u>4</u>
Sample ID: <u>MW-6-171215</u>	Lab: <u>Caltest</u> Analysis: <u>see CDC</u>

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments: ① Lat on vial, cleaned & remeasured vial = 0.66



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M Date: 12/15/17
 Client/Site: St. Helena WWTRP Project & task number: 110.18 T

Well ID: <u>MW-7</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>35 ft</u>
DTW: <u>19.52</u>	Total Depth: <u>44.16</u>	
Purge Equipment: Bladder <u>Peri</u> Waterra Positive Air Displacement Other:		
disp bailer teflon bailer Ext. system		Tubing: New <u>Dedicated</u> NA
Sampling Method: 3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:		

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal ml/min)	Volume Removed (gal L)	Temp (°C °F)	pH	Cond (ms µS)	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
13:57	300	0.9	16.01	7.08	345.8	1.37	4.36	33.8	19.52	
14:00		1.8	14.16	7.01	344.2	1.41	5.42	34.7	19.52	
14:03		2.7	13.75	6.97	343.5	1.32	5.75	35.1	19.52	
14:06		3.6	13.70	6.95	343.6	1.55	5.80	35.2	19.52	
14:09	↓	4.5	13.70	6.94	343.4	1.57	5.83	35.5	19.52	

Did well dewater? YES <u>NO</u>	Total Volume Removed (gal L): <u>4.5</u>
Sample Method: Disp Bailer <u>Ded. Tubing</u> New Tubing Ext. Port Other:	
Date: <u>12/15/17</u> Time: <u>14:15</u>	DTW (ft): <u>19.52</u> Number of Bottles: <u>4</u>
Sample ID: <u>MW-7-171215</u>	Lab: <u>Caltest</u> Analysis: <u>see COC</u>

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle MDate: 12/15/17Client/Site: St. Helena WWTRPProject & task number: 110.19 T4

Well ID: <u>REC-001</u>	Well Diam: <u>N/A</u>	Pump Depth / intake: <u>N/A</u>
DTW: <u>N/A</u>	Total Depth: <u>N/A</u>	
Purge Equipment: <i>Bladder</i> <i>Peri</i> <i>Watterra</i> <i>Positive Air Displacement</i> <i>Other:</i> ☒ <u>disp bailer</u> ☐ <i>teflon bailer</i> ☐ <i>Ext. system</i>		
Sampling Method: <i>3-5 case volume</i> <i>micro/low-flow</i> <i>Passive diffusion</i> ☒ <i>Other:</i> <u>N/A</u>		Tubing: <i>New</i> <i>Dedicated</i> ☒ <i>NA</i>

 Multipliers : 1"= 0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal ml/min)	Volume Removed (gal L)	Temp (°C °F)	pH	Cond (ms μ S)	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
14:30	—	—	12.10	7.11	672.2	23.6	3.86	433.7	N/A	Pond grab

Did well dewater? YES NO		Total Volume Removed (gal L):	
Sample Method: ☒ <u>Disp Bailer</u> ☐ <i>Ded. Tubing</i> ☐ <i>New Tubing</i> ☐ <i>Ext. Port</i> ☐ <i>Other:</i>			
Date: <u>12/15/17</u>	Time: <u>14:30</u>	DTW (ft):	Number of Bottles:
Sample ID: <u>REC-001-171215</u>		Lab:	Analysis:
Field Duplicate ID:		Time:	
Field Blank ID:		Time:	
Comments:			



Groundwater Monitoring Field Log

Water Level Measurements

Field Crew: Danielle M.

Client/Site: St. Helena WWTRP

Date: 1/17/18

Project & task number: 110.19 T4

Well I.D.	Time	Dia (in)	Ref Point TOC/BGS	Depth to Water	Total Depth [measured]	Total Depth [historical]	Units		Notes
MW-1	08:25	2	TOC	23.19	53.79	53.82	ft		
MW-2	09:15	2	TOC	16.55	43.23	43.26	ft		
MW-3	09:50	2	TOC	15.20	63.40	63.40	ft		
MW-4	10:40	2	TOC	15.71	42.91	42.98	ft		
MW-5	11:25	2	TOC	18.43	43.75	43.75	ft		
MW-6	12:00	2	TOC	20.22	45.88	45.88	ft		
MW-7	12:45	2	TOC	19.93	44.05	44.16	ft		
REC-001	13:45	NA	NA	NA	NA	NA	-		Sample w/bailer in REC-001 pond

Comments: _____



Groundwater Monitoring Field Log

Well Maintenance Inspection Form

Field Crew: Danielle M
Client/Site: St. Helena WWTP Date: 1/17/18

Project & task number: 110.19 T4

Accessories

Well I.D.	Time	Well Inspected - No Corrective Action Required	Entry Indicates Deficiency									Well Not Inspected (see notes)	Notes & On-site Repairs
			Non-functional Cap	Non-functional Lock	Missing Lock	Annular Seal Incomplete	Apron Damaged	Rim/Lid Broken	Trip Hazard	Below Grade	Other (see notes)		
MW-1	08:15				X								
MW-2	09:15				X								
MW-3	09:50				X						X		not labeled on base
MW-4	10:40				X								
MW-5	11:25				X								
MW-6	12:00				X								
MW-7	12:45				X								
REC-001	13:45												

Comments: _____



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 1/17/18
 Client/Site: St. Helena WWTRP Project & task number: 110,19 T4

Well ID: <u>MW-1</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>41.90</u>
DTW: <u>23.19</u>	Total Depth: <u>53.79</u>	
Purge Equipment: Bladder <u>Pert</u> Waterra Positive Air Displacement Other:		
disp bailer teflon bailer Ext. system		Tubing: <u>New</u> Dedicated NA
Sampling Method: 3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:		

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume 80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal/ml/min)	Volume Removed (gal/L)	Temp (°C/°F)	pH	Cond (ms/μS)	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
8:34	400	0.4	17.26	6.29	429.0	0.41	5.13	54.3	23.19	
8:37	400	0.8	17.44	6.29	427.7	1.61	5.03	51.4	23.19	
8:39	400	1.2	17.48	6.29	427.6	0.92	5.02	50.5	23.19	
8:41	400	1.6	17.48	6.30	426.1	0.44	5.01	49.8	23.19	
8:43	400	2.0	17.49	6.30	426.5	0.59	5.03	49.4	23.19	

Did well dewater? YES <u>NO</u>	Total Volume Removed (gal/L): <u>2.0</u>
Sample Method: Disp Bailer Ded. Tubing New Tubing Ext. Port Other:	
Date: <u>1/17/18</u>	Sample Time: <u>08:45</u> DTW (ft): <u>23.19</u> Number of Bottles: <u>4</u>
Sample ID: <u>MW-1-180117</u>	Lab: <u>Caltest</u> Analysis: <u>See COC</u>

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 1/17/18
Client/Site: St. Helena WWTP Project & task number: 11019 T4

Well ID: MW-2	Well Diam: 2"	Pump Depth / intake: 39.25
DTW: 16.55	Total Depth: 43.23	
Purge Equipment:	Bladder disp bailer	☒ Peri teflon bailer
	☐ Waterra Ext. system	☐ Positive Air Displacement ☐ Other:
		Tubing: ☒ New ☐ Dedicated ☐ NA
Sampling Method:	☐ 3-5 case volume ☒ micro/low-flow	☐ Passive diffusion ☐ Other:

Multipliers : 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

[illegible]

Did well dewater?	YES	<u>NO</u>	Total Volume Removed (gal) (L):	2.0
Sample Method:	Disp Bailer	Ded. Tubing	<u>New Tubing</u>	Ext. Port Other:
Date:	1/17/18	Sample Time:	09:30	DTW (ft): 16.62
Sample ID:	MW-2-180117	Lab:	Caltest	Analysis: see COC

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 1/17/18
Client/Site: St. Helena W/WTRP Project & task number: 110.19 TY

Well ID: MW-3	Well Diam: 2"	Pump Depth / intake: 53.41
DTW: 15.20	Total Depth:	
Purge Equipment:	Bladder ☒ Per Water Positive Air Displacement Other: disp bailer teflon bailer Ext. system	
Sampling Method:	3-5 case volume ☒ micro/low-flow Passive diffusion Other:	
	Tubing: ☒ New Dedicated NA	

$$(TP - DTW) \times \text{Multiplier} = 1 \text{ Volume} \quad 80\& \text{ Recover } (TP - DTW \times 0.20 + DTW)$$
$$1 \text{ Volume} = \frac{X}{\text{(Total Purge)}} \times 80\%$$
[illegible]

Did well dewater?	YES	<u>NO</u>	Total Volume Removed (gal)	<u>①</u> : 2.0
Sample Method:	Disp Bailer	Ded. Tubing	<u>New Tubing</u>	Ext. Port Other:
Date:	1/17/18	Sample Time:	10:10	DTW (ft): 15.37
Sample ID:	MW-3-180117	Lab:	Caltest	Analysis: see EOC

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danille M. Date: 1/17/18
 Client/Site: St. Helena WWTP Project & task number: 110.19 T4

Well ID: <u>MW-4</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>35.50</u>
DTW: <u>15.71</u>	Total Depth:	
Purge Equipment: Bladder <u>Peri</u> Waterra Positive Air Displacement Other:		
disp bailer teflon bailer Ext. system		Tubing: <u>New</u> Dedicated NA
Sampling Method: 3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:		

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume 80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal ml/min)	Volume Removed (gal (L))	Temp (°C °F)	pH	Cond (ms (μS))	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
10:56	400	0.4	17.70	6.30	475.6	1.37	1.52	60.5	15.71	
10:58	400	0.8	17.71	6.30	473.6	0.51	1.47	49.0	15.71	
11:00	400	1.2	17.71	6.30	466.1	1.69	1.44	45.5	15.71	
11:02	400	1.6	17.74	6.30	464.6	0.86	1.42	44.0	15.71	
11:04	400	2.0	17.75	6.30	462.0	1.68	1.40	43.1	15.71	

Did well dewater? YES <u>NO</u>	Total Volume Removed (gal (L)): <u>2.0</u>
Sample Method: Disp Bailer Ded. Tubing <u>New Tubing</u> Ext. Port Other:	
Date: <u>1/17/18</u>	Sample Time: <u>11:10</u> DTW (ft): <u>15.71</u> Number of Bottles: <u>4</u>
Sample ID: <u>MW-4-180117</u>	Lab: <u>Caltest</u> Analysis: <u>see COC</u>

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 1/17/18
 Client/Site: St Helena WWTRP Project & task number: 110.19 T4

Well ID: <u>MW-5</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>36.25</u>
DTW: <u>18.43</u>	Total Depth: <u>43.75</u>	
Purge Equipment: Bladder ☐ Peri ☒ Waterra ☐ Positive Air Displacement ☐ Other: ☐		
disp bailer ☐ teflon bailer ☐ Ext. system ☐		Tubing: <u>New</u> Dedicated ☐ NA ☐
Sampling Method: 3-5 case volume ☐ <u>micro/low-flow</u> ☒ Passive diffusion ☐ Other: ☐		

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal (ml/min))	Volume Removed (gal (L))	Temp (°C (°F))	pH	Cond (ms (µS))	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
11:30	350	0.35	18.48	6.62	601.3	5.62	1.53	56.8	18.59	
11:32	350	0.7	18.15	6.64	600.1	4.62	1.28	51.7	18.61	
11:34	350	1.05	18.11	6.64	599.3	3.72	1.11	48.8	18.62	
11:36	350	1.4	18.11	6.65	590.2	2.34	0.91	47.2	18.63	
11:38	350	1.75	18.15	6.65	589.8	2.80	0.73	45.5	18.64	

Did well dewater? YES ☐ NO ☒	Total Volume Removed (gal (L)): _____
Sample Method: Disp Bailer ☐ Ded. Tubing ☐ <u>New Tubing</u> ☒ Ext. Port ☐ Other: ☐	
Date: <u>1/17/18</u>	Sample Time: <u>11:45</u> DTW (ft): <u>18.63</u> Number of Bottles: <u>4</u>
Sample ID: <u>MW-5-180117</u>	Lab: <u>Caltest</u> Analysis: <u>see LOC</u>

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 1/17/18
Client/Site: St. Helena WWTP Project & task number: 110.19 TY

Well ID: MW-6	Well Diam: 2"	Pump Depth / intake: 38.40
DTW: 20.22	Total Depth: 45.88	
Purge Equipment:	Bladder <u>Peri</u> Waterra Positive Air Displacement Other:	
	disp bailer teflon bailer Ext. system	Tubing: <u>New</u> Dedicated NA
Sampling Method:	3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:	

Multipliers : 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X0.163

(TD - DTW) X Multiplier = 1 Volume

80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

[illegible]

Did well dewater? YES <u>NO</u>		Total Volume Removed (gal <u>L</u>): 2,25	
Sample Method: Disp Bailer Ded. Tubing <u>New Tubing</u> Ext. Port Other:			
Date: 1/17/18	Sample Time: 12:25	DTW (ft): 20.27	Number of Bottles: 4
Sample ID: MW-6-180117		Lab: Caltest	Analysis: see COC

Field Duplicate ID:	Time:
Field Blank ID:	Time:

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 1/17/18
 Client/Site: St. Helena Project & task number: 110.19 T4

Well ID: <u>MW-7</u>	Well Diam: <u>2"</u>	Pump Depth / intake: <u>37.65</u>
DTW:	Total Depth:	
Purge Equipment:	Bladder <u>Peri</u> Waterra Positive Air Displacement Other:	
	disp bailer teflon bailer Ext. system	
Sampling Method:	3-5 case volume <u>micro/low-flow</u> Passive diffusion Other:	
	Tubing: <u>New</u> Dedicated NA	

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume 80% Recover (TD - DTW X 0.20 + DTW)

1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal (mi/min))	Volume Removed (gal (L))	Temp (°C (°F))	pH	Cond (ms (µS))	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
12:54	450	450	14.53	6.89	382.8	2.23	3.53	42.30	19.95	
12:56	450	900	14.25	6.89	383.6	2.23	3.76	41.20	19.95	
12:58	450	1350	14.10	6.89	381.8	2.61	4.02	40.50	19.95	
13:00	450	1800	13.98	6.89	383.8	2.40	4.20	39.9	19.95	
13:02	450	2250	13.92	6.89	383.2	2.09	4.26	39.6	19.95	
13:04	450	2700	13.85	6.89	382.5	2.26	4.36	39.4	19.95	

Did well dewater? YES <u>(NO)</u>	Total Volume Removed (gal (L)):
Sample Method: Disp Bailer Ded. Tubing <u>(New Tubing)</u> Ext. Port Other:	
Date: <u>1/17/18</u> Sample Time: <u>13:10</u>	DTW (ft): <u>19.95</u> Number of Bottles: <u>4</u>
Sample ID: <u>MW-7-180117</u>	Lab: <u>Caltest</u> Analysis: <u>see COC</u>
Field Duplicate ID: <u>MW-7 FD</u>	Time: <u>13:10</u>
Field Blank ID:	Time:

Comments:



Groundwater Monitoring Field Log

Well Monitoring Data Sheet

Field Crew: Danielle M. Date: 1/17/18
 Client/Site: St. Helena WWTRP Project & task number: 110.19 TY

Well ID: <u>REC-001</u>	Well Diam: <u>N/A</u>	Pump Depth / intake: <u>N/A</u>
DTW: <u>N/A</u>	Total Depth: <u>N/A</u>	
Purge Equipment: <u>Bladder</u> <u>Peri</u> <u>Waterra</u> <u>Positive Air Displacement</u> <u>Other:</u> <u>disp bailer</u> <u>teflon bailer</u> <u>Ext. system</u>		
Sampling Method: <u>3-5 case volume</u> <u>micro/low-flow</u> <u>Passive diffusion</u> <u>Other:</u> <u>Bailer, surface W</u>		Tubing: <u>New</u> <u>Dedicated</u> <u>NA</u>

Multipliers: 1"=0.04 2"=0.16 3"=0.37 4"=0.65 5"=1.02 6"=1.47 Radius² X 0.163

(TD - DTW) X Multiplier = 1 Volume	80% Recover (TD - DTW X 0.20 + DTW)
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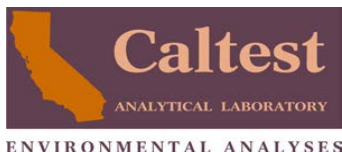
1 Volume = _____ X _____ = _____ (Total Purge) 80% = _____

Time	Purge Rate (gal ml/min)	Volume Removed (gal L)	Temp (°C °F)	pH	Cond (ms µS)	Turbidity (NTU)	DO (mg/L)	ORP (mv)	DTW	Notes
13:50	N/A	NA	16.59	6.93	692.9	18.8	4.87	98.2	NA	

Did well dewater? YES NO		Total Volume Removed (gal L):	
Sample Method: <u>Disp Bailer</u> <u>Ded. Tubing</u> <u>New Tubing</u> <u>Ext. Port</u> <u>Other:</u>			
Date: <u>1/17/18</u>	Sample Time: <u>13:45</u>	DTW (ft):	Number of Bottles: <u>4</u>
Sample ID: <u>REC-001-180117</u>		Lab: <u>Caltest</u>	Analysis: <u>see COC</u>
Field Duplicate ID:		Time:	
Field Blank ID:		Time:	

Comments:

NELAP/ORELAP Certification 4036



CA-ELAP Certification 1664

Thursday, December 14, 2017

Kristine Corneillie
Larry Walker Associates
1480 Drew Avenue
Davis, CA 95618

Re Lab Order: S110839
Project ID: ST HELENA WWTRP

Collected By: DANIELLE MOSS
PO/Contract #:

Dear Kristine Corneillie:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday, November 17, 2017. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

CC: Danielle Moss, Larry Walker & Associates

Enclosures


Project Manager: Greg Martindale

12/14/2017 05:01

REPORT OF LABORATORY ANALYSIS

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NELAP/ORELAP Certification 4036



CA-ELAP Certification 1664

SAMPLE SUMMARY

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	Sample ID	Matrix	Date Collected	Date Received
S110839001	MW-1	Water	11/17/2017 09:15	11/17/2017 15:31
S110839002	MW-2	Water	11/17/2017 10:00	11/17/2017 15:31
S110839003	MW-3	Water	11/17/2017 10:40	11/17/2017 15:31
S110839004	MW-4	Water	11/17/2017 11:25	11/17/2017 15:31
S110839005	MW-5	Water	11/17/2017 12:20	11/17/2017 15:31
S110839006	MW-6	Water	11/17/2017 13:05	11/17/2017 15:31
S110839007	MW-7	Water	11/17/2017 13:55	11/17/2017 15:31
S110839008	REC-001	Water	11/17/2017 14:30	11/17/2017 15:31

12/14/2017 05:01

REPORT OF LABORATORY ANALYSIS

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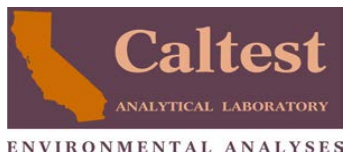
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NARRATIVE

Lab Order: S110839
Project ID: ST HELENA WWTRP

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis are not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

Qualifiers and Compound Notes

- 1 Not all seed control samples met dissolved oxygen (DO) depletion requirements in the method (delta greater than 2.0 ppm). Samples requiring seed may not have received sufficient seed population and may be biased low.
- 2 This sample was selected for the batch matrix spike/matrix spike duplicate quality control sample. The percent recovery(ies) of the matrix spike(s) for this analyte was outside established control limits, possibly due to matrix interferences. Please refer to QC section for more information.

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REPORT OF LABORATORY ANALYSIS

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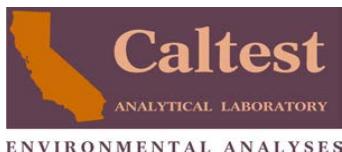
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ANALYTICAL RESULTS

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	S110839001	Date Collected	11/17/2017 09:15		Matrix	Water		
Sample ID	MW-1	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	178 mg/L	6	4	2		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1 11/17/17 16:10	BML 14141	11/19/17 15:08	BML 14142	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1 11/18/17 13:06	BOD 10703	11/23/17 11:07	BOD 10709	1
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.13 mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	2
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	230 mg/L	10	4.0	1		11/22/17 10:45	WGR 6632	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	3.6 mg/L	0.1	0.020	1		11/18/17 11:22	WIC 6093	
Chloride	14 mg/L	2	0.40	2		12/06/17 05:37	WIC 6106	

Lab ID	S110839002	Date Collected	11/17/2017 10:00		Matrix	Water		
Sample ID	MW-2	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	ND mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1 11/17/17 16:12	BML 14141	11/19/17 15:09	BML 14142	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1 11/18/17 13:08	BOD 10703	11/23/17 11:10	BOD 10709	1
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.13 mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	

Lab ID	S110839002	Date Collected	11/17/2017 10:00		Matrix	Water		
Sample ID	MW-2	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	ND mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1 11/17/17 16:12	BML 14141	11/19/17 15:09	BML 14142	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1 11/18/17 13:08	BOD 10703	11/23/17 11:10	BOD 10709	1
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.13 mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	

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REPORT OF LABORATORY ANALYSIS

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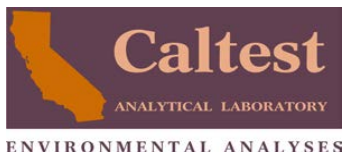
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ANALYTICAL RESULTS

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	S110839002	Date Collected	11/17/2017 10:00	Matrix	Water			
Sample ID	MW-2	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Dissolved Solids	240 mg/L	10	4.0	1		11/22/17 10:45	WGR 6632	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	2.8 mg/L	0.1	0.020	1		11/18/17 11:49	WIC 6093	
Chloride	17 mg/L	2	0.40	2		12/06/17 05:55	WIC 6106	
Lab ID	S110839003	Date Collected	11/17/2017 10:40	Matrix	Water			
Sample ID	MW-3	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	ND mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1 11/17/17 16:14	BML 14141	11/19/17 15:30	BML 14142	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1 11/18/17 13:09	BOD 10703	11/23/17 11:12	BOD 10709	1
Nitrogen, Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.22 mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	280 mg/L	10	4.0	1		11/22/17 10:45	WGR 6632	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	3.8 mg/L	0.1	0.020	1		11/18/17 12:17	WIC 6093	
Chloride	32 mg/L	5	1.0	5		12/06/17 06:12	WIC 6106	
Lab ID	S110839004	Date Collected	11/17/2017 11:25	Matrix	Water			
Sample ID	MW-4	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	3 mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	MRH	
Total Coliform	2 MPN/100mL	1.8	1.8	1 11/17/17 16:16	BML 14141	11/21/17 15:06	BML 14142	

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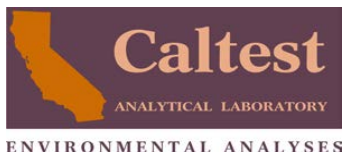
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ANALYTICAL RESULTS

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	S110839004	Date Collected	11/17/2017 11:25		Matrix	Water			
Sample ID	MW-4	Date Received	11/17/2017 15:31						
Parameters		Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Biochemical Oxygen Demand/5-Day		Prep Method:	SM 5210 B-11		Prep by:	RJD			
		Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L		5	5	1	11/18/17 13:09	BOD 10703	11/23/17 11:15	BOD 10709
Nitrogen,Total Kjeldahl Analysis		Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.35 mg/L		0.1	0.070	1			11/24/17 00:00	WAT 4463
Nitrogen, Ammonia (as N)		Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L		0.1	0.040	1			11/29/17 00:00	WAT 4464
Total Dissolved Solids Analysis		Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	330 mg/L		10	4.0	1			11/22/17 10:45	WGR 6632
Anions by Ion Chromatography		Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	6.4 mg/L		0.1	0.020	1			11/18/17 12:44	WIC 6093
Chloride	32 mg/L		5	1.0	5			12/06/17 06:30	WIC 6106

Lab ID	S110839005	Date Collected	11/17/2017 12:20		Matrix	Water			
Sample ID	MW-5	Date Received	11/17/2017 15:31						
Parameters		Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis		Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	27 mg/L		3	2	1			11/24/17 10:46	BIO 18674
Coliform Analysis (MPN 15-Tube)		Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
		Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL		1.8	1.8	1	11/17/17 16:18	BML 14141	11/19/17 15:32	BML 14142
Biochemical Oxygen Demand/5-Day		Prep Method:	SM 5210 B-11		Prep by:	RJD			
		Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L		5	5	1	11/18/17 13:10	BOD 10703	11/23/17 11:17	BOD 10709
Nitrogen,Total Kjeldahl Analysis		Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	10.088 mg/L		0.1	0.070	1			11/24/17 00:00	WAT 4463
Nitrogen, Ammonia (as N)		Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L		0.1	0.040	1			11/29/17 00:00	WAT 4464
Total Dissolved Solids Analysis		Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	410 mg/L		10	4.0	1			11/22/17 10:45	WGR 6632
Anions by Ion Chromatography		Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	1.8 mg/L		0.1	0.020	1			11/18/17 13:52	WIC 6093
Chloride	54 mg/L		5	1.0	5			12/06/17 06:48	WIC 6106

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REPORT OF LABORATORY ANALYSIS

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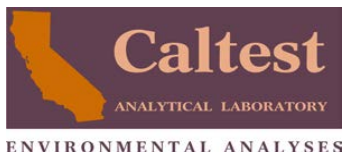
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ANALYTICAL RESULTS

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	S110839006	Date Collected	11/17/2017 13:05		Matrix	Water		
Sample ID	MW-6	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	4 mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1	11/17/17 16:20	BML 14141	11/19/17 15:33	BML 14142
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1	11/18/17 13:11	BOD 10703	11/23/17 11:20	BOD 10709
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	ND mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	330 mg/L	10	4.0	1		11/22/17 10:45	WGR 6632	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	1.7 mg/L	0.1	0.020	1		11/18/17 14:19	WIC 6093	
Chloride	50 mg/L	5	1.0	5		12/06/17 07:05	WIC 6106	

Lab ID	S110839007	Date Collected	11/17/2017 13:55		Matrix	Water		
Sample ID	MW-7	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	6 mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	MYS	
Total Coliform	1600 MPN/100mL	1.8	1.8	1	11/17/17 16:22	BML 14141	11/20/17 13:46	BML 14142
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1	11/18/17 13:12	BOD 10703	11/23/17 11:22	BOD 10709
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.35 mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	

Lab ID	S110839007	Date Collected	11/17/2017 13:55		Matrix	Water		
Sample ID	MW-7	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	6 mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	MYS	
Total Coliform	1600 MPN/100mL	1.8	1.8	1	11/17/17 16:22	BML 14141	11/20/17 13:46	BML 14142
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1	11/18/17 13:12	BOD 10703	11/23/17 11:22	BOD 10709
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.35 mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	ND mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	

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REPORT OF LABORATORY ANALYSIS

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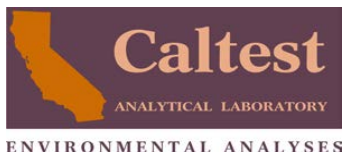
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ANALYTICAL RESULTS

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	S110839007	Date Collected	11/17/2017 13:55	Matrix	Water			
Sample ID	MW-7	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Dissolved Solids	310 mg/L	10	4.0	1		11/22/17 10:45	WGR 6632	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	80.2 mg/L	0.1	0.020	1		11/18/17 14:47	WIC 6093	
Chloride	79 mg/L	10	2.0	10		12/07/17 05:20	WIC 6108	
Lab ID	S110839008	Date Collected	11/17/2017 14:30	Matrix	Water			
Sample ID	REC-001	Date Received	11/17/2017 15:31					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	RJD	
Total Suspended Solids	6 mg/L	3	2	1		11/24/17 10:46	BIO 18674	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06			Prep by:	MRH		
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1	11/17/17 16:24	BML 14141	11/19/17 15:36	BML 14142
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11			Prep by:	RJD		
	Analytical Method:	SM 5210 B-11				Analyzed by:	RJD	
Biochemical Oxygen Demand	ND mg/L	5	5	1	11/18/17 13:12	BOD 10703	11/23/17 11:25	BOD 10709
Nitrogen, Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	2.5 mg/L	0.1	0.070	1		11/24/17 00:00	WAT 4463	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	MRH	
Ammonia (as N)	0.29 mg/L	0.1	0.040	1		11/29/17 00:00	WAT 4464	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	510 mg/L	10	4.0	1		11/22/17 10:45	WGR 6632	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	1.1 mg/L	0.1	0.020	1		11/18/17 15:14	WIC 6093	
Chloride	140 mg/L	10	2.0	10		12/06/17 07:41	WIC 6106	

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REPORT OF LABORATORY ANALYSIS

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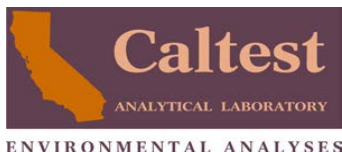
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QUALITY CONTROL DATA

Lab Order: S110839
Project ID: ST HELENA WWTRP

Analysis Description:	Total Suspended Solids Analysis	QC Batch:	BIO/18674
Analysis Method:	SM 2540 D-11	QC Batch Method:	SM 2540 D-11

METHOD BLANK: 790096

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Suspended Solids	ND	3	2	mg/L	

LABORATORY CONTROL SAMPLE: 790097

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Suspended Solids	mg/L	500	506	101	80-120	

SAMPLE DUPLICATE: 790099

Parameter	Units	S110026007 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Total Suspended Solids	mg/L	226	224	0.9	20	6	4	

Analysis Description:	Biochemical Oxygen Demand/5-Day	QC Batch:	BOD/10703
Analysis Method:	SM 5210 B-11	QC Batch Method:	SM 5210 B-11

METHOD BLANK: 789239

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Biochemical Oxygen Demand	ND	5	5	mg/L	1

LABORATORY CONTROL SAMPLE: 789240

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Biochemical Oxygen Demand	mg/L	198	184	93	85-115	1

SAMPLE DUPLICATE: 789708

Parameter	Units	S110004017 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Biochemical Oxygen Demand	mg/L	573	616	7.2	30	50	50	1

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REPORT OF LABORATORY ANALYSIS

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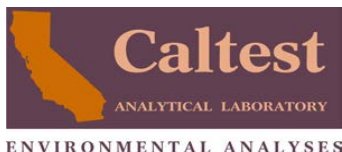
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QUALITY CONTROL DATA

Lab Order: S110839
Project ID: ST HELENA WWTRP

Analysis Description:	Nitrogen, Total Kjeldahl Analysis	QC Batch:	WAT/4463
Analysis Method:	SM 4500-NH3 C-11	QC Batch Method:	SM 4500-NH3 C-11

METHOD BLANK: 790117

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Kjeldahl Nitrogen	ND	0.1	.07	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 790118 790119

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Total Kjeldahl Nitrogen	mg/L	5	4.88	4.61	98	92	90-110	5.7	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790142 790143

Parameter	Units	S110839001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Total Kjeldahl Nitrogen	mg/L	0.13	5	3.69	4.35	71	84	80-120	16	20	3

Analysis Description:	Nitrogen, Ammonia (as N)	QC Batch:	WAT/4464
Analysis Method:	SM 4500-NH3 C-11	QC Batch Method:	SM 4500-NH3 C-11

METHOD BLANK: 790483

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Ammonia (as N)	ND	0.1	.04	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 790484 790485

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Ammonia (as N)	mg/L	5	5.04	4.93	101	99	90-110	2.2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790486 790487

Parameter	Units	S110838001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Ammonia (as N)	mg/L	8.8	5	14.1	14	106	104	70-130	0.7	20	

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REPORT OF LABORATORY ANALYSIS

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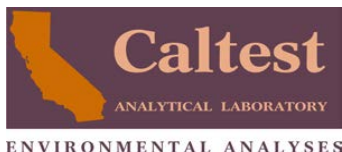
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QUALITY CONTROL DATA

Lab Order: S110839
Project ID: ST HELENA WWTRP

Analysis Description:	Total Dissolved Solids Analysis	QC Batch:	WGR/6632
Analysis Method:	SM 2540 C-97/-11	QC Batch Method:	SM 2540 C-97/-11

METHOD BLANK: 789737

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Dissolved Solids	ND	10	4	mg/L	

LABORATORY CONTROL SAMPLE: 789738

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Dissolved Solids	mg/L	500	464	93	80-120	

SAMPLE DUPLICATE: 789876

Parameter	Units	S110812006 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Total Dissolved Solids	mg/L	230	230	0.4	20	10	4	

SAMPLE DUPLICATE: 789877

Parameter	Units	S110839001 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Total Dissolved Solids	mg/L	230	240	4.7	20	10	4	

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6093
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

METHOD BLANK: 789780

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Nitrogen, Nitrate (as N)	ND	0.1	.02	mg/L	

LABORATORY CONTROL SAMPLE: 789781

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Nitrogen, Nitrate (as N)	mg/L	2.5	2.65	106	90-110	

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REPORT OF LABORATORY ANALYSIS

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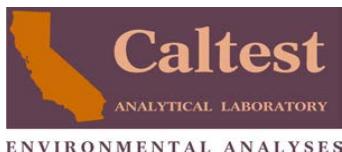
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QUALITY CONTROL DATA

Lab Order: S110839
Project ID: ST HELENA WWTRP

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6093
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 789782 789783

Parameter	Units	S110856001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate (as N)	mg/L	0.063	4	4.26	4.26	105	105	80-120	0	20	

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6106
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

METHOD BLANK: 791663

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Chloride	ND	1	.2	mg/L	

LABORATORY CONTROL SAMPLE: 791664

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Chloride	mg/L	8	8.5	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791665 791666

Parameter	Units	S110833001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Chloride	mg/L	83	100	192	191	109	108	80-120	0.5	20	

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6108
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

METHOD BLANK: 791787

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Chloride	ND	1	.2	mg/L	

LABORATORY CONTROL SAMPLE: 791788

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Chloride	mg/L	8	8.65	108	90-110	

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REPORT OF LABORATORY ANALYSIS

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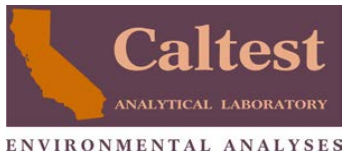
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QUALITY CONTROL DATA

Lab Order: S110839
Project ID: ST HELENA WWTRP

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6108
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791789 791790

Parameter	Units	S120271001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Chloride	mg/L	9.5	100	125	124	116	115	80-120	0.8	20	

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QUALITY CONTROL DATA QUALIFIERS

Lab Order: S110839
Project ID: ST HELENA WWTRP

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

- 1 Not all seed control samples met dissolved oxygen (DO) depletion requirements in the method (delta greater than 2.0 ppm). Samples requiring seed may not have received sufficient seed population and may be biased low.
- 3 Low Matrix Spike recovery(ies) due to possible matrix interferences in the QC sample. QC batch accepted based on LCS and RPD results.

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REPORT OF LABORATORY ANALYSIS

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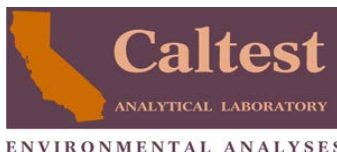
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
S110839001	MW-1	SM 2540 D-11	BIO/18674		
S110839002	MW-2	SM 2540 D-11	BIO/18674		
S110839003	MW-3	SM 2540 D-11	BIO/18674		
S110839004	MW-4	SM 2540 D-11	BIO/18674		
S110839005	MW-5	SM 2540 D-11	BIO/18674		
S110839006	MW-6	SM 2540 D-11	BIO/18674		
S110839007	MW-7	SM 2540 D-11	BIO/18674		
S110839008	REC-001	SM 2540 D-11	BIO/18674		
S110839001	MW-1	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839002	MW-2	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839003	MW-3	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839004	MW-4	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839005	MW-5	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839006	MW-6	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839007	MW-7	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839008	REC-001	SM 9221 B/E-06	BML/14141	SM 9221 B/E-06	BML/14142
S110839001	MW-1	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839002	MW-2	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839003	MW-3	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839004	MW-4	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839005	MW-5	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839006	MW-6	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839007	MW-7	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839008	REC-001	SM 5210 B-11	BOD/10703	SM 5210 B-11	BOD/10709
S110839001	MW-1	SM 4500-NH3 C-11	WAT/4463		
S110839002	MW-2	SM 4500-NH3 C-11	WAT/4463		
S110839003	MW-3	SM 4500-NH3 C-11	WAT/4463		
S110839004	MW-4	SM 4500-NH3 C-11	WAT/4463		
S110839005	MW-5	SM 4500-NH3 C-11	WAT/4463		
S110839006	MW-6	SM 4500-NH3 C-11	WAT/4463		
S110839007	MW-7	SM 4500-NH3 C-11	WAT/4463		
S110839008	REC-001	SM 4500-NH3 C-11	WAT/4463		
S110839001	MW-1	SM 4500-NH3 C-11	WAT/4464		
S110839002	MW-2	SM 4500-NH3 C-11	WAT/4464		

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REPORT OF LABORATORY ANALYSIS

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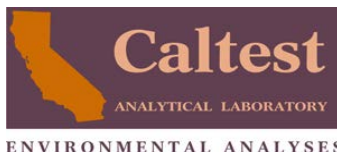
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: S110839
Project ID: ST HELENA WWTRP

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
S110839003	MW-3	SM 4500-NH3 C-11	WAT/4464		
S110839004	MW-4	SM 4500-NH3 C-11	WAT/4464		
S110839005	MW-5	SM 4500-NH3 C-11	WAT/4464		
S110839006	MW-6	SM 4500-NH3 C-11	WAT/4464		
S110839007	MW-7	SM 4500-NH3 C-11	WAT/4464		
S110839008	REC-001	SM 4500-NH3 C-11	WAT/4464		
S110839001	MW-1	SM 2540 C-97/-11	WGR/6632		
S110839002	MW-2	SM 2540 C-97/-11	WGR/6632		
S110839003	MW-3	SM 2540 C-97/-11	WGR/6632		
S110839004	MW-4	SM 2540 C-97/-11	WGR/6632		
S110839005	MW-5	SM 2540 C-97/-11	WGR/6632		
S110839006	MW-6	SM 2540 C-97/-11	WGR/6632		
S110839007	MW-7	SM 2540 C-97/-11	WGR/6632		
S110839008	REC-001	SM 2540 C-97/-11	WGR/6632		
S110839001	MW-1	EPA 300.0	WIC/6093		
S110839002	MW-2	EPA 300.0	WIC/6093		
S110839003	MW-3	EPA 300.0	WIC/6093		
S110839004	MW-4	EPA 300.0	WIC/6093		
S110839005	MW-5	EPA 300.0	WIC/6093		
S110839006	MW-6	EPA 300.0	WIC/6093		
S110839007	MW-7	EPA 300.0	WIC/6093		
S110839008	REC-001	EPA 300.0	WIC/6093		
S110839001	MW-1	EPA 300.0	WIC/6106		
S110839002	MW-2	EPA 300.0	WIC/6106		
S110839003	MW-3	EPA 300.0	WIC/6106		
S110839004	MW-4	EPA 300.0	WIC/6106		
S110839005	MW-5	EPA 300.0	WIC/6106		
S110839006	MW-6	EPA 300.0	WIC/6106		
S110839008	REC-001	EPA 300.0	WIC/6106		
S110839007	MW-7	EPA 300.0	WIC/6108		

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SAMPLE CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER:
St. Helena WWTRP

CLIENT: Larry Walker Associates
REPORT ATTN: Kristine Cornille

MAILING ADDRESS: 1480 Drew Avenue, Suite 100, Davis

BILLING ADDRESS: 1480 Drew Avenue, Suite 100, Davis

PHONE NUMBER: 530 753 6400 FAX PHONE NUMBER: 530 753 7030

SAMPLER (PRINT & SIGN NAME): Kristine Cornille

ATTN: Kristine Cornille

STATE: CA

ZIP: 95618

ANALYSES REQUESTED

LAB ORDER #

510839

PAGE 1 OF 4

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE / AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. OF GRAB	ANALYSES REQUESTED				REMARKS	
									NO3-N; CL; TDS; TSS	Biochemical Oxygen Demand	Total Coliform - 15 Tube, 9221B	TKN; NH3-N		
1	11/7/17	9:15	ML	1 L Plastic	None / <6C	MW-1		G	X					
			ML	1 PT Plastic	None / <6C			G	X					
			ML	100 ml Plastic	Na2S2O3 / <10C			G		X				
			ML	1 PT Plastic	H2SO4 / <6C			G		X				
			ML	1 L Plastic	None / <6C			G			X			
		10:00	ML	1 L Plastic	None / <6C	MW-2		G	X					
			ML	1 PT Plastic	None / <6C			G		X				
			ML	100 ml Plastic	Na2S2O3 / <10C			G			X			
			ML	1 PT Plastic	H2SO4 / <6C			G			X			
			ML	1 L Plastic	None / <6C			G				X		

FOR LAB USE ONLY										RECEIVED BY			
SAMPLES:	WC	MICRO	BIO	AA	SV	VOA	pH	Y/N	TEMP	SEALED	Y/N	INTEGRITY	Y/N
BD:	BIO	WC	AA										
CC:	AA	SV	VOA										
SL:	TP	PT	QT	VOA									
WHNO ₃	H ₂ SO ₄			NaOH									
PL:	HNO ₃	H ₂ SO ₄		NaOH		HCL							

RELINQUISHED BY: *[Signature]* DATE/TIME: 11/7/17 15:31 RECEIVED BY: *[Signature]* DATE/TIME: 11/7/17 15:31

COMMENTS: Please CC Report and EDD to: Felix Hernandez (Fhernandez@cityofsthenapa.org)

Denise Moss (DeniseMoss@cityofsthenapa.org)

*MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.S. Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge, Solid; FP = Free Product.

**CONTAINER TYPES: AL = Amber Lier, AHL = 500 ml Amber, PT = Pint (Plastic), QT = Quart (Plastic), HG = Half Gallon (Plastic), SJ = Soil Jar, BA = 4oz. BACT; BT = Brass Tube, VOA = 40ml VOA, OTC - Other Type Container

R _____ PR _____ M _____ F _____

11/8/17

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SAMPLE CHAIN OF CUSTODY

ENVIRONMENTAL ANALYSES

PROJECT NAME / PROJECT NUMBER:
St. Helena WWTP

P.O. NUMBER

LAB ORDER #

PAGE 2 OF 4
S10839

CLIENT:
Larry Walker Associates

REPORT ATTN:
Kristine Cornelle

ANALYSES REQUESTED

MAILING ADDRESS:
1480 Drew Avenue, Suite 100, Davis

STATE: CA ZIP: 95618

BILLING ADDRESS:
1480 Drew Avenue, Suite 100, Davis

ATTN: Kristine Cornelle

PHONE NUMBER: 530 753 6400 FAX PHONE NUMBER: 530 753 7030

SAMPLER (PRINT & SIGN NAME):
Danielle Moss

TURN-AROUND TIME
☐ STANDARD
☐ RUSH
DUE DATE:

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE/ AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMPL. or GRAB	NO3-N; CL; TDS; TSS	Biochemical Oxygen Demand	Total Coliform - 15 Tube, 9221B	TKN; NH3-N	ADDITIONAL VOLUME	REMARKS
3	11/7/17	10:40	ML	1 L Plastic	None / <6C	MW-3		G	X					
			ML	1 PT Plastic	None / <6C			G		X				
			ML	100 ml Plastic	Na2S2O3 / <10C			G			X			
			ML	1 PT Plastic	H2SO4 / <6C			G				X		
			ML	1 L Plastic	None / <6C			G					X	
			ML	1 L Plastic	None / <6C	MW-4		G	X					
			ML	1 PT Plastic	None / <6C			G		X				
			ML	100 ml Plastic	Na2S2O3 / <10C			G			X			
			ML	1 PT Plastic	H2SO4 / <6C			G				X		
			ML	1 L Plastic	None / <6C			G					X	

WHITE - LABORATORY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
<i>Danielle Moss</i>	11/7/17 15:31	<i>Cheryl</i>			

FOR LAB USE ONLY									
Samples:	WC	MCRO	AA	SV	VOA	PH?	YN	TEMP	SEALED:
BD:	BIO	WC	AA						ON
CC:	AA	SV	VOA						ON
SL:	HP	PT	QT	VOA					
WHNO ₃	H ₂ SO ₄			NaOH					
PL:	HNO ₃	H ₂ SO ₄		HCL					
COMMENTS: Please CC Report and EDO to: Felix Hernandez (fhernandez@caltestlabs.org) Danielle Moss (DanielleM@wva.com)									
**MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.S. Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge, Solid; FP = Free Product **CONTAINER TYPES: AL = Amber Luer, APL = 500 ml Amber PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Bore Tube; VOA = 40ml VOA, OTC - Other Type Container R PR M F 11/16/17									

FOR LAB USE ONLY

BD: WC MICRO BIO AA SV VOA pH? Y/N TEMP. SEaled: ON INTACT: Y/N

CC: AA SV VOA

SL: HP PT QT VOA

W/NO₃ H₂SO₄ NaOH

PL: HNO₃ H₂SO₄ NaOH HCL

Caltest
ANALYTICAL LABORATORY

ENVIRONMENTAL ANALYSES

CLIENT: Larry Walker Associates

MAILING ADDRESS: 1480 Drew Avenue, Suite 100, Davis

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SAMPLER (PRINT & SIGN NAME): Danielle Moss

REPORT ATTN: Kristine Cornelle

STATE: CA ZIP: 95618

ATTN: Kristine Cornelle

ANALYSES REQUESTED

NO₃-N; CL; TDS; TSS

Biochemical Oxygen Demand

Total Coliform - 15 Tube, 9221B

TKN; NH₃-N

ADDITIONAL VOLUME

TURN-AROUND TIME

☐ STANDARD

☐ RUSH

DUE DATE:

REMARKS

RELINQUISHED BY: [Signature]

DATE/TIME: 11/17/17 12:20

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DATE/TIME: 11/17/17 12:20

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DATE/TIME: 11/17/17 12:20

RECEIVED BY: [Signature]

DATE/TIME: 11/1



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SAMPLE CHAIN OF CUSTODY

PAGE 4 OF 4

PROJECT NAME / PROJECT NUMBER:
St. Helena WWTRP

P.O. NUMBER

LAB ORDER #

5108391

CLIENT:
Larry Walker Associates

REPORT ATTN:
Kristine Cornelle

ANALYSES REQUESTED

BILLING ADDRESS:

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SAMPLER (PRINT & SIGN NAME):

Danielle Moss

DUE DATE:

TURK-AROUND TIME

STANDARD

RUSH

REMARKS

WHITE - LABORATORY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE/ AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	NO3-N; CL; TDS; TSS	Biochemical Oxygen Demand	Total Coliform - 15 Tube, 9221B	TKN; NH3-N	ADDITIONAL VOLUME
7	11/17/17	13:55	ML	1 L Plastic	None / <6C	MW-7		G	X				
			ML	1 PT Plastic	None / <6C			G	X				
			ML	100 ml Plastic	Na2S2O3 / <10C			G		X			
			ML	1 PT Plastic	H2SO4 / <6C			G			X		
			ML	1 L Plastic	None / <6C			G				X	
			ML	1 L Plastic	None / <6C	REC-001		G	X				
			ML	1 PT Plastic	None / <6C			G		X			
			ML	100 ml Plastic	Na2S2O3 / <10C			G			X		
			ML	1 PT Plastic	H2SO4 / <6C			G				X	
			ML	1 L Plastic	None / <6C			G					X

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
<i>[Signature]</i>	11/17/17 15:31	<i>[Signature]</i>			

FOR LAB USE ONLY

Sample: WC ☒ MICRO ☒ BIO ☒ AA ☒ SV ☒ VOA ☒ pH ☒ VN ☒ TEMP ☒ SEALED: ☒ IN ☒ INTACT: ☒ Y/N

BD: ☒ BIO ☒ WC ☒ AA ☒ SV ☒ VOA ☒ PT ☒ QT ☒ VOA ☒ NaOH ☒ HCL ☒

CC: ☒ AA ☒ SV ☒ VOA ☒ PT ☒ QT ☒ VOA ☒ NaOH ☒ HCL ☒

SIL: ☒ HP ☒ PT ☒ QT ☒ VOA ☒ NaOH ☒ HCL ☒

WHNO3 ☒ H2SO4 ☒ NaOH ☒ HCL ☒

PL: ☒ HNO3 ☒ H2SO4 ☒ NaOH ☒ HCL ☒

COMMENTS: Please CC Report and EDO to: Felix Hernandez (Fhernandez@caltestlaboratory.org)

Danielle Moss (DanielleM@caltestlaboratory.org)

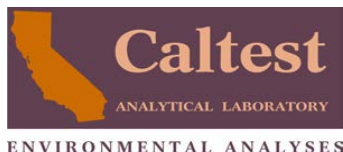
MATRIX: AQ = Aqueous Nondrinking Water, Digested Metast. FE = Low R.L.S. Aqueous Nondrinking Water, Digested Metast. DW = Drinking Water, SL = Soil Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Lier, APL = 600 ml Amber, PT = Pint (Plastic), QT = Quart (Plastic), HG = Half Gallon (Plastic), SJ = Soil Jar, BA = 4oz. BACT; BT = Brass Tube, VOA = 40ml VOA, OTC - Other Type Container

R ☒ PR ☒ M ☒ F ☒

11/18/17

NELAP/ORELAP Certification 4036



CA-ELAP Certification 1664

Friday, December 29, 2017

Kristine Corneillie
Larry Walker Associates
1480 Drew Avenue
Davis, CA 95618

Re Lab Order: S120725
Project ID: ST. HELENA WW RTP

Collected By: DANIELLE MOSS
PO/Contract #:

Dear Kristine Corneillie:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday, December 15, 2017. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

CC: Danielle Moss, Larry Walker & Associates

Enclosures


Project Manager: Greg Martindale

12/29/2017 12:38

REPORT OF LABORATORY ANALYSIS

Page 1 of 15

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(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com



NELAP/ORELAP Certification 4036



CA-ELAP Certification 1664

SAMPLE SUMMARY

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	Sample ID	Matrix	Date Collected	Date Received
S120725001	MW-1	Water	12/15/2017 08:25	12/15/2017 15:33
S120725002	MW-2	Water	12/15/2017 09:30	12/15/2017 15:33
S120725003	MW-3	Water	12/15/2017 10:25	12/15/2017 15:33
S120725004	MW-4	Water	12/15/2017 11:35	12/15/2017 15:33
S120725005	MW-5	Water	12/15/2017 12:25	12/15/2017 15:33
S120725006	MW-6	Water	12/15/2017 13:10	12/15/2017 15:33
S120725007	MW-7	Water	12/15/2017 14:15	12/15/2017 15:33
S120725008	REC-001	Water	12/15/2017 14:30	12/15/2017 15:33

12/29/2017 12:38

REPORT OF LABORATORY ANALYSIS

Page 2 of 15

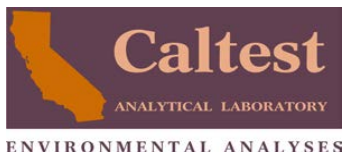
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NARRATIVE

Lab Order: S120725
Project ID: ST. HELENA WW RTP

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis are not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

12/29/2017 12:38

REPORT OF LABORATORY ANALYSIS

Page 3 of 15

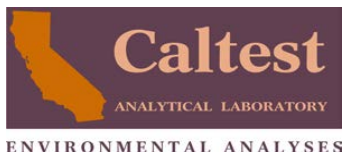
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CA-ELAP Certification 1664

ANALYTICAL RESULTS

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	S120725001	Date Collected	12/15/2017 08:25		Matrix	Water			
Sample ID	MW-1	Date Received	12/15/2017 15:33						
Parameters	Result Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11					Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1			12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06			Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06					Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1	12/15/17 16:13	BML 14237	12/17/17 15:40	BML 14238	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11			Prep by:	RJD			
	Analytical Method:	SM 5210 B-11					Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:38	BOD 10761	12/21/17 13:06	BOD 10769	
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Total Kjeldahl Nitrogen	ND mg/L	0.1	0.070	1			12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Ammonia (as N)	ND mg/L	0.1	0.040	1			12/27/17 18:33	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11					Analyzed by:	VCB	
Total Dissolved Solids	230 mg/L	10	4.0	1			12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0					Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	5.7 mg/L	0.1	0.020	1			12/16/17 06:19	WIC 6119	
Chloride	13 mg/L	10	2.0	10			12/16/17 06:37	WIC 6119	

Lab ID	S120725002	Date Collected	12/15/2017 09:30		Matrix	Water			
Sample ID	MW-2	Date Received	12/15/2017 15:33						
Parameters	Result Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11					Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1			12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06			Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06					Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1	12/15/17 16:15	BML 14237	12/17/17 15:41	BML 14238	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11			Prep by:	RJD			
	Analytical Method:	SM 5210 B-11					Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:39	BOD 10761	12/21/17 13:09	BOD 10769	
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Total Kjeldahl Nitrogen	ND mg/L	0.1	0.070	1			12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Ammonia (as N)	ND mg/L	0.1	0.040	1			12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11					Analyzed by:	VCB	

Lab ID	S120725002	Date Collected	12/15/2017 09:30		Matrix	Water		
Sample ID	MW-2	Date Received	12/15/2017 15:33					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1		12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1	12/15/17 16:15	BML 14237	12/17/17 15:41	BML 14238
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:39	BOD 10761	12/21/17 13:09	BOD 10769
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	ND mg/L	0.1	0.070	1		12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Ammonia (as N)	ND mg/L	0.1	0.040	1		12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	

12/29/2017 12:38

REPORT OF LABORATORY ANALYSIS

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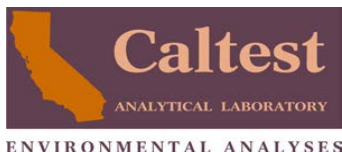
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CA-ELAP Certification 1664

ANALYTICAL RESULTS

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	S120725002	Date Collected	12/15/2017 09:30	Matrix	Water			
Sample ID	MW-2	Date Received	12/15/2017 15:33					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Dissolved Solids	220 mg/L	10	4.0	1		12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	2.9 mg/L	0.1	0.020	1		12/16/17 06:54	WIC 6119	
Chloride	15 mg/L	10	2.0	10		12/16/17 07:12	WIC 6119	
Lab ID	S120725003	Date Collected	12/15/2017 10:25	Matrix	Water			
Sample ID	MW-3	Date Received	12/15/2017 15:33					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1		12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1 12/15/17 16:17	BML 14237	12/17/17 15:42	BML 14238	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1 12/16/17 13:40	BOD 10761	12/21/17 13:10	BOD 10769	
Nitrogen, Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	ND mg/L	0.1	0.070	1		12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Ammonia (as N)	ND mg/L	0.1	0.040	1		12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	280 mg/L	10	4.0	1		12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	3.6 mg/L	0.1	0.020	1		12/16/17 07:30	WIC 6119	
Chloride	30 mg/L	10	2.0	10		12/16/17 07:47	WIC 6119	
Lab ID	S120725004	Date Collected	12/15/2017 11:35	Matrix	Water			
Sample ID	MW-4	Date Received	12/15/2017 15:33					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1		12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1 12/15/17 16:19	BML 14237	12/17/17 15:43	BML 14238	

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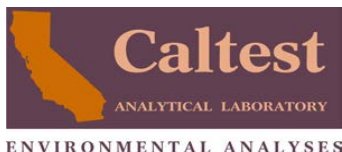
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ANALYTICAL RESULTS

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	S120725004	Date Collected	12/15/2017 11:35		Matrix	Water		
Sample ID	MW-4	Date Received	12/15/2017 15:33					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11	Prep by:		RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:40	BOD 10761	12/21/17 13:13	BOD 10769
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	JO.088 mg/L	0.1	0.070	1		12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Ammonia (as N)	ND mg/L	0.1	0.040	1		12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	310 mg/L	10	4.0	1		12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	5.7 mg/L	0.1	0.020	1		12/16/17 08:05	WIC 6119	
Chloride	27 mg/L	10	2.0	10		12/16/17 08:23	WIC 6119	

Lab ID	S120725005	Date Collected	12/15/2017 12:25		Matrix	Water		
Sample ID	MW-5	Date Received	12/15/2017 15:33					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1		12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06	Prep by:		MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	MRH	
Total Coliform	2 MPN/100mL	1.8	1.8	1	12/15/17 16:21	BML 14237	12/18/17 16:01	BML 14238
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11	Prep by:		RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:41	BOD 10761	12/21/17 13:15	BOD 10769
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.26 mg/L	0.1	0.070	1		12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Ammonia (as N)	ND mg/L	0.1	0.040	1		12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids	420 mg/L	10	4.0	1		12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	1.7 mg/L	0.1	0.020	1		12/16/17 09:33	WIC 6119	
Chloride	47 mg/L	10	2.0	10		12/16/17 09:51	WIC 6119	

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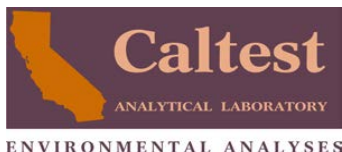
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ANALYTICAL RESULTS

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	S120725006	Date Collected	12/15/2017 13:10		Matrix	Water			
Sample ID	MW-6	Date Received	12/15/2017 15:33						
Parameters	Result Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11					Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1			12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06			Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06					Analyzed by:	KKR	
Total Coliform	ND MPN/100mL	1.8	1.8	1	12/15/17 16:23	BML 14237	12/17/17 15:46	BML 14238	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11			Prep by:	RJD			
	Analytical Method:	SM 5210 B-11					Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:41	BOD 10761	12/21/17 13:18	BOD 10769	
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.35 mg/L	0.1	0.070	1			12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Ammonia (as N)	0.12 mg/L	0.1	0.040	1			12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11					Analyzed by:	VCB	
Total Dissolved Solids	430 mg/L	10	4.0	1			12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography	Analytical Method:	EPA 300.0					Analyzed by:	MYS	
Nitrogen, Nitrate (as N)	0.55 mg/L	0.1	0.020	1			12/16/17 10:09	WIC 6119	
Chloride	83 mg/L	10	2.0	10			12/16/17 10:26	WIC 6119	

Lab ID	S120725007	Date Collected	12/15/2017 14:15		Matrix	Water			
Sample ID	MW-7	Date Received	12/15/2017 15:33						
Parameters	Result Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11					Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1			12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06			Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06					Analyzed by:	MRH	
Total Coliform	240 MPN/100mL	1.8	1.8	1	12/15/17 16:25	BML 14237	12/18/17 16:01	BML 14238	
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11			Prep by:	RJD			
	Analytical Method:	SM 5210 B-11					Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:42	BOD 10761	12/21/17 13:20	BOD 10769	
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.26 mg/L	0.1	0.070	1			12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11					Analyzed by:	JDC	
Ammonia (as N)	10.044 mg/L	0.1	0.040	1			12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11					Analyzed by:	VCB	

Lab ID	S120725007	Date Collected	12/15/2017 14:15	Matrix	Water			
Sample ID	MW-7	Date Received	12/15/2017 15:33					
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis	Analytical Method:	SM 2540 D-11				Analyzed by:	KKR	
Total Suspended Solids	ND mg/L	3	2	1		12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)	Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
	Analytical Method:	SM 9221 B/E-06				Analyzed by:	MRH	
Total Coliform	240 MPN/100mL	1.8	1.8	1	12/15/17 16:25	BML 14237	12/18/17 16:01	BML 14238
Biochemical Oxygen Demand/5-Day	Prep Method:	SM 5210 B-11		Prep by:	RJD			
	Analytical Method:	SM 5210 B-11				Analyzed by:	KKR	
Biochemical Oxygen Demand	ND mg/L	5	5	1	12/16/17 13:42	BOD 10761	12/21/17 13:20	BOD 10769
Nitrogen,Total Kjeldahl Analysis	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen	0.26 mg/L	0.1	0.070	1		12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)	Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Ammonia (as N)	30.044 mg/L	0.1	0.040	1		12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis	Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	

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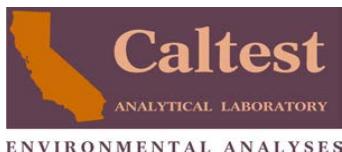
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ANALYTICAL RESULTS

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	S120725007	Date Collected	12/15/2017 14:15		Matrix	Water			
Sample ID	MW-7	Date Received	12/15/2017 15:33						
Parameters		Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Dissolved Solids		250 mg/L	10	4.0	1		12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography		Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)		0.32 mg/L	0.1	0.020	1		12/16/17 10:44	WIC 6119	
Chloride		54 mg/L	10	2.0	10		12/16/17 11:02	WIC 6119	
Lab ID	S120725008	Date Collected	12/15/2017 14:30		Matrix	Water			
Sample ID	REC-001	Date Received	12/15/2017 15:33						
Parameters		Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Total Suspended Solids Analysis		Analytical Method:	SM 2540 D-11				Analyzed by:	KKR	
Total Suspended Solids		8 mg/L	3	2	1		12/20/17 10:56	BIO 18763	
Coliform Analysis (MPN 15-Tube)		Prep Method:	SM 9221 B/E-06		Prep by:	MRH			
		Analytical Method:	SM 9221 B/E-06				Analyzed by:	KKR	
Total Coliform		ND MPN/100mL	1.8	1.8	1	12/15/17 16:27	BML 14237	12/17/17 15:50	BML 14238
Biochemical Oxygen Demand/5-Day		Prep Method:	SM 5210 B-11		Prep by:	RJD			
		Analytical Method:	SM 5210 B-11				Analyzed by:	KKR	
Biochemical Oxygen Demand		ND mg/L	5	5	1	12/16/17 13:43	BOD 10761	12/21/17 13:23	BOD 10769
Nitrogen,Total Kjeldahl Analysis		Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Total Kjeldahl Nitrogen		2.8 mg/L	0.1	0.070	1		12/21/17 00:00	WAT 4480	
Nitrogen, Ammonia (as N)		Analytical Method:	SM 4500-NH3 C-11				Analyzed by:	JDC	
Ammonia (as N)		0.38 mg/L	0.1	0.040	1		12/27/17 00:00	WAT 4484	
Total Dissolved Solids Analysis		Analytical Method:	SM 2540 C-97/-11				Analyzed by:	VCB	
Total Dissolved Solids		560 mg/L	10	4.0	1		12/19/17 17:20	WGR 6651	
Anions by Ion Chromatography		Analytical Method:	EPA 300.0				Analyzed by:	MYS	
Nitrogen, Nitrate (as N)		2.6 mg/L	0.1	0.020	1		12/16/17 11:19	WIC 6119	
Chloride		130 mg/L	50	10	50		12/22/17 23:30	WIC 6126	

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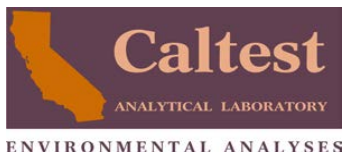
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QUALITY CONTROL DATA

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Analysis Description:	Total Suspended Solids Analysis	QC Batch:	BIO/18763
Analysis Method:	SM 2540 D-11	QC Batch Method:	SM 2540 D-11

METHOD BLANK: 793885

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Suspended Solids	ND	3	2	mg/L	

LABORATORY CONTROL SAMPLE: 793886

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Suspended Solids	mg/L	500	492	98	80-120	

SAMPLE DUPLICATE: 793989

Parameter	Units	S120001019 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Total Suspended Solids	mg/L	767	747	2.6	20	20	13.34	

SAMPLE DUPLICATE: 793887

Parameter	Units	S120006005 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Total Suspended Solids	mg/L	180	190	5.4	20	10	6.66	

Analysis Description:	Biochemical Oxygen Demand/5-Day	QC Batch:	BOD/10761
Analysis Method:	SM 5210 B-11	QC Batch Method:	SM 5210 B-11

METHOD BLANK: 793377

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Biochemical Oxygen Demand	ND	5	5	mg/L	

LABORATORY CONTROL SAMPLE: 793378

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Biochemical Oxygen Demand	mg/L	198	173	87	85-115	

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REPORT OF LABORATORY ANALYSIS

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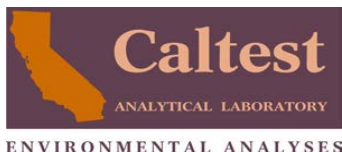
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QUALITY CONTROL DATA

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Analysis Description:	Biochemical Oxygen Demand/5-Day	QC Batch:	BOD/10761
Analysis Method:	SM 5210 B-11	QC Batch Method:	SM 5210 B-11

SAMPLE DUPLICATE: 793689

Parameter	Units	S120004015 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Biochemical Oxygen Demand	mg/L	752	846	12	30	50	50	

Analysis Description:	Nitrogen, Total Kjeldahl Analysis	QC Batch:	WAT/4480
Analysis Method:	SM 4500-NH3 C-11	QC Batch Method:	SM 4500-NH3 C-11

METHOD BLANK: 794156

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Kjeldahl Nitrogen	ND	0.1	.07	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 794157 794158

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Total Kjeldahl Nitrogen	mg/L	5	4.79	4.7	96	94	90-110	1.9	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 794225 794226

Parameter	Units	S120806003 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Total Kjeldahl Nitrogen	mg/L	0	5	3.95	4.04	79	81	80-120	2.3	20	2

Analysis Description:	Nitrogen, Ammonia (as N)	QC Batch:	WAT/4484
Analysis Method:	SM 4500-NH3 C-11	QC Batch Method:	SM 4500-NH3 C-11

METHOD BLANK: 794589

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Ammonia (as N)	ND	0.1	.04	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 794590 794591

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Ammonia (as N)	mg/L	5	5.07	5	101	100	90-110	1.4	20	

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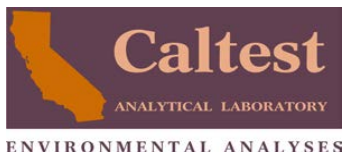
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QUALITY CONTROL DATA

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Analysis Description:	Nitrogen, Ammonia (as N)	QC Batch:	WAT/4484
Analysis Method:	SM 4500-NH3 C-11	QC Batch Method:	SM 4500-NH3 C-11

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 794604 794605

Parameter	Units	S120835001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Ammonia (as N)	mg/L	42	5	47.1	47.5	102	110	70-130	0.8	20	

Analysis Description:	Total Dissolved Solids Analysis	QC Batch:	WGR/6651
Analysis Method:	SM 2540 C-97/-11	QC Batch Method:	SM 2540 C-97/-11

METHOD BLANK: 793765

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Dissolved Solids	ND	10	4	mg/L	

LABORATORY CONTROL SAMPLE: 793766

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Dissolved Solids	mg/L	500	490	98	80-120	

SAMPLE DUPLICATE: 793768

Parameter	Units	S120683001 Result	DUP Result	RPD	Max RPD	Reporting Limit	MDL	Qualifiers
Total Dissolved Solids	mg/L	10000	10000	4.9	20	10	4	

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6119
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

METHOD BLANK: 793560

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Nitrogen, Nitrate (as N)	ND	0.1	.02	mg/L	
Chloride	ND	1	.2	mg/L	

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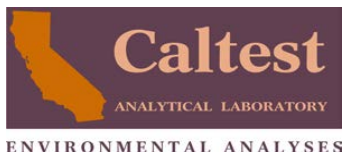
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QUALITY CONTROL DATA

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6119
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

LABORATORY CONTROL SAMPLE: 793561

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Nitrogen, Nitrate (as N)	mg/L	2.5	2.58	103	90-110	
Chloride	mg/L	6.2	6.63	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 793562 793563

Parameter	Units	S120726001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Nitrogen, Nitrate (as N)	mg/L	0	4	4.22	4.23	106	106	80-120	0.2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 793562 793563

Parameter	Units	S120726001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Chloride	mg/L	36	100	149	142	113	106	80-120	4.8	20	

Analysis Description:	Anions by Ion Chromatography	QC Batch:	WIC/6126
Analysis Method:	EPA 300.0	QC Batch Method:	EPA 300.0

METHOD BLANK: 794460

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Chloride	ND	1	.2	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 794461 794462

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Chloride	mg/L	6.2	6.52	6.55	104	105	90-110	0.5	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 794463 794464

Parameter	Units	S120725008 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Chloride	mg/L	130	100	242	235	112	105	80-120	2.9	20	

12/29/2017 12:38

REPORT OF LABORATORY ANALYSIS

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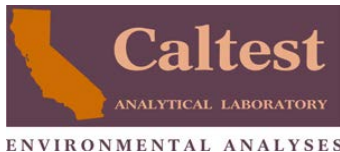
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CA-ELAP Certification 1664

QUALITY CONTROL DATA QUALIFIERS

Lab Order: S120725
Project ID: ST. HELENA WW RTP

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

2 Low Matrix Spike recovery(ies) due to possible matrix interferences in the QC sample. QC batch accepted based on LCS and RPD results.

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REPORT OF LABORATORY ANALYSIS

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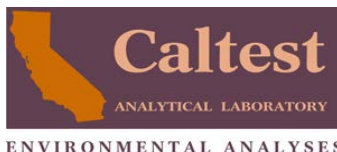
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
S120725001	MW-1	SM 2540 D-11	BIO/18763		
S120725002	MW-2	SM 2540 D-11	BIO/18763		
S120725003	MW-3	SM 2540 D-11	BIO/18763		
S120725004	MW-4	SM 2540 D-11	BIO/18763		
S120725005	MW-5	SM 2540 D-11	BIO/18763		
S120725006	MW-6	SM 2540 D-11	BIO/18763		
S120725007	MW-7	SM 2540 D-11	BIO/18763		
S120725008	REC-001	SM 2540 D-11	BIO/18763		
S120725001	MW-1	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725002	MW-2	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725003	MW-3	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725004	MW-4	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725005	MW-5	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725006	MW-6	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725007	MW-7	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725008	REC-001	SM 9221 B/E-06	BML/14237	SM 9221 B/E-06	BML/14238
S120725001	MW-1	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725002	MW-2	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725003	MW-3	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725004	MW-4	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725005	MW-5	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725006	MW-6	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725007	MW-7	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725008	REC-001	SM 5210 B-11	BOD/10761	SM 5210 B-11	BOD/10769
S120725001	MW-1	SM 4500-NH3 C-11	WAT/4480		
S120725002	MW-2	SM 4500-NH3 C-11	WAT/4480		
S120725003	MW-3	SM 4500-NH3 C-11	WAT/4480		
S120725004	MW-4	SM 4500-NH3 C-11	WAT/4480		
S120725005	MW-5	SM 4500-NH3 C-11	WAT/4480		
S120725006	MW-6	SM 4500-NH3 C-11	WAT/4480		
S120725007	MW-7	SM 4500-NH3 C-11	WAT/4480		
S120725008	REC-001	SM 4500-NH3 C-11	WAT/4480		
S120725001	MW-1	SM 4500-NH3 C-11	WAT/4484		
S120725002	MW-2	SM 4500-NH3 C-11	WAT/4484		

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REPORT OF LABORATORY ANALYSIS

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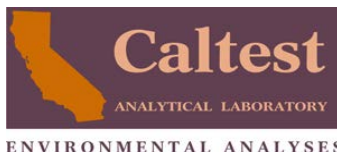
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: S120725
Project ID: ST. HELENA WW RTP

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
S120725003	MW-3	SM 4500-NH3 C-11	WAT/4484		
S120725004	MW-4	SM 4500-NH3 C-11	WAT/4484		
S120725005	MW-5	SM 4500-NH3 C-11	WAT/4484		
S120725006	MW-6	SM 4500-NH3 C-11	WAT/4484		
S120725007	MW-7	SM 4500-NH3 C-11	WAT/4484		
S120725008	REC-001	SM 4500-NH3 C-11	WAT/4484		
S120725001	MW-1	SM 2540 C-97/-11	WGR/6651		
S120725002	MW-2	SM 2540 C-97/-11	WGR/6651		
S120725003	MW-3	SM 2540 C-97/-11	WGR/6651		
S120725004	MW-4	SM 2540 C-97/-11	WGR/6651		
S120725005	MW-5	SM 2540 C-97/-11	WGR/6651		
S120725006	MW-6	SM 2540 C-97/-11	WGR/6651		
S120725007	MW-7	SM 2540 C-97/-11	WGR/6651		
S120725008	REC-001	SM 2540 C-97/-11	WGR/6651		
S120725001	MW-1	EPA 300.0	WIC/6119		
S120725002	MW-2	EPA 300.0	WIC/6119		
S120725003	MW-3	EPA 300.0	WIC/6119		
S120725004	MW-4	EPA 300.0	WIC/6119		
S120725005	MW-5	EPA 300.0	WIC/6119		
S120725006	MW-6	EPA 300.0	WIC/6119		
S120725007	MW-7	EPA 300.0	WIC/6119		
S120725008	REC-001	EPA 300.0	WIC/6119		
S120725008	REC-001	EPA 300.0	WIC/6126		

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REPORT OF LABORATORY ANALYSIS

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SAMPLE CHAIN OF CUSTODY

PAGE 1 OF 4

PROJECT NAME / PROJECT NUMBER:
 St. Helena WWTRP

P.A. NUMBER

LAB ORDER #

5120725

CLIENT:
 Larry Walker Associates

REPORT ATTN:
 Kristine Cornille

STATE:

CA

ZIP

95618

MAILING ADDRESS:
 1480 Drew Avenue, Suite 100, Davis

BILLING ADDRESS:
 1480 Drew Avenue, Suite 100, Davis

PHONE NUMBER:
 530 753 6400

FAX PHONE NUMBER:
 530 753 7030

SAMPLER PRINT & SIGN NAME:
 Kristine Cornille

ATTN:

Kristine Cornille

ANALYSES REQUESTED

NO3-N; CL; TDS; TSS
 Biochemical Oxygen Demand
 Total Coliform - 15 Tube, 9221B
 TKN; NH3-N

DUE DATE:

☒ STANDARD
☐ RUSH

REMARKS

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE/AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GROUP	NO3-N; CL; TDS; TSS	Biochemical Oxygen Demand	Total Coliform - 15 Tube, 9221B	TKN; NH3-N	REMARKS
1	12/15/17	08:25	ML	1 L Plastic	None / <6C	MW-1		G	X				
			ML	1 PT Plastic	None / <6C			G	X				
			ML	100 ml Plastic	Na2S2O3 / <10C			G		X			
			ML	1 PT Plastic	H2SO4 / <6C			G			X		
			ML	1 L Plastic	None / <6C	MW-2		G	X				
			ML	1 PT Plastic	None / <6C			G		X			
			ML	100 ml Plastic	Na2S2O3 / <10C			G			X		
			ML	1 PT Plastic	H2SO4 / <6C			G				X	

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RELINQUISHED BY		DATE/TIME		RECEIVED BY		DATE/TIME	
<i>[Signature]</i>		12/17/17 15:33		<i>[Signature]</i>			

FOR LAB USE ONLY	
Samples: WC MICRO BIO AA SV VOA pH7 Y/N TEMP: <i>NK</i> SEALED: <i>YN</i> INTACT: <i>YN</i> BD: BIO WC AA CC: AA SV VOA SIL: HP PT QT VOA WHNO3 H2SO4 NaOH PL: HNO3 H2SO4 NaOH HCL	COMMENTS: Please CC Report and EDO to: Felix Hernandez (Fhernandez@spdrsthelema.org) Danielle Moss (DanielleM@lwa.com)
*MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.s. Aqueous Nondrinking Water; Digested Metals; DW = Drinking Water; SL = Soil Sludge; Solid; FP = Free Product **CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; BGL = 4oz BACT; BT = Brass Tube; VOA = 40ml VOA; OTC = Other Type Container R PR M F 12/14/17	



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SAMPLE CHAIN OF CUSTODY

PAGE 2 OF 2

PROJECT NAME / PROJECT NUMBER: St. Helena WWTP
 REPORT ATTN: Kristine Cornille
 ANALYSES REQUESTED: NO3-N; CL; TDS; TSS; Biochemical Oxygen Demand; Total Coliform - 15 Tube, 9221B; TKN; NH3-N

LAB ORDER # S120725

CLIENT: Larry Walker Associates
 MAILING ADDRESS: 1480 Drew Avenue, Suite 100, Davis
 BILLING ADDRESS: 1480 Drew Avenue, Suite 100, Davis
 PHONE NUMBER: 530 753 6400 FAX PHONE NUMBER: 530 753 7030
 SAMPLE PREP & SIGN NAME: Kristine Cornille
 STATE: CA ZIP: 95618
 ATTN: Kristine Cornille

TURN-AROUND TIME
☒ STANDARD
☐ RUSH
 DUE DATE: _____

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE/AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	NO3-N; CL; TDS; TSS	Biochemical Oxygen Demand	Total Coliform - 15 Tube, 9221B	TKN; NH3-N	REMARKS
3	12/5/17	10:25	ML	1L Plastic	None / <6C	MW-3		G	X				
			ML	1 PT Plastic	None / <6C			G		X			
			ML	100 ml Plastic	Na2S2O3 / <10C			G			X		
			ML	1 PT Plastic	H2SO4 / <6C			G				X	
4		11:35	ML	1L Plastic	None / <6C	MW-4		G	X				
			ML	1 PT Plastic	None / <6C			G		X			
			ML	100 ml Plastic	Na2S2O3 / <10C			G			X		
			ML	1 PT Plastic	H2SO4 / <6C			G				X	

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RELINQUISHED BY: <i>Donna Moss</i>		DATE/TIME: 12/5/17 5:33		RECEIVED BY: <i>Caltest</i>		RELINQUISHED BY:		DATE/TIME:		RECEIVED BY:																																																																																					
FOR LAB USE ONLY <table border="1"> <tr> <td>Sample:</td> <td>WC</td> <td>MICRO</td> <td>BIO</td> <td>AA</td> <td>SV</td> <td>VOA</td> <td>pH?</td> <td>Y/N</td> <td>TEMP:</td> <td>SEALED:</td> <td>Y/N</td> <td>INTACT:</td> <td>Y/N</td> </tr> <tr> <td>BC:</td> <td>BIO</td> <td>WC</td> <td>AA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CC:</td> <td>AA</td> <td>SV</td> <td>VOA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SL:</td> <td>HP</td> <td>PT</td> <td>QT</td> <td>VOA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>WHNO₃</td> <td>H₂SO₄</td> <td></td> <td></td> <td>NaOH</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>PL:</td> <td>HNO₃</td> <td>H₂SO₄</td> <td></td> <td>NaOH</td> <td></td> <td>HCL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> COMMENTS: Please CC Report and EDO to: Fala Hernandez (Fahernandez@caltesthelenas.com) Danielle Moss (DanielleMoss@caltesthelenas.com) *MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.S. Aqueous Nondrinking Water; Digested Metals; DW = Drinking Water; SL = Soil Sludge; Solid; FP = Free Product **CONTAINER TYPES: AL = Amber Liter, AHL = 500 ml Amber, PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; BA = 4oz. BACIT; BT = Brass Tube; VOA = 40ml VOA; OTC = Other Type Container R _____ PR _____ M _____ F _____ 12/14/17												Sample:	WC	MICRO	BIO	AA	SV	VOA	pH?	Y/N	TEMP:	SEALED:	Y/N	INTACT:	Y/N	BC:	BIO	WC	AA											CC:	AA	SV	VOA											SL:	HP	PT	QT	VOA										WHNO ₃	H ₂ SO ₄			NaOH										PL:	HNO ₃	H ₂ SO ₄		NaOH		HCL							
Sample:	WC	MICRO	BIO	AA	SV	VOA	pH?	Y/N	TEMP:	SEALED:	Y/N	INTACT:	Y/N																																																																																		
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WHNO ₃	H ₂ SO ₄			NaOH																																																																																											
PL:	HNO ₃	H ₂ SO ₄		NaOH		HCL																																																																																									



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SAMPLE CHAIN OF CUSTODY

PAGE 3 OF 4

PROJECT NAME / PROJECT NUMBER:
 St. Helena WWTRP

REPORT ATTN:

CLIENT:
 Larry Walker Associates

Kristine Cornille

MAILING ADDRESS:
 1480 Drew Avenue, Suite 100, Davis

STATE: CA ZIP: 95618

BILLING ADDRESS:
 1480 Drew Avenue, Suite 100, Davis

ATTN: Kristine Cornille

PHONE NUMBER: 530 753 6400 FAX PHONE NUMBER: 530 753 7030

SAMPLER (PRINT & SIGN NAME):
 Danielle Moss

ANALYSES REQUESTED

PO. NUMBER

LAB ORDER #

5120725

TURN-AROUND TIME
☒ STANDARD
☐ RUSH
 DUE DATE:

REMARKS

CLIENT LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE/ AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GROUP	NO3-N; CL; TDS; TSS	Biochemical Oxygen Demand	Total Coliform - 15 Tube, 9221B	TKN; NH3-N
5	12/15/17	12:25	ML	1L Plastic	None / <6C	MW-5		G	X			
			ML	1 PT Plastic	None / <6C			G	X			
			ML	100 ml Plastic	Na2S2O3 / <10C			G		X		
			ML	1 PT Plastic	H2SO4 / <6C			G		X		
6		13:10	ML	1L Plastic	None / <6C	MW-6		G	X			
			ML	1 PT Plastic	None / <6C			G	X			
			ML	100 ml Plastic	Na2S2O3 / <10C			G		X		
			ML	1 PT Plastic	H2SO4 / <6C			G		X		

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<i>[Signature]</i>		12/17/15:33		<i>[Signature]</i>					

Sample:	WC	MICRO	BIO	AA	SV	VOA	pH?	Y/N	TEMP:	SEALED:	Y/N	INTACT:	Y/N
BC:	BIO	WC	AA										
CC:	AA	SV	VOA										
SL:	HP	PT	QT	VOA									
WHNO ₃	H ₂ SO ₄			NaOH									
PL:	HNO ₃	H ₂ SO ₄		NaOH		HCL							

COMMENTS:
 Please CC Report and EDO to:
 Felix Hernandez (Fhernandez@sthelellina.org)
 Danielle Moss (DanielleMoss@sthelellina.org)

LAB ORDER # 5120725

TURN-AROUND TIME
☒ STANDARD
☐ RUSH
 DUE DATE:

REMARKS

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SAMPLE CHAIN OF CUSTODY

5/20/25

CLIENT: Larry Walker Associates 1480 Drew Avenue, Suite 100, Davis 1480 Drew Avenue, Suite 100, Davis PHONE NUMBER: 530 753 6400 FAX PHONE NUMBER: 530 753 7030 ANALYSES REQUESTED:		REPORT ATTN: Kristine Cornille Kristine Cornille STATE: CA ZIP: 95618 CITY: CA		PROJECT NAME / PROJECT NUMBER: St. Helena WWTP P.O. NUMBER:	
BILLING ADDRESS: 1480 Drew Avenue, Suite 100, Davis PHONE NUMBER: 530 753 6400 FAX PHONE NUMBER: 530 753 7030		SAMPLER (PRINT & SIGN NAME): Kristine Cornille Kristine Cornille		LAB ORDER # 5120725	
DATE SAMPLED: 12/15/17		TIME SAMPLED: 14:15		TURN-AROUND TIME ☒ STANDARD ☐ RUSH	
SAMPLE TYPE / MATRIX: ML		CONTAINER TYPE / AMOUNT: 1 L Plastic		PREPARED BY: Kristine Cornille	
PRESERVATIVE: None / <6C		SAMPLE IDENTIFICATION / SITE: MW-7		CLIENT LAB # G	
COMMENTS: REC-001		COMMENTS: NO3-N; CL; TDS; TSS Biochemical Oxygen Demand Total Coliform - 15 Tube, 9221B TKN; NH3-N		REMARKS:	

DATE	TIME	SAMPLE TYPE / MATRIX	CONTAINER TYPE / AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	NO3-N; CL; TDS; TSS	Biochemical Oxygen Demand	Total Coliform - 15 Tube, 9221B	TKN; NH3-N
12/15/17	14:15	ML	1 L Plastic	None / <6C	MW-7	G	X				
		ML	1 PT Plastic	None / <6C		G	X				
		ML	100 ml Plastic	Na2S2O3 / <10C		G		X			
		ML	1 PT Plastic	H2SO4 / <6C		G		X			
		ML	1 L Plastic	None / <6C	REC-001	G	X				
		ML	1 PT Plastic	None / <6C		G		X			
		ML	100 ml Plastic	Na2S2O3 / <10C		G		X			
		ML	1 PT Plastic	H2SO4 / <6C		G		X			

RELINQUISHED BY: [Signature] DATE/TIME: 12/15/17 15:33		RECEIVED BY: [Signature] DATE/TIME:	
SAMPLES: WC MICRO BIO AA SV VOA CC: AA SV VOA SIL HP PT QT VOA W/HNO3 H2SO4 NaOH P/L HNO3 H2SO4 NaOH HCL		COMMENTS: Please CC Report and EDD to: Felix Hernandez (Fhernandez@cityofsthenapa.org) Danielle Moss (danielle@lwa.com)	
FOR LAB USE ONLY		REMARKS: *MATRIX: AO = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.S. Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge; Solid; FP = Free Product **CONTAINER TYPES: AL = Amber Luer; APL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; BD = 4oz. BAC11; BT = Brass Tube; VOA = 40ml VOA; OTC - Other Type Container	

FINAL

St. Helena Monitoring Well Installation and Monitoring Network Workplan

Prepared for:
Larry Walker Associates

August 31, 2017

Prepared by:



FINAL

St. Helena Monitoring Well Installation and Monitoring Network Workplan

Prepared for:

Larry Walker Associates
1405 South Bascom Avenue
San Jose, CA 95128

Contact:

Kristine Corneillie
Senior Engineer
(408) 261-3996

Prepared by:

GEI Consultants
2868 Prospect Park Drive, Suite 400
Sacramento, CA 95670

Contact:

Ryan Alward
Senior Hydrogeologist
(916) 631-4578

August 31, 2017

Project No. 1703092.1

ST. HELENA MONITORING WELL INSTALLATION AND MONITORING
NETWORK WORKPLAN

Certifications and Seals

This report and analysis was prepared by the following GEI Consultants, Inc. professional engineers and geologists.



Ryan Alward

Date: 8-31-17

Ryan Alward
Senior Hydrogeologist

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Appendices

Appendix A.	NorCal Geophysical Report
Appendix B.	USEPA SOP for the HydraSleeve Sampling Method

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Abbreviations and Acronyms

BGS	Below Ground Surface
BOD	Biological Oxygen Demand
CDO	Cease and Desist Order
City	City of St. Helena
DWR	California Department of Water Resources
EDH	Napa County Environmental Health Division
GEI	GEI Consultants, Inc.
HASP	Health and Safety Plan
LWA	Larry Walker Associates
NOV	Notice of Violation
NAVD88	North American Vertical Datum of 1988
NPDES	National Pollution Discharge Elimination System
Regional Water Board	San Francisco Bay Regional Water Quality Control Board
ROWD	Report of Waste Discharge
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
WRR	Water Reclamation Requirements
WWTP	Wastewater Treatment Plant

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1. Introduction

This workplan has been prepared by GEI Consultants, Inc. (GEI) to construct monitoring wells adjacent to the City of St. Helena (City) wastewater treatment plant (WWTP) aeration ponds. The project is in response to the City being notified that they are in violation of Water Reclamation Requirements (WRR) (Order No. 97-090). The San Francisco Bay Regional Water Quality Control Board (Regional Water Board) requires that the City update their Report of Waste Discharge (ROWD). The Notice of Violation (NOV) (Regional Water Board, November 7, 2016) provided comments regarding the City's August 16, 2016 *Draft Feasibility Study for Wastewater Treatment Plant Improvements* (Draft Feasibility Study), required by the Cease and Desist Order No. R2-2016-0004 (CDO). Larry Walker Associates (LWA), under contract with the City, requested the assistance of GEI for the design and installation of a monitoring well system to be used in the updated ROWD as required by the NOV. The project location and proposed monitoring well locations are shown on **Figure 1**.

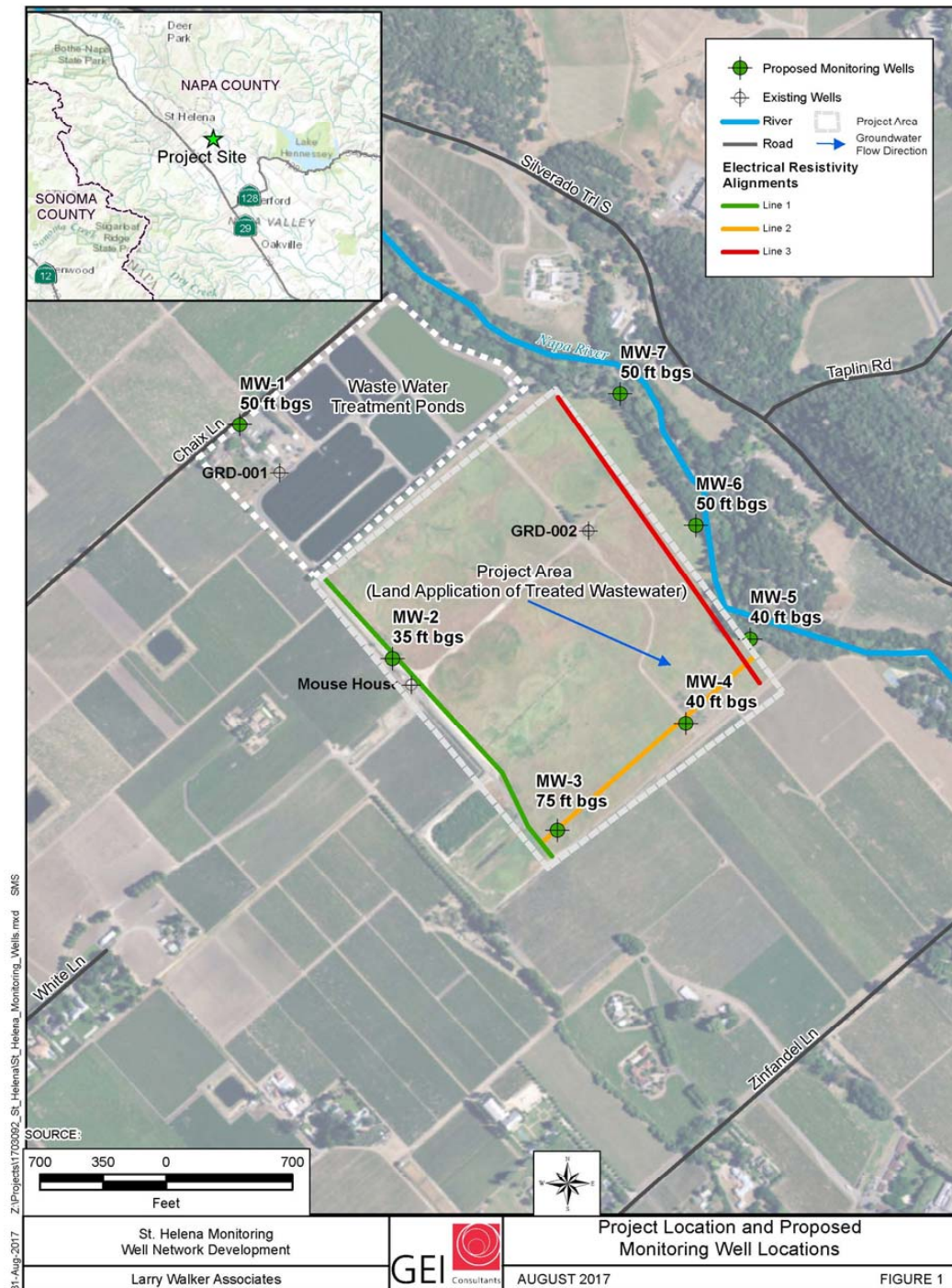
1.1 Background

The WWTP is in the southern portion of the City with vineyards to the west and north. The aeration ponds are located about 0.6 miles to the northeast disposal. The land application area is directly adjacent to the southeastern boundary of the aeration ponds. **Figure 1** shows that the Napa River is adjacent to the eastern boundary of the aeration ponds and the land application fields. Per the *Report of Waste Discharge for Land Application of Treated Wastewater* authored by LWA, the WWTP provides secondary treatment for about 0.5 million gallons per day of domestic wastewater. The City is in the planning process to upgrade the WWTP. The treated wastewater is applied to the 88-acre land application area adjacent to the WWTP aeration ponds. During high flow conditions when the influent flows exceed the capacity of the treatment plant storage and land application discharge systems, and ambient river flow affords adequate dilution, the City's National Pollution Discharge Elimination System (NPDES) (No. CA0038016, currently implemented as Order No. R2-2016-0003) permit allows treated wastewater to discharge to the Napa River.

There are only three existing wells in the vicinity. These wells are labeled on **Figure 1**. There is an up-gradient well that is approximately 139 feet deep and two other wells that are about 350 to 450 feet deep. A draft memorandum, *City of St. Helena Wastewater Treatment and Reclamation Plant Groundwater Investigation* (LSCE, 2015) indicated sand and gravel are found between 20 and 80 feet deep beneath the property near the ponds, and the depth to water may be about 10 to 15 feet below ground surface (bgs). Due to the relatively shallow depths of the sand and gravel that form the shallow aquifer, the wells currently located near the site are insufficient to be used as monitoring wells for the shallow aquifer. The depths of the sediments were determined through the interpretation of driller's logs for the three wells that are currently located near the site as shown on **Figure 1** (LSCE, 2015).

To further characterize the site and to determine the appropriate depths to which the monitoring wells will need to be constructed, at the recommendation of GEI, the City contracted NorCal Geophysics of Cotati, California to perform a high resolution electrical resistivity survey. The survey was conducted by gathering electrical resistivity data along the three transect lines shown on **Figure 1**. This work was

Figure 1. Site Location Map



completed to characterize the texture of sediments from surface to 300 feet below ground surface (bgs). The resistivity data were interpreted by NorCal Geophysics and GEI to select locations, preliminary depths, and screen zones for the monitoring well system.

1.2 Purpose

The City requires a shallow well system for monitoring changes in groundwater quality and levels that may result from the land application of treated wastewater. The City is currently in the process of responding to the four tasks presented in the NOV that pertain to the ROWD. These four tasks are:

- (1) Water balance evaluation for the proposed discharge practices
- (2) Evaluation of groundwater movement and fate
- (3) Nutrient balance evaluation of nitrogen discharges to the land application area
- (4) Groundwater monitoring plan

This workplan is in response to the fourth task, the groundwater monitoring plan. The purpose of this workplan is to present the data and information considered in designing the monitoring well network. This document is provided to the Regional Water Board for their review and ultimate approval of the monitoring well system presented herein. A separate Sampling and Analysis Plan will be developed by LWA and submitted to the Regional Water Board to cover water quality sampling after monitoring network construction is complete.

The Regional Water Board NOV letter stated that the ROWD *“must propose a groundwater monitoring plan that will allow the City to characterize groundwater depth, quality, and movement, and any potential changes that may occur as a result of the land discharge practices. The plan must propose a system of properly constructed groundwater monitoring wells at locations both upgradient and downgradient of, and perhaps within, the land application area, with screening depths appropriate for groundwater sampling and analysis based on the local ambient groundwater characteristics.”*

The Regional Water Board also requested the monitoring wells be constructed no more than 200-feet apart along the downgradient perimeter of the property. The Regional Water Board stated that the *“wells must be screened at a depth that will detect the wastewater plume as it migrates offsite.”* GEI recently called the Regional Water Board to discuss the 200-foot monitoring well spacing request. Water Board staff communicated that the 200-foot spacing requirement could be modified if supporting information and justification are provided.

2. Site Description and Monitoring Well Design

The following sections describe the site and project conditions including the project setting, hydrogeologic and groundwater level conditions, and proposed monitoring well design.

2.1 Project Setting

The City of St Helena is located in Napa Valley, east of Santa Rosa and northwest of Lake Hennessy, along Highway 29. The WWTP is at the southwestern edge of the City just north of the town of Zinfandel. Land use within the immediate vicinity of the project area is open agricultural fields. The proposed site of the new monitoring wells is southeast of the aeration ponds east of the WWTP. The monitoring wells to be constructed as part of the monitoring system will be used to provide up-gradient and downgradient groundwater levels and groundwater water quality data within the shallow aquifer.

2.2 Hydrogeologic Setting

The site is in Napa Valley Subbasin which is part of the larger Napa-Sonoma Valley Groundwater Basin. The project site is underlain by the Tertiary (Pliocene and Miocene) Sonoma Volcanics Lower Member tuff, Tertiary sedimentary sands and clays, and Quaternary alluvial sediments. In addition to the underlying formations, the Geologic Map of Eastern Sonoma and Western Napa Counties indicate the project site is located adjacent to the terrace deposits from the Napa River.

The Pliocene and late Miocene Sonoma Volcanics Formation in the project area consists primarily of pumiceous ash-flow tuff deposits, with interbedded volcanic sands and gravel overlying the volcanic bedrock of the Napa Valley Subbasin (Graymer, 2007). The Quaternary alluvial sediments and terrace deposits overlay the Sonoma Volcanics Formation around the Napa River. The Quaternary alluvial deposits and sand and clay deposits around the project area have a thickness of approximately 300 feet bgs, thickening toward the center of the valley, and thinning towards the mountain front area to the east.

The deepest aquifer is the Sonoma Volcanics, which is below the alluvial sediments and has a thickness of at least 400 feet starting at approximately 300 feet bgs near the project area.

2.2.1 Groundwater Level Conditions

A review of California Department of Water Resources (DWR) Groundwater Information Center Interactive Map Application (GICIMA) databases shows that the depth-to-water in the area south of St. Helena is about 10 feet bgs, and the depth-to-water in the center of the town reaches 20 to 30 feet bgs. Based on the data from the DWR GICIMA database, the depth to groundwater in the project area is estimated to be between 10 to 15 feet bgs. Individual wells with water level data were not found adjacent to the project site so groundwater contours could not be created. The proximity of the Napa River right next to the project site may cause the groundwater in the shallow aquifer to fluctuate seasonally which may also change the groundwater gradient at different times of the year. Due to the potential of the groundwater gradient fluctuating seasonally, the monitoring well system was designed based on the electrical resistivity data, to monitor the flow of groundwater in any direction from the land application fields.

2.3 Electrical Resistivity Survey Results and Design of Monitoring System

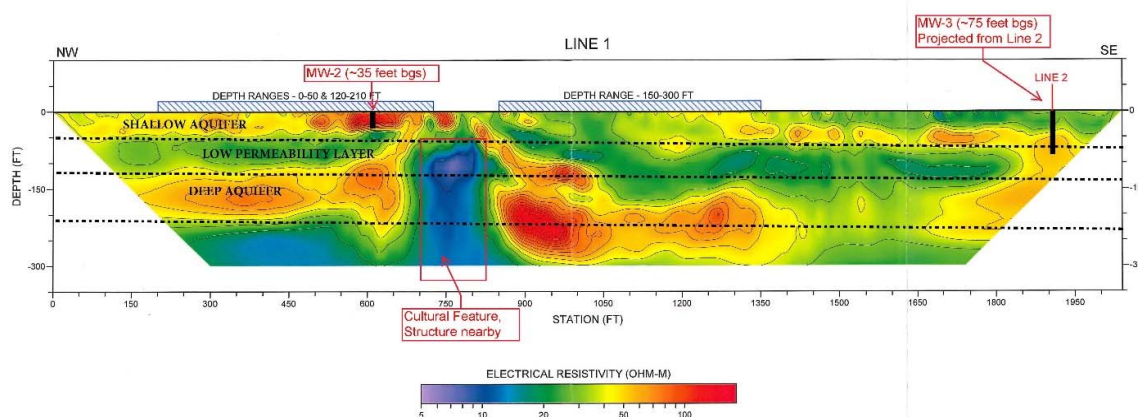
On July 12, 2017 an electrical resistivity survey was conducted by NorCal Geophysics on three sides of the land application area along the transect lines shown on **Figure 1**. The three lines were from about 1,550 feet to 2,000 feet long and the depth of the electrical resistivity signal is a function of the length of the transect. For this study the data were interpreted to a depth of about 300 feet bgs and the thickness of the interpretation tapers near the end of each line. The results of the electrical resistivity survey were used to design the monitoring system. The relative permeability of the sediments can be evaluated using electrical resistivity surveys. The higher the resistivity, the coarser the sediments which may have a higher permeability. The lower the resistivity, the finer the sediments which may have less permeability. To determine the depths at which aquifers may be present the higher resistivity areas were correlated. The report for the geophysical survey is presented in Appendix A and describes in detail the electrical resistivity survey process and data interpretation.

GEI had staff onsite for the first day of the electrical resistivity survey to oversee the work of NorCal Geophysics and select final transect locations to avoid cultural features. Cultural features such as electrical power lines, buried metal pipes, chain-link fences, and structures can potentially cause interference with the resistivity survey making data interpretation difficult or impossible. A few cultural features could not be avoided (i.e., grounded chain-link fence, the structure called the ‘Mouse House,’ and buried irrigation piping) so the results of the survey for the three lines were interpreted accounting for these cultural features. The results of the three lines are discussed below.

Electrical Resistivity Survey Results – Line 1

Line 1 is approximately 2,050 feet long and runs from northwest to southeast on the southwest boundary of the application field as shown on **Figure 1**. **Figure 2** provides the electrical resistivity interpretation. There were cultural features along this line that consisted of a structure and associated electrical lines. A high resistivity layer was observed from ground surface to about 50 feet bgs. This high resistivity layer appears to dip to the southeast indicating that the coarser sediments that start at ground surface are thicker to the southeast. The higher resistivity area that begins at ground surface will be referred to as the “shallow aquifer” for the remainder of this document.

Figure 2. Electrical Resistivity – Line 1

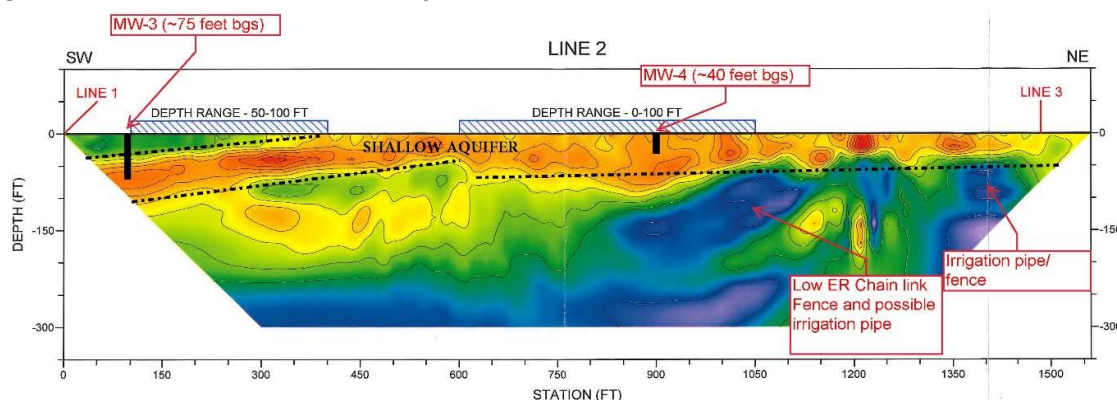


The shallow aquifer, ground surface to 50 feet bgs, is the target of the monitoring system because it contains the first groundwater which could be affected by the application of treated water. Below the shallow aquifer, a lower resistivity layer is present from about 50 feet bgs to about 120 feet bgs, which could be indicative of a low-permeability layer or aquitard. This low permeability layer may act as a barrier from water infiltrating from the shallow aquifer to a deeper aquifer. From about 120 feet bgs to 210 feet bgs another high resistivity layer is present which may be indicative of a second, deep aquifer that may be confined by the low-resistivity layer above. This deeper high resistivity layer will be referred to as the “deep aquifer” for the remainder of this document.

Electrical Resistivity Survey Results – Line 2

Line 2 is approximately 1,550 feet long and runs from southwest to northeast on the southeast boundary of the application field as shown on **Figure 1**. **Figure 3** provides the electrical resistivity interpretation. On Line 2 there was a grounded chain-link fence and a sub-surface irrigation pipe that caused interference. The chain-link fence was also near a portion of Line 3 and was noted by field staff. The shallow aquifer on Line 2 is more apparent than on Line 1 and a portion of the high resistivity response is about 50 feet bgs for the first 400 feet along the southwest side of the transect. After about 400 feet the shallow aquifer begins at ground surface and is about 50 feet thick and extends northeast towards Line 3. The deep aquifer on Line 2 is less defined. This may be the result of interference caused by the cultural features described above.

Figure 3. Electrical Resistivity – Line 2



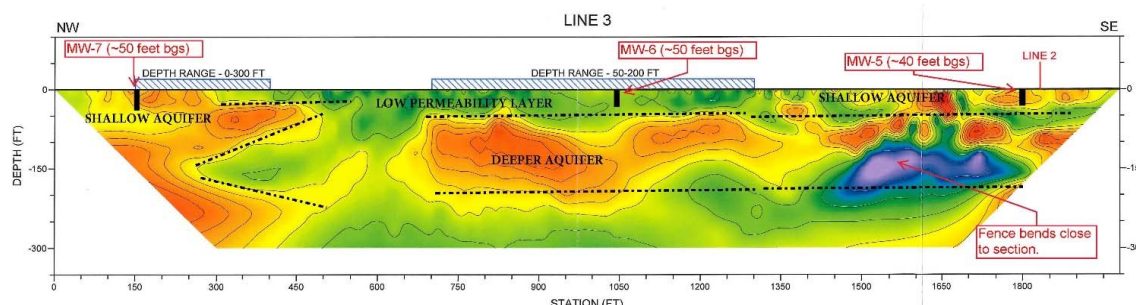
Electrical Resistivity Survey Results – Line 3

Line 3 is approximately 2,000 feet long and runs from southeast to northwest on the northeast boundary of the application field and is adjacent to the Napa River as shown on **Figure 1**. **Figure 4** provides the electrical resistivity interpretation. The middle section of Line 3 has a low resistivity from ground surface to about 50 feet bgs which indicates that low permeability sediments are present that may not allow applied water to infiltrate. The low resistivity zone in the middle of Line 3 may be due to flood deposits from the Napa River which may be fine grained. The low permeability sediments in the middle of Line 3 show that the shallow aquifer that is being monitored to the southeast of Line 3 and at Line 1 and Line 2 is not present, indicating that the Napa River may not be connected to the shallow aquifer at this location.

The northwest and southeast ends of the Line 3 each have high resistivity zones that begin at ground surface, indicating that a shallow aquifer is present at these areas. The high resistivity response for about

the first 300 feet of Line 3 from the northwest has relatively high resistivity to a depth of about 300 feet bgs. This high resistivity area could indicate that there is a thick permeable unit at this area of the project site. In the center of Line 3 from about 700 feet to 1,350 feet there is a deep layer of high resistivity from about 50 feet bgs to 200 feet bgs. Along the southeast part of Line 3 the chain-link fence that was present on Line 2 bends into Line 3 and caused some interference.

Figure 4. Electrical Resistivity – Line 3



Design of the Monitoring System

A monitoring well will be constructed near the northwest portion of the WWTP property by Chaix Lane upgradient. Six shallow aquifer monitoring wells will be constructed along the perimeter of the application field where electrical resistivity data were gathered. Monitoring wells have been located around the site due to the unknown and potentially variable groundwater gradient. A table showing the preliminary well construction details including depth and screen lengths (**Table 2**) is provided in Section 4 – Monitoring Well Construction Workplan.

One monitoring well will be constructed along Line 1 to monitor the shallow aquifer (**Figure 2**). Two monitoring wells will be constructed along the southeast portion of the property along Line 2 to monitor the shallow aquifer (**Figure 3**). Three monitoring wells will be constructed along the northeast portion of the property along Line 3, one will be constructed at the southeast side of transect, one will be constructed to monitor any permeable sediments and groundwater that may be present in the low-resistivity area in the middle of Line 3. The final monitoring well on Line 3 will be constructed to monitor the shallow aquifer on the northwest portion of the transect (**Figure 4**).

We do not propose to monitor the deep aquifer as part of this monitoring system. If the results of the shallow aquifer groundwater results indicate that there is contamination present that may have a potential to migrate to the deeper aquifer, a recommendation for deeper wells can be made in the future.

3. Health and Safety Plan, Permitting, and Clearances

3.1 General, Site-Specific, and Subcontractor Health and Safety Plans (HASPs)

GEI prepared site-specific Health and Safety Plans (HASP) specifically for the construction of the monitoring wells around the perimeter of the land application field. The HASP is provided separately from this workplan, and will be kept on-site at all times.

The drilling subcontractor is required to prepare a task-specific HASP for their field operations. Subcontractor HASPs must be provided to GEI prior to any field activities. Hard copy and electronic versions of subcontractor HASPs shall be submitted to the GEI Project Manager.

3.1.1 Health and Safety Policy Compliance

GEI personnel will act as the Site Safety and Health Officer during the drilling phase of this project. Daily tailgate health and safety meetings will be held at the beginning of each work day where health and safety topics relevant to the work at hand will be discussed. If GEI personnel observe drilling crews out of compliance with their health and safety policies, GEI personnel will remind drilling crews of compliance requirements. If drilling crews fail to comply, GEI's field geologist is authorized to shut down drilling operations and contact GEI's Project Manager or GEI's Corporate Health and Safety Officer (contact information provided in the HASP).

3.2 Personnel

The Project Manager, Ryan Alward, will be responsible for all elements of the project, and will be the key point of contact for any project issues. GEI's Field Geologist, Justin Crose, will observe and direct the subsurface explorations, including sampling and logging of the boring and installation of monitoring wells. We anticipate that other GEI staff may be present on-site part-time to assist in well development activities.

Contact information for project personnel is provided below in **Table 1**.

Table 1. List of Contacts

Name	Role	Organization	Mailing Address	Telephone	Cellular Telephone
Autumn Eberhardt	Regional Health & Safety Officer	GEI	2868 Prospect Park Drive, Suite 400, Rancho Cordova, 95670	(916) 631-4525	(631) 481-5094
Ryan Alward	Project Manager	GEI	2868 Prospect Park Drive, Suite 400, Rancho Cordova, 95670	(916) 631-4578	(916) 941-5756
Justin Crose	Field Geologist	GEI	2868 Prospect Park Drive, Suite 400, Rancho Cordova, 95670	(916) 631-4582	(530) 570-8478
Sean Storey	Field Geologist	GEI	2868 Prospect Park Drive, Suite 400, Rancho Cordova, 95670	(916) 631-4529	(916)-521-7727

3.3 Permitting

Monitoring well drilling permits will be acquired from the Napa County Environmental Health Division – Planning, Building & Environmental Services (EHD) for each monitoring well. A copy of this workplan will be provided to EHD for approval of the monitoring well permits. The City of St. Helena also requires that well permits are issued for each monitoring well. The project location is located just to the south of the St. Helena city limits; therefore, a permit from the City is not required for the monitoring wells.

3.4 Borehole Utilities Clearance

Underground Service Alert will be notified at least 48 hours prior to the start of drilling activities so subscribers can identify any subsurface utilities on public right-of-ways.

4. Monitoring Well Construction Workplan

This workplan has been prepared to describe the monitoring well location rationale and construction plans to create a groundwater monitoring network that measures the groundwater flow and quality of groundwater beneath the land application site. The following sections describe the monitoring well locations, drilling methods, preliminary designs, and development.

4.1 Monitoring Well Locations

The monitoring well system was designed to monitor the shallow aquifer on three sides of the land application field. The general groundwater gradient is from northwest to southeast, following the Napa River (ROWD, LWA 2017). Local groundwater gradients may be influenced by applied water, nearby groundwater pumping for irrigation, and applied water from the treatment plant. One upgradient well will be constructed near Chaix Lane to monitor the shallow aquifer.

The monitoring system wells around the application field are designed to monitor the water applied as it immediately infiltrates. Monitoring wells MW-5, MW-6, and MW-7 are adjacent to the Napa River and will be used to characterize the shallow aquifer water quality and the groundwater movement toward the river. The upgradient MW-1 well near Chaix Lane will monitor the groundwater level and groundwater quality of water prior to being influenced by applied water from the wastewater treatment ponds and will serve as a baseline. We do not have geologic data for this location and the well details will be determined using information gathered during the monitoring well drilling process.

4.2 Monitoring Well Construction

4.2.1 Monitoring Well Construction Schedule

Upon receiving notice to proceed the contractor will be ready to mobilize to the site within two weeks. Monitoring well construction will take approximately 2 weeks and well development will take an additional 2 weeks for a total duration of 4 weeks.

4.2.2 Drilling and Well Construction

The monitoring wells will be drilled by Cascade Drilling, of West Sacramento, California; a State-licensed drilling contractor. The wells will be constructed in accordance with California Monitoring Well Standards (DWR Bulletin 74-90). The boreholes will be drilled using a drill rig with an 8-inch diameter hollow-stem auger attachment and the monitoring wells will be constructed within the hollow-stem auger. This drilling method has a limited footprint to reduce any potential impact to the site. Seven borings will be drilled to a depth of range of 35 to about 75 feet bgs with soil samples collected every five feet using brass sleeves. This depth was selected to encounter and monitor the coarse sediments based on the electrical resistivity study. Soils from each sample interval will be placed in plastic bags and will be logged using the Unified Soil Classification System (USCS) for texture and grain size. Between each borehole the sampling and drilling tools will be decontaminated. A high-pressure washer will be combined with standard disinfection practices that include the use of a detergent (Alconox), potable water, and bleach. Disinfection water will be contained and transported to the WWTP for disposal. Drill cuttings will be disposed on-site.

4.2.3 Monitoring Well Design

A monitoring well will be constructed in each of the seven (7) boreholes to monitor the groundwater. The monitoring well design will vary by location but the construction materials will be the same for each monitoring well. The design consists of a 2-inch diameter schedule-40 PVC with 0.030-inch slot PVC well screen. A 5-foot blank section of PVC casing and cap will be placed at the bottom of each well. A #3 sand filter pack will be placed from the bottom of the borehole to 2-feet above the well screen. The well will be constructed inside of the 8-inch diameter auger which will then be lifted out of the borehole. A bentonite seal will be placed from approximately 3 feet bgs to the top of the filter pack (2-feet above the well screens). **Figure 5** shows the well design described above for a 50 foot deep well. The specific depths and screen intervals that are estimated are presented in **Table 2**. The wells shall be completed with an above-ground steel monument with locking lid, concrete pad, and protected by three steel bollards filled with concrete, with a height at least three-feet above ground surface and painted yellow. As part of pouring the concrete pad the remaining borehole shall be filled with concrete to ground surface.

Figure 5. Well Construction Detail – Actual Depth Varies by Location

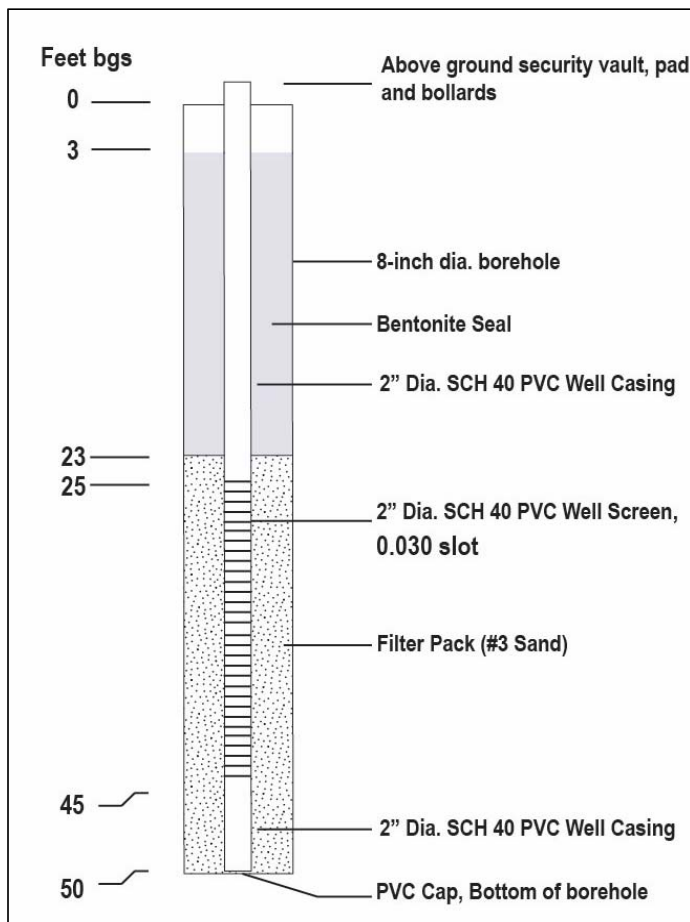


Table 2. Estimated Well Depths and Screen Intervals

Well Name	Estimated Depth (feet bgs)	Estimated Screen Zone (feet bgs)	Aquifer Monitored
MW-1	50	25-45	Shallow
MW-2	35	10-30	Shallow
MW-3	75	50-70	Shallow
MW-4	40	15-35	Shallow
MW-5	40	15-35	Shallow
MW-6	50	25-45	Shallow
MW-7	50	25-45	Shallow

4.2.4 Monitoring Well Development

After allowing the annular sealing materials to set for a minimum of 48 hours, the monitoring wells will be developed using a swab, purge, and bailer method followed by pumping. Development water will be allowed to be discharged to ground surface for infiltration. The development water will not be allowed to migrate off the land application field. Prior to development, all equipment will be cleaned as described in Section 4.2.2. Water-level measurements will be collected during well development, with an electric water-level sounder accurate to 0.01-foot. The wells shall be developed until they are free of silt and sand to the unaided eye or until the developed water is no longer visually improving. A turbidity meter will be used onsite to record the turbidity of the developed water and will be used to assess whether the developed water is continuing to have a reduction in turbidity or if it has stabilized. The temperature, pH, turbidity, and conductivity of the produced water will be documented at least every 30 minutes during development.

4.2.5 Well Survey

The well locations and elevations of the top-of-casing reference point will be surveyed in reference to NAVD88 by a California-licensed surveyor contracted with the City.

5. Groundwater Level Monitoring and Water Quality Sampling

5.1 Groundwater Level Monitoring

Water-level measurements will be collected from each well with an electric water-level sounder accurate to 0.01-foot. The measurements will be made at the reference point that will be marked on the top of each well casing which will be referenced to surveyed elevations using NAVD88 datum.

The City and LWA will arrange to have the initial water quality sampling of the monitoring wells within two weeks of final development to characterize the groundwater and provide the baseline water quality condition. The wells will be sampled using HydraSleeves or another EPA-approved groundwater sampling procedure which will be documented within the Sampling and Analysis Plan (SAP). Hydrasleeves are a no-purge passive sampling method. These are single-use disposable samplers that have been approved by the U.S. Environmental Protection Agency (USEPA). The USEPA Standard Operating Procedure (SOP) for the selected groundwater sampling procedure will be followed. The USEPA Standard Operating Procedure for HydraSleeve sampling is attached in **Appendix B**. The benefits of this method include undisturbed formation-quality water samples, ease of HydraSleeve deployment, and ability to collect samples in wells with low production rates. Groundwater sampling procedures will be consistent between monitoring events. The water quality samples will be stored in a chilled cooler and delivered following standard chain-of-custody methods to a State-certified laboratory chosen by the City. Field parameters will be measured that include electrical conductivity, pH, temperature, and turbidity.

After the initial water quality sampling event, City staff will be trained by LWA to perform the subsequent sampling events. Water quality will be monitored monthly for the first 6 months then quarterly for the next 6 months. Based on the results of the first year of monitoring a monitoring plan for subsequent monitoring will be developed.

5.2 Water Quality Sampling

Groundwater quality samples collected from the monitoring wells during the initial sampling event will be analyzed by a State-certified laboratory for:

- Total Coliform (SM 9221 B)
- Total Dissolved Solids (SM 2540 C)
- Biological Oxygen Demand (BOD) (SM 5210 B, 5-Day)
- Total Suspended Solids (TSS) (SM 2540 D)
- Electrical Conductivity (EPA Method 120.1)
- Total Kjeldahl Nitrogen (TKN) (SM 4500Norg + SM 4500 NH₃ B)
- Ammonia as N (SM 4500 NH₃-B/C)

- Nitrate as N (EPA Method 300.0)
- Chloride (EPA Method 300.0)
- pH (SM4500H+B)

All analyses will be conducted at a laboratory certified by the California Division of Drinking Water and in accordance with current USEPA guideline procedures.

5.3 Data Analyses

Water quality samples collected from MW-1 through MW-7 from the first year of monitoring will be used as the background water quality. The results of the water quality sampling will be compared to the WRR to determine if the WRR are being met and to assist in groundwater fate and transport modeling. A Groundwater Monitoring Report will be provided after two years of monitoring for submittal to the City and RWQCB. The report will include the following at a minimum:

- Narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring
- Summary of groundwater elevation results and analysis and provide an update on groundwater flow direction and gradient and a discussion of seasonal trends, if any
- Comparison of groundwater quality upgradient with effluent water quality and downgradient wells using non-parametric statistics for data analysis
- Analytical results for all groundwater monitoring locations including spatial and temporal trends data to determine whether there are changes in concentration over time
- Copies of laboratory analytical report(s) for groundwater monitoring

6. Reporting

6.1 Final Monitoring Well Completion Report

A monitoring well completion report will be created by GEI for submittal to the City and the Regional Water Board. The report will contain:

- Summary of work performed during monitoring well construction
- As-built monitoring well construction drawings
- Map showing location of constructed monitoring wells
- Measured water-level data from first water quality sampling event
- Water quality laboratory results from initial water quality sampling event
- Conclusions regarding groundwater conditions at the site

7. Schedule

7.1 Monitoring Well Installation and Sampling Schedule

GEI anticipates that the monitoring well construction can begin within two weeks following approval by the Regional Water Board and authorization by LWA. The timeline for project completion is as follows:

- Within 14 days of Regional Water Board workplan approval, monitoring well construction will begin
- Monitoring Sampling and Analysis Plan will be completed prior to the completion of the monitoring wells
- No less than 14 days, but not greater than 30 days after completion of the monitoring wells, groundwater monitoring will begin
- Within 30 days of receiving the first water quality sampling laboratory results, a monitoring well construction completion report will be provided to the Regional Water Board that will include the initial water quality sampling event results

We anticipate that the proposed monitoring well construction, sampling, and reporting activities can be completed 105 days from the notice to proceed, if delays are not encountered.

8. References

- California Department of Water Resources (DWR). California Well Standards, Water Wells, Monitoring Wells, Cathodic Protection Wells, Bulletin 74-90 (Supplement to Bulletin to 74-81), June 1991.
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Appendix A. NorCal Geophysical Report



August 11, 2017

Larry Walker Associates
1405 South Bascom Avenue
San Jose, California 95128

Subject: Electrical Resistivity Profiling Survey
St. Helena Water Treatment Plant
St. Helena, California

Terracon Job No. NS175031

Attention: Kristine Corneillie

This report presents the findings of an Electrical Resistivity Profiling (ERP) survey performed by NORCAL Geophysical Consultants (a Terracon company) for Larry Walker Associates (LWA) at the St. Helena Water Treatment Plant in St. Helena, California. The work was authorized under the Standard Subconsultant Agreement LWA Project No: 110.19 dated July 6, 2017. NORCAL California Professional Geophysicists David T. Hagin and Donald J Kirker, Staff Geophysicist Hunter S. Philson and Senior Geophysical Technician Travis W. Black conducted the ER survey during the period of July 12 through July 14, 2017. Background information and site logistics were provided onsite by Mr. Ryan Alward of GEI Consultants; GEI is a subconsultant to LWA, and is directing our investigation for this project.

1.0 SITE DESCRIPTION and PURPOSE

The site is an approximately square lot to the southeast of the wastewater ponds, as shown on Plate 1. The flat, grass-covered field is approximately 82 acres in size and is bordered on the northeast by the Napa River. Based on information supplied by GEI, groundwater flow is toward the southeast; therefore, water leaching from the ponds is thought to migrate beneath the field.

In an effort to assess the possible impact of wastewater on the local groundwater, GEI is currently implementing a groundwater monitoring and reporting plan. According to GEI, the installation of both shallow and deep groundwater monitoring wells situated around the downgradient perimeter of the property is a key part of the plan. As the placement of wells into

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Environmental ☐ Facilities ☐ Geotechnical ☐ Materials ☐



Larry Walker Associates
August 11, 2017
Page 2

areas with relatively high groundwater permeability is desired, ER Lines are situated along the downgradient perimeter of the property, as specified by GEI (Plate 1).

By quantifying electrical resistivity (ER) values, it is possible to differentiate between geologic units with greater or lesser permeability. The purpose of the ERP survey is to identify areas around the downgradient perimeter of the property where ER values indicate geologic formations that may be more coarse-grained and therefore more permeable.

2.0 CULTURAL FEATURES

Cultural features that may have affected the measured ER values include a structure and associated electric lines on Line 1, grounded fencing and suspected underground piping on Line 2 and a grounded fence that is locally in close proximity to Line 3. Such features can create electrical pathways and cause low ER zones to appear on the resulting profile.

The ER lines were situated to minimize the influence of these features. However, limited access forced portions of the lines to be in proximity to some of these cultural features in some locations.

3.0 RATIONALE

Electrical resistivity is a measure of the resistance to the flow of electrical current through a volume of earth material. Measuring subsurface variations in the ER values can be useful in evaluating the relative permeability of unconsolidated materials. This is because (saturation aside) coarse-grained sediments such as sands and gravels are typically more electrically resistive (higher ER values) than fine-grained sediments such as clays and silts.

4.0 SCOPE OF WORK

In order to characterize the electrical properties of the subsurface we conducted 2D electrical resistivity profiling (ERP) along three traverses designated as Lines 1 through 3, as shown on Plate 1. Appendix A describes the ERP methodology, data acquisition and analysis procedures and limitations.



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5.0 RESULTS and INTERPRETATIONS

The results of the ERP surveys conducted along Lines 1 through 3 are illustrated by the ER profiles shown on Plates 2 and 3. These profiles depict variations of the electrical resistivity values both laterally and with depth along each line. On each profile, the black line at the top represents ground surface, the horizontal axis represents the stationing (distance in feet) and the vertical axis represents depth (in feet). The locations of intersecting lines are annotated on each plate. The ER values are in ohm-meters (ohm-m), and are represented by color-shaded contours according to the scale shown beneath each profile. The same range of ER values and scale has been used on all of the lines for ease of comparison.

5.1 ER VALUES

The ER values depicted by the three profiles range from about 5 ohm-m to 180 ohm-m, as indicated by the electrical resistivity scale shown on each plate. For the purposes of this study, ER values above approximately 50 to 75 (orange to red) are interpreted to present the best available targets for higher groundwater permeability zones. Within the selected target zones, the highest ER values likely represent the most coarse-grained materials.

5.2 LINE 1

The distinct low ER zone near station 750 coincides with the location of a structure and associated electrical lines. Therefore, it is likely that the low ER zone is due to cultural features, and is not reflective of subsurface conditions.

Between stations 200 and 700, we note a shallow target zone within the upper 50 feet and a deeper zone between approximately 120 and 210 feet in depth. Another deep target zone is apparent between station 850 and station 1350; this zone ranges in depth from 150 to 300 feet and has the highest ER values near station 925 at a depth of 225 feet. The deeper target zones are separated by the suspect low ER zone, which may obscure a connection between the two target zones. In addition, they are situated below a thick low ER layer (likely fine grained), which suggests some degree of confinement in the interpreted aquifer.



Larry Walker Associates
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5.3 LINE 2

Although Line 2 was oriented to minimize the effects of cultural features, the relative proximity of a chain-link fence to the southeast and suspected sub-surface irrigation piping to the northwest likely affected the data. The low ER zone extending across the bottom of the profile and upward to relatively shallow depths on the northeast portion is interpreted as due to these cultural features and not due to lithologic changes.

A shallow higher ER layer extends across a majority of the profile, and presents a likely target between stations 600 and 1050, where it is thickest. This target zone ranges in depth from ground surface to approximately 100 feet. We have also selected a target zone between stations 100 and 400, at depths ranging from 50 to 100 feet. Part of this zone is situated beneath a low ER layer, again suggesting some degree of confinement.

5.4 LINE 3

The distinct low ER zone between stations 1475 and 1775 coincides with the location where a chain link fence bends into close proximity to the line. This consideration makes the zone suspect as a culturally induced feature.

A relatively large target zone is noted between station 700 and station 1300, ranging in depth from approximately 50 to 200 feet. This target zone is situated beneath a lower ER zone, suggesting that it may represent a confined aquifer. We have identified another target zone between stations 150 and 400 that appears to extend beyond the northwest end of the profile. The zone appears to be somewhat inter-fingered with low ER zones, and extends from ground surface to the bottom of the profile at 300 feet.

6.0 STANDARD CARE AND WARRANTY

The scope of NORCAL's services for this project consisted of using the electrical resistivity profiling (ERP) method to characterize the shallow subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to this technique. We performed our services in a manner consistent with the level of skill ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.



Larry Walker Associates
August 11, 2017
Page 5

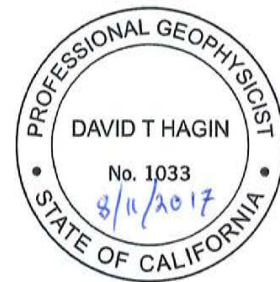
We appreciate the opportunity to provide our services for this project. Should you require additional geophysical services or have questions regarding this survey, please do not hesitate to call.

Sincerely,

NORCAL Geophysical Consultants, Inc.

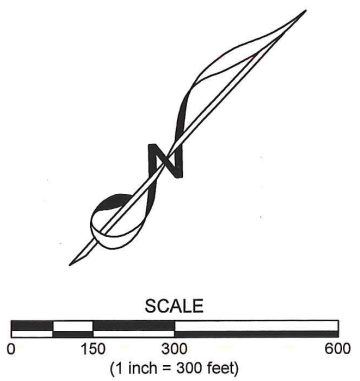
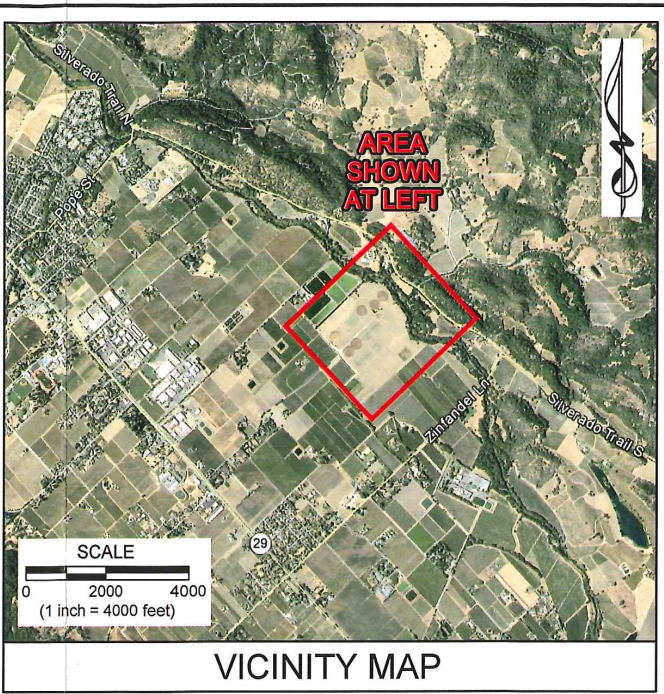
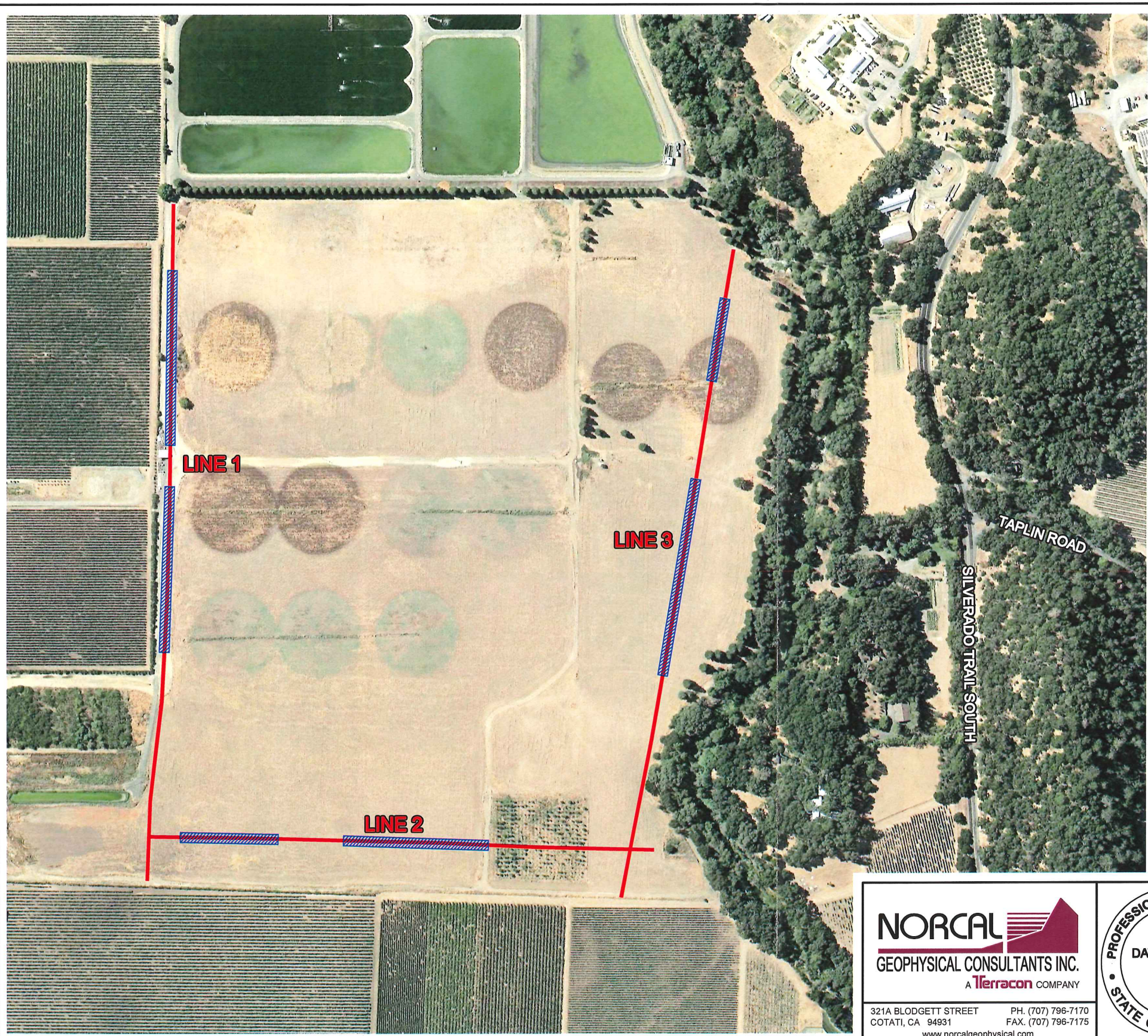
A handwritten signature in blue ink that reads "David T. Hagin". The signature is fluid and cursive.

David T. Hagin
California Professional Geophysicist, PGp 1033



DTH/KGB/tt

Enclosures: Plates 1 through 3
Appendix A – Electrical Resistivity Survey



LEGEND	
	ELECTRIC RESISTIVITY LINE
	TARGET ZONE

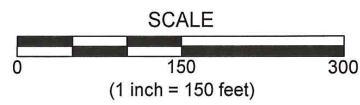
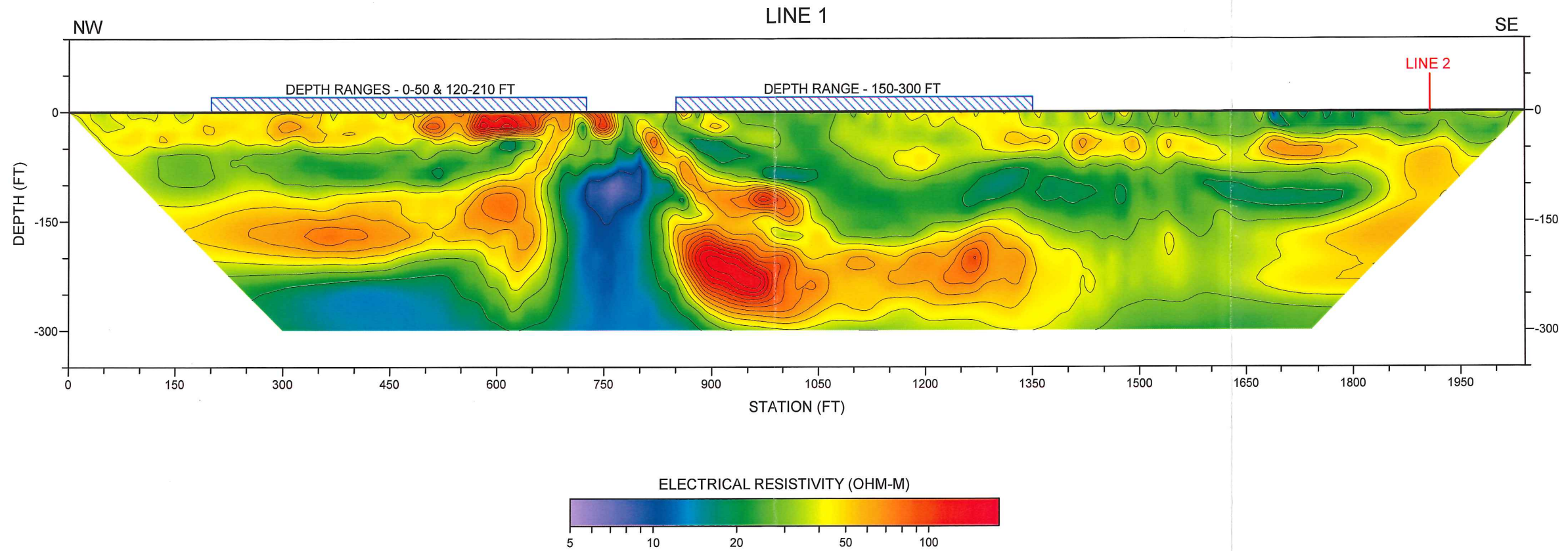
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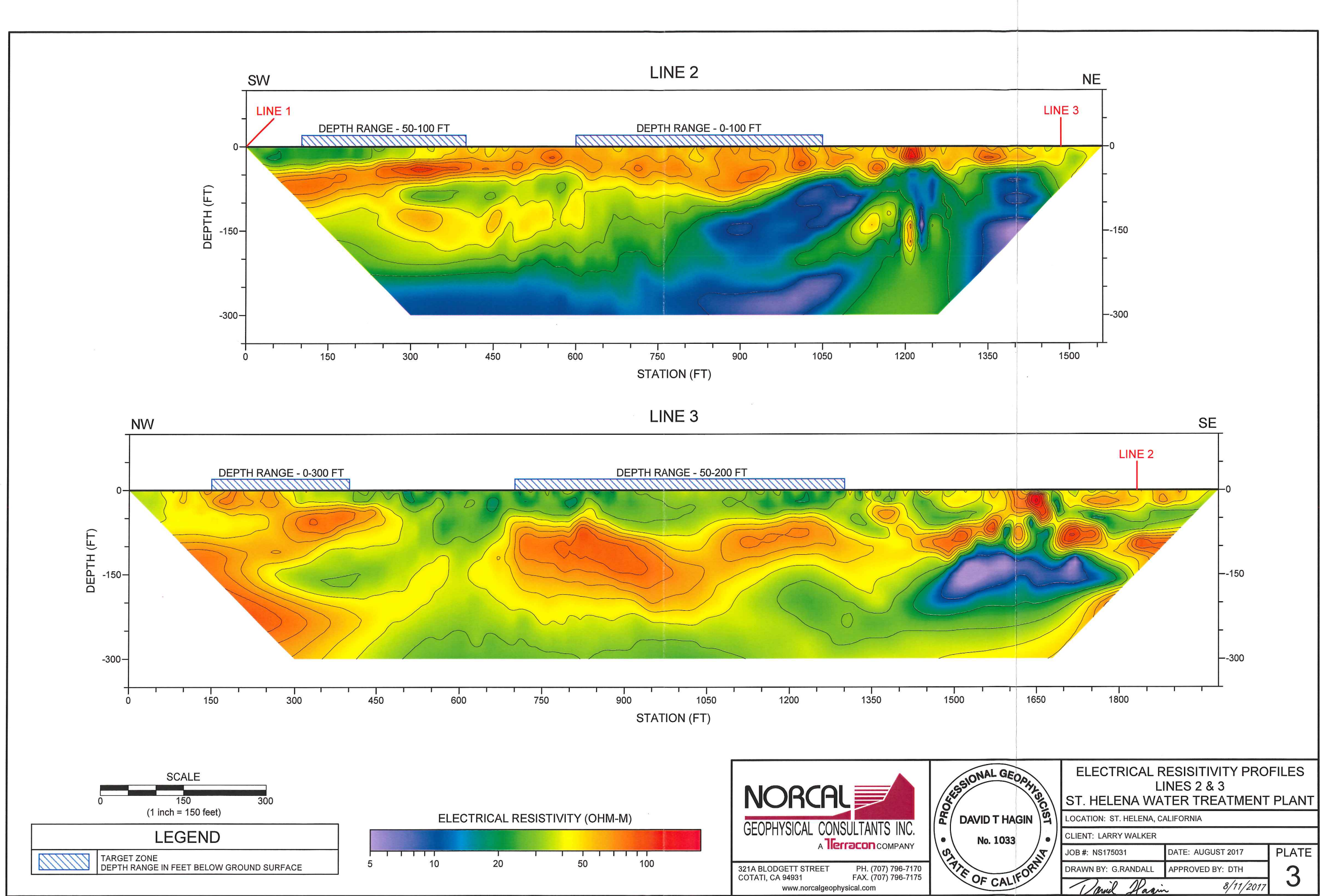
PROFESSIONAL GEOPHYSICIST
DAVID T HAGIN
No. 1033
STATE OF CALIFORNIA

SITE LOCATION MAP ELECTRICAL RESISTIVITY SURVEY ST. HELENA WATER TREATMENT PLANT			
LOCATION: ST. HELENA, CALIFORNIA			
CLIENT: LARRY WALKER			
JOB #: NS175031	DATE: AUGUST 2017	PLATE 1	
DRAWN BY: G.RANDALL	APPROVED BY: DTH		
<i>David Hagin</i>		8/11/2017	



LEGEND	
	TARGET ZONE DEPTH RANGE IN FEET BELOW GROUND SURFACE

NORCAL GEOPHYSICAL CONSULTANTS INC. A Terracon COMPANY 321A BLODGETT STREET COTATI, CA 94931 PH. (707) 796-7170 FAX. (707) 796-7175 www.norcalgeophysical.com	PROFESSIONAL GEOPHYSICIST DAVID T HAGIN No. 1033 STATE OF CALIFORNIA	ELECTRICAL RESISTIVITY PROFILE	
		LINE 1	
		ST. HELENA WATER TREATMENT PLANT	
		LOCATION: ST. HELENA, CALIFORNIA	
		CLIENT: LARRY WALKER	
JOB #: NS175031	DATE: AUGUST 2017	PLATE	
DRAWN BY: G.RANDALL	APPROVED BY: DTH	2	
		8/11/2017	





Appendix A

GEOPHYSICAL METHODOLOGY



Appendix A

ELECTRICAL RESISTIVITY SURVEYS

Rational

Electrical resistivity is the physical property of a material that resists the flow of electrical current. The electrical resistivity of earth materials is directly affected by moisture content and permeability. Typically, in a sedimentary environment, electrical resistivity decreases as moisture content increases. Thus, fine-grained materials such as clays have a lower electrical resistivity than coarse grained materials such as sands and gravels. The resistivity of earth materials is also greatly affected by the concentration of dissolved salts or free ions in the saturating fluid. The presence of fluids that have a high concentration of dissolved salts or free ions can significantly decrease the electrical resistivity of both fine and coarse-grained materials.

Electrical properties of rock can vary greatly depending upon the degree of weathering and fracturing, as well as composition. Rock formations that are deeply buried and not exposed to chemical weathering are generally impermeable, contain little water, and have a relatively high electrical resistivity. Conversely, highly weathered and fractured rock that contains moisture typically has lower resistivity values.

Based on the above relationships, geophysical methods that measure the electrical resistivity of the subsurface can be used to determine the depth and/or lateral extent of permeable materials, possible water-bearing formations, and the depth to bedrock.

Methodology

The electrical resistivity of the subsurface is measured using a galvanic resistivity method. This consists of transmitting electrical current into the earth through a pair of grounded metal electrodes, and measuring the resulting potential drop across the second pair of grounded metal electrodes. There are a variety of electrode arrangements (arrays) that can be used. The dipole-dipole electrode configuration is typically used because it provides information on both the depth and lateral extent of subsurface electrical properties.

The dipole-dipole array consists of four electrodes that are placed in the ground in a collinear arrangement. One pair of adjacent electrodes is used to transmit current into the earth and is referred to as the current dipole. The second pair of electrodes is used to measure the resulting potential drop, and is referred to as the potential dipole. Both dipoles have the same length.



To begin a profile, a reading is taken with the dipoles separated by their common length. Subsequent readings are taken as the potential dipole is moved along the profile while the current dipole remains stationary. The separation between dipoles is always a multiple of the dipole length. As the separation between dipoles increases, so does the depth of investigation. Once the maximum separation is reached, the current dipole is moved along the profile one dipole length and the entire procedure is repeated.

For each reading, a value is calculated that represents the apparent resistivity of the volume of earth that the current flows through. The term, apparent, is used because the value represents the resistivity of a volume rather than an individual layer. The apparent resistivity values are then plotted in cross-section and contoured to form what is referred to as a "pseudo-section". The term "pseudo" is used because the vertical scale is not scalar but is proportional to the dipole separation. In addition, the resistivities are apparent rather than true. However, the pseudo-section can be inverted to generate a 2-D model showing the depth and true resistivity of subsurface layers.

Instrumentation

Apparent resistivity data is typically acquired using a SuperSting R1 Resistivity meter with the Swift automatic multi-electrode system. Both systems are manufactured by Advanced Geosciences Incorporated (AGI). The Sting is a self-contained unit that transmits current at outputs ranging from 1 to 500 milliAmps (mA). The unit also measures the potential drop and converts the data to values of apparent resistivity for a number of electrode arrays. The data are stored in internal memory and can be downloaded to a computer for processing. The Swift consists of an electrode interface console, four cables, and 56 stainless steel electrodes. Each cable has 14 individual take-outs that can be connected to electrodes at intervals up to 10 meters. Depending on the objective of the survey, the Swift can operate using 28 to 56 electrodes.

Data Acquisition

ER surveys using the Sting/Swift resistivity system are initiated by laying out the cables, end-to-end, along each profile. The Swift console is then connected between the two cables and to the Sting ER meter. At each take-out in the cable, stainless steel electrodes are driven into the ground and then fastened to the respective take-out. To begin the survey, the ER meter tests the contact resistance of each electrode. If any of the values are abnormally high, the electrode plant as well as the connection between the electrode and the switch is inspected, and if necessary, improved. The survey is begun once all of the electrode contacts tested satisfactory. To start out, readings are taken with the dipoles separated by their common length and moved along the length of the array. For example, if the length between two electrodes (referred to as a dipole) is



10 meters, then the distance between the current and potential dipoles (two electrodes each) will also be 10 meters. Since each of the switches are individually addressable by the Sting, the instrument is able to move this configuration down the array by turning the appropriate switches on and off, as necessary, to switch from one dipole to another. Subsequent readings are then taken by increasing the distance between dipoles, up to eight times the dipole separation, along the array. It then repeats the entire procedure using dipole lengths typically two to three times the length of the initial dipole. For example, if the initial dipole was 10 meters, then the Sting/Swift system repeats the process using dipole lengths of 20 and 30 meters.

Data Analysis

Upon completion of a dipole-dipole survey, apparent resistivity data are downloaded from the Sting to a lap-top computer using the program STINGDMP. The data are inverted to true resistivity versus depth and distance using the program EARTHIMAGER 2D. Both programs are written by AGI. The data generated by the EARTHIMAGER 2D program are then gridded and contoured using the computer program Surfer 11.0 by Golden Software to produce 2-D models.

Limitations

A common feature of all electrical methods is that the models derived from the electric profiling are not unique. That is, depending on the subsurface geo-electric structure, there may be many models that will produce essentially the same apparent resistivities. This is known as the *principal of equivalence*. To overcome this limitation, computer software programs include routines for evaluating the equivalence of a given model relative to the observed resistivity values, resulting in a model that provides the closest fit to the observed data.

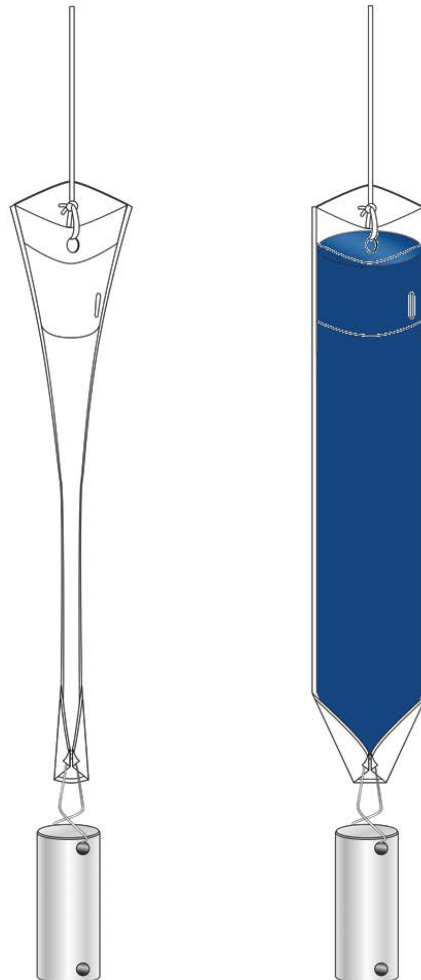
Appendix B. USEPA SOP for the HydraSleeve Sampling Method

HYDRASleeve™

Simple by Design

US Patent No. 6,481,300; No. 6,837,120 others pending

Standard Operating Procedure: Sampling Ground Water with a HydraSleeve



This Guide should be used in addition to field manuals appropriate to sampling device (i.e., HydraSleeve or Super Sleeve).

Find the appropriate field manual on the HydraSleeve website at <http://www.hydrasleeve.com>.

For more information about the HydraSleeve, or if you have questions, contact:
GeoInsight, 2007 Glass Road, Las Cruces, NM 88005, 1-800-996-2225,
info@hydrasleeve.com.

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Introduction

The HydraSleeve is classified as a no-purge (passive) grab sampling device, meaning that it is used to collect ground-water samples directly from the screened interval of a well without having to purge the well prior to sample collection. When it is used as described in this Standard Operating Procedure (SOP), the HydraSleeve causes no drawdown in the well (until the sample is withdrawn from the water column) and only minimal disturbance of the water column, because it has a very thin cross section and it displaces very little water (<100 ml) during deployment in the well. The HydraSleeve collects a sample from within the screen only, and it excludes water from any other part of the water column in the well through the use of a self-sealing check valve at the top of the sampler. It is a single-use (disposable) sampler that is not intended for reuse, so there are no decontamination requirements for the sampler itself.

The use of no-purge sampling as a means of collecting representative ground-water samples depends on the natural movement of ground water (under ambient hydraulic head) from the formation adjacent to the well screen through the screen. Robin and Gillham (1987) demonstrated the existence of a dynamic equilibrium between the water in a formation and the water in a well screen installed in that formation, which results in formation-quality water being available in the well screen for sampling at all times. No-purge sampling devices like the HydraSleeve collect this formation-quality water as the sample, under undisturbed (non-pumping) natural flow conditions. Samples collected in this manner generally provide more conservative (i.e., higher concentration) values than samples collected using well-volume purging, and values equivalent to samples collected using low-flow purging and sampling (Parsons, 2005).

Applications of the HydraSleeve

The HydraSleeve can be used to collect representative samples of ground water for all analytes (volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], common metals, trace metals, major cations and anions, dissolved gases, total dissolved solids, radionuclides, pesticides, PCBs, explosive compounds, and all other analytical parameters). Designs are available to collect samples from wells from 1" inside diameter and larger. The HydraSleeve can collect samples from wells of any yield, but it is especially well-suited to collecting samples from low-yield wells, where other sampling methods can't be used reliably because their use results in dewatering of the well screen and alteration of sample chemistry (McAlary and Barker, 1987).

The HydraSleeve can collect samples from wells of any depth, and it can be used for single-event sampling or long-term ground-water monitoring programs. Because of its thin cross section and flexible construction, it can be used in narrow, constricted or damaged wells where rigid sampling devices may not fit. Using multiple HydraSleeves deployed in series along a single suspension line or tether, it is also possible to conduct in-well vertical profiling in wells in which contaminant concentrations are thought to be stratified.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

As with all groundwater sampling devices, HydraSleeves should not be used to collect groundwater samples from wells in which separate (non-aqueous) phase hydrocarbons (i.e., gasoline, diesel fuel or jet fuel) are present because of the possibility of incorporating some of the separate-phase hydrocarbon into the sample.

Description of the HydraSleeve

The HydraSleeve (Figure 1) consists of the following basic components:

- A suspension line or tether (A.), attached to the spring clip or directly to the top of the sleeve to deploy the device into and recover the device from the well. Tethers with depth indicators marked in 1-foot intervals are available from the manufacturer.
- A long, flexible, 4-mil thick lay-flat polyethylene sample sleeve (C.) sealed at the bottom (this is the sample chamber), which comes in different sizes, as discussed below with a self-sealing reed-type flexible polyethylene check valve built into the top of the sleeve (B.) to prevent water from entering or exiting the sampler except during sample acquisition.
- A reusable stainless-steel weight with clip (D.), which is attached to the bottom of the sleeve to carry it down the well to its intended depth in the water column. Bottom weights available from the manufacturer are 0.75" OD and are available in three sizes: 5 oz. (2.5" long); 8 oz. (4" long); and 16 oz. (8" long). In lieu of a bottom weight, an optional top weight may be attached to the top of the HydraSleeve to carry it to depth and to compress it at the bottom of the well (not shown in Figure 1);
- A discharge tube that is used to puncture the HydraSleeve after it is recovered from the well so the sample can be decanted into sample bottles (not shown).
- Just above the self-sealing check valve at the top of the sleeve are two holes which provide attachment points for the spring clip and/or suspension line or tether. At the bottom of the sample sleeve are two holes which provide attachment points for the weight clip and weight.

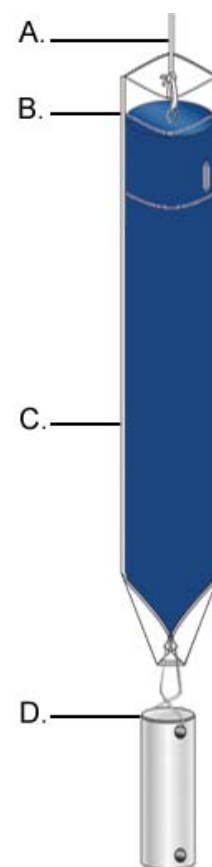


Figure 1. HydraSleeve components.

Note: The sample sleeve and the discharge tube are designed for one-time use and are disposable. The spring clip, weight and weight clip may be reused after thorough cleaning. Suspension cord is generally disposed after one use although, if it is dedicated to the well, it may be reused at the discretion of the sampling personnel.

Selecting the HydraSleeve Size to Meet Site-Specific Sampling Objectives

It is important to understand that each HydraSleeve is able to collect a finite volume of sample because, after the HydraSleeve is deployed, you only get one chance to collect an undisturbed sample. Thus, the volume of sample required to meet your site-specific sampling and analytical requirements will dictate the size of HydraSleeve you need to meet these requirements.

The volume of sample collected by the HydraSleeve varies with the diameter and length of the HydraSleeve. Dimensions and volumes of available HydraSleeve models are detailed in Table 1.

Table 1. Dimensions and volumes of HydraSleeve models.

Diameter	Volume	Length	Lay-Flat Width	Filled Dia.
<i>2-Inch HydraSleeves</i>				
Standard 625-ml HydraSleeve	625 ml	< 30"	2.5"	1.4"
Standard 1-Liter HydraSleeve	1 Liter	38"	3"	1.9"
1-Liter HydraSleeve SS	1 Liter	36"	3"	1.9"
2-Liter HydraSleeve SS	2 Liters	60"	3"	1.9"
<i>4-Inch HydraSleeves</i>				
Standard 1.6-Liter HydraSleeve	1.6 Liters	30"	3.8"	2.3"
Custom 2-Liter HydraSleeve	2 Liters	36"	4"	2.7"

HydraSleeves can be custom-fabricated by the manufacturer in varying diameters and lengths to meet specific volume requirements. HydraSleeves can also be deployed in series (i.e., multiple HydraSleeves attached to one tether) to collect additional sample to meet specific volume requirements, as described below.

If you have questions regarding the availability of sufficient volume of sample to satisfy laboratory requirements for analysis, it is recommended that you contact the laboratory to discuss the minimum volumes needed for each suite of analytes. Laboratories often require only 10% to 25% of the volume they specify to complete analysis for specific suites of analytes, so they can often work with much smaller sample volumes that can easily be supplied by a HydraSleeve.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

HydraSleeve Deployment

Information Required Before Deploying a HydraSleeve

Before installing a HydraSleeve in any well, you will need to know the following:

- The inside diameter of the well
- The length of the well screen
- The water level in the well
- The position of the well screen in the well
- The total depth of the well

The inside diameter of the well is used to determine the appropriate HydraSleeve diameter for use in the well. The other information is used to determine the proper placement of the HydraSleeve in the well to collect a representative sample from the screen (see HydraSleeve Placement, below), and to determine the appropriate length of tether to attach to the HydraSleeve to deploy it at the appropriate position in the well.

Most of this information (with the exception of the water level) should be available from the well log; if not, it will have to be collected by some other means. The inside diameter of the well can be measured at the top of the well casing, and the total depth of the well can be measured by sounding the bottom of the well with a weighted tape. The position and length of the well screen may have to be determined using a down-hole camera if a well log is not available. The water level in the well can be measured using any commonly available water-level gauge.

HydraSleeve Placement

The HydraSleeve is designed to collect a sample directly from the well screen, and it fills by pulling it up through the screen a distance equivalent to 1 to 1.5 times its length. This upward motion causes the top check valve to open, which allows the device to fill. To optimize sample recovery, it is recommended that the HydraSleeve be placed in the well so that the bottom weight rests on the bottom of the well and the top of the HydraSleeve is as close to the bottom of the well screen as possible. This should allow the sampler to fill before the top of the device reaches the top of the screen as it is pulled up through the water column, and ensure that only water from the screen is collected as the sample. In short-screen wells, or wells with a short water column, it may be necessary to use a top-weight on the HydraSleeve to compress it in the bottom of the well so that, when it is recovered, it has room to fill before it reaches the top of the screen.

Example

2" ID PVC well, 50' total depth, 10' screen at the bottom of the well, with water level above the screen (the entire screen contains water).

Correct Placement (figure 2): Using a standard HydraSleeve for a 2" well (2.6" flat width/1.5" filled OD x 30" long, 650 ml volume), deploy the sampler so the weight (an 8 oz., 4"-long weight with a 2"-long clip) rests at the bottom of the well. The top of the sleeve is thus set at about 36" above the bottom of the well. When the sampler is recovered, it will be pulled upward approximately 30" to 45" before it is filled; therefore, it is full (and the top check valve closes) at approximately 66" (5 ½ feet) to 81" (6 ¾ feet) above the bottom of the well, which is well before the sampler reaches the top of the screen. In this example, only water from the screen is collected as a sample.

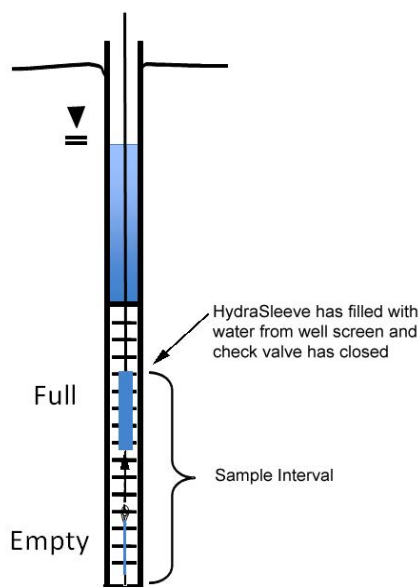


Figure 2. Correct placement of HydraSleeve.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

Incorrect Placement (figure 3): If the well screen in this example was only 5' long, and the HydraSleeve was placed as above, it would not fill before the top of the device reached the top of the well screen, so the sample would include water from above the screen, which may not have the same chemistry.

The solution? Deploy the HydraSleeve with a top weight, so that it is collapsed to within 6" to 9" of the bottom of the well. When the HydraSleeve is recovered, it will fill within 39" (3 ¼ feet) to 54" (4 ½ feet) above the bottom of the well, or just before the sampler reaches the top of the screen, so it collects only water from the screen as the sample.

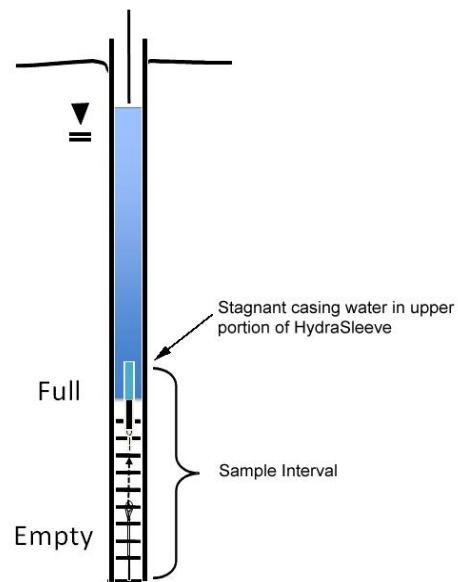


Figure 3. Incorrect placement of HydraSleeve.

This example illustrates one of many types of HydraSleeve placements. More complex placements are discussed in a later section.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

Procedures for Sampling with the HydraSleeve

Collecting a ground-water sample with a HydraSleeve is a simple one-person operation.

Note: Before deploying the HydraSleeve in the well, collect the depth-to-water measurement that you will use to determine the preferred position of the HydraSleeve in the well. This measurement may also be used with measurements from other wells to create a ground-water contour map. If necessary, also measure the depth to the bottom of the well to verify actual well depth to confirm your decision on placement of the HydraSleeve in the water column.

Measure the correct amount of tether needed to suspend the HydraSleeve in the well so that the weight will rest on the bottom of the well (or at your preferred position in the well). Make sure to account for the need to leave a few feet of tether at the top of the well to allow recovery of the sleeve

Note: Always wear sterile gloves when handling and discharging the HydraSleeve.

I. Assembling the HydraSleeve

1. Remove the HydraSleeve from its packaging, unfold it, and hold it by its top.
2. Crimp the top of the HydraSleeve by folding the hard polyethylene reinforcing strips at the holes.
3. Attach the spring clip to the holes to ensure that the top will remain open until the sampler is retrieved.
4. Attach the tether to the spring clip by tying a knot in the tether.

Note: Alternatively, attach the tether to one (NOT both) of the holes at the top of the Hydralleeve by tying a knot in the tether.

5. Fold the flaps with the two holes at the bottom of the HydraSleeve together and slide the weight clip through the holes.
6. Attach a weight to the bottom of the weight clip to ensure that the HydraSleeve will descend to the bottom of the well.

II. Deploying the HydraSleeve

1. Using the tether, carefully lower the HydraSleeve to the bottom of the well, or to your preferred depth in the water column

During installation, hydrostatic pressure in the water column will keep the self-sealing check valve at the top of the HydraSleeve closed, and ensure that it retains its flat, empty profile for an indefinite period prior to recovery.

Note: Make sure that it is not pulled upward at any time during its descent. If the HydraSleeve is pulled upward at a rate greater than 0.5'/second at any time prior to recovery, the top check valve will open and water will enter the HydraSleeve prematurely.

2. Secure the tether at the top of the well by placing the well cap on the top of the well casing and over the tether.

Note: Alternatively, you can tie the tether to a hook on the bottom of the well cap (you will need to leave a few inches of slack in the line to avoid pulling the sampler up as the cap is removed at the next sampling event).

III. Equilibrating the Well

The equilibration time is the time it takes for conditions in the water column (primarily flow dynamics and contaminant distribution) to restabilize after vertical mixing occurs (caused by installation of a sampling device in the well).

- Situation: The HydraSleeve is deployed for the first time or for only one time in a well

The HydraSleeve is very thin in cross section and displaces very little water (<100 ml) during deployment so, unlike most other sampling devices, it does not disturb the water column to the point at which long equilibration times are necessary to ensure recovery of a representative sample.

In most cases, the HydraSleeve can be recovered immediately (with no equilibration time) or within a few hours. In regulatory jurisdictions that impose specific requirements for equilibration times prior to recovery of no-purge sampling devices, these requirements should be followed.

- Situation: The HydraSleeve is being deployed for recovery during a future sampling event

In periodic (i.e., quarterly or semi-annual) sampling programs, the sampler for the current sampling event can be recovered and a new sampler (for the next sampling event)

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

deployed immediately thereafter, so the new sampler remains in the well until the next sampling event.

Thus, a long equilibration time is ensured and, at the next sampling event, the sampler can be recovered immediately. This means that separate mobilizations, to deploy and then to recover the sampler, are not required. HydraSleeves can be left in a well for an indefinite period of time without concern.

IV. HydraSleeve Recovery and Sample Collection

1. Hold on to the tether while removing the well cap.
2. Secure the tether at the top of the well while maintaining tension on the tether (but without pulling the tether upwards)
3. Measure the water level in the well.
4. In one smooth motion, pull the tether up between 30" to 45" (36" to 54" for the longer HydraSleeve) at a rate of about 1' per second (or faster).

The motion will open the top check valve and allow the HydraSleeve to fill (it should fill in about 1 to 1.5 times the length of the HydraSleeve). This is analogous to coring the water column in the well from the bottom up.

When the HydraSleeve is full, the top check valve will close. You should begin to feel the weight of the HydraSleeve on the tether and it will begin to displace water. The closed check valve prevents loss of sample and entry of water from zones above the well screen as the HydraSleeve is recovered.

5. Continue pulling the tether upward until the HydraSleeve is at the top of the well.
6. Decant and discard the small volume of water trapped in the Hydrasleeve above the check valve by turning the sleeve over.

V. Sample Collection

Note: Sample collection should be done immediately after the HydraSleeve has been brought to the surface to preserve sample integrity.

1. Remove the discharge tube from its sleeve.
2. Hold the HydraSleeve at the check valve.
3. Puncture the HydraSleeve just below the check valve with the pointed end of the discharge tube
4. Discharge water from the HydraSleeve into your sample containers.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

Control the discharge from the HydraSleeve by either raising the bottom of the sleeve, by squeezing it like a tube of toothpaste, or both.

5. Continue filling sample containers until all are full.

Measurement of Field Indicator Parameters

Field indicator parameter measurement is generally done during well purging and sampling to confirm when parameters are stable and sampling can begin. Because no-purge sampling does not require purging, field indicator parameter measurement is not necessary for the purpose of confirming when purging is complete.

If field indicator parameter measurement is required to meet a specific non-purging regulatory requirement, it can be done by taking measurements from water within a HydraSleeve that is not used for collecting a sample to submit for laboratory analysis (i.e., a second HydraSleeve installed in conjunction with the primary sample collection HydraSleeve [see Multiple Sampler Deployment below]).

Alternate Deployment Strategies

Deployment in Wells with Limited Water Columns

For wells in which only a limited water column exists to be sampled, the HydraSleeve can be deployed with an optional top weight instead of a bottom weight, which collapses the HydraSleeve to a very short (approximately 6" to 9") length, and allows the HydraSleeve to fill in a water column only 36" to 45" in height.

Multiple Sampler Deployment

Multiple sampler deployment in a single well screen can accomplish two purposes:

- It can collect additional sample volume to satisfy site or laboratory-specific sample volume requirements.
- It can accommodate the need for collecting field indicator parameter measurements.
- It can be used to collect samples from multiple intervals in the screen to allow identification of possible contaminant stratification.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

It is possible to use up to 3 standard 30" HydraSleeves deployed in series along a single tether to collect samples from a 10' long well screen without collecting water from the interval above the screen.

The samplers must be attached to the tether at both the top and bottom of the sleeve. Attach the tether at the top with a stainless-steel clip (available from the manufacturer). Attach the tether at the bottom using a cable tie. The samplers must be attached as follows (figure 4):

- The first (attached to the tether as described above, with the weight at the bottom) at the bottom of the screen
- The second attached immediately above the first
- The third (attached the same as the second) immediately above the second

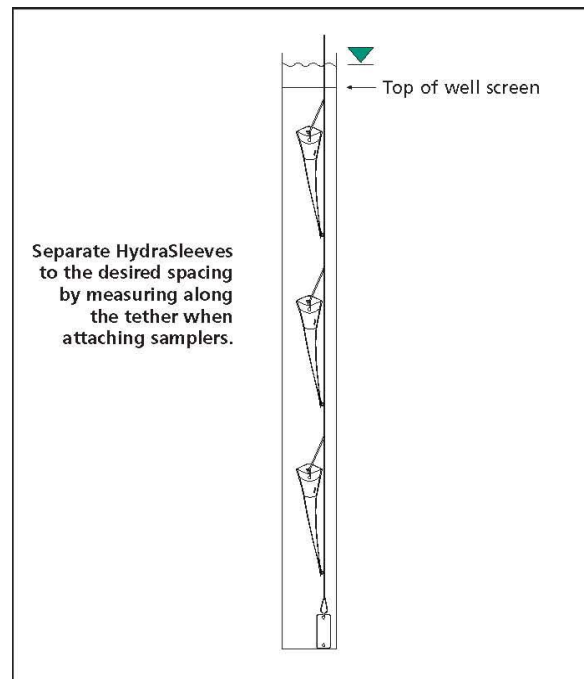


Figure 4. Multiple HydraSleeve deployment.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

Alternately, the first sampler can be attached to the tether as described above, a second attached to the bottom of the first using a short length of tether (in place of the weight), and the third attached to the bottom of the second in the same manner, with the weight attached to the bottom of the third sampler (figure 5).

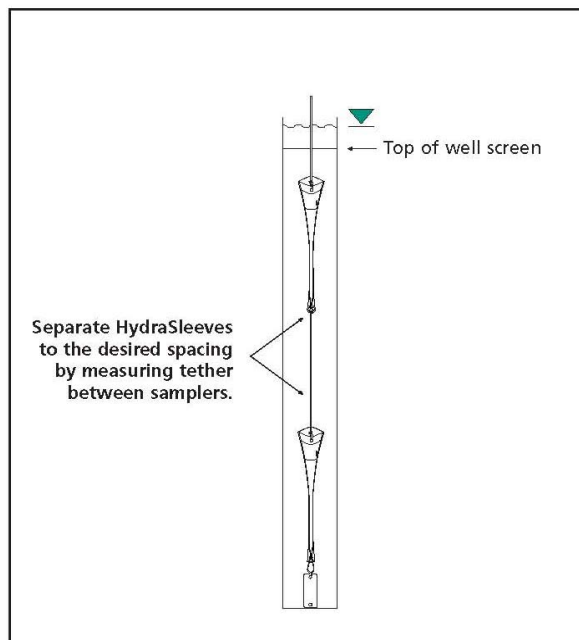


Figure 5. Alternative method for deploying multiple HydraSleeves.

In either case, when attaching multiple HydraSleeves in series, more weight may be required to hold the samplers in place in the well than would be required with a single sampler. Recovery of multiple samplers and collection of samples is done in the same manner as for single sampler deployments.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

Post-Sampling Activities

The recovered HydraSleeve and the sample discharge tubing should be disposed as per the solid waste management plan for the site. To prepare for the next sampling event, a new HydraSleeve can be deployed in the well (as described previously) and left in the well until the next sampling event, at which time it can be recovered.

The weight and weight clip can be reused on this sampler after they have been thoroughly cleaned as per the site equipment decontamination plan. The tether may be dedicated to the well and reused or discarded at the discretion of sampling personnel.

Standard Operating Procedure: Sampling Groundwater with the HydraSleeve (patents: 6,481,300; 6,837,120)

References

McAlary, T. A. and J. F. Barker, 1987, Volatilization Losses of Organics During Ground-Water Sampling From Low-Permeability Materials, Ground-Water Monitoring Review, Vol. 7, No. 4, pp. 63-68

Parsons, 2005, Results Report for the Demonstration of No-Purge Ground-Water Sampling Devices at Former McClellan Air Force Base, California; Contract F44650-99-D-0005, Delivery Order DKO1, U.S. Army Corps of Engineers (Omaha District), U.S. Air Force Center for Environmental Excellence, and U.S. Air Force Real Property Agency

Robin, M. J. L. and R. W. Gillham, 1987, Field Evaluation of Well Purging Procedures, Ground-Water Monitoring Review, Vol. 7, No. 4, pp. 85-93

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San Francisco Bay Regional Water Quality Control Board

Sent by email
Confirmation of Receipt Requested

July 31, 2018
 CW-258386

City of St. Helena
 ATTN: Erica Ahmann Smithies
 1480 Main Street
 St. Helena, CA 94574

**Subject: St. Helena Wastewater Treatment and Reclamation Plant –
 Groundwater Investigation Report and Revised Draft Feasibility Study**

Dear Ms. Ahmann Smithies:

We received the City's March 2018 *Draft Groundwater Investigation/ Fate and Transport Modeling Report* and its June 2018 *Wastewater Treatment and Reclamation Plant Improvements Feasibility Study*. The investigation report provides the results of the City's recent hydrogeological investigation of the irrigation fields it uses to dispose of treated wastewater. The feasibility study uses this information to analyze options to upgrade the treatment plant as required by Cease and Desist Order (CDO) No. R2-2016-0004. We are pleased with the City's approach.

The City has about 70 acres of fields adjacent to the Napa River that it currently uses to dispose of its treated wastewater after it flows through a series of treatment ponds. The Feasibility Study analyzed the pros and cons of the two most feasible options identified by previous reports: constructed wetlands or a trickling filter. Either option will improve water quality and will satisfy the CDO requirements, and both options score about equally when considering the major decision factors (cost, effectiveness, ability to implement, etc.). The Feasibility Study recommended the trickling filter alternative. It also recommended including a shallow infiltration pond to provide additional disposal capacity and tertiary filtration regardless of whether the City selects constructed wetlands or a trickling filter for secondary treatment. If the City chooses the wetland treatment option, we would propose an extended time schedule for compliance to allow time for plants to become established and provide reliable treatment.

We are satisfied with either approach, and we concur that tertiary treatment is appropriate. Tertiary treatment will not only reduce BOD and TSS concentrations, but can also be designed to reduce nutrients and improve the City's ability to recycle treated wastewater. While the City's current NPDES permit (Order No. R2-2016-0003) and Water Reclamation Requirements (Order No. 87-090) do not have a numeric limit for total nitrogen, we anticipate that the Regional Water Board

DR. TERRY F. YOUNG, CHAIR | BRUCE H. WOLFE, EXECUTIVE OFFICER

1515 Clay St., Suite 1400, Oakland, CA 94612 | www.waterboards.ca.gov/sanfranciscobay



St. Helena Wastewater Treatment Plant

- 2 -

July 31, 2018

will impose a total nitrogen limit of no more than 10 mg/L to ensure that discharges from the shallow infiltration pond will be protective of groundwater. To protect groundwater, Basin Plan Table 3-5 lists a “nitrate plus nitrite” water quality objective of 10 mg/L (California’s maximum contaminant level). To ensure use of the irrigation field will not degrade groundwater, the City will likely also be required to apply treated wastewater at agronomic rates.

The City has requested an extension of the August 1, 2018, deadline to submit its Final Feasibility Study (task 5) pursuant to our January 11, 2018, letter. While we cannot formally extend the deadline, we will not take enforcement for the missed deadline as long as the City submits the Final Feasibility Study by August 22, 2018.

Sincerely,



Bill Johnson, Chief
NPDES Wastewater Division

cc:

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Fresno, CA 93728

Danyal Kasapligil
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Bean Family Vineyards, LLC
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Palo Alto, CA 94301

Jack Neal & Son Vineyard Management
Attention: Mr. Mark Neal
360 La Fata Street
St. Helena, CA 94574

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GOVERNORMATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

San Francisco Bay Regional Water Quality Control Board

Sent by email
Confirmation of Receipt Requested

January 11, 2018
CW-258386

City of St. Helena
ATTN: Erica Ahmann Smithies
1480 Main Street
St. Helena, CA 94574

**Subject: St. Helena Wastewater Treatment and Reclamation Plant –
Groundwater Investigation and Cease and Desist Order
Revised Compliance Schedule**

Dear Ms. Ahmann Smithies:

We received the City's December 27, 2017, request to revise deadlines included in our September 15, 2017, letter to comply with Cease and Desist Order No. R2-2016-0004 (CDO) and the Water Board's Notice of Violation dated November 7, 2016. The City made this request because the Napa fires in October 2017 delayed the groundwater investigation. The City wishes to ensure there will be sufficient time to construct plant upgrades.

We agree that additional time to complete these tasks is appropriate. We will not initiate enforcement for the deadlines associated with CDO Table 3 or for failure to submit a complete Report of Waste Discharge as required by the November 7, 2016, Notice of Violation, as long as the City completes the following tasks according to the schedule below:

Task	Description	Due Date
1	Submit a Draft Groundwater Investigation/Fate and Transport Modeling report. The numerical model developed for the report must be capable of estimating the direction, speed, and volumetric flow of groundwater beneath and downgradient of the land application area. Additionally, the City shall characterize the impact of wastewater discharges on groundwater flow and levels. The City shall use the results of groundwater modeling work to determine the effect of wastewater discharges on groundwater. Based on these results, the City shall propose short-term strategies deemed necessary to minimize any impacts.	March 1, 2018
2	Submit the Final Groundwater Investigation/Fate and Transport Modeling report. This report shall incorporate any necessary changes in response to Water Board staff	June 1, 2018

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St. Helena Wastewater Treatment Plant

- 2 -

January 11, 2018

	comments. It shall also include as-built construction drawings of the newly installed monitoring wells, a map showing the well locations, and the water quality information described in Sections 5.2 and 5.3 of the City's August 31, 2017, <i>Monitoring Well Installation and Monitoring Network Workplan</i> .	
3	Submit a Revised Feasibility Study that incorporates the groundwater report information and any necessary changes in response to Water Board staff comments.	June 1, 2018
4	Submit a Draft Interim Wastewater Discharge Management Plan that describes how the City will manage treated wastewater to protect groundwater from nutrient impacts while the City constructs its new or modified treatment system.	June 1, 2018
5	Submit the Final Feasibility Study that incorporates any necessary changes in response to Water Board staff comments.	August 1, 2018
6	Submit a Monitoring Well Installation Completion Report that documents installation of the monitoring wells.	April 1, 2018
7	Submit the Final Wastewater Discharge Management Plan that incorporates any necessary changes in response to Water Board staff comments.	August 1, 2018
8	Submit a Draft Workplan for implementing the preferred alternative selected in the Final Feasibility Study. This report shall include plans for financing the preferred alternative.	August 1, 2018
9	Submit the Final Workplan for implementing the preferred alternative that incorporates any necessary changes in response to Water Board staff comments.	October 1, 2018
10	Submit a Draft Design for the preferred alternative.	April 1, 2019
11	Submit the Final Design for the preferred alternative that incorporates any necessary changes in response to Water Board staff comments.	October 1, 2019
12	Submit documentation of the completion of Final Workplan implementation and begin operation of the new or modified treatment system. (CDO Table 3, task f)	December 1, 2021
13	Submit a report evaluating the effectiveness of the new or modified treatment system and whether it is likely to meet the requirements of the NPDES permit. Identify and implement measures to ensure compliance. (CDO Table 3, task g)	September 1, 2022
14	Achieve full compliance with the 2016 Permit effluent limits listed in CDO Table 1. (CDO Table 3, task h)	March 1, 2023
15	Submit Quarterly Groundwater Monitoring Reports providing the groundwater monitoring results of the previous quarter for the parameters listed in Section 5.2 of the City's August 31, 2017, <i>Monitoring Well Installation and Monitoring Network Workplan</i> .	Every January 1, April 1, July 1, and October 1 each year, starting April 1, 2018

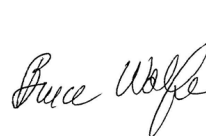
St. Helena Wastewater Treatment Plant

- 3 -

January 11, 2018

You may contact Vincent Christian at (510) 622-2336 or vchristian@waterboards.ca.gov if you have any questions.

Sincerely,



Digitally signed
by Bruce H. Wolfe
Date: 2018.01.11
16:07:07 -08'00'

Bruce H. Wolfe
Executive Officer

cc:

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Bean Family Vineyards, LLC
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Jack Neal & Son Vineyard Management
Attention: Mr. Mark Neal
360 La Fata Street
St. Helena, CA 94574

Copy (sent by email):

Becky Mitschele, U.S. EPA, Region 9, becky.mitschele@epamail.epa.gov>
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Kristine Corneillie, Larry Walker Associates, KristineC@lwa.com
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Melissa Thorme, mthorme@DowneyBrand.com

Phase	<i>Current CIP Budget</i>	<i>Trickling Filter w/o Tertiary</i>	<i>Trickling Filter w/Tertiary</i>	<i>Constructed Wetlands w/o Tertiary</i>	<i>Constructed Wetlands w/Tertiary</i>
Design	\$ 1,578,514.00	\$ 1,789,054.00	\$ 2,025,954.00	\$ 1,719,254.00	\$ 1,956,154.00
Environmental/Planning	\$ 35,000.00	\$ 35,000.00	\$ 35,000.00	\$ 35,000.00	\$ 35,000.00
Legal Services	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00
Construction Management	\$ 537,000.00	\$ 550,000.00	\$ 550,000.00	\$ 550,000.00	\$ 550,000.00
Construction Contract	\$ 6,270,000.00	\$ 5,076,826.00	\$ 5,861,156.00	\$ 4,690,436.00	\$ 5,474,766.00
Contingency		\$ 3,197,520.00	\$ 3,635,190.00	\$ 3,002,010.00	\$ 3,439,680.00
<i>Total</i>	\$ 8,430,514.00	\$ 10,658,400.00	\$ 12,117,300.00	\$ 10,006,700.00	\$ 11,465,600.00



Project Title: WWTP Phase 1 Upgrades

Address: 1 Chaix Ln

Project Number: S-52

Project Purpose and Description:

Per the State Cease and Desist Order, upgrade the plant to meet compliance requirements by 2021. In addition, to compliance requirements, levee repairs and sludge removal will be incorporated into construction of this project.

Financial Overview:

Phase	Prior Years			2019-2023 CIP BUDGET					
	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	FY 17/18	FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Design	\$203,763	\$402,491	\$606,254	\$972,260					\$1,578,514
Environmental/Planning					\$35,000				\$35,000
Land & Easements									\$0
Legal Services				\$5,000	\$2,500	\$2,500			\$10,000
Construction Management					\$268,500	\$268,500			\$537,000
Construction Contract					\$3,135,000	\$3,135,000			\$6,270,000
Contingency									\$0
CIP Overheads									\$0
Total	\$203,763	\$402,491	\$606,254	\$977,260	\$3,441,000	\$3,406,000	\$0	\$0	\$8,430,514

Funding Sources	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	FY 17/18	FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Wastewater Impact Fee					\$ 11,250	\$ 11,250			\$ 22,500
Wastewater Utility	\$ 203,763	\$ 402,491	\$ 606,254	\$ 977,260	\$ 3,429,750	\$ 3,394,750			\$ 8,408,014
Total	\$203,763	\$402,491	\$606,254	\$977,260	\$3,441,000	\$3,406,000	\$0	\$0	\$8,430,514



Project Title: Reclamation Field Improvements

Address: 1 Chaix Ln

Project Number: S-53

Project Purpose and Description:

Replace the spray field irrigation system on approximately 80 acres in order to adequately discharge secondary treated water as part of the Wastewater Reclamation and Treatment Plant permit.

Financial Overview:

Phase	Prior Years			2019-2023 CIP BUDGET					
	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	FY 17/18	FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Design	\$11,760		\$11,760		\$30,000				\$41,760
Environmental/Planning									\$0
Land & Easements									\$0
Legal Services						\$2,000	\$2,000		\$4,000
Construction Management						\$60,000	\$60,000		\$120,000
Construction Contract		\$30,000	\$30,000	\$150,000		\$380,240	\$558,000		\$1,118,240
Contingency						\$58,000	\$58,000		\$116,000
CIP Overheads									\$0
Total	\$11,760	\$30,000	\$41,760	\$150,000	\$30,000	\$500,240	\$678,000	\$0	\$1,400,000

Funding Sources	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	FY 17/18	FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
	FY 16/17	FY 17/18	FY 17/18	FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Wastewater Impact Fee				\$22,500	\$4,500	\$75,036	\$101,700		\$203,736
Wastewater Utility	\$11,760	\$30,000	\$41,760	\$127,500	\$25,500	\$425,204	\$576,300		\$1,196,264
Total	\$11,760	\$30,000	\$41,760	\$150,000	\$30,000	\$500,240	\$678,000	\$0	\$1,400,000

**Project Title: Facilities Automation****Address:** 1 Chaix Ln**Project Number:** S-62**Project Purpose and Description:**

Integrate Wastewater Treatment and Reclamation Plant facilities with Supervisory, Control and Data Acquisition System (SCADA). SCADA is utilized to monitor and control a plant and/or equipment.

Financial Overview:

Phase	Prior Years			2019-2023 CIP BUDGET					
	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	Life to date thru FY 17/18	Budget FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Design						\$20,000			\$20,000
Environmental/Planning									\$0
Land & Easements									\$0
Legal Services									\$0
Construction Management							\$1,000		\$1,000
Construction Contract							\$100,000		\$100,000
Contingency							\$14,000		\$14,000
CIP Overheads									\$0
Total	\$0	\$0	\$0	\$0	\$0	\$20,000	\$115,000	\$0	\$135,000

Funding Sources	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	Life to date thru FY 17/18	Budget FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
	FY 16/17	FY 17/18	Life to date thru FY 17/18	Budget FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Wastewater Utility						\$20,000	\$115,000		\$135,000
Total	\$0	\$0	\$0	\$0	\$0	\$20,000	\$115,000	\$0	\$135,000

**Project Title: New Well at WWTP****Address:** 1 Chaix Ln**Project Number:** S-66**GL Code(s):****Project Purpose and Description:**

The purpose of this project is to install a new well for domestic water use. If the well is not feasible, the alternative option is to tie into the City's 12" water main on Main Street/Highway 29 and bring a water line down Chaix Lane to the Wastewater Treatment and Reclamation Plant.

Financial Overview:

Phase	Prior Years			2019-2023 CIP BUDGET					
	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	Life to date thru FY 17/18	Budget FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Design				\$10,000					\$10,000
Environmental/Planning									\$0
Land & Easements									\$0
Legal Services									\$0
Construction Management				\$5,000					\$5,000
Construction Contract				\$50,000					\$50,000
Contingency									\$0
CIP Overheads									\$0
Total	\$0	\$0	\$0	\$65,000	\$0	\$0	\$0	\$0	\$65,000

Funding Sources	Actual Life to Date thru	Estimated	Estimated	Proposed	Projected				
	FY 16/17	FY 17/18	Life to date thru FY 17/18	Budget FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Wastewater Utility				\$65,000					\$65,000
Total	\$0	\$0	\$0	\$65,000	\$0	\$0	\$0	\$0	\$65,000

**Project Title: WWTP Phase 2 Upgrades****Address:** 1 Chaix Ln**Project Number:** S18-80**Project Purpose and Description:**

Wastewater Treatment and Reclamation Plant Phase 2 Upgrades will upgrade the Supervisory, Control and Data Acquisition System (SCADA). SCADA is utilized to monitor and control a plant and/or equipment.

Financial Overview:

Phase	Prior Years			2019-2023 CIP BUDGET					
	Actual Life to Date thru	Estimated	Estimated	Proposed Budget	Projected				
	FY 16/17	FY 17/18	Life to date thru FY 17/18		FY19/20	FY20/21	FY21/22	FY22/23	Total
Design						\$100,000			\$100,000
Environmental/Planning									\$0
Land & Easements									\$0
Legal Services									\$0
Construction Management									\$0
Construction Contract							\$100,000	\$100,000	\$200,000
Contingency									\$0
CIP Overheads									\$0
Total	\$0	\$0	\$0	\$0	\$0	\$100,000	\$100,000	\$100,000	\$300,000

Funding Sources	Actual Life to Date thru	Estimated	Estimated	Proposed Budget	Projected				
	FY 16/17	FY 17/18	Life to date thru FY 17/18		FY19/20	FY20/21	FY21/22	FY22/23	Total
	FY 16/17	FY 17/18	Life to date thru FY 17/18	FY 18/19	FY19/20	FY20/21	FY21/22	FY22/23	Total
Wastewater Utility						\$100,000	\$100,000	\$100,000	\$300,000
Total	\$0	\$0	\$0	\$0	\$0	\$100,000	\$100,000	\$100,000	\$300,000