

STATE OF CALIFORNIA  
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

STAFF SUMMARY REPORT (Ralph Lambert)  
MEETING DATE: February 8, 2017

**ITEM:** 8

**SUBJECT:** **Prosperity Cleaners, Marinwood Plaza, 187 Marinwood Avenue, San Rafael, Marin County** – Status Report on Cleanup Plans and Activities

**CHRONOLOGY:** February 2014 – Site Cleanup Requirements adopted  
August 2014 – Site Cleanup Requirements amended  
April 2016 – Status Report on proposed cleanup plan

**DISCUSSION:** The purpose of this status report is twofold: (i) to seek Board feedback on a revised cleanup plan for offsite contaminated groundwater and (ii) to update the Board on the onsite soil cleanup that is currently under way. This site has generated significant community interest, which warrants this status report.

Background

The Prosperity Cleaners site is located in the Marinwood Plaza shopping center in Marinwood, north of San Rafael. Releases of tetrachloroethene (PCE) from past dry cleaning operations have impacted soil, soil vapor, and groundwater beneath and downgradient of the site.

Board staff has been overseeing site investigation and cleanup for several years. To guide Site cleanup, the Board adopted a site cleanup requirements order in early 2014 and amended the order later that year. Site investigations have identified two PCE “hot spots”: one under the dry cleaner building and another at the eastern edge of the site. A groundwater plume containing elevated levels of PCE extends a total of about 2,900 feet to the east where it goes under Highway 101 and under Silveira Ranch and Catholic Charities pasture lands. A soil vapor plume surrounds the source areas, extending toward but not reaching residences in the nearby Casa Marinwood complex.

The current landowner, Marinwood Plaza, LLC, has implemented interim cleanup and mitigation actions at the site, including in-situ treatment of the eastern hot spot and wellhead treatment for an impacted drinking water supply well at Silveira Ranch. As a result of these interim mitigation actions, human and ecological exposure to released contaminants is being controlled to acceptable risk levels.

Revised Cleanup Plan for Offsite Groundwater

The Board rejected the original cleanup plan for offsite groundwater last October. That cleanup plan relied on natural attenuation of the solvents in offsite groundwater, and the Board concluded that this would take too long to reach cleanup levels. The Board’s rejection letter directed that a revised cleanup plan be submitted, one that would result in groundwater cleanup levels being met within

10 years. The 10-year timeframe is appropriate, given that groundwater beneficial uses have already been impacted and given the feasibility of completing groundwater cleanup in this timeframe. Marinwood Plaza, LLC, submitted a *Revised RAP Addendum #3* (Addendum) to treat offsite groundwater on November 21, 2016, in compliance with the 2014 order and our letters subsequent to the April 2016 status report.

*Addendum Summary:* The Addendum proposes groundwater cleanup via injection of a mixture of organic substrate, finely-ground zero valent iron, and dechlorinating bacterial cultures in six lines crossing the plume (see map in Appendix D). These injection lines will treat the groundwater as it flows through these zones.

The Addendum also proposes a one-year pilot study prior to the final design. The pilot study would involve injecting the mixture(s) in two areas of the plume to verify the effectiveness and feasibility of the injections along with injection spacing, testing injection pressure, determining groundwater flow rate, and perhaps testing different injection mixtures.

*Comments on the Addendum:* We circulated the Addendum to interested parties and provided a 30-day public comment period in December. We received comments from Catholic Charities and Silveira Ranch representatives (Appendix C). The comments raised several issues on the adequacy of the proposed approach to restoring groundwater to drinking water standards within 10 years. Our responses to those comments are included in Appendix B.

*Staff Response to Addendum:* The Addendum represents a significant improvement in the proposal for cleanup of offsite groundwater contamination as compared to the previous proposal. Board staff recommends that we approve the Addendum subject to two conditions that will assure a timely pilot study and the incorporation of pilot-study findings into the full-scale design. We have prepared a draft response letter that does just that (see Appendix A).

We also intend to propose a further amendment to the 2014 order to formally incorporate the 10-year groundwater cleanup timeframe into the order. We would circulate a tentative order for the amendment and provide for a 30-day comment period before finalizing the amendment. We expect to complete this amendment by September this year.

#### *Onsite Soil Cleanup Status*

To complete the cleanup of contaminated soil at the Site, Marinwood Plaza, LLC, proposed building demolition, soil excavation under the former dry cleaner to remove PCE-impacted soils, and backfill with clean fill. Our April 19, 2016, letter approved this cleanup plan and required a report documenting completion of proposed work by February 1, 2017.

Marinwood Plaza, LLC, has encountered difficulties in finding a contractor to perform asbestos abatement for the whole building. It recently revised the cleanup plan to allow for soil cleanup without full building demolition, after removal of non-load-bearing walls and the concrete slab in the area of the former dry cleaner.

Marinwood Plaza, LLC, completed asbestos abatement and the demolition of two interior walls within the structure in early January. Soil excavation began inside of the building the week of January 16, 2017. Soil excavation and verification sampling is expected to be completed by the end of January. Verification soil samples have been collected from the sides of the excavation and at the bottom (expected depth of 15 feet). When all soil above the cleanup goals has been removed then amendments will be added to fill and groundwater in the excavation to treat the local groundwater. Excavated soils have been stockpiled on plastic in a bermed area behind the building. The soil is covered with plastic sheeting that has been weighed down. Soil samples have been submitted to the lab for profiling as required before a landfill will accept the soil.

We have inspected the soil cleanup work and conclude that it is being done consistent with the approved workplan and in a way that protects nearby residents. However, we suspect that the soil cleanup work and associated completion report will not be completed by the February 1 deadline. We will assess any non-compliance after February 1 and again after the completion report is submitted. Depending on the results of that assessment, we may recommend enforcement action.

Board Meeting

This status report provides an opportunity for the Board to consider staff's recommended approach and public comments and to give direction to staff on an appropriate response to the Addendum. We expect stakeholders to comment on both the Addendum and the onsite soil cleanup status.

**RECOMMEN-  
DATION:**

This is a status report to hear public comments and to provide the Board an opportunity to give direction to staff. No formal Board action is necessary.

File No. 21S0053 (RAL)

Appendices:       A – Recommended Response to Addendum  
                          B – Response to Comments  
                          C – Comments Received  
                          D – Map of Proposed Offsite Injection Lines

**Appendix A**

**RECOMMENDED RESPONSE TO ADDENDUM**

**San Francisco Bay Regional Water Quality Control Board**

*DRAFT*

February XX, 2017  
File No. 21S0053 (RAL)

Marinwood Plaza, LLC  
c/o Mr. Tom Fitzsimons  
Assistant Vice President - Real Estate Services  
Wells Fargo Bank  
P.O. Box 63939  
San Francisco, CA 94163  
Sent via email: [Thomas.Fitzsimons@wellsfargo.com](mailto:Thomas.Fitzsimons@wellsfargo.com)

**SUBJECT: Conditional Approval of Revised Remedial Action Plan Addendum #3 and Requirement for Pilot Testing Work Plan, Former Prosperity Cleaners - Marinwood Plaza, 187 Marinwood Avenue, San Rafael, Marin County**

Dear Mr. Fitzsimons:

This letter conditionally approves the December 29, 2016, *Revised RAP Addendum #3, Groundwater Remedial Action Feasibility Study* (Addendum) submitted on behalf of Marinwood Plaza, LLC. The Addendum presents offsite groundwater remediation alternatives. This letter is sent to you as the representative of Marinwood Plaza, LLC, owner of the above-referenced site.

**Background**

Prosperity Cleaners (Site) was located in Marinwood Plaza in San Rafael. Releases of tetrachloroethene (PCE) from past dry cleaning operations at the Site have contaminated soil, soil vapor, and groundwater beneath the Site. PCE and its degradation products have been detected in the Site's soil, soil vapor, and groundwater. PCE has been detected in soil vapor and groundwater at offsite locations. The Site is subject to the Regional Water Board's Site Cleanup Requirements Order No. R2-2014-0007 adopted in February 2014 and amended in August 2014 by Order No. R2-2014-0036 (Order). In December 2015, the Remedial Action Plan (RAP) was submitted in accordance with Task 6 of the Order. Following a public comment period, the RAP was partially approved on April 19, 2016. On May 26, 2016, Regional Water Board staff approved Addendum #1 for installing additional soil vapor probes. On September 19, 2016, Regional Water Board staff approved Addendum #2 for expanding the soil excavation under the dry cleaner. On October 27, 2016, Regional Water Board staff rejected Addendum #3 (offsite groundwater cleanup). The rejection letter required Marinwood Plaza, LLC, to propose remedial actions with a high probability of meeting drinking water standards in offsite groundwater in less than 10 years. To comply with that directive you submitted the Addendum on November 21, 2016.

**Addendum Summary**

The Addendum proposes offsite groundwater remediation via the injection of a mixture of organic substrate, finely ground zero valent iron (ZVI), and dechlorinating bacterial cultures in six lines crossing the plume. These injection lines will create zones that treat the groundwater as it flows through these zones. These zones are referred to as permeable reactive barriers or PRBs. The organics would support microbial growth, which breaks down/transforms PCE and its daughter products to non-toxic by products. The ZVI

creates reducing conditions that reductively dehalogenates the PCE without production of daughter products and typically lasts longer than the organic substrate injections. The Addendum proposes a conceptual plan of six PRB lines across the higher concentration areas of the plume with the stated goal of “7 to 10 years to complete groundwater cleanup to the Site Cleanup Levels specified in the Order.”

The Addendum recommends a one-year pilot study by injecting the mixture in two areas of the plume prior to full implementation. Section 6 of the Addendum states “*additional investigation and pilot testing are proposed to ensure the timely achievement of cleanup goals.*” The final locations, spacing, and depths of the PRB lines may change after completing additional lithologic logging/groundwater sampling and based on the results of the pilot test. Injection boring spacing may be adjusted for the final PRB configuration based on groundwater flow rate information and pilot testing results.

The proposed schedule in the Addendum indicates that the pilot testing will start during the first quarter of 2017. Based on heavy rainfall after the Addendum was submitted, this schedule may not be achievable due to offsite heavy equipment inaccessibility as a result of high water content in soil.

### **Public Comments Received on the Addendum**

Regional Water Board staff issued a fact sheet inviting comments on the Addendum on December 7, 2016. On December 15, 2016, we met with representatives of the impacted offsite landowners (Catholic Charities and Silveira Ranch) to hear their comments/concerns on the Addendum. The public comment period closed January 9, 2017. We received comments from representatives of Catholic Charities and Silveira Ranch and provided a separate “response to comments” memo.

These comments focus on the following themes:

- Increase the length and reduce the spacing of the proposed injection lines;
- Pressure required to inject ZVI may cause in-situ fractures; and
- Time required for pilot testing may delay ultimate groundwater cleanup.

### **Discussion**

The Addendum represents a significant improvement in the proposal for cleanup of offsite groundwater contamination, as compared to the previous proposal. It proposes proven groundwater cleanup technologies that are capable of attaining groundwater cleanup levels in a relatively short time. It proposes a pilot test to calibrate the in-situ groundwater cleanup methods to the Site’s conditions, including adjustment of the length and spacing of treatment lines for the selected in-situ method.

The comments raise legitimate concerns about the efficacy and speed of the offsite groundwater cleanup. The pilot test will provide the necessary data to address the first two comment themes. The time spent on the pilot test should not increase the net time to cleanup, since it will permit optimal design of the full-scale cleanup system. Further, the Water Code does not allow us to specify the manner of compliance, but we can set a deadline for attainment of groundwater cleanup levels, as we did in our October 27, 2016, letter.

However, the Addendum does not specify when the pilot test workplan will be submitted or what specific elements will be included in it. It also does not specify when pilot test results will be submitted or how results will be incorporated into the full-scale design. The absence of these elements creates uncertainty about the overall cleanup timeframe and how the pilot study results will be used.

### **Addendum Conditional Approval**

I hereby approve the Addendum subject to two conditions:

- 1) Submit an acceptable pilot test work plan by **March 16, 2017**. The work plan must describe in detail the objectives, installation, and monitoring of the pilot test, describe what data is needed for full PRB installation, and describe how this data will be obtained. The work plan shall also describe how this information will be used for the PRB's full deployment.
- 2) Submit an acceptable pilot test implementation report by **July 16, 2018**. The report must also include a revised design for the full-scale groundwater treatment, based on pilot test results.

### **Other**

Regional Water Board staff will recommend a further amendment of the Order to incorporate language in our October 27, 2016, letter requiring that groundwater cleanup levels be met within 10 years. The 10-year period would start on the date of this letter. The rationale for this period is that offsite groundwater is currently used for domestic and agricultural beneficial uses and that water quality objectives to support these beneficial uses need to be met in the shortest time practical. The Addendum and its predecessor identified feasible methods to meet groundwater cleanup levels in the offsite area within 10 years. We will circulate a tentative order for Order amendment to interested parties and provide a 30-day comment period prior to finalizing the amendment. We anticipate completing this process by September 2017.

If you have any questions, please contact Mr. Ralph Lambert of my staff at (510) 622-2382 or via e-mail at: [RALambert@waterboards.ca.gov](mailto:RALambert@waterboards.ca.gov).

Sincerely,

Bruce H. Wolfe  
Executive Officer

**Copy sent via email: Mailing List**

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**Appendix B**

**RESPONSE TO COMMENTS**

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**RESPONSE TO COMMENTS**

**TO:** Bruce Wolfe  
Executive Officer  
January 25, 2017  
File Nos. 21S0053 (RAL)

**FROM:** Ralph Lambert  
Engineering Geologist

**CONCUR:** Laurent Meillier  
Section Leader  
Toxics Cleanup Division  
Stephen A. Hill  
Division Chief  
Toxics Cleanup Division

**SUBJECT:** **Former Prosperity Cleaners, 187 Marinwood Avenue, Marinwood, Marin County - Water Board Responses to Comments on the Revised Rap Addendum #3, Groundwater Remedial Action Feasibility Study**

This memo provides Regional Water Board staff's response to comments on the November 21, 2016, *Revised RAP Addendum #3, Groundwater Remedial Action Feasibility Study* (Addendum) submitted on behalf of Marinwood Plaza LLC, owner of the Former Prosperity Cleaners site (Site).

The Site is subject to the Regional Water Board's February 2014 Site Cleanup Requirements Order No. R2-2014-0007, which was amended in August 2014 by Order No. R2-2014-0036 (collectively the Order). Our April 19, 2016, letter partially approved the December 29, 2015, Remedial Action Plan (RAP). It specifically rejected the RAP elements dealing with groundwater cleanup, due to the absence of a feasibility study. It required submittal of RAP addenda to address RAP deficiencies, including submittal of an addendum by September 1, 2016, to address offsite groundwater cleanup. The original Addendum #3 was submitted on August 23, 2016, in accordance with Task 6 of the Order and our April 19, 2016, letter. However, our October 27, 2016, letter rejected the recommendation made in the original Addendum #3 and required a revision. The Addendum was subsequently submitted.

Regional Water Board staff initiated a 30-day public comment period for the Addendum on December 7, 2016, and circulated a fact sheet to nearby residents and interested persons at the start of the comment period. On December 15, 2016, Board staff hosted a meeting with representatives of the offsite property owners to introduce the Addendum and hear preliminary comments. On January 5, 2017, Board staff also met with representatives of the responsible parties. Comments received may be found in the Community Involvement section of GeoTracker at:  
[http://geotracker.waterboards.ca.gov/profile\\_report.asp?global\\_id=SL0604185908](http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0604185908).

Written comments were submitted by the following individuals:

<b>Date Received</b>	<b>Commenter</b>
1/1/17	Fred Clark of the Source Group, Inc., and David Trotter, attorney, representing Silveira Ranch
1/9/17	Michael Van Zandt, attorney for Catholic Charities

We have reviewed all of the above submittals. Our responses to key issues in these submittals are provided below following a summary of the comments (in italics).

### **Silveira Ranch**

1. **Comment:** *The treatment lines for the offsite area should be longer and more closely spaced than proposed in order to meet drinking water standards within 10 years, as suggested in Fred Clark's more detailed comments.*

**Response:** See our response to comments #2 and #3 (below).

2. **Comment:** *The proposed treatment lines proposed, while an improvement over the prior proposal, would only treat to about the 40 µg/L total VOC contour line. The treatment lines should be extended to fully encompass the 5 µg/l total VOC contour line.*

**Response:** The length of the treatment lines will be determined by the results of the pilot test and it will not be necessary to extend the treatment lines to the 5 µg/l total VOC contour line in order to meet chemical-specific cleanup levels within 10 years. A review of the sample data shows the recommended extended treatment lines may intercept groundwater from an additional 20 sample locations. Of this additional sample data the two highest concentrations were between 20 and 30 µg/L PCE. Fourteen of the locations (70%) showed PCE at 10 µg/L or less. This data indicates that most of the expanded treatment lines would treat very low concentrations. The final locations and extent of injections may well differ from those currently proposed.

3. **Comment:** *The treatment lines should be closer together than proposed to shorten the cleanup time and/or more closely match the stated spacing of 350 feet apart.*

**Response:** Treatment line spacing is based on an assumption of groundwater flow rate. Groundwater flow rate will be determined as part of the pilot testing and associated investigation. This data will then be used to determine the final spacing of the treatment lines needed to accomplish full cleanup within 10 years.

4. **Comment:** *There is a discrepancy between the text where it says treatment lines are approximately 350 feet apart and the proposed location map (Figure 13).*

**Response:** We agree that the spacing on Figure 13 is not consistent and does not match the text. The final locations will be based on the results of additional investigation and the pilot tests so that groundwater cleanup levels are met within 10 years. Also, see the response to comment #3 above.

5. **Comment:** *The risk to users of the groundwater will depend on the total of individual VOCs that have a carcinogenic or chronic risk associated with them and not individual constituents. Offsite groundwater should be cleaned up to a total VOC concentration of 5 µg/L.*

**Response:** We disagree. The Order sets chemical-specific cleanup levels based on drinking water standards, after concluding that this approach is protective of human health. Specifically, the cumulative risk of multiple VOCs falls within the acceptable risk range established by U.S. EPA and Cal/EPA. The treatment system should be designed to meet chemical-specific cleanup levels within 10 years.

6. **Comment:** *Zero valent iron (ZVI) is injected at high pressures that could lead to fracturing. The radius of influence and volumes needed must be determined. The contractors may need to keep the option of injecting only the carbon substrate and bio-degrading bacteria (DHc). These issues can be determined during the pilot test phase and outlined in the pilot test work plan.*

**Response:** We agree. The pilot tests will assess the potential and consequence of high-pressure fracturing – and the treatment system will be modified in light of those tests. Injecting only the carbon substrate and DHc (versus in conjunction with ZVI) will require a longer treatment time and would have to be conducted more than once. Fracturing will be assessed during the pilot test. Fracturing is not necessarily bad and, in fact, is often done on purpose. The concern is that the injectants may not stay where they are most useful but may spread to other areas and become unnecessarily lost from the treatment zone.

7. **Comment:** *Are two pilot test locations needed?*

**Response:** Two pilot test locations are proposed so that different portions of the aquifer, with different concentrations, may be tested. The eastern-most pilot test location will also help define the optimal treatment of the plume's leading edge and minimize the plume's expansion. Having a second pilot test location will not delay cleanup.

8. **Comment:** *Bench scale testing could be used to test different mixes of injectable fluids.*

**Response:** We agree but will defer to the discharger on the net value of bench scale testing. The discharger should consider the trade-off of obtaining additional information to optimize the treatment system with the extra time period required to conduct bench scale testing. Either way, groundwater cleanup needs to be completed within 10 years.

### **Catholic Charities**

9. **Comment:** *It is unclear how long the pilot test will take and during that time the plume will continue to travel at least another 50 feet before treatment is in place.*

**Response:** The pilot test should result in a net reduction in cleanup time, by making sure that the cleanup system is designed in a manner that most effectively cleans up groundwater contamination. The schedule presented in Figure 14 of the Addendum indicates that the pilot test work plan will be submitted and implemented during the first quarter of 2017. This may be optimistic based on approval time frames and the current saturated field conditions preventing heavy equipment (drill rigs) from accessing the field. The schedule indicates that the full scale implementation will be determined based on monitoring the pilot test for one year. The groundwater plume may still migrate during this timeframe; however, the proposed pilot test near the eastern edge will help limit expansion of the plume downgradient. A clear schedule for the pilot study would be helpful.

**Appendix C**

**COMMENTS RECEIVED**

**From:** [David Trotter](#)  
**To:** [Lambert, Ralph@Waterboards](mailto:Lambert_Ralph@Waterboards)  
**Cc:** "[Renee](#)"; [Fred Clark](#); [Van Zandt, Michael@hansonbridgett.com](mailto:Van_Zandt_Michael@hansonbridgett.com); "[david.trotter@dtrotterlaw.com](mailto:david.trotter@dtrotterlaw.com)"  
**Subject:** Marinwood Plaza/Prosperity Cleaners - Fred Clark/SGL Comments on Geologica Revised RAP Addendum #3 dated 11/21/16  
**Date:** Sunday, January 01, 2017 12:28:29 PM  
**Attachments:** [RAP review letterhead.docx](#)  
[Silveira Ranch F13\\_SGI Modified 20160920\\_v2.pdf](#)

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Dear Ralph:

Attached please find Fred Clark's written comments on the Geologica Revised RAP Addendum #3 dated 11/21/2016. They are in line with the points raised during our meeting on December 15. We continue to believe that the number and length of the proposed treatment grids should be increased and expanded, as previously illustrated and explained by Mr. Clark. I believe that the representatives of Catholic Charities concur with this approach, which is the only one likely to meet the stated goal of the reaching the 5 ug/L safe drinking water standard on the offsite properties within 10 years.

Best regards,

David Trotter

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-----Original Message-----

From: Fred Clark [<mailto:Fred.Clark@apexcos.com>]  
Sent: Monday, December 19, 2016 3:41 PM  
To: David Trotter <[david.trotter@dtrotterlaw.com](mailto:david.trotter@dtrotterlaw.com)>  
Cc: 'Renee' <[rfsilv@comcast.net](mailto:rfsilv@comcast.net)>  
Subject: RE: Marinwood Plaza/Prosperity Cleaners - Revised RAP Addendum #3 dated 11/21/16

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The Source Group is a division of Apex Companies, LLC.

December 19, 2016

Ralph Lambert, PG, CHg  
San Francisco Regional Water Quality Control Board  
1515 Clay Street  
Suite 1400  
Oakland, CA 94612

**Subject: Review of Proposed Remedial Action Plan for Former Prosperity Cleaners**

Marinwood Plaza Shopping Center  
187 Marinwood Avenue  
Case #21S0053  
San Rafael, California

Dear Mr. Lambert:

I have reviewed the Revised RAP Addendum #3 dated November 21, 2016 prepared by Geologica, and have the following observations and technical comments on that document.

Revised RAP Addendum #3 states (at p. 24) that Alternative 3 (Offsite Treatment Grid) is the recommended alternative for remediation of the offsite VOC contamination on the Silveira property. While this is a step in the right direction for reasons previously stated, the proposed treatment grid program is still too limited.

**First:** In concept, I agree with selecting an increased number of injection lines to decrease the treatment time. However, the length and number of treatment lines proposed by Marinwood Plaza and its consultant does not do enough to meet the Response Action Outcome (RAO) required in this case - i.e., reducing the level of VOC contamination in the groundwater so that it meets the drinking water standard of 5 ug/L for PCE and associated daughter products. The length of the treatment lines should be as close to the total VOC 5 ug/L contour as realistically possible. Although the order requires MCLs of individual constituents for the RAO, the risk to users of the groundwater will depend on the total of individual VOCs that have either a carcinogenic risk or a chronic risk associated with them. As long as the plan is considering the proposed lines of treatment, extending them to treat a larger portion of the dissolved plume is an incremental increase that will be far more costly if it is not done concurrently as part of the remediation now being proposed by Geologica.

The previously recommended array of treatment grid lines that I proposed on September 20, 2016 (see attached map) is far more likely to accomplish the required remediation within the 10-year timeframe required by the Water Board. The treatment grid lines now being proposed by Geologica (see Figure 13) would only treat to about the 40 ug/L VOC contour line in the groundwater plume, leaving the remainder of the contaminated plume roughly 35 ug/L above the target clean up goals. SGI realizes that the contours are an interpretation of the plume location, but they are located based on

the best data available. For these reasons, the Water Board should require the treatment grid lines to be lengthened as previously proposed, which should shorten the collapse of the VOC plume and clean-up times considerably.

It appears there is a slight discrepancy between the Geologica text and the map of the treatment line spacing. The text states that treatment lines are approximately 350 feet apart, the map shows lines are over 400 feet apart. This discrepancy is not enough to change the proposed locations spacing. The addition of two treatment lines as proposed by SGI (9/20/16) would shorten some of the treatment time near the source area and benefit the treatment of the downgradient plume by reducing the mass of VOCs requiring destruction to the west.

**Second:** It should be noted that zero valent iron (ZVI) compounds are injected at much higher pressures than carbon substrate and DHc alone. The tip of the injection tool opens at 150 psi and ZVI injection pressures of over 300 psi are not uncommon. By contrast, carbon substrate can be injected as low as 60 psi. The physical emplacement of the ZVI compound is typically the major portion of a field test. The viability of the injection (measurement of the radius of influence, ROI and possible failures of the injection) and the volumes of the injection are tested during this procedure. Because the injection levels on the Silveira property are relatively shallow and the subsurface is made up of permeable lenses, the injection volume may be much less than if a homogeneous subsurface was present. The effectiveness of the injection on contaminant load can be also tested over time (typically 6 months to 1 year). Moreover, with injection of ZVI compounds at these higher pressures, it is also possible to fracture the surrounding less permeable material (failure of injection) and experience daylighting of the ZVI material at the surface. These issues can be determined during the pilot test phase and outlined in the pilot test work plan.

**Third:** Geologica has proposed to conduct pilot testing at two locations – north of Miller Creek on the Silveira Ranch property near MW-8 in the center of the VOC plume, and at the southeasterly edge of the inferred plume south of Miller Creek on the Silveira property. However, unless multiple locations for pilot testing are warranted by diverse stratigraphy, a single well-designed field pilot test in the vicinity of MW-8 coupled with a bench scale test may be advisable. The bench scale test could be designed to test different mixes of ZVI (more or less carrier fluid in the mixture, in this case carbon substrate oil) on collected soil and groundwater samples. Some testing of bio-degradation (see last comment) can also be made. Duration of bench studies are usually not long enough to get a complete picture of bio-degradation, although some indication of the bio-destruction efficiency can be determined. Coupled with bench studies, bio-traps can also be used for bio-degradation data collection over longer periods (90 days) to determine subsurface response to bio-stimulation.

Because of these potential problems with shallow (30 feet or less) ZVI injection, the alternative of carbon substrate and DHc injection should be kept in reserve as a possible remedy. Although bio-degradation (carbon substrate and DHc alone) was not screened in Revised RAP Addendum #3 as a stand-alone remedy, it is much the same



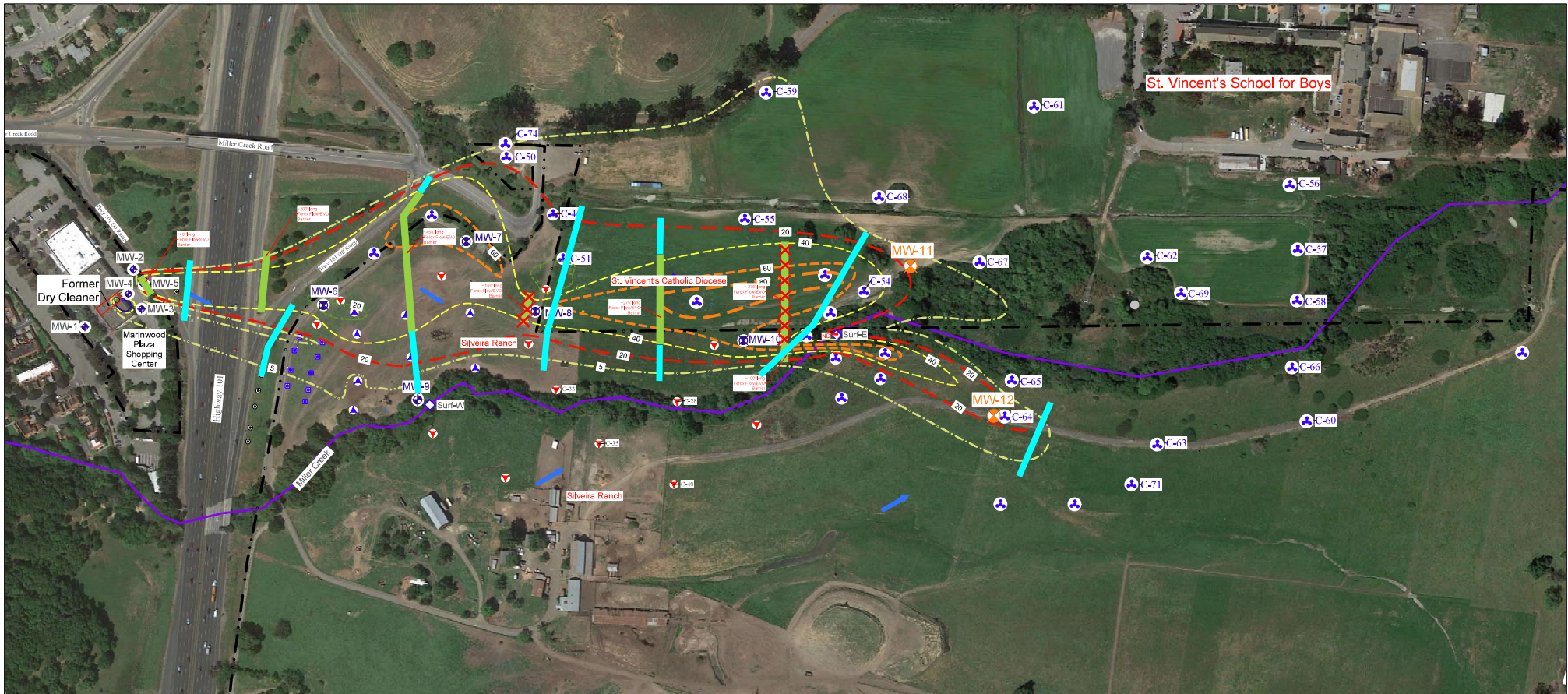
as Alternatives #2 and #3 but at lower injection pressures. With a bit less duration in the subsurface, a bio-degradation treatment alone would have to be renewed at least once, maybe twice during a 10 year duration.

If you have any questions or require additional information, please do not hesitate to call either of the undersigned at (805) 373-9063, extension 1701.

Respectfully submitted,  
The Source Group, Inc.

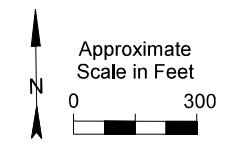
A handwritten signature in blue ink, appearing to read "Fred Clark".

Fred Clark P.G. #4802  
Principal Geologist  
The Source Group, Inc.



**Key**

- On-Site Monitoring Well (October 2007)
- October 2013 CPT Cluster Groundwater "Grab" Sample Location
- August/September 2015 CPT Cluster Exploration Location
- Completed June 2016 CPT Cluster Sampling Locations
- Total (sum of chlorinated) VOCs Concentration Contours, ug/L
- 10
- 5
- Creek Sampling Locations (March 3, 2016)
- Proposed Line of Injection Borings for Treatment Grid
- May 2015 CPT Cluster Groundwater "Grab" Sample Location
- December 2014 CPT Cluster Groundwater "Grab" Sampling Location
- Property Boundary
- Observed Groundwater Gradients (June 2016)



**geologica**  
Oakland, California

**Marinwood Plaza/  
Former Prosperity Cleaners**  
187 Marinwood Avenue  
San Rafael, California

**Figure 13**  
**Map Showing  
Injection Boring Grid for  
Alternative 3**

The Source Group, Inc.  
Modified: September 20, 2016

- SGI Recommended Supplemental Injection
- Omit Injection Line



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January 9, 2017

VIA U.S. MAIL and E-Mail

Ralph Lambert, PG, CHg  
San Francisco Regional Water Quality Control  
Board  
1515 Clay Street, Suite 1400  
Oakland, CA 94612  
[ralph.lambert@waterboards.ca.gov](mailto:ralph.lambert@waterboards.ca.gov)

Re: Review of Proposed Remedial Action Plan for Former Prosperity Cleaners  
Marinwood Plaza Shopping Center, 187 Marinwood Avenue, San Rafael, California  
Case #21S0053

Dear Mr. Lambert:

On behalf of my client Catholic Charities of San Francisco, I have reviewed the Revised RAP Addendum #3 dated November 21, 2016 prepared by Geologica. I hereby submit the following comment on behalf of my client.

Catholic Charities appreciates the change in recommendation for remedial action at the site by providing a more aggressive and active treatment that sets as its goal a cleanup in less than ten years. Catholic Charities does have some observations about the ability of the proposed solution to achieve the cleanup in the stated time frame, however.

Catholic Charities incorporates by reference and adopts the comments of The Source Group, Inc., provided by Fred Clark by letter on December 19, 2016 to the Regional Board. Most specifically, Catholic Charities agrees that the proposed lines of interception borings should be extended both north and south to ensure that the entire plume is intercepted and treated. Moreover, we agree with the addition of the additional lines of borings in order to capture more of the underground flow of pollutants.

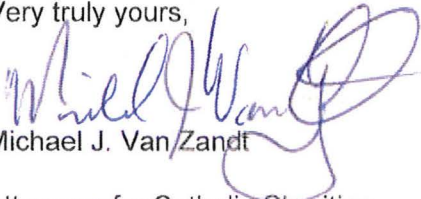
As to the location of the injection boring sites, we disagree with the spacing of the proposed lines of injection borings. The RAP Addendum #3 states on p. 6 that the rate of movement of the plume is assumed to be 50 feet per year. The Addendum also notes that there will be a pilot test of bench test of the media in order to verify its effectiveness. It is unclear how long this will take, but it could be a year before the actual borings are in place and the media begins treatment. At 50 feet per year, the plume will continue to travel at least another 50 feet before the borings are in place.



The original proposal has six lines of proposed injection borings. As currently spaced, the lines are between 360 to 420 feet apart. At 50 feet per year, it will take between 7 to 9 years to achieve cleanup, even assuming there is some natural attenuation of the plume. Since the bench test will take a year, the timeframe for treating the plume will exceed ten years, which is inconsistent with the terms of the Addendum's goal. Moreover, the line of borings located at MW8 does not intercept the entire plume. Mr. Clark has recommended a much longer intercept line. Assuming the Geologica proposal remains in place, Catholic Charities is concerned that the interception line will not capture the entire plume and that this area of treatment may require over 16 years to remediate the plume since the interception lines are effectively 810 feet apart.

Catholic Charities agrees with Mr. Clark's analysis that the lines of interception must extend to north and south to treat the entire plume. In addition, Catholic Charities, notes that the spacing of the interception borings is to be no greater than 350 feet as expressed on the RAP Addendum #3 at page 20. However, the spacing is over 400 feet in places. Given the uncertainties of groundwater movement, this spacing should be 300 feet and the lines of interception should be placed at the furthest extent of the plume, which is now beyond MW12. Thus there should be at least nine lines of interception to achieve the stated goal of cleanup within ten years.

Very truly yours,



Michael J. Van Zandt

Attorneys for Catholic Charities  
of San Francisco

cc: Catholic Charities of San Francisco  
Steve Grant  
J. Dennis McQuaid

## **Appendix D**

### **MAP OF PROPOSED OFFSITE INJECTION LINES**

# Proposed Injection and Pilot Test Locations

