Public Services

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VERN M. REDIFER, P.E., Director

January 31, 2017

David Bowen
Department of Ecology, Central Region Office
1250 West Alder Street
Union Gap, WA 98903

Re: **Lower Yakima Valley GWMA - 2016 Fourth-Quarter Report (IAA No. C 1200235)**

Dear David:

Enclosed please find one (1) copy of Yakima County's fourth-quarter report as required under Attachment A, Statement of Work, Agreement No. C 1200235 between the State of Washington Department of Ecology and Yakima County.

This report addresses deliverables 1.1 and 2.2 as required under the agreement.

Deliverable 2.1, invoices, to be sent under separate cover.

If you have any questions, please let me know.

Thank you.

Lisa H. Freund, Administrative Manager
Yakima County Public Services

enclosure

IAA No. C 1200235 – Fourth Quarter 2016 Report
Lower Yakima Valley GWMA
December 31, 2016

TASK 1 - ADMINISTRATIVE FUNCTIONS
DELIVERABLES

1.1 Meeting Records

For each meeting of the GWAC, submit a copy of the agenda, minutes, attendance and public meeting notice at the end of each quarter.

Attachment [A] includes the final GWAC meeting summaries of August 18, October 20, and November 17, 2016; the draft GWAC meeting summary of December 15, 2016; the Irrigated Ag Working Group (IAWG) summaries of October 18 and November 15, 2016; the Residential, Commercial, Industrial, and Municipal (RCIM) Working Group summaries of October 10 and November 14, 2016; the Data Collection, Characterization and Monitoring Working Group summaries of October 12 and November 9, 2016; the Regulatory Framework Working Group summaries of October 12 and November 9, 2016; the Livestock/CAFO Working Group summaries of October 6, November 3, and December 1, 2016; and the Joint Data Collection, EPO, Livestock/CAFO, RCIM and Regulatory Framework meeting on abandoned wells held December 5, 2016. The Education and Public Outreach (EPO) and Funding working groups did not hold meetings in this quarter.

TASK 2 - PROGRAM FUNCTIONS
DELIVERABLES

2.2 Status Report

Submit written quarterly status reports summarizing GWAC plans, activities and work products, and describing any interlocal agreements or other contracts by the end of each quarter.

The GWAC held three meetings in this quarter: October 20, November 17, and December 15.

Ambient Groundwater Monitoring Network (AMN). At its October and November meetings, the GWAC focused on the Proposed Ambient Groundwater Monitoring Plan (version 5) developed by Pacific Groundwater (PGG). The purpose was to reach agreement on the plan.

> **Summary.** At the October GWAC meeting, Data Collections Chair Melanie Redding provided an overview of the proposed plan and methodology through a PowerPoint presentation, and described the process the Data Collections working group had followed to develop the proposal.
>
> Melanie explained PGG had developed a final draft of this plan to help assess the goal of the GWMA, "*to reduce nitrate contamination concentrations in groundwater below state drinking water standards.*" To augment this network, the Data working group had explored other monitoring initiatives to help meet this goal by providing different types of information.

The working group's top two recommendations to the GWAC were 1. Common Water Supply Aquifers - an initiative that focused on sampling existing private domestic wells, and 2. Hotspot Identification - an initiative to continue monitoring the 71 hotspots identified by PGG where the maximum concentrations were in excess of 20 mg/L.

Following discussion, the GWAC was asked if it was ready to make a decision regarding the plan. The majority of members present were comfortable approving the plan; however, four members expressed reservations. The action item was tabled to the November GWAC meeting, and the four members and PGG were invited to the next Data meeting (November 9) to specifically address concerns and answer questions.

GWAC Decision. At the November GWAC meeting the group agreed to move ahead with the AMN, and they further agreed to authorize Vern Redifer to contact contractors and develop a sample plan to monitor common water supply and develop a sampling Quality Assurance Project Plan (QAPP).

The Ambient Monitoring Network PowerPoint presentation "GWMA AMN and Other Monitoring_GWAC Presentation," the "GWMA Ambient Monitoring Network Report Final for Approval," the "GWMA Ambient Monitoring Network Report Attachments," and "Recommendation Groundwater Monitoring from Data Working Group," are included as Attachment [B]

GWAC Budget Discussion. At the November meeting Vern Redifer reviewed the GWAC's budget, and reminded the group that the grant funds must be expended by December 2017. He asked the group to consider how they might best allocate the approximately $1.16 million remaining from the current funding limit of $2.36 million.

Due to time limitations, no budget decisions were made at the November meeting; however, the group returned to the discussion at its December meeting, and agreed to dedicate over half of the remaining funds to the Ambient Monitoring Plan: $331,000 for planning, analysis and implementation, and $350,000 for drinking water monitoring. Funds were also dedicated to monitoring analysis ($76,681), and drain monitoring ($60,000). The group further agreed to dedicate $100,000 each for Educational Outreach Campaigns and Irrigation Water Management Education.

Hotspot monitoring, abandoned wells and the contingency reserve were removed from the budget.

GWAC Decision. The group reached consensus to adopt the revised budget authorizations on December 15. Its authorizations are outlined in the document "GWMA LTD-2016 12-15-16 Group Decisions_Exhibit A."

The budget overview "2016_1020 GWAC Budget Discussion" and the new budget authorizations agreed to by the GWAC on December 15, 2016, "GWMA LTD-2016 12-15-16 Group Decisions_Exhibit A" are included as Attachment [C]

Abandoned Wells Joint Meeting. Several working groups had expressed interest in abandoned wells: their impact on the aquifer, and the need to identify and properly abandon them. Accordingly, a joint working group meeting was convened on December 5 to discuss the topic.

The group suggested a variety of actions: education, investigation, revising legislative or Ecology variant standards, and initiating incentive programs to identify the problem.

At Ginny Stern's suggestion, the group agreed to pursue Department of Health Source Water Protection Funds to investigate hotspot areas near public water systems in Sunnyside, Outlook, Buena, Mabton and Fairview. The group further agreed that public education on the topic should begin immediately.

Other Work Plans and Products

Nitrogen Loading Assessment. The draft was completed by Washington State Department of AG (WSDA) and Yakima County. Peer review is underway. The review process includes peer review, workgroup review, and GWAC review.

"Test Your Well" Billboard Campaign. Progress continued on the "Test Your Well" billboard campaign approved by the GWAC at its August meeting. Yakima County signed contracts with Lamar advertising ($4000) and Paul's Properties LLC ($1800) on October 4, 2016 for billboard placement (in English and Spanish) in the Lower Yakima Valley. The billboards were slated to go live in January 2017.

Working Group Activities

Education and Public Outreach (Lisa Freund, Chair)

The EPO did not meet in this quarter.

Data Collection (Melanie Redding, Chair)

The Data Collection working group met on October 12 and November 9, 2016. The focus at both meetings was to prepare the Proposed Ambient Monitoring Network for GWAC approval.

At the October meeting the group reviewed and discussed PGG's "Lower Valley GWMA Proposed Ambient Water Monitoring Network," and "AMN final draft comments from data working group, (July 6, 2016)." Also reviewed were the results of the working group's rankings of PGG's 2013 recommended monitoring objectives. The working group's top recommendation was "Water Supply Aquifer" followed by "Hotspots."

To allow the group time to process and respond to PGG's latest report, the group was asked to review PGG's document after the meeting and submit edits by October 17. The group agreed that PGG's latest proposal would be tentatively placed on the October 20 GWAC agenda, and further agreed to recommend "Water Supply Aquifer" and "Hotspots" as the priority items for an ambient monitoring program to address.

At the November meeting, the primary focus was to answer the questions of GWAC members who declined to make a recommendation on the proposed Ambient Monitoring Network at the October GWAC meeting. To this end PGG (Steve Swope, Pony Ellingson) answered attendees' questions via phone. A variety of questions and concerns were raised and responded to: proximity of monitoring wells to roadways, first water, existing private wells, existing public wells, randomness of well sites, historical nitrate trends, and adequate funding. The discussion

concluded with several [GWAC] members still expressing reservations but willing to support an AMN provided it was considered as a building block to future endeavors, not an end-all/be-all.

At the meeting's conclusion, the group agreed to present PGG's final draft AMN proposal at the November GWAC meeting for that group's approval. They further agreed to discuss the GWAC's budget status.

The "AMN Final Draft Comments from Data Working Group_2016_0706" is included as Attachment [D]

Irrigated Ag (IAWG) (Troy Peters, Chair)

The group met on October 18 and November 15. On both dates the group discussed its agreed-upon solutions that Chair Troy Peters intended to propose to the GWAC: education, soil moisture sensor/irrigation management, soil samples/nutrient management assistance to growers, and outreach to fertilizer companies. The group discussed how these recommendations might be carried out (who, when, how, and at what cost). They considered that for the purposes of the GWMA Plan, they must define what each recommendation would entail, determine the cost, and explain the benefits.

At the November meeting the group agreed to recommend to the GWAC that it request the Washington State Conservation Commission and WSU Extension to receive additional funding in the LYV GWMA for education and outreach, Best Management Practices' (BMP) implementation, irrigation water management, soil nutrient management, and manure management and applications.

Residential, Commercial, Industrial, and Municipal (RCIM) (Dan DeGroot, Chair)

The group met on October 10 and November 14. At the October meeting, Regulatory Framework Working Group Chair Jean Mendoza presented her group's analysis of regulatory statutes, voluntary incentives and regulatory assistance programs. Meeting participants asked her to confirm with Ecology what the requirements were for a National Pollution Discharge Elimination System (NPDES) permit. At the next meeting, David Bowen followed up with an overview of Ecology's NPDES permitting process in the GWMA. The presentation generated additional questions specific to the GWMA that David agreed to research: the number of discharge permits for construction and municipal stormwater, the number of cases of toxic cleanup/removal, collecting a list of NPDES permit in the GWMA, etc.

On-Site Sewage Systems (OSS). The group focused on in-depth investigation of on-site sewage systems at both meetings. They reviewed what made a septic system healthy, what triggered a system to be permitted by the state (output of 3500+ gallons per day), issues with old, improperly engineered systems; systems improperly installed and/or systems not being properly maintained.

Incentives considered were creating an aquifer protection district, providing education, and determining under what circumstance the County might be willing to take on ownership and operation of a community system.

Vern Redifer reminded the group that they should include all proposed alternatives in their recommendation to the GWAC.

Note: the RCIM removed the Abandoned Wells initiative from their agenda pending a joint work group decision to pursue a Department of Health Source Water Protection pilot program.

Regulatory Framework (Jean Mendoza, Chair)

The Regulatory Group met on October 12 and November 9. At the October 12 meeting, Chair Jean Mendoza reported on the recent presentation she had made to the RCIM working group regarding the Regulatory Framework's analysis of regulatory statutes, voluntary incentives and regulatory assistance programs. David Bowen volunteered to find much of the information requested by the RCIM related to her presentation. The group also discussed regulations and actions that drive small farmers out of business and non-point source pollution and Ecology's plan to address this problem. The group also discussed Total Maximum Daily Load (TMDL's); RCW 90.64.180 protocol for monitoring water near dairies and CAFOs; however, it was determined this protocol only addressed monitoring of surface waters.

At its November meeting, the working group reviewed a document Jean had prepared summarizing costs due to nitrate contamination in groundwater in the Lower Yakima Valley. Several questioned the purpose of the exercise. The group then reviewed the document and advised changes that would more accurately reflect actual costs. The group also discussed what other costs growers/producers incur due to elevated nitrates. A member suggested Jean contact Ginny Stern for accurate numbers regarding healthcare costs related to blue baby syndrome.

Composting law was also discussed and handouts provided on abandoned decommissioned wells.

Ginny Prest agreed to obtain information that would reflect a more accurate estimate of the cost to educate dairies to safely apply manure to crops in the GWMA. Jean will pass on the "Summary Washington Rules & Regulations regarding Abandoned and Decommissioned Wells" to the working group.

Livestock/CAFO (David Bowen, Chair)

The Livestock/CAFO Working Group met October 6, November 3, and December 1.

The group concluded the Best Management Practices (BMP) discussion regarding pens, corrals, lagoons/ponds, composting, feed storage, and animal mortality operations. The group agreed to use the NRCS practices relevant to the LYV GWMA Livestock/CAFO as the foundation of BMPs to be recommended for use within the boundaries of the GWMA and may augment with other scientifically-based methods, where appropriate.

In December the working group focused on regulatory framework, alternatives, and recommendations to be forwarded for inclusion in the final Groundwater Management Plan. A draft of areas where agreement was reached was expected to be created and forwarded to the working group for review and discussion in mid-January 2017. Further discussion of this topic was scheduled for January and February meetings.

GWMA Website
The GWMA website continued to be updated in real time.

Contracts and Interlocal Agreements

A contract with Lamar Advertising in the amount of $4000 for the six month "Test Your Wells" billboard campaign in the Lower Yakima Valley was executed on October 4, 2016.

The contract with Paul's Properties LLC in the amount of $1800 for the six month "Test Your Wells" billboard campaign in the Lower Yakima Valley was executed on October 4, 2016.

The contracts are included as Attachment [E]

Attachment A

- Final GWAC meeting summaries of August 18, October 20 and November 17, 2016.
- Draft GWAC meeting summary of December 15, 2016.
- GWAC agendas, attendance roster records, and public meeting notices for October 20, November 17 and December 15, 2016.
- Irrigated Ag Working Group (IAWG) summaries of October 18 and November 15, 2016.
- Residential, Commercial, Industrial and Municipal (RCIM) Working Group summaries of October 10 and November 14, 2016.
- Data Collection, Characterization and Monitoring Working Group summaries of October 12, and November 9, 2016.
- Regulatory Framework Working Group summaries of October 12 and November 9, 2016.
- Livestock/CAFO Working Group summaries of October 6, November 3 and December 1, 2016.
- Abandoned Wells Joint Working Group summary of December 5, 2016.

YAKIMA VALLEY GROUNDWATER MANAGEMENT AREA ADVISORY COMMITTEE (GWAC)

MEETING SUMMARY

Thursday, August 18, 2016 – 5:00 p.m. – 7:00 p.m.

Radio KDNA Conference Rooms 1 & 2
121 Sunnyside Avenue, Granger, WA

Note: This document is only a summary of issues and actions of this meeting. It is not intended to be a transcription of the meeting, but an overview of points raised and responses from Yakima County and Groundwater Advisory Committee members. It may not fully represent the ideas discussed or opinions given. Examination of this document cannot equal or replace attendance.

I. Call to Order: This meeting was called to order at 5:05 PM by Jim Davenport, Facilitator.

Member	Seat	Present	Absent
Stuart Turner	Agronomist, Turner and Co.,		✓
Chelsea Durfey		✓	
Bud Rogers	Lower Valley Community Representative Position 1	✓	
Kathleen Rogers	Lower Valley Community Representative Position 1 (alternate)	✓	
Patricia Newhouse	Lower Valley Community Representative Position 2	✓	
Sue Wedam	Lower Valley Community Representative Position 2 (alternate)	✓	
Doug Simpson	Irrigated Crop Producer	✓	
Jean Mendoza	Friends of Toppenish Creek	✓	
Eric Anderson	Friends of Toppenish Creek (alternate)		✓
Jan Whitefoot	Concerned Citizens of the Yakama Reservation		✓
Jim Dyjak	Concerned Citizens of the Yakama Reservation (alternate)	✓	
Steve George	Yakima County Farm Bureau	✓	
Frank Lyall	Yakima County Farm Bureau (alternate)		✓
Jason Sheehan	Yakima Dairy Federation		✓
Dan DeGroot	Yakima Dairy Federation (alternate)		✓
Ron Cowin	Roza-Sunnyside Joint Board of Control	✓	
	Roza-Sunnyside Joint Board of Control (alternate)		
Laurie Crowe	South Yakima Conservation District	✓	

Jim Newhouse	South Yakima Conservation District (alternate)		✓
Robert Farrell	Port of Sunnyside	✓	
John Van Wingerden	Port of Sunnyside (alternate)		✓
Rand Elliott	Yakima County Board of Commissioners	✓	
Vern Redifer	Yakima County Board of Commissioners (alternate)	✓	
Dave Cole	Yakima Health District		✓
Ryan Ibach	Yakima Health District		✓
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center		✓
Lucy Edmondson	U.S. Environmental Protection Agency	✓	
Marie Jennings	U.S. Environmental Protection Agency (alternate)		✓
Elizabeth Sanchey	Yakama Nation		✓
Stuart Crane	Yakama Nation (alternate)	✓	
Virginia "Ginny" Prest	WA Department of Agriculture	✓	
Jaclyn Hancock	WA Department of Agriculture (alternate)		✓
Andy Cervantes	WA Department of Health	✓	
Ginny Stern	WA Department of Health (alternate)		✓
David Bowen	WA Department of Ecology		✓
Sage Park	WA Department of Ecology	✓	
Lino Guerra	Hispanic Community Representative	✓	
Rick Perez	Hispanic Community Representative (alternate)		✓
Jessica Black	Heritage University	✓	
Matt Bachmann	USGS	✓	

*via phone

II. Welcome & Meeting Overview

Jim Davenport called the meeting to order at 5:04 PM and asked the group to pause briefly in a moment of silence. The members and guests then introduced themselves.

III. Working Group Reports

RCIM Working Group: No report presented.

Irrigated Ag Working Group (IAWG): No report presented.

Data Working Group: Melanie Redding updated the group on the status of the Ambient Groundwater Monitoring Network (AMN). She pointed out that the GWAC has yet to decide who would run the AMN program, who would analyze the data, and how it will be funded long term. Melanie went on to say that the Data group had discussed other previously identified monitoring options. The group's goal was to vote and prioritize their top three choices, but had been unable to do so at the August meeting because of low member turnout. The group also discussed other methods of useful monitoring networks.

In addition, Matt Bachmann from the USGS presented his Particle Tracking Model and the group contemplated how it could be used with current and future GWMA initiatives. Melanie gave an update on the Nitrogen Loading Assessment which she hoped would be to the committees soon. Finally, Melanie provided information compiled from the Yakima County and Department of Ecology websites on what other GWMA's were doing (*Washington, Oregon and California*) *as a source for other potential monitoring options.* Melanie reminded the GWAC committee that she and Ginny Stern would be presenting a basic groundwater presentation one hour prior to the October 20 GWAC meeting. She is working with EPO to coordinate outreach and Spanish translation.

Livestock/CAFO: The group's report was prepared by Chair David Bowen and given by Sage Park. The major areas of discussion included meeting the GWAC timeline, anticipation of receipt of the Nitrogen Loading Study, review, refining and prioritization of best management practices (BMP's), regulatory framework, implementation funding, and the recent release of Ecology's draft CAFO General Permit (the comment period for this has been extended to August 31, 2016). The Regulatory Framework working group provided an overview of the rules, laws, and voluntary programs at the group's August meeting. Next steps for the group will be to identify any regulatory gaps and areas of improvement of potential regulatory changes that could or should be implemented.

Regulatory Framework Working Group: Jean Mendoza handed out a copy of her report which included directions to view videos of the 2016 GWAC and Regulatory Framework meetings. Jean has also posted Regulatory Framework meeting summaries and supporting documents to her website. In the last few months the Regulatory group heard a presentation on the Yakima County Voluntary Stewardship Program which is an effort to provide solutions to protect water and preserve farm land. In addition, the group worked on their presentations for the Livestock/CAFO, Irrigated Ag (IAWG) and RCIM working groups. Jean provided an outline. The group presented to Livestock/CAFO in August and hoped to present to Irrigated Ag and RCIM at their October meetings. The group had also discussed both the application of fertilizers and manures to crop land and atmospheric deposition. These sources will be presented to the IAWG for their consideration. Ginny Prest asked that the information she had handed out to the GWAC (WSDA "Implementation of Nutrient Management Training Program for Farmers") be included in the presentation. Jean noted that she had raised the issue of doing a cost benefit analysis to the group, however, the group was reluctant to take on the task and asked Jean to come back with more specific proposals before considering the topic again. Vern clarified and said that while he was interested in identifying the cost of each proposed strategy for implementation, the difficulty lies in quantifying the benefits of subjective strategies.

Education and Public Outreach (EPO) Working Group: Lisa Freund announced that the outreach group had staffed five health fairs between May and August in the GWMA and thanked all those who volunteered. The health fairs had allowed one-on-one contact with approximately 250 Lower Valley residents. Volunteers passed out surveys, test strips and brochures with other pertinent information. Their greatest take-away was that many people still had not heard the GWAC's message and, therefore, the EPO group was proposing a billboard campaign which would be outlined later on in the agenda. Lisa added that the group had not been contacted by any of the working groups after the June GWAC call for legislative proposals. A member asked what the EPO Working Group had done in the last three years to educate the public about protection, prevention and participation. Lisa noted several activities including the door-to-door campaign done by Heritage University, informational posters and banners in the County Courthouse, television and radio ads, the well assessment survey and the five health fairs in addition to the proposed billboard campaign. Lisa went on to say that all of these endeavors provided the public with a contact phone number and directions to the website so that individuals could get questions answered and obtain additional information. The member (a participant in the EPO working group) stated that she had several educational ideas and wanted to know how those should be presented. Both Lisa and Jim Davenport responded that any recommendations for eduction should be brought to the EPO. If the EPO working group felt they met the GWAC's goals the group would then make recommendations to the GWAC. The member replied that they did not believe that the GWAC approved EPO's presence at the health fairs; Lisa responded that approval had been sought by the EPO and received at the April GWAC meeting and noted that she would not disrespect the GWAC by not asking for their approval.

IV. Don Stuart Presentation

Jim Davenport reminded the group that this item had been tabled from the previous meeting. Melanie stated that she had heard Don Stuart speak at a seminar and believed his presentation would be beneficial to the group as they were deciding how to move forward and thinking about how to work together. She recommended the members look at the presentation which would be available soon on the County website or read the book Mr. Stuart had written, "Barnyards and Birkenstocks – Why Farmers and Environmentalists Need Each Other." Lucy Edmondson also believed it could cause agricultural and environmental communities to think differently. A member objected, desiring additional background information. A discussion ensued and the presentation was tabled until the next meeting as the group could not reach a consensus.

V. Working Groups' Requests to the Legislature

Vern handed out a document entitled "GWMA Expenditures through July 31, 2016" which he noted was a condensed version (like columns were combined) of a 50 page document. He noted that the original Ecology grant was for $2.3 million and to date $1.4 million had been spent which should be sufficient to fund activities through December 2017. Long-term funding requests, i.e., ambient network monitoring and testing, however, would still need to be sought. Vern spoke with David Bowen and requested that he put a placeholder for long-

term funding in the Ecology budget. Sage said she would double check on the placeholder. A member asked about funding for the items remaining after December 2017, as she assumed that the SEPA process and public meetings would take place after this deadline. Vern said he hoped all of this would be done before the end of 2017 thus negating the need for additional funding but stated that the group would continue until the Department of Ecology accepted the program. The member was also concerned that there were only eight more GWAC meetings and suggested the group return to meeting monthly. Vern felt the group could wait until there were more substantive things to discuss; however, working groups might want to consider meeting more frequently. A member desired an explanation of the column entitled "equipment rental." Vern explained these charges were for County vehicles used to transport staff and equipment to meetings and outreach events. Another member wanted to affirm that if Rand went to the legislature for additional funding that the request would be approved by the committee prior to Rand making the request.

VI. Report on International Groundwater Conference (San Francisco)

Rand Elliott, Ginny Prest and Ginny Stern attended this conference in June. Rand reported hundeds of people attended with 60 countries represented. He came away with a clear realization that the problem is not unique and there is no "one size fits all" solution. He was reminded at the conference to look at the whole water picture and not get too focused on a single aspect. Rand also noted the following points: 1) If there is no agriculture there is no food. 2) There is a cost to everything – industry, farming, coming to the GWAC meeting in a car – none of these things can be eliminated and actions create unintended consequences. 3) The group should be aware of septic sources and legacy nitrogen and answers must be through science not emotions. 4) Farming can be a green renewable industry but nitrogen is essential to produce crops and timing, rate, source, rainfall, soil types all must be considered for proper nitrogen management. 5) Farmers need information and shared data if they are going to change. 6) Who can do that? Perhaps an extension service but each group should do what works, what is economical and education should be provided by someone they are willing to listen to. 7) The conference also confirmed the need for soil testing and water monitoring for measuring success and that fertilizer, manure and septic show up differently. 8) There are ways to measure, e.g., borax would indicate septic as it's in a lot of household products. Iodine is attributable most likely to dairies as it is used as an antiseptic. In conclusion, Rand reminded everyone of the importance to improve water quality and preserve profitability – there needs to be a balance between economics and environment. He added that there are many barriers to change: economic, cultural, demographics, institutional and environmental. Each affects a farmer's decision to varying degrees, but only one keeps a farmer from changing. Figure out that barrier and you could solve the problem. Ginny Prest stated that she heard many times about legacy nitrates and the lag time between making changes on the surface and the difference in the nitrate levels. Ginny was encouraged by Rand's attendance and desire to listen and learn as it reinforced to her that the GWAC had good leadership. A member asked if the members would have access to the materials from the conference. Ginny said all had been recorded and that she would advise as soon as the

presentations were posted to the web. The member appreciated Rand's comments on the need for data noting that people were reluctant to share soil sampling results. Rand responded that there continued to be barriers to publicly putting this information on the internet but ultimately the GWAC would decide this issue. Rand also felt that there was already lots of data out there for education that the industry could use.

EPO Recommendation to the GWAC: "Test Your Well" Billboard Campaign

Lisa Freund asked the members to look at the billboard proposals. She explained that EPO suggested three billboards (five sides) in three locations in the heart of the GWMA. Lisa also provided mock-ups and pointed out that the actual ad would include the website and phone number and two of the five would be in Spanish. Lisa advised that member Pat Newhouse knew of a family with two sons (ages 2 and 3) that reflect the demographics and are willing to appear in the ads and sign a release. Another member noted that these kids were not in the age group at risk. A member wondered if the well tests would be part of the GWMA cost – Lisa said no but that the County still had a number of test strips that could be mailed out. A member suggested that the ad read: "Test your private well." Jim Davenport asked the group if anyone objected to the proposal. A member stated that she thought the work should be done by the Department of Health. Another member believed that a significant number of people were not aware of the GWMA's message and the billboards provided a continual presence. Another member noted that he was supportive of the effort, felt that the location/area targeted was appropriate and that people impacted by nitrates would drive by the sign day after day allowing the message to sink in. The objecting member withdrew her objection and approval of the billboard proposal was unanimous.

VII. Committee Business

After confirmation that a quorum was present the committee approved the June 16, 2016, meeting summary as presented.

VIII. Public Comment

None. Jim Davenport announced that he would be leaving for England to visit family and would be travelling indefinitely through the fall. Therefore, he was going off-contract with the County and did not anticipate attending the October 2016, GWAC meeting. He and Vern would be in touch to work out a plan for the future. A member wondered who would be doing the writing for the GWAC (documents summarizing the rules and regulations and the characterization in Jim's absence). Vern said he would work that out with Jim Davenport, Rand and David Bowen. The meeting was adjourned at 6:43 PM.

IX. Next Meeting

Thursday, October 20, 2016, 5:00-7:00 PM, Location: *Denny Blaine Boardroom, 810 East Custer Ave., Sunnyside, WA.*

X. Next Steps

Meeting summary approved by the GWAC on November 17, 2016.

YAKIMA VALLEY GROUNDWATER MANAGEMENT AREA ADVISORY COMMITTEE (GWAC)

MEETING SUMMARY

Thursday, October 20, 2016 – 5:00 p.m. – 7:00 p.m.

Denny Blaine Boardroom
810 East Custer Avenue, Sunnyside, WA

Note: This document is only a summary of issues and actions of this meeting. It is not intended to be a transcription of the meeting, but an overview of points raised and responses from Yakima County and Groundwater Advisory Committee members. It may not fully represent the ideas discussed or opinions given. Examination of this document cannot equal or replace attendance.

I. Call to Order: This meeting was called to order at 5:05 PM by Vern Redifer, Facilitator.

Member	Seat	Present	Absent
Stuart Turner	Agronomist, Turner and Co.,	✓	
Chelsea Durfey			✓
Bud Rogers	Lower Valley Community Representative Position 1	✓	
Kathleen Rogers	Lower Valley Community Representative Position 1 (alternate)	✓	
Patricia Newhouse	Lower Valley Community Representative Position 2	✓	
Sue Wedam	Lower Valley Community Representative Position 2 (alternate)		✓
Doug Simpson	Irrigated Crop Producer	✓	
Jean Mendoza	Friends of Toppenish Creek	✓	
Eric Anderson	Friends of Toppenish Creek (alternate)		✓
Jan Whitefoot	Concerned Citizens of the Yakama Reservation		✓
Jim Dyjak	Concerned Citizens of the Yakama Reservation (alternate)	✓	
Steve George	Yakima County Farm Bureau	✓	
Frank Lyall	Yakima County Farm Bureau (alternate)		✓
Jason Sheehan	Yakima Dairy Federation		✓
Dan DeGroot	Yakima Dairy Federation (alternate)	✓	
Ron Cowin	Roza-Sunnyside Joint Board of Control	✓	
	Roza-Sunnyside Joint Board of Control (alternate)		
Laurie Crowe	South Yakima Conservation District	✓	

Jim Newhouse	South Yakima Conservation District (alternate)		✓
Robert Farrell	Port of Sunnyside	✓	
John Van Wingerden	Port of Sunnyside (alternate)		✓
Rand Elliott	Yakima County Board of Commissioners	✓	
Vern Redifer	Yakima County Board of Commissioners (alternate)	✓	
Dave Cole	Yakima Health District	✓	
Ryan Ibach	Yakima Health District (alternate)		✓
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center	✓	
Lucy Edmondson	U.S. Environmental Protection Agency	✓	
Peter Contreras	U.S. Environmental Protection Agency (alternate)	✓	
Elizabeth Sanchey	Yakama Nation		✓
Stuart Crane	Yakama Nation (alternate)	✓	
Virginia "Ginny" Prest	WA Department of Agriculture	✓	
Jaclyn Hancock	WA Department of Agriculture (alternate)		✓
Andy Cervantes	WA Department of Health		✓
Ginny Stern	WA Department of Health (alternate)	✓	
David Bowen	WA Department of Ecology	✓	
Sage Park	WA Department of Ecology		✓
Lino Guerra	Hispanic Community Representative	✓	
Rick Perez	Hispanic Community Representative (alternate)		✓
Jessica Black	Heritage University		✓
Matt Bachmann	USGS		✓

II. Welcome & Meeting Overview

Vern Redifer welcomed everyone and announced that Jim Davenport was back and would rejoin the group shortly. Vern thanked Melanie Redding and Ginny Stern for the pre-meeting presentation of their groundwater primer which he found to be quite illustrative. The members and guests introduced themselves and spent a moment in silence to prepare for the meeting. There were no additions to the agenda.

III. Working Group Reports

Data Working Group: Melanie Redding gave an update on the work her group had done on the Ambient Groundwater Monitoring Network proposal which would be presented later on in the meeting. The Data group had also discussed and prioritized the other monitoring initiatives presented by PGG in 2013 and recommended common water supply aquifers and hot spots as its top two choices. Matt Bachmann from USGS had presented an overview of

the particle tracking model at a Data meeting. The group's goal had been to determine if this work could benefit current or future efforts. Melanie updated everyone on the status of the Nitrogen Loading Assessment which is still in peer review. Last of all Melanie stated that the Data group had discussed abandoned wells which began a Committee discussion of several possible actions. Finally it was suggested that Vern schedule a joint session of the working groups since several of them had spent time on the topic already to explore this matter further.

Livestock/CAFO: Chair David Bowen said the group had focused on the following dairy practices: pens, corrals, lagoons/ponds, composting, feed storage and animal mortality operations. They have had ongoing discussions on Best Management Practices (BMPs) and had agreed to use the Natural Resource Conservation Service (NRCS) practices relevant to the Lower Yakima Valley GWMA livestock/CAFO's as the foundation of the BMPs to be recommended for use and may augment with other scientifically based methods where they saw gaps when appropriate. Periodic updates had also been provided to the group on the Department of Ecology draft CAFO General Permit.

Irrigated Ag Working Group (IAWG): Troy Peters said that his group had focused on solutions *to recommend to the Legislature and the group was in agreement on the following:* 1) resources and efforts behind education and outreach; 2) help and tools for irrigation water management i.e., soil moisture sensors or consulting on when to turn the water off and on; 3) economic help for growers to do soil sampling and nutrient management; and, 4) an effort to engage and work with the fertilizer industry to encourage them to aid in the effort to effect needed changes. Troy said that the group still needs to work through the details of how to carry out and pay for each of these goals. Troy was open to any other suggestions the committee might have but added that the IAWG was not inclined to add any regulations at this time even though they recognized they may have the ability to make changes because they believed that they would hurt people at the same time. A member asked if the group discussed the monetary savings of water management. Troy indicated the group had not only discussed this but also discussed the monetary savings of nutrient management and both would be a part of the educational component.

RCIM Working Group: Dan Degroot reported that the group was attempting to confirm with the Department of Ecology that they were monitoring (via the NPDES permit) the commercial, industrial and municipal portion of the committee's work. The group hoped to learn what various entities were discharging and when, obtain samples of the reports and specifics of what Ecology does to analyze, chart or monitor each permit. David Bowen will obtain this information for the group and stated that Ecology analyzes exceedances very closely on a monthly basis and also looks for seasonal and annual trends.

Dan said that onsite sewage systems (OSS) continue to be a topic discussed by the committee as they do little to treat for nitrogen. Ginny Stern and Leslie Turner (Department of Health) recently attended a meeting and provided the group with a great deal of information on these systems. The group is concerned about outdated systems (that were not correctly engineered or installed), systems that are not maintained, systems that have a larger population than they are designed for and systems found close to each other (more than 40 systems per square mile – 16 acres per system) because when density reaches this level the groundwater begins to receive more nitrogen than it can dilute adequately before the next well is encountered. Dan stated that the GWMA features many high density areas. Vern added that the groundwater primer illustrated this well.

Regulatory Framework Working Group: Jean indicated that her group made presentations to Livestock/CAFO, Irrigated Ag (this presentation included Ginny Prest from WSDA) and RCIM and passed out their "Analysis of Regulatory Statutes, Voluntary Incentives and Regulatory Assistance Programs" to each. Jean summarized their presentations. In addition, the group is holding discussions on non-point source pollution, composting and WAC 173.350.500 *in order to look more closely at regulations and exemptions for the dairy* industry, regulations for decommissioning abandoned wells, atmospheric deposition, Total Maximum Daily Loads (TMDL's) and RCW 90.64.180 Protocol for monitoring waters near dairies and CAFO's with its Executive Summary.

Education and Public Outreach (EPO) Working Group: Lisa Freund reminded everyone that *the GWAC had approved the "test your well" concept and budget EPO had recommended at* the August GWAC meeting and noted that two of the three billboards were now under rental agreements: 1) Lamar ($4,000) on the Yakima Valley Highway and 11th in Sunnyside which will go live on December 12; and, 2) Tom Paul ($1,800) located at 1600 1st Street in Sunnyside which will go live January 1st. Pat Newhouse explained that the photo shoot had taken place in her home on October 16 with two little boys who lived in the GWMA. She believed the boys responded well and the committee would be pleased with the pictures. The photographer had donated his time and the parents had signed a release for use.

IV. Approval of the Ambient Groundwater Monitoring Plan

Melanie Redding addressed the group regarding the June 8, 2016 Lower Yakima Valley GWMA Proposed Ambient Groundwater Monitoring Network plan. She reminded everyone that at the February 2015 GWAC meeting the group had agreed that an ambient groundwater monitoring system was needed with the following characteristics: 35-40 purpose-built wells with linear-flow patterns that were dispersed enough to look at different areas of the GWMA and down to the water table/shallow aquifer. She added that PGG had also included a proposal to monitor drains separately. Melanie noted that the goal of both of these projects was to look at the quality of the water over time and that the ambient groundwater

monitoring network was designed to be a baseline – wells or other systems could be added later to answer other questions.

Melanie explained how PGG located the well sites randomly on a priority basis and that all were within the boundaries of public access so that Yakima County could always monitor them. The committee proceeded asking questions and discussing a variety of topics which included whether there was an adequate number of wells to meet scientific needs, placement of the wells, the importance of drilling new wells and whether surface contamination could occur in these specifically drilled wells, concern that the wells would be roadside and therefore suceptible to contamination, the usefulness of data for other purposes, whether any wells should be site specific, whether adjacent property owners would be made aware of the locations, and the ability to test since the water table varies seasonally. Discussion ensued. A member requested that the attributes of each individual site be noted.

Rand and Vern explained that the first step in the process was for the GWAC to approve the proposed plan. The County would then begin its process to procure competitive installation bids. They noted that doing this in a timely manner would allow the group to obtain four samplings prior to the committee's presentation to the Legislature. Vern believed this was an important component of the GWAC's recommendations back to the Legislature and that the GWAC budget included the resources to begin well installation and testing costs. Vern then asked for a show of hands of who felt ready to make a decision regarding the Ambient Groundwater Monitoring Plan. All but four members raised their hands indicating they were ready to make a decision. Vern then asked the four members what they needed to reach a decision. A member suggested—and it was agreed—that a meeting with PGG to obtain more information would help them come to a decision. Vern agreed to schedule the meeting with PGG and the four committee members for this purpose.

V. Budget Discussion

Vern distributed his "GWAC Budget Discussion 10-20-2016" for the group's review. Due to time constraints, the discussion about reallocating the remaining funds will take place at the next meeting.

VI. Public Comment

None. The meeting was adjourned at 7:30 PM. All other agenda items were postponed.

VII. Next Meeting

The group agreed to cancel its December meeting and meet again in November. A meeting was scheduled for November 17, 2016, 5:00-7:00 PM, Location: *Denny Blaine Boardroom, 810 East Custer Ave., Sunnyside, WA.*

VIII. Next Steps

- Schedule a meeting with a PGG representative and the four members who would like additional information regarding the June 8, 2016 *Lower Yakima Valley GWMA Proposed Ambient Groundwater Monitoring Network*.
- Schedule a joint working group meeting to discuss abandoned wells.
- Review the budget allocation worksheet at the November meeting.
- Reach a decision regarding the proposed Ambient Groundwater Monitoring Plan.

Meeting summary approved by the GWAC on November 17, 2016.

YAKIMA VALLEY GROUNDWATER MANAGEMENT AREA ADVISORY COMMITTEE (GWAC)

MEETING SUMMARY

Thursday, November 17, 2016 – 5:00 p.m. – 7:00 p.m.

Denny Blaine Boardroom
810 East Custer Avenue, Sunnyside, WA

Note: This document is only a summary of issues and actions of this meeting. It is not intended to be a transcription of the meeting, but an overview of points raised and responses from Yakima County and Groundwater Advisory Committee members. It may not fully represent the ideas discussed or opinions given. Examination of this document cannot equal or replace attendance.

I. **Call to Order:** This meeting was called to order at 5:03 PM by Vern Redifer, Facilitator.

Member	Seat	Present	Absent
Stuart Turner	Agronomist, Turner and Co.,	✓	
Chelsea Durfey			✓
Bud Rogers	Lower Valley Community Representative Position 1	✓	
Kathleen Rogers	Lower Valley Community Representative Position 1 (alternate)	✓	
Patricia Newhouse	Lower Valley Community Representative Position 2	✓	
Sue Wedam	Lower Valley Community Representative Position 2 (alternate)	✓	
Doug Simpson	Irrigated Crop Producer	✓	
Jean Mendoza	Friends of Toppenish Creek	✓	
Eric Anderson	Friends of Toppenish Creek (alternate)		✓
Jan Whitefoot	Concerned Citizens of the Yakama Reservation		✓
Jim Dyjak	Concerned Citizens of the Yakama Reservation (alternate)	✓	
Steve George	Yakima County Farm Bureau	✓	
Frank Lyall	Yakima County Farm Bureau (alternate)		✓
Jason Sheehan	Yakima Dairy Federation	✓	
Dan DeGroot	Yakima Dairy Federation (alternate)	✓	
Ron Cowin	Roza-Sunnyside Joint Board of Control	✓	
	Roza-Sunnyside Joint Board of Control (alternate)		
Laurie Crowe	South Yakima Conservation District	✓	

Jim Newhouse	South Yakima Conservation District (alternate)		✓
Robert Farrell	Port of Sunnyside	✓	
John Van Wingerden	Port of Sunnyside (alternate)		✓
Rand Elliott	Yakima County Board of Commissioners	✓	
Vern Redifer	Yakima County Board of Commissioners (alternate)	✓	
Dave Cole	Yakima Health District	✓	
Ryan Ibach	Yakima Health District (alternate)		✓
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center		✓
Lucy Edmondson	U.S. Environmental Protection Agency	✓	
Peter Contreras	U.S. Environmental Protection Agency (alternate)		✓
Elizabeth Sanchey	Yakama Nation		✓
Stuart Crane	Yakama Nation (alternate)	✓	
Virginia "Ginny" Prest	WA Department of Agriculture	✓	
Jaclyn Hancock	WA Department of Agriculture (alternate)		✓
Andy Cervantes	WA Department of Health	✓	
Ginny Stern	WA Department of Health (alternate)		✓
David Bowen	WA Department of Ecology	✓	
Sage Park	WA Department of Ecology		✓
Lino Guerra	Hispanic Community Representative		✓
Rick Perez	Hispanic Community Representative (alternate)		✓
Jessica Black	Heritage University		✓
Matt Bachmann	USGS	✓	

II. Welcome, Meeting Overview and Introductions: Vern Redifer welcomed everyone and reviewed the agenda. There were no additions. Everyone introduced themselves and spent a moment in silence preparing for the meeting.

III. Approval of the Ambient Groundwater Monitoring (AMN) Plan, Discussion of Other Monitoring Objectives and the Budget: Vern explained that Melanie was unable to attend the GWAC meeting but had prepared a power point presentation that he would narrate. The presentation served as an overview of the recent Data Collections Working Group meeting which had allowed everyone to voice any concerns or questions they might have. In the presentation Melanie explained that the group would need to consider four different topics: the network itself, other monitoring initiatives (which the Data group had narrowed down to two additional priorities – common water supply and hot spot identification), the budget and the Quality Assurance Project Plan (QAPP) which needs to be updated as it was

done in 2014. Melanie then outlined the concerns raised at the meeting and noted the concessions and agreements that resulted. Further, she believed this group needed to consider and talk about all four components collectively. Vern agreed. He believed confusion had resulted because the topics hadn't been discussed simultaneously and accordingly invited the members of the GWAC to begin their discussion. Vern also pointed out several maps he had provided which were posted around the room as he felt these maps would aid in the group's understanding and discussion.

Members voiced the following concerns:

1. There was no need to test drains and the cost of this testing could fund two or three additional purpose built wells or the testing of domestic wells.
2. Other GWMAs utilized existing public and rural domestic wells for testing rather than building purpose built wells; it was significantly less expensive and increased the number of wells that could be tested.
3. The group should test common water supply aquifers.
4. The value of data increases when the number of test sites is greater.
5. Existing wells will give the group information on trends more quickly.
6. Only one well in the AMN was in a UGA while there were several UGAs in the GWMA.
7. They were not opposed to the AMN plan if a concurrent plan is ready to go.

Responses to the concerns raised were:

1. There would be full control of the wells which provided long-term certainty for testing.
2. There was value in having the data at first water as deeper wells won't reveal where the contamination comes from.
3. Because of the previous work done to gather information through well head assessments another 250 data points are available which were plotted on the maps that Vern provided.
4. The AMN plan does not stand by itself but as a supplement to other monitoring initiatives.
5. Other GWMAs didn't have the funds to consider purpose built wells.
6. Purpose built wells at shallow depths will reveal changes to the groundwater quickly.
7. Building consistency and location randomness of the wells is important.
8. The money has already been set aside for this plan.
9. Monitoring the drains would be a relatively inexpensive option.

During the discussion the group looked at the budget document Vern had prepared. He pointed out that while the group had spent $1,207,957, there remained available $1,156,043 through the end of September; it was noted later that approximately $10-15,000 remained outstanding from September. Of that, $332,000 was left in the contingency budget. Also, of $443,000 allocated to deep soil sampling only $288,692 had been spent. The group could decide if this was still a priority as only 34 fields were tested in the spring of 2016. In addition, $60,000 was set aside to do dairy pens and manure storage sampling which the GWAC had not done and $10,000 for a lagoon assessment based on EPA data. The group could also decide if these items were still priorities. Vern did state that he does need $83,000 for administrative funding for Yakima County, but the group could consider redoing its budget taking these other things into consideration. When questioned, Vern added that grant money could not be paid in advance to contractors; the work must be performed by December 2017.

The group also discussed testing the area downstream from the dairy cluster which is currently not in the AMN plan as they are being tested per the Consent Order by the EPA on County owned sites making testing information available to the County. Some members were concerned about a bias while others noted that these purpose-built wells had been examined and vetted by the EPA. Concern was also voiced about building purpose built wells if the testing of these wells would end December 2017 when the GWMA's mandate and funding ends. David Bowen stated that, in coordination with Yakima County as the lead entity, the Department of Ecology would continue to monitor the wells as it is the first priority in their business plan. A member inquired as to who would decide whether to pursue active or passive monitors. Vern believed the recommendation had been for passive testing and he would make the decision. Passive monitors cost less in the short term and active monitors cost less in the long term. Neither is better than the other; the real cost is the sampler. A member also wanted to know when the group would formulate a plan to analyze the data acquired from these wells. Both the USGS and WSDA had volunteered to do the analysis previously. David also noted that this could be included in his Environmental Assessment Program. The group then wondered how quickly they could move forward with common water supply testing. Vern indicated that the QAPP would need to be refined first. A member pointed out that Benton County was just finishing its QAPP which could be used as a reference. Vern said that once the plan was in place the group would be able to vote on it at the following GWAC meeting and when approved everything else would fall into place quickly.

Vern then asked the group if anyone didn't want to proceed with the AMN plan as proposed. Two members weren't ready to proceed. Both felt that plans for purpose built wells and existing wells should proceed simultaneously to fill in holes. Upon further discussion, the group agreed to authorize Vern to contact contractors and develop a sample plan to monitor common water supply and develop a sampling QAPP for the group to consider at next month's meeting. The group could also consider who will analyze the data. With that the group agreed to move ahead with the AMN plan.

IV. **Budget:** Although the group had already discussed the budget Vern did not feel the group had enough information to make the decisions necessary to amend the budget. Vern suggested the group address the budget again at the next meeting. In the interim he encouraged everyone to review the budget handout and consider what funds could be reallocated (as noted above) and what items needed to be funded. Specifically, was there a need for deep soil sampling? A member was also concerned whether the group needed to do more in terms of communicating with the public.

V. **Working Group Reports:** Vern gave the working group chairs an opportunity to report, but given the lateness of the hour no one felt it was necessary. Vern stated that he had attended most of the working group meetings and felt they were making progress.

VI. **Committee Business:** The group approved both the August 18 and October 20, 2016 GWAC meeting summaries as presented. Jim Davenport commended the group for its courteous interaction and suggested the group keep this model for discussion with Vern facilitating.

VII. **Public Comment:** The public expressed gratification for all the group had accomplished. The meeting was adjourned at 6:52 PM.

VIII. **Next Steps:**

-Vern to contact contractors and develop a sampling QAPP for the group to consider.
-Move ahead with the Ambient Groundwater Monitoring Network plan.
-Move ahead to consider how the data from the AMN will be analyzed.
-Members to review the budget allocation worksheet giving consideration to what projects need to be funded and what funds could be reallocated for discussion at next month's meeting.

IX. **Next Meeting:** the group decided to convene the GWAC meeting scheduled for December 15, 2016, 5:00-7:00 PM. Location: *Radio KDNA, 121 Sunnyside Avenue, Granger, WA.*

X. Meeting Summary: approved by the GWAC on December 15, 2016.

YAKIMA VALLEY GROUNDWATER MANAGEMENT AREA ADVISORY COMMITTEE (GWAC)

MEETING SUMMARY

Thursday, December 15, 2016 – 5:00 p.m. – 7:00 p.m.

Radio KDNA Conference Rooms 1 & 2
121 Sunnyside Avenue, Granger WA

Note: This document is only a summary of issues and actions of this meeting. It is not intended to be a transcription of the meeting, but an overview of points raised and responses from Yakima County and Groundwater Advisory Committee members. It may not fully represent the ideas discussed or opinions given. Examination of this document cannot equal or replace attendance.

I. **Call to Order:** This meeting was called to order at 5:09 PM by Vern Redifer, Facilitator.

Member	Seat	Present	Absent
Stuart Turner	Agronomist, Turner and Co.,	✓	
Chelsea Durfey			✓
Bud Rogers	Lower Valley Community Representative Position 1		✓
Kathleen Rogers	Lower Valley Community Representative Position 1 (alternate)		✓
Patricia Newhouse	Lower Valley Community Representative Position 2	✓	
Sue Wedam	Lower Valley Community Representative Position 2 (alternate)	✓	
Doug Simpson	Irrigated Crop Producer	✓	
Jean Mendoza	Friends of Toppenish Creek	✓	
Eric Anderson	Friends of Toppenish Creek (alternate)		✓
Jan Whitefoot	Concerned Citizens of the Yakama Reservation		✓
Jim Dyjak	Concerned Citizens of the Yakama Reservation (alternate)		✓
Steve George	Yakima County Farm Bureau	✓	
Frank Lyall	Yakima County Farm Bureau (alternate)		✓
Jason Sheehan	Yakima Dairy Federation	✓	
Dan DeGroot	Yakima Dairy Federation (alternate)		✓
Ron Cowin	Roza-Sunnyside Joint Board of Control	✓	
	Roza-Sunnyside Joint Board of Control (alternate)		
Laurie Crowe	South Yakima Conservation District	✓	

Jim Newhouse	South Yakima Conservation District (alternate)		✓
Robert Farrell	Port of Sunnyside		✓
John Van Wingerden	Port of Sunnyside (alternate)	✓	
Rand Elliott	Yakima County Board of Commissioners	✓	
Vern Redifer	Yakima County Board of Commissioners (alternate)	✓	
Dave Cole	Yakima Health District		✓
Ryan Ibach	Yakima Health District (alternate)	✓	
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center		✓
Lucy Edmondson	U.S. Environmental Protection Agency		✓
Peter Contreras (by phone)	U.S. Environmental Protection Agency (alternate)	✓	
Elizabeth Sanchey	Yakama Nation		✓
Stuart Crane	Yakama Nation (alternate)		✓
Virginia "Ginny" Prest (by phone)	WA Department of Agriculture	✓	
Jaclyn Hancock	WA Department of Agriculture (alternate)		✓
Andy Cervantes	WA Department of Health	✓	
Ginny Stern	WA Department of Health (alternate)		✓
David Bowen	WA Department of Ecology	✓	
Sage Park	WA Department of Ecology		✓
Lino Guerra	Hispanic Community Representative	✓	
Rick Perez	Hispanic Community Representative (alternate)		✓
Jessica Black	Heritage University		✓
Matt Bachmann	USGS	✓	

II. Welcome, Meeting Overview and Introductions: Vern Redifer had everyone present introduce themselves. He then asked everyone to pause for a moment in order to prepare for the meeting and reviewed the evening's agenda.

III. Budget Discussion: Vern asked everyone to refer to the budget worksheets he had provided to facilitate the group's discussion. He noted that the unspent funding balance was $1,156,043. Of that, Yakima County would require $128,362 in the next year to complete its administrative work, write and coordinate the plan, maintain the database, GIS, website, facilitation and RCIM loading which left $1,027,681 in funding that could be reallocated from the group's previous budget.

Several members asked some clarifying questions about items that had existed in the original budget. Vern then asked the group to begin to discuss how it might best spend the remaining funds in 2017. He also encouraged the group to suggest any items that might need to be added or reallocated. Matt Bachmann updated the PGG estimates for the planning, analysis and implementation of the ambient groundwater monitoring network. The following suggestions were then made for the newly authorized budget:

Ambient Groundwater Monitoring Plan Planning, analysis and implementation	$331,000.00
Drain Monitoring	$60,000
Drinking Water Monitoring Assessment of the quality of existing domestic wells – six samples of 160 domestic wells in the next year	$350,000.00
Monitoring Analysis For ambient groundwater, drain and drinking water monitoring referred to above	$76,681.00
Septic System Maintenance Outreach Proposed by the RCIM Working Group	$10,000.00
Educational Outreach Campaigns, Surveys To educate the public about what the GWAC is doing. This includes billboard costs of $19,000 already approved.	$100,000.00
Irrigation Water Management Workshops, Shallow Soil Sampling (1 to 2 feet) for Growers and Education	$100,000.00

The following items were removed from the budget:

Hot Spot Monitoring – although this had been a priority from the Data Collection Working Group the group felt it should be done after information started to come in from the Ambient Groundwater, drain and drinking water monitoring.

Abandoned Wells – Vern explained that the joint working group had decided to pursue a pilot program with money available through the Department of Health's Source Water Protection Fund.

Contingency Reserve – There was no need to fund a contingency reserve as the grant monies are only available through 2017.

Wellhead risk assessment surveys (Vern noted that he had looked at the data for trends but found none); deep soil sampling; nutrient loading database, analysis, reporting (WSDA); dairy pens and manure storage sampling; lagoon assessment based on EPA data, regulatory review; and best management practices either required no additional funding or no longer needed to be pursued.

After a great deal of discussion there were no further questions and a consensus to adopt the revised budget was reached with no further comments or objections. A copy of the revision is attached as Exhibit A.

IV. **Working Group Reports:** The group agreed to postpone the reports until the next GWAC meeting given the lateness of the hour.

V. **Committee Business:** Prior to the approval of last month's meeting summary a member voiced concerns as to whether the Ambient Monitoring Network Plan had been approved and if the group had agreed to the inclusion of the data from the dairy clusters. Several members responded noting that the EPA had agreed to give Yakima County access to the data and the plan had been approved at last month's GWAC meeting. The November 17 summary was then approved as presented.

VI. **Public Comment:** A member of the public thought the educational and incentive plan proposed for growers encouraging good behavior was crucial. She also suggested that a copy of the revised budget the group had approved be included as part of this meeting summary.

VII. **Next Meeting:** The group decided to convene again on February 16, 2017. Vern advised the group to expect monthly meetings in 2017.

VIII. **Next Steps:** None.

IX. **Meeting Summary** approved by the GWAC on _____.

LOWER YAKIMA VALLEY

GROUNDWATER ADVISORY COMMITTEE

Groundwater Management Area (GWMA):
The purpose of the GWMA is to reduce nitrate contamination concentrations in groundwater below state drinking water standards

Meeting Time and Location

Thursday, October 20, 2016

Denny Blaine Boardroom
810 East Custer Avenue
Sunnyside, WA 98944

4:00-5:00 PM Groundwater Primer (Demonstration)

5:00-7:00 PM Regular GWAC Meeting - Agenda

Time	Topic	
5:00 – 5:10 p.m.	Welcome, Meeting Overview and Introductions: • Committee members • *Others attending the meeting*	Vern Redifer, Facilitator
5:10 – 5:40 p.m.	Working Group Reports • Data Collection • Livestock/CAFO • IAWG • RCIM • Regulatory Framework • EPO	 Melanie Redding David Bowen Troy Peters Dan DeGroot Jean Mendoza Lisa Freund
5:40 – 6:00 p.m.	Approval of the Ambient Groundwater Monitoring Plan **Action Item**	Melanie Redding
6:00 – 6:15 p.m.	Other Monitoring Objectives Discussion	Melanie
6:15 – 6:30 p.m.	Budget Discussion	Vern
6:30 – 6:35 p.m.	Don Stuart Presentation **Action Item**	Melanie

6:35 – 6:40 p.m.	Committee Business	Approve the August 18, 2016 GWAC Meeting Summary	Vern
6:40 – 6:45 p.m.	Public Comment		
6:45 p.m.	Adjourn		

Committee Members

Stuart Turner, agronomist, Chelsea Durfey (alternate)	Turner and Co.
Bud Rogers, Kathleen Rogers (alternate)	Lower Valley Community Representative Position 1
Patricia Newhouse, Sue Wedam (alternate)	Lower Valley Community Representative Position 2
Doug Simpson	Irrigated Crop Producer
Dr. Jessica Black	Heritage University
Jean Mendoza, Eric Anderson (alternate)	*Friends of Toppenish Creek*
Jan Whitefoot, Jim Dyjak (alternate)	Concerned Citizens of the Yakama Reservation
Steve George, Frank Lyall (alternate)	Yakima County Farm Bureau
Jason Sheehan, Dan DeGroot (alternate)	Yakima Dairy Federation
Ron Cowin	Sunnyside-Roza Joint Board of Control
Laurie Crowe, Jim Newhouse (alternate)	South Yakima Conservation District
Robert Farrell, John Van Wingerden (alternate)	Port of Sunnyside
Rand Elliott, Vern Redifer (alternate)	Yakima County Commission
Dave Cole, Ryan Ibach (alternate)	Yakima Health District
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center
Lucy Edmondson, Peter Contreras (alternate)	U.S. Environmental Protection Agency
Elizabeth Sanchey, Stuart Crane (alternate)	Yakama Nation
Virginia "Ginny" Prest Jaclyn Hancock (alternate)	Washington Department of Agriculture
Andy Cervantes, Ginny Stern (alternate)	Washington Department of Health
David Bowen, Sage Park (alternate)	Washington Department of Ecology
Lino Guerra, Rick Perez (alternate)	Hispanic Community Representative

Matt Bachmann	U.S. Geological Survey

Committee Ground Rules:

- Come to committee meetings prepared
- Treat one another with civility
- Respect each other's perspectives
- Listen actively
- Participate actively
- Honor time frames
- Silence electronic devices during meetings
- Speak from interests, not positions.

2016 Meeting Dates:

February 18	June 16	October 20
April 21	August 18	December 15

Meeting Materials:

Name	Date Provided	From
2016_0818_GWAC_DraftMeetingSummary_v2	8/30/2016 & 10/13/2016	lisa.freund@co.yakima.wa.us
Meeting Agenda	10/13/2016	lisa.freund@co.yakima.wa.us
Data Collection Working Group Reports of August 10, 2016 & October 10, 2016	10/13/2016	lisa.freund@co.yakima.wa.us
Livestock/CAFO Working Group Reports of September 1 and October 6, 2016	10/13/2016 At Table	lisa.freund@co.yakima.wa.us
IAWG Working Group Report of September 27, 2016	10/13/2016	lisa.freund@co.yakima.wa.us
Regulatory Framework Working Group Reports of August 10 and September 14, 2016	10/13/2016	lisa.freund@co.yakima.wa.us
RCIM Working Group Reports of September 12, 2016 & October 10, 2016	10/13/2016 At Table	lisa.freund@co.yakima.wa.us
EPO (did not meet)		
GWMA Ambient Monitoring Network Report v6 Final for Approval	10/13/2016	lisa.freund@co.yakima.wa.us
GWMA Ambient Monitoring Network Report Attachments	10/13/2016 & update 10/14/2016	http://www.yakimacounty.us/DocumentCenter/View/11833

LOWER YAKIMA VALLEY
GROUNDWATER ADVISORY COMMITTEE

Groundwater Management Area (GWMA):
The purpose of the GWMA is to reduce nitrate contamination concentrations in groundwater below state drinking water standards

Meeting Time and Location

Thursday, November 17, 2016 5:00 p.m. – 7:00 p.m.

Denny Blaine Boardroom
810 East Custer Avenue
Sunnyside, WA 98944

Agenda

Time	Topic	
5:00 – 5:10 p.m.	Welcome, Meeting Overview and *Introductions:* • Committee members • Others attending the meeting	Vern Redifer, Facilitator
5:10 – 5:30 p.m.	Approval of the Ambient Groundwater Monitoring Plan **Action Item**	Vern
5:30 – 5:45 p.m.	Other Monitoring Objectives Discussion	Vern
5:45 – 6:00 p.m.	Budget Discussion	Vern
6:00 – 6:30 p.m.	Working Group Reports • Data Collection • Livestock/CAFO • IAWG • RCIM • Regulatory Framework • EPO	 TBD David Bowen Troy Peters Dan DeGroot Jean Mendoza Lisa Freund

6:30 – 6:40 p.m.	Committee Business • Approve the August 18 and October 20, 2016 GWAC *Meeting Summaries* • Confirm Next Meeting Date	Vern
6:40 – 6:45 p.m.	Public Comment	
6:50 p.m.	Adjourn	

Committee Members

Stuart Turner, agronomist, Chelsea Durfey (alternate)	Turner and Co.
Bud Rogers, Kathleen Rogers (alternate)	Lower Valley Community Representative Position 1
Patricia Newhouse, Sue Wedam (alternate)	Lower Valley Community Representative Position 2
Doug Simpson	Irrigated Crop Producer
Dr. Jessica Black	Heritage University
Jean Mendoza, Eric Anderson (alternate)	Friends of Toppenish Creek
Jan Whitefoot, Jim Dyjak (alternate)	Concerned Citizens of the Yakama Reservation
Steve George, Frank Lyall (alternate)	Yakima County Farm Bureau
Jason Sheehan, Dan DeGroot (alternate)	Yakima Dairy Federation
Ron Cowin	Sunnyside-Roza Joint Board of Control
Laurie Crowe, Jim Newhouse (alternate)	South Yakima Conservation District
Robert Farrell, John Van Wingerden (alternate)	Port of Sunnyside
Rand Elliott, Vern Redifer (alternate)	Yakima County Commission
Dave Cole, Ryan Ibach (alternate)	Yakima Health District
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center
Lucy Edmondson, Peter Contreras (alternate)	U.S. Environmental Protection Agency
Elizabeth Sanchey, Stuart Crane (alternate)	Yakama Nation

Virginia "Ginny" Prest Jaclyn Hancock (alternate)	Washington Department of Agriculture
Andy Cervantes, Ginny Stern (alternate)	Washington Department of Health
David Bowen, Sage Park (alternate)	Washington Department of Ecology
Lino Guerra, Rick Perez (alternate)	Hispanic Community Representative
Matt Bachmann	U.S. Geological Survey

Committee Ground Rules:

- Come to committee meetings prepared
- Treat one another with civility
- Respect each other's perspectives
- Listen actively
- Participate actively
- Honor time frames
- Silence electronic devices during meetings
- Speak from interests, not positions.

2016 Meeting Dates:

February 18	June 16	October 20
April 21	August 18	November 17
		~~December 15~~

Meeting Materials:

Name	Date Provided	From
2016_1020_GWAC_ DraftMeetingSummary_v2 2016_0818_GWAC_DraftMeetingSummary_v2	10/26/2016 8/30/2016 10/13/2016	lisa.freund@co.yakima.wa.us
Meeting Agenda	11/10/16	lisa.freund@co.yakima.wa.us
Data Collection Working Group Meeting Summary of November 9, 2016	At Table	lisa.freund@co.yakima.wa.us
Livestock/CAFO Working Group Meeting Summary of November 3, 2016	11/10/16	lisa.freund@co.yakima.wa.us
IAWG Working Group Meeting Summary of October 18, 2016	11/10/16	lisa.freund@co.yakima.wa.us
Regulatory Framework Working Group Meeting Summary of October 12, 2016	11/10/16	lisa.freund@co.yakima.wa.us
RCIM Working Group Meeting Summary	N/A	lisa.freund@co.yakima.wa.us
EPO Working Group Meeting Summary	N/A	
GWMA Ambient Monitoring Network Report v6 Final for Approval	10/13/16 & 10/20/16	lisa.freund@co.yakima.wa.us
GWMA Ambient Monitoring Network Report Attachments	10/13/16 & 10/20/16	lisa.freund@co.yakima.wa.us
GWAC Budget Discussion 10-20-2016	10/20/16	
Jean Mendoza's 11/14/2016 correspondence to the GWAC RE: Ambient Monitoring	11/14/2016	lisa.freund@co.yakima.wa.us
Copy of Phase I Well Assess Survey_Prelim Data Results_Feb 2015	11/15/2016	lisa.freund@co.yakima.wa.us

LOWER YAKIMA VALLEY
GROUNDWATER ADVISORY COMMITTEE

Groundwater Management Area (GWMA):
The purpose of the GWMA is to reduce nitrate contamination concentrations in groundwater below state drinking water standards

Meeting Time and Location

Thursday, December 15, 2016 5:00 p.m. – 7:00 p.m.

Radio KDNA Conference Rooms 1-2
121 Sunnyside Avenue
Granger, WA 98932

Agenda

Time	Topic	
5:00 – 5:10 p.m.	Welcome, Meeting Overview and Introductions: • Committee members • Others attending the meeting	Vern Redifer, Facilitator
5:10 – 6:10 p.m.	Budget Discussion	Vern
6:10 – 6:40 p.m.	Working Group Reports • Data Collection • Livestock/CAFO • IAWG • RCIM • Regulatory Framework • EPO	 Melanie Redding David Bowen Troy Peters Dan DeGroot Jean Mendoza Lisa Freund
6:40 – 6:45 p.m.	Committee Business • Approve the November 17, 2016 GWAC Meeting Summary • Confirm Next Meeting Date	Vern
Tentative 2017 Meeting Dates	February 16, April 20, June 15, August 17, October 19 and December 21	

6:45 – 6:50 p.m.	Public Comment
6:55 p.m.	Adjourn

Committee Members

Stuart Turner, agronomist, Chelsea Durfey (alternate)	Turner and Co.
Bud Rogers, Kathleen Rogers (alternate)	Lower Valley Community Representative Position 1
Patricia Newhouse, Sue Wedam (alternate)	*Lower Valley Community Representative Position 2*
Doug Simpson	Irrigated Crop Producer
Dr. Jessica Black	Heritage University
Jean Mendoza, Eric Anderson (alternate)	Friends of Toppenish Creek
Jan Whitefoot, Jim Dyjak (alternate)	Concerned Citizens of the Yakama Reservation
Steve George, Frank Lyall (alternate)	Yakima County Farm Bureau
Jason Sheehan, Dan DeGroot (alternate)	Yakima Dairy Federation
Ron Cowin	Sunnyside-Roza Joint Board of Control
Laurie Crowe, Jim Newhouse (alternate)	South Yakima Conservation District
Robert Farrell, John Van Wingerden (alternate)	Port of Sunnyside
Rand Elliott, Vern Redifer (alternate)	Yakima County Commission
Dave Cole, Ryan Ibach (alternate)	Yakima Health District
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center
Lucy Edmondson, Peter Contreras (alternate)	U.S. Environmental Protection Agency
Elizabeth Sanchey, Stuart Crane (alternate)	Yakama Nation
Virginia "Ginny" Prest Jaclyn Hancock (alternate)	Washington Department of Agriculture
Andy Cervantes, Ginny Stern (alternate)	Washington Department of Health
David Bowen, Sage Park (alternate)	Washington Department of Ecology
Lino Guerra, Rick Perez (alternate)	Hispanic Community Representative
Matt Bachmann	U.S. Geological Survey

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- Honor time frames
- Silence electronic devices during meetings
- Speak from interests, not positions.

2016 Meeting Dates:

February 18	June 16	October 20
April 21	August 18	November 17
		December 15

Meeting Materials:

Name	Date Provided	From
2016_11_17 GWAC Meeting Draft Summary	11/22/2016 12/8/2016	lisa.freund@co.yakima.wa.us
Meeting Agenda	12/8/2016	lisa.freund@co.yakima.wa.us
Data Collection Working Group Meeting Summary (did not meet)	N/A	
Livestock/CAFO Working Group Meeting Summary of December 1, 2016	12/9/2016	lisa.freund@co.yakima.wa.us
IAWG Working Group Meeting Summary of November 15, 2016	12/8/2016	lisa.freund@co.yakima.wa.us
Regulatory Framework Working Group Meeting Summary of November 9, 2016	12/8/2016	lisa.freund@co.yakima.wa.us
RCIM Working Group Meeting Summary of November 14, 2016	12/8/2016	lisa.freund@co.yakima.wa.us
EPO Working Group Meeting Summary (did not meet)	N/A	
Abandoned Wells Discussion: Joint Working Group Meeting Summary of December 5, 2016	12/9/2016	lisa.freund@co.yakima.wa.us
GWMA LTD – 2016 for 12-15-16 mtg	12/8/2016	lisa.freund@co.yakima.wa.us

GWAC Attendance Roster

Member	20-Oct-2016	17-Nov-2016	15-Dec-2016
Stuart Turner	Present	Present	Present
Chelsea Durfey	Absent	Absent	Absent
Bud Rogers	Present	Present	Absent
Kathleen Rogers	Present	Present	Absent
Patricia Newhouse	Present	Present	Present
Sue Wedam	Absent	Present	Present
Doug Simpson	Present	Present	Present
Jean Mendoza	Present	Present	Present
Eric Anderson	Absent	Absent	Absent
Jan Whitefoot	Absent	Absent	Absent
Jim Dyjak	Present	Present	Absent
Steve George	Present	Present	Present
Frank Lyall	Absent	Absent	Absent
Jason Sheehan	Absent	Present	Present
Dan DeGroot	Present	Present	Absent
Ron Cowin	Present	Present	Present
Laurie Crowe	Present	Present	Present
Jim Newhouse	Absent	Absent	Absent
Robert Farrell	Present	Present	Absent
John Van Wingerden	Absent	Absent	Present
Rand Elliott	Present	Present	Present
Vern Redifer	Present	Present	Present
Ryan Ibach	Absent	Absent	Present
David Cole	Present	Present	Absent
Dr. Troy Peters	Present	Absent	Absent
Lucy Edmondson	Present	Present	Absent
Peter Contreras	Present	Absent	Phone
Elizabeth Sanchey	Absent	Absent	Absent
Stuart Crane	Present	Present	Absent
Virginia "Ginny" Prest	Present	Present	Phone
Jaclyn Hancock	Absent	Absent	Absent
Andy Cervantes	Absent	Present	Present
Ginny Stern	Present	Absent	Absent
David Bowen	Present	Present	Present
Sage Park	Absent	Absent	Absent
Lino Guerra	Present	Absent	Present
Rick Perez	Absent	Absent	Absent
Jessica Black	Absent	Absent	Absent
Matt Bachmann	Absent	Present	Present

YAKIMA HERALD-REPUBLIC

Affidavit of Publication

STATE OF WASHINGTON,)
)
COUNTY OF YAKIMA)

Jackie Chapman, being first duly sworn on oath deposes and says that she/he is the Accounting clerk of Yakima Herald-Republic, Inc., a daily newspaper. Said newspaper is a legal newspaper approved by the Superior Court of the State of Washington for Yakima County under an order made and entered on the 13th day of February, 1968, and it is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language continually as a daily newspaper in Yakima, Yakima County, Washington. Said newspaper is now and has been during all of said time printed in an office maintained at the aforesaid place of publication of said newspaper.

That the annexed is a true copy of a:
Yakima County Notice of Public Meeti

it was published in regular issues (and not in supplement form) of said newspaper once each day and for a period of 1 times, the first insertion being on 10/12/2016 and the last insertion being on 10/12/2016

Yakima Herald-Republic 10/12/16
YakimaHerald.com 10/12/16

and the such newspaper was regularly distributed to its subscribers during all of the said period. That the full amount of the fee charged for the foregoing publication is the sum of $109.12

Jackie Chapman
Accounting Clerk

LISA M DRIPPS NOTARY PUBLIC STATE OF WASHINGTON My Comm. Expires 04/05/2017

Sworn to before me this 12th day of, October 2016

Lisa M. Dripps
Notary Public in and for the
State of Washington,
residing at Yakima

Yakima County

Notice of Public Meeting
Lower Yakima Valley
Groundwater Advisory
Committee

NOTICE IS HEREBY GIVEN that Yakima County is holding a public meeting of the Lower Yakima Valley Groundwater Advisory Committee on **Thursday, October 20, 2016, at 5:00 PM at Denny Blaine Boardroom, Sunnyside School District No. 201, 810 E. Custer, Sunnyside, WA 98944** pursuant to Chapter 173-100-080 WAC Ground Water Management Areas and Programs.

For Additional Information
To learn more about the Lower Yakima Valley Groundwater Management Area, the Groundwater Advisory Committee, and its goals and objectives, please see the Lower Yakima Valley Groundwater Management Area on the County webpage at: http://www.yakimacounty.us/gwma/

For more information about the meeting, please contact Lisa Freund, Yakima County Public Services Administrative Manager at 574-2300.

If you are a person with a disability who needs any accommodation in order to participate in this program, you may be entitled to receive certain assistance at no cost to you. Please contact the ADA Coordinator at Yakima County no later than forty-eight (48) hours prior to the date service is needed.

Yakima County ADA
Coordinator
128 N. 2nd Street, Room B27
Yakima, WA 98901
(509) 574-2210
7-1-1 or 1-800-833-6384
(Washington Relay Services for deaf and hard of hearing)

Dated this Thursday, October 6, 2016

(683403) October 12, 2016

Legals (1 column)

Yakima County

Notice of Public Meeting Lower Yakima Valley Groundwater Advisory Committee

NOTICE IS HEREBY GIVEN that Yakima County is holding a public meeting of the Lower Yakima Valley Groundwater Advisory Committee on **Thursday, October 20, 2016, at 5:00 PM at Denny Blaine Boardroom, Sunnyside School District No. 201, 810 E. Custer, Sunnyside, WA 98944** pursuant to Chapter 173-100-080 WAC Ground Water Management Areas and Programs.

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Yakima County ADA Coordinator
128 N. 2nd Street, Room B27
Yakima, WA 98901
(509) 574-2210
7-1-1 or 1-800-833-6384
(Washington Relay Services for deaf and hard of hearing)

Dated this Thursday, October 6, 2016

Publish: DAILY SUN NEWS
October 12, 2016

COST TO PUBLISH
#63.75

#7.50
PC1
8½"

YAKIMA HERALD-REPUBLIC

Affidavit of Publication

STATE OF WASHINGTON,)
)
COUNTY OF YAKIMA)

Danielle Rogers, being first duly sworn on oath deposes and says that she/he is the Accounting clerk of Yakima Herald-Republic, Inc., a daily newspaper. Said newspaper is a legal newspaper approved by the Superior Court of the State of Washington for Yakima County under an order made and entered on the 13th day of February, 1968, and it is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language continually as a daily newspaper in Yakima, Yakima County, Washington. Said newspaper is now and has been during all of said time printed in an office maintained at the aforesaid place of publication of said newspaper.

That the annexed is a true copy of a:
Yakima County Notice of Public Meeti

it was published in regular issues (and not in supplement form) of said newspaper once each day and for a period of 1 times, the first insertion being on 11/09/2016 and the last insertion being on 11/09/2016

Yakima Herald-Republic 11/09/16
YakimaHerald.com 11/09/16

and the such newspaper was regularly distributed to its subscribers during all of the said period. That the full amount of the fee charged for the foregoing publication is the sum of $105.60

Danielle Rogers

Accounting Clerk

LISA M DRIPPS NOTARY PUBLIC STATE OF WASHINGTON My Comm. Expires 04/05/2017

Sworn to before me this 9th day of, November 2016

Lisa M. Dripps

Notary Public in and for the
State of Washington,
residing at Yakima

Yakima County

Notice of Public Meeting
Lower Yakima Valley Groundwater Advisory Committee

NOTICE IS HEREBY GIVEN that Yakima County is holding a public meeting of the Lower Yakima Valley Groundwater Advisory Committee on **Thursday, November 17, 2016, at 5:00 PM at Denny Blaine Boardroom, Sunnyside School District No. 201, 810 E. Custer, Sunnyside, WA 98944** pursuant to Chapter 173-100-080 WAC Ground Water Management Areas and Programs.

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128 N. 2nd Street, Room B27
Yakima, WA 98901
(509) 574-2210
7-1-1 or 1-800-833-6384
(Washington Relay Services for deaf and hard of hearing)

Dated this **Thursday, November 3, 2016**

(690518) November 9, 2016

Courtesy of Yakima Herald-Republic

Legals (1 column)

YAKIMA COUNTY
Notice of Public Meeting
Lower Yakima Valley Groundwater Advisory Committee

NOTICE IS HEREBY GIVEN that Yakima County is holding a public meeting of the Lower Yakima Valley Groundwater Advisory Committee on Thursday, November 17, 2016, at 5:00 PM at Denny Blaine Boardroom, Sunnyside School District No. 201, 810 E. Custer, Sunnyside, WA 98944 pursuant to Chapter 173-100-080 WAC Ground Water Management Areas and Programs.

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Yakima, WA 98901
(509) 574-2210
7-1-1 or 1-800-833-6384
(Washington Relay Services for deaf and hard of hearing)

Dated this Thursday,
November 3, 2016
PUBLISH: DAILY SUN NEWS
November 9, 2016

COST TO PUBLISH
#60.00

$2.50
PCI
8" x 1

YAKIMA HERALD-REPUBLIC

Affidavit of Publication

STATE OF WASHINGTON,)
)
COUNTY OF YAKIMA)

Danielle Rogers, being first duly sworn on oath deposes and says that she/he is the Accounting clerk of Yakima Herald-Republic, Inc., a daily newspaper. Said newspaper is a legal newspaper approved by the Superior Court of the State of Washington for Yakima County under an order made and entered on the 13th day of February, 1968, and it is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language continually as a daily newspaper in Yakima, Yakima County, Washington. Said newspaper is now and has been during all of said time printed in an office maintained at the aforesaid place of publication of said newspaper.

That the annexed is a true copy of a:
Yakima County Notice of Public Meeti

it was published in regular issues (and not in supplement form) of said newspaper once each day and for a period of 1 times, the first insertion being on 12/07/2016 and the last insertion being on 12/07/2016

Yakima Herald-Republic 12/07/16
YakimaHerald.com 12/07/16

and the such newspaper was regularly distributed to its subscribers during all of the said period. That the full amount of the fee charged for the foregoing publication is the sum of $105.60

Danielle Rogers

Accounting Clerk

LISA M DRIPPS NOTARY PUBLIC STATE OF WASHINGTON My Comm. Expires 04/05/2017

Sworn to before me this 7th day of, December 2016

Lisa M. Dripps

Notary Public in and for the
State of Washington,
residing at Yakima

Yakima County

Notice of Public Meeting
Lower Yakima Valley
Groundwater Advisory
Committee

NOTICE IS HEREBY GIVEN that Yakima County is holding a public meeting of the Lower Yakima Valley Groundwater Advisory Committee on **Thursday, December 15, 2016, at 5:00 PM at Radio KDNA, 121 Sunnyside Avenue, Granger, WA 98932** pursuant to Chapter 173-100-080 WAC Ground Water Management Areas and Programs.

For Additional Information
To learn more about the Lower Yakima Valley Groundwater Management Area, the Groundwater Advisory Committee, and its goals and objectives, please see the Lower Yakima Valley Groundwater Management Area on the County webpage at: http://www.yakimacounty.us/gwma/

For more information about the meeting, please contact Lisa Freund, Yakima County Public Services Administrative Manager at 574-2300.

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128 N. 2nd Street, Room B27
Yakima, WA 98901
(509) 574-2210
7-1-1 or 1-800-833-6384
(Washington Relay Services for deaf and hard of hearing)

Dated this **Thursday, December 1, 2016**

(696922) December 7, 2016

Courtesy of Yakima Herald-Republic

Affidavit of Publication

STATE OF WASHINGTON
ss.
County of Yakima

Roger Harnack, being first duly sworn on oath deposes and says that he is the Publisher of the DAILY SUN NEWS, a daily newspaper.

That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publications hereinafter referred to, published in the English language continually as a daily newspaper in the city of Sunnyside, YAKIMA County, Washington, and it is now and during all of said time printed in an office maintained at the afforesaid place of publication of said newspaper, and that the said Daily Sun News was on the 4th Day of April, 1969 approved as a legal newspaper by the Superior Court of said Yakima County.

That the annexed is a true copy of a LEGAL PUBLICATION -
Yakima County Public Services
FC3463–100–120GWAC 12/15

published in regular issues (and not in supplemental forms) of said newspaper once each week for a period of 1 consecutive issue(s) commencing 12/07/16 and ending on 12/07/16, both dates inclusive, and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is the sum of $52.50, amount has been paid in full, at the rate of $7.50 per column inch per insertion.

Subscribed and sworn to before me 12/07/16

Notary Public in and for the State of Washington

030110–00000

KAREN ZACKULA
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
JUNE 18, 2020

Yakima County
Notice of Public Meeting
Lower Yakima Valley Groundwater Advisory Committee

NOTICE IS HEREBY GIVEN that Yakima County is holding a public meeting of the Lower Yakima Valley Groundwater Advisory Committee on **Thursday, December 15, 2016, at 5:00 PM at Radio KDNA, 121 Sunnyside Avenue, Granger, WA 98932** pursuant to Chapter 173-100-080 WAC Ground Water Management Areas and Programs.

For Additional Information

To learn more about the Lower Yakima Valley Groundwater Management Area, the Groundwater Advisory Committee, and its goals and objectives, please see the Lower Yakima Valley Groundwater Management Area on the County webpage at: http://www.yakimacounty.us/gwma/

For more information about the meeting, please contact Lisa Freund, Yakima County Public Services Administrative Manager at 574-2300.

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Yakima, WA 98901
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7-1-1 or 1-800-833-6384
(Washington Relay Services for deaf and hard of hearing)

Dated this Thursday,
December 1, 2016
Ref # FC3463-100-120
PUBLISH: DAILY SUN NEWS
December 7, 2016

Irrigated Ag Working Group (IAWG)

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Dr. Troy Peters (GWAC-WSU); Bob Stevens (interested party) Bud Rogers (GWAC-Citizen), Chelsea Durfey (GWAC), Dan McCarty (interested party), Dave Cowan (interested party), Dave Fraser (Interested Party - Simplot Agronomist), Donald Jameson (interested party), Doug Simpson (GWAC-Farmer), Frank Lyall (GWAC-Farm Bureau), Ginny Prest (GWAC-Dept. of Ag), Jean Mendoza (GWAC-Friends of Toppenish Creek), Jim Newhouse (GWAC), Kevin Lindsey (interested party), Kirk Cook (GWAC-WSDA), Laurie Crowe (GWAC-South Yakima Conservation District), Melanie Redding (Ecology), Mike Shuttleworth (interested party), Ralph Fisher (EPA), Ron Cowin (GWAC-SVID), Scott Stephen (interested party), Stuart Turner (GWAC-Turner & Co.), Tom Tebb (GWAC-Department of Ecology), Rosalio Brambila (interested party), Vern Redifer, Jim Davenport.

Meetings/Calls Dates

Meeting: Sunnyside Valley Irrigation District Office, 120 S. Eleventh Street, Sunnyside, WA

When: October 18, 2016, from 1:30 pm to 3:30 pm.

Call: (509) 574-2353 – Pin # 2353

Participants

Troy Peters (Chair), Vern Redifer, Doug Simpson, Ron Cowin, Jean Mendoza, Scott Stephen, Stuart Crane, Bobbie Brady (Yakima County Support Staff). No one was present via telephone.

Key Discussion Points

Troy Peters called the meeting to order at 1:40 PM. Kathleen Rogers had sent an email indicating that she was unable to attend but included her suggestions for the group's discussion. Troy listed three items that he felt the group had already agreed upon which he intended to pass on to the GWAC at the November 17 meeting:

1. Education;
2. Soil moisture sensors/irrigation management; and,
3. Soil samples/nutrient management assistance to growers.

Troy believed these recommendations could be encouraged through cost share. In addition, Troy stated that his take-away from the group's previous discussions was that while regulatory measures can be effective, they generally hurt growers. Troy had also received an email from Laurie Crowe who encouraged educational measures but did not feel any additional regulations were necessary. Vern pointed out that he believed the WAC said the group was to look at all the

alternatives; evaluate them and then select those that the group thought best to recommend. He added that it was important for the group to include its reasons for recommending or discarding each potential solution so everyone could understand the rationale that went into the group's decision-making process. He likened it to a "show your work" mentality that illustrated why it was important to move forward with the solutions that had been recommended.

A member voiced concern that the group wasn't addressing the non-dairy irrigated agriculture component. Another member pointed out that while the Irrigation District is a non-regulatory group it could help with compliance. A discussion ensued. Troy concluded the discussion and pointed out that all three recommendations would save growers money, help the environment and provide better yields.

Troy then asked if the members had any new solutions they wanted to discuss. A member suggested that the GWAC consider making presentations at the various grower meetings which are hosted by the commercial fertilizer companies. He believed this would give the GWAC the opportunity to help both the growers and the commercial fertilizer industry understand the ramifications of continuing with their current practices and thus effect change. Another member suggested that the GWAC could also make a presentation at the ag show at the Sun Dome which is held at the beginning of each year. Members went on to point out that Bleyhl's, Wilbur-Ellis, Simplot, CBS, Husch and Husch in Harrah and others hold grower meetings from November or December through March. Hundreds of growers attend each of these meetings to obtain credits to get their pesticide applicator license. Crop advisors and agronomists also attend as they can also get some certification at these meetings. Troy was concerned about the fertilizer industry's receptivity to the message of the GWMA, but a member responded and said they need to get on board. Another member agreed and said that he often comes across instances where no analysis was done or soil samples were taken but they weren't done correctly because the samples didn't adequately represent the field.

The group agreed that the objective at these grower meetings would be to bring an awareness of the nitrate problems to the growers and fertilizer companies and instruction on how to manage the fields/crops including how to take a soil sample. Vern was concerned that the commercial fertilizer groups were not participating in the GWAC or Irrigated Ag Working Group discussions and it would be good to invite them to share what the group had been learning. He felt it was important to meet with the industry to advise them of the challenges before the group would make any presentations to the growers. Vern believed that when the nitrogen loading assessment is finished irrigated ag will fall within the top three sources and this knowledge needs to be shared with the industry as a great deal of acreage in the GWMA is impacted by irrigated agriculture. Another member added that a lot of fertilizer companies also work on the dairies' behalf but are uneducated on the use of manure. He did not believe the fertilizer industry should help dairies make those decisions.

Vern pointed out that the group could make a recommendation to put a hefty tax on fertilizer to implement beneficial programs like education and soil moisture testing. He was concerned however that people would be forced out of business if a tax was implemented and was not suggesting that this was a good idea unless education and voluntary measures didn't work at some point. Troy agreed that while it might have a good effect it would hurt some people. Vern

did not believe that the County had the ability to implement such a tax and that it would have to be an action taken by the State legislature.

Ron volunteered to make contact with Simplot and ask them to attend a meeting to listen and discuss the nitrate issues and what the group had learned i.e., deep soil sampling, etc. Troy would get the contact information for each company. Members also mentioned GS Long and D & M Chemical but noted that these companies worked mostly with fruit growers and not a lot with row crops. They added that there were other fertilizer/chemical groups targeting a larger region including the Tri-Cities and northern Idaho, but the companies listed above specifically targeted agriculture in the GWMA and this information would be more applicable to them. The group agreed to add this solution to the list found above:

4. Engage the fertilizer industry as a whole and get them on board as a conduit to growers.

The group also discussed the contribution of organic matter in the soil. Vern informed the group that the Livestock/CAFO Work Group was going through the NRCS BMP's for solutions and thought that perhaps Irrigated Ag could follow suit as there could be BMP's that the group might utilize. Another member was concerned that without regulations there would be no way to monitor the solutions and the group should perhaps consider a performance standard. Another member responded and said he didn't think there was a magic bullet as the process was complex. He felt it was more important to have a goal in mind that would take time to accomplish. Vern added that the next tasks for the group would be to develop who would oversee each recommendation, what the cost would be and how it might be funded.

The meeting adjourned at 3:10 PM.

Recommendations for GWAC

Resources Requested

Deliverables/Products Status

Proposed Next Steps

- Ron will make contact with Simplot and ask them to attend a meeting to listen and discuss the nitrate issues and what the group had learned, i.e., deep soil sampling, etc.
- Troy will get contact information for the fertilizer companies mentioned.
- Jean will send any additional thoughts to Troy.

Irrigated Ag Working Group (IAWG)

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Dr. Troy Peters (GWAC-WSU); Bob Stevens (interested party) Bud Rogers (GWAC-Citizen), Chelsea Durfey (GWAC), Dan McCarty (interested party), Dave Cowan (interested party), Dave Fraser (Interested Party - Simplot Agronomist), Donald Jameson (interested party), Doug Simpson (GWAC-Farmer), Frank Lyall (GWAC-Farm Bureau), Ginny Prest (GWAC-Dept. of Ag), Jean Mendoza (GWAC-Friends of Toppenish Creek), Jim Newhouse (GWAC), Kevin Lindsey (interested party), Kirk Cook (GWAC-WSDA), Laurie Crowe (GWAC-South Yakima Conservation District), Melanie Redding (Ecology), Mike Shuttleworth (interested party), Ralph Fisher (EPA), Ron Cowin (GWAC-SVID), Scott Stephen (interested party), Stuart Turner (GWAC-Turner & Co.), Tom Tebb (GWAC-Department of Ecology), Rosalio Brambila (interested party), Vern Redifer, Jim Davenport.

Meetings/Calls Dates

Meeting: Sunnyside Valley Irrigation District Office, 120 S. Eleventh Street, Sunnyside, WA

When: November 15, 2016, from 1:30 pm to 3:30 pm.

Call: (509) 574-2353 – Pin # 2353

Participants

Troy Peters (Chair), Vern Redifer, Kathleen Rogers, Jean Mendoza, Jim Davenport, David Bowen, Stuart Crane, Bobbie Brady (Yakima County Support Staff). No one was present via telephone.

Key Discussion Points

Troy Peters called the meeting to order at 1:31 PM and reminded everyone of the four solutions the group had previously agreed to pass on to the GWAC: 1) education; 2) irrigation management; 3) nutrient management; and, 4) outreach to fertilizer companies. The goal for the meeting was to develop these recommendations and a plan to implement them.

A member raised the issue that none of the suggested solutions dealt with the application of manure to croplands which the GWAC had designated for the Irrigated Ag Working Group to address. It was her belief that solutions for this source couldn't be accomplished on a voluntary basis. Troy said that he thought the group agreed it could be a problem and wondered if the group could suggest guidelines with limitations. However, Jim Davenport didn't believe the group had enough information to address the issue and suggested that the group should recommend developing more information to ascertain the impact of application of manures to croplands in the GWMA as an additional solution.

Troy agreed that the group lacked information about where and how much manure was applied in the GWMA but stated the group did have the science to determine what can happen with manure, what should be applied and reasonable rates of application.

A member was concerned about the Department of Agriculture's (WSDA) ability to oversee the Dairy Nutrient Management Plan (DNMP) as currently there is only one staff member on the eastern side of the mountains to oversee over 50 percent of the dairies in the State. It was suggested that another recommendation for the group to consider was that additional staff be added to the WSDA to help with DNMP oversight in eastern Washington.

The group also discussed that the Dairy Nutrient Management plans were not made public. Jim Davenport noted that WAC 1606.210 Subsection 29 sets out categories of information the WSDA is supposed to make public and pointed out that the WSDA consolidates information from the Dairy Nutrient Management Plans into these reports.

The group continued their discussions about who could help with the proposed educational component. Jim encouraged the group to think about who could do this best over the long term. Two entities were considered – the South Yakima Conservation District and the WSU Extension Services. The group discussed extra funding, current funding sources, the need for additional staffing, and the controlling boards for each. Troy noted that it would require specific direction from State senators or the GWMA to ask WSU to focus their attention on the issues pertinent to the GWMA. This would result in WSU redirecting funding and wouldn't necessarily require additional funding. He added that WSU Extension Services basically has the same objectives as the Conservation District through a different funding source. Troy indicated he would help facilitate this if the GWAC gave its approval. The group suggested that GWAC approval be sought for Troy to approach both the South Yakima Conservation District and the WSU Extension Services and explain the four ideas the group is trying to pursue and pose the following question: If the Irrigated Ag Working Group/GWAC were to recommend these four ideas as solutions, what strategies and techniques would you use and what would be the cost to implement each. In addition, the group understood that the Conservation District may need to expand its fiscal capacity to carry out these endeavors and would need them to explain how much expansion, and what they would need to move these things move forward.

Vern pointed out that the group was not done with its work on the four recommendations they had already agreed upon as the group must define what each recommendation would entail specifically, determine the cost and explain the benefits of each. In addition, he pointed out that the Livestock/CAFO Working Group had reviewed the list of BMP's from NRCS and came up with a list applicable to livestock and CAFO's. Livestock/CAFO is now discussing the benefits of each and will determine if they would be implemented in a regulatory or voluntary manner. David Bowen said that the group had agreed on 34 NRCS BMP's but realized that not all 34 were applicable to every location. They have also not decided on any incentives. He added that the group is considering a performance based program which would mean that as long as a defined requirement was met groups could pick and choose which BMP's they desired to use. Last of all David pointed out that this would require money for an agency to oversee. Jim Davenport said that the group could consider making soil testing with a required number the basis for funding, loans and building permits. Troy added that Jim Trull created a list from the BMP's recommended by HDR and had created a spreadsheet with comments on each.

Troy said that Ginny Prest had previously suggested another recommendation for the group to consider was a nutrient applicator's license (similar to a pesticide applicator license) in order to buy nutrients in any quantity. The license would indicate that the operator knew what they were doing. Troy felt this was the most palatable of additional regulations. Other members were concerned that inappropriate application was being done by those who don't need to buy their fertilizer. They felt that the group needed to go back to the quality of the soil tests being done. From this discussion Troy suggested another possible strategy would be to hire a soil scientist who would perform "spot auditing" soil tests which would be publically funded – one per field every three years. This had been discussed previously as a "mobile lab" and would provide feedback to fertilizer companies as well.

Vern pointed out that the group had learned that most fertilizer companies test for free and that the recommendation can lean towards commercial fertilizers. He was concerned again about how to get the fertilizer companies to the table to educate them and to learn more about how they work. Jim Davenport said that in order to get the commercial fertilizer industry to the table the group could propose a threatening strategy like asking the legislature to require distributors of fertilizer to report gross sales by volume by County. The group asked Kathy to ask Bud if he could recommend a retired field man from the fertilizer industry who could come and talk to the group.

A member suggested that the group propose a strategy for a better mechanism to gather data.

Troy mentioned that he would not be available to attend Thursday's GWAC meeting. It was agreed that Troy would draft a report and Kathleen would give it on behalf of the group. It was also agreed that the group would not meet again until its January 17, 2017, meeting date. The meeting adjourned at 3:01 PM. Jean provided the group with the Yakima Valley Dairies Consent Order Update dated June, 2016, and December, 2014 and Agrimanagement Fertility Reports.

Recommendations for GWAC

GWAC request the Washington State Conservation Commission and WSU Extension to put additional funding to the Yakima Valley for education and outreach, for BMP implementation, irrigation water management, soil nutrient management, and manure management and applications.

Resources Requested

Deliverables/Products Status

Proposed Next Steps

The group asked Kathy to ask Bud if he could recommend a retired field man from the fertilizer industry who could come and talk to the group.

Troy will make the requests to outlined in "Recommendations for GWAC" was they have approved the recommendation.

Residential, Commercial, Industrial, Municipal (RCIM) Work Group

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Dan DeGroot, Chair (Yakima Dairy Federation), Dave Cole (Yakima Health District), Elizabeth Sanchey (Yakama Nation), Jan Whitefoot (Concerned Citizens of Yakama Reservation), John Van Wingerden (Port of Sunnyside), Stuart Turner (Turner & Co.), Tom Ring (Yakama Nation), Kathleen Rogers (Citizen Rep), Sanjay Barik (Ecology)

Meetings/Calls Dates

Meeting: October 10, 2016
Sunnyside School District Administration Building, 1110 S. 6th Street, Conference Room 20, Sunnyside, WA 98944
Call in: 509-574-2353 (pin 2353#)

Participants

Present: Dan DeGroot (Chair), Dave Cole, Vern Redifer, Jean Mendoza and Bobbie Brady (Yakima County Support Staff). No one was available by phone.

Key Discussion Points

The meeting was called to order by Chair Dan DeGroot at 2:07 PM. Everyone introduced themselves. Dan introduced Jean Mendoza Chair of the Regulatory Framework Working Group. She made a presentation on her group's analysis of regulatory statutes, voluntary incentives and regulatory assistance programs. Jean provided the group with a handout that had been recently updated and reviewed each item. Her review included how each is monitored, enforced, measured, its effectiveness and potential future changes.

Dan then summarized what the group had reviewed thus far: hobby farms, on-site sewage systems (which would be discussed in more detail later in the meeting) and lawns which were all part of the residential component of the group's mandate. Dan explained that the group had not been overly concerned about the nitrate contamination contribution by hobby farms – he believed that the education component would be important but that there wasn't a strong need for monitoring or regulation. Dan asked Jean if the Regulatory group had learned of any laws that governed private residences. Jean said there were none.

Dan went on to explain that the group had been told that commercial, industrial and municipal entities were governed by permits through the Department of Ecology (Ecology) which to-date the group had been unable to confirm. Dan believed the National Pollution Discharge Elimination System (NPDES) permitting under Ecology which governed point source pollution to be the applicable permit for these entities. Since Jean had covered the NPDES permitting in her

presentation Dan asked if she could confirm with Ecology what the requirements were for a NPDES permit for various companies. In addition, he was interested in finding out if Ecology did testing, what they test for, how to make an application, how the permit is tracked and what Ecology does with the information. Dan reminded Jean that they were only interested in permitting for nitrogen – no other chemicals. Dan wanted to make sure the group had done its due diligence and verified Ecology was actually providing oversight of these industries. Vern added that Jim Davenport may have begun this investigation as well and may have some information he could provide the group.

Dan explained that the group is now primarily focused on an in-depth investigation into on-site sewage systems. He went on to say that Ginny Stern and Leslie Turner from the Department of Health (DOH) had met with the group last month. From their discussion Dan concluded that there were three important components for healthy systems:

1. They are engineered properly especially as it relates to the number of people in the house. Yakima County Health District has been overseeing this since the mid to late 70's.
2. They are installed properly. The Health District inspects the systems during installation.
3. They are properly maintained which includes pumping. This is not currently monitored.

The group had also learned that if the output is 3,500 gallons per day or more systems are then permitted by the State. Currently two large on-site systems exist in the GWMA at a cherry orchard and a packing house. Dan added that Ginny said these permits require annual reports which list how often the system is used and how many people are using it.

Dan believed that quite a few on-site sewage systems existed that had been installed at residences prior to the 1980's and was especially concerned that these systems did not meet the criteria outlined above as on-site sewage systems are designed to return water to the aquifer but do little to filter nitrogen. He added a good system will only remove about 10 to 12 percent. Vern said while doing research he had learned there were 6,764 on-site sewage systems in the County and 80 to 85 percent of the locations leant themselves to denitrification.

Dan outlined his concerns he believed the group needed to address as follows:

1. Old improperly engineered systems (built prior to the current rules).
2. Systems that weren't properly installed.
3. Systems that are not being properly maintained.

He went on to say he would like to see the following:

1. Systems engineered and installed correctly and properly maintained.
2. A plan to convert older systems.
3. A list of enhancements for new systems and a determination of their initial capital cost.

Dan listed the carrot and stick approaches previously discussed by the group:

1. Some sort of incentive for pumping a septic system in a timely manner. Dave estimated that it costs $200 to $300 to pump every three years. Jim Davenport had suggested an aquifer protection district which would result in a property tax that would be a source of funding. A receipt for pumping would give homeowners a break in this tax.

2. Education. Help people understand what they can do to take care of their system, why it's important and that proper care will save money over time.
3. Pay attention to building density within the Urban Growth Boundary before permitting. Where small clusters exist already determine whether a community association/system be created. Vern added that the County would consider taking on ownership and operation of these systems as it allows the County to ensure the systems are properly maintained and managed and if one entity already owns and operates these smaller systems it is easier to connect everything to a sewer operation down the road.

Dave offered to talk with several counties in Western Washington about their Operation and Maintenance (O & M) programs which he thought might give the group more ideas. Dave will also take a look at engineering upgrades to see what they entail and if they could work with existing tanks. Dave added that if the group considered an O & M plan it could include inspections to assess impact and the ability to get new systems in place. He also added that if the Health District had a table that indicated water levels they could come up with some special protections when systems were installed where tables were higher. Dan added that he would also like to see something in place that would monitor new systems that might be designed in the future.

Dave added that he had spoken with one of his busiest on-site sewage system installers and the upgrades the group had been discussed at the last meeting would cost between $10,000 and $15,000. He said that currently a brand new conventional system for a three bedroom home was about $3,000. One member was concerned that this was a significant increase to pass on to homeowners and might preclude some from purchasing a home. Another member was not inclined to double or triple those costs.

Vern thought it was important that the group provide information to the GWAC on the costs to upgrade older systems especially when they consider what to do in higher density areas. Vern went on to say that he thought the group should include all of the alternatives in its proposal even if they have a higher price tag and were not currently being considered.

Dan indicated that there would be a presentation at the next RCIM meeting by Natural Selection Farms. The meeting was adjourned at 4:15 PM.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

- Jean will check with Ecology to find out more about the NPDES permit as outlined above.
- Dave Cole will check with Western Washington DOH offices to learn more about their O & M programs and look further into engineering upgrades as outlined above.

Residential, Commercial, Industrial, Municipal (RCIM) Work Group

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Dan DeGroot, Chair (Yakima Dairy Federation), Dave Cole (Yakima Health District), Elizabeth Sanchey (Yakama Nation), Jan Whitefoot (Concerned Citizens of Yakama Reservation), John Van Wingerden (Port of Sunnyside), Stuart Turner (Turner & Co.), Tom Ring (Yakama Nation), Kathleen Rogers (Citizen Rep), Sanjay Barik (Ecology)

Meetings/Calls Dates

Meeting: November 14, 2016
Sunnyside School District Administration Building, 1110 S. 6th Street, Conference Room 23, Sunnyside, WA 98944
Call in: 509-574-2353 (pin 2353#)

Participants

Present: Dan DeGroot (Chair), Kathleen Rogers, Steve George, David Bowen, Jim Davenport and Bobbie Brady (Yakima County Support Staff). No one was present by phone.

Key Discussion Points

The meeting was called to order by Chair Dan DeGroot at 2:02 PM and everyone introduced themselves. David Bowen from the Department of Ecology was also in attendance to make a presentation on the commercial, industrial and municipal segment of this committee's work.

Department of Ecology Presentation: David provided three handouts – a Fact Sheet for the Port of Sunnyside permit, answers to the seven questions the group had formulated and three examples of NPDES permits – Port of Sunnyside, City of Grandview and the City of Granger.

Before continuing with David's presentation on the NPDES permits the group inquired about what other permits the Department of Ecology (Ecology) issues to commercial, industrial or municipal entities in an endeavor to ensure that they had explored all potential permittees. David explained that Ecology also issues discharge permits for construction and municipal storm water. He estimated that there were 500 of these in his region (Oregon to the Canadian border), 152 of which were individual. He also estimated that approximately 100 of those are in Yakima County; he did not know the exact number relevant to the GWMA but would find out. A member asked if fertilizer companies were permitted by Ecology. David said only if they are using water and discharging in a manner that impacts surface water. He added that Ecology may also be called upon in a case of toxic clean-up/removal. David was asked to find out how many cases of toxic clean-up/removal exist in the GWMA. Another member asked about dry cleaners or other manufacturing activity in towns. David responded and said that Ecology doesn't have any, but

that this might be permitted by the towns. He explained however that towns will contact Ecology if there is an issue that they might need to investigate. Another member asked if the City of Sunnyside has their own NPDES permit. David will check this and also generate a list of permittees in the GWMA for the group.

David continued his presentation explaining the handouts he had provided. The group had several questions. Dan wanted to know how long Ecology kept the discharge monitoring reports (15 years electronically), what audit processes were utilized (auditing occurs when they see trends or something looks out of the ordinary in order to better analyze the situation) and how many Notices of Violations, Administrative Orders or other enforcement actions had been issued in the GWMA in the last 15 years (David will provide this information). Upon inquiry David also explained that if the Port of Sunnyside received waste from someone that appeared to be out of order, *Ecology would go with the Port to provide technical assistance to the waste provider in* order to resolve the issue. At that point the group had no further questions about nitrate sources in the commercial, industrial or municipal sectors that Ecology could help with.

Onsite Sewage Systems: Dan handed out excerpts from a brochure that Lisa Freund, Chair of the EPO Working Group had provided. The brochure was produced by the Environmental Protection Agency (EPA) and covered the basics on care and maintenance for an onsite sewage system. The brochure is also available in Spanish. The group discussed the brochure noting those things they felt were lacking and/or confusing. The discussion moved towards how to create a mailing list of homeowners with onsite sewage systems in the GWMA. Ultimately the group decided that the brochure needed to be developed further and funded as a component of the group's recommendations to the GWAC rather than an educational component which would be pursued now. The group also discussed mailing the pamphlet annually and potentially participating in EPA's "Smart Septic" week.

Dan explained that Dave Cole was compiling a list of suggested solutions for onsite sewage systems but was not able to attend the meeting. Dave had mentioned a Craft 3 program which he was investigating further. Dan understood that Craft 3 was a low interest loan program available if the Department of Health required an onsite sewage system to be upgraded and/or replaced because it failed. It had been used primarily on the west side of the mountains in those areas where oyster beds were at risk. These loans were made through funding from the Department of Ecology to the Department of Health.

The group discussed other possible solutions including a statutory requirement for a landowner to pump their system, requiring inspections of existing onsite sewage systems, moving towards centralized systems where clusters of perhaps 10 or more systems exist, requiring homeowners to install enhanced systems prior to sale, inserting into the building code that onsite sewage systems include applicable upgrades, and proceeding with an educational program while providing funding to dig deeper wells for people who need them (this would help solve the nitrate issues sooner as septic upgrades are expensive and it will take longer to see improvements from this source). The group also discussed the merits of an aquifer protection taxing district. The district would not be regulatory in nature and the group could suggest tasks to be performed that would exempt homeowners from paying the tax. Jim Davenport pointed out that the taxing district would require a vote of the people but whether it succeeded or failed a great deal of educational

information would be made available to the residents located in the GWMA. The district could fund the projects and educational component mentioned above and the group could consider including mitigation on abandoned wells in this program as well. The group would need to come up with a list of projects, estimate their costs and calculate a per acre tax based on those costs. In order to help the group analyze what an aquifer protection district could do, Jim Davenport volunteered to write up a potential plan and provide it to the group for their consideration. Dan will create time on the next RCIM agenda for the group to discuss Jim's proposal.

The group also agreed that funding should be pursued from the Legislature and other sources and noted that it would be important to discuss affordability and costs attributable to each solution before it was presented to the GWAC. Jim Davenport mentioned a concern that Ecology doesn't want any new wells and wasn't sure the GWAC could recommend decommissioning an at-risk well while drilling for a new one under the proposed Yakima County Water Resource System. A member asked Jim to research this and find out if it would be feasible if the GWMA recommended it.

Finally, the group had a brief discussion about abandoned wells. Jim pointed out that a special joint working group meeting was scheduled for Monday, December 5, 1:00-3:00 PM at the Department of Ecology to discuss this issue and that everyone would be encouraged to come with their ideas on how best to approach this issue. Immunity and cost assistance were two solutions that had already been suggested.

The group decided to cancel its December meeting and meet again on January 9, 2017. The meeting was adjourned at 3:56 PM.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

David Bowen will research and provide the following information to the group:

- The number of discharge permits for construction and municipal storm water relevant to the GWMA.
- The number of cases of toxic clean-up/removal that exist in the GWMA.
- Whether the City of Sunnyside has their own NPDES permit.
- Generate a list of NPDES permittees in the GWMA.
- Ascertain how many Notices of Violations, Administrative Orders or other enforcement actions have been issued in the GWMA in the last 15 years.
- Find out what the Port of Sunnyside does with the solids they remove during processing.

Jim Davenport will research the ability to decommission and drill new wells (if the GWAC recommended it) under the proposed Yakima County Water Resource System.

Data Collection, Characterization, Monitoring

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Melanie Redding (Chair); Andres Cervantes; Bob Stevens; Charles (Pony) Ellingson; David Bowen; Chelsea Durfey; Dave Cowan; Donald Brown; Doug Simpson; Elizabeth Sanchey; Eric Winiecki; Frank Lyall; Ginny Stern; Jaclyn Hancock; Jan Whitefoot; Jean Mendoza, Jennifer MacDonald; John Van Wingerden, Kevin Lindsey; Laurie Crowe; Lino Guerra; Mike Shuttleworth; Ralph Fisher; René Fuentes; Robert Farrell; Ron Cowin; Scott Stephen; Sheila Fleming; Steve Swope; Stuart Turner; Dr. Troy Peters

Meetings/Calls Dates

Meeting: Wednesday, October 12, 2016, 1:00-3:00 PM
Call Number: 509-574-2353 pin: 2353#

Participants

Present: Melanie Redding* (Chair), Vern Redifer, Jean Mendoza, Margie Van Cleve, David Bowen, Steve George, Steve Swope*, Pony Ellingson*, Chris Saunders (County support staff) *via phone

Key Discussion Points

The meeting convened at 1:04pm. After the customary introductions, Vern passed out a document from the Pacific Groundwater Group dated June 8, 2016, titled "~~Draft~~ Lower Valley GWMA Proposed Ambient Groundwater Monitoring Network". The edited document contained changes made by PGG in response to comments from Data working group members. Vern hoped that the group could recommend the report to the GWAC at the October 20th meeting, where he anticipated further discussion about allocating resources based on the report's contents.

Discussion ensued on whether this report had been sent out in a timely manner so as to solicit adequate and informed comment from working group members. Vern cautioned that delaying the matter until the December GWAC meeting would hinder the ability to install the monitoring stations by the Spring of 2017, as laid out in the timeline on pages 11-12.

Vern pulled up the submitted comments, contained in the document "AMN final draft comments from data workgroup", and the group proceeded to discuss them. Melanie reiterated that PGG's ambient monitoring network could be supplemented with more testing sites or monitoring beyond nitrates at a future date. PGG had attempted to address concerns about shallow basalt in Section 3.1 (pages 4-5) of their report.

A group member inquired, whatever number of well monitors are installed, how will we know whether they're pointing us in a direction to know that we need to expand our monitoring

capacity? Vern suggested that this could be addressed by ongoing consultation with PGG. Group members representing PGG stated that they can better answer this question if they have more clarity as to what goals the GWMA and/or their successor entities want to accomplish. Acknowledging that there can be a high degree of variability between well results, they stated that the goal of a broad network was to come up with an average variability that would be useful enough to get an average picture.

Vern cautioned the group that the GWMA's budget did not allow for the installation of all of PGG's suggested wells by the end of the GWMA's mandate in December 2017. Adding to the system would most likely have to be a formal recommendation to the GWMA's successors, in his view. Another member saw the PGG report as an early phase plan designed to inform the implementation of a broader nitrate mitigation plan down the road. Once more data became available, it would be easier to approach legislators with funding requests for future endeavors.

It was decided that copies of PGG's latest report would be e-mailed out to working group members after the meeting, with a deadline of noon on October 17th (Monday) for submitting comments, questions, or concerns. The PGG monitoring plan would be tentatively placed on the October 20th GWAC agenda, subject to removal if working group members raised substantial objections upon review.

Results of voting on Other Monitoring Objectives: Melanie reviewed the results of the working group's rankings of PGG's 2013 recommended monitoring objectives. "Water Supply Aquifer" had taken the top spot by a comfortable margin, with "Hot Spots" in second place. She felt that a broad-enough base of workgroup members had voted since the last meeting to bring the matter before the October 20th GWAC for discussion.

Other Monitoring Factors: After stating that a cost analysis of what was affordable was still in the works, Melanie invited the group to give input on how they saw a monitoring program being implemented.

In terms of hot spots, a group member wanted to see wellhead assessments performed on previously-sampled wells with nitrate concentrations in excess of 25 mg/L in order to identify what might be leading to the contamination of those wells. Vern stated that the county already had some of that data. Doing further assessments would require obtaining permission from the property owner. The group kept the idea open for consideration.

A member stated that they had heard from USGS and Ecology that it was possible to get a comprehensive assessment of Lower Valley aquifers using private and public wells. The group also discussed how to handle the question of well depth. It was PGG's intention to focus on shallow alluvial wells, although it was possible to have different ranges within any network. Yakima County had a separate contract out looking at water supply issues, which could also be a useful data source.

Melanie stated that so far she had only heard positives about using existing wells for monitoring purposes, and asked the group if this reflected their opinions. A group member replied that it depended on the goal. For example, are we trying to find new hot spots, or address the existing ones? Melanie reiterated that cost estimates were in the works for a plan to address hot spots. Another group member inquired whether cost estimates would include private wells. Pony

replied that existing wells were a good way to measure the water supply aquifer, but that drilling should occur under water tables because it provides information not available otherwise. Asked whether PGG had done any 3D modeling of the water supply aquifer, Pony answered that they had done a study that included seven sedimentary layers, but that it hadn't been classified by aquifer. Department of Health data on deep municipal wells, combined with data on county-owned wells, could be utilized to paint a picture of water supply aquifers.

Melanie felt that the Data workgroup had enough to tell the GWAC in broad terms, "This is our next step; addressing common water supply aquifers using existing wells". The GWAC members would ask questions and discuss the matter, vote on establishing this as a top-priority goal for an ambient monitoring system to address, and then Data could fill in the details and line up the resources. This would take place at the same time as they were reviewing PGG's latest report.

Melanie asked the group what their priorities were beyond the constraints of an ambient monitoring program. Vern noted that the nitrate loading results should be forthcoming from the Department of Agriculture soon, and that these would inform the development of any program.

A member noted that several groups had discussed the subject of identifying abandoned wells and the potentially significant costs of fixing them. Discussion ensued on whether this item was best handled by Data, or by a joint meeting of different working groups.

The group also discussed the question of passive vs. active samplers. Vern stated that passive samplers were less expensive in the short term, and that while normally, he would lean in favor of long-term savings, the expiration of the GWMA's mandate in December 2017 tilted the scales in favor of getting as much data as fast as possible, in order to hand off to their successors.

The meeting adjourned at 3:00pm.

Resources Requested

Recommendations for GWAC

Approval of PGG's latest proposal will be tentatively placed on the October 20th GWAC agenda, subject to removal if working group members raise objections after reviewing the document.

"Water Supply Aquifer" and "Hot Spots" will be recommended to the October 20th GWAC as priority items for an ambient monitoring program to address.

Deliverables/Products Status

Proposed Next Steps

Working group members will review PGG's latest report and submit comments, questions, or concerns to Melanie by noon on October 17th.

Agenda items not covered will be moved to the November 9th Data Working Group agenda.

Abandoned wells may be added to the Data workgroup agenda, subject to discussion with other working group chairs who are interested in the issue.

Data Collection, Characterization, Monitoring

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Melanie Redding (Chair); Andres Cervantes; Bob Stevens; Charles (Pony) Ellingson; David Bowen; Chelsea Durfey; Dave Cowan; Doug Simpson; Elizabeth Sanchey; Frank Lyall; Ginny Stern; Jaclyn Hancock; Jan Whitefoot; Jean Mendoza, John Van Wingerden, Kevin Lindsey; Laurie Crowe; Lino Guerra; Mike Shuttleworth; Ralph Fisher; Robert Farrell; Ron Cowin; Scott Stephen; Steve Swope; Stuart Turner; Dr. Troy Peters

Meetings/Calls Dates

Meeting: Wednesday, November 9, 2016, 1:00-3:00 PM
Call Number: 509-574-2353 pin: 2353#

Participants

Present: Melanie Redding (Chair), Steve George, Jean Mendoza, Jim Dyjak, Kathleen Rogers, Rand Elliott, David Bowen, Stuart Turner, Sandy Braden, Margie Van Cleve, Ginny Prest, Stuart Crane, Jim Davenport, Vern Redifer, Gary Bahr*, Bob Farrell*, Steve Swope*, Pony Ellingson*, Laurie Crowe*, Lucy Edmondson*, Matt Bachmann*, Kevin Lindsey*, Ralph Fisher*, Nick Peak*, Chris Saunders, Marlene Carpenter (County support staff) *via phone

Key Discussion Points

Meeting Overview: The meeting got underway at 1:03pm. After the customary introductions, Melanie reviewed the purpose of the meeting. At the October 20 GWAC meeting, some members had expressed concerns about PGG's proposed ambient monitoring network (AMN). After much discussion, the proposal was tabled for further review at this Data working group meeting, to which all members of the GWAC were invited, to allow representatives from PGG to address whatever outstanding questions and concerns members might have. The goal of this meeting was to help members feel comfortable casting a vote for or against the AMN at the November 17 GWAC meeting.

Ambient Monitoring Network Task: Melanie gave a brief overview of the history leading up to this point. Yakima County had contracted with Pacific Groundwater Group (PGG) to design a groundwater monitoring system. On December 3, 2013, PGG issued a report laying out a realm of possible priorities that a monitoring network could address. On August 15, 2014, PGG issued an interim monitoring plan for the purpose of tracking current and future nitrate levels.

On February 19, 2015, the GWAC approved the development of an AMN which would address the GWMA goal of reducing nitrate in groundwater over time. The GWAC specified the following characteristics for an AMN; 1) 35-40 purpose-built wells, 2) linear flow patterns, 3) dispersed

enough to look at different areas of the GWMA, and 4) down to the water table/shallow aquifer. PGG was later contracted to develop this AMN based on these specifications.

Melanie stressed that no one monitoring network could answer all the questions out there. In her view, the proposed AMN before the group should be understood as a first step, and a basis to inform and supplement future nitrate monitoring and mitigation efforts. Several of those priorities, contained in the December 2013 PGG report, had been discussed at the last two Data working groups, and placed on the agenda for discussion at the October GWAC meeting, although debate over PGG's AMN had prevented the group from getting to them. Melanie reminded the group that PGG's final draft report was the issue on the table, and asked members to focus their questions on the matter before them.

GWAC Member Concerns

Proximity of monitoring wells to roadways: A member repeated concerns he had expressed at the October GWAC meeting that many of PGG's proposed wells would be located in close proximity to roads. Specifically, he was concerned that 1) runoff from roads would contaminate the nearby groundwater supply with nickel, copper, and hydrocarbons, 2) roads would create a wall of compacted soil that would prevent monitoring stations from getting a true 360-degree view of groundwater, 3) statutes in other states forbid the siting of wells in close proximity to roadways, although he wasn't sure about the status of the law in Washington on this matter, 4) some drivers in rural areas don't always stay on the road, which could potentially lead to wellhead damage.

On the first point, Steve Swope of PGG replied that the monitoring stations are designed to monitor nitrates only, and that to his knowledge, there have not been any studies showing that roadways lead to higher nitrate contamination in adjacent soils. On the second point, Steve saw soil compaction caused by roads to be a problem down to 10 feet in depth, but not something that would interfere with groundwater flow 50 feet deep. On the third point, Steve acknowledged that while there are setback rules against locating domestic wells too close to roadways, the proposed wells were observation wells, and he was not aware of any legal restraints on placing them next to roads. PGG had located many observation wells next to roadways in Washington in other projects, including the city of Olympia, for the reason that it's easy to gain legal access to them. On the fourth point, Steve said PGG had not encountered problems with errant drivers damaging wells in their prior work.

The member stated that if roadside wells were located at the far edge of county right-of-way, it might assuage some of his concerns.

First Water: A member expressed concern about the depth of the wells, the difference in monitoring first water vs. first legal drinking water, and about the possibility of monitoring a seasonal perched water table that would skew the results. Pony felt that PGG's process for siting wells was adequate to address the issue of perched water, and that they had enough depth data from USGS to be able to tap into the aquifer at the drilling site.

Existing Private Wells: Some members disagreed with the approach of drilling new purpose-built wells rather than relying on existing private wells for data-gathering. They felt that this approach would be cheaper than drilling new wells from scratch, would be located in fields, thus

giving a better sense of land-use practices and BMP effectiveness, and had already been used as the approach in Whatcom County. Vern stated that the County's preference for purpose-built wells was because it can take years to get private landowners to grant permission to monitor their property; often they want monetary compensation, which can inflate the costs; and they can revoke permission to use their wells at any time. The benefit to drilling new purpose-built wells is that the implementing agency can maintain control over them. They had also been advised by a member of the Umatilla GWMA to go with purpose-built wells, not private. PGG did not have a stated preference, other than the fact that they had been directed by the GWAC to pursue purpose-built at the February 2015 meeting.

One of the members who had long expressed a preference for private wells stated that he was prepared to reluctantly concede the issue for the sake of not struggling with siting, and gaining a faster real-time report card on nitrate trend-lines. Jim Davenport suggested that a possible forward course could involve authorizing PGG to take GWAC members to their intended drilling locations to see if they were satisfactory. The member was eager to pursue that course, pending authorization from the GWAC.

Existing Public Wells: Another member questioned why some of the existing public wells shown on PGG's attachments, especially those within the EPA cluster, couldn't be used for data gathering. Pony reiterated that PGG had been asked to devise a purpose-built system. Some of the existing public wells don't have construction records or well logs, and Pony felt it would be a difficult task to locate all the existing public wells, which have inexact coordinates. On the EPA wells, it was agreed that they could be included in the study, and that this would be put in writing.

Randomness of Well Sites: A member spoke on behalf of another GWAC member who was not present, relaying their concerns that none of PGG's proposed wells were located in an Urban Growth Area (UGA). They felt this would miss out on tracking nitrate contributions from high-density septic system clusters, and that PGG should talk with the RCIM work group to select a site in a UGA. Steve stated that this concern had been addressed in Section 4.0 of PGG's latest report.

Another member expressed concerns about avoiding well locations next to unlined canals. Given the volume of unlined canals in the Sunnyside Valley Irrigation District alone, the member felt this would be avoiding a very common influence on nitrate concentrations, skewing the data gathered. Steve stated that PGG's goal had been to avoid known dominant biases in locating wells. The member felt this was putting a thumb on the scales.

Melanie was wary of "tampering" with PGG's suggested well sites to address UGA or other concerns, fearing that this would invalidate the randomness and introduce bias. She felt these concerns, while valid, would be better addressed in future monitoring projects.

Adequate funding: Some group members were concerned that the price tag associated with the AMN would deplete resources for implementing future projects. David Bowen stated that Lower Valley nitrate contamination was the number one priority in his division of Ecology, and that there was no intention of letting this fall off the radar screen in terms of funding. As far as appropriations from the state for future projects, Rand Elliott stated that he would need a concrete proposal before approaching lawmakers with a request for funds.

In terms of the existing GWAC budget, Vern stated that this had been included on the October GWAC agenda, and briefly discussed. A more in-depth discussion of the budget, and how money might be reallocated to reflect the group's priorities, is on the agenda for the November GWAC, although members would need time to develop their proposals before any votes get taken.

Historical Nitrate Trends: Another member was concerned that by relying on randomly-dispersed purpose-built wells, the GWMA would be getting a record of current and future nitrate levels, but sacrificing a record of past nitrate trends. Steve replied that this had not been part of the mandate they received from the GWAC in February of 2015.

GWAC: Melanie asked group members who had not been ready to cast a vote at the last GWAC meeting whether their concerns had been addressed sufficient to vote on the AMN proposal. One member on the phone needed time to discuss the matter with her department. Another member could not support PGG's proposal unless a program addressing hotspots and other priorities using existing private and/or public wells was conducted simultaneously. Other members still had reservations, but were willing to support an AMN, as long as it was understood as a building block to future endeavors, not the be-all/end-all, and as long as PGG was willing to accommodate concerns about siting as the program was being implemented.

Jim Davenport's Role: Members inquired as to Jim Davenport's future role with the GWAC. Jim answered that he was still under contract with Yakima County to provide assistance to the group, although this did not formally include his role as facilitator. Several members expressed a desire to see Jim continue facilitating GWAC meetings, and hoped the full GWAC membership would ratify that role at the next meeting.

The meeting adjourned at 3:50pm.

Resources Requested

Recommendations for GWAC

PGG's final draft AMN proposal will be placed on the November 17 GWAC agenda for a vote.

Discussion of future projects and priorities such as monitoring hot spots, informed by utilizing data from existing private and EPA wells, will be included on the November 17 GWAC agenda.

Discussion of the GWAC's budget status will be included on the November 17 GWAC agenda.

Deliverables/Products Status

Proposed Next Steps

Melanie will send members a copy of PGG's August 15, 2014 QAPP "Interim Final Groundwater Monitoring Plan."

PGG will stay in contact with interested GWAC members about physically touring the well sites before drilling takes place, once authorization is received.

Regulatory Framework Working Group

Charge from Groundwater Management Area Advisory Committee

[Insert Charge]

Working Group Members

Jean Mendoza, Chair (Friends of Toppenish Creek), Andres Cervantes (Department of Health), David Bowen (Department of Ecology), Chelsea Durfey (Turner and Co.), Dan DeGroot (Yakima Dairy Federation), David Newhouse (interested party), Ginny Prest (WSDA), Jason Sheehan (Yakima Dairy Federation), Jim Dyjak (Concerned Citizen of Yakama Reservation), Larry Fendell (interested party), Laurie Crowe (South Yakima Conservation District), Nick Peak (EPA), Patricia Newhouse (Lower Valley Community Representative), Steve George (Yakima County Farm Bureau), Stuart Crane (Yakama Nation), Sue Wedam (Lower Valley Community Representative), Vern Redifer (Yakima County Public Services), Jim Davenport (Yakima County Public Services)

Meetings/Calls Dates

Meeting: October 12, 2016 5:00-7:30 PM

Call Number: 360 407-3780 PIN Code: 306589#

Participants

Present: Jean Mendoza (Chair), David Bowen, Larry Fendell, Steve George, Dan DeGroot, Patricia Newhouse, Vern Redifer, Stuart Crane, Ginny Prest, Bobbie Brady (Yakima County Public Services). No one was on the phone.

Key Discussion Points

Jean opened the meeting at 5:03 PM. Everyone introduced themselves.

Jean informed the group that she had met with the RCIM Working Group earlier in the week to talk about pertinent regulatory requirements. Jean provided the group with a summary of her meetings with both the Irrigated Ag (IAWG) and RCIM Working Groups. The Irrigated Ag group had compiled a list of potential solutions (some were agreed upon in the Irrigated Ag meeting and others did not have the full agreement of the group). Jean reviewed each with the Regulatory group and the group discussed several in particular. A member emphasized the importance of the GWMA working groups being up-to-date with the technology available to the agricultural community and suggested that some of the consultants in attendance at the IAWG meetings may be able to provide this information. Vern added that a member of the Irrigated Ag Working Group had been concerned that the group didn't drive smaller growers out.

Jean noted that RCIM had already looked at WAC 246-272 which governed onsite sewage systems, and asked for more information regarding the National Pollution Discharge Elimination System (NPDES) permits issued by the Department of Ecology (Ecology). Vern pointed out that while

the WAC included design parameters and construction requirements, it only included one small sentence pertaining to the homeowners' responsibility for operation and maintenance. A discussion ensued about onsite sewage systems. David volunteered to get additional information on the NPDES permitting for RCIM as his group at Ecology oversees the permitting. Dan added that it would be nice to see what commercial, industrial and/or municipal entities are discharging and what is being discharged. In addition, he asked to see samples of the reports and what the group does to analyze, chart or monitor them. Dan also said it would be nice to have a spreadsheet summary from the last two to three years' reports.

Non-Point Source Pollution: Jean had provided the group with an invitation to a Clean Water Guidance for Agriculture Webinar she had received from Ben Rau. Jean asked if the group desired to invite Ben to speak at its next meeting to answer questions on this topic. A member wanted to know if it was relevant to the group and another asked if he was addressing surface water or groundwater. Both David and Ginny thought it was surface water. David will check into this further.

Total Maximum Daily Load (TMDL's): David provided the group with a written update on TMDL's and asked them to browse through it. There were no questions and/or comments.

RCW 90.64.180 Protocol for Monitoring Water Near Dairies and CAFO's With Executive Summary: Jean was concerned that this only pertained to surface water and not groundwater. Another member indicated that the executive summary related to the whole State and was not applicable to the area within the GWMA as the land is irrigated and governed by irrigation districts. Jean did not believe that discharge to groundwater was sufficiently monitored and felt that since Ecology hadn't developed a plan to monitor groundwater there was a gap in the regulations. Several members brought up the fact that the GWMA was setting up a groundwater monitoring system. A member didn't feel like there was a gap because of this ambient monitoring plan.

Confined Animal Feeding Operations (CAFO's) Water quality protection requirements: Jean said that Steve and Laurie had provided this information to her and she read aloud the last paragraph on page 1 and No. 7 on page 2 to the group. She believed that this raises questions about monitoring requirements for agricultural composting found in WAC 173 350 500. A discussion ensued. Jean indicated that she would send the group a list of applicable laws and highlight areas that apply to the groundwater in Yakima Valley.

Jean noted that the following items would be on next month's agenda:

- Regulations for decommissioning abandoned wells.
- Cost Analysis for GWMA proposals. Jean had hoped to have this presentation ready, but felt better postponing it until next month's meeting. She reminded the group that they had been willing to revisit this issue if she had more specific data.
- WAC 173 350 500 Groundwater monitoring Jean indicated that she desired to talk more about this WAC at next month's meeting. A member wanted to know how this correlates with groundwater.

The meeting concluded shortly after 7:00 PM.

Next meeting Wednesday, November 9, 2016, 5:00-7:30 PM.

Resources Requested: None.

Recommendations for GWAC: None.

Deliverables/Products Status: None.

Proposed Next Steps

- David volunteered to get additional information on the NPDES permit through the Department of Ecology as outlined above.
- David will check on the Ben Rau presentation.
- Jean will send the group a list of applicable composting laws and highlight areas that apply to the groundwater in Yakima Valley.

Regulatory Framework Working Group

Charge from Groundwater Management Area Advisory Committee

[Insert Charge]

Working Group Members

Jean Mendoza, Chair (Friends of Toppenish Creek), Andres Cervantes (Department of Health), David Bowen (Department of Ecology), Chelsea Durfey (Turner and Co.), Dan DeGroot (Yakima Dairy Federation), David Newhouse (interested party), Ginny Prest (WSDA), Jason Sheehan (Yakima Dairy Federation), Jim Dyjak (Concerned Citizen of Yakama Reservation), Larry Fendell (interested party), Laurie Crowe (South Yakima Conservation District), Nick Peak (EPA), Patricia Newhouse (Lower Valley Community Representative), Steve George (Yakima County Farm Bureau), Stuart Crane (Yakama Nation), Sue Wedam (Lower Valley Community Representative), Vern Redifer (Yakima County Public Services), Jim Davenport (Yakima County Public Services)

Meetings/Calls Dates

Meeting: November 9, 2016 5:00-7:30 PM

Call Number: 360 407-3780 PIN Code: 306589#

Participants

Present: Jean Mendoza (Chair), David Bowen, Larry Fendell, Steve George, Sue Wedam, Kathleen Rogers, Bud Rogers, Sandy Braden, Jim Davenport, Stuart Crane, Ginny Prest and Bobbie Brady (Yakima County Public Services). No one was on the phone.

Key Discussion Points

Jean opened the meeting at 5:05 PM and welcomed everyone. Jean asked the group if they felt a need to hold a December meeting. The group agreed to cancel it and convene again on January 11, 2016, 5:00-7:30 PM.

Costs for Certain Populations: Jean advised it was her goal was to discuss the financial impact of nitrate pollution in groundwater for communities in the Lower Yakima Valley. To aid in the discussion Jean provided an updated version of the analysis she had prepared entitled "Costs Related to Elevated Nitrates in the Groundwater" which examined the impact on families, the direct and indirect costs to tax payers for education, monitoring and improvements, the unpaid costs for volunteers to participate in the GWAC and its various working groups, costs incurred by growers and producers and the costs of health risks directly attributable to increased nitrates in the groundwater. Jim Davenport asked the context Jean intended to use these numbers in. Jean said she desired to compile the data for informational purposes in an effort to elicit the cost of doing nothing. Jim pointed out that the costs of proposed alternatives (the cost of doing something) will be analyzed once those alternatives are presented by the various working groups.

Another member added that he was not in favor of hiring someone to do this. However, he saw Jean's estimates and the group's discussion as helpful as it would provide a simple baseline of comparison which would be important in the future.

The group then reviewed and discussed each category and agreed to make the following changes:

1. Families: In the first scenario a member noted that the cost of bottled water was not five percent of the budget, but four percent. The group felt Jean should also look at other cost options besides purchasing bottled water, i.e., a reverse osmosis system, deepening an existing well or drilling a new one. One member suggested that in order to obtain this information Jean might contact Apple Valley Well Drilling and ask the per foot cost to drill a well.

2. Tax Payers: Costs for the Washington State Dairy Nutrient Management Program (DNMP) should be changed from $1.2 million (as this number was a state-wide cost for two years) to $100,000 annually per Ginny Prest as it more accurately reflected the WSDA cost to deal with nitrates in the GWMA. Ginny Prest will obtain information that would reflect a more accurate estimate of the cost to train dairies on how to safely apply manures to crops in the GWMA as the amount estimated by Jean of $575,000 in 2015-16 was a statewide figure. *(NOTE Ginny Prest provided the following update: the DNMP annual statewide budget is $561,000. DNMP annual expenditures in Yakima are $72,543 which includes 0.25 Program Manager; 0.50 Inspector salary, benefits, goods & services, and travel. This estimate is based on the last three years' direct expenditure. This does not include expenditures from the NRAS or other agency activities. If the working group is interested in those figures as well, Ginny can work with other WSDA programs to get an estimated cost.)*

The group discussed the cost to connect public sewage from Sunnyside to Outlook; Jim Davenport noted that this could be a proposed alternative.

3. GWAC Participation: A member preferred that citizens' and local advocacy group members' "costs" for attending GWAC and working group meetings be termed "in-kind contributions" since they don't and won't get paid for their time.

4. Growers and Producers: The group discussed the amount of irrigated acres in the Lower Yakima Valley and agreed 94,000 was a more accurate number than 90,000. Jean also explained that she included estimates for both one and two soil samples on 40 and 80 acres because she was unsure of the accuracy of both of these numbers. Jim Davenport said that the recommendation that came out of the Irrigated Ag Working Group was one time per year on 80 acres. The group agreed. The group also discussed what other costs growers/producers incur due to elevated nitrates. One member said that they would have to grow crops that will help them mine the nitrogen that perhaps would not be as profitable as the crop of their choice. Another member noted the expense of transitioning irrigation techniques. Another member suggested hiring an agronomist, but others pointed out that most growers/producers already have at least one.

5. Health: It was suggested that Jean contact Ginny Stern at the Department of Health to find out if she could help with concrete estimates of the health care costs of blue baby syndrome. Jean said that it had been suggested that some cancers result from nitrates but this can't be proven. Another member responded and said that she would not consider including in this category health costs for diseases which were not scientifically linked to nitrates in the groundwater.

Composting Law: Jean referred the group to the "Summary of Washington Rules and Regulations Regarding Composting in Animal Agriculture" she had prepared and noted that the applicable composting laws were found under solid waste and that the Washington State Department of Ecology and the Department of Health monitor the laws. In addition, Jean explained that she had spoken with Ted Silvestri of the Yakima Health District who explained that only one Yakima County dairy reports to them under this law, and that although the law is in place, they haven't been enforced. Ginny added that she didn't believe there was a lot of composting going on in the GWMA as most were dry solids, which is not true composting. Another member didn't believe that most dairies were aware of Department of Health reporting and that composting for dairies is covered under their DNMP. Ginny also point out that composting would be covered in the new CAFO permit which had been directed to be out by the end of the year. Jean also informed the group that Ted Silvestri had been complimentary of Natural Selections Farm, Inc., and explained that they had a leachate pond made of compacted concrete with a device underneath to monitor for leakage. Ginny mentioned that WSU was testing a resistive array. Another member said that it was being tested in Yakima Valley and that WSU was still in the research phase.

Abandoned and Decommissioned Wells: Jean had provided the group with a handout, "Summary of Washington Rules & Regulations Regarding Abandoned and Decommissioned Wells." Her desire was for the group to review the information and agree to present this regulatory information to the Joint Working Group on Abandoned and Decommissioned Wells. The group reviewed and discussed the regulatory information and agreed it could be presented to the Joint Working Group for their meeting on December 5.

The meeting concluded shortly after 6:16 PM. The next meeting will be held Wednesday, January 11, 2017, 5:00-7:30 PM.

Resources Requested: None.

Recommendations for GWAC: None.

Deliverables/Products Status: None.

Proposed Next Steps

- Ginny Prest will obtain information that would reflect a more accurate estimate of the cost to train dairies on how to safely apply manures to crops in the GWMA.

- Jean will pass on the "Summary of Washington Rules & Regulations Regarding Abandoned and Decommissioned Wells" along with the attachments to the Joint Working Group on Abandoned and Decommissioned Wells.

Livestock/CAFO Working Group

Charge from Groundwater Management Area Advisory Committee

Discussion of data sources and remaining Work Plan Items

Working Group Members

David Bowen, Chair (Department of Ecology), Gary Bahr (Department of Agriculture), Elizabeth Sanchey (Yakama Nation), Jason Sheehan (Dairy Federation), Jim Newhouse (South Yakima Conservation District), Laurie Crowe (South Yakima Conservation District), Sue Wedam (LV Community Rep.), Patricia Newhouse (Community Rep Position #2), Steve George (Yakima County Farm Bureau), Stuart Turner (Turner & Co., Inc.), Jean Mendoza (Friends of Toppenish Creek), Jim Dyjak (Concerned Citizens of the Yakama reservation)

Meetings/Calls Dates

Meeting: Thursday, October 6, 2016, 5:00 – 7:00 PM

Participants

David Bowen, Jim Dyjak, Jean Mendoza, Steve George, Larry Fendell, Sandy Braden, Sue Wedam, Kathleen Rogers, Bud Rogers, Michelle Burkhart, Vern Redifer and Bobbie Brady (Yakima County Support Services).

Key Discussion Points

Chair David Bowen opened the meeting at 5:06 PM. He reviewed the Committee Operating Guideline Ground Rules with the group and highlighted in particular the last item "speak from interests not positions." When asked, several members felt this meant the group should focus on their mandate to clean up groundwater rather than be entrenched in their own interests.

BMP Discussion: Before proceeding with the discussion David stated that his understanding was that the group was to focus on pens, corrals, lagoons/ponds, composting, feed storage and animal mortality operations. The group agreed. A member noted that WSU had a recommendation guideline that is regularly followed pertaining to animal mortality and suggested the group consider it when addressing the topic. Another member thought there was an RCW that pertained to bovine/equine composting as well.

David asked the group to look at the NRCS Standards Relevant to LYV GWMA Livestock/CAFO Work Group handout he had provided to the group prior to the meeting. David noted that Stu Turner, Laurie Crowe and Ginny Prest had helped him put the list together. He explained that it was his goal to provide as many standards as possible so that people could pick and choose what would work on their land as all standards won't apply to everyone.

The group began its review of the list and discussed each standard. Vern reminded the group that any standards remaining on the list could be reviewed in more detail at a later date and any items removed should be those standards specifically not applicable to protecting the groundwater in pens, corrals, lagoons/ponds, composting, feed storage and animal mortality operations. It was the group's consensus that the following standards be removed: Nos. 560, 310, 356, 554, 432, 375, 373, 382, 410, 412, 516, 484, 582, 378, 345, 570, 350, 570, 587, 606, and 614.

The group also discussed how to handle the standards they believed should be added to this abbreviated list, i.e., those relating to silage. Jim Dyjak volunteered to compile a list and respond back to the group within the next two weeks. David's goal was to try to complete this discussion via email prior to next month's meeting. David will also email Stu Turner to find out if it is important for the group to exclusively consider Washington State standards or if standards from other states could be utilized.

Finally, the group discussed its meeting schedule for 2017. The group agreed to schedule meetings for each month in 2017 with the thought that meetings could be cancelled on a month-by-month basis if they were deemed unnecessary. David added that at the next month's meeting it was his goal to work on the regulatory piece specifically identifying gaps and a means to fill them. His desire was to complete this work at the November and December working group meetings so that the group's recommendations could be submitted to the GWAC at its December meeting.

The next meeting will be held Thursday, November 3, 2016, 5:00-7:00 PM.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

- Jim Dyjak volunteered to provide the group with a list of other standards that might need to be added to the list the group had already compiled.

- David will email Stu Turner to find out if standards from other states could be considered by the group.

Livestock/CAFO Working Group

Charge from Groundwater Management Area Advisory Committee

Discussion of data sources and remaining Work Plan Items

Working Group Members

David Bowen, Chair (Department of Ecology), Gary Bahr (Department of Agriculture), Elizabeth Sanchey (Yakama Nation), Jason Sheehan (Dairy Federation), Jim Newhouse (South Yakima Conservation District), Laurie Crowe (South Yakima Conservation District), Sue Wedam (LV Community Rep.), Patricia Newhouse (Community Rep Position #2), Steve George (Yakima County Farm Bureau), Stuart Turner (Turner & Co., Inc.), Jean Mendoza (Friends of Toppenish Creek), Jim Dyjak (Concerned Citizens of the Yakama reservation)

Meetings/Calls Dates

Meeting: Thursday, November 3, 2016, 5:00 – 7:00 PM

Participants

David Bowen, Jim Dyjak, Jean Mendoza, Laurie Crowe Larry Fendell, Sandy Braden, Sue Wedam, Jason Sheehan, Stuart Crane, Jim Davenport, Vern Redifer and Bobbie Brady (Yakima County Support Services).

Key Discussion Points

David welcomed Jim Davenport back to the group and opened the meeting at 5:08 PM. David asked everyone to refer to the list of NRCS standards provided with this month's agenda so that the group could continue their BMP discussion. He reminded everyone that the items in yellow had been approved by the group to keep at last month's meeting, the items highlighted in blue were those the group had asked Jim Dyjak to research and suggest for the group's review and the non-highlighted practices were those he had found and forwarded earlier in the month for comment by the group. David also provided the group with written comments that were sent to him from members who had been unable to attend the meeting

The group discussed whether or not to confine their consideration of the NRCS standards to practices that had already been approved by an engineer and recognized in Washington State or to look at suggested practices from across the Country. It was finally decided that anything that had been recommended that could have a positive effect should be on the list and could be modified and tailored for this State at a later date.

The group began its review of the list. David reminded everyone that the group's focus was on pens, corrals, lagoons/ponds, composting, feed storage and animal mortality operations and the reduction of nitrates. After review and discussion of each standard it was the group's consensus that the following standards be removed Nos.: 309, 656, 605, 595, 443, 436, 441, 468, 576, 367 and 527. The group decided to keep Nos. 393, 318, 578 and 635. The group also decided to keep No. 442

Sprinkler Systems, but Laurie Crowe will look at the NRCS and find the one that is actually applicable to dust abatement.

After a brief break David asked the group to consider what topics hadn't been addressed in the BMP discussion. As an example David said he had spent time going through the NRCS standards and hadn't been able to find one that addressed silage. Laurie said silage gets addressed but is intertwined with NRCS standards on other topics. The group discussed several BMP actions for silage. A member produced a BMP from the Minnesota Pollution Control Agency about managing leachate and feed storage area runoff that the group could look at. Members also brought up and discussed composting requirements, the number of cows in an enclosure, and additional BMP's to require improvements on lagoons and to look specifically at older lagoons. The group also discussed adaptive management, the economics of overcrowding, the ability to measure BMP's and the measurement of the overall effectiveness of a group of BMP's.

David then turned the group's attention to the list of unanswered questions Jim Dyjak felt the group should discuss. The group looked specifically at Question No. 3 – "How can we encourage people to use BMP's?" A member believed that education increases awareness. Another member felt that Question No. 2, "What is the best way to encourage the use of BMP's in ALL of the agricultural community (CAFO, fruit, hops, produce, etc.)?" was a very good question. Vern mentioned that at the last Irrigated Ag meeting he had suggested that group look at the NRCS practices as well. He added that the group had suggested as a possible solution that the GWMA go to the growers meetings held in the winter by a variety of commercial fertilizer companies to educate them about these issues. David concluded the discussion by asking members to get any other ideas to him in the next few weeks. His goal was to look at regulatory framework at the next meeting which will be on Thursday, December 1, 2016, 5:00-7:00 PM. David will put together what he has collected and send it out in advance of the meeting for everyone to consider. The meeting concluded at 7:04 PM.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

Laurie Crowe will look at the NRCS standards and find the one that is applicable to dust abatement.

Members are to provide David with any other ideas for the regulatory framework discussion in the next few weeks. David will put together what he has collected and send it out in advance of the meeting for everyone to consider.

Livestock/CAFO Working Group

Charge from Groundwater Management Area Advisory Committee

Discussion of data sources and remaining Work Plan Items

Working Group Members

David Bowen, Chair (Department of Ecology), Gary Bahr (Department of Agriculture), Elizabeth Sanchey (Yakama Nation), Jason Sheehan (Dairy Federation), Jim Newhouse (South Yakima Conservation District), Laurie Crowe (South Yakima Conservation District), Sue Wedam (LV Community Rep.), Patricia Newhouse (Community Rep Position #2), Steve George (Yakima County Farm Bureau), Stuart Turner (Turner & Co., Inc.), Jean Mendoza (Friends of Toppenish Creek), Jim Dyjak (Concerned Citizens of the Yakama reservation)

Meetings/Calls Dates

Meeting: Thursday, December 1, 2016, 5:00 – 7:00 PM

Participants

David Bowen, Jim Dyjak, Jean Mendoza, Laurie Crowe, Larry Fendell, Sandy Braden, Steve George, Bud Rogers, Kathleen Rogers*, Jeff Steele, Jim Davenport and Bobbie Brady (Yakima County Support Services). *via phone

Key Discussion Points

David Bowen began the meeting at 5:08 PM and asked everyone to introduce themselves. David noted that the group's work on BMPs was 95 percent done – he is looking at the RCW's and some Washington State University (WSU) guidelines. In addition David began a draft of the Livestock/CAFO report to the GWAC which will include information on the composition of the working group and the approach taken, an overview of existing management strategies and programs, alternative management strategies, recommended management strategies, and an implementation plan and recommended methodology to monitor progress. In addition he had reviewed the notes from the group's previous meetings and created a list of possible solutions the group had identified to close the potential gaps for pens and barns, corrals, lagoons and ponds, composting, feed storage and animal mortality. David explained his goal was to review each item and add or delete as the group desired. Discussion ensued and the group made additions to the list and categorized potential solutions as follows. (PLEASE NOTE: the items highlighted in yellow are still under consideration and the items highlighted in green the group agreed should be included, most requiring more details). All will require further discussion.

Dairy Nutrient Management Plan

Potential to disclose some information to the extent possible where it could help problems.
Remove the mystery and assumptions.
How do we know they work?

Laurie pointed out that the DNMP had been developed for guidance and was never meant to be a regulatory tool but has become more regulatory in nature.

BMP Implementation

What does that look like? Must be GWMA specific.
Encourage use, best impact, effectiveness.

Increase Funding to SYCD

Outreach, education, technical assistance.

A member agreed in principle as long as the funding remained within the boundaries of the GWMA.

County CAFO Ordinance – GWMA Specific? A member wanted to know if the Department of Ecology agreed with this idea. David indicated that if the County ordinance was more stringent it would prevail over Ecology's. The group also discussed that it could up to three years before Ecology's permit would go into effect as it would most likely be appealed by several groups. Jim Davenport suggested that the group postpone any discussion on this until Vern Redifer was present.

Who will monitor? Agency, County, organization (public oversight)

Lead entity: money dedicated, tbd, specific skill sets

A member believed the County should be the lead entity. Jim Davenport said that the only entity within the County with the institutional confidence is the County. A member pointed out that the County is not staffed to do the monitoring – Jim agreed. The group also discussed the viability of getting funding for the proposed GWAC plan.

Adaptive Management DNMP, CAFO GP (Learn as you go). A member wanted to define what this meant. David said that he thought it meant that an entity would have a plan in place then implement and monitor it to see if it met expectations then adapt to what works best. Another member indicated that he thought an entity would exhaust the most palatable efforts before moving on to the others on the list. A member asked if the group needed to include adaptive management ideas as part of its recommendations; others thought this might be difficult as they felt operators would "adapt as they go." Jim Davenport said that the group could simply recommend that an adaptive management plan be created. The group agreed that it should be included but didn't know what it should look like yet. Another member wondered if adaptive management recommendations could be found in either the DNMP or CAFO permits.

Bad Actors – how to bring them in without penalizing the rest (cost or customer). A member suggested that the group needed a metric to determine how to identify which operators were bad. A discussion ensued. Some members felt that good actors could identify bad actors. Others thought the Department of Agriculture could provide input by looking at historical data. However, concerns were expressed that a complaint driven system was not a good way to gather data as it would reflect neighborhood disputes. A member suggested that a structure of recommendations establishing clear expectations be put in place first. He felt it was important for the group to encourage voluntary compliance first before moving to alternatives that might be more stringent requiring compliance. He did not recommend a regulatory component but a way to address those

who were not complying with the outlined expectations. Jim Davenport added that he thought it would be good to define good and bad practices. He said that "bad" was in the eye of the beholder and it must be defined or the group can't implement a plan to deal with the problem. He also suggested that the group might come up with a definition for worst management practices. A member thought "bad" could be defined as someone who isn't doing what was suggested. A member thought the CAFO permit covered this. The group also thought the term "bad actors" should be changed. David will try to come up with a different name.

Central Depository of Information Online public information (EPO)

Website – upgrade (One member would only agree to this depending on the legalities).

Tracking Manure – volume and location. A member pointed out that this was being addressed in the new Ecology permit (which will most likely be delayed because of appeals). Another member asked if the group could insert the portion of the CAFO permit regarding manure into its recommendations to the GWMA. Another member said this could be discussed. The member also added that growers are responsible to apply the manure at a correct rate. Jim Davenport said that the Irrigated Ag Working group was not addressing this and it was dropping through the cracks. The group discussed whether it should ask for a statute enacting a county by county tracking system on commercial fertilizers which would require sellers to report gross sales of nitrogen fertilizers. A member said he would support this for the GWMA only. Jim Davenport wanted it done statewide.

Education/Outreach – to prevent leaching of nitrates. This would be focused on operators in order to help them to buy into the BMPs or other practices. A member wondered if this would be carried out by the current EPO working group or the Conservation District and wanted the entity to be trusted by the local community. A member pointed out that the Conservation District is an independent body and this proposal for additional funding and the associated responsibilities would require agreement by the board. Other members explained that the EPO working group wouldn't exist after 2017 when the GWAC work was done and that the Irrigation District could help with educational work as well.

Testing/Monitoring/Sampling – Performance Objectives: The group wanted to define what would be tested: soil, water or both. Another member indicated that they wanted pens/corrals and lagoons tested. Some members responded and said that those locations would be tested under the new Ecology permit. Jim Davenport added that the GWMA could put in a request for the Legislature to approve the CAFO permit in the GWMA.

The group also discussed who should monitor. One member thought the designated lead entity will determine this as it would need to either go out to contract or be done by the lead agency. Another member wanted to know the cost, but others agreed that was impossible to ascertain now. David recommended that the group leave who would monitor up to the lead agency, but create a list of applicable monitoring skill sets. A member wanted to ensure that there was public oversight.

Jim Davenport suggested that whatever monitoring plan was agreed upon there must be performance objectives, e.g., a 10 percent reduction in nitrates and that a baseline must be established, e.g., results of the 459 wells already tested and the first measurements from the ambient monitoring system. It was also suggested that at-risk wells be part of a performance

objective standard. Jim went on to say that there could be a broad set of performance objectives as well like: the amount of BMPs implemented, funding successes, and reduction in the number of bad actors. A member indicated that they would like to see a BMP implementation structure developed similar to the one used by the Clean Air Agency. David will develop this topic further. A member indicated that he would not support soil tests in corrals.

A member wanted to monitor pens, corrals, barns and composting structures and address leaching. David did not envision monitoring all of these as the designs are addressed in the DNMP and they will be monitored with the BMPs.

The group also discussed the following items which were not on David's original list:

Silage/Feed Storage – Impervious surface engineering citation and industry/public support. A member asked if a BMP on silage had been found. Laurie said it was part of the waste management system. David is checking with WSU on this as noted above. The member said that there are recommendations and an engineering plan which require installation on an impervious surface. Another member said that the recommendation should say that.

AKART (All Known, Available and Reasonable Technology - Methods of Prevention, Control and Treatment): A member desired to discuss the inclusion of AKART again. Another member didn't believe AKART was scientifically proven and therefore would not support this endeavor.

Checklist – what are we monitoring: groundwater (first water), nitrates, BMP implementation, ambient (baseline) testing to date, Inp –lab, A & R, existing monitoring, commercial fertilizer tracking in the GWMA.

Technology Investment (waste i.e., energy) (more general) (research and development). A member desired to recommend that the public invest in specific technology with specific benefits. Another member didn't disagree but was concerned about the cost-effectiveness and how long developing technology would be up-to-date. He liked the concept and suggested instead recommending an investment in technology because it was for the public good without too many specifics. He also suggested: Funding Research Institutions

Any requirements must be economically feasible for industry, private and public.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

- David will consider use of another term for "bad actors."
- David will develop the topic of performance objectives further.

Joint Data Collection, EPO, Livestock/CAFO, RCIM and Regulatory Meeting on Abandoned Wells

Charge from Groundwater Management Area Advisory Committee

Working Group Members

See working group memberships for Data Collection, EPO, Livestock/CAFO, RCIM and Regulatory Framework Working Groups

Meetings/Calls Dates

Meeting: Department of Ecology, 1250 West Alder Street, Union Gap, WA

When: December 5, 2016 from 1:00pm to 3:00 PM

Call: (360) 407-3780 PIN: 387313#

Participants

Jim Davenport (Facilitator for Joint Meeting on Abandoned Wells), Kathleen Rogers, Stu Turner, Vern Redifer, Avery Richardson, David Bowen, Stuart Crane, Joye Redfield-Wilder, Ignacio Marquez, Dan DeGroot, Lisa Freund, Ginny Stern*, Andres Cervantes* and Bobbie Brady (Yakima County Support Services). *via telephone

Key Discussion Points

Jim Davenport opened the meeting at 1:04 PM and explained the purpose was to bring various group members together who had expressed an interest in abandoned wells for further discussion and decision making. Jim referenced a document he had prepared and provided entitled "Abandoned Wells per Avery Richardson" which substantively reviewed the discussions of two previous working group meetings and reports made by Avery to each. He added that the notes reflected the groups' brainstorming efforts and no conclusions had been reached.

Avery Richardson affirmed that the Department of Ecology (Ecology) had an electronic summary of known permitted wells since 1972 but the database doesn't correlate original owner to current well owner. Avery indicated that records are by quarter quarter section and each can contain lots of small acreage with 10 to 30 wells in one section. He also noted that for the most part in Yakima County, common wells are uncommon because wells can be drilled easily at a relatively low cost due to the accessibility to the aquifer. Therefore, most homes have their own well and each produces more than the average household needs. Avery stated that the cost to decommission a well still impedes the process. Ecology charges the homeowner a $50 fee per well and it costs approximately $5,000.00 to hire a licensed well driller to do the decommissioning work. Other issues impede the process as well, e.g., wells may be cut off five feet below land surface and may

not be possible to decommission effectively, or wells were built four to five inches wide and can't be cleaned out and decommissioned because equipment doesn't exist to do this anymore.

A member wanted to know what Avery had done to identify decommissioned wells specifically when urban growth areas are incorporated into a city. Avery didn't believe that this was a problem because in his experience cities encouraged people to connect to municipal water systems by paying to decommission their wells. He said that this allowed cities to acquire a tiny water right under city municipal code which allowed them to expand further. After some discussion, the group agreed this might be a newer practice and some cities might not be aware of the law.

As the group's discussion continued the following suggested solutions were made by members regarding abandoned wells in the GWMA:

1. Send out a postcard to 10 percent of the known property owners on record as having a well. The responses could be used to find out how many wells are in use and to cross-reference those that have been decommissioned for data purposes. Avery indicated that many property owners don't know where and how many wells are actually on their land and this endeavor may not produce the desired sampling of results.

2. Compare Google Earth or Yakima County GIS Department images to determine building changes and thus possible well usage changes. The search could focus on a hotspot high density area in the GWMA, perhaps a square mile in size, to provide an informational data base. Once well usage changes had been identified the group would need to "ground truth" their existence. Vern felt this would be possible, but tedious. Avery indicated that previous efforts to do this had produced sparse results. A member suggested that ground truth could be accomplished with ground penetrating radar. Other members were concerned that this equipment would pick up other pipes and noted it worked better on horizontal piping. Avery said that in his experience many of the homes built from 1890 to 1930 had big cisterns (not wells) or water was obtained from irrigation sources or the river. Vern said the County GIS has aerial photos from 1937 that can be overlaid on a screen, turned off and on and viewed but are not high quality.

3. Vern felt that the real question was what could be done practically and pragmatically in the next 12 months – a study or a notation in the legislative report that abandoned wells are a problem in the GWMA that someone should address down the road. Jim Davenport wanted to know if the group felt abandoned wells were a large enough contributor so that it could decide how much money, time and effort should be invested. A member also asked if the group had a responsibility to quantify whether someone else should come along and fix the problem. Ginny Stern believed the group needed to determine the ranking of contribution from abandoned wells and a had duty to become knowledgeable about the resources available to homeowners.

4. A member suggested an educational approach to work with real estate agents and the banking industry so that homeowners disclose wells when a real estate transaction occurred. Concern was voiced that homeowners may not desire to disclose this information as it may cause issues with the sale. There was also some discussion on whether declaring a well abandoned

could be driven by the importance to sustain water rights which ultimately could add value to the property.

5. Ginny Stern noted that poorly abandoned wells have been an issue to the water sources in the State and have affected public health. She agreed that there needed to be an educational/outreach component helping people understand the liability of an ill-secured well. She suggested an effort be made to get property owners to secure and register their wells while offering them a form of protection. Others added that education and outreach could include a call-in hotline to report an abandoned well and to help current property owners keep their wells safe and secure.

6. Avery suggested the group ask the Legislature to make a change in the WAC on decommissioning standards in the GWMA. He explained that the WAC requires the homeowner to go in and clean out what is in the well or fill it with sealant. However, Ecology is allowed to issue a variance in some cases which is, in his opinion, 95 percent as good of a job and reduces the cost of decommissioning a well from $5,000 to $500. Ecology cannot issue this variance for economic reasons. Avery believed that if the Legislature would allow this, more people would come forward to decommission wells. He felt it would be more effective to have more people do something that is 95 percent effective than it is for less people do something 100 percent effective.

7. Ginny suggested that the group put together a pilot program in order to estimate the size of the problem. She suggested the program educate people so they understand why the GWAC is looking for abandoned wells, the risk of abandoned wells and the liability to each homeowner. Funding for the pilot program could come from the Source Water Protection Program and would help identify the people who have wells that may not be secure or safe (the funding would not help to decommission the wells). A pilot program of this nature would provide the group with informational data that would be useful when a request for funding is made to the legislature. The group could then determine how to decommission these wells.

Vern summarized the above solution suggestions as follows:

1. Education – health risk/etc./liability which could be done now. This should include the drilling community;
2. Investigation – determine the scope of the problem before the group puts anything in the program – aerial photos/land proofing;
3. Legislative or Ecology variance standards. Significant enough problem lessen the standard will get 95 percent of the value; and,
4. Incentive programs because the problem is so significant a state-funded abandonment program in the GWMA would be appropriate.

A member desired to add:
5. Poorly constructed wells. Members pointed out that there is no RCW governing this issue unless it is detrimental to someone else, while there is a specific RCW pertaining to the abandoned well issue and the four solution suggestions noted above. Also, the remedy for a poorly constructed well is to hook up to an alternative water supply or drill a new well. Avery thought poorly constructed wells were not as big of an issue because they are in the top 20 to 30

feet of depth while a 200 foot well is a bigger issue because nitrates at this depth are far more difficult to move. Dan DeGroot (Chair of the RCIM Working Group) noted that the risk of contamination from things like onsite sewage systems is very high and the GWMA is not supposed to distinguish between various groundwater supplies, either they are polluted or not. While it may be easier to "clean-up" shallow aquifers people are still at risk.

Vern reminded the group that the GWAC would be reviewing its budget at the next meeting (December 15) and since some of the items on the group's list would require funding the group needed to resolve the issue now. He also agreed that the Legislature will want data to support the GWMA's requests. Ginny added that the money available through the Source Water Protection Program is federal money and on a different cycle than State legislative funding. The group could ask for funding based on the fact that there are public water systems in areas with high nitrates in the GWMA and the impact abandoned wells would have on the aquifer that supplies these public water systems. A search for abandoned wells in these areas would therefore help identify a contributor to the problem and thus help out numerous public water systems.

The group agreed that Vern should recommend the following to the GWAC:

1. Education - to begin immediately.
2. Pursuit of Ginny's Source Water Protection Program for hot spot areas near public water systems in Sunnyside, Outlook, Buena, Mabton and Fairview. If the work can get done in time then the group can develop the other strategies for the program. Otherwise the group will have to tell the Legislature that this needs more investigation but we know it's a problem.

Resources Requested

Recommendations for GWAC

Vern should recommend the following to the GWAC:

1. Education - to begin immediately
2. Pursuit of Ginny's Source Water Protection Program for hot spot areas near public water systems in Sunnyside, Outlook, Buena, Mabton and Fairview. If the work can get done in time then the group can develop the other strategies for the program. Otherwise the group will have to tell the Legislature that this needs more investigation but we know it's a problem.

Deliverables/Products Status

Proposed Next Steps

Attachment B

Ambient Monitoring Network PowerPoint presentation: "GWMA AMN and Other Monitoring_GWAC Presentation

GWMA Ambient Monitoring Network Report Final for Approval

GWMA Ambient Monitoring Network Report Attachments

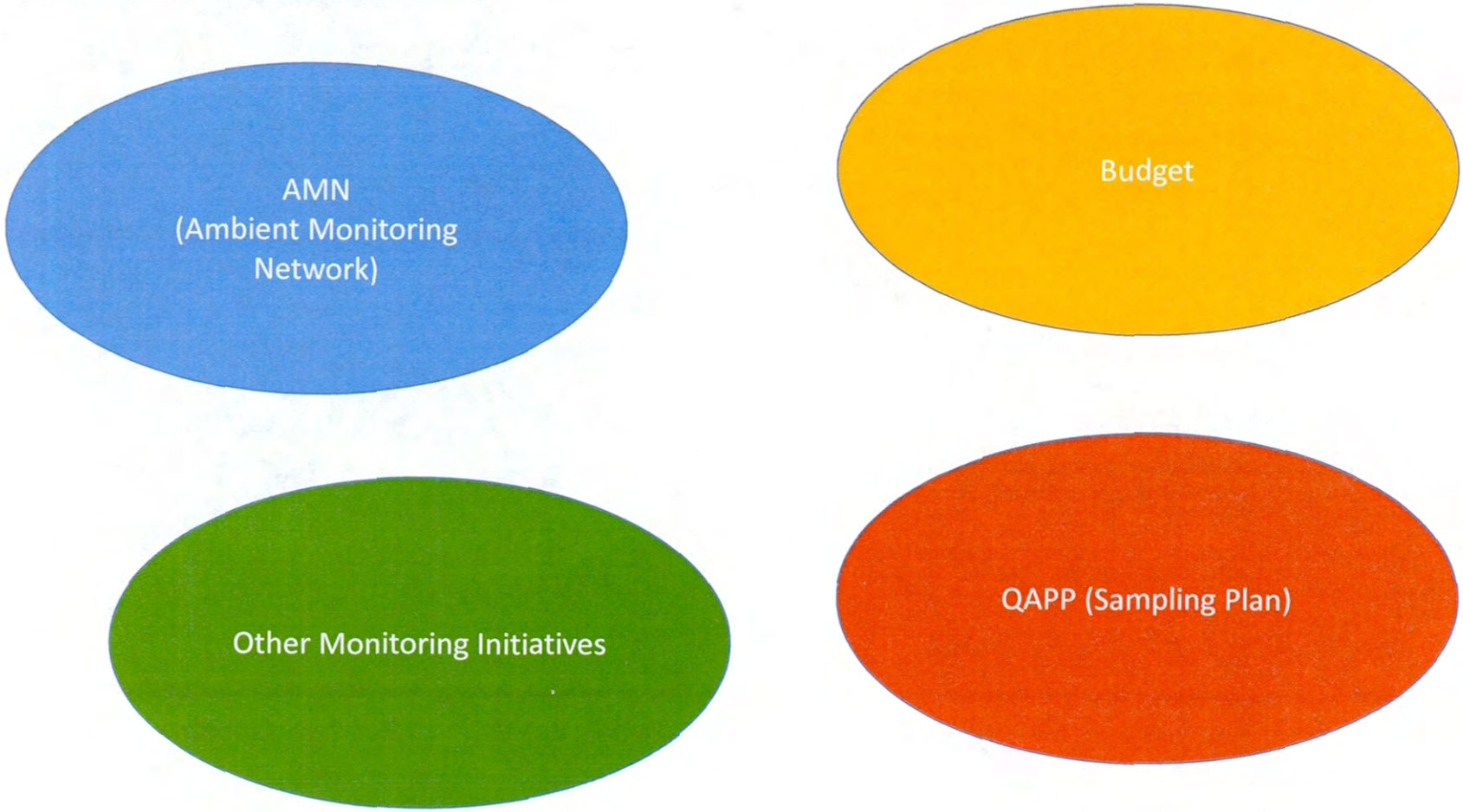
Recommendation Groundwater Monitoring from Data Working Group

Ambient Groundwater Monitoring Network

Lower Yakima Valley

Groundwater Management Area

4 Different Topics:



Topics:

- Ambient Monitoring Network
  - draft "Proposed Ambient Monitoring Network" developed by PGG
  - Based on GWAC approval (2/19/15 meeting)
    - Structured around the GWMA goal: reduce nitrate in groundwater over time
    - Following characteristics
      - 35 – 40 purpose built wells
      - Linear flow patterns
      - Dispersed enough to look at different areas of the GWMA
      - Down to the water table/shallow aquifer
- Other Monitoring Initiatives
  - Common Water Supply
  - Hot Spot Identification
- Budget
  - Funds available to allocate to these efforts
  - Funds we need
    - What do we want to do
    - How much will it cost
    - Finding $$ to get the job done
- QAPP (Sampling Plan)

Data Workgroup meeting

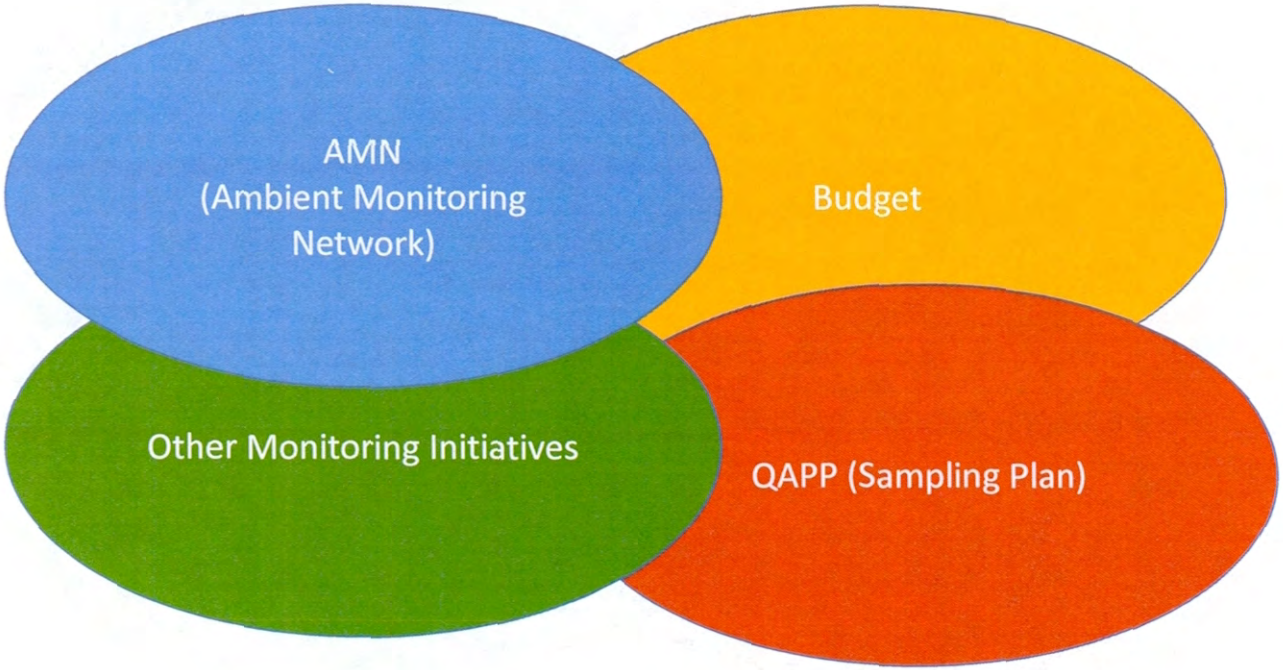
- Purpose of meeting – address outstanding concerns and questions related to the AMN (ambient monitoring network).
- Background
  - GWAC approval of AMN (2/19/15 meeting)
    - Excellent basis for future monitoring initiatives
    - Already contracted and paid PGG to prepare this plan. Plan is now a final draft.
  - Approval of just draft AMN with the knowledge that no one monitoring program will address all concerns and that there are other monitoring initiatives that can be undertaken.
  - QAPP was completed 8/15/2014.
  - Budget decisions determine how much of developed plans will get implemented.
- Concerns discussed:
  - Proximity of wells to roadways
  - First Water
  - Existing private wells
  - Existing public wells
  - Randomness of well sites
  - Adequate funding
  - Historical nitrate trends
  - QAPP (Sampling Plan)

Data Workgroup meeting (con't)

- Most concerns addressed during Data Workgroup meeting.

- Concessions and Revelations
  - Support AMN as a building block for future endeavors
  - Support AMN as long as other monitoring initiatives are also approved by the GWAC
  - Concern that we will spend our entire budget on installing monitoring wells and not have enough funds to address other high priority issues.
  - QAPP can be amended based on budgeted projects. Current document provides a foundation for all monitoring work
  - All four elements need to be discussed concurrently
    1. Ambient Monitoring Network
    2. Other monitoring initiatives
    3. Budget
    4. QAPP

1 Topic with 4 components:



Other Monitoring Initiatives

- Prioritized by Data Workgroup Members

1. **Common Water Supply Aquifers** – Focus is on sampling existing private domestic wells which provide drinking water to residents in rural areas (which are not typically sampled by the Health Department). These wells are usually screened in the uppermost aquifer that produces a reliable water supply. This was the highest priority since this initiative assesses the health of the water supply for residents. Costs would be significantly lower since the existing wells would be sampled.
2. **Hot Spot Identification** – PGG identified 71 hot spots where the maximum nitrate concentrations were in excess of 20 mg N/L. The goal of this initiative is to continue monitoring the wells where nitrate has already been identified to be the biggest concern.

LOWER YAKIMA VALLEY GWMA PROPOSED AMBIENT GROUNDWATER MONITORING NETWORK

June 8, 2016

LOWER YAKIMA VALLEY GWMA PROPOSED AMBIENT GROUNDWATER MONITORING NETWORK

Prepared for:

Lower Yakima Valley Groundwater Advisory Committee
and
Yakima County
128 N. Second Street
Yakima, Washington 98901

Prepared by:

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June 8, 2016
JE1512
GWMA Ambient Monitoring Network Report v5

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.IT IS LIKELY THAT SOME WELL CONSTRUCTION AND COMPLETION DECISIONS WILL ALSO NEED TO BE MADE IN THE FIELD DUE TO THE UNCERTAINTIES ASSOCIATED WITH DRILLING. IN GENERAL, SATURATED MATERIALS WITH LOW PERMEABILITIES (FOR BASALT AND SEDIMENTS) WILL BE AVOIDED FOR SCREENED SECTIONS SINCE GROUNDWATER SAMPLES COLLECTED FROM SUCH MATERIALS MAY NOT BE REPRESENTATIVE OF CONCENTRATIONS AND TRENDS OCCURRING IN THE BROADER VALLEY-WIDE SHALLOW AQUIFER SYSTEM 5

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APPENDICES

Appendix A: Local Maps of Preliminary Drill Sites

SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.

Charles Ellingson
Principal Hydrogeologist
Washington State Hydrogeologist No. 631

Glenn Mutti-Driscoll
Hydrogeologist
Washington State Hydrogeologist No. 2832

1.0 INTRODUCTION

The Groundwater Advisory Committee (GWAC) for the Lower Yakima Valley Groundwater Management Area (GWMA) requested the design of a purpose-built groundwater monitoring system to establish a baseline of groundwater quality conditions near the water table in the GWMA. The water table is being targeted since little data from this zone exists, and because concentration changes associated with land use change will occur there first. The design considerations were:

- Target the water table or shallow aquifer
- Establish reasonable well density
- Consider the availability of alternative sampling locations
- Consider the general pattern of land use but avoid locations likely to be anomalous as a result of local man-made or natural conditions
    - Include a scale of prioritization indicating which of the specific wells should be given the highest priority for early installation

The network designed using those guidelines will be appropriate for tracking concentration changes at the water table over time. It may also allow mapping of the variation in concentration at the water table. The confidence associated with calculated averages and variation will be sensitive to the number of wells installed, which is not yet determined.

The following report presents the method used to generate a groundwater monitoring network composed of wells, and the results of that work – preliminary drill sites. A comparison of preliminary drill sites to general land use in the GWMA is presented, as well as a discussion on how a monitoring network at irrigation drains can be used to augment groundwater monitoring at wells. Interim work products were presented to the GWMA Data Committee in the form of two technical memoranda (PGG, 2016a; PGG, 2016b) which were discussed on April 13 and May 11, 2016. This final report includes information in the prior memos, and presents network installation cost estimates and timelines.

This work was performed, and this report prepared, in accordance with hydrogeologic practices generally accepted at this time in this area. The resulting report is for the exclusive use of the Lower Yakima Valley Groundwater Advisory Committee and Yakima County for specific application to the Lower Yakima Valley. This is in lieu of other warranties, express or implied.

2.0 GENERAL WELL LOCATION METHODOLOGY

To be responsive to the design considerations, a method was developed that distributed and ranked monitoring points using only the geographic shape of the GWMA. These points were subsequently adjusted to facilitate permanent access and avoid potentially anomalous areas, consistent with GWAC design considerations. The following subsections provide details on this method.

2.1 INITIAL RANDOM MONITORING POINT POOL

Initial Random Monitoring Points were generated using the Geographical Information System program ArcMap, which was used to first randomly distribute 1000 points across and within the GWMA (excluding the EPA monitored dairy-cluster area). The ArcMap Create Random Points (ESRI, 2016) tool used was to generate this distribution. These interior points created a pool from which *General Well Locations* were selected. General information on random sampling can be found in Gilbert (1987) and EPA (2009).

2.2 GENERAL WELL LOCATION SELECTION AND RANKING

Ranked General Well Locations were selected from the pool of Initial Random Monitoring Points. The resulting ranked set of General Well Locations was based on the following process:

- The first location selected is the point furthest from the GWMA boundary; this location approximates the centroid of the GWMA.
- The second General Well Location is the point that is farthest from the combination of the boundary and the first General Well Location. This is the middle of the largest un-sampled area.
    - Each subsequent General Well Location is the point closest to the center of the largest un-sampled area. This evenly distributes general well locations throughout the GWMA and ranks them by the size of the un-sampled area.

Figure 1 presents the first 30 General Well Locations as selected and prioritized by the method presented above. Additional locations could be identified using this process in the future. Following the selection of ranked General Well Locations, Preliminary Drill Sites (discussed below) were selected by identifying nearby public land where potential anomalous groundwater nitrate concentrations were not expected.

2.3 PRELIMINARY DRILL SITE SELECTION

Preliminary Drill Sites are refined from the General Well Locations by evaluating surrounding land use. Public lands, canals, agricultural drains, dairies, parcels with septic systems, and known existing monitoring wells were mapped to help select preliminary drill sites. Additionally, road signage and roadside images were reviewed to identify relatively safe sites. The preliminary drill sites were not inspected by visitation. The following bullets describe how each factor was considered.

- Groundwater flow directions and irrigation features (canals, joint drains, lateral canals, and drainage ditches) were mapped to assess up-gradient and down-gradient locations for identifying Preliminary Drill Sites.
- Preliminary Drill Sites were moved from the center of the General Well Location to the nearest public land, subject to the additional criteria below. We recommend that final drill sites be selected near the Preliminary Drill Sites based on field inspection and utility clearances.

- Irrigation canals and joint drains (which have multiple drainage ditches flowing into them) can lose water to the ground and may influence groundwater quality in their vicinity. Preliminary Drill Sites were not located within approximately one-quarter mile from irrigation canals and joint drains.[1] Data from the Columbia Basin GWMA support using a setback from irrigation features (Columbia Basin GWMA, 2008).
- Lateral canals and drainage ditches are smaller features which also may lose water and locally affect groundwater quality. Preliminary Drill Sites were not located within approximately 200 feet from these features.
- Preliminary Drill Sites were not located within one-quarter mile downgradient from other known land uses that may result in anomalous groundwater nitrate concentrations. In application, only one site was moved on this basis: Preliminary Drill Site 7 was moved away from the Port of Sunnyside sprayfield. In addition, although Preliminary Drill Site 23 was not near a dairy or sprayfield, the closest public land with sufficient canal offset was within the EPA dairy-cluster area; therefore the drill site was moved further away to be outside of the cluster.
- Existing publically-owned water table monitoring wells were mapped based on information in the Ecology well log database to assess the availability of pre-existing wells. The accuracy of the monitoring well map coverage is likely imperfect. Use of existing wells is subject to field verification, water table completion, and agreement with the (public) well owner. In practice, no existing monitoring wells were mapped within ¼ mile of the General Well Locations,[2] and therefore existing wells are not proposed for monitoring in lieu of the purpose built wells proposed within this plan.
- Street-view imagery from Google Street View is available for much of the Lower Yakima Valley, and was reviewed for each Preliminary Drill Site (where available) to identify intersections with stop signs, locations with suitable road shoulders, and the presence of overhead lines or other utilities that could interfere with drilling. Mapped irrigation features were also reviewed to assess if they are subsurface pipes and therefore not expected to leak significantly.

3.0 PRELIMINARY DRILL SITES

Preliminary Drill Sites are shown in Figure 2, with more detailed maps of each site in Appendix A, Figures A1 to A30. Site descriptions are presented in Table 1, and include a general summary of the Preliminary Drill Site and the rationale used when moving away from the General Well Location to the Preliminary Drill Site.

Depth to water estimates were used to develop well drilling cost estimates. Depth to water estimates come from mapped regional water table elevations (Vaccaro and others, 2009), with linear interpolation applied to estimate elevations between mapped contours; depth to water was then calculated by subtracting this elevation from surficial elevations based on USGS 1:24,000 topographic maps. We have assumed that all wells will be screened over 20 vertical feet extending down from the water table at the time of drilling; however, these well depths are estimates, and actual depths are expected to differ. A

[1] PGG initially considered providing setbacks from canals only.
[2] Monitoring wells logs near General Well Locations 7 and 22 were reviewed based on their proximity to the Preliminary Drill Sites, but these monitoring wells were either decommissioned or mis-located.

comparison of water levels measured at 10 EPA monitoring wells in the dairy cluster to USGS estimates found half of the wells were within 15 feet of the USGS estimate, while the other half had estimates between 33 feet too high and 126 feet too low. Areas with the greatest discrepancies generally appear to be in higher elevation areas near the edge of the valley and in the vicinity of the Roza Canal. Therefore, in some instances (at sites 15 and 25), professional judgement was used in estimating depths to water based on observed EPA-well water levels.

3.1 PRELIMINARY DRILL SITE LOCATIONS IN RELATION TO SHALLOW BASALT

Shallow geology within the GWMA is primarily alluvial and semi-consolidated basin fill sediments; however, shallow basalt occurs in some areas, which could influence the optimal drilling method. Also, some basalt is of such low permeability that it will not yield sufficient water to a monitoring well.

To evaluate this issue, Preliminary Drill Site well depths were compared to estimated top of basalt elevations. Regional USGS data were used to approximate the top of basalt elevation and the water table elevation (Vaccaro and others, 2009). As discussed in Section 3.0, subsurface elevations based on the USGS regional characterization may differ from observed actual elevations. In areas where basalt elevations are expected near or above the water table, local well logs from Ecology's well log viewer were reviewed to evaluate basalt and groundwater depths. Areas identified where basalt will likely be encountered above the water table are:

- Preliminary Drill Site 14: it is very likely that basalt will be encountered before the water table at this location.
- Preliminary Drill Site 18: it is likely that basalt will be encountered before the water table at this location.
- Preliminary Drill Sites 9 and 24: it is possible that basalt may be above the water table at these locations, or that saturated sediments will be encountered but will not be 20 feet thick (which is the assumed screen length).
- Preliminary Drill Site 4: basalt may be observed at this location, but it is likely that 20 feet of saturated sediments are present.

Though there is uncertainty in what the constructed depths of the wells will be and the geologic materials that they will encounter, we assume that wells will not be moved in response to expected shallow geology - thus retaining a basin-wide water table monitoring network that is not limited to basin fill areas.

In instances where basalt is encountered during drilling, the following decision process is proposed:

- If basalt of any character is encountered but at least 15 ft of saturated sediments with high permeability (silty sand or coarser) are present, a well should be completed within the sediments only.

- If water-bearing basalt is encountered at the water table, the saturated basalt should be screened.
- If dense basalt with low permeability is encountered at the water table and will have insufficient yield to support a well, the borehole should be abandoned (decommissioned) and the next well in the ranked priority should be drilled.
- Detailed well construction and completion decisions will need to be made in the field in response to the field data. In general, saturated materials with low permeability (for basalt and sediments) will be avoided for screened sections because they compromise well performance and sample representativeness.

4.0 COMPARISON OF PRELIMINARY DRILL SITES TO GENERAL LAND USE

Figures 2 and 3 map preliminary drill sites relative to land use. Figure 2 shows that Preliminary Drill Sites 1 through 9 (the highest priority sites) are all in the lower (southeast) part of the GWMA, that nearly all the drill sites are located close to agricultural land uses, and that several are also near residential, cultural/recreation lands, and undeveloped land. Site 12 appears to be the only site surrounded by non-agricultural uses (it is in Grandview). Sites 1, 5, and 20 (all near Sunnyside) also have significant residential and commercial land uses nearby.

Whereas Figure 2 lumps all agricultural land uses, Figure 3 differentiates various irrigated agricultural land categories according to a method developed for the GWMA's Deep Soil Sampling work (PGG, 2014b), and presented in Table 2. The method defines categories of fields that have three parameters in common:

- NRCS nitrate leaching potential (primarily represents soil type)
- Crop rooting depth (represents crop types)
- Irrigation type (represents potential for over-irrigation)

Figure 3 maps only the ten largest categories according to acreage (they make up 96 percent of the total irrigated acreage)[3]. White areas on the map are a land use other than irrigated agriculture (see Figure 2). The categories mapped on Figure 3 are defined below in order of decreasing acreage.

5.0 GROUNDWATER MONITORING WITH DRAINS

Given the relatively high installation cost of purpose-built monitoring wells, supplemental groundwater monitoring using the existing irrigation drain[4] network (ie drainage ditches and wasteways) in the GWMA was considered. Given that drains have no addi-

[3] A category with "unknown" irrigation type was excluded.

[4] The drain network as referred to in this report includes the drainage ditches and wasteways conveying water from and between fields. Tile drains are not included in our term "drainage network" or "drains" since they are maintained on a field-scale by landowners and are not mapped basin-wide. All return-flow features interconnecting fields are henceforth referred to as "drains" in this report.

tional installation costs, pumps or passive samplers are not necessary for sampling, and they can be sampled in minutes (relative to approximately an hour for sampling a monitoring well with a pump), groundwater monitoring data from drains is much less expensive than data from wells.

While data produced from a drain monitoring network will differ from a monitoring well network (as further discussed below), both well and drain monitoring programs can be pursued in parallel.

5.1 CONCEPTUAL DRAIN MONITORING APPROACH

Nitrate concentrations in Yakima Valley drains vary in response to the irrigation season. Irrigation in the Yakima Valley typically occurs from April through October, with water from the Yakima River diverted through canals and ultimately applied to fields. During this period, unused irrigation water, irrigation runoff, and water intercepted by subsurface tile drains is conveyed to drains, and ultimately discharges to the Yakima River. Most of the water present in the drains during this period is water diverted from the Yakima River. Since nitrate and nitrogen concentrations in Yakima River water are low, nitrate concentrations in the drain line water are also relatively low during irrigation months.

During the non-irrigation season (roughly November through March), water diversion from the Yakima River ceases, and water present in the drains is predominantly groundwater that continues to enter those features. Multiple studies in the Yakima Valley (Ebbert and others, 2003; Zuroske, 2009) and from the irrigated part of the Central Columbia Plateau (Williamson and others, 1998) have found elevated nitrate concentrations in drains during the non-irrigation season due to the un-diluted discharge of higher concentration groundwater. Example data plots from existing reports showing this trend are presented in Figure 4. Figure 4a plots drain-water nitrate concentrations and streamflow, and shows that nitrate concentrations are high when flow is low. Figure 4b is a set of bar graphs plotting median monthly nitrate concentration and flow values for the Granger Drain and Sulphur Creek Wasteway; a comparison of the two bar graphs indicates that higher nitrate concentrations occur in non-irrigation months when groundwater discharge is not diluted.

Apart from differences in cost, groundwater data collected from drains will differ from data collected from wells in several ways, and in some cases may pose benefits or limitations relative to data collected from wells. These differences include:

- Groundwater collected from drains will be an aggregate of groundwater discharged to the drains over potentially large areas that may not be well known. The shallow aquifer capture area for a given drain may be affected by numerous spatially distributed land uses. Groundwater sampled from monitoring wells, on the other hand, is captured from a relatively small area of the shallow aquifer and will be effected by land use directly upgradient of the well.
- For groundwater to discharge to a drain, the water table must intersect the bottom of the drainage feature, groundwater must flow toward the drain, and there must be hydraulic continuity between the drain and aquifer. Therefore water-tight pipelines or areas with paved drainage ditches will receive limited groundwater discharge. In areas of the GWMA with higher elevations that are relatively far from the Yakima River, groundwa-

ter will not discharge to drains because the water table is lower in elevation than the drain bottom. Thus the entire GWMA cannot be monitored by sampling drains, and the available drain sampling stations cannot be randomly located.

- Upstream/downstream sampling and/or studies where multiple sampling locations are present along a discharge path can easily be performed using drains. These data could be used to evaluate nitrate contributions from different drain segments.
- Given that nitrate concentrations in drains are only representative of groundwater concentrations during non-irrigation months, drain data cannot be used to evaluate seasonality of groundwater nitrate concentrations. Monitoring well data are necessary to evaluate seasonal groundwater nitrate concentrations in the GWMA.

Because of these differences, we recommend maintaining and evaluating drain monitoring data separately from well data, and therefore have not altered proposed well monitoring locations based on the presence/absence of proposed drain monitoring locations discussed below.

5.2 PROPOSED DRAIN SAMPLE STATIONS

A total of 25 drain sampling stations are identified on Figure 5 and Table 3 based on the distribution of drains, the occurrence of shallow groundwater, and the presence of historical nitrate sampling data. Sampling stations, as discussed below, were not randomly selected and generally are proposed near the Yakima River at drain mouths or upstream at relatively large joint drain junctions. Digital drain coverages for the Sunnyside Valley and Roza[5] irrigation districts where reviewed; however, we were unable to review drain coverages in some of the smaller irrigation districts (Union Gap, Buena, Home, Grandview, and Zillah) present in the GWMA, and therefore additional sampling locations in some of these irrigation districts could be added based on local knowledge or if mapped coverages become available.

Data from Ecology's Environmental Information Management (EIM) database for the Lower Yakima Valley were downloaded to identify historical drain sampling locations. Where possible, proposed sampling locations were located adjacent to historical sampling sites with the intent of combining data sets. In total, 19 out of the 25 proposed sampling locations have historical data. Coordination with the Roza-Sunnyside Board of Joint Control (RSBOJC) and USGS is recommended to obtain any additional monitoring data (historical or current) that are not available in the EIM database.

As shown in Figure 5 and Table 3, most drains have one sample location proposed, though some larger drains with numerous tributaries (Granger Drain and Sulphur Creek Wasteway) have multiple sampling locations proposed. Both the Granger Drain and Sulphur Creek Wasteway have large drainage areas, and it is likely that nitrate concentration changes will be more detectable at the smaller scale/more localized drain monitoring stations.

[5] Roza Irrigation District wasteways were reviewed, while all other drains in the Roza District are managed by land owners and could not be reviewed at a valley-wide scale.

We recommend that each drain site initially be sampled to establish its seasonal signature of flow and nitrate concentration. That could be accomplished with a minimum of six samples collected bimonthly over a year. Subsequent sampling (targeting groundwater only) should occur only in winter at stations exhibiting a signature of surface water dilution during the irrigation season.

While winter flow is expected at all proposed sampling locations, it is possible that some may not have flow or may have access limitations. If this is the case, other nearby sampling locations should be considered. Coordination with other entities (RSBOJC, USGS, others) is also recommended since they currently may be monitoring some of the proposed drain sampling locations. Field verification and marking of sampling locations should be performed as part of a future scope of work.

6.0 ESTIMATED COSTS

Costs for well drilling, well sampling, and drain sampling are presented in the following subsections. Costs are planning-level estimates and will likely differ from actual costs depending on management decisions and market conditions.

In addition to drilling contractor costs, the GWMA will incur other costs related to drilling and sampling that are only briefly covered in the discussions to follow. Management decisions are required to select personnel for that work. The work includes technical oversight during drilling (geologic logging, in-field well design, documentation, well testing, and as-built reporting), and a professional survey of well head locations and elevations. Field services and data analysis cost estimates are included in Table 4 for reference, and are subject to the numerous assumptions listed at the bottom of Table 4.

Sampling supplies and lab costs are not included beyond the one year assumed for the initial effort summarized below.

6.1 WELL DRILLING COSTS

Estimated drilling costs for the installation of monitoring wells is dependent on drilling method and depth. The estimates presented in Table 4 assume that a hollow-stem auger (HSA) drill rig will be used for installing 2-inch diameter monitoring wells up to 50 feet deep, while a sonic drill rig is assumed for installing 2-inch monitoring wells between 50 and 200 feet deep. HSA is generally the cheapest drilling method for installing shallow monitoring wells (estimated to be $79 per foot of completed well), but the method does not perform as well at depth (therefore a sonic drill rig, which is $98 per foot of completed well, was assumed for the deeper wells). The use of two drill rigs should help minimize costs if numerous wells are installed since the difference in per-foot drilling costs will offset additional mobilization costs; if only a few wells are installed however, it may be more cost effective to use only one drill rig. We assume that wells will be completed flush-to-ground and have one hour of development time.

Depending on the final number of wells the GWMA decides to install, it is possible that air rotary drilling may be a better choice for installing deep wells than sonic. Air rotary drilling is significantly faster in basalt than sonic. Therefore, use of an air rotary rig for

some or all of the deeper wells may be beneficial, especially if the GWMA installs more than 9 wells (since Preliminary Drill Sites 9, 14, 18, and 24 have higher likelihoods of encountering basalt). While air rotary drilling is quicker than sonic drilling in basalt and at depth, a trade-off occurs if all deep wells are installed with air rotary since less detailed geologic information is generally obtained with that method compared to sonic (such as identifying fine grained material percentages, thin perching layers, and where the water table is encountered), which can increase the likelihood that wells may erroneously be installed at non-targeted depths. Once the total number of wells that will be installed is determined, air rotary cost estimates can be made and compared to cost estimates for mobilizing two deep well rigs (one sonic and one air-rotary).

6.2 WELL SAMPLING COSTS

We assumed that passive samplers are used rather than sampling pumps. Passive samplers have lower upfront costs than pumps and should greatly reduce sampling time, resulting in additional cost savings. However, the passive samplers will require further vetting and quality assurance data that may require some duplication. Also, comparisons of long-term costs between passive samplers and pumps are sensitive to who does the sampling – which is not determined at this time.

The presented cost estimates in Table 4 are for one year of monitoring with six sampling events occurring at each well. Laboratory costs assume that nitrate, nitrite, ammonium, and Total Kjehldahl nitrogen are analyzed in accordance with the Interim Final Groundwater Monitoring Plan (PGG, 2014). However, the separate analyses for nitrate and nitrite will require samples to be analyzed within 48 hours of collection – which will be difficult and expensive to achieve as a result of frequent shipments to the lab and possible lab surcharges for quick analysis. Combined analysis of nitrate-plus-nitrite is a common analysis approach, would reduce cost, and is a recommended change to the Sampling and Analysis Plan for this project[6].

6.3 DRAIN SAMPLING COSTS

We assume few costs related to establishment of drain sampling stations are necessary, and include only updating the groundwater sampling and analysis plan and field verifying the sample locations. Sampling costs in Table 5 are for six rounds over one year. Samples would be obtained by filling bottles in the field. Sampling personnel have not been determined, but an estimate for the labor if performed by PGG is included.

7.0 NETWORK INSTALLATION PROCESS & SCHEDULE

The table below summarizes a process for further work on the ambient monitoring networks. Possible dates are included for each step assuming that each step is pursued without delay following completion of prior necessary steps. The estimated schedule considers County, Data Committee, and GWAC management processes, but our assessment of the duration of management decision times may be optimistic. In summary, drain sam-

[6] Nitrite is very unlikely to comprise a significant portion of the total nitrogen content in groundwater.

pling should be possible in early 2017, and wells should be able to be installed in the next deep-water-table season (winter-spring 2017).

Work Common to Wells and Drains	
Finalize this report after Data Committee review (August 2016).	
Determine who will conduct sampling, surveying, and technical oversight. Then develop cost estimates for ancillary work related to well installation and sampling and analysis of wells and drains (July - September 2016).	
Allocate available funds between well installation, well sampling and analysis, and drain sampling and analysis (September – October 2016).	
Work Specific to Well Network	**Work Specific to Drain Network**
Field verify and mark preliminary drill sites. Include evaluation of possible interference from underground utilities (One-Call). Revisit sites after utilities are marked, and move drill sites if necessary to avoid utilities. (October – November 2016).	Determine whether the USGS and RSBJC are collecting drain water quality data that will meet GWMA monitoring needs. (October 2016).
Develop drilling specifications. Generate bid package for well drilling. Select drilling contractor. (November 2016 – January 2017).	Field verify and mark drain sampling stations. Move stations to accommodate access if necessary. Obtain access agreements if necessary. (October - November 2016).
Obtain any permits necessary for drill site access, including traffic control during field work. (November – December 2016).	Develop a Drain Sampling and Analysis Plan (SAP). This document could be an addendum to the Interim Final Groundwater Monitoring Plan (PGG, 2014a) or its successor. (Submit to Data Committee October – November 2016).
Schedule drilling for late winter or spring when water table is deepest. Re-mark drill locations and utilities one week prior to drilling if delay has removed field marks. (January – March 2017).	Contract with samplers and laboratory. (November – December 2016).
Drill wells, logging geology and documenting well as-builts and brief well tests. Survey wellhead locations and elevations. (January – March 2017).	Begin sampling drains. Consider initial frequency of 6/year (stage and nitrate concentration) to assess seasonality and possible surface water dilution, followed by lower frequency to capture groundwater-only samples. (January – February 2017).
Document well installations (as-built report). (April – May 2017).	

Update the GWMA's Interim Final Groundwater *Monitoring Plan (PGG, 2014a) if necessary to* implement changes, such as use of passive samplers. (April – June 2017, includes two-month Data Committee approval time).	
Begin sampling wells. Consider initial frequency of 6/year to assess seasonality, followed by lower frequency to capture desired data. (July 2017).	

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APPENDIX A
LOCAL MAPS OF PRELIMINARY DRILL SITES

Table 1. Preliminary Drill Sites - Lower Yakima Valley GWMA

Rank	Lower Yakima Valley Vicinity	Location Description	Estimated Depth to Water (feet)	Estimated Well Depth (feet)	Distance Moved from General Well Location (feet)	Direction Moved	Movement Rationale
1	East outskirts of Sunnyside	Van DeGraff Blvd just north of E Lincoln Ave	10	30	1013	NW	Moved to nearest ROW intersection approximately 1/4-mile from Sulfur Creek Wasteway.
2	Northwest of Sunnyside & Northeast of Outlook	South side of Arrowsmith Rd between Maple Grove Rd and Scoon Rd	56	76	2030	E	Moved to ROW 1/4 mile from the SVID Main Canal and Joint Drains 32.0 and 33.4.
3	Northwest of Grandview	East side of N Forsell Rd about 770 feet north of Stover Rd	18	38	1226	NE	Moved to nearest ROW 1/4 mile from Joint Drain 43.9
4	South-southwest of Grandview	North side of E Euclid Rd and Riverfront Rd Intersection	37	57	179	W	Moved to nearest ROW intersection
5	West-southwest of Sunnyside	West side of S Lester Rd about 430 feet south of Gap Rd	44	64	654	SW	Moved to ROW and offset from mapped drain line
6	North-northeast of Sunnyside	NW corner of State Route 241 & Arrowsmith Rd	46	66	1505	NW	Moved to nearest ROW intersection
7	South-southwest of Sunnyside	Linderman Rd at Murray Rd	31	51	4676	SW	Moved to nearest ROW intersection that is 1/4 mile from Sunnyside sprayfields and nearby feedlots.
8	North of Outlook	South side of Van Belle Rd between Price Rd and N Outlook Rd	12	32	527	E	Moved to County Fire District No. 5 Station No. 12 parcel
9	East of Sunnyside & North of Grandview	NW corner of Bethany Rd and Sheller Rd	58	78	1594	E	Moved to nearest ROW intersection 1/4-mile from SVID Main Canal
10	North of Zillah	East side of Roza Dr between Gilbert Rd and Highlan Dr	88	108	422	NW	Moved to ROW
11	East-northeast of Zillah	West side of Eagle Peak Rd between Lamb Rd and E Zillah Dr	145	165	2541	W	Moved to nearest ROW 1/4-mile from SVID Main Canal
12	In Grandview	Intersection of King St and Velma Ave	61	81	879	N	Moved to ROW intersection 1/4 mile from Joint Drain 2, at city park and Grandview Water Tower
13	North-northwest of Sunnyside	SW corner of W Merz Rd and N Fordyce Rd	115	135	1781	NE	Moved to nearest ROW intersection
14	*North of Grandview*	*NE corner of Harrison Rd and Alexander Ext*	*62*	*82*	3517	*NE*	*Moved to nearest ROW intersection 1/4-mile from SVID Main Canal*
15	North of Sunnyside	East side of Scoon Rd between Williamson Rd and Phipps Rd	105	125	640	S	Moved to ROW 1/4-mile from Roza Canal
16	East of Granger	North side of Van Belle Rd between Liberty Rd and Arms Rd	19	39	2301	S	Moved to nearest ROW 1/4-mile from SVID Joint Drain 27.5 and 28.0
17	Northeast of Donald	Brooks Rd east of Konnowac Pass Rd	127	147	1421	E	Moved to nearest ROW intersection 1/4-mile from Union Gap Canal
18	South of Grandview, East-southeast of Mabton	South side of State Route 22 near 27990 SR 22 (between Byron Rd and Bus Rd)	50	70	1176	E	Moved to nearest ROW intersection (pullout to side road). South of WDFW Byron Unit and City of Grandview Wastwater Treatment Plant.
19	Northeast of Buena	NE corner of Darby Rd and Blue Goose Rd	44	64	1925	SE	Moved to nearest ROW intersection 1/4-mile from Union Gap Canal and SVID Main Canal
20	North of Sunnyside	SW corner of Cemetery Rd & E Woodin Rd	23	43	128	W	Moved to nearest ROW intersection

Table 1. Preliminary Drill Sites - Lower Yakima Valley GWMA (Continued)

Rank	Lower Yakima Valley Vicinity	Location Description	Estimated Depth to Water (feet)	Estimated Well Depth (feet)	Distance Moved from General Well Location (feet)	Direction Moved	Movement Rationale
21	West-southwest of Grandview	South side of Belma Rd just west of Hornby Rd	47	67	1343	NE	Moved to nearest ROW intersection
22	West of Grandview	South side of Green Valley Rd 150 ft west of Mabton Sunnyside Rd	19	39	2047	W	Moved to nearest ROW intersection
23	North of Granger	North side of Orchardvale Rd just east of N Granger Rd	35	55	3004	W	Moved to nearest ROW intersection 1/4-mile from SVID Main Canal
24	North of Grandview	North side of Olmstead Rd just east of Wilson Hwy	39	59	1979	E	Moved to nearest ROW intersection 1/4-mile from SVID Joint Drain 44.9
25	Northeast of Zillah	East side of Bailey Rd just north of Highland Dr	180*	200*	647	NE	Moved to ROW 1/4-mile from Roza Canal
26	East of Donald	End of Riggins Rd	145	165	2105	NE	Moved to nearest ROW intersection 1/4-mile from Union Gap Canal
27	Southeast of Sunnyside	West side of Braden Rd just south of Tear Rd	18	38	4050	E	Moved to nearest ROW intersection 1/4-mile from Sulfur Creek Wasteway and Joint Drain 40.2
28	Southeast of Mabton	East side of S Phillips Rd just north of Rusk Rd	33	53	704	N	Moved to nearest ROW intersection
29	South of Snipes Mountain	Southwest corner of Emerald Rd and S Emerald Rd intersection	10	30	4500	SE	Moved to ROW intersection south of Snipes Mountian
30	North of Sunnyside	South side of Reeves Rd just west of Cemetery Rd	60	80	1032	N	Moved to nearest ROW intersection

ROW = Right of Way; SVID = Sunnyside Valley Irrigation District

*Estimated depths to water at preliminary drill sites 15 and 25 were modified based on professional judgement since data from local monitoring wells suggest that depths to water based on USGS analyses alone appear to be over estimates in these areas. Using USGS data alone, preliminary drill site 15 has a predicted depth to water of 145 feet, while site 25 has a predicted depth to water of 283 feet.

Table 2. Soil and Irrigated Agriculture Land Use Categories

Category*	NRCS Nitrate Leaching Class	Irrigation type	Primary crops (similar rooting depth)
1	0.34-0.66	sprinkler	Corn, grapes, pasture, wheat, grass hay, sudangrass, triticale
2	0.34-0.66	sprinkler	Tree fruit, alfalfa, hops, asparagus
3	0.67-1.0	sprinkler	Tree fruit, alfalfa, hops, asparagus
4	0.34-0.66	surface	Corn, grapes, pasture, wheat, grass hay, sudangrass, triticale
5	0.67-1.0	sprinkler	Corn, grapes, pasture, wheat, grass hay, sudangrass, triticale
6	0.34-0.66	drip	Tree fruit, alfalfa, hops, asparagus
7	0.34-0.66	drip	Corn, grapes, pasture, wheat, grass hay, sudangrass, triticale
8	0.67-1.0	surface	Corn, grapes, pasture, wheat, grass hay, sudangrass, triticale
9	0.67-1.0	drip	Corn, grapes, pasture, wheat, grass hay, sudangrass, triticale
10	0.34-0.66	surface	Tree fruit, alfalfa, hops, asparagus

*These 10 categories account for 96 percent of the GWMA irrigated agricultural lands (fields with unknown crop type or unknown irrigation type are not included in this total). See PGG (2014b) for more information on the derivation of categories.

Table 3. Preliminary Drain Sampling Stations -Lower Yakima Valley GWMA

Drain Station Number	Lower Yakima Valley Vicinity	Latitude	Longitude	Location Description	Drain Sampled	*Has* Historical Nitrate Data?	Notes/Comments
1	Between Donald & Buena	46.46093054	-120.3684576	Roza Canal Wasteway #3 at Yakima Valley Highway	Roza Canal Wasteway #3	N	
2	Southeast of Buena	46.41417682	-120.3024766	Buena Drain on Westbound I-82 by Exit 50 to SR97 Sign	Buena Irrigation District Drain	N	Possible alternative access by red Golf Club barn accessed through Zillah Lakes housing development on Yakima Valley Highway
3	Zillah	46.40412261	-120.2768151	Manhole at SE corner of Chevron Station Property, I-82 Exit 52	Joint Drain 14.6	Y	Historical samples have been obtained from this location, unclear if current access feasible.
4	Granger	46.34273273	-120.2006477	Outfall pipe on cliff behind house at 307 W. Blvd in Granger	Drain 27	Y	Unclear if current access is possible
5	Granger	46.34317058	-120.1880148	Granger Drain at Mouth (E Avenue)	Joint Drain 26.6	Y	
6	Northeast of Granger	46.34728695	-120.1776299	Joint Drain 26.6 at Yakima Valley Highway & Schneider Ln	Joint Drain 26.6	Y	Additional upstream sampling could be pursued if winter flow is present
7	East of Granger	46.33953601	-120.1565564	Joint Drain 27.5 at Yakima Valley Highway	Joint Drain 27.5	Y	Location is immediately north of the Yakima Valley Highway. Additional upstream sampling could be pursued if winter flow is present
8	Between Granger & Outlook	46.33965613	-120.1413834	Joint Drain 28 immediately North of Yakima Valley Highway	Joint Drain 28	Y	Additional upstream sampling could be pursued if winter flow is present
9	Between Granger & Outlook	46.33899521	-120.1325244	Drain 2 at Yakima Valley Highway	Drain 2	Y	Sampling recommended north of the road where RSBOJC flume present. Additional upstream sampling could be pursued if winter flow is present
10	West of Outlook	46.33156352	-120.1045882	Joint Drain 32 at Outlook Road	Joint Drain 32	Y	Additional upstream sampling could be pursued if winter flow is present
11	South of Snipes Mountain	46.25878634	-120.0653944	DID7 at Green Valley Rd	Drainage Improvement District 7 Drain	Y	Historical samples have been collected at the culvert nearest to the drain mouth in the WDFW Sunnyside Wildlife Area. If accessible, this sampling location is preferred to the proposed Green Valley Rd location.
12	South of Sunnyside	46.25117068	-120.0201977	Sulphur Creek Wasteway at Holaday Rd	Sulphur Creek Wasteway	Y	
13	South of Sunnyside	46.28206839	-120.0096429	Joint Drain 33.4 South of Duffy Rd	Joint Drain 33.4	Y	
14	West Sunnyside	46.32867671	-120.0252698	Joint Drain 33.4 at Yakima Valley Highway	Joint Drain 33.4	Y	Historical samples have been collected behind a warehouse near 1st St, unclear if access to this location still exists.
15	Northwest of Sunnyside	46.33378121	-120.0333092	Joint Drain 33.4 accessed from Rougk Lane	Joint Drain 33.4	N	Additional upstream sampling could be pursued if winter flow is present
16	Northwest of Sunnyside	46.33835633	-120.0232698	Joint Drain 34.2 at E Woodin Rd	Joint Drain 34.2	N	Additional upstream sampling could be pursued if winter flow is present
17	South of Sunnyside	46.28332189	-119.9992253	Joint Drain 43.9 at Sunnyside-Mabton Rd	Joint Drain 43.9	Y	Additional upstream sampling could be pursued if winter flow is present
18	South of Sunnyside	46.28746282	-119.9974738	Joint Drain 40.2 mouth along Tear Rd	Joint Drain 40.2	Y	Additional upstream sampling could be pursued if winter flow is present

Table 3. Preliminary Drain Sampling Stations -Lower Yakima Valley GWMA (Continued)

Drain Station Number	Lower Yakima Valley Vicinity	Latitude	Longitude	Location Description	Drain Sampled	Has Historical Nitrate Data?	Notes/Comments
19	Southeast Sunnyside	46.30940881	-119.9914319	Joint Drain 35.4 at Allen Rd	Joint Drain 35.4	Y	Additional upstream sampling could be pursued if winter flow is present
20	East of Sunnyside	46.32450288	-119.9781487	Joint Drain 37.9 at Hanford Rd	Joint Drain 37.9	Y	Additional upstream sampling could be pursued if winter flow is present
21	East of Sunnyside	46.33163342	-119.9799318	Sulphur Creek Wasteway at Sheller Rd	Sulphur Creek Wasteway	N	East wasteway channel should be sampled. Additional upstream sampling could be pursued if winter flow is present
22	North of Mabton	46.24010344	-119.9992304	Drain 31 at West Charvet Rd	Drain 31	Y	Located at West Charvet Rd and Sunnyside-Mabton Rd intersection
23	Southwest of Grandview	46.2364516	-119.9629096	Drain 35 off of Charvet Rd	Drain 35	Y	Historical sampling location was at a broken pipe at the south end of a hops field at 1701 Charvet Rd. Uncertain if sampling access currently possible.
24	SSW of Grandview	46.22924162	-119.925942	Joint Drain 2 (Grandview Drain) at Chase Rd	Joint Drain 2	Y	Historical sampling location was at a private pond at 862 Chase Rd, near the mouth of the joint drain.
25	East of Mabton	46.19769036	-119.9184388	Joint Drain 1 at Bus Rd	Joint Drain 1	N	Downstream sampling between Byron Ponds in the WDFW Byron Unit may not be representative of groundwater concentrations due to water fowl usage of the wetlands.

Note:

-Historical nitrate data were queried from Ecology's EIM database to assess if data exist for the proposed sampling locations. Other data sources (such as USGS or RSBOJC) may exist that are not in the EIM database.

Table 4. Well Installation and First-Year Monitoring Cost Estimate

	Wells 1 - 5	Wells 1 - 10	Wells 1 - 15	Wells 1 - 20	Wells 1 - 25	Wells 1 - 30
Number of Wells	***5***	***10***	***15***	***20***	***25***	***30***
Well Installation						
Drilling Subcontract	$24,588	$56,845	$114,450	$148,502	$188,880	$232,044
Field Geology Labor (PGG)	$6,785	$15,152	$30,046	$39,033	$49,266	$60,124
First-Year Well Monitoring						
Lab (samples from wells)	$4,990	$9,148	$14,137	$18,295	$23,285	$27,443
Passive Sampling Devices (PSDs)	$2,500	$4,610	$7,110	$9,220	$11,720	$13,830
Well Sampling Labor (PGG supplies one of two samplers)	$11,318	$16,980	$21,683	$26,385	$33,008	$37,710
Drill and lab contract support, Data management, Analysis, & Reporting						
Update Sampling and Analysis Plan (PGG)	$1,940	$1,940	$1,940	$1,940	$1,940	$1,940
Field location verification, utility clearances (PGG)	$6,158	$8,159	$10,639	$12,640	$15,121	$17,121
Drill specs and drill contract support (PGG)	$11,951	$11,951	$11,951	$11,951	$11,951	$11,951
Well tests, initial sampling device install, data management (PGG)	$6,372	$8,223	$10,714	$12,885	$15,376	$17,547
As-built report, well logs, sampling reports (PGG)	$13,158	$18,130	$23,918	$28,613	$32,938	$37,725
Project management, communication, meetings (PGG)	$23,684	$42,105	$55,263	$65,790	$65,790	$78,948
Total Drilling, Well Sampling, & Well Labor Cost	**$113,443**	**$193,242**	**$301,851**	**$375,253**	**$449,272**	**$536,382**

Notes for Tables 4 and 5.

1 Others contract directly with lab and driller, and lab supplies all passive sampler equipment (ie: no markup, and PGG generates technical drill specification).
2 Others perform certain uncosted tasks including site permitting and access agreements if necessary, and surveying.
3 Utility locates are performed by One-Call contractors only (no cost for private locate firm).
4 Hollow stem auger drill is used for wells 50-ft deep and less. Sonic drill is used for wells more than 50 ft deep.
5 Duration of project is approximately 18 months (install wells, sample for one year, then report).
6 Others provide one uncosted sampler for wells, and PGG provides one sampler for both wells and drains.
7 *Tasks ending with "(PGG)" are based on Pacific Groundwater Group direct costs and fees, and assumed level of PGG effort.*
8 Others provide and implement uncosted traffic control plan.
9 One field duplicate is collected and analyzed for each 10 samples collected, per current Sampling and Analysis Plan.
10 Costs are for first-year sampling which consists of six sample rounds.
11 Samples are analyzed for nitrate, nitrite, Total Kjeldahl nitrogen, and ammonium (per current Sampling and Analysis Plan). However, note recent discussion of analytes at Data Committee meeting.
12 Passive samplers are used in wells (no pumps).
13 Analysis of first-year water quality data is basic and intra-station only (description, N speciation, summary statistics, seasonality).

Table 5. Drain First-Year Monitoring Cost Estimate

	Drains 1 - 25
Number of Drains	***25***
First-Year Drain Monitoring	
Lab (samples from drains)	$23,285
Drain Sampling Labor (PGG)	$15,893
Lab contract support, Data management, Analysis, & Reporting	
Update Sampling and Analysis Plan (PGG)	$1,940
Field verification and marking (PGG)	$3,461
Analysis & Reporting (PGG)	$13,170
Total Drain Sampling and Drain Labor Cost	**$57,748**

See list of assumptions on Table 4.

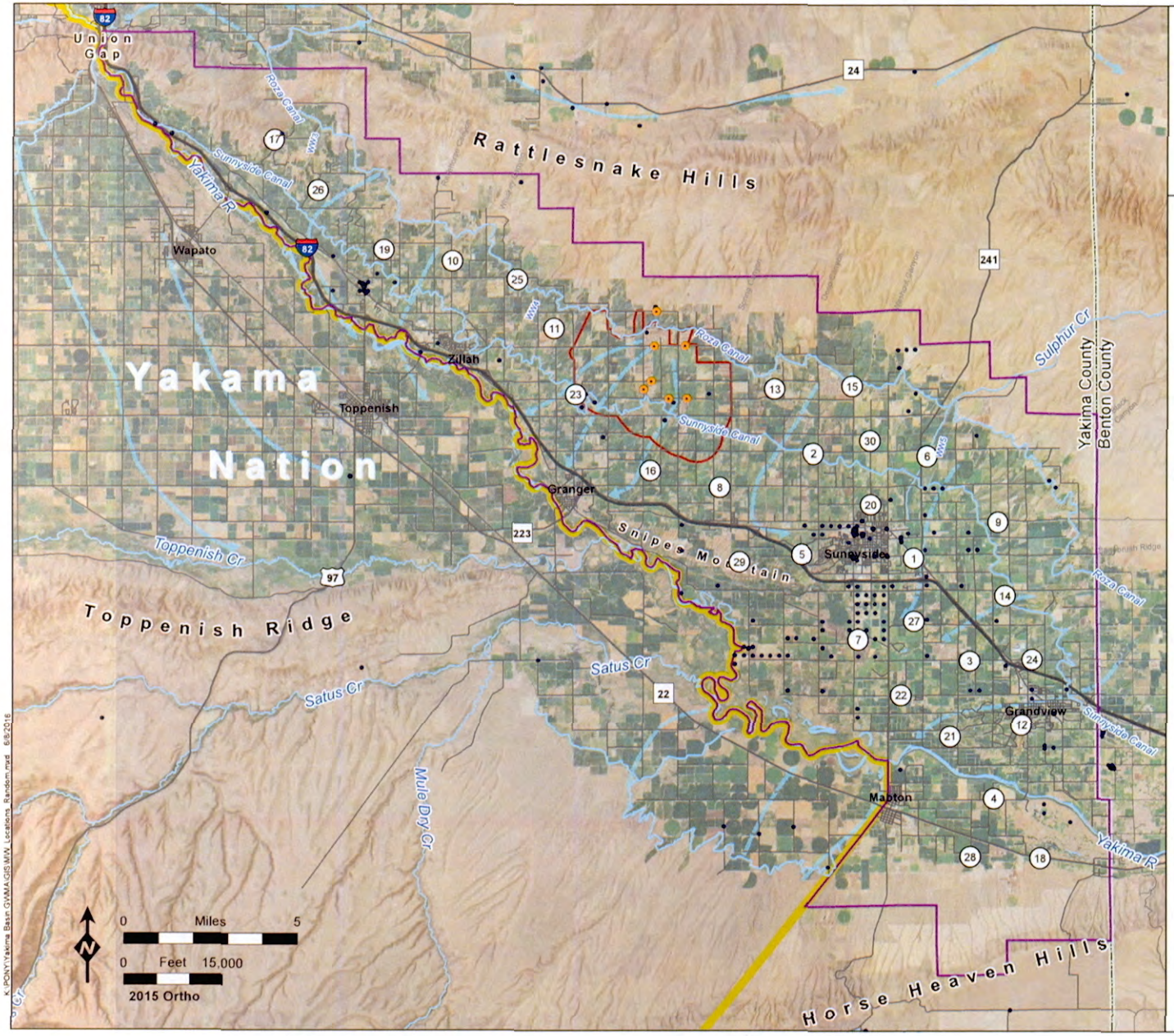

Figure 1

General Well Locations 1 – 30

PgG

- General Well Locations
- EPA Monitoring Wells
- Existing Public Monitoring Wells (from EIM and Well Log Databases)
- GWMA Boundary
- EPA Dairy Cluster Buffer Boundary
- Yakama Nation Boundary (from Yakima County)
- General Groundwater Flow Direction (from USGS)

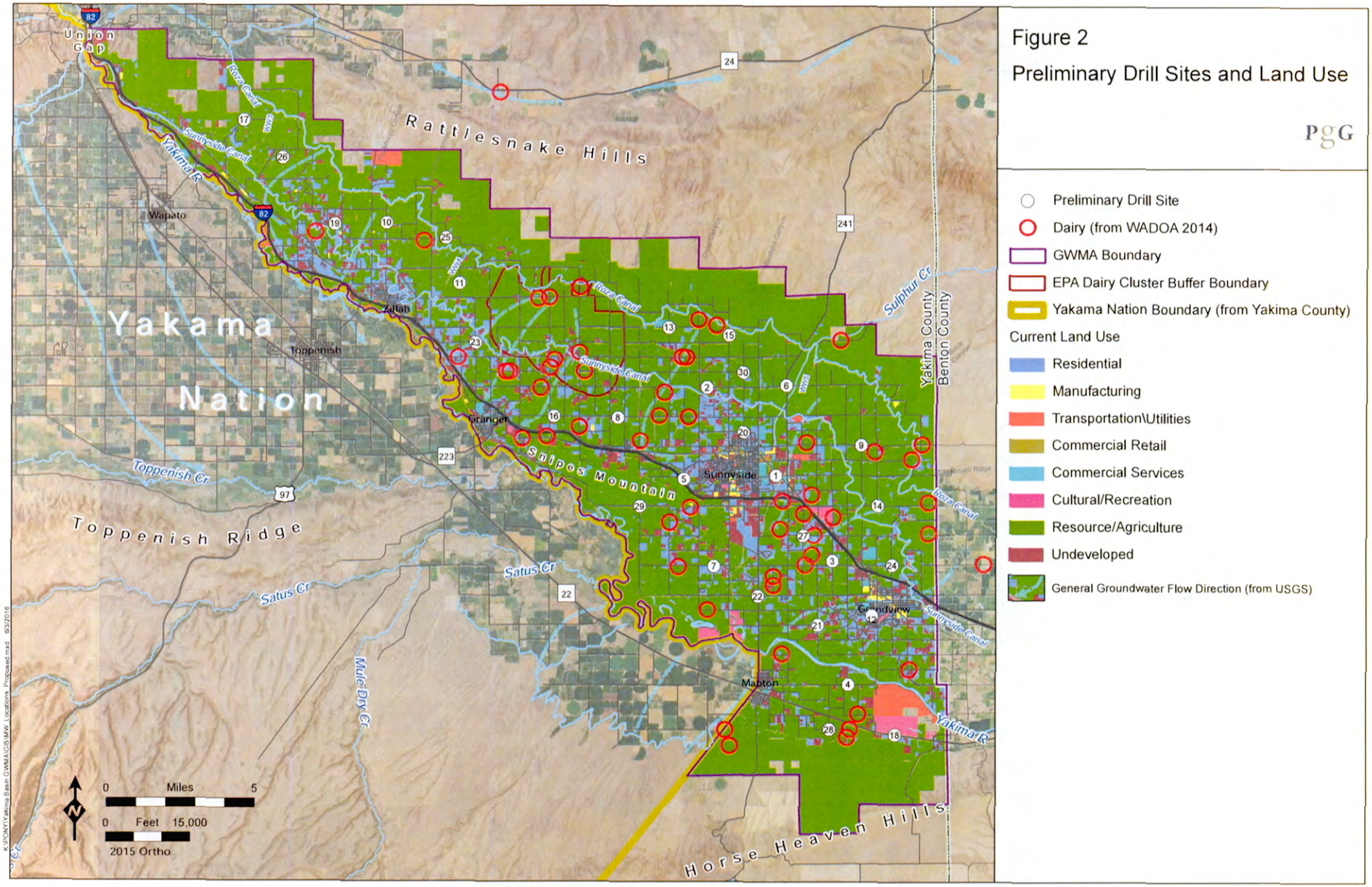
Figure 2
Preliminary Drill Sites and Land Use
PgG
Preliminary Drill Site
Dairy (from WADOA 2014)
GWMA Boundary
EPA Dairy Cluster Buffer Boundary
Yakama Nation Boundary (from Yakima County)
Current Land Use
Residential
Manufacturing
Transportation\Utilities
Commercial Retail
Commercial Services
Cultural/Recreation
Resource/Agriculture
Undeveloped
General Groundwater Flow Direction (from USGS)
Union Gap
Wapato
Zillah
Toppenish
Granger
Sunnyside
Grandview
Mabton
Yakama Nation
Rattlesnake Hills
Toppenish Ridge
Horse Heaven Hills
Snipes Mountain
Yakima County
Benton County
Yakima R
Roza Canal
Sunnyside Canal
Toppenish Cr
Satus Cr
Mule Dry Cr
Sulphur Cr
0 Miles 5
0 Feet 15,000
2015 Ortho
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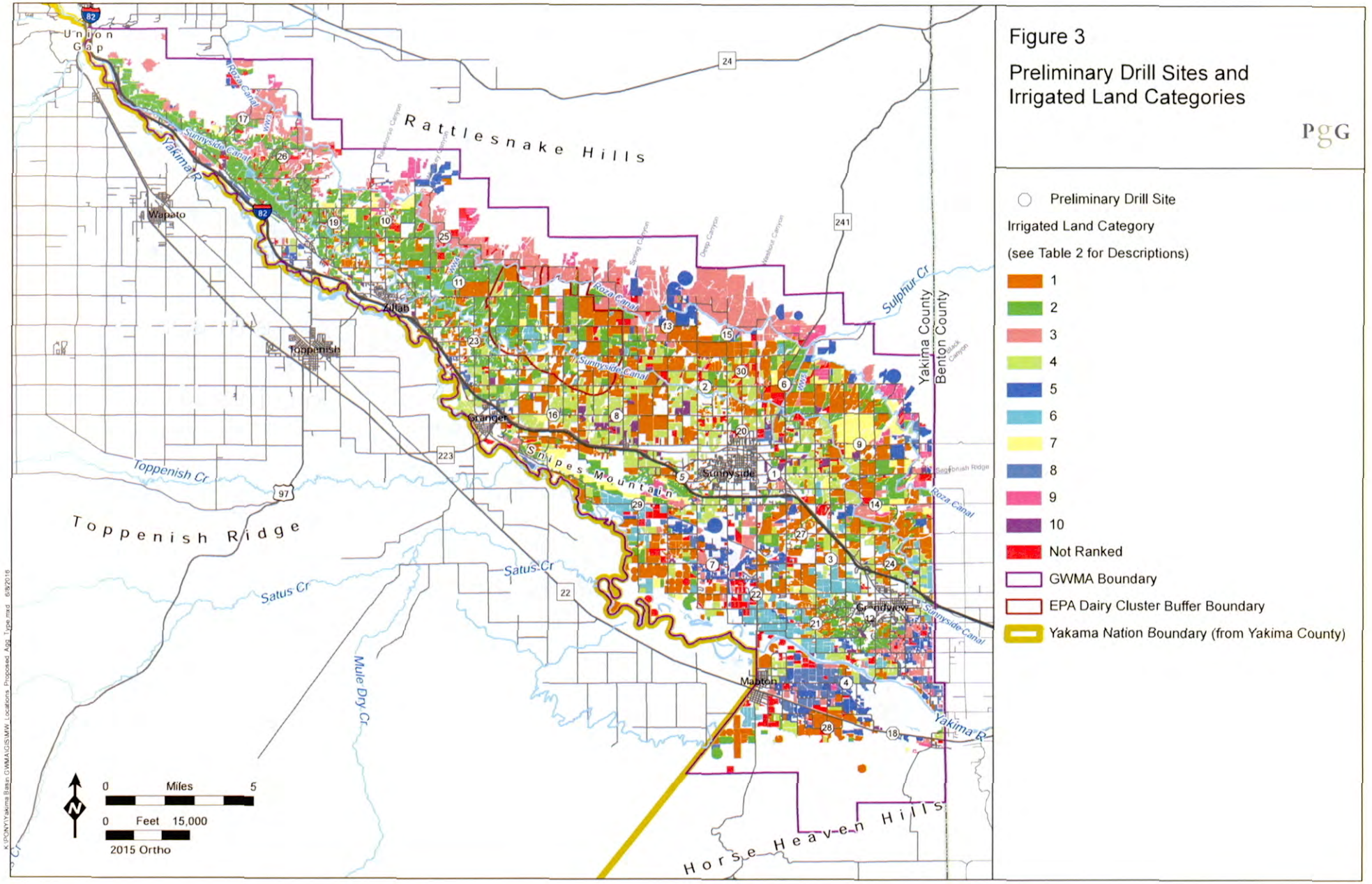
Figure 3
Preliminary Drill Sites and Irrigated Land Categories
PgG
Preliminary Drill Site
Irrigated Land Category
(see Table 2 for Descriptions)
1
2
3
4
5
6
7
8
9
10
Not Ranked
GWMA Boundary
EPA Dairy Cluster Buffer Boundary
Yakama Nation Boundary (from Yakima County)
Union Gap
Wapato
Toppenish
Zillah
Granger
Sunnyside
Grandview
Mabton
Rattlesnake Hills
Toppenish Ridge
Horse Heaven Hills
Snipes Mountain
Yakima County
Benton County
Yakima R
Toppenish Cr
Satus Cr
Mule Dry Cr
Sulphur Cr
Roza Canal
Sunnyside Canal
0 Miles 5
0 Feet 15,000
2015 Ortho
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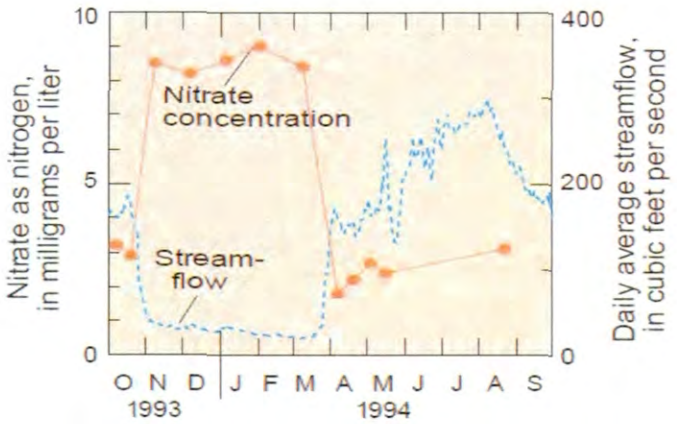
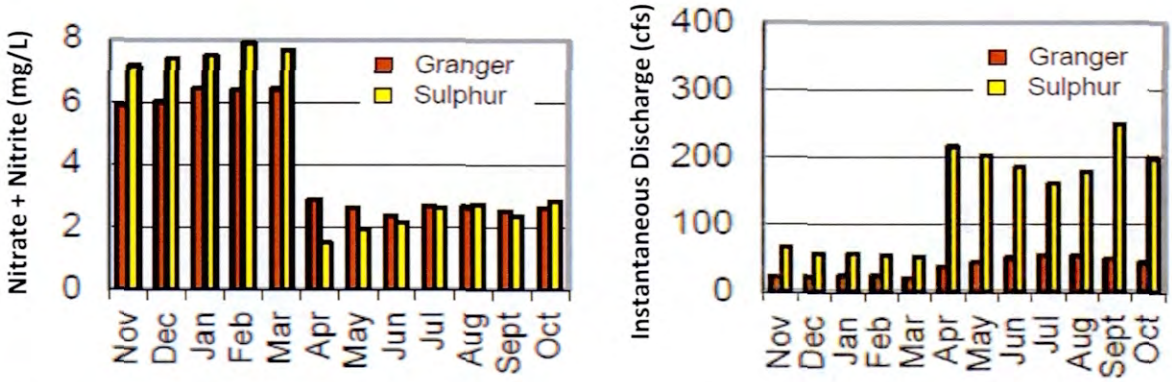


4a) Nitrate concentrations in wasteways are generally highest in the winter when their main source is groundwater discharge and negligible dilution from return flows occurs. Figure from Williamson & others (1998).



4b) Median monthly nitrate and discharge measurements from 2000 - 2008 for Granger Drain and Sulphur Creek Wasteway. Figures from Zuroske (2009).

Figure 4
Comparison of Drain Concentrations to Irrigation Flow

LYV GWMA Monitoring Network Design
JE1512

PgG

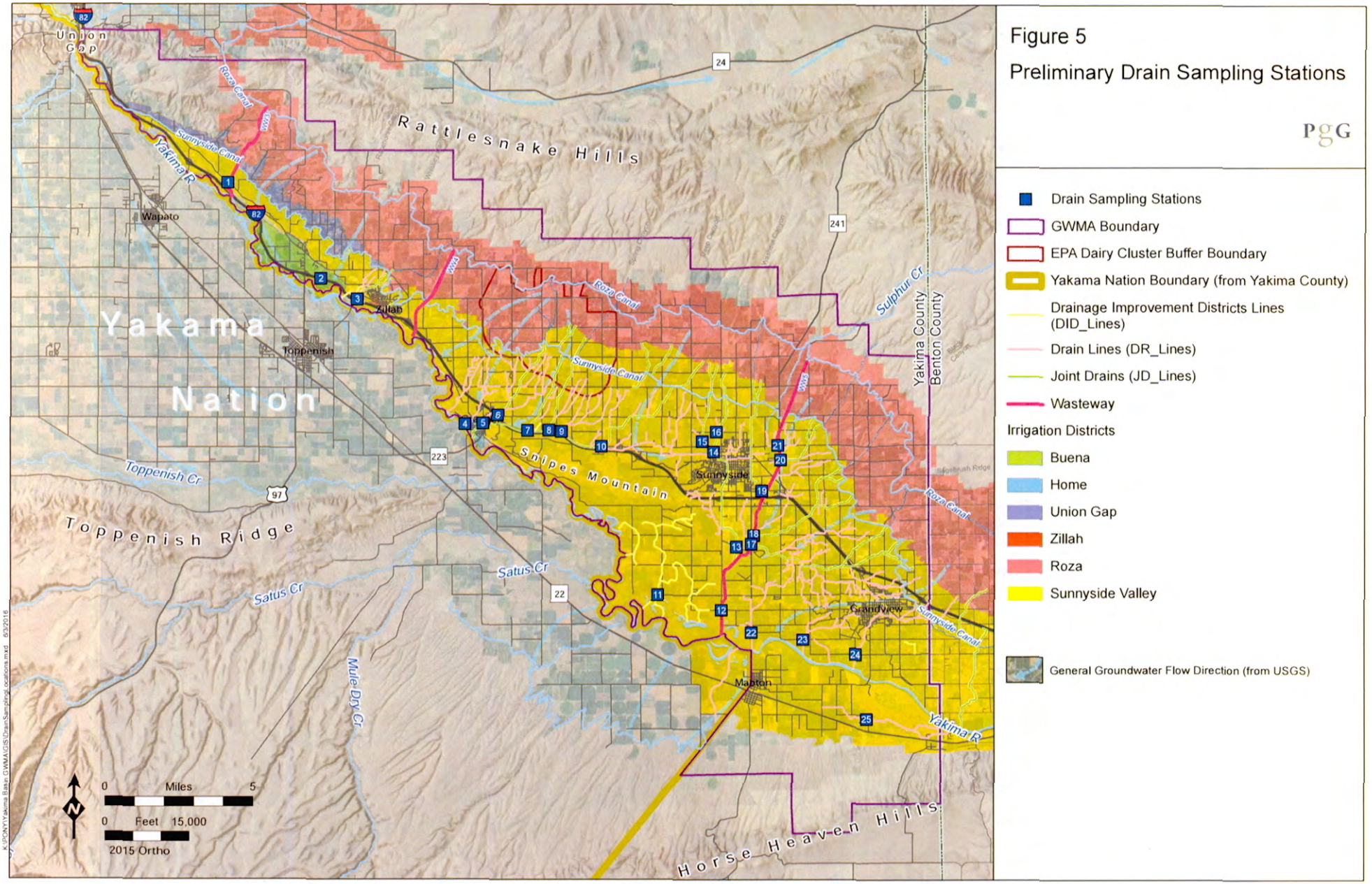


Figure 5
Preliminary Drain Sampling Stations
PgG
Drain Sampling Stations
GWMA Boundary
EPA Dairy Cluster Buffer Boundary
Yakama Nation Boundary (from Yakima County)
Drainage Improvement Districts Lines (DID_Lines)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Wasteway
Irrigation Districts
Buena
Home
Union Gap
Zillah
Roza
Sunnyside Valley
General Groundwater Flow Direction (from USGS)
Yakama Nation
Rattlesnake Hills
Toppenish Ridge
Horse Heaven Hills
Snipes Mountain
Union Gap
Wapato
Zillah
Toppenish
Sunnyside
Grandview
Mabton
Yakima County
Benton County
Yakima R
Sunnyside Canal
Roza Canal
Wasteway
Sulphur Cr
Toppenish Cr
Satus Cr
Mule Dry Cr
0 Miles 5
0 Feet 15,000
2015 Ortho
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APPENDIX A
LOCAL MAPS OF PRELIMINARY DRILL SITES

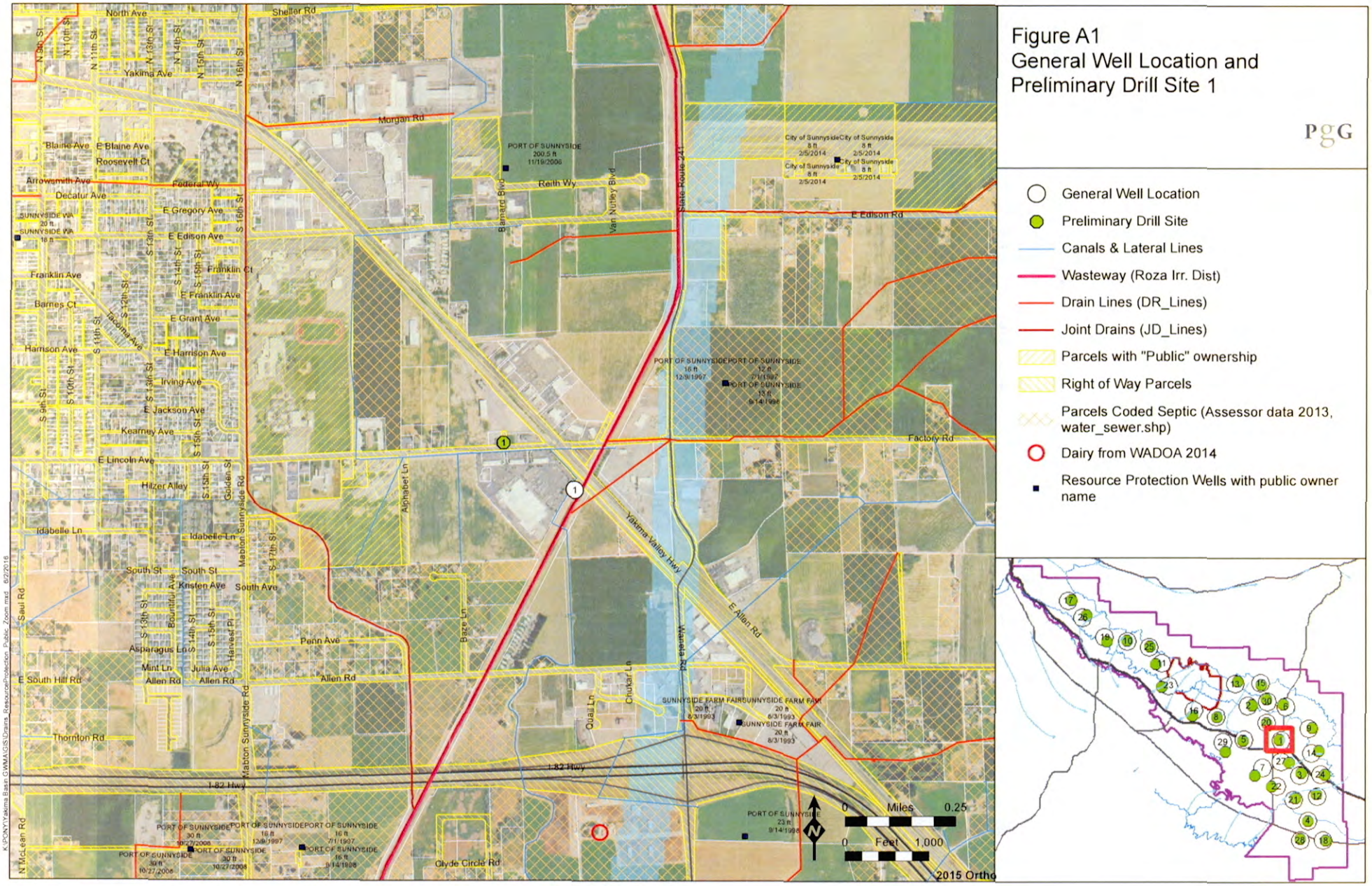
Figure A1
General Well Location and
Preliminary Drill Site 1
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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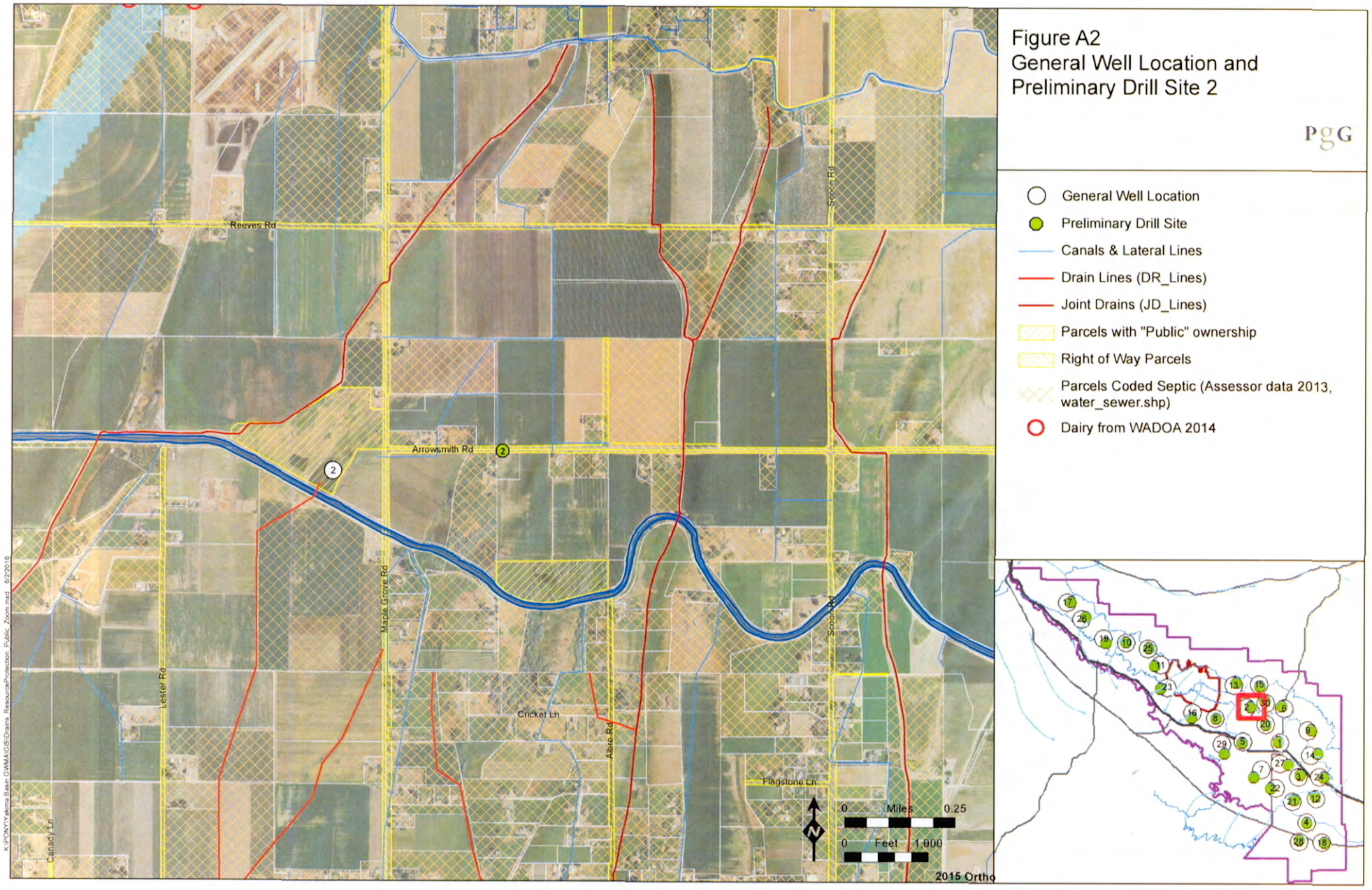
Figure A2
General Well Location and
Preliminary Drill Site 2
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Reeves Rd
Arrowsmith Rd
Scoon Rd
Lester Rd
Maple Grove Rd
Cricket Ln
Abbie Rd
Flagstone Ln
Canady Ln
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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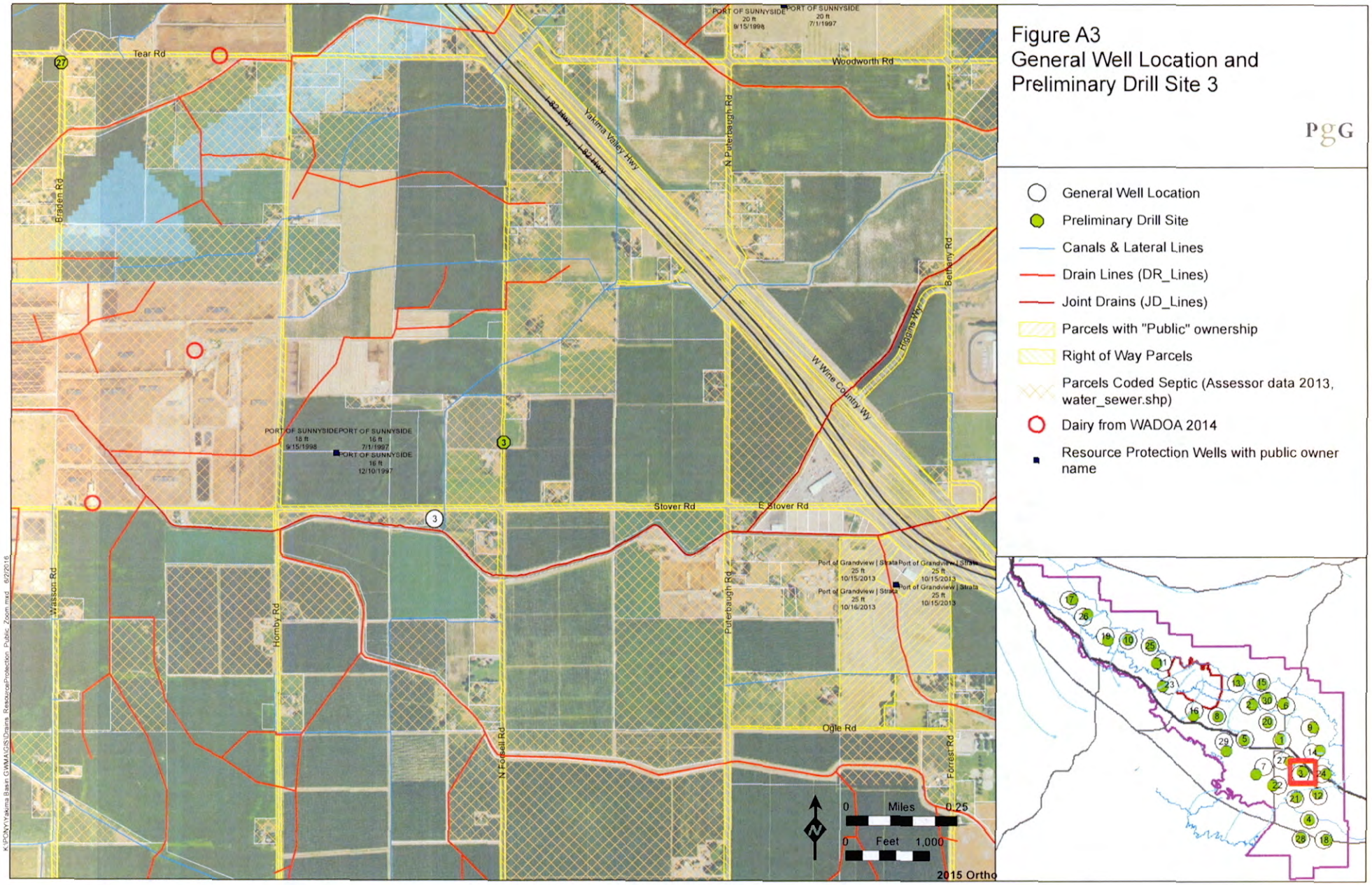
Figure A3
General Well Location and
Preliminary Drill Site 3
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Tear Rd
Woodworth Rd
Braden Rd
Yakima Valley Hwy
I-82 Hwy
N Puterbaugh Rd
Bethany Rd
Higgins Wy
W Wine Country Wy
Stover Rd
E Stover Rd
Watson Rd
Hornby Rd
N Fogwell Rd
Puterbaugh Rd
Ogle Rd
Forrest Rd
PORT OF SUNNYSIDE 20 ft 9/15/1998
PORT OF SUNNYSIDE 20 ft 7/1/1997
PORT OF SUNNYSIDE 18 ft 9/15/1998
PORT OF SUNNYSIDE 16 ft 7/1/1997
PORT OF SUNNYSIDE 16 ft 12/10/1997
Port of Grandview | Strata 25 ft 10/15/2013
Port of Grandview | Strata 25 ft 10/16/2013
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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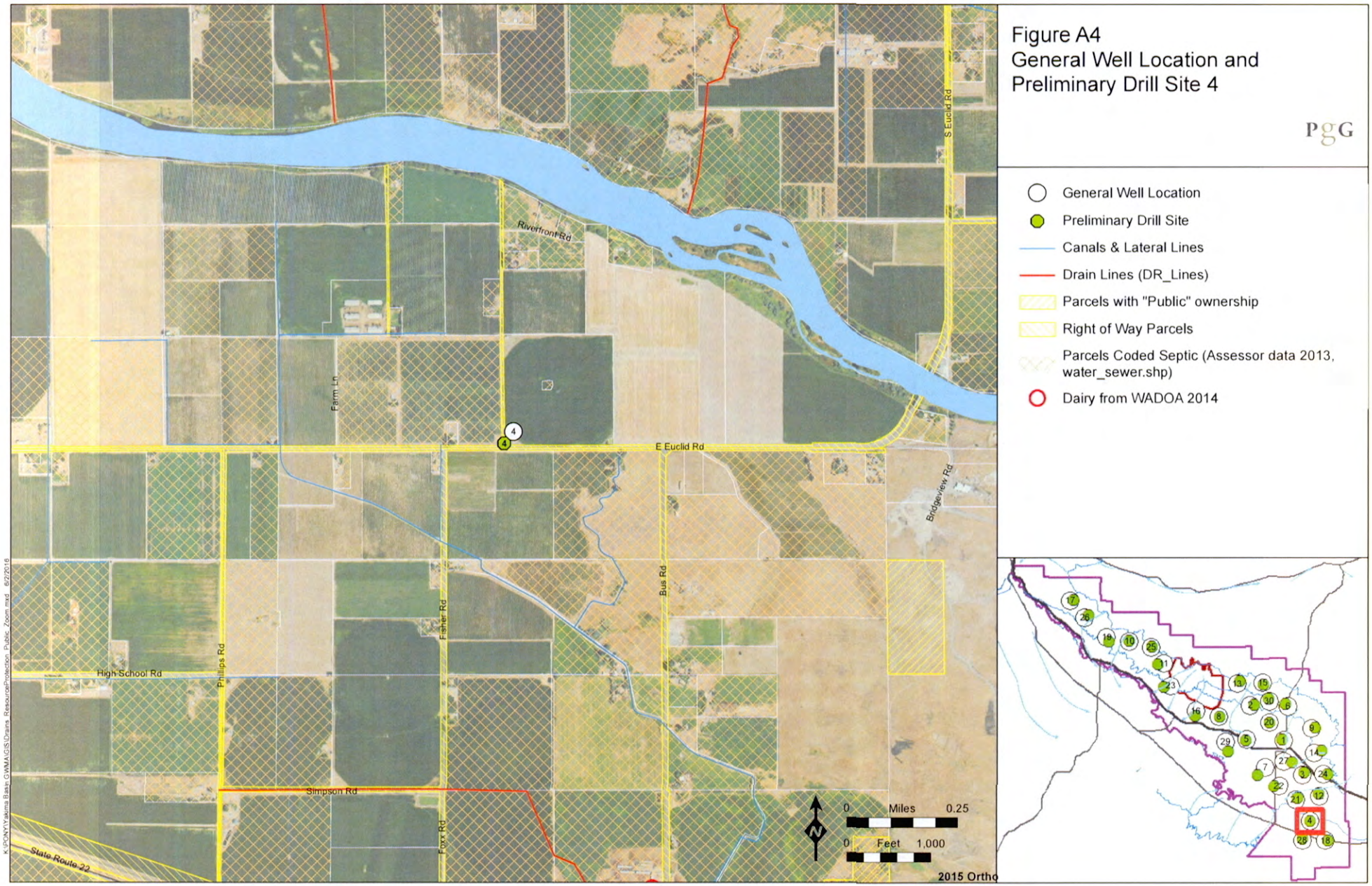
Figure A4
General Well Location and
Preliminary Drill Site 4
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Riverfront Rd
S Euclid Rd
Farm Ln
E Euclid Rd
Bridgeview Rd
Bus Rd
Fisher Rd
Phillips Rd
High School Rd
Simpson Rd
Foxx Rd
State Route 22
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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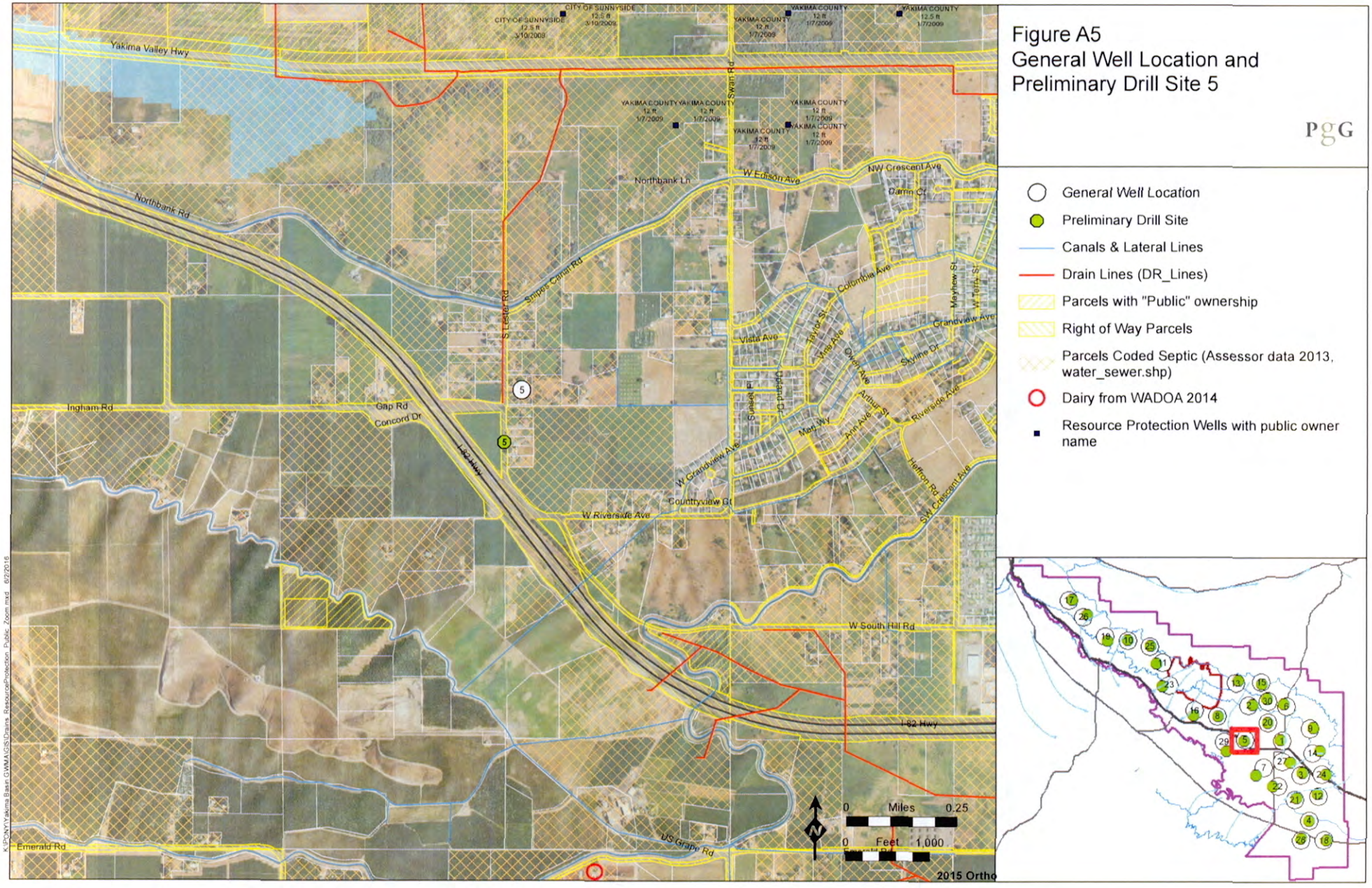
Figure A5
General Well Location and
Preliminary Drill Site 5
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Yakima Valley Hwy
Northbank Rd
Northbank Ln
W Edison Ave
NW Crescent Ave
Darrin Ct
Sniper Canal Rd
S Lester Rd
Swan Rd
Colombia Ave
Mayhew St
W Tuma St
Grandview Ave
Vista Ave
Taylor St
Area Ave
Oliver Ave
Skyline Dr
Orchard Dr
Ingham Rd
Gap Rd
Concord Dr
I-82 Hwy
W Grandview Ave
Countryview Ct
W Riverside Ave
Arthur St
Ann Ave
May Wy
Riverside Ave
Heffron Rd
SW Crescent Ave
W South Hill Rd
Emerald Rd
US Grape Rd
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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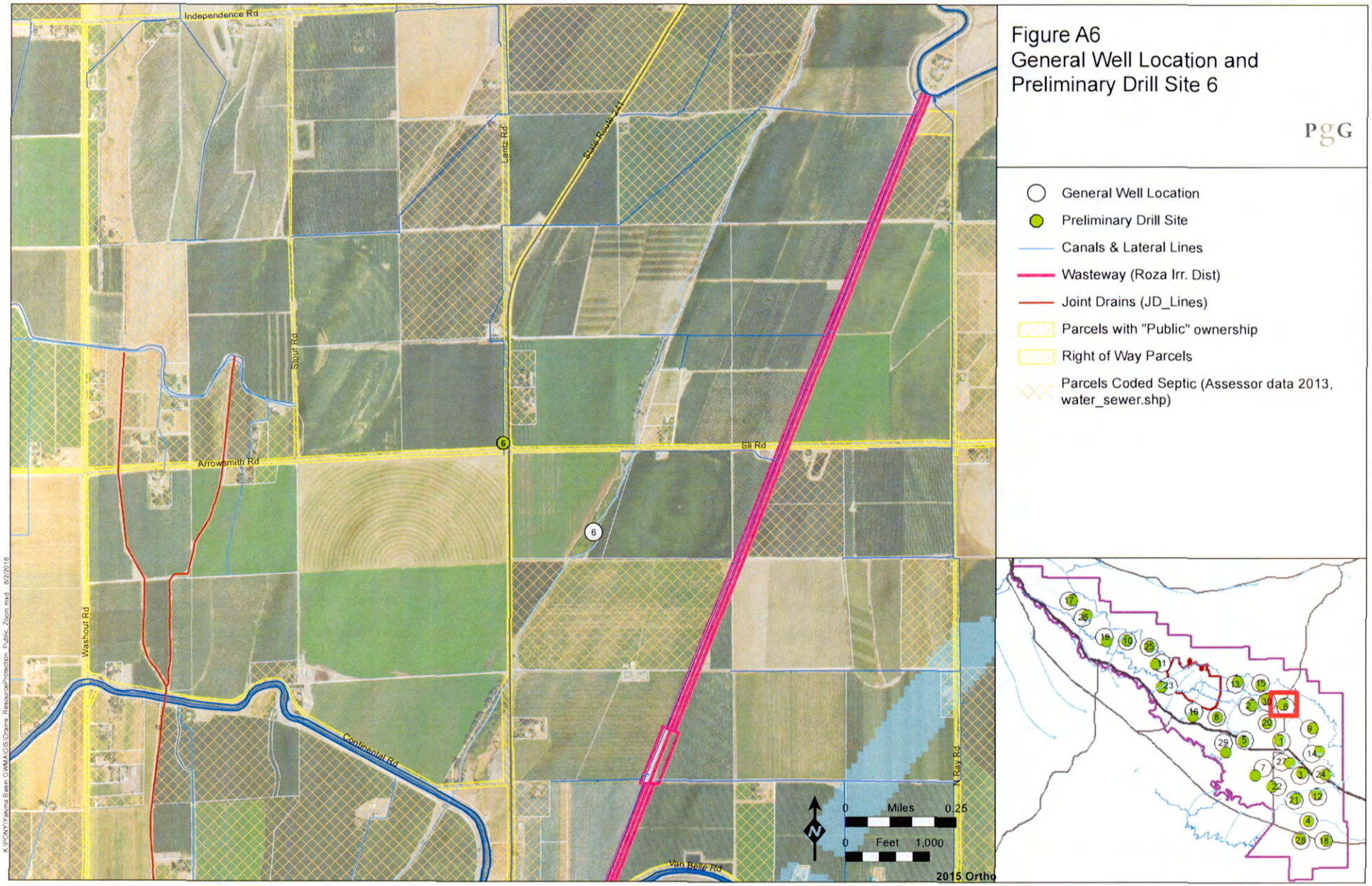

Figure A6
General Well Location and
Preliminary Drill Site 6

PgG

- General Well Location
- Preliminary Drill Site
- Canals & Lateral Lines
- Wasteway (Roza Irr. Dist)
- Joint Drains (JD_Lines)
- Parcels with "Public" ownership
- Right of Way Parcels
- Parcels Coded Septic (Assessor data 2013, water_sewer.shp)

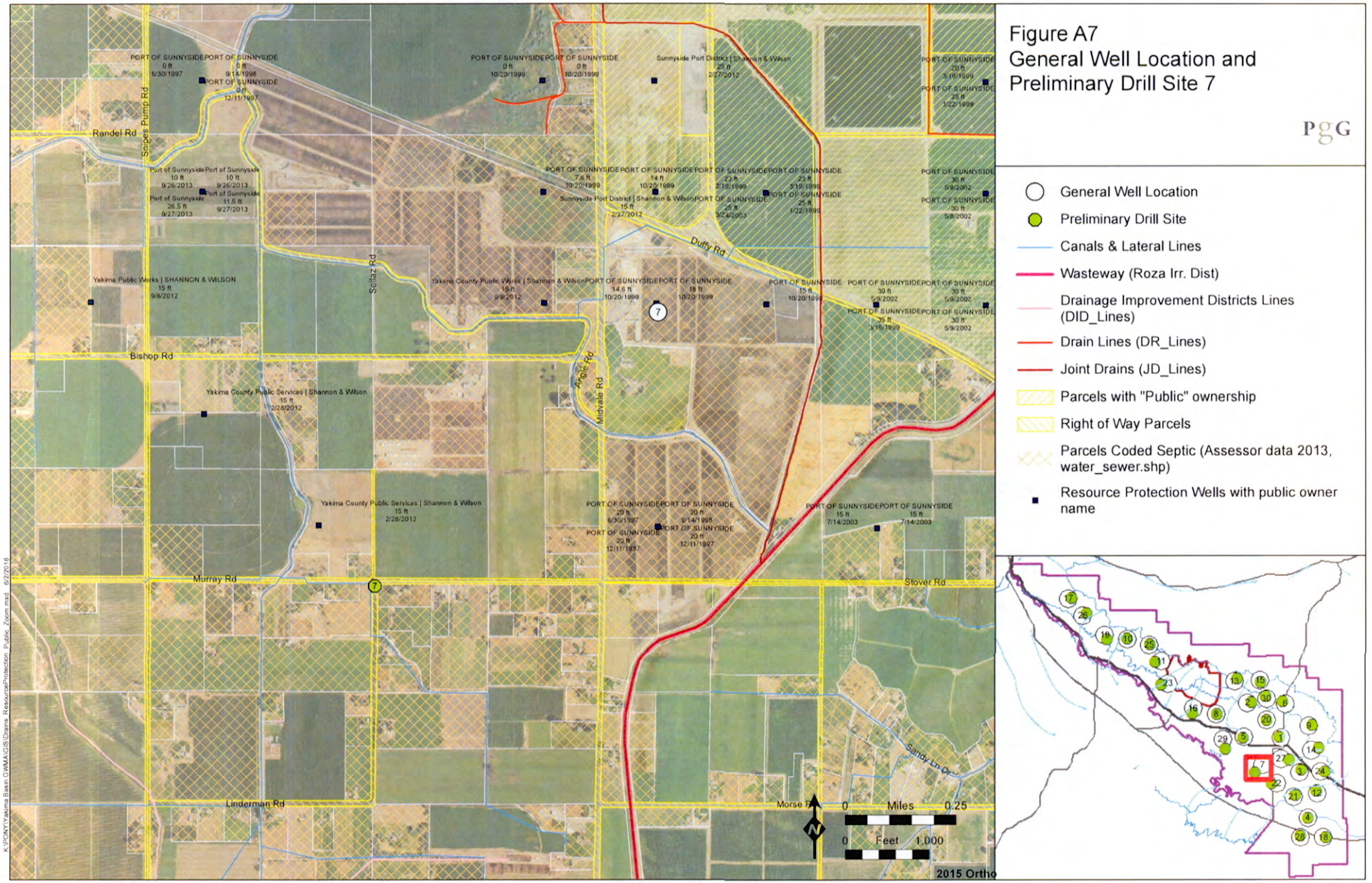

Figure A7
General Well Location and Preliminary Drill Site 7

PgG

- General Well Location
- Preliminary Drill Site
- Canals & Lateral Lines
- Wasteway (Roza Irr. Dist)
- Drainage Improvement Districts Lines (DID_Lines)
- Drain Lines (DR_Lines)
- Joint Drains (JD_Lines)
- Parcels with "Public" ownership
- Right of Way Parcels
- Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
- Resource Protection Wells with public owner name

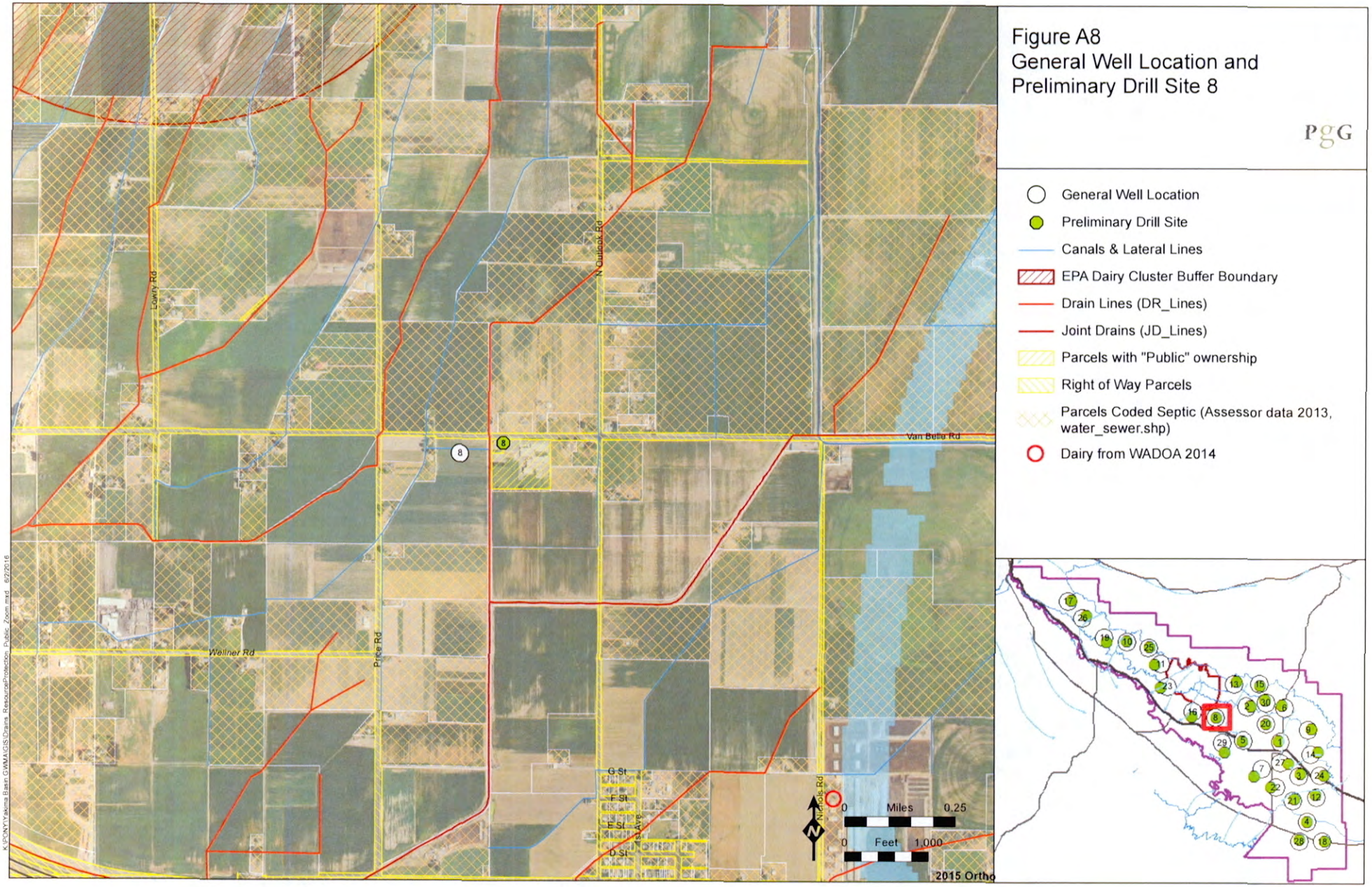
Figure A8
General Well Location and
Preliminary Drill Site 8
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
EPA Dairy Cluster Buffer Boundary
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Lowry Rd
N Outlook Rd
Van Belle Rd
Wellner Rd
Pirkl Rd
G St
F St
E St
D St
Nichols Rd
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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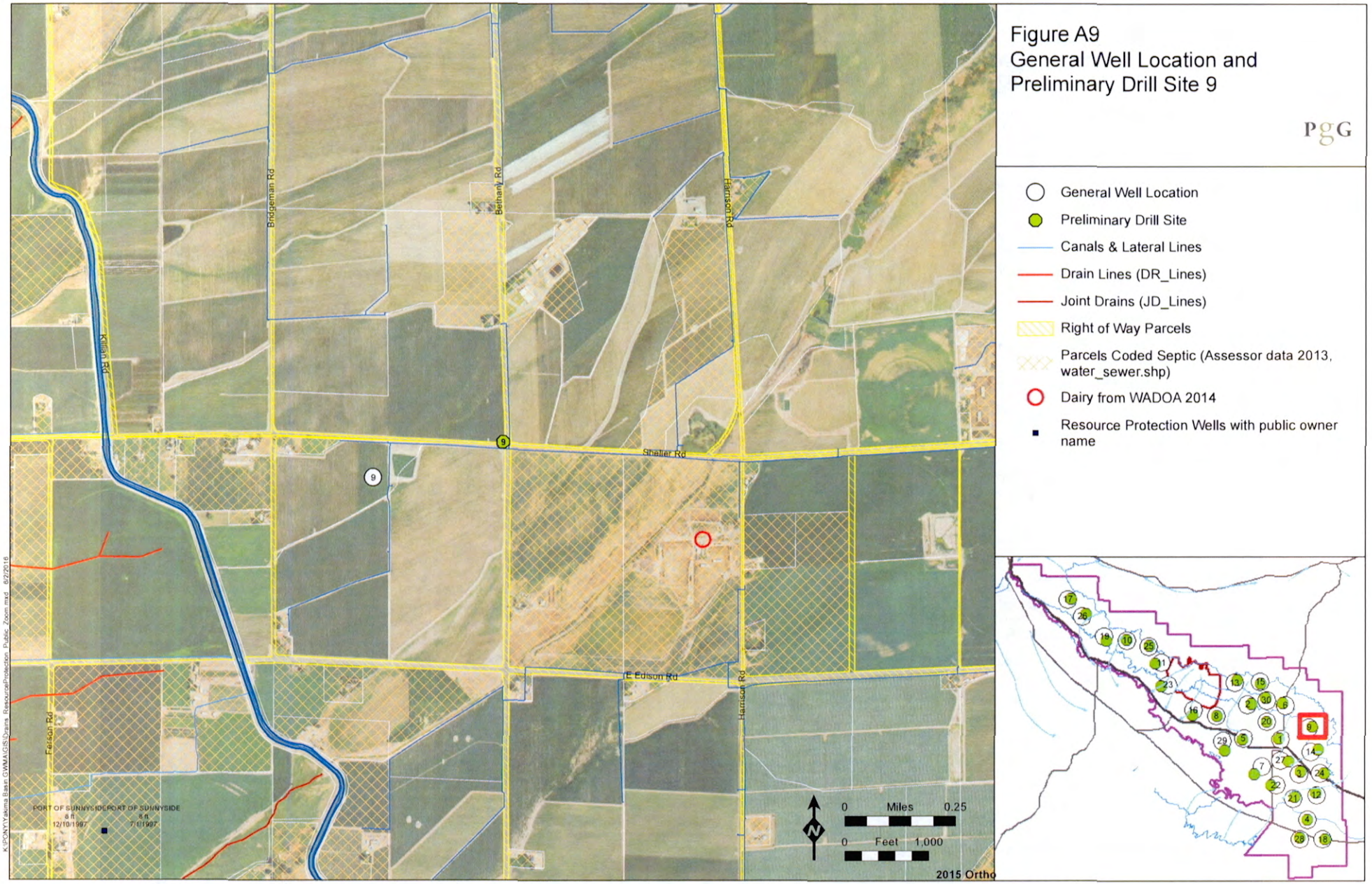
Figure A9
General Well Location and
Preliminary Drill Site 9
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Bridgeman Rd
Bethany Rd
Harrison Rd
Killian Rd
Shaller Rd
E Edison Rd
Ferguson Rd
PORT OF SUNNYSIDE
8 ft
12/10/1997
PORT OF SUNNYSIDE
8 ft
7/1/1997
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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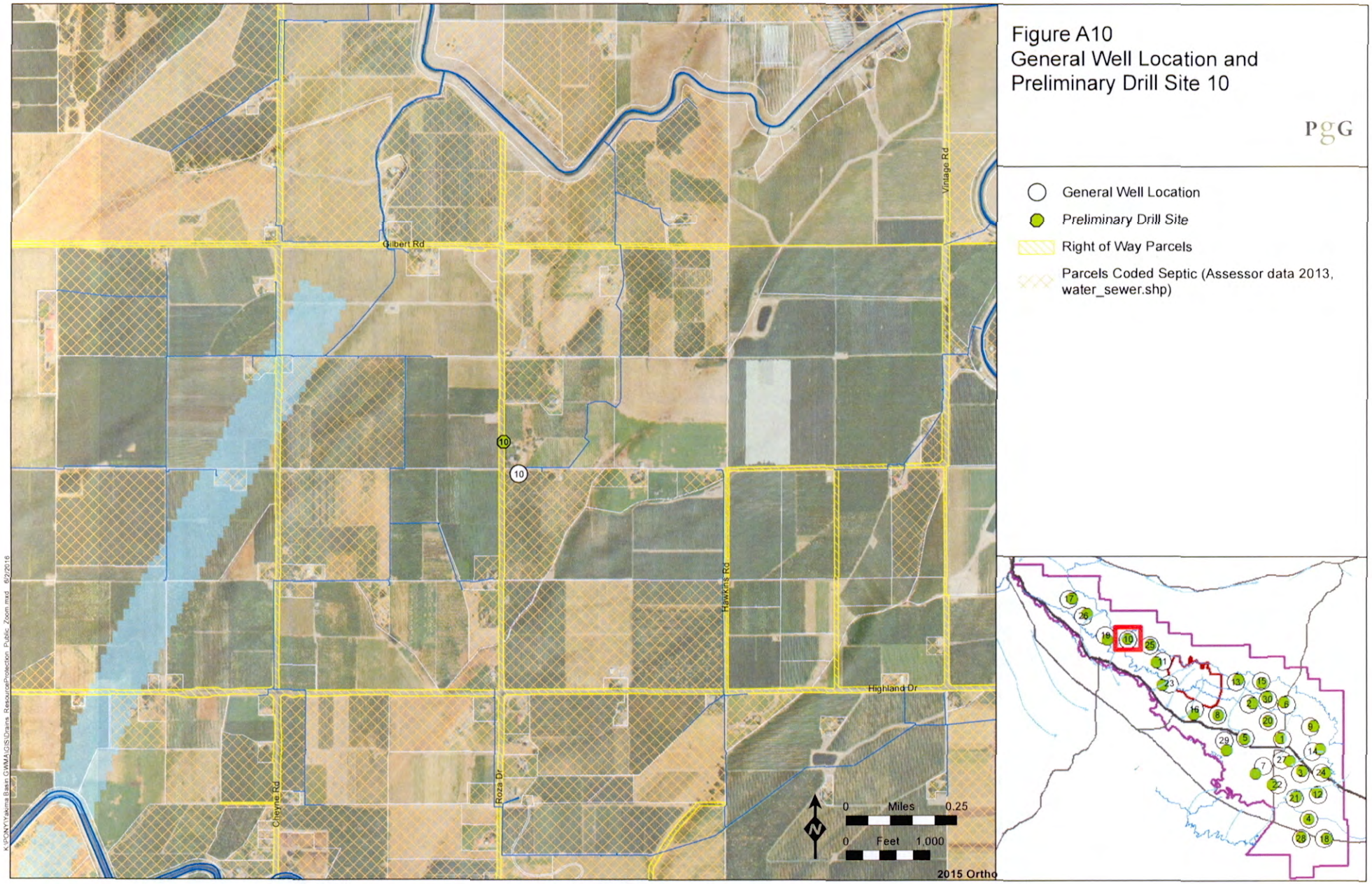
Figure A10
General Well Location and
Preliminary Drill Site 10
PgG
General Well Location
Preliminary Drill Site
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Gilbert Rd
Village Rd
Hawk's Rd
Highland Dr
Cheyne Rd
Roza Dr
10
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

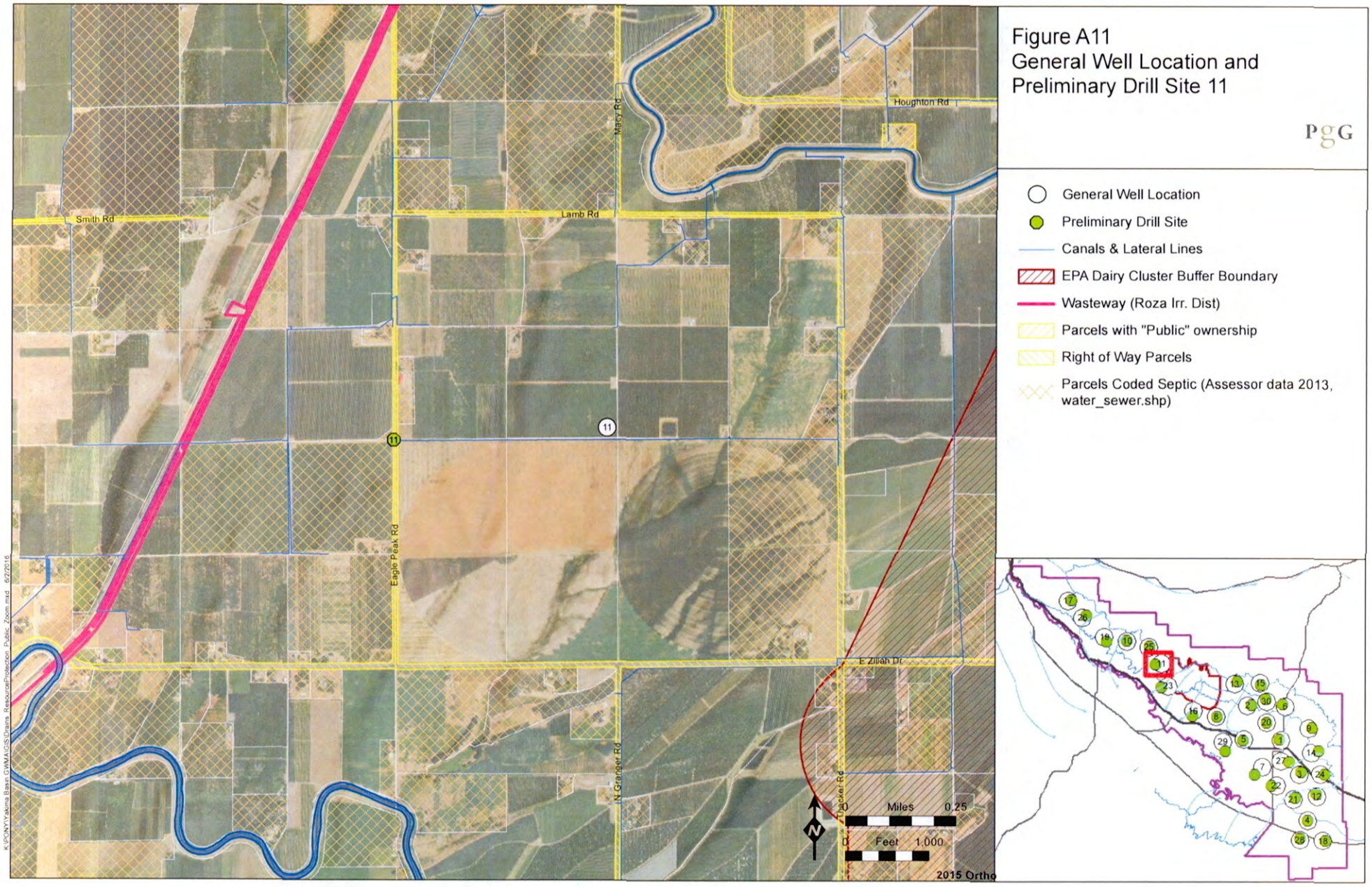
Figure A11
General Well Location and
Preliminary Drill Site 11
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
EPA Dairy Cluster Buffer Boundary
Wasteway (Roza Irr. Dist)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Smith Rd
Lamb Rd
Houghton Rd
Macy Rd
Eagle Peak Rd
N Granger Rd
E Zillah Dr
11
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains Resource\Protection Public_Zoom.mxd 6/2/2016

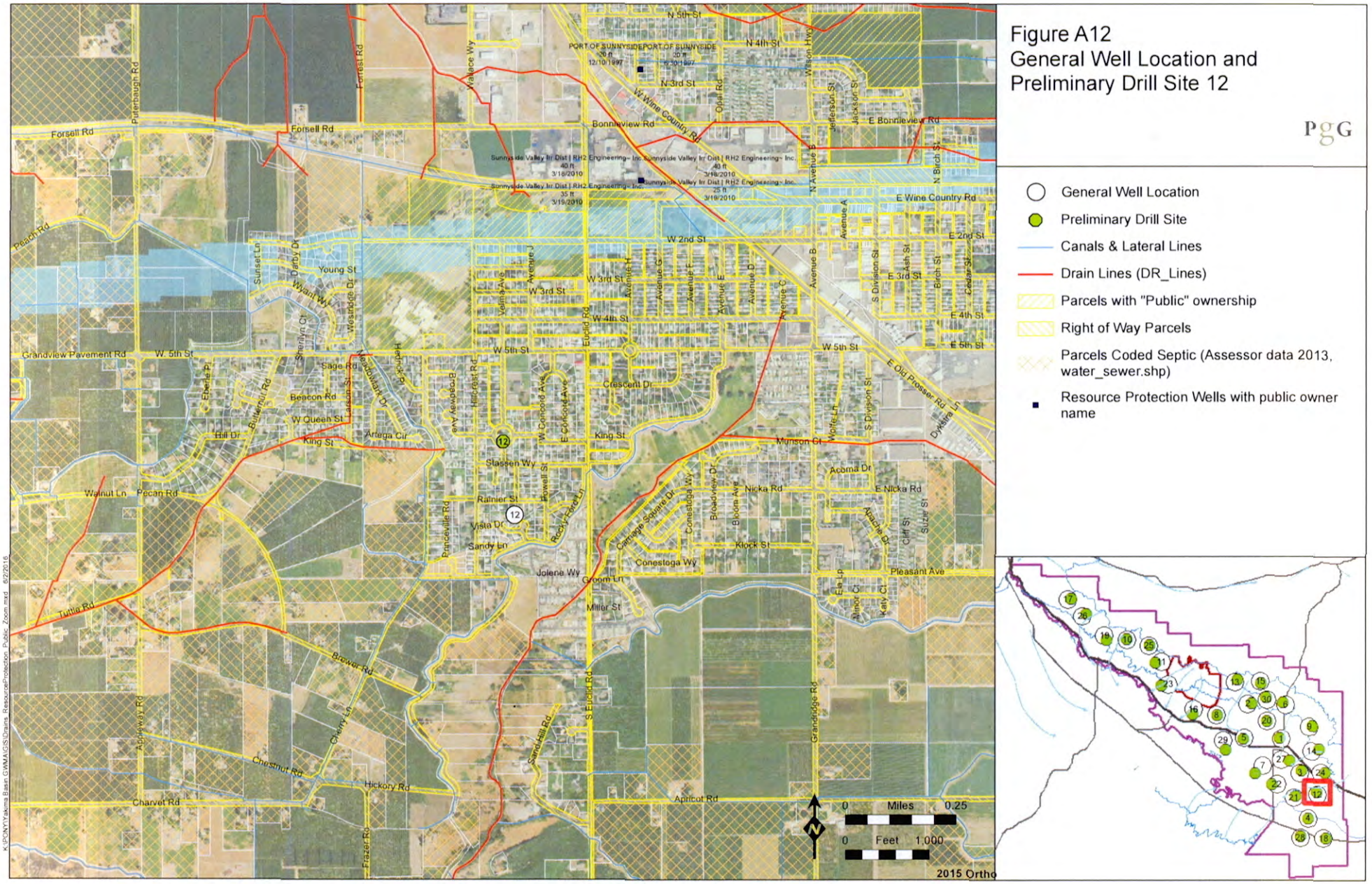
Figure A12
General Well Location and
Preliminary Drill Site 12
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with public owner name
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains ResourceProtection Public Zoom.mxd 6/2/2016

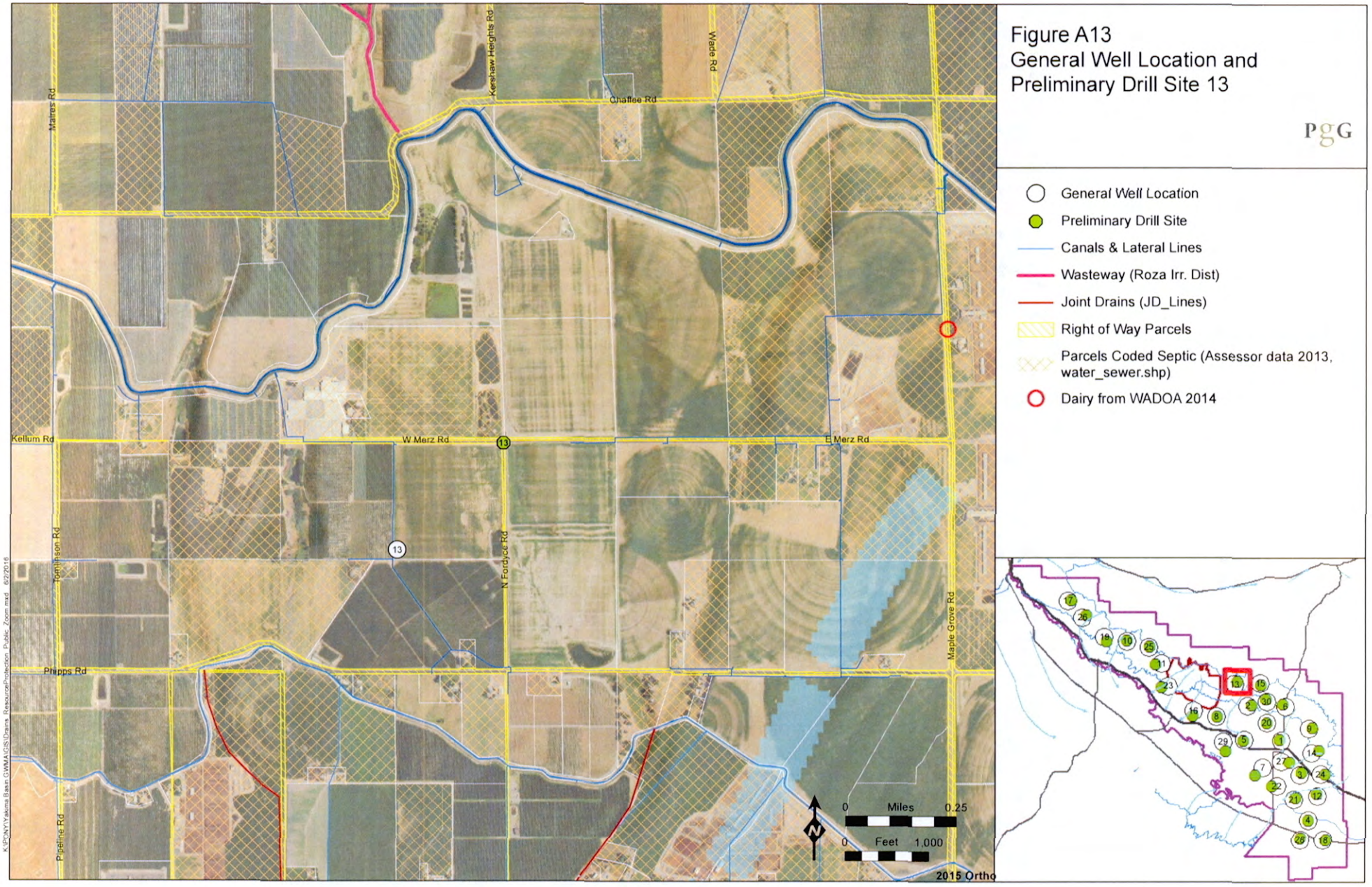
Figure A13
General Well Location and
Preliminary Drill Site 13
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Joint Drains (JD_Lines)
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Kellum Rd
W Merz Rd
E Merz Rd
Chaffee Rd
Kershaw Heights Rd
Wade Rd
Mairas Rd
Tomlinson Rd
N Fordyce Rd
Maple Grove Rd
Phipps Rd
Pipeline Rd
13
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PCNY\Yakima Basin GWMA\GIS\Drains ResourceProtection Public Zoom.mxd 6/2/2016

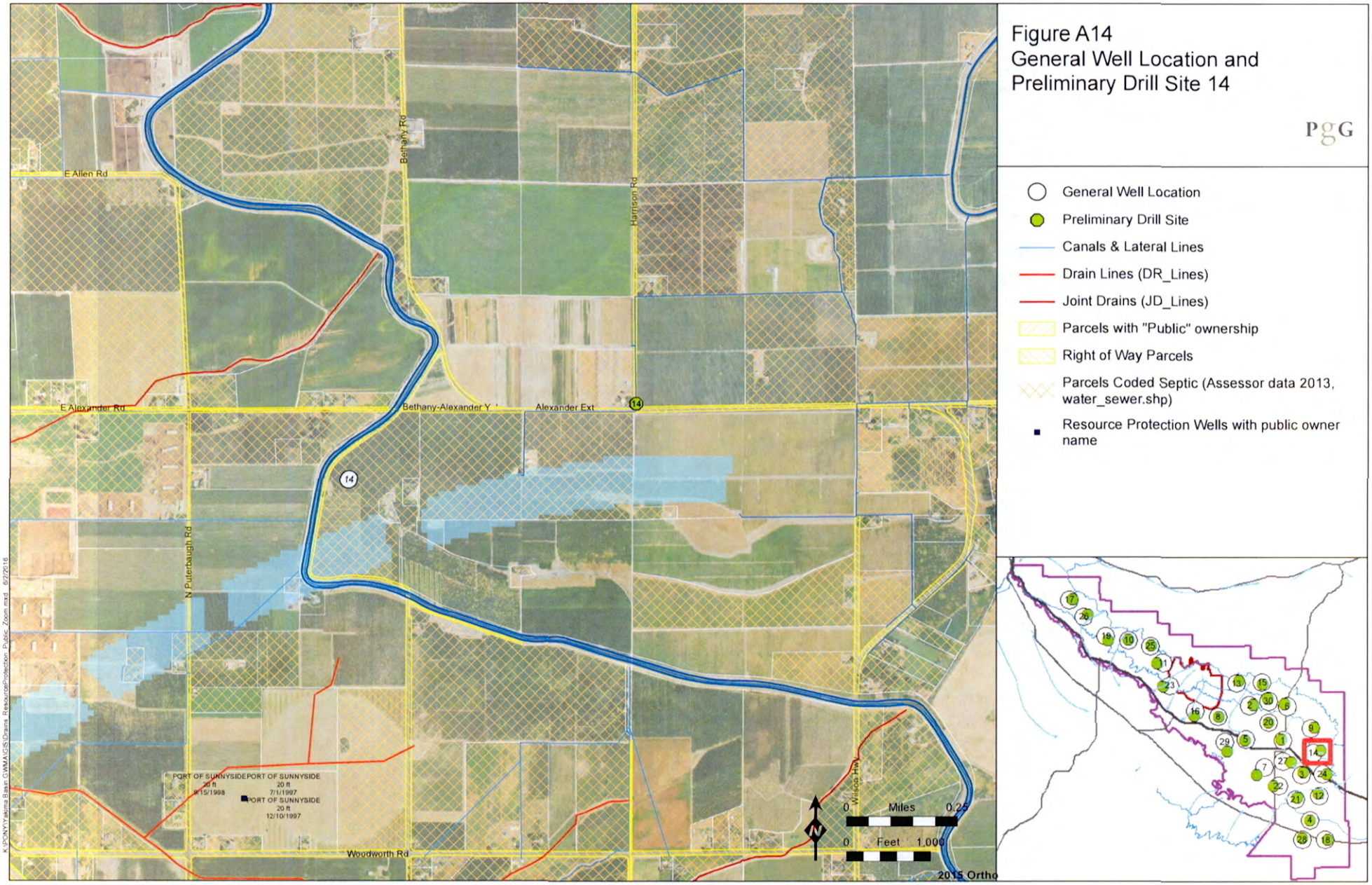

Figure A14
General Well Location and Preliminary Drill Site 14

PgG

- General Well Location
- Preliminary Drill Site
- Canals & Lateral Lines
- Drain Lines (DR_Lines)
- Joint Drains (JD_Lines)
- Parcels with "Public" ownership
- Right of Way Parcels
- Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
- Resource Protection Wells with public owner name

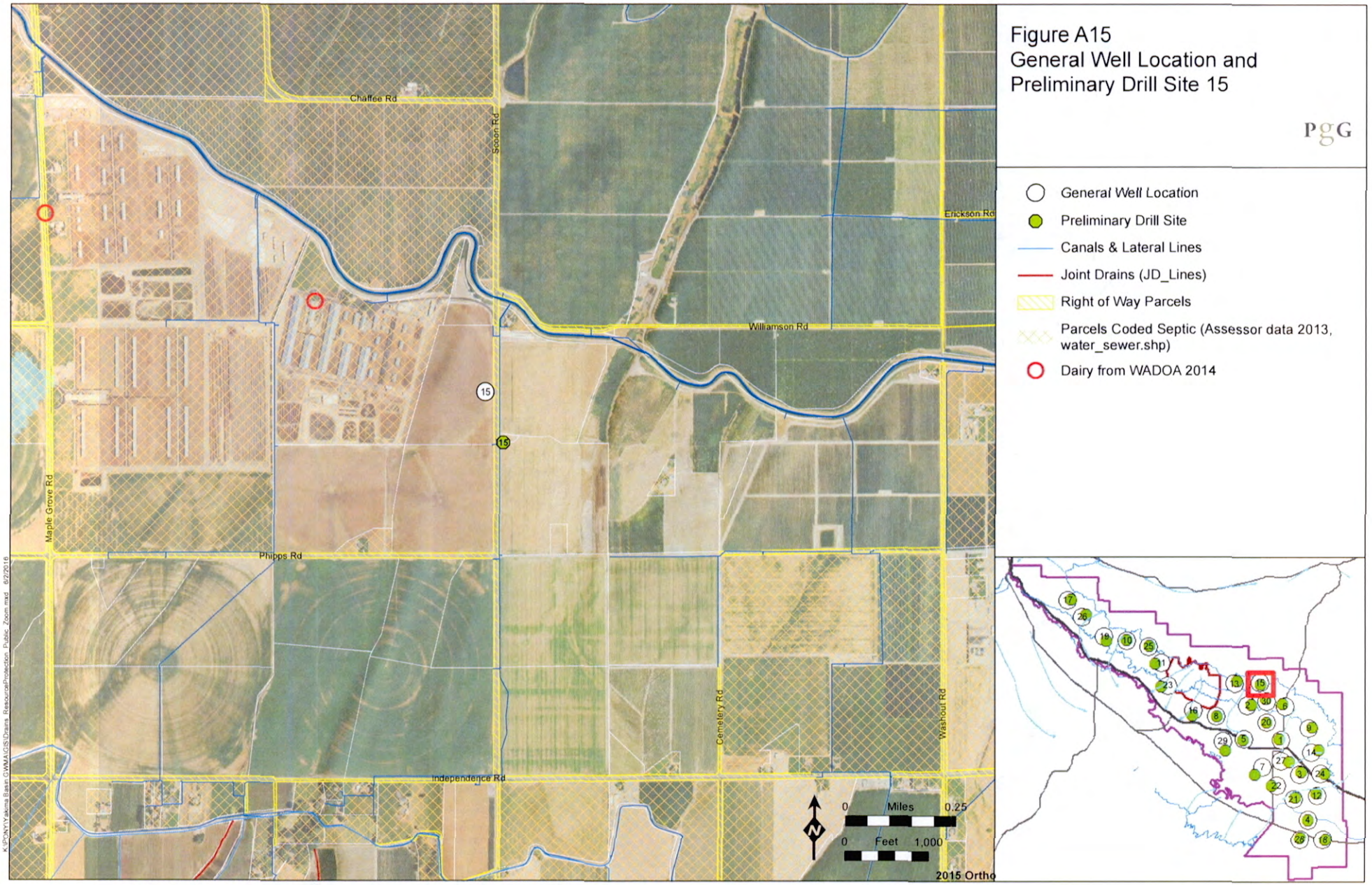
Figure A15
General Well Location and
Preliminary Drill Site 15
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Joint Drains (JD_Lines)
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Chaffee Rd
Scoon Rd
Erickson Rd
Williamson Rd
Maple Grove Rd
Phipps Rd
Cemetery Rd
Washout Rd
Independence Rd
15
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains ResourceProtection Public Zoom.mxd 6/2/2016

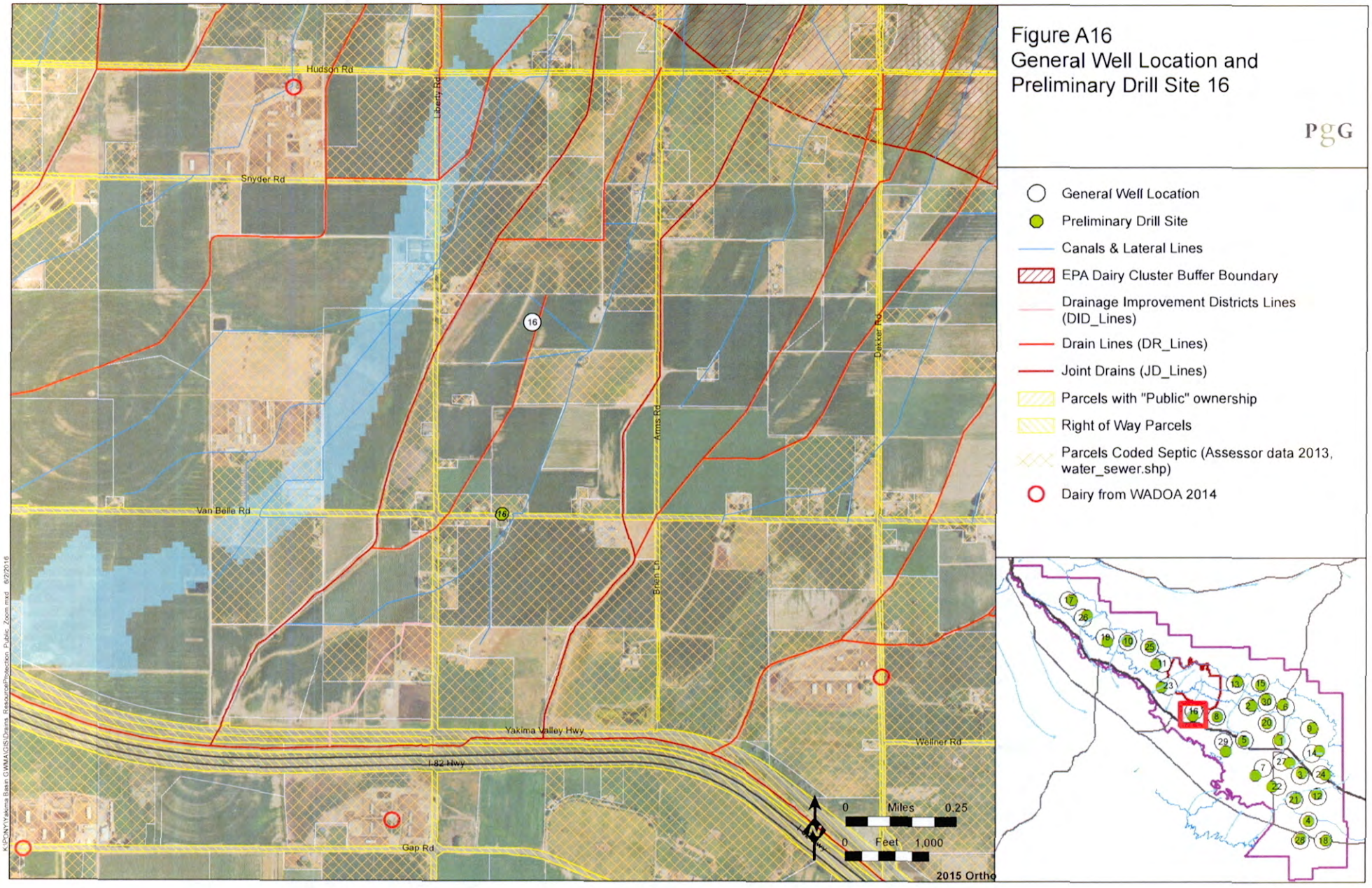
Figure A16
General Well Location and
Preliminary Drill Site 16
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
EPA Dairy Cluster Buffer Boundary
Drainage Improvement Districts Lines (DID_Lines)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Hudson Rd
Snyder Rd
Liberty Rd
Dekker Rd
Arms Rd
Bden Ln
Van Belle Rd
Yakima Valley Hwy
I-82 Hwy
Wellner Rd
Gap Rd
16
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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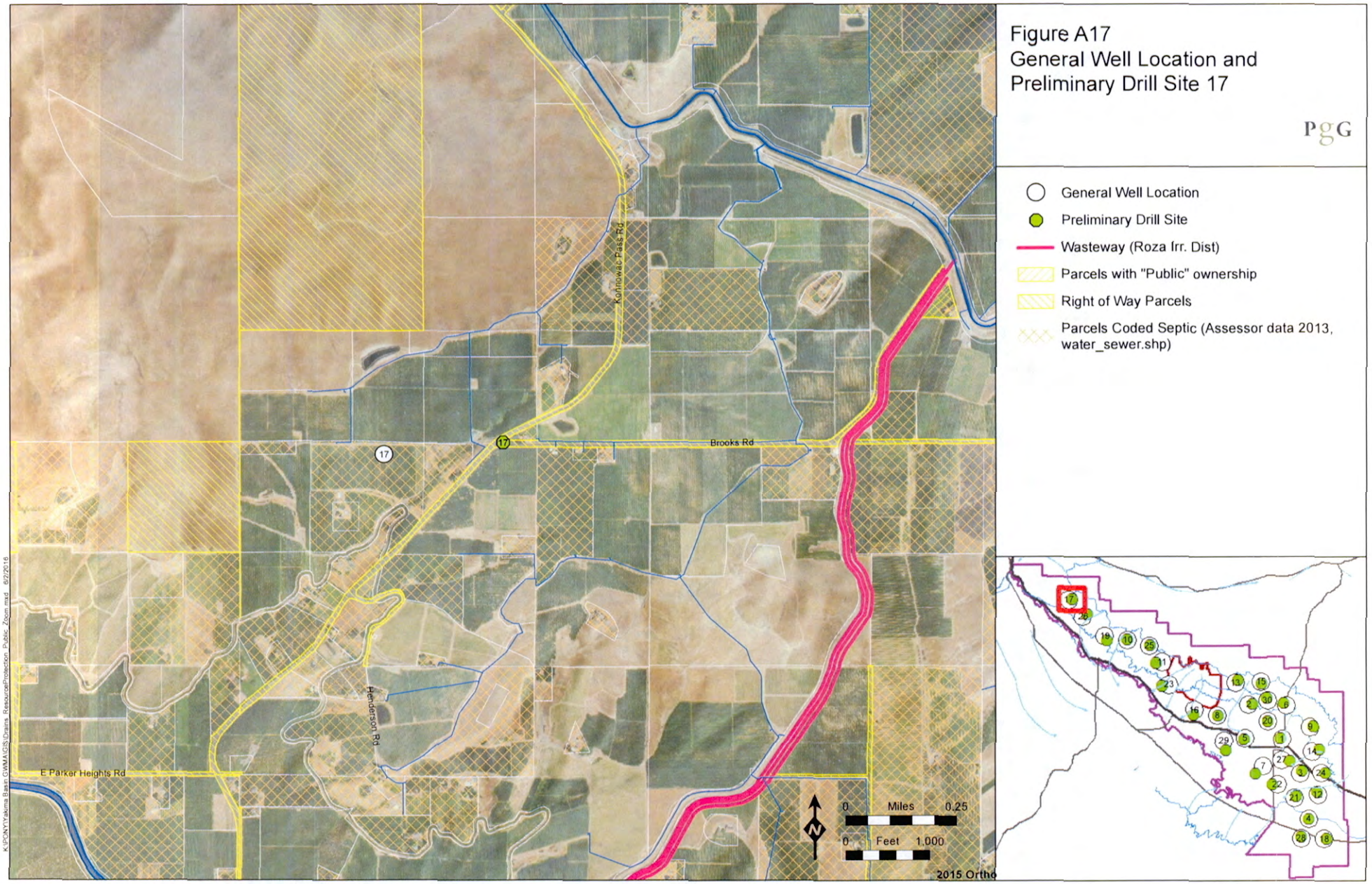
Figure A17
General Well Location and
Preliminary Drill Site 17
PgG
General Well Location
Preliminary Drill Site
Wasteway (Roza Irr. Dist)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Kohnowac Pass Rd
Brooks Rd
Henderson Rd
E Parker Heights Rd
17
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 8/2/2016

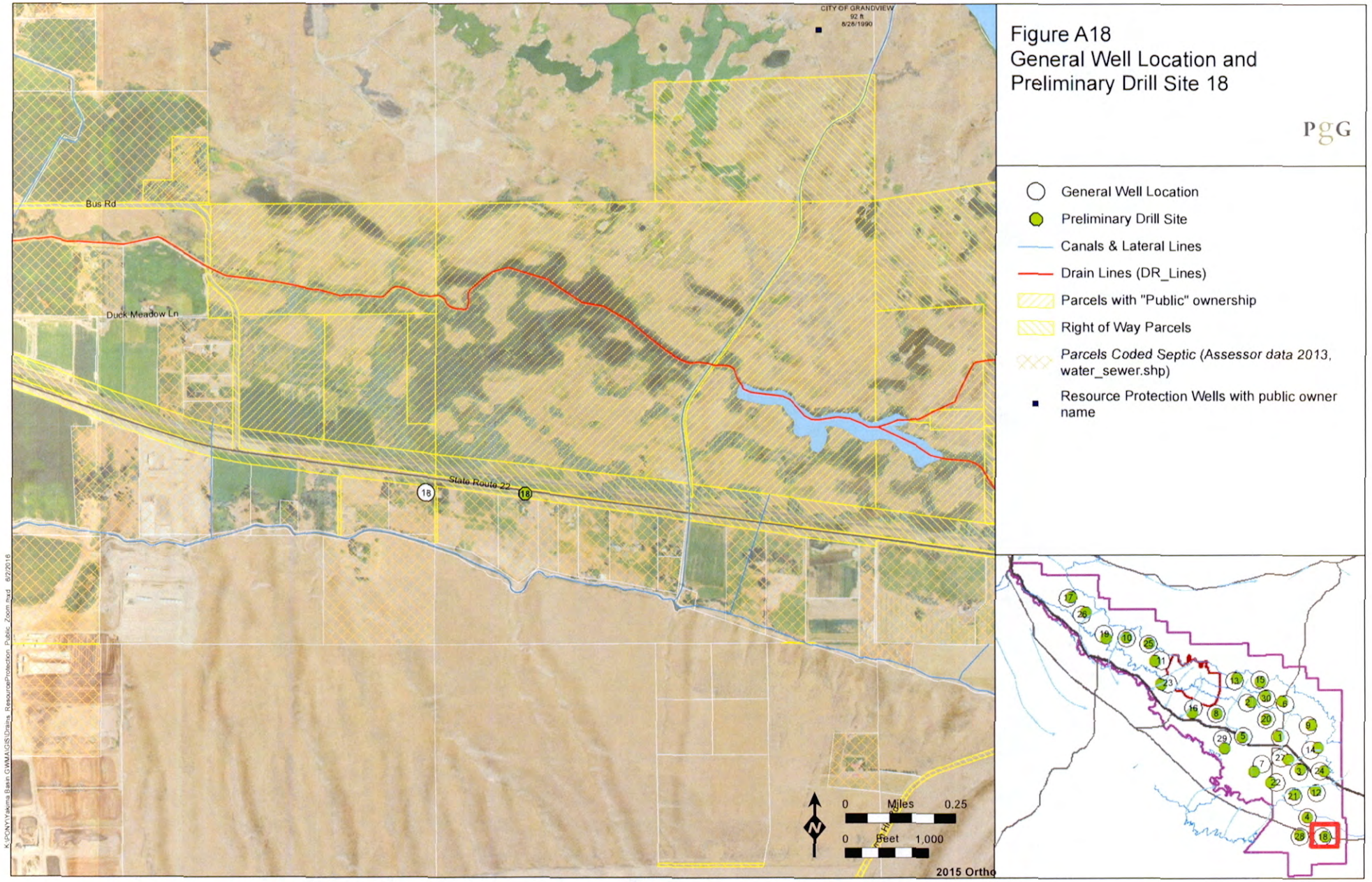

Figure A18
General Well Location and
Preliminary Drill Site 18

PgG

- General Well Location
- Preliminary Drill Site
- Canals & Lateral Lines
- Drain Lines (DR_Lines)
- Parcels with "Public" ownership
- Right of Way Parcels
- *Parcels Coded Septic (Assessor data 2013, water_sewer.shp)*
- Resource Protection Wells with public owner name

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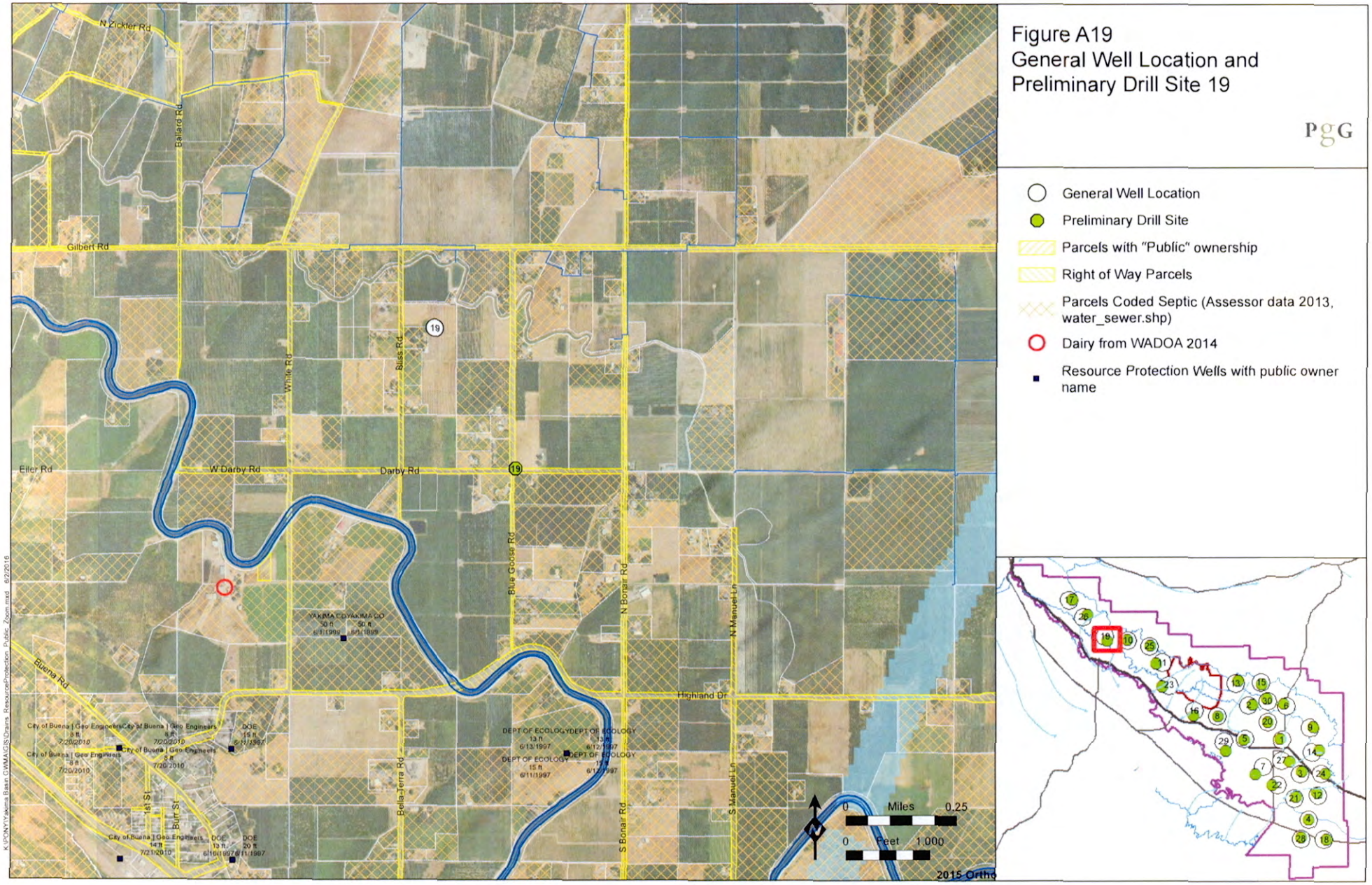

Figure A19
General Well Location and
Preliminary Drill Site 19

PgG

- General Well Location
- Preliminary Drill Site
- Parcels with "Public" ownership
- Right of Way Parcels
- Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
- Dairy from WADOA 2014
- Resource Protection Wells with public owner name

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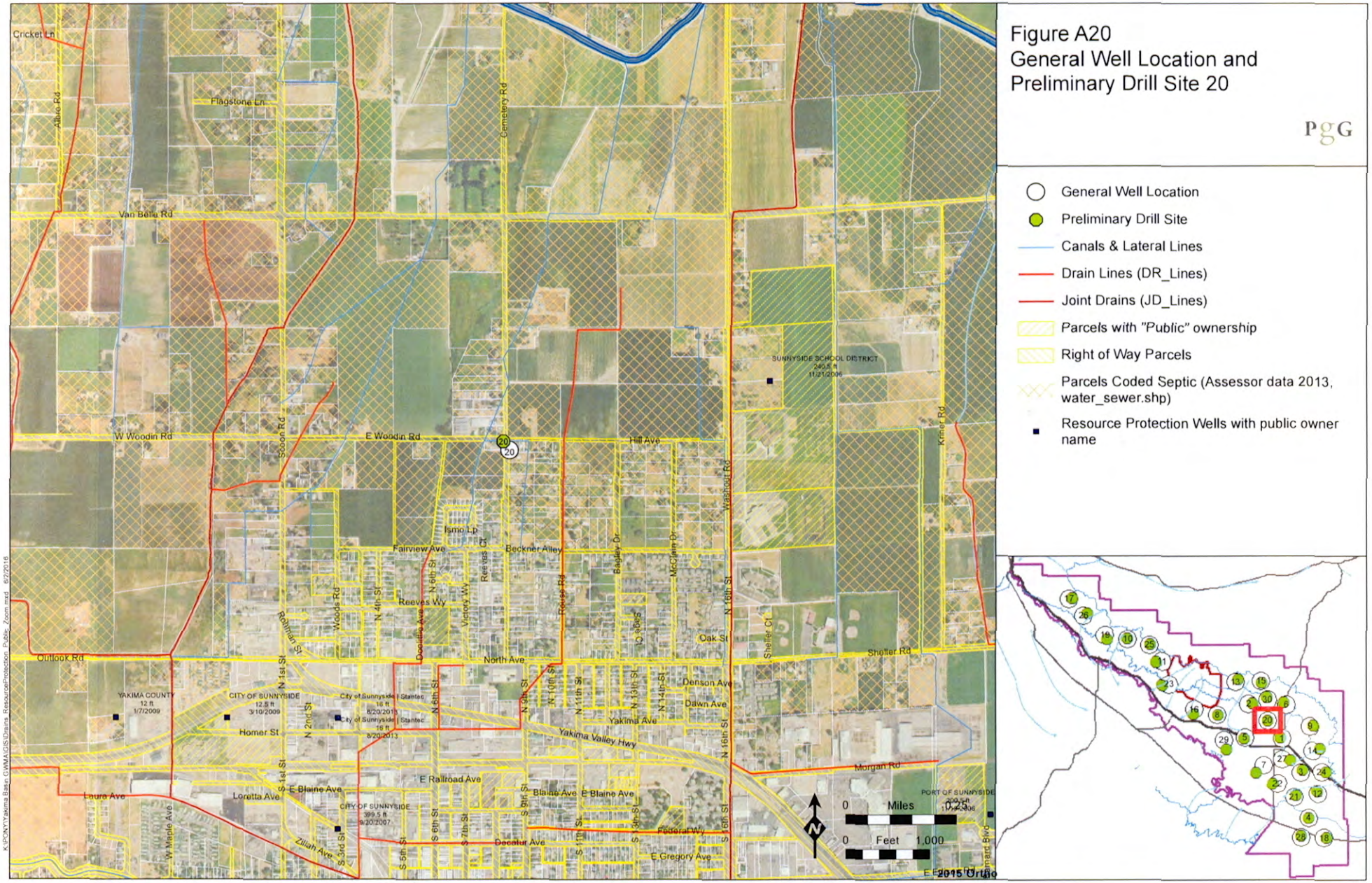
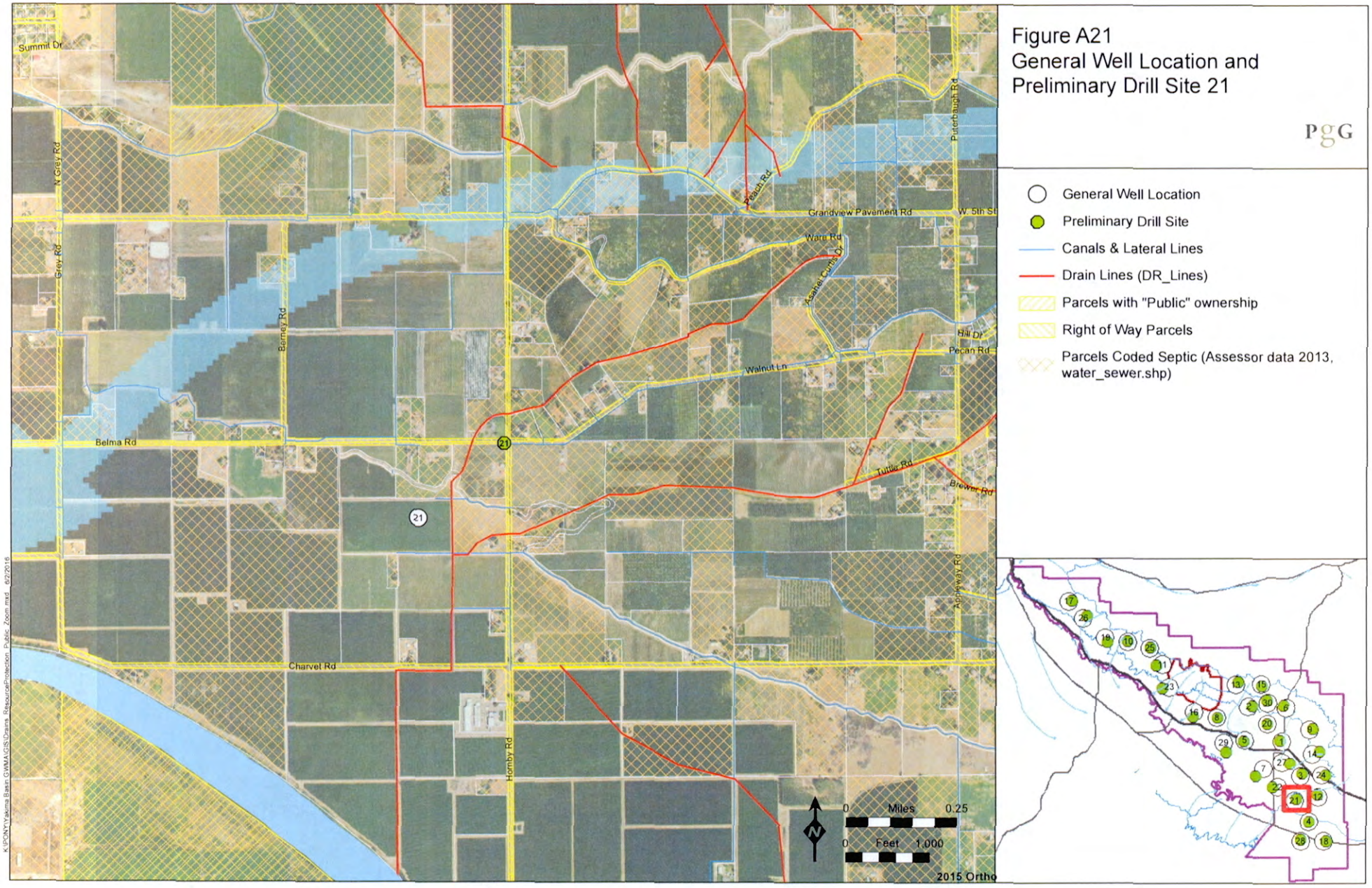


Figure A20
General Well Location and
Preliminary Drill Site 20
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with public owner name
Cricket Ln
Flagstone Ln
Van Belle Rd
W Woodin Rd
E Woodin Rd
Outlook Rd
Homer St
E Blaine Ave
Laura Ave
Loretta Ave
Ziliah Ave
E Railroad Ave
North Ave
Fairview Ave
Reeves Wy
Ismo Ln
Beckner Alley
Hill Ave
Oak St
Shelter Rd
Denson Ave
Dawn Ave
Yakima Ave
Yakima Valley Hwy
Morgan Rd
Decatur Ave
E Gregory Ave
Federal Wy
Albre Rd
Cemetery Rd
Scoon Rd
Woods Rd
Rahman St
Victory Wy
Reese Ct
Rader Rd
Bagley Dr
McClain Dr
Washout Rd
Kinnie Rd
Shelter Ct
N 1st St
N 2nd St
N 4th St
N 6th St
N 8th St
N 9th St
N 10th St
N 11th St
N 13th St
N 14th St
N 16th St
S 1st St
S 3rd St
S 5th St
S 6th St
S 7th St
S 9th St
S 11th St
S 13th St
S 16th St
W Maple Ave
Desoto Ave
SUNNYSIDE SCHOOL DISTRICT
240.5 ft
11/21/2006
YAKIMA COUNTY
12 ft
1/7/2009
CITY OF SUNNYSIDE
12.5 ft
3/10/2009
City of Sunnyside | Stantec
16 ft
8/20/2013
City of Sunnyside | Stantec
15 ft
8/20/2013
CITY OF SUNNYSIDE
399.5 ft
9/20/2007
PORT OF SUNNYSIDE
0.025 ft
10/4/2006
0 Miles
0 Feet 1,000
N
2015 Ortho
K:\PONY\Yakima Baltic GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016


Summit Dr
N Grey Rd
Grey Rd
Berney Rd
Belma Rd
Charvet Rd
Hornby Rd
Peach Rd
Grandview Pavement Rd
W. 5th St
Ware Rd
Asahel Curtis Dr
Hill Dr
Pecan Rd
Walnut Ln
Tuttle Rd
Brewer Rd
Alpowa Rd
Peterbaugh Rd
21
0 Miles 0.25
0 Feet 1,000
2015 Ortho
N
Figure A21
General Well Location and
Preliminary Drill Site 21
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
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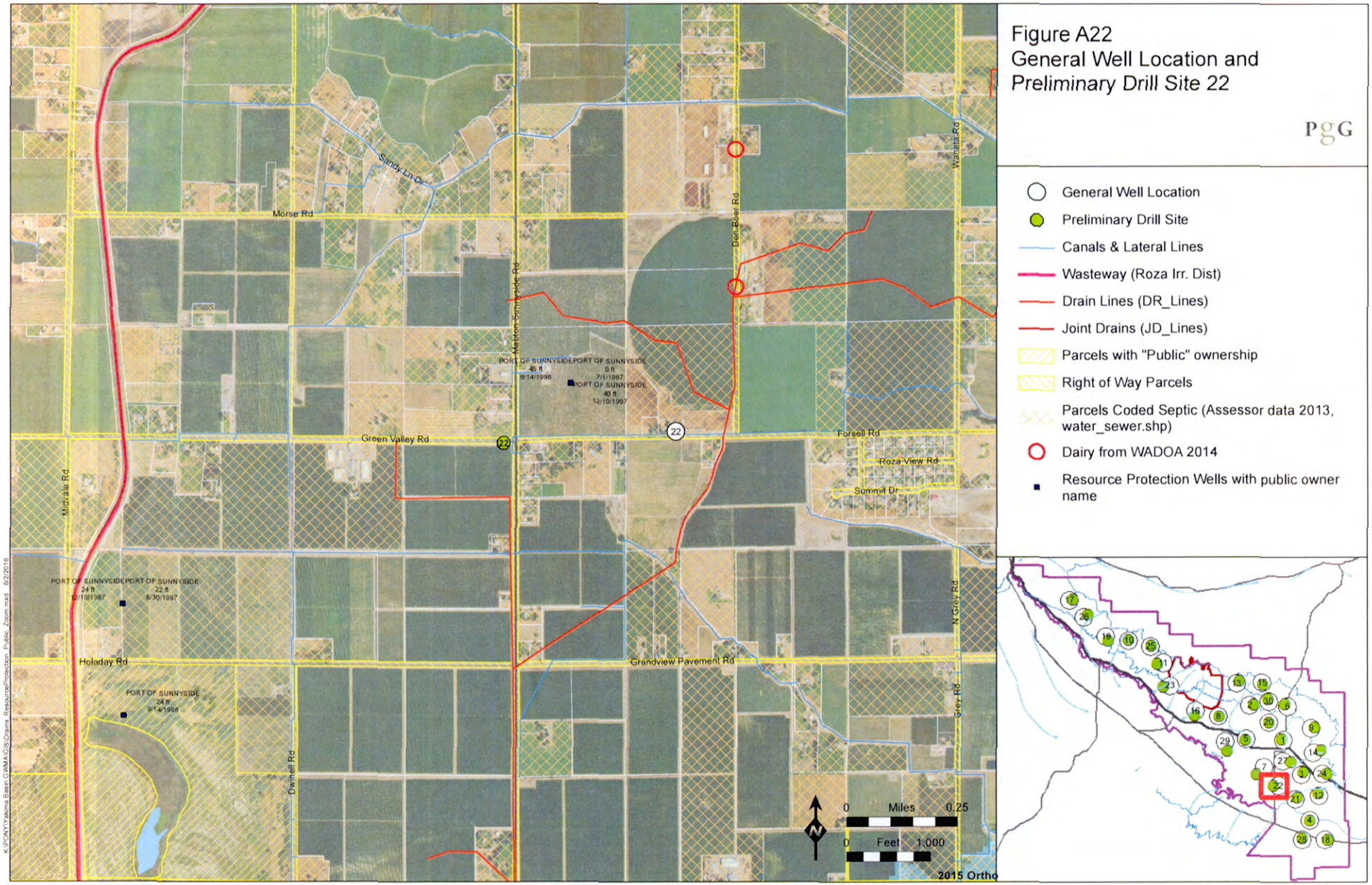


Figure A22
General Well Location and
Preliminary Drill Site 22
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Sandy Ln Dr
Morse Rd
Mabton-Sunnyside Rd
Den Boer Rd
Wanela Rd
Green Valley Rd
Forsell Rd
Roza View Rd
Summit Dr
Midvale Rd
Holaday Rd
Grandview Pavement Rd
N Grey Rd
Grey Rd
Dwinell Rd
PORT OF SUNNYSIDE 45 ft 9/14/1998
PORT OF SUNNYSIDE 0 ft 7/1/1997
PORT OF SUNNYSIDE 40 ft 12/10/1997
PORT OF SUNNYSIDE 24 ft 12/10/1997
PORT OF SUNNYSIDE 22 ft 6/30/1997
PORT OF SUNNYSIDE 24 ft 9/14/1998
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PCNY\Yakima Basin GWMA\GIS\Drains ResourceProtection Public Zoom.mxd 8/2/2016

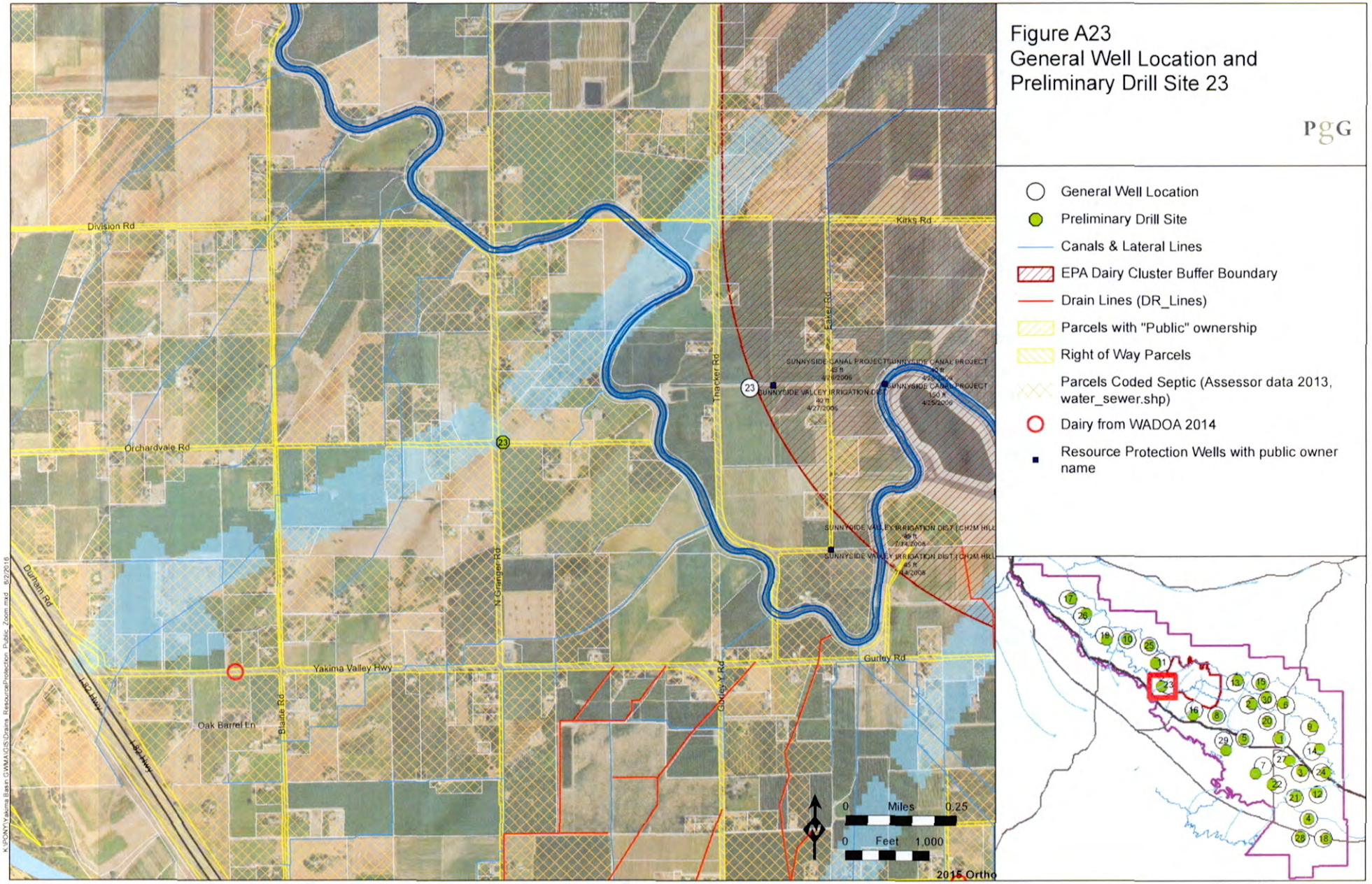


Figure A23
General Well Location and
Preliminary Drill Site 23
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
EPA Dairy Cluster Buffer Boundary
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Division Rd
Orchardvale Rd
Yakima Valley Hwy
Oak Barrel Ln
Durham Rd
I-82 Hwy
Blade Rd
N Granger Rd
Thacker Rd
Baker Rd
Kirks Rd
Gurley Rd
Gurley Rd
SUNNYSIDE CANAL PROJECT
SUNNYSIDE VALLEY IRRIGATION DIST
SUNNYSIDE VALLEY IRRIGATION DIST | CH2M HILL
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 5/2/2016

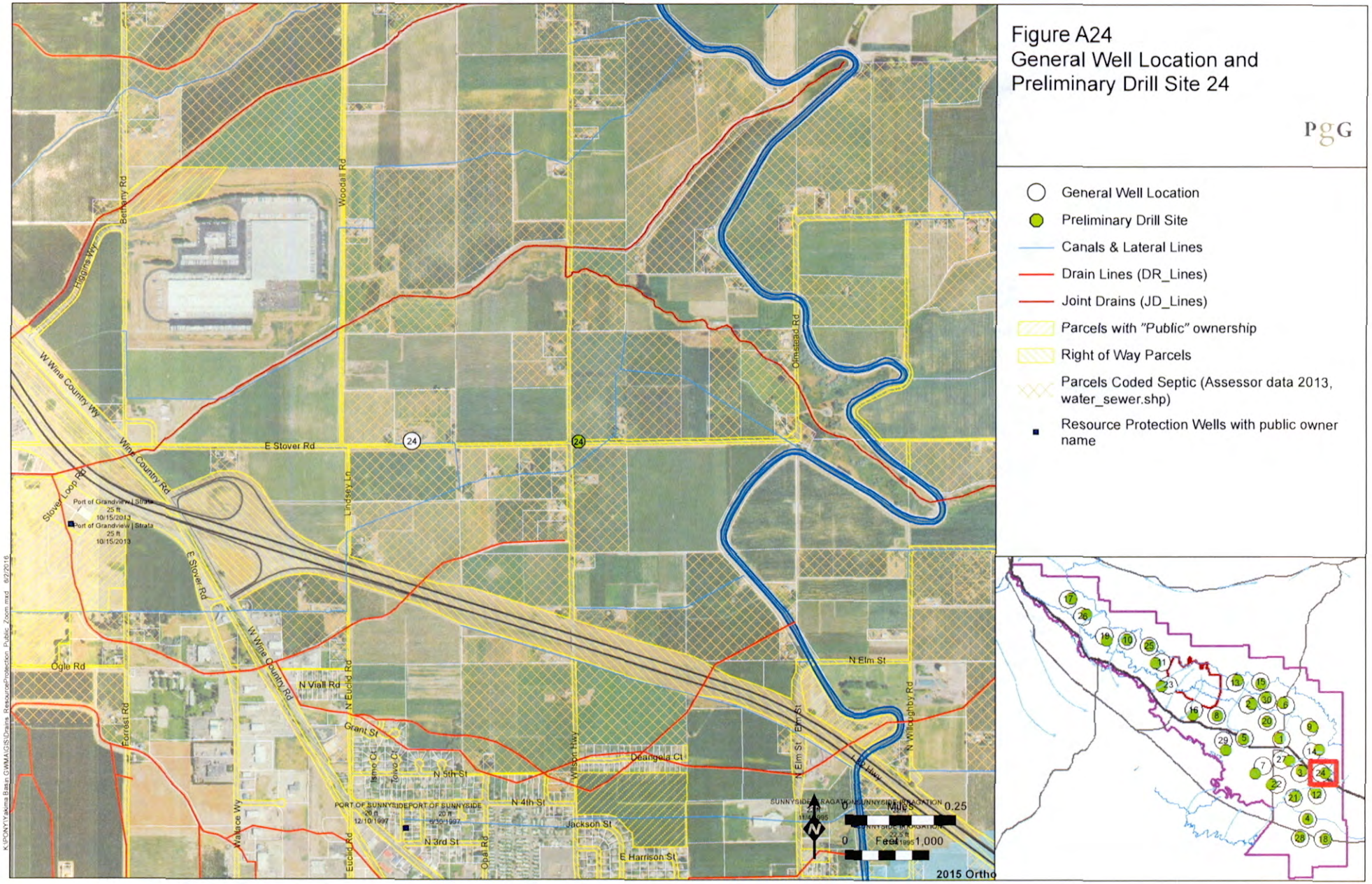


Figure A24
General Well Location and
Preliminary Drill Site 24
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with public owner name
E Stover Rd
N Viall Rd
Ogle Rd
N Elm St
N 5th St
N 4th St
N 3rd St
Jackson St
E Harrison St
Bethany Rd
Woodall Rd
Olmstead Rd
Lindsey Ln
N Euclid Rd
Wilson Hwy
N Willoughby Rd
Deangela Ct
Grant St
Forrest Rd
Euclid Rd
Opal Rd
Wallace Wy
Higgins Wy
W Wine Country Wy
Wine Country Rd
Stover Loop Rd
W Wine Country Rd
Port of Grandview | Strata
25 ft
10/15/2013
Port of Grandview | Strata
25 ft
10/15/2013
PORT OF SUNNYSIDE
20 ft
12/10/1997
PORT OF SUNNYSIDE
20 ft
9/30/1997
SUNNYSIDE IRRIGATION
22.5 ft
11/4/1995
SUNNYSIDE IRRIGATION
22.5 ft
11/4/1995
0
0.25
Miles
0
1,000
Feet
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains ResourceProtection Public Zoom.mxd 8/2/2016

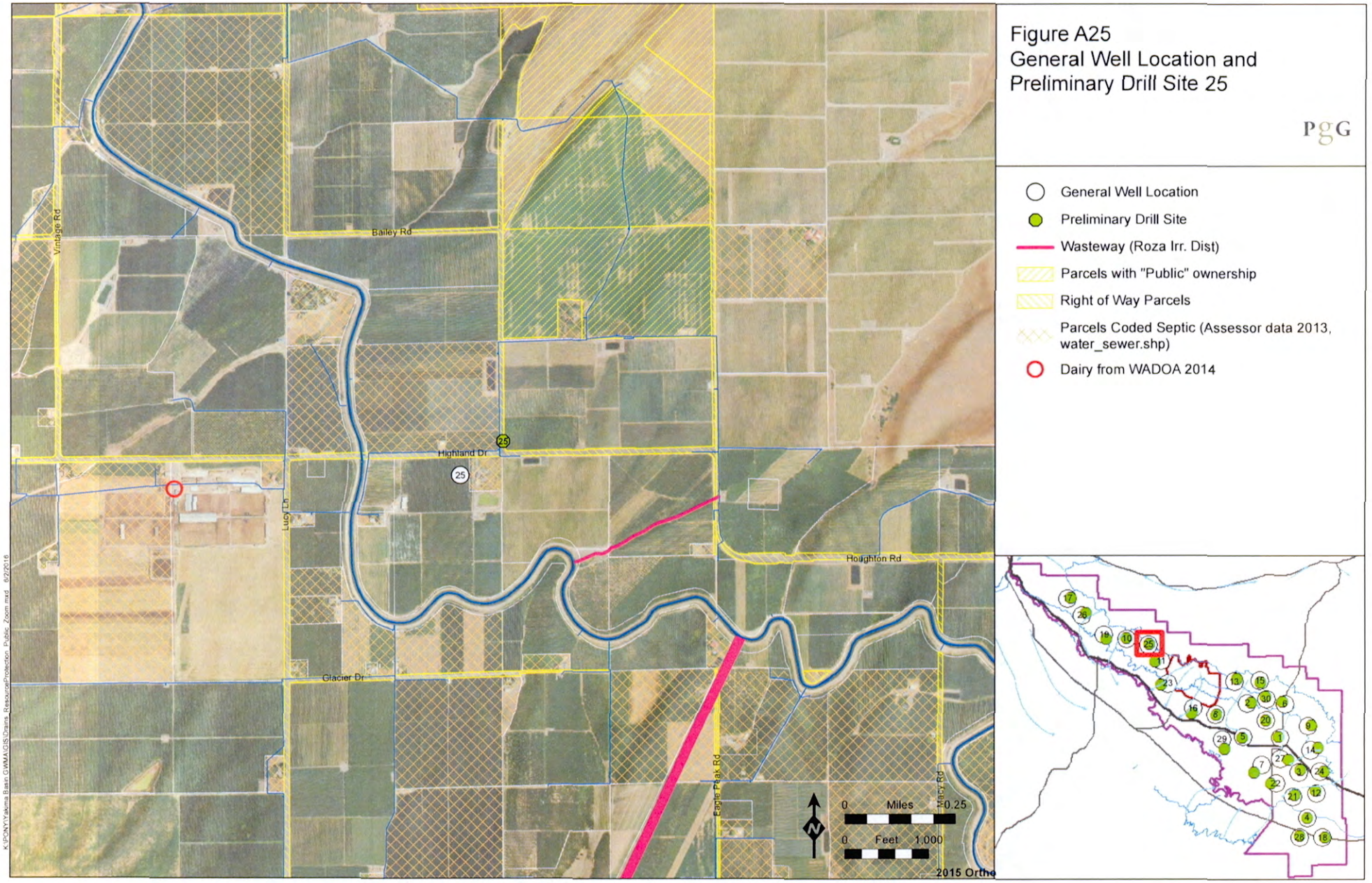


Figure A25
General Well Location and
Preliminary Drill Site 25
PgG
General Well Location
Preliminary Drill Site
Wasteway (Roza Irr. Dist)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Vintage Rd
Bailey Rd
Highland Dr
Lucy Ln
Houghton Rd
Glacier Dr
Eagle Peak Rd
May Rd
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains ResourceProtection_Public_Zoom.mxd 6/2/2016

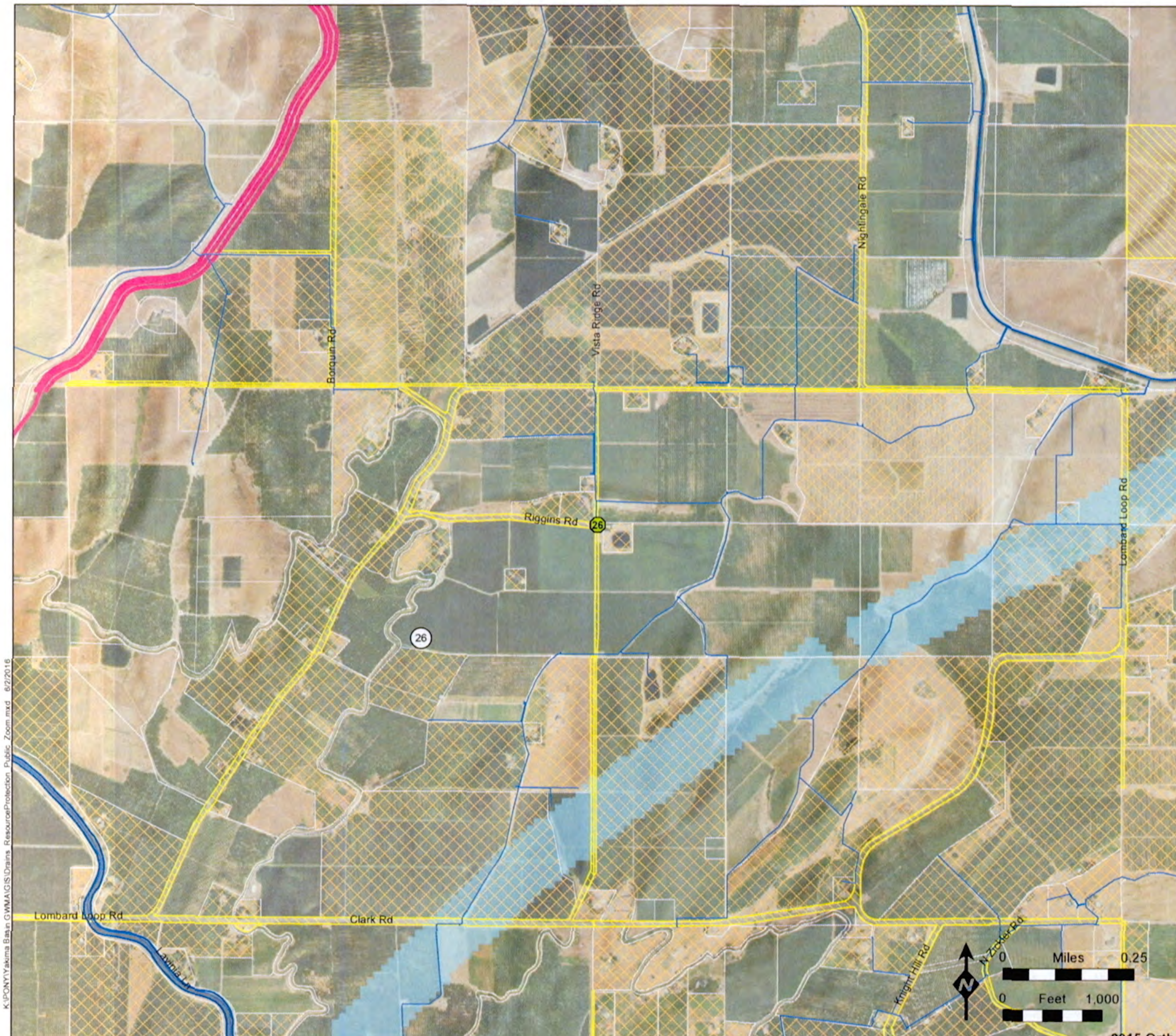
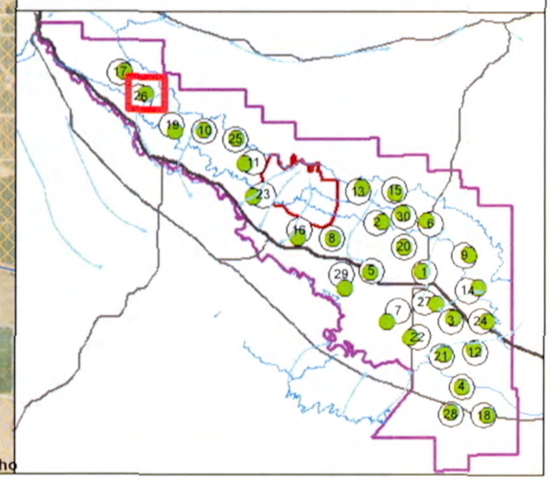


Figure A26
General Well Location and Preliminary Drill Site 26

PgG

- General Well Location
- Preliminary Drill Site
- Wasteway (Roza Irr. Dist)
- Parcels with "Public" ownership
- Right of Way Parcels
- Parcels Coded Septic (Assessor data 2013, water_sewer.shp)



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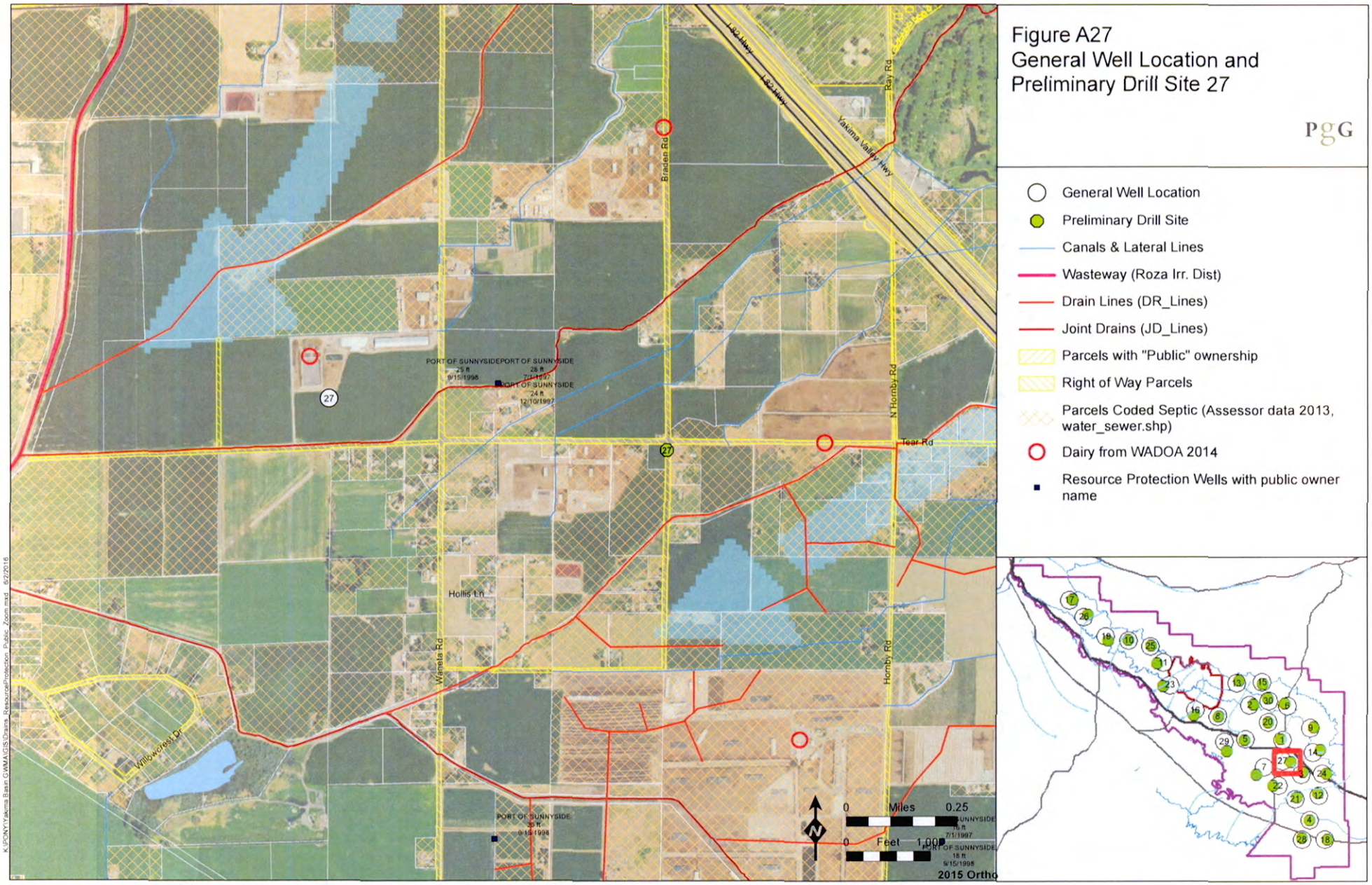
Figure A27
General Well Location and
Preliminary Drill Site 27
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Braden Rd
Ray Rd
N Hornby Rd
Hornby Rd
Tear Rd
Hollis Ln
Wanela Rd
Willowcrest Dr
Yakima Valley Hwy
182 Hwy
27
PORT OF SUNNYSIDE
25 ft
9/15/1998
PORT OF SUNNYSIDE
28 ft
7/1/1997
PORT OF SUNNYSIDE
24 ft
12/10/1997
PORT OF SUNNYSIDE
18 ft
9/15/1998
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains ResourceProtection_Public_Zoom.mxd 6/2/2016

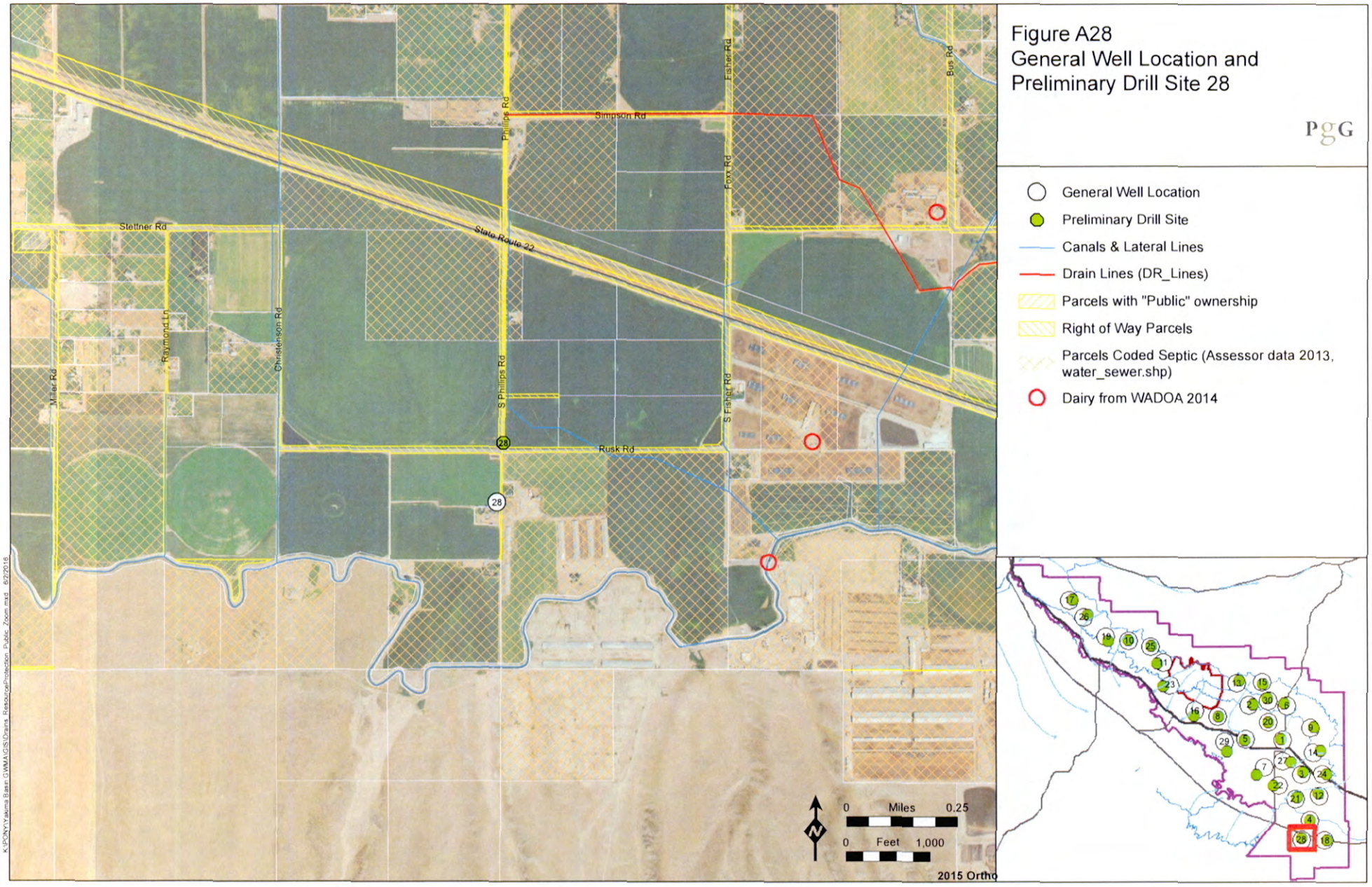
Figure A28
General Well Location and
Preliminary Drill Site 28
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Simpson Rd
Fisher Rd
Bus Rd
Phillips Rd
Foxx Rd
Stettner Rd
State Route 22
Miller Rd
Raymond Ln
Christenson Rd
S Phillips Rd
S Fisher Rd
Rusk Rd
28
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains ResourceProtection Public Zoom.mxd 6/2/2016

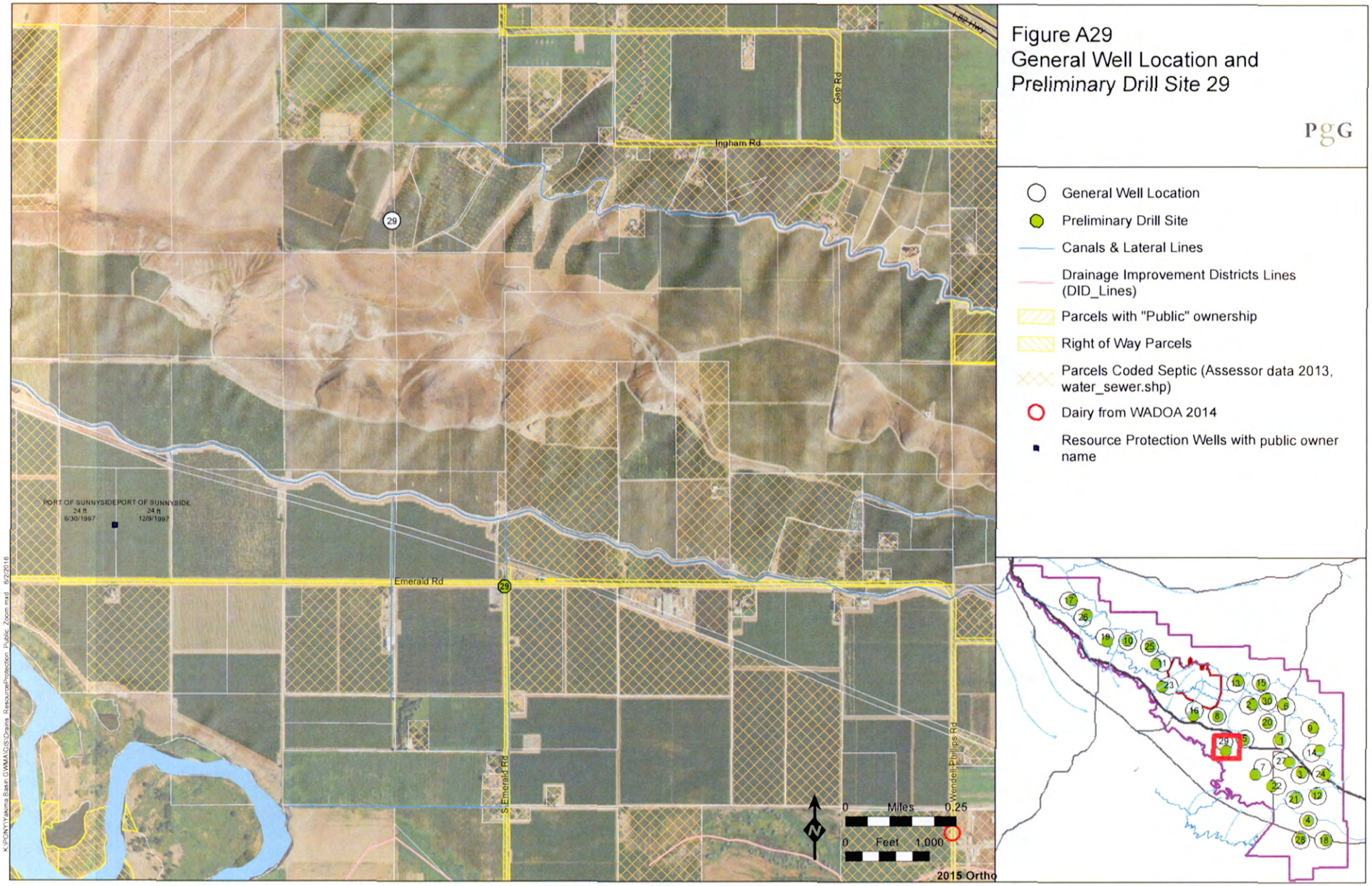
Figure A29
General Well Location and
Preliminary Drill Site 29
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drainage Improvement Districts Lines (DID_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Ingham Rd
Gap Rd
Emerald Rd
S Emerald Rd
Wendel Phillips Rd
PORT OF SUNNYSIDE 24 ft 6/30/1997
PORT OF SUNNYSIDE 24 ft 12/9/1997
29
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains ResourceProtection_Public_Zoom.mxd 6/2/2016

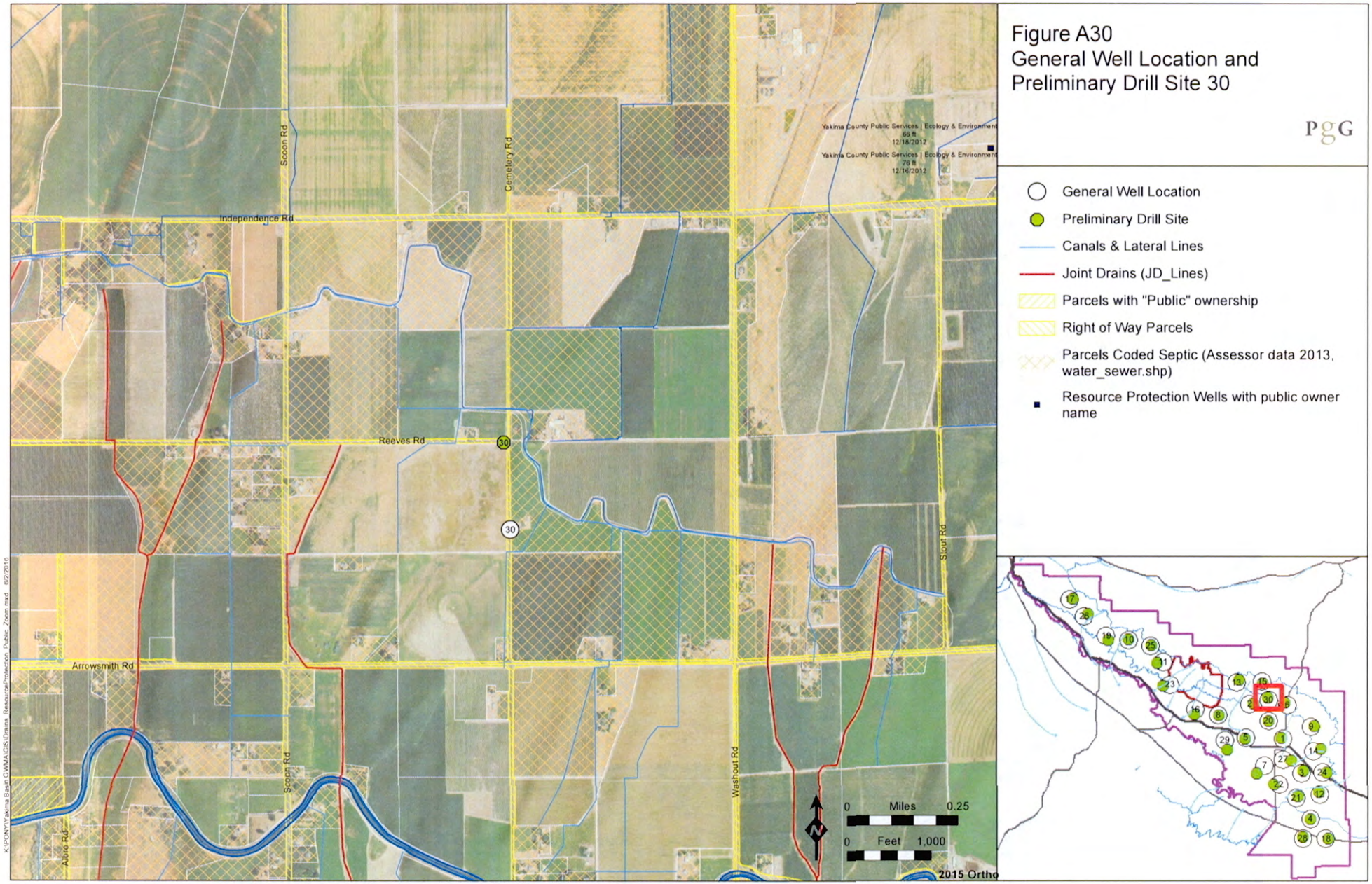
Figure A30
General Well Location and
Preliminary Drill Site 30
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with public owner name
Yakima County Public Services | Ecology & Environment
66 ft
12/18/2012
Yakima County Public Services | Ecology & Environment
76 ft
12/16/2012
Independence Rd
Scoon Rd
Cemetery Rd
Reeves Rd
30
Stout Rd
Arrowsmith Rd
Washout Rd
Abbs Rd
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

Recommendation on Future Groundwater Monitoring Initiatives from the Data Workgroup

Previously the GWAC approved an Ambient Groundwater Monitoring Network. PGG developed a final draft of this plan which will help assess the goal of the GWMA *"to reduce nitrate contamination concentrations in groundwater below state drinking water standards"*.

To augment this network, the Data Workgroup explored other monitoring initiatives that can help meet this goal by providing different types of information. These monitoring initiatives are described in PGG's document "*Potential Groundwater Monitoring Stations, Yakima Groundwater Management Area*" (12/3/2013).

Our top two recommendations are described below:

1. Common Water Supply Aquifers – This initiative would focus on sampling existing private domestic wells. These wells are not typically sampled by the Health Department, but they provide drinking water to residents in rural areas. These wells are usually screened in the uppermost aquifer that produces a reliable water supply. The data workgroup felt this was the highest priority since this assesses the health of the water supply for residents. The costs would be significantly lower than the ambient monitoring network since the targeted wells already exist.
2. Hot Spot Identification – PGG identified 71 hot spots where the maximum nitrate concentrations were in excess of 20 mg N/L. The goal of this initiative is to continue monitoring the wells where there nitrate has already been identified to be the biggest concern.

Attachment C

2016_1020 GWAC Budget Discussion

GWMA LTD-2016 12-15-16 Group Decisions_Exhibit A

GWAC Budget Discussion 10-20-2016

Work Description	Approved	Spent	Balance	New Budget	Increase / Decrease
Groundwater Monitoring Plan - Planning, Analysis, and Implementation	$ 604,000	$ 247,844	$ 356,156		
Abandoned Wells and Septic System Maintenance Outreach	$ 76,000	$ -	$ 76,000		
Educational Outreach Campaigns, Surveys	$ 105,000	$ 33,185	$ 71,815		
Irrigation Water Management Workshops	$ 7,000	$ -	$ 7,000		
Wellhead Risk Assessment Surveys	$ 154,000	$ 141,222	$ 12,778		
Yakima County: Administration, Plan Writing, Plan Coordination, etc.; Datatbase Maintenance; GIS; Website;	$ 410,000	$ 364,638	$ 45,362	$ 493,000	$ 83,000
Deep Soil Sampling	$ 443,000	$ 288,692	$ 154,308		
Nutrient Loading: Database, Analysis, Reporting (WSDA)	$ 45,000	$ 45,000	$ -		
Dairy Pens and Manure Storage Sampling	$ 60,000	$ -	$ 60,000		
Lagoon Assessment Based on EPA Data	$ 10,000	$ -	$ 10,000		
Regulatory Review	$ 39,000	$ 10,876	$ 28,124		
Best Management Practices	$ 79,000	$ 76,500	$ 2,500		
Contingency / Reserve	$ 332,000	$ -	$ 332,000		
Column Totals	$ 2,364,000	$ 1,207,957	$ 1,156,043	$ 493,000	
Current Funding Limit	$ 2,364,000				

GWAC Budget Discussion 12-15-2016

Work Description	Original Budget			New Budget		
	Original Allocation	Current Expenditures	Unspent Balance	Current Expenditures	New Authorization	Revised Budget
Ambient Groundwater Monitoring Plan - Planning, Analysis, and Implementation	$ 604,000	$ 247,844	$ 356,156	$ 247,844	$ 331,000	$ 578,844
Drain Monitoring	$ -	$ -	$ -	$ -	$ 60,000	$ 60,000
Drinking Water Monitoring	$ -	$ -	$ -	$ -	$ 350,000	$ 350,000
Monitoring analysis					$ 76,681	$ 76,681
Hotspot Monitoring	$ -	$ -	$ -	$ -	$ -	$ -
Abandoned Wells				$ -	$ -	$ -
Septic System Maintenance Outreach	$ 76,000	$ -	$ 76,000	$ -	$ 10,000	$ 10,000
Educational Outreach Campaigns, Surveys	$ 105,000	$ 33,185	$ 71,815	$ 33,185	$ 100,000	$ 133,185
Irrigation Water Management Workshops; SSS and Education	$ 7,000	$ -	$ 7,000	$ -	$ 100,000	$ 100,000
Wellhead Risk Assessment Surveys	$ 154,000	$ 141,222	$ 12,778	$ 141,222	$ -	$ 141,222
Yakima County: Administration, Plan Writing, Plan Coordination, etc.; Datatbase Maintenance; GIS; Website; Facilitation; RCIM Loading	$ 410,000	$ 364,638	$ 45,362	$ 364,638	$ 128,362	$ 493,000
Deep Soil Sampling	$ 443,000	$ 288,692	$ 154,308	$ 288,692	$ -	$ 288,692
Nutrient Loading: Database, Analysis, Reporting (WSDA)	$ 45,000	$ 45,000	$ -	$ 45,000	$ -	$ 45,000
Dairy Pens and Manure Storage Sampling	$ 60,000	$ -	$ 60,000	$ -	$ -	$ -
Lagoon Assessment Based on EPA Data	$ 10,000	$ -	$ 10,000	$ -	$ -	$ -
Regulatory Review	$ 39,000	$ 10,876	$ 28,124	$ 10,876	$ -	$ 10,876
Best Management Practices	$ 79,000	$ 76,500	$ 2,500	$ 76,500	$ -	$ 76,500
Contingency / Reserve	$ 332,000	$ -	$ 332,000	$ -	$ -	$ -
Column Totals	$ 2,364,000	$ 1,207,957	$ 1,156,043	$ 1,207,957	$ 1,156,043	$ 2,364,000
					Current Funding Limit	$ 2,364,000
					Balance (should equal zero)	

$ -

Attachment D

AMN Final Draft Comments from Data Working Group_2016_0706

July 6th, 2016

To: Pony Ellingson, PGG
Glenn Mutti-Driscoll, PGG

From: Melanie Redding, Ecology, Lower Yakima Valley GWMA Data Workgroup Chair

Thank you for all your hard work on the Ambient Groundwater Monitoring Network for the Lower Yakima Valley GWMA. I appreciate your patience with presenting this information, answering questions and addressing concerns. Overall I feel like this is an excellent plan for establishing an ambient groundwater monitoring network that the GWAC can build on and expand in the future as resources and interest is identified.

The following are the consolidated comments from the Lower Yakima Valley GWMA data workgroup members:

1. Section 2.0: Need a reference for the random monitoring site selection methodology.
2. Section 2.3: I like establishing a setback distance from irrigation canals and drains. This decision is supported by the Columbia Basin GWMA (2008) which found that unlined irrigation canals provide a dilution effect on groundwater constituents within 0.5 miles. ((using a quarter mile setback))

   Columbia Basin Groundwater Management Area, 2008. Analysis of Nitrate Concentrations and Trends in the Suprabasalt Sediment Aquifers, Pasco and Quincy Basins, Washington, 2006-2007. S.S. Papadopulos & Associates, Inc. 277 pgs.

3. Section 3.0: Will the wells be screened across the water table to account for seasonal fluctuations? (Will drill in low water season in spring max variation is 10 feet should result in 20' of water) I know that this will depend on the time of year that wells are installed. If they are installed during the winter-spring season as planned, then the water table should be captured during well installation. If wells are not installed during this time, this should be factored into the placement of the well screen.
4. Figures 1 and 2: I appreciate how you have differentiated land use on the different figures.
5. Section 5.0: I like the idea of monitoring both monitoring wells and drains, and I agree that the data should be evaluated separately.
6. Section 6.0: Is it possible to recommend a ballpark percentage or value that the GWAC should set aside to cover these unspecified expenses. (they provided a more detailed cost breakdown) And what is your estimate on the cost difference for passive samplers vs. people? I think your advice (even if it's not included in this report) would benefit the group as decisions are made and requests for additional funding is submitted. (pumps plus sampling time versus passive bags at $65 per bag) (At about 40 sampling events the costs are about the same).
7. Section 7.0: well network, 3rd box down, change deepest to highest.
8. Thank you for moving preliminary well site #7 inside the boundaries for the 1990 Agricultural Chemicals Pilot Study (because of the port spray field) and preliminary well site # 29 to the northwest corner of that study.

9. I disagree with the assumption that this plan "establish(s) reasonable well density". The plan does not sample the entire aquifer. In fact it does not describe the aquifer(s). The boundaries of the GWMA do not define the aquifer. The only measure of equidistance is two dimensional – a flat plane. Sampling is not proportional to groundwater volume, land volume above the river level, distance from the river, density of known nitrogen sources, land use categories or historic nitrate concentrations. Proposed sampling does not consider variations in rate of groundwater flow or variations in depth of the vadose zone. (probably true by doesn't invalidate the process that we are using) we're not drilling to aquifers we're drilling to ground water)
10. The plan states, "The network designed using those guidelines will be appropriate for ~~calculating basin-wide average conditions at the water table, and for~~ tracking concentration changes at the water table over time." (technically this statement is correct) I disagree and would like to have this statement removed. In order to calculate average conditions over time the first step is to define the aquifer(s) and the second is to prove that there are a sufficient number of representative samples. This plan does not meet these criteria.
11. The plan states, "This work was performed, and this report prepared, in accordance with hydrogeologic practices generally accepted at this time in this area." Can you produce other studies that used this methodology and have demonstrated reliability and validity? (this is ok)
12. Sampling of drains is a great addition to the program. It shows that people are willing to look at the problems from several angles. Can we add two more sampling sites, one east of site 11 and one northwest from site 11? This is the only drainage district in the area. The topography is rather unique. (not necessary for ambient monitoring)
13. Can you provide cost per foot estimates for well drilling using the two referenced methods? (they are available)
14. Proposed monitoring well #18 would likely be drilled into the Saddle Mountain Unit of the Columbia River Basalt Group. This is at the edge of the GWMA and separate from the main part of the study. Is it important to drill one well in a corner of the study that is not hydro geologically connected to the main body? (Need to review and then make a statement in the plan).
15. By eliminating proposed monitoring well # 25 we could likely save $10,000. (will look at)

Attachment E

Contract with Lamar Advertising in the amount of $4000 executed on October 4, 2016.

Contract with Paul's Properties LLC in the amount of $1800 executed on October 4, 2016.

Spokane
1015 E. Cataldo
Spokane, WA 99202
Phone: 509-489-4684
Fax: 509-489-3484

LAMAR

CONTRACT # 2667687

Date: 9/19/2016
New/Renewal: NEW
Account Executive: Thomas Knaub
Phone: 509-489-4684

CONTRACTED DIRECTLY BY ADVERTISER	
Customer #	566999-2
Name	YAKIMA COUNTY PUBLIC SERVICES
Address	YAKIMA COUNTY COURT HOUSE
City/State/Zip	YAKIMA, WA 98901
Contact	Lisa Freund
Email Address	lisa.freund@co.yakima.wa.us
Phone #	(509) 574-2300
Fax #	(509) 574-2301
P.O./ Reference #	
Advertiser/Product	TEST YOUR WELLS
Campaign	

Production/Other Services

Department	Plant	Production Type	Misc	Service Dates	# Billing Periods	Invest Per Period	Cost
Vinyl	239 Spokane, WA	One 10' x 20' billboard vinyl		12/12/16	1	$400.00	$400.00

Total Production/Other Services Costs: $400.00

Space

# of Panels: 1 — Billing Cycle: Every 4 weeks

Panel # / TAB ID	Market	Location	Illum	Media Type	Size	Misc	Service Dates	# Billing Periods	Invest Per Period	Cost
90901 30493765	239-SUNNYSIDE, WA	YAKIMA VALLEY HWY N/L 210' E/O 11TH	No	Junior Bulletin	10' 0" x 20' 0"		12/12/16-05/28/17	6	$600.00	$3,600.00

Total Space Costs: $3,600.00

Total Costs: $4,000.00

Special Considerations:

Advertiser authorizes and instructs The Lamar Companies (Lamar) to display in good and workmanlike manner, and to maintain for the terms set forth above, outdoor advertising displays described above or on the attached list. In consideration thereof, Advertiser agrees to pay Lamar all contracted amounts within thirty (30) days after the date of billing. Advertiser acknowledges and agrees to be bound by the terms and conditions on all pages of this contract.

The Agency representing this Advertiser in the contract executes this contract as an agent for a disclosed principal, but hereby expressly agrees to be liable jointly and severally and in solido with Advertiser for the full and faithful performance of Advertiser's obligations hereunder. Agency waives notice of default and consents to all extensions of payment.

The undersigned representative or agent of Advertiser hereby warrants to Lamar that he/she is the Media Buyer (Officer/Title) of the Advertiser and is authorized to execute this contract on behalf of the Advertiser.

BOARD OF YAKIMA COUNTY COMMISSIONERS

Michael D. Leita, Chairman

Kevin J. Bouchey, Commissioner

J. Rand Elliott, Commissioner

Attest:

Tiera J. Girard, Clerk of the Board / Deputy Kay O'Hara
Deputy Clerk of the Board

Approved as to form:

Deputy Prosecuting Attorney

THE LAMAR COMPANIES

This contract is NOT BINDING UNTIL ACCEPTED by a Lamar General Manager.

ACCOUNT EXECUTIVE: Thomas Knaub | GENERAL MANAGER | DATE

INITIALS [redacted]

BOCC297-2016
October 4, 2016

Spokane
1016 E. Cataldo
Spokane, WA 99202
Phone: 509-489-4684
Fax: 509-489-3484

LAMAR

CONTRACT # 2667687

Date: 9/19/2016
New/Renewal: NEW
Account Executive: Thomas Knaub
Phone: 509-489-4684

STANDARD CONDITIONS

1. Late Artwork: The Advertiser must provide or approve art work, materials and installation instructions ten (10) days prior to the initial Service Date. In the case of default in furnishing or approval of art work by Advertiser, billing will occur on the initial Service Date.

2. Copyright/Trademark: Advertiser warrants that all approved designs do not infringe upon any trademark or copyright, state or federal. Advertiser agrees to defend, indemnify and hold Lamar free and harmless from any and all loss, liability, claims and demands, including attorney's fees arising out of the character contents or subject matter of any copy displayed or produced pursuant to this contract.

3. Payment Terms: Lamar will, from time to time at intervals following commencement of service, bill Advertiser at the address on the face hereof. Advertiser will pay Lamar within thirty (30) days after the date of invoice. If Advertiser fails to pay any invoice when it is due, in addition to amounts payable thereunder, Advertiser will promptly reimburse collection costs, including reasonable attorney's fees plus a monthly service charge at the rate of 1.5% of the outstanding balance of the invoice to the extent permitted by applicable law. Delinquent payment will be considered a breach of this contract. Payments will be applied as designated by the Advertiser; non designated payments will be applied to the oldest invoices outstanding.

4. Service Interruptions: If Lamar is prevented from posting or maintaining any of the spaces by causes beyond its control of whatever nature, including but *not limited to acts of God, strikes, work stoppages or picketing, or in the event of damage or destruction of any of the spaces, or in the event Lamar is unable* to deliver any portion of the service required in this contract, including buses in repair, or maintenance, this contract shall not terminate. Credit shall be allowed to Advertiser at the standard rates of Lamar for such space or service for the period that such space or service shall not be furnished or shall be discontinued or suspended. In the case of illumination, should there be more than a 50% loss of illumination, a 20% pro-rata credit based on four week billing will be given. If this contract requires illumination, it will be provided from dusk until 11:00p.m. Lamar may discharge this credit, at its option, by furnishing advertising service on substitute space, to be reasonably approved by Advertiser, or by extending the term of the advertising service on the same space for a period beyond the expiration date. The substituted or extended service shall be of a value equal to the amount of such credit.

5. Entire Agreement: This contract, all pages, constitutes the entire agreement between Lamar and Advertiser. Lamar shall not be bound by any stipulations, conditions, or agreements not set forth in this contract. Waiver by Lamar of any breach of any provision shall not constitute a waiver of any other breach of that provision or any other provision.

6. Copy Acceptance: Lamar reserves the right to determine if copy and design are in good taste and within the moral standards of the individual communities in which it is to be displayed. Lamar reserves the right to reject or remove any copy either before or after installation, including immediate termination of this contract.

7. Termination: All contracts are non-cancellable by Advertiser without the written consent of Lamar. Breach of any provisions contained in this contract may result in cancellation of this contract by Lamar.

8. Materials/Storage: Production materials will be held at customer's written request. Storage fees may apply.

9. Installation Lead Time: A leeway of five (5) working days from the initial Service Date is required to complete the installation of all non-digital displays.

10. Customer Provided Production: The Advertiser is responsible for producing and shipping copy production. Advertiser is responsible for all space costs involved in the event production does not reach Lamar by the established Service Dates. These materials must be produced in compliance with Lamar production specifications and must come with a 60 day warranty against fading and tearing.

11. Bulletin Enhancements: Cutouts/extensions, where allowed, are limited in size to 5 feet above, and 2 feet to the sides and 1 foot below normal display area. The basic fabrication charge is for a maximum 12 months.

12. Assignment: Advertiser shall not sublet, resell, transfer, donate or assign any advertising space without the prior written consent of Lamar.

INITIALS [redacted]

Billboard Advertising Agreement

This agreement between **Paul's Properties LLC**, Thomas R. Paul mananger (hereafter called Landlord) 1441 S. 2nd St., Sunnyside, Wa. 98944 (509-840-1201) and

Yakima County Public Services, 128 N 2nd Street 4th Floor, Yakima, Wa. 98901 (509-574-2300), (hereafter called Renter).

Location of billboard to be rented:

1. The South side of a 20' X 8' billboard located at 1600 1st Street, Sunnyside, Wa.

The terms are as stated:

Renter to **provide** cover for the billboard to the Landlord (Renter will have maker of banner contact Landlord prior to it being made). Landlord to install billboard cover at beginning of term and remove at end of term.

Time frame: Rent shall be for a period of six months, January 1, 2017 through June 30, 2017. Rental period may be extended ny Renter after the rental period at a rate of $300.00 per month, with written notice given to Landlord prior to end of rental term.

Total Cost: [redacted] *($300.00 per month [$1,800.00 total for six months]* with monies due at time of signing).

Signature: Thomas R Paul 9/1/2016

Printed Name: THOMAS R PAUL

Date:

BOARD OF YAKIMA COUNTY COMMISSIONERS

Michael D. Leita, Chairman

Kevin J. Bouchey, Commissioner

J. Rand Elliott, Commissioner

Attest:

Tiera L. Girard, Clerk of the Board

SEAL OF THE BOARD OF YAKIMA COUNTY COMMISSIONERS STATE OF WASHINGTON

Approved as to form: Linda Kay O'Hara
Deputy Clerk of the Board

Deputy Prosecuting Attorney