Public Services

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VERN M. REDIFER, P.E., Director

July 13, 2016

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

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

Dear David:

Enclosed please find one (1) copy of Yakima County's second-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

Lisa H. Freund, Administrative Manager
Yakima County Public Services

enclosure

IAA No. C 1200235 – Second Quarter 2016 Report
Lower Yakima Valley GWMA
June 30, 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 February 18 and April 21, 2016; the draft GWAC meeting summary of June 16, 2016; the Education and Public Outreach (EPO) Working Group summaries of April 25 and June 1, 2016; the Irrigated Ag Working Group (IAWG) summaries of April 19, May 17, and June 28, 2016; the Residential, Commercial, Industrial and Municipal (RCIM) Working Group summaries of May 9 and June 13, 2016; the Data Collection, Characterization and Monitoring Working Group summaries of April 13, May 11, and June 8, 2016; and the Regulatory Framework Working Group summaries of April 13, May 11, and June 8, 2016; and the the Livestock/CAFO Working Group summary of June 2, 2016. The Funding Working Group did not hold a meeting 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 meetings on April 21 and June 16.

Work Plans and Products

Deep Soil Sampling (DSS). The Deep Soil Sampling Program's objective was to gather four seasons (two falls, two springs) of data from volunteered locations on agricultural properties within the GWMA. The data would be gathered from measurements of nitrate concentrations in soil at levels up to six feet below ground surface. The data, primarily anecdotal in character due to the anonymity of location, have been of significant value to those agriculturalists whose soils have been sampled, likely affecting their nitrogen (fertilizer) application practices. The data have been initially characterized as to its variety and spread by Landau Associates, the contractor employed to collect the data, in its June 28 "Deep Soil Sampling Program Fall 2014: Spring 2015: Fall 2015: Spring 2016 Preliminary Data Analysis" document.

The Irrigated Agriculture Working Group (IAWG) is entertaining a proposal from an academician to analyze the data for potential publication. The raw data is in the hands of the Lower Yakima Valley Conservation District. The charted data is in the hands of Yakima County Public Services. The contract for data collection was performed on time, within budget.

Landau Associates "Deep Soil Sampling Program Fall 2014: Spring 2015: Fall 2015: Spring 2016 Preliminary Data Analysis" document dated June 28, 2016 is included as Attachment [B]

Nitrogen Loading Assessment. The Nitrogen Loading Assessment is a mass balance study being conducted by the Washington State Department of Agriculture (WSDA) and Yakima County Public Services. Its intention is to discover and characterize the relative contributions to nitrogen loading within the GWMA from individual components of each of three general source categories: livestock and concentrated animal feeding operations, irrigated agriculture, and residential, commercial, industrial and municipal. The initial work is near completion and at various stages of peer review.

Ambient Groundwater Monitoring Network. On June 8 Pacific Groundwater Group (PGG) issued the "Draft Lower Yakima Valley GWMA Proposed Ambient Groundwater Monitoring Network" report for working group review. The report includes methodology, preliminary drill sites, drain monitoring, estimated costs, and installation process and schedule. Cost estimates are $250,000 plus sampling personnel and hydrogeologist. Review of the report will take place within the Data group in the third quarter and presented to the GWAC at its August meeting.

The goal of the network is to develop an ambient groundwater monitoring network that supports the GWAC's goal of monitoring the progress of groundwater quality. This goal is different than looking at groundwater trends, identifying hot-spots, or determining sources of contamination as one monitoring program cannot adequately address all these issues. An ambient monitoring network will be the tool that will characterize the state of groundwater in the Lower Yakima Valley and will address the goal of the GWAC. Other efforts (described in the above document) can be built off of the ambient monitoring network.

PGG's report "Draft Lower Yakima Valley GWMA Proposed Ambient Groundwater Monitoring Network," dated June 8, 2016 is included as Attachment [C]

High Risk Well Assessment Survey Phase II. The high risk well assessment survey was closed to the public on March 31 with 290 sampling surveys completed—90 surveys above the EPO's original target of 200. A second amendment was approved by the Board of County Commissioners on April 12, 2016 to allow the Yakima Health District to complete the final sampling surveys that were initiated in late March.

Participant Follow-up. In April the County mailed the last round of results letters to the 2016 participants with their certified lab results and educational materials.

The program remained within the GWAC-approved budget of $100,000.

Amendment No. 2 to the Yakima Health District agreement is included as Attachment [D]

2016 Health Fair Outreach. With well testing concluded, EPO's 2016 focus shifted to health fairs to promote well testing and groundwater awareness in the GWMA. On May 19 a GWAC member and staff attended the Fred Hutch health fair in Sunnyside, the first in a series of 2016 health fairs sponsored by Fred Hutch. 122 adults and children visited the fair. Educational materials were distributed and participants encouraged to complete an outreach survey. On June 18 GWAC volunteers staffed the second health fair in Mabton, held in conjunction with Mabton Community Days. Test strip kits with a self-addressed stamped envelope were added to

the handout list, and distributed to visitors who self-identified as receiving their drinking water from a private or shared well in the GWMA. Three more health fairs are scheduled in the third quarter.

Working Group Activities

Education and Public Outreach (Lisa Freund, Chair)

The EPO met on April 25 and June 1. Lisa briefed the group on the Well Assessment Phase II final tasks. The County had sent results letters to the 290 participants. The letters included handouts on nitrate, coliform, and private well and septic system maintenance. Discussion focused on the data quality control conducted by Lee Murdock, and mapping the survey results. A member asked if the percentage of households with water filters was known. The short answer was no.

Prevention Campaign, Recommendations and Next Steps. Gretchen Stewart discussed volunteer outreach and the 2016 Fred Hutch health fairs, most of which will take place within the GWMA boundaries. The purpose of EPO's presence at the fairs is to raise awareness regarding nitrate in groundwater, to reach people served by private wells in the GWMA, and to make information available about the GWMA and the GWAC. It is also an opportunity to survey more people regarding their knowledge of the above issues.

It was agreed that a banner, tablecloth and other visual aids were necessary to "brand" the GWMA and identify the volunteers at health fairs and community events. The target date to design and produce the materials—before the first health fair in May—was met. The banner will also be displayed at GWAC meetings.

The question was raised whether EPO's outreach was passive (e.g., making information available at community events) or aggressive. (e.g., making presentations at conferences). Jim Davenport observed that given the diversity of stakeholders on the GWAC, members would be very leery about allowing any one person to speak on behalf of the entire group. Accordingly, outreach is passive.

At the June meeting Pat Newhouse debriefed the group on the Sunnyside Health Fair. 122 women and children (and a few men) attended the event. All attendees live in the GWMA. A number of public surveys were completed on behalf of the GWAC. Lisa noted that beginning with the upcoming Mabton health fair, test strips with an instructional card will be offered to people on private wells so they can test their water. A self-addressed stamped envelope will be provided for them to return their test results to the County. Gretchen and Ignacio are working on coloring sheets for children who visit the booth. These materials will be distributed at the remaining 2016 health fairs.

Volunteers for the remaining events are still needed. Lisa will distribute the health fair calendar again at the upcoming GWAC meeting and ask for volunteers. The banner and tablecloth will also be displayed at the meeting.

Data Collection (Melanie Redding, Chair)

The Data Collection working group met on April 13, May 11 and June 8, 2016. At the April 13 meeting Pacific Groundwater Group (PGG) presented its April "Ambient Monitoring Tech Memo." Staff explained the methodology for the random sample locations outlined in the memo. Input from the group was requested. The Nitrogen Loading Assessment status was also

reviewed: Livestock peer review was completed; Irrigated AG was under peer review and Yakima County was working to complete the RCIM component.

At the May meeting the group learned that WSDA had received the peer reviewer comments on the Livestock/CAFO component. WSDA was reviewing those comments, checking its calculations and rewriting sections based on peer feedback. The Irrigated AG component had also been returned from the peer reviewers; updating was in progress. The County, meanwhile, was validating input data for RCIM. The group learned that PGG was evaluating locations of monitoring wells and that PGG had identified 25 potential irrigation drain sites for monitoring. It was noted that irrigation data from drains provided immediate information and was much less expensive than the monitoring wells.

On June 8 the Nitrogen Loading status was again reviewed. Livestock and Irrigated AG remained under review; the County anticipated submitting the RCIM component by July 1. PGG had completed its June 8 update and planned to distribute it to the group for comment. It was noted that the document did not provide significant change to previous reports; rather, it was a compilation of the last two reports. Initial cost estimates were included: a total of $250,000 plus sampling personnel and hydrogeologist. The group's goal was to review the report and make a recommendation to the GWAC at its August meeting.

Groundwater Primer. Melanie introduced the groundwater primer concept, a tabletop sand tank model that visually illustrates groundwater, how it moves, and how it can be impacted by what we do on the land surface. The group agreed that this concept should be taken to the EPO for presentation in August before the GWAC meeting. The group also discussed long-term funding for ambient monitoring.

Irrigated Ag (IAWG) (Troy Peters, Chair)
The group met on April 19, May 17 and June 28. At the April meeting the group discussed the Deep Soil Sampling (DSS) status report. Spring sampling was underway, with a goal of 45 samples. It was noted that approximately $45,000 would remain in the South Yakima Conservation District (SYCD) contract after sampling was completed. The group agreed that $30,000 of these funds would be retained for retesting, and $15,000 would be provided to the RCIM for DSS of septic drain fields. The group agreed to discuss WSDA's draft "Irrigated Agriculture: Estimated Nitrogen Loading Potential," but concluded it would not be shared with the other working groups until IAWG had completed its review.

New Chair Dr. Troy Peters led the group through an exercise intended to develop a list of potential solutions to high nitrate that are under the purview of IAWG, and to also establish its priorities for the upcoming year. The exercise was continued at its May 17 meeting, and a list of items to be addressed through education was also developed.

The group agreed to a summary of potential solutions, and the group further agreed that education and public outreach was the top priority and would be recommended to the GWAC.

At its June 28 meeting, Landau Associates made a presentation on the Deep Soil Sampling program, and reviewed its methodology and testing schedule. (See Attachment [B])

Residential, Commercial, Industrial, and Municipal (RCIM) (Ryan Ibach, Chair)
The group met on May 9 and June 13. On May 9 they reviewed the status of the RCIM loading assessment and focused mainly on the contribution by septic systems but also discussed hobby farms, biosolids, lawns and fertilizers. At the June meeting discussion focused on methods to identify septic tank contribution to nitrogen loading and possible solutions. When the loading assessment is done the group will begin to focus on strategies to recommend to the GWAC to improve nitrogen loading rates.

Ryan Ibach announced at the June meeting that he had accepted a new position with the Yakima Health District. The members agreed that Dan DeGroot would become the new chairperson.

Regulatory Framework (Jean Mendoza, Chair)
The Regulatory Group met on April 13, May 11 and June 8. The group developed a plan in which the Regulatory Group will present information regarding laws, rules, policies and voluntary incentives to the Livestock/CAFO, the Irrigated Ag and the RCIM groups. The group has spent considerable time discussing a list of priority questions that group members submitted in order to develop a better understanding of each other's perspective.

The first area for joint analysis will be animal agriculture. Planning for consultation between Livestock/CAFO and Regulatory has begun. The group hopes to have a process for presentation and collaboration worked out before talking to the IAWG and the RCIM during the fourth quarter.

The general presentation plan is to identify the problems from the other group's perspective, identify voluntary and least costly interventions, prioritize and discuss, ask whether there should be "hand slapping," and ask how that might be codified.

Livestock/CAFO (David Bowen, Chair)
Livestock/CAFO Working Group met June 2 to review the status of previous agenda items and the deliverables associated with the working group plan.

The group discussed the recently released Washington Nitrate Prioritization Project, a publication that identifies groundwater areas in Washington State which are most vulnerable to nitrate contamination, not new information but existing data compiled in one location.

The mid-June release of Ecology's draft CAFO General Permit was announced. There will be a 60-day comment period. On July 27 there will be a 2:00 p.m. webinar followed by a public education meeting and hearing on the 28th at the Yakima Convention Center at 6:00 p.m.

The group agreed to proceed with identifying potential nitrate reduction solutions (education and technical assistance with financial motivations), without focusing on percentage contribution of any particular source while the nitrogen loading assessment is finalized.

It was suggested that the group begin thinking about what information the EPO working group may need as solutions are drafted. The group was encouraged to answer the questions: "who do we need to educate" and "what do we want them to know" when preparing its list of solutions.

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

Contracts and Interlocal Agreements

Amendment No. 2 - Agreement between the Yakima Health District and Yakima County (BOCC105-2016) was signed on April 12, 2016. The amendment increased the number of surveys to be conducted (from 280 to 290) and increased the contract amount (from a maximum of $70,000 to $72,500).

The amendment is included as Attachment [D]

Attachment A

- Final GWAC meeting summary of February 18, 2016.
- Final GWAC meeting summary of April 21, 2016.
- Draft GWAC meeting summary of June 16, 2016.
- GWAC agenda, attendance roster record and public meeting notice for April 21, 2016.
- GWAC agenda, attendance roster record and public meeting notice for June 16, 2016.
- Education and Public Outreach (EPO) Working Group summaries of April 25 and June 1, 2016.
- Irrigated Ag Working Group (IAWG) summaries of April 19, May 17 and June 28, 2016.
- Data Collection, Characterization and Monitoring Working Group summaries of April 13, May 11 and June 8, 2016.
- Regulatory Framework Working Group summaries of April 13, May 11, and June 8, 2016.
- Residential, Commercial, Industrial and Municipal (RCIM) Working Group summaries of May 9 and June 13, 2016.
- Livestock/CAFO Working Group summary of June 2, 2016.

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

YAKIMA VALLEY GROUNDWATER MANAGEMENT AREA ADVISORY COMMITTEE (GWAC)

MEETING SUMMARY

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

Denny Blaine Boardroom
810 East Custer Ave., 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

Roll Call: This meeting was called to order at 5:02 p.m. 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)	✓	
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		✓
Tom Ring	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)	✓	
Charlie McKinney	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	✓	

*via phone

II. Welcome & Meeting Overview

Facilitator Jim Davenport asked the group to spend a moment thinking quietly about having a positive, courteous, affirmative attitude in the discussion.

Jim then introduced Gary Bahr from the Washington State Department of Agriculture – Kirk Cook's replacement. General introductions followed.

Jim Davenport informed the group that at the recent Irrigated Ag Working Group meeting the group had recommended to the GWAC that they draft a letter of condolence (in light of Jim Trull's) passing to Jim's widow and family to be signed by the members of the GWAC. At this recommendation, a letter had been written and was presented. Jim asked Troy Peters (as the new chair of the Irrigated Ag Working Group) to read the letter aloud to the group. It was the consensus of the group to sign and send the letter as presented. Jim reminded the members that they were not under compulsion to sign. Members were also

invited to vocalize remembrances of Jim. They stated that Jim had a very "even keel" personality, a respectful manner towards all viewpoints and he would be missed.

III. Chairman's Report – Rand Elliott

Chairman Rand Elliott reported that Jean Mendoza, Jim Dyjak and Larry Fendell had recently requested to meet with him and Jim Davenport to discuss another GWAC member's recent testimony to a State legislative committee in Olympia. Rand said that after listening to the group it was determined that the comments that were made were personal in nature and not on behalf of the GWAC. Rand reminded the group that they were free to express their personal opinions; however, the group needs to make sure they are stating them as such and that they are not representing the GWAC. Rand went on to say that he had sent a letter to the Chairman of the Legislative Committee (where the testimony was received) indicating that the GWAC had come to no conclusions or recommendations thus far.

A member asked whether the group was going to discuss the facilitator's work and whether he should continue in that role. Jim Davenport thought this was a good idea. A discussion followed about his compensation for his facilitator services. Jim explained that he had a prior personal services contract with Yakima County to assist in their performance as lead agency of GWMA. When the previous facilitator's contract was not renewed, Vern asked him if he would also fill that role. Vern asked Jim to estimate the additional cost to the County of this work. Jim responded that he would provide this additional service to the County at no additional cost, that he would volunteer his services for facilitation. The County is not invoiced for this additional work. The member then voiced a desire to have a GWAC meeting where the budget was disclosed. Vern Redifer reminded the group that the grant is between Yakima County and the Department of Ecology. Vern went on to say that the GWAC's role is to help the County prioritize how the money is spent and that he does not have an issue with accounting to the GWAC how the money was spent. Another member reminded the group that the previous facilitator had charged $4,000 to $5,000 per meeting to moderate and that Jim's volunteer services allow the County to save this amount.

One member asked that another GWAC member be censured for his comments to a State legislative committee. Jim Davenport advised that the other member should be present so that he might respond to and defend the allegations.

IV. Guidance from WAC 173-100-100 Re: GWAC Program – Charlie McKinney

Charlie encouraged the group to keep their eye on the prize – the GWMA program. He reminded the group to follow WAC 173-100 and provided an overview. Charlie addressed

specifically several of the items from his overview - No. 4 is silent on the type of alternatives to deal with the problems. There is no discussion of regulatory, education or other types of other alternatives. The group must ask itself "what do we need to do to solve the problem." Additionally, Charlie noted under No. 5 that this is when the group will really zero in on the final product. At this point the group will take a look at the laundry list of problems, then make recommendations to solve the problems with a rationale why this is selected. The group will also want to include who they are making recommendations for, identify who should be leads at implementing each recommendation, i.e., agencies implementing regulations/recommendations (this is the group's first audience). Under No. 6 Charlie felt some of this will be difficult without the help of the agency implementing the recommendations working on the plan. He also pointed out that the group must work with the agency to determine what it will cost to implement the plan and what the feasibility to implement the plan will be.

When the plan is done it must then go through 173-100-110 SEPA Review and 173-100-120 Hearings and Implementation in order to give the public input into this process. When all of this is complete the plan can then be implemented.

A member asked when the committee should start the SEPA review process in light of the December 2017 deadline. Vern responded that the SEPA timeline varies, but the entire process takes at least a couple of months. Vern felt the group would be in compliance if they had a draft done by December 2017. Ginny Stern pointed out that other GWMA didn't make their deadlines but had things in place so that they could finish.

V. Report on Evaluation of USGS Particle Tracking Analysis Model – Ginny Stern

Ginny explained that the USGS took existing EPA data, and used a time-step application to estimate nitrate travel times based on flow data from 1959 to September, 2001. The model is designed to tell us how water moves in this County. Ginny explained that the particle tracking model is a useful tool and presents itself well. With this model it is possible to test the assumptions the GWAC is working with and answer questions like: "is this a near-term problem or something that comes before?" A member asked Ginny if the report could analyze legacy nitrates. Matt Bachmann (the author of the report from the USGS) stated that this report does not contain any measurements of nitrate concentrations, it is just about water and how old it is and where it came from. Jim Davenport added that this report will be discussed further in the Data Group.

VI. Working Group Reports:

Data Working Group – Ginny Stern: Ginny Stern presented the report provided by Chair, Melanie Redding. As to the Ambient Monitoring Network: PGG has a contract with Yakima County for its design. PGG has consolidated data in GIS and they are developing maps. They will use this information to recommend early development of sample site locations. A preliminary report is anticipated at the March Data workgroup meeting for review and comment. The Nitrogen Loading Assessment is being written in three pieces: dairy/livestock sources, irrigated agriculture sources and RCIM sources. Three designated peer reviewers will provide a neutral technical review to determine that the study meets quality and professional standards. The dairy/livestock source component draft is currently undergoing peer review. The written irrigated agriculture and the RCIM pieces will be finished soon and available for peer review. Once peer review is complete, drafts of the reports will be shared with the workgroups for their review and comment. After revisions have been made, the full nitrogen loading assessment will be presented to the GWAC. Ginny shared Melanie's mantra for the workgroup noting that ultimately the group's goal is to ensure credible data that can be used by the GWAC to make decisions. A member voiced concerns about several issues. Ginny responded and said that the concerns were issues to deal with after the scientific proof, quality control and quality assurance is met.

Livestock/CAFO Working Group – Charlie McKinney: No report – the group did not meet.

Irrigated Ag Working Group – Troy Peters: Troy Peters reported the group had taken time to remember Jim Trull at its last meeting. They also reviewed the 2015 Deep Soil Sample results that were taken from 60 different sites. When the work is complete they will have four sets of samples from spring and fall 2015 and 2016. In addition, the group had a presentation and discussion about the preliminary work performed by the Washington State Department of Agriculture on the Nitrogen Loading Assessment and found some very useful conclusions could be drawn and that the variability of sources could be significant.

RCIM Working Group – Ryan Ibach: Jim Davenport reported this group also has a new chair, Ryan Ibach. He thanked Bob Farrell for his service as chair and reminded the group that Bob will remain a GWAC member. Ryan informed the group that in their latest meeting they had learned the breakdown of the number of parcels in Yakima County with an area of 10 acres or less not otherwise included in the irrigated agriculture mapping done by the Department of Agriculture– these were categorized as hobby farms. This information was provided by Yakima County's GIS Department. Hobby farms thus

determined total 2,757 acres. There are three categories: 0 to 2.5 Acres = 2,323 acres; 2.6 to 5 Acres = 314 acres; and 5.1 to 10 Acres = 120 acres. He went on to explain that the GWMA contains 175,161.2 acres of land, leaving hobby farms as 1.6 percent of the total. At the group's next meeting they will be discussing septic systems and biosolids. A member asked how the group had defined a hobby farm. Vern indicated that they utilized what the GIS system knew about properties by looking at smaller parcels, not single residential parcels, 10 acres or less, agricultural crop land or animals on it and then proofed their conclusions with aerial photos.

Regulatory Framework Working Group – Jean Mendoza: The group has heard presentations from many agencies over the past year and would hear next from the irrigation districts, Yakama Nation and WSDA Fertilizer application. The group would then begin work toward meeting the goals and objectives put into place in the 2012 Work plan (Sections 3.0-3.9). They will also consider authority, feasibility, cost, time, monitoring, effectiveness and enforcement. The group has the task of developing alternative management plans and for presenting these potential solutions to the GWAC. Jean also reported that Jim Davenport has begun describing Regulatory Framework in a written document. He has created a table that looks at the major regulations which are cross-referenced by source and topic – Laws and Regulations, Sources of Nitrogen, Atmospheric Deposition, Compliance and Enforcement. Jean was pleased to announce that Vern had affirmed his agreement to create a Regulatory Framework web page. The content will be vetted by the working group.

Education and Public Outreach (EPO) Working Group – Lisa Freund: Lisa was pleased to report the success of the Web Assessment Survey Phase II and gave kudos to the EPO Working Group as they have worked very hard on outreach for the survey. She reported that the EPO had continued its outreach (flyers, radio ads) to reach its goal of 200 completed surveys. As of December 31, 2015, 115 sampling surveys were completed. In January 2016, to reach the goal of 200 surveys, a second direct mail piece was sent to 350 households in the GWMA inviting them to participate. This resulted in a jump in requests to participate in the survey. As of February 11, 240 had requested the survey (a 100 percent increase from December). Accordingly, Yakima County extended the well assessment contract with the Health District from $50,000 to $70,000 (80 additional surveys). The term was also extended from February 29 to March 31. The community survey (English and Spanish) will go live next week on the GWMA website in order to measure the public's awareness. In addition, Notify Me, which was introduced to the GWAC at the October 2015

meeting has experienced some glitches which has delayed Yakima County from working with it exclusively. Feedback indicates email notification is working better than text messages on mobile phones. With the 2015 website redesign, the resources page was streamlined. In October the EPO recommended to this group that resources (links to other sites and documents) should only be added back to the site if there is agreement by this group. Lisa then deferred to a group member who was requesting that the GWAC put the VanderSlice research done in 2004/2005 in the Columbia Basin surveying children under six months and the effects of nitrates in the water in their systems back on the website. It was the consensus of the group to put this research back on the website.

VII. Report on High Risk Well Assessment Survey Results

A chart and map was provided of the sampling survey test results through February 15, 2016, in the meeting packet. Vern believed it would be wise not to state trends or conclusions until all the surveys are done at the end of March. He did note however that the highest percentage of wells that have bacteria in them have less nitrates. Matt Bachmann noted that bacteria doesn't flow as easily as nitrates do.

VIII. Groundwater Monitoring Program Update/Inter-Agency Agreement: Yakima County and Ecology – Vern Redifer

Vern observed that Ginny had already addressed the progress of the Ground Water Monitoring Program in her Data Working Group report. He advised the group that the contract between the Department of Ecology and the County of Yakima had been signed – a copy was enclosed for the members. A member asked if there was much chance of receiving money beyond the terms of this contract. Vern pointed out that the first paragraph stated the expectation "whereas this is expected to be the final appropriation . . . ." A member inquired as to whether the group should start advocating for more money. Other members indicated that in their experience in working with GWMA in other regions if the majority of the work is done there could be a host of opportunities for funding at that time. Vern pointed out that the answer to a request for funding is never a solid no – as the group writes the program and develops implementation there are ways to keep meeting goals.

IX. Committee Business

The committee approved the October 15, 2015, meeting summary as presented. It also approved the 2016 GWAC Meeting Schedule as presented on the meeting agenda. Instructions for signing up for automatic calendar and agenda notifications for GWAC and working group meetings can be found in the meeting packet.

Jim Davenport stated that the agenda provided for an opportunity to thank Charlie McKinney as this was his last meeting. He noted that for the past year and a half he had

observed Charlie's objectivity and ability to settle arguments – he has been a valuable asset and provided a great deal of knowledgeable information. Charlie responded that it had been good to work on something so worth while and to get to know the entire group. He noted that Yakima County's responsibility for being the lead agency was not a small task. He felt the County had done an excellent job. Jim then invited the group to express their thanks to Charlie, and to give their opinion about the progress of the GWAC. Many members thanked Charlie for his effort and participation. He will be missed. One member noted that Charlie had a way of explaining things in laymen's terms which had been appreciated.

Members expressed optimism for meeting the December 2017 deadline (although the process seemed quite slow), expressed appreciation for the members' efforts and common goals and are looking forwad to evaluating proposals, suggestions, work plans and decisions. A member was concerned that sometimes the group was too negative about what hadn't yet been accomplished and missed the small successes – more had been done in a year than the group realized. Another member shared concern as well about the transition when the deadline is met and how the political climate may impact the application of GWMA. Several people involved with GWMA in other areas offered that have not seen this kind of work product done in this short amount of time. They felt this was a hard working group of people and were encouraged by people working together.

Members expressed a concern about what is being written via email to carry on squabbles with other members of the group. It was their perception that a compromise will be the end result – no one is going to get exactly what they want. The group was encouraged to keep their eye on the big picture – focus and set aside differences – Charlie had provided a good example of this attitude. Most of the people sitting in the room lived in the GWMA and had a vested interest in its outcome. Some members were encouraged by the education effort. They felt it was exceptional and working quickly and effectively. It has people talking about nitrates and they are interested in a profitable outcome as well. People are paying attention and that makes a difference. Some members expressed that they had been concerned over the number of chairs lost in the past few months, but were encouraged with their replacements and their fresh momentum.

Ginny Prest announced the "Sustainable Groundwater in Agriculture Conference Linking Science and Policy 2016" to be held June 28-30, 2016, in San Francisco, California. She strongly encouraged the GWAC to send representatives.

X. Public Comments

Public Comments are included in the round table discussion notes found above.

XI. Next Meeting:

Thursday, April 21, 2016, 5:00 PM

Location: Radio KDNA, 121 Sunnyside Ave., Granger, WA 98932

XII. Next Steps

The meeting was adjourned at 7:15 PM

Meeting summary approved by the GWAC on April 21, 2016.

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

YAKIMA VALLEY GROUNDWATER MANAGEMENT AREA ADVISORY COMMITTEE (GWAC)

MEETING SUMMARY

Thursday, April 21, 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 5:06 p.m. 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)	✓	
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		✓
Tom Ring	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

Facilitator Jim Davenport asked everyone to spend a moment setting the day aside and to think about courteous ways to engage in meaningful conversation. He commended the group for the progress they had made in reaching solutions and encouraged everyone to continue to strive to move forward together.

General introductions followed. Jim introduced David Bowen the new Water Quality Section Manager at the Department of Ecology. David shared his background as a Kittitas County Commissioner, Auditor and his 25 year participation in the family farm.

III. Working Group Reports:

Data Working Group – Melanie Redding

Ambient Groundwater Monitoring Network: Pacific Groundwater Group (PGG) has a contract with Yakima County to design an ambient groundwater monitoring network based

on the February 19, 2015, GWAC approval of this venture. The system will be the tool that will characterize the state of groundwater and address GWAC's goal to monitor the progress of groundwater quality. Melanie noted that one program will not adequately address all the issues but will require other efforts as described previously by PGG. She reported that PGG submitted a Technical Memorandum to the working group dated March 18, 2016, for their consideration. The goals were to establish a reasonable well density, consider the availability of alternate sampling locations and land use patterns while avoiding sites that could be anomalous and to prioritize well installation sites. Further, they would randomly identify potential monitoring points across the valley and come up with a preliminary drill site selection that would include 30 well sites situated on public lands and take into account various other considerations, i.e., land use, depth, number of wells, costs. They would also consider sampling drains to supplement data. The working group was concerned about several long-term issues: 1) Where will the long-term funding come from to monitor these wells, and 2) who will analyze the data? A member asked about the use of privately owned existing wells. Melanie explained that the group considered the pros and cons and would continue to explore this option. A member wondered if PGG would use the input/concerns expressed in the last Data group meeting. Jim Davenport affirmed that PGG had taken note of all of the comments and were working through what was said.

Nitrogen Loading Assessment: The assessment will provide the relative nitrogen loading from all sources and consists of livestock, irrigated agricultural areas and RCIM components. The challenge is to make sure all three use similar methodology (approach, evaluation, and assumption) in order to have one seamless document that is scientifically sound, neutral, reproducible, transparent, and useful to make future decisions. The process includes: peer review; committee review and then GWAC review. A member asked about the timing. Melanie thought the draft would be completed in the next couple of months. She felt that given the peer review comments on the first assessment (livestock) that each would be a substantially revised product. Another member asked that the group show what was included and what was excluded so that the members could see the peer review process. He was assured that no edits were made to data – only comments to the authors of each piece.

Livestock/CAFO Working Group – David Bowen: No report – the group did not meet. David will be working with Bobbie next week to schedule meetings beginning in June.

Irrigated Ag Working Group (IAWG) – Troy Peters: Troy Peters reported that Perry Beale had presented his work on the nitrogen loading assessment Irrigated Ag piece at the last

meeting. Perry also reported on his meeting with animal scientists and extension specialists at WSU who specialize in crop and soil sciences, and nutrient management. The IAWG reviewed Perry's assessment and mass balance data and felt it was robust, a good effort and had a confidence in the methodology. The group also talked about the deep soil samples, noting that remaining funding could be used to retest some questionable spots, and could also be shared with RCIM for septic system testing although they think the issue is *de-minimis*. In addition, the group started working on a prioritization of ideas that might help make a difference and once refined will be presented to the GWAC.

RCIM Working Group – Kathleen Rogers presented on behalf of Ryan Ibach who was unable to attend: Kathleen reported that the group was following up on septic systems as a potential source of nitrates, and that they were interested in using some of the remaining funds from deep soil sampling to conduct further studies. They are also addressing questions about the permitting and testing processes of bio-solids. Dan DeGroot asked about well coverage. Vern replied that the County had several requests for maps, and that well coverage and other map overlays will be presented during tonight's GIS presentation.

Regulatory Framework Working Group – Jean Mendoza: The group had heard from several presenters: Ron Cowin from Roza/Sunnyside Irrigation District talked about irrigation systems and drains. Phil Rigdon also shared about efforts to address nitrate and water issues within the nation. Brent Barnes, WSDA, Assistant Director for Pesticide Management spoke about chemigation and fertigation. Jean provided the highlights of each speaker. In addition, at Jean's direction each member of the work group submitted three items of priority to be considered as the group plans to analyze the data collected to date. Jean distributed the group's list. Jim Davenport noted he found this to be a helpful exercise that other groups should consider using. The group also began to formulate a plan for analysis of the policies, regulations and laws in order to gather together the relevant material for each primary work group—RCIM, Irrigated Ag, CAFO/Livestock—and schedule joint meetings to discuss voluntary incentives and regulatory measures. The group will use Jim Davenport's spreadsheet of applicable statutes for each source as its starting point.

Education and Public Outreach (EPO) Working Group – Lisa Freund: The High Risk Well Assessment Phase II survey closed with 290 participants exceeding the group's 200 survey goal. Yakima County amended the original contract twice and stayed under budget. A results summary will be shared at the next GWAC meeting and results letters with educational materials are being sent to participants. High demand and excellent media coverage

(newspapers, TV interviews, and a Radio KDNA interview) attributed to overall public awareness of the GWMA and its work. Lisa also reported that the GWMA website community survey in English and Spanish which went live in March and can be found at https://www.surveymonkey.com/r/Door2Door en. Its purpose is to measure the public's awareness of the GWAC, the GWMA and nitrate issues. It is identical to the survey conducted in the 2013 by Heritage University students. EPO will now shift its focus to new messaging regarding well testing and prevention campaigns and are currently measuring volunteer interest in staffing community events to help pass out flyers on a variety of topics. The group desired to know if anyone from the GWAC had an interest in participating at the events. Lisa distributed a sign-up sheet to solicit GWAC member participation and encouraged everyone to consider signing up. Based on the GWAC response the EPO may come back in June and make a presentation requesting approval for a traveling display.

IV. **Area Characterization: - Yakima County GIS:** Vern introduced GIS Director Mike Martian. Mike explained that he was present to discuss area characterization as defined within WAC 173.100.100. Mike reviewed the provisions of WAC, which require that the group put together a ". . . program for each groundwater management area (that) will be tailored to the specific conditions of the area. The following guidelines on program content are intended to serve as a general framework for the program, to be adapted to the particular needs of each area. Each program shall include, as appropriate, the following: (1) An area characterization section. . . ." Mike defined characterization as the description of the qualities or peculiarities of a person, place or thing. He went on to say that in this case it is designed to answer the questions: "what do we know and what more do we need to know?"

Mike then presented a series of GIS overlay maps that illustrated some of the readily-available information that can be used to complete the area characterization: GWMA boundaries and city limits, zoning by type, critical aquifer recharge areas, irrigation district boundaries, public ownership by group, topography, soil types, soil infiltration loading rates, geology types, depth to groundwater, groundwater flow directions, well locations, cropping patterns and inventory, large on-site sewer systems, municipal underground injection control devices, on-site sewer systems, map estimating private well locations, septic tank density per square mile, soil infiltration rates with total nitrogen loading, bio-solids with "2015 acres actually applied" in each section, estimated hobby farms, residential lawns in towns and nitrogen application, large, medium and small dairies in 2014, ponds, lagoons and corrals, climate summaries, 2010 population density per square mile, and a summary of the Census Bureau information for the GWMA.

Following Mike's presentation, Jim Davenport queried the group for additional information they would like GIS to map to complete the area characterization. The group asked for a compilation of maps for the following: creeks, designated wetlands, overlay of nitrogen

hotspots, seasonality: well samples by quarter, decade-by-decade maps of land use, quarterly summaries of load, impervious surfaces, amount of water delivered to parcel(s) (Note: Ron Cowin observed that delivery and acres assigned to that delivery is not always accurate), irrigation water – amount of return flow, trends – how has the amount of water delivered changed over time?

V. Committee Business

The committee approved the February 18, 2016 meeting summary as presented.

VI. Next Meeting

Thursday, June 16, 2016, 5:00 PM

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

VII. Next Steps

The meeting was adjourned at 7:00 PM.

Meeting summary approved by the GWAC on June 16, 2016.

Continued work on the "What More Do We Need to Know" list in Section 4 above.

YAKIMA VALLEY GROUNDWATER MANAGEMENT AREA ADVISORY COMMITTEE (GWAC)

MEETING SUMMARY

Thursday, June 16, 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)	✓	
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		✓
Tom Ring	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

Facilitator Jim Davenport invited the group to set aside the day and think about a positive outcome as the group worked through its agenda. General introductions followed. Jim observed that the group had gained a great deal of knowledge through this process and although he sensed some people's frustration he felt that the group was further ahead at this point than most. Jim asked Pat Newhouse to share about her recent experience as a participant in the EPO outreach at the May 19 Sunnyside Health Fair. Pat explained that she and two others had interacted with and provided written brochures to approximately 120 people about the nitrate issues in the GWMA. Some people filled out informational questionnaires. She recommended that the group have something for children at the next event and at least one Spanish speaking volunteer. She encouraged everyone to volunteer. Jim added that he had also been encouraged because he received a letter from Yakima County stating that they would be through in the next few months to clean out 130 County-owned septic systems in the Buena area.

III. Working Group Reports:

Data Working Group – Report prepared by Melanie Redding and given by David Bowen

Nitrogen Loading Assessment (NLA): Melanie reviewed the purpose and goals of this assessment. Gary Bahr of USDA hoped to have the final assessment to the GWAC in October. Four WSDA staff are working on information and data layer updates and verifying the accuracy of the calculations. Ambient Groundwater Monitoring Network: PGG completed a review draft of its report which includes methodology, preliminary drill sites, drain monitoring, estimated costs, and installation process and schedule and it is being reviewed by the group and will be presented to the GWAC at its August meeting. Drilling could begin in the spring of 2017 and monitoring in July. Cost estimates are $250,000 plus sampling personnel and hydrogeologist. Groundwater Primer: Melanie will talk with EPO about providing a tabletop sand tank model prior to the August GWAC meeting to visually illustrate groundwater, how it moves, and how it can be impacted by what we do on the land surface. Long-Term Initiatives: The Data group was concerned about long-term funding/support for on-going programs and monitoring. Questions: Jean asked if the NLA could be to the GWAC in August as she felt the report was holding everything else up. Gary Bahr said an October presentation was more likely. Jim agreed the delay was unfortunate but noted that the groups were progressing and working on solutions. He added that when the ranges were available the groups could then determine the priority of the solutions.

Livestock/CAFO – David Bowen

David informed the group that Livestock/CAFO held its first meeting this year on June 2. The group spent time discussing the progress they had made and David now believed he could review the plan and prepare a list of next steps. David also reported on the Ecology Washington Nitrate Prioritization Project (Link to site): http://ecologywa.blogspot.com/2016/05/new-report-compiles-information-about.html and the Ecology CAFO General Permit update which was released June 15. A comment period and meetings will be held. More information can be obtained at: (http://www.ecy.wa.gov/programs/wq/permits/cafo/publicinvolvement.html. The group agreed to proceed with identifying solutions and didn't feel that the delay would keep the group from moving forward. The group will also begin to answer the questions: "who do we need to educate" and what do we want them to know" so that it might pass this information on to EPO. When questioned, David noted that he expected the Livestock/CAFO work group to be briefed on and discuss the new CAFO permit. A member clarified that individuals were invited to comment and not the GWAC as a whole. David added that there was also another literature review done by Melanie Redding which had been released on the impact of manure on the groundwater. David would provide this link to Yakima County support staff to get out to the group.

Irrigated Ag Working Group (IAWG): Troy Peters was absent but Jim reported that the May meeting summary was in the group's packet. He indicated that the group had been discussing solutions and ideas and he anticipated one to two more meetings on this.

RCIM Working Group – Ryan Ibach: Ryan reported that the group had met this past Monday (June 13) and began working on solutions. They also discussed the status of the RCIM loading assessment and focused mainly on the contribution by septic systems but also discussed hobby farms, biosolids, lawns and fertilizers. Ryan also announced that he had accepted a new position with the Yakima Health District and that the participants had agreed that Dan DeGroot would become the new chairperson.

Regulatory Framework Working Group – Jean Mendoza: The group met and discussed priority questions and how to interact with the other groups when presenting the laws and policies applicable to each of the three working groups. The rough presentation plan is to identify the problems from the other group's perspective, identify voluntary and least costly interventions, prioritize and discuss, ask whether there should be "hand slapping" and ask how that might be codified. Jean anticipated two meetings with the Livestock/CAFO group.

Education and Public Outreach (EPO) Working Group – Lisa Freund: Lisa displayed the new GWMA banner, tablecloth and a variety of handouts being used at various outreach events. The handouts included brochures, a groundwater color page for kids, a public survey and private well testing kits. The kits are being tracked and provide the group with the person's name and telephone number. Outreach photos are being posted on the GWMA website. Lisa encouraged members to consider signing up to help in the health fair booths which would allow the group to have one-on-one contact with 1000+ people in the Lower Valley. Looking to the future Lisa indicated that the group is considering and acquiring costs for a billboard campaign. This information would be presented at the August meeting for the group to consider. EPO has also asked the working groups to identify their target audiences (who) and the messages they want delivered (what) so that EPO can develop proposed campaigns for the working groups' consideration.

Jim gave Jean Mendoza a chance to voice her concerns. Jean was concerned that because of the delays the GWAC will be stuck with the nitrogen loading assessment and would be unable to look at alternate studies. Jean desired to propose that the GWAC accept the 2012 EPA study which she felt was a reasonable option as it was similar and the science was based on local data. She encouraged the group to abandon its assessment. Members agreed there were a variety of other possible studies and options, but were happy to see this GWMA doing one of their own. And, while they understood the delay was frustrating, they felt it was good the group had done its own. They believed the delay had allowed time for good discussions. The members disagreed that the delay of the assessment had stopped the process as many working groups had already reported they were working on solutions. The group had no objection to Jean's request to distribute the EPA Lower Yakima Valley Project Nitrogen

Loading Screening Analysis at this meeting. Jean was also concerned that the group hadn't done a mid-term review. A member didn't recall a mid-term review in the the group's master plan and is therefore not frustrated that one hadn't been done.

IV. Don Stuart Presentation

David Bowen advised the group that Melanie Redding was recommending that the group invite Don Stuart to speak at the next GWAC meeting. Don Stuart authored a book entitled "Barnyard and Birkenstocks: Why Farmers and Environmentalists Need Each Other." Don made a presentation at the DOE which Melanie attended and she felt the GWAC could benefit from inviting him as a guest speaker/collaborator. A link had been provided with a 5 minute clip for the group's consideration. Several members indicated that they had not been able to view the presentation as the link failed. David said he would look into this. The group agreed to postpone this item until the next meeting to give everyone a chance to first review the link. Jean Mendoza asked how to get an item on the GWAC Agenda. Vern said that it depended on the agenda item. If it was something for discussion it was very easy to get on the agenda but there was a protocol established early on if someone desired a guest speaker to make a presentation. Instead of inviting a speaker it is put on the agenda for the group to decide. Jim Dyjak asked who approves the agenda. Vern said that he did with the help of Jim and David. Any agenda requests should be made in writing.

V. Potential Requests to the Legislature

Vern and Jim explained to the group that funding requests could be made through the legislature or through different agencies' budgets. They believed it was important for the group to begin to consider what requests should be made and which agency would govern each project. Agency budget requests must be made as soon as possible and Legislative requests need to be in before the session begins in January. Funding from these requests would be available in July 2017. If the legislative ask wasn't made until January 2018, the funding wouldn't be available until July 2018.

Vern believed the group should consider a request for long-term funding for the monitoring program under design now. He stated that the current budget would cover the installation and the first year's worth of data collection if the network was in the ground by spring 2017. However, the funding ends December 2017, and the success of the system is long-term sampling. In addition the group needed to decide who should be responsible for the monitoring – Yakima County, Yakima Health District, Ecology, EPA, or the Department of Health. Steve George agreed that the established well monitoring needs to be ongoing and believed that the County should be the lead entity as he felt they were central to everyone and the project needed a local presence not a State agency. Ginny Stern said that in other GWMA's the local county handled this. The County is prepared to have lead entity status. Rand added that an ongoing program like well monitoring would need to be funded through a State agency's budget. This request would need to be made immediately so it could be

included in the the Department of Ecology budget. He added that if the request was for a one-time effort the request could be made legislatively and would need to be in by the end of the year. Jean was concerned as the Data group was not in agreement yet about the monitoring plan. Vern explained that while there may be differences of opinion, in general those differences won't substantially change the ongoing costs. David said that he would talk to his Program Manager about putting a placeholder in the budget but noted that they would need concrete information by September/October. Rand suggested that Vern talk to David to come up with a number and then refine the plan over the next several months. Ginny Stern encouraged the group not to assume all the funding would come from one source but to seek funding from every angle.

Members suggested other items for funding consideration: expanding the monitoring network, options for community outreach, education on the importance of pumping private septic systems, funding to identify and decommission abandoned wells, identifying high priority wells to see if they were properly constructed, drilling new wells for people, soil sampling before planting and education on water management. A member suggested that the work groups put together lists of their top three priorities in the next month and get them to the GWAC. Proposals should include the benefits of the proposal and what the likely costs would be. Another member was concerned that a cost benefit analysis should be done before requests for money were made. Jim responded and said that's why he encouraged the work groups to put together their ideas and bring them to the GWAC. Rand asked if the group was willing to allow the County to discuss with its lobbyist an effort to fund the ongoing testing of the Ambient Monitoring Network. The group agreed with no objections.

VI. Committee Business

After confirmation that a quorum was present the committee approved the April 21, 2016, meeting summary as presented.

VII. Public Comment

None.

VIII. Next Meeting

Thursday, August 18, 2016, 5:00 PM, Location: *Denny Blaine Board Room, Sunnyside School District No. 201, 810 East Custer Avenue, Sunnyside, WA 98944*

IX. Next Steps

The meeting was adjourned at 6:53PM.

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, April 21, 2016 5:00 p.m. – 7:00 p.m.

Radio KDNA Conference Rooms 1 & 2
121 Sunnyside Ave.
Granger, WA 98932

Regular GWAC Meeting

Time	Topic	
5:00 – 5:15 p.m.	Welcome, Meeting Overview and Introductions: • David Bowen, Ecology • Committee members • Others attending the meeting	Jim Davenport, Facilitator
5:15 – 6:05 p.m.	Working Group Reports • Data Collection • Livestock/CAFO • IAWG • RCIM • Regulatory Framework • EPO	 Melanie Redding *No Report* Troy Peters Ryan Ibach Jean Mendoza Lisa Freund
6:05 – 6:45 p.m.	Area Characterization: • What is it? • What do we know? • What more do we need to know?	Jim Davenport Mike Martian, Yakima County GIS
6:45 – 6:50 p.m.	Committee Business • Approve the February 18, 2016 GWAC Meeting Summary	
6:50 – 6:55 p.m.	Public Comment	
7:00 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
Ryan Ibach	Yakima Health District
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center
Lucy Edmondson, Marie Jennings (alternate)	U.S. Environmental Protection Agency
Elizabeth Sanchey, Tom Ring (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

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

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

Meeting Materials:

Name	Date Provided	From
2016_0218_GWAC_DraftMeetingSummary	3/1/2016 4/14/2016	lisa.freund@co.yakima.wa.us
Meeting Agenda	4/14/2016	lisa.freund@co.yakima.wa.us
Data Collection Working Group Report of March 9, 2016	4/14/2016	lisa.freund@co.yakima.wa.us
IAWG Working Group Report of February 10, 2016	4/14/2016	lisa.freund@co.yakima.wa.us
Regulatory Framework Working Group Reports of February 17 and March 9, 2016	4/14/2016	lisa.freund@co.yakima.wa.us
RCIM Working Group Report of March 24, 2016	4/14/2016	lisa.freund@co.yakima.wa.us
EPO Working Group Report of March 2, 2016	4/14/2016	lisa.freund@co.yakima.wa.us

GWAC Attendance Roster

Member	21-Apr-2016
Stuart Turner	Present
Chelsea Durfey	Present
Bud Rogers	Present
Kathleen Rogers	Present
Patricia Newhouse	Present
Sue Wedam	Present
Doug Simpson	Present
Jean Mendoza	Present
Eric Anderson	Absent
Jan Whitefoot	Absent
Jim Dyjak	Present
Steve George	Present
Frank Lyall	Present
Jason Sheehan	Present
Dan DeGroot	Present
Ron Cowin	Present
Laurie Crowe	Present
Jim Newhouse	Absent
Robert Farrell	Absent
John Van Wingerden	Absent
Rand Elliott	Present
Vern Redifer	Present
Ryan Ibach	Absent
Dr. Troy Peters	Present
Lucy Edmondson	Present
Marie Jennings	Absent
Elizabeth Sanchey	Absent
Tom Ring	Absent
Virginia "Ginny" Prest	Present
Jaclyn Hancock	Absent
Andy Cervantes	Absent
Ginny Stern	Present
David Bowen	Present
Sage Park	Absent
Lino Guerra	Absent
Rick Perez	Absent
Jessica Black	Absent
Matt Bachmann	Present

YAKIMA HERALD-REPUBLIC

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-Ad Proof-

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Please confirm placement prior to deadline, by contacting your account rep at (509) 577-7740.

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Company Name:	YAKIMA COUNTY SURFACE WATER MANAGEMENT
Contact:	Tina Beck,AP
Address:	128 NORTH 2ND STREET ROOM 408 YAKIMA, WA 98901
Telephone:	(509) 574-2343

Ad ID:	636879
Start:	04/13/16
Stop:	04/13/16
Total Cost:	$105.60
# of Inserts:	2
Lines:	62.0
Ad Class:	6021
Ad Class Name:	Public Legal Notices
Account Rep:	Simon Sizer
Phone #	(509) 577-7740
Email:	ssizer@yakimaherald.com

Run Dates:
Yakima Herald-Republic 04/13/16
YakimaHerald.com 04/13/16

Ad Proof

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, April 21, 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.

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 five (5) working days 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 **Tuesday, April 12, 2016**

(636879) April 13, 2016

Bobbie Brady

From: DSN Legals <DSNLegals@dailysunnews.com>
Sent: Friday, May 06, 2016 4:21 PM
To: Bobbie Brady
Subject: RE: Publication Notice for April 21, GWAC Meeting

Bobbie,
I did not find anything. I am sorry for delay getting back to you,
We have been changing offices this week (incl. computer changes).
What a nightmare.
Thank you,

Karen Zackula
Classifieds
DSNClassifieds@DailySunNews.com
(509) 837-4500

From: Bobbie Brady [mailto:bobbie.brady@co.yakima.wa.us]
Sent: Friday, May 06, 2016 9:43 AM
To: DSN Legals <DSNLegals@dailysunnews.com>
Cc: Lisa Freund <lisa.freund@co.yakima.wa.us>
Subject: RE: Publication Notice for April 21, GWAC Meeting

Karen: We spoke the other day by telephone about whether this notice had ever been published in the Daily Sun News. You were going to do some more research, but I assume that you haven't been able to find any evidence that it was published. If you could please confirm this assumption it would be helpful for our records. Thanks!

Bobbie Brady
Office Specialist
Yakima County Public Services
128 N. 2nd Street, 4th Floor
Yakima, WA 98901
509-574-2957 – Desk
509-574-2301 – Fax
Bobbie.Brady@co.yakima.wa.us

From: DSN Legals [mailto:DSNLegals@dailysunnews.com]
Sent: Thursday, April 07, 2016 3:48 PM
To: Bobbie Brady <bobbie.brady@co.yakima.wa.us>
Subject: RE: Publication Notice for April 21, GWAC Meeting

Bobbie,
Thank you for your Publication Notice. I will get your cost and proof sheet back to you before the end of the afternoon on Friday.

Karen Zackula
Classifieds
DSNClassifieds@DailySunNews.com
(509) 837-4500

From: Bobbie Brady [mailto:bobbie.brady@co.yakima.wa.us]
Sent: Thursday, April 07, 2016 3:39 PM
To: DSN Legals <DSNLegals@dailysunnews.com>
Cc: Lisa Freund <lisa.freund@co.yakima.wa.us>
Subject: Publication Notice for April 21, GWAC Meeting

Attached for Publication is a Notice of Public Meeting for the Lower Yakima Valley Groundwater Advisory Committee. Please publish this notice on Wednesday, April 13, 2016, and bill to FC3463-100-120. Please contact me if there is any issue or you have questions. As usual we will require a proof of publication.

Bobbie Brady
Office Specialist
Yakima County Public Services
128 N. 2nd Street, 4th Floor
Yakima, WA 98901
509-574-2957 – Desk
509-574-2301 – Fax
Bobbie.Brady@co.yakima.wa.us

NOTICE: This communication may contain privileged or other confidential information. If you are not the intended recipient, or believe that you have received this communication in error, please do not print, copy, retransmit, disseminate, or otherwise use the information. Also, please indicate to the sender that you have received this in error, and delete the copy you received. Thank you.

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, June 16, 2016 5:00 p.m. – 7:00 p.m.

Radio KDNA Conference Rooms 1 & 2
121 Sunnyside Ave.
Granger, WA 98932

Regular GWAC Meeting

Time	Topic	
5:00 – 5:10 p.m.	Welcome, Meeting Overview and Introductions: • Committee members • Others attending the meeting	Jim Davenport, Facilitator
5:10 – 6:00 p.m.	Working Group Reports • Data Collection • Livestock/CAFO • IAWG • RCIM • Regulatory Framework • EPO	 Melanie Redding David Bowen Troy Peters Ryan Ibach Jean Mendoza Lisa Freund
6:00 – 6:05 p.m.	Don Stuart Presentation	Melanie Redding
6:05 – 6:45 p.m.	Potential Requests to the Legislature	Vern Redifer
6:45 – 6:50 p.m.	Committee Business Approve the April 21, 2016 GWAC Meeting Summary	Jim Davenport
6:50 – 6:55 p.m.	Public Comment	
7:00 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
Ryan Ibach	Yakima Health District
Dr. Troy Peters	WSU Irrigated Agriculture Research and Extension Center
Lucy Edmondson, Marie Jennings (alternate)	U.S. Environmental Protection Agency
Elizabeth Sanchey, Tom Ring (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

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

Meeting Materials:

Name	Date Provided	From
2016_0421_GWAC_DraftMeetingSummary	6/13/2016	lisa.freund@co.yakima.wa.us
Meeting Agenda	6/13/2016	lisa.freund@co.yakima.wa.us
Data Collection Working Group Reports of April 13 and May 11, 2016	6/13/2016	lisa.freund@co.yakima.wa.us
Livestock/CAFO Working Group Report of June 2, 2016	6/13/2016	lisa.freund@co.yakima.wa.us
IAWG Working Group Reports of April 19 and May 17, 2016	6/13/2016	lisa.freund@co.yakima.wa.us
Regulatory Framework Working Group Reports of April 13 and May 11, 2016	6/13/2016	lisa.freund@co.yakima.wa.us
RCIM Working Group Report of May 9, 2016	6/13/2016	lisa.freund@co.yakima.wa.us
EPO Working Group Reports of April 25 and June 1, 2016	6/13/2016	lisa.freund@co.yakima.wa.us

GWAC Attendance Roster

Member	16-Jun-2016
Stuart Turner	Absent
Chelsea Durfey	Absent
Bud Rogers	Present
Kathleen Rogers	Present
Patricia Newhouse	Present
Sue Wedam	Present
Doug Simpson	Present
Jean Mendoza	Present
Eric Anderson	Absent
Jan Whitefoot	Absent
Jim Dyjak	Present
Steve George	Present
Frank Lyall	Absent
Jason Sheehan	Absent
Dan DeGroot	Present
Ron Cowin	Present
Laurie Crowe	Absent
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Robert Farrell	Absent
John Van Wingerden	Present
Rand Elliott	Present
Vern Redifer	Present
Ryan Ibach	Present
Dr. Troy Peters	Absent
Lucy Edmondson	Present
Marie Jennings	Absent
Elizabeth Sanchey	Absent
Tom Ring	Absent
Virginia "Ginny" Prest	Present
Jaclyn Hancock	Absent
Andy Cervantes	Absent
Ginny Stern	Present
David Bowen	Present
Sage Park	Absent
Lino Guerra	Absent
Rick Perez	Absent
Jessica Black	Absent
Matt Bachmann	Present

Legals (1 column)

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

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For more information about the meeting, please contact Lisa Freund, Yakima County Public Services Administrative Manager at (509)574-2300.

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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, June 2, 2016
PUBLISH: DAILY SUN NEWS
Wednesday, June 8, 2016
Bill: FC3463-100-120

[redacted]

Cost To Publish
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YAKIMA HERALD - REPUBLIC

INVOICE

114 N. 4th Street PO Box 9668 Yakima, WA 98909

Date: 06/08/16

Account #: 110536
Company Name: YAKIMA COUNTY SURFACE WATER MANAGEM
Contact: Tina Beck,AP
Address: 128 NORTH 2ND STREET ROOM 408
YAKIMA, WA 98901
Telephone: (509) 574-2343 Fax:
Account Rep: Simon Sizer- Legals - 398
Phone #: (509) 577-7740
Email: ssizer@yakimaherald.com

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Yakima County Notice of Public Meeti

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# of Inserts:	2
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Date Authorized 6/10/16

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Yakima County

Notice of Public Meeting Lower Yakima Valley Groundwater Advisory Committee

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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, June 2, 2016**

(651461) June 8, 2016

YAKIMA HERALD-REPUBLIC

Affidavit of Publication

STATE OF WASHINGTON,)
)
COUNTY OF YAKIMA)

Debbie Martin, 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 06/08/2016 and the last insertion being on 06/08/2016

Yakima Herald-Republic 06/08/16
YakimaHerald.com 06/08/16

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

Debbie Martin

Accounting Clerk

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

Sworn to before me this 8th day of, June 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

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

Dated this **Thursday, June 2, 2016**

(651461) June 8, 2016

[Education and Public Outreach]

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Andres Cervantes (GWAC-DOH), Jean Mendoza (GWAC-Friends of Toppenish Creek), Elizabeth Torres (Citizen), Gretchen Stewart (EPA), Nieves Negrete (Citizen), Patricia Newhouse (GWAC-Citizen Rep Position #2), Joye Redfield-Wilder (Ecology), Stuart Turner (GWAC-Turner & Co), Ignacio Marquez (AGR), Jessica Black (GWAC); Lisa Freund (Yakima County-Chair)

Meetings/Calls Dates

Meeting: Monday, April 25, 2016 from 12:30 p.m. to 2:30 p.m.

Participants

Lisa Freund (Chair-Yakima County), Patricia Newhouse (GWAC-Citizen Rep Position #2), Jim Davenport (Yakima County) Gretchen Stewart (EPA), Jessica Black (GWAC), *Andres Cervantes (GWAC-DOH), Ignacio Marquez (AGR), Joye Redfield-Wilder (Ecology), Lee Murdock, Chris Saunders (Yakima County)

*Via phone

Key Discussion Points

The meeting was called to order at 12:38 p.m. Lisa reviewed the agenda, noting that an additional agenda item – a request by Wapato High School students for water quality info – had been added. There were no objections to proceeding with the agenda.

Phase II High-Risk Well Assessment Survey

Lisa presented the summary of EPO's activities which was delivered at the April 21st GWAC meeting. The well testing concluded on March 31st, an extension from their previous deadline of February 29. The group exceeded their original target of 200 wells and tested 290. The contract was amended twice to meet the unexpected demand, increasing the payment from $50,000 to $72,500 out of the $100,000 budget approved by the GWAC.

The first 115 results letters were issued in January to the 2015 participants. The mailing contained information on the proper maintenance of septic systems, private well-testing, coliform, etc. Mailings continue to be sent out monthly as test results are received from the health district. To date, 175 results letters have been sent out. The letters are tailored to the individuals' results. There are three basic Nitrate results letters, one for 5 mg/L of contamination or less, one for between 5-10 mg/L, one for 10 mg/L and three additional variations based on coliform results. The letters recommend a testing schedule best suited to their needs.

Households with high contamination levels receive a phone call from the Yakima Health District (YHD) informing them.

Lee Murdock is conducting quality control over the data. There are 5,732 known well locations within the GWMA. Since well registration only began in 1972, there are an unknown number of older, unregistered wells out there.

Discussion ensued on what the group wanted to get out of mapping these results. County staff felt that people's confidentiality could be maintained, since one dot on a map of the GWAC would cover a large enough area that onlookers would not be able to identify exactly which property the dot was associated with.

Other members were interested in whether the dots on the map would be clustered together, potentially indicating that they had heard about well-testing via word-of-mouth. A variety of sources may have contributed to increased public awareness of water quality issues, including EPO's outreach fliers and direct mail, plus local news coverage of the program, and national media attention paid to the Flint, Michigan water crisis.

A member of the group inquired whether anyone knew the percentage of households with water filters. The short answer is no. Both the Phase I and Phase II surveys asked household residents about filtration systems, the second one in more detail, but there is a gap in knowledge about how often they're maintained, in addition to turnover within the household, with people moving out and new ones moving in, making tracking difficult. In addition, there's the cost factor. Many low-income families may not have the disposable income to purchase and maintain a filtration system.

Prevention Campaign, Recommendations and Next Steps

Gretchen Stewart's ad hoc group had a phone conversation Friday morning about possible directions of volunteer outreach in the Lower Valley. Prior volunteers had been ill-prepared to deliver presentations on nitrate contamination of groundwater without visual aids, so it would be desirable to produce some kind of "traveling visual aid" for use at community events, etc. Volunteers could also carry hand-outs with web addresses to pertinent sites such as the GWMA.

So far, only one GWAC member has volunteered to do public outreach and education, Pat Newhouse at the Sunnyside Health Fair on May 19th. Discussion ensued on the merits of horizontal vs. vertical banners advertising who we are, what graphics such banners should contain, cost, etc. Gretchen suggested that if Lisa would visit the website she had referenced,

they would send back design options within 5 to 10 days. As to the substance of the information contained in any hand-outs and banners, it was generally agreed that what was on the GWMA website was the "party line", so to speak, and that anything beyond that would require approval of the GWAC.

A member of the group commented that it was unclear what kind of outreach group EPO is supposed to be, passive or aggressive. In his view, the kind of outreach that has been done to date falls into the "passive" category, of making information available at community events, while an "aggressive" role would entail making presentations at conferences, etc. Jim Davenport stated that given the diversity of stakeholders on the GWAC, members would be very leery about allowing any one person to speak on behalf of the entire group. Until some kind of consensus is reached on a common approach, someone on the committee will object. The member agreed that any information presented ought to be neutral and factual, and not veer into advocacy for any particular position or interest.

Wapato High School Outreach

Dr. Jessica Black offered to contact the student who had written the Department of Ecology (DOE) about nitrate contamination. She mentioned that whatever hand-outs the GWMA produced would need to contain information connecting people on the Yakama Nation to the proper public health authorities. There has been confusion on this point in the past. Lisa noted that the GWMA materials list the Indian Health Services contact information and phone number for Nation residents.

Review and Update 2016 Strategy

Present to 12/2017	**Post-GWMA Approved Plan**
School education – Heritage/Jessica Prevention – Well testing Current materials exist New Moms Babies	GWAC Recommendations IAWG (Irrigators)

The next EPO meeting is scheduled for Wednesday, June 1st.

The meeting adjourned at 2:15pm.

Resources Requested

- None

Recommendations for GWAC

- None

Deliverables/Products Status

Lee Murdock will supply EPO members with the web traffic statistics regarding how many people are using the GWMA website as a source of information.

Lisa will work with Gretchen to design and price the cost of a banner.

County will supply Pat Newhouse with a horizontal and/or vertical banner and document holders for the Health Fair display table.

Proposed Next Steps

June meeting:

- Review the target audiences identified in the EPO's 2012 Outreach Plan and identify the top three to target in 2016.
- Develop 2016 outreach based on the top three audiences identified.

Attend Data Collection, Regulatory Framework and IAWG workgroup meetings to identify their post-GWMA adoption educational needs.

Prepare a summary of well assessment survey project (Lisa); map the survey results (Lee)

Lower Yakima Valley Groundwater Management Area Advisory Committee

[Education and Public Outreach]

Charge from Groundwater Management Area Advisory Committee m

Working Group Members

Andres Cervantes (GWAC-DOH), Jean Mendoza (GWAC-Friends of Toppenish Creek), Elizabeth Torres (Citizen), Gretchen Stewart (EPA), Nieves Negrete (Citizen), Patricia Newhouse (GWAC-Citizen Rep Position #2), Joye Redfield-Wilder (Ecology), Stuart Turner (GWAC-Turner & Co), Ignacio Marquez (AGR), Jessica Black (GWAC); Lisa Freund (Yakima County-Chair)

Meetings/Calls Dates

Meeting: Wednesday, June 1, 2016 from 1:30 p.m. to 3:30 p.m.

Participants

Lisa Freund (Chair-Yakima County), Jean Mendoza (GWAC-Friends of Toppenish Creek), Patricia Newhouse (GWAC-Citizen Rep Position #2), Jim Davenport (Yakima County) Gretchen Stewart (EPA), Andres Cervantes (GWAC-DOH), Ignacio Marquez (AGR), Joye Redfield-Wilder (Ecology), Karri Espinoza (Yakima County)

*Via phone

Key Discussion Points

The meeting was called to order at 1:35 p.m. Lisa reviewed the agenda, no additional items were added.

Sunnyside Health Fair

Pat and Lisa attended the Fred Hutchinson-sponsored Health Fair in Sunnyside on May 19 where they hosted a GWMA table. The event was moved indoors due to the weather which allowed for the tables to be closer together making the flow of the event run smoother. 120 people visited the event, mostly women with children, but also a few men. GWMA materials in English and Spanish were provided and visitors were invited to complete the public survey.

Lisa complimented Pat's technique for soliciting survey participation, noting that even if people said they lived in Sunnyside, Pat would ask them if they had family or friends who lived in the countryside. If they said "yes," Pat gave them a survey to pass along to those people. This technique should be continued at the upcoming health fairs to increase survey participation.

Pat noted it is imperative that at least one person volunteering at a Health Fair speak Spanish, as approximately 80% of the visitors preferred to speak in Spanish. Also, providing activities for the children is important to keep them entertained while their parents talk to staff and fill out the survey. Clip boards are also needed for visitors' to use when filling out the survey. Some photos were taking and photo release forms were signed by the visitors so photos can be posted to the website.

Upcoming Health Fairs
There are 4 more Health Fairs scheduled for this summer and more volunteers are needed, especially at the Zillah health fair (Sunday, July 17), which no one has signed up for. Members were encouraged to sign up. Pat observed that two volunteers per health fair is ideal.

Volunteers will not be responsible for set up or take down of the booth. Yakima County staff will bring all the supplies and set up the booth before the event, and take it down afterwards. Volunteers just need to attend and work the event.

Test strips: at upcoming health fairs, test strips with an instructional card will be offered to people on private wells so they can test their water. A self-addressed stamped envelope will be provided for them to return their test results to the County.

Gretchen and Ignacio are working on coloring sheets for children who visit the booth. Lisa noted that if they provide her the print-ready coloring sheets, the County will print them before the next event.

ACTION: **Lisa will follow-up with Jessica Black to see if any Heritage University students would be willing to volunteer for future Health Fairs or other events.**

Lisa will send Gretchen the GWMA logo for the coloring sheets.

Gretchen will work with Ignacio and Andy to create the coloring sheets. Lisa asked that the print ready materials be provided to her by next week (June 10)

EPO Outreach Plan - 2016

Gretchen Stewart reported that the ad hoc committee had discussed target audiences and the best advertisement avenues to reach them. They determined that the general public in the GWMA was the primary target audience.

These following avenues were identified:

- Billboards
- Radio
- Fliers
- Website
- Medical Environments (clinics etc.)
- Health Fairs
- Publications from Irrigation Districts
- Irrigated Ag Working Group

General Outreach	Partnership with Irrigated Ag Working Group	Established Projects
• **Billboards** • **Health Fairs** • **Displays**	**Wait for the IAWG to produces a report of their findings and needs.**	• **Test Strips** • **GWMA Website** • **Radio** • **Well Testing** • **Surveys**

The ad hoc group also recommended partnering with the Irrigated AG Working Group (IAWG) and the Irrigation Districts to conduct outreach. Finally, the group came to the conclusion that program sustainability, primarily through the website, should be a focus of outreach.

Jim Davenport noted that the EPO/IAWG partnership idea is timely. It will be important for the IAWG (and other technical groups) to identify who they want to educate, what they want to educate them on, and what goals they want to reach (define the program), and then bring that information to the EPO so the EPO identify how to implement the program, and how much it would cost (program design, budget.) One possible example is promoting annual soil sampling. The IAWG should be ready to have this discussion in the next couple of months.

A discussion began about the website content and link locations, this conversation was tabled until a County website representative can be determined and provide information on the back-end.

Billboard Campaign
Lisa obtained a quote from Lamar for a billboard in the lower valley that is not on the reservation - $600 + installation for 4 weeks. The billboard faces east and is 10 x 20 feet with an estimated 35,000 impressions a week.

ACTION: **Jean will forward the Clean Air Authority website link to Lisa.**

Joy will forward the Story Map link to Lisa.

All members will take a look at the GWMA website and review its current content.

Pat will look for other billboard companies in the lower valley area and pass that information to Lisa so cost and availability can be obtained.

The next EPO meeting is scheduled for Wednesday, July 6th.

The meeting adjourned at 3:10pm.

Resources Requested

- None

Recommendations for GWAC

- None

Deliverables/Products Status

- Lisa will send Gretchen the GWMA logo to create print-ready publications.
- Lisa will investigate the number of web hits to the website provide that information to Gretchen for ad hoc consideration.
- Jean will forward the Clean Air Authority website link to Lisa.
- Joy will forward the Story Map link to Lisa.
- [Placeholder] deliver more New Mom flyers to area hospitals (unassigned)

Proposed Next Steps

- [Placeholder] Initiate outreach partnership with IAWG when that group is ready to move forward.
- Well testing: Add test strip kits to health fair information.
- Develop and implement a billboard campaign that promotes GWAC-approved messages (well testing, new mom and infant information, etc.)
- Develop partnerships with other agencies and/or providers who can help sustain the GWMA messages beyond the life of this group.

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

When: April 19, 2016, from 1:30 pm to 3:30 pm.

Call: (509) 574-2353 – Pin # 2353

Participants

Troy Peters (Chair), Kathleen Rogers, Doug Simpson, Frank Lyall, Jean Mendoza, Larry Fendell, Jim Dyjak, Laurie Crowe*, Ralph Fisher*, Scott Stephen*, Stu Turner, Ron Cowin, Dan McCarty, Steve George, David Bowen, Ginny Prest, Anthony Dorsett, Perry Beale, Bobbie Brady (Yakima County support staff)

*via telephone

Key Discussion Points

Chair Troy Peters opened the meeting at 1:35 PM. He asked everyone to introduce themselves and acknowledged the persons on the phone.

Update on the N Prioritization Project/Nitrogen Loading Assessment – Perry Beale

Troy asked Perry Beale to provide the group with an update on the N prioritization project/nitrogen loading assessment. A member voiced a concern about Perry presenting the draft of his project to the group as it had been explained to other working groups that the assessments would not be disbursed to the groups until the peer review had been completed on all three components. A discussion ensued around the following points:

1. Some members were concerned that the peer reviewers were acting as a sensor for the groups. They felt that the purpose of the peer review was to assure accurate methods for the collection of data and not what it means.

2. Another member felt that the materials should be released immediately with a giant asterisk noting that the material contained raw data and was still awaiting peer review. Further, the caution should be included that the group shouldn't jump to conclusions about the material and that it was important to work with experts when reviewing the material for a better understanding of what had been learned as a result of the assessment.

3. Most felt, however, that the disclosure of the assessments prior to peer review would have gone a long way toward transparency among the various members of the groups. A member went on to say that while the process couldn't be altered now they felt that as the GWAC continued to move forward it would help if the groups were allowed to examine the data with a caution not to jump to conclusions.

The group concluded that they did not have a problem with Perry Beale releasing the data today and that they would accept the caution not to jump to conclusions until the assessment had gone through the peer review process.

With that Perry Beale passed out the N Prioritization Project/Nitrogen Loading Assessment. He also emailed a copy to those calling in by phone. (In addition, the assessment and draft report were emailed to Yakima County Support Staff for distribution to the working group). Perry asked everyone first to refer to the legend. He pointed out that the green columns represent N inputs, the yellow columns were informational – either crops/acre or lbs./acre. Orange represents N output and blue was the N totals – the darker blue is per acre and the light blue totals.

The group then had a chance for review and to ask questions as follows:

1. A member asked about several columns on the backside of the chart – AH and AI. They wanted to know what the number was at the bottom of these columns and noted that one was a negative (-) number and one was a positive (+) number. Perry explained that columns AG, AH and AI represent the low, medium and high ranges. A member asked a follow-up question to this as they wondered what the primary factor was for the variance in these number. Perry explained that it was due to the range in rates of fertilizer application and soil conversion. He added that if you multiplied the low number it was good for nitrates and the high number would not be. The main driver of the disparity is the rate of nitrogen in commercial manure, compost, fertilizers.

2. A member asked about loss to nitrogen loss to atmosphere 17 lbs./acre Perry indicated that he can fine tune this a bit. Another member had already provided him with some good information but the piece had already gone to peer review. He will update the number when the review is complete. Another member pointed out that there was a wide range of numbers out there and loss is influenced by temperatures and climate. Stu Turner felt that the number didn't seem right as well and could provide Perry with additional information and research.

Update on Meeting with the WSU Faculty – Perry Beale

Perry informed the group that he had met about the Irrigated Ag piece of the Nitrogen Loading Assessment with WSU faculty Dr. James Harsh, Chair Crop & Soil Sciences, Professor/Scientist; Dr. William L. Pan, Professor, Scientist & Extension Specialist; Dr. Haiying Tao, Assistant Professor Nutrient Management Specialist; Dr. Dave Huggins, Soil Scientist, USDA – Agricultural Research Services and Joe Harrison, Animal Scientist & Extension Specialist WSU Puyallup was in by video conference. The group had had a chance to review the assessment and mass balance sheet prior to the meeting and Perry provided the group with additional background as they first met. He didn't spend as much time providing an in-depth overview of the mass balance sheet, but wanted to talk to them about the model and was willing to accept and be open to different inputs if it could be backed up with science. Perry reported that after reviewing the piece the WSU personnel were very excited about what the Irrigated Ag group is doing. They said the mass balance method is accurate and that no one had done this without book value. Off the record they said that there was a large hole in this kind of research and they would have grad students work up new projects.

Ginny Prest spoke up and said that they were working out a contract with DMNP to update a nutrient balancer tool from DOS days in the 90's. The funding for the update is from an education provisio through the Legislature to help farmers dial in on manure management. They have already been to Yakima Valley to meet with farmers and were looking at the data from the deep soil sampling. Troy asked how this tool would feed into what the working group was doing. Ginny responded that it would help where people were struggling with identifying/quantifying inputs. She went on to say that if someone was only looking at nitrates and ammonia not organic material they could overapply. This tool would allow them to factor in the organic material and its impact.

A member asked Perry if he taken samples before or after – Perry reminded them that he had mentioned last meeting that the survey results came from talking to people. He also noted that he had previously disclosed that people may have been conservative in their responses. Perry indicated that because people had thought something was missing he called back to check up again on their responses.

A member pointed out that volitization denitrification process goes on in soils and wanted to know if this was accounted for. Ginny responded and said that this is a bigger player in Western Washington where there is shallow groundwater but not as big of a player here in Yakima County. In Yakima County it would be more particular to a field due to poor drainage or irrigation season. She felt this would be a de-minimis number but that the group should still make sure we recognize it and have a scientific article agreeing with it. Ginny said she would look for an article.

Jim Davenport expressed concerns about the percentage data in yellow columns F, J and N. He noted that if you add the percentages you get more or less than 100 percent. If you did N commercial than the rationale is fairly developed. He went on to say that he was uncomfortable with the lack of information to determine those percentages in both in the deep soil sampling and personal interviews. He asked the group if they had any thoughts as to where they could get this information from. He went on to say that the Regulatory group had learned that fertilizer companies pay tonnage to the State but that there is no way to dial this information down to

Yakima County. Someone suggested that the group could ask fertilizer companies. Ginny said that she contacted the Department of Revenue, but the information is mixed up with seed and other things. Another member thought it might be possible to go to the fertilizer companies directly for the information, but they had no incentive to provide it. Jim's concern that this was only one side of the percentage split with fertilizer – it does not handle manure. His concern stems out of the fact that if you start changing the number in the spreadsheet the weighted average will change. He went on to issue a challenge to the group to find a way to determine the percentages of commercial fertilizers/manures in the GWMA. He felt this was important because the group is trying to strategize and this information would better direct the group where to focus their time. A farmer always has the choice to utilize nutrients from a source they choose. In a perfect world you could line out the variable to producers. Jim wants to know Perry's estimates are solid.

Ginny commended Perry for his work noting that he was professional at looking at the new information (integrity but with a human element). Chair Troy Peters asked if there were any more questions for Perry Beale

A member asked if at the meeting with WSDA faculty recommended any changes to methods. Perry said, no, they said these are good and noted that no one had used estimates from a survey in their work before. It had been his goal to get 30 percent but mostly got 50 to 60 percent. WSU was ok with that. He added that he had sent his survey methodology to WSU to look at as well and they felt good about it and didn't feel a need to change it.

A member wanted a list of references behind Perry's work – Perry explained it was in the draft that would be sent out. She asked about his methodology for the survey work. Perry said he used a telephone. He then noted that his Quality Assurance was in the project plan as well so the member could review it. He did not ask for last names of the people he spoke with people on the phone on purpose but he contacted five primary commercial consultants in Yakima. Every single person he spoke with was an agronomist. He kept them protected out of the GWMA by not procuring names. He believed the information was accurate. The member noted that you have to be able to replicate methodology in order to have good science. Perry responded that the member could call the same companies and come up with the same results – Bleyhl, Simplot, Wilbur Ellis and GS Long. All sources were documented by type - many consultants, other growers, warehouses. Also, Stu Turner looked at the data too and provided Perry with local knowledge. Some people were precise in reporting to Perry and others, but people generally were afraid to share.

The member then asked Perry if he kept a written record when he called – Perry said chicken scratch on notes as he input information immediately in the mass balance sheet.

Another member mentioned that since the report draft is in peer review does it go back to peer review if there is no change to methodology. No, it would only go back but if there are changes to data.

Perry said that he double checked models/estimates with soil sampling data – DSS data is in part of it. He thought the DSS data was good data – really good data. He won't do additional soil sampling averages.

Status of Deep Soil Sampling Project

Laurie Crowe told the group that they had a goal to procure 45 samples in the last round of deep soil samples this spring. That would mean they have procured 186 total samples in all of the rounds which is slightly off from the GWAC goal of 200. She went on to say that if the spring sampling costs about the same they will have about $45,000 remaining. Each six foot sample costs about $1,300. This would provide enough money for another sampling to be done in the fall so the question is do we need another round of sampling. A member asked if any areas need to be resampled. Laurie said, yes, a few samples caused her to raise her eyebrows and wonder why. Resampling would allow her to determine if the original samples were abnormal. A member asked Laurie how many samples she thought she would like to retest. Laurie said 12 to 24 but that number will depend on this next sampling.

Someone noted that in a past meeting the group had discussed giving 1/3 of the $45,000 to RCIM to test septic systems. Another suggestion was made to use the funds to help producers find out how good they are doing with nutrient management – to allow those guys to do sampling.

It was agreed that the group keep $30,000 for retesting to further verify the integrity of the sampling process. Not only would this allow for a reverification of the greater body of data, but the group would also know if hot spot existed. $30,000 would allow for resampling of about 23 sites she had questions about. It was suggested that she change the sampling plan to look at the hotspot and possibly do six cores randomly distributed and one at the original testing site. Troy will recommend to the GWAC (and the group was in agreement) that the remaining $15,000 be given to RCIM for deep soil sampling of septic in drain fields. Laurie went on to say that there is also a MOU (Memorandum of Understanding) with the County that will require discussion. Jim Davenport said that the decision to reprioritize the funds will be done in Vern's office.

A member voiced concerned about Laurie's group doing the septic testing, but Laurie spoke up and informed the group that she had discussed this already with Bob Farrell (then chair of RCIM) in a meeting early on in 2016. She stated that septic testing would take on a whole different protocol and is much more complicated to do therefore it would be done by someone else. Ginny noted that septic issues were starting to be addressed on the west side of the State and it would cost homeowners a lot of money to make the necessary changes. Other members also expressed concerns that there is a variability of soils, size of septic system, and how much water pumped.

A member brought up biosolids and said two meetings ago Stu provided a per ton number he didn't feel was accurate. Stu said he would bring the analytic sheets from Natural Selection Farms and will get raw data to the group. Per acre application is what was important not this number. Stu will send to Bobbie. It was noted that a presentation was made on the subject of biosolids to RCIM and this was their business not Irrigated A.

A member went on to say that the dynamics of where organic material goes is changing. Previously it wasn't send out beyond Yakima County but now they do. A member indicated that there were three big players that produce 90 percent of the product – Ginny/Stu could provide with information. They are arranging transport and could tell us where it went. Jim Dyjak concerned about this item. Another member said that no inspection reports have been received but were asked for. Ecology is trying to do this – everything being composted and exported off

site. A member concerned about the term "export." Apparently this means going off one farm to another – not exported oversees. Ecology cognizant of the term and is not using it – they have changed to the word "transfer." Ginny said that WSDA is asking dairies on the newly added form where they are transferring manure. Perry did not at transferring and said that Column I could be on their property or someone else's.

How Do We Solve the Problem of High Nitrates in the Groundwater – List and Prioritize Potential Solutions.

Troy explained that as the new chair of the working group he wanted to take time to strategize what the group wants to accomplish and how the group will go about executing the strategy in order to make a list of priorities and agenda items for future meetings.

One member spoke up and said that they had learned from a report at the Regulatory meeting that the Irrigation District cannot dictate irrigation standards on property. Therefore, they see the need for:

1. Educating irrigation users on the consequences of irrigation usage. Get them engaged in the goals of GWMA because they know how and where they are putting the water. We need to broaden the pool of people we are speaking to.

Another member said that the groups had heard frequently the term "precision ag," but it requires gathering accurate data. It was her suggestion that the group:

2. Create a giant data base. We don't have the data base to see the impact on human health.

Another member spoke up and said that most often the group had procured preseason soil sampling and they would like to see the group work out of way of providing for the:

3. Cost of hiring sampling done, subsidies, measuring equipment, personnel or self-test kits.

Another member wanted to see if there was some way to:

4. Have people develop and create irrigation management plans (similar to nutrient management plans) and assist with the cost share of this program. They were not suggesting more regulations but felt there would be a benefit to expanded recordkeeping because it would provide the ability to tell a story with data.

This member also noted that they were surprised to see the changes already being made with manure application directed right were the crop is. Another member was concerned that dairies were required by law to have a nutrient management plan but no one was required to follow it. He wanted them to disclose the whole nutrient management plan.

Jim Davenport and Jean Mendoza advised the group that at the last Regulatory meeting it had been decided that the group would summarize the regulations pertaining to each nitrate source. They would then provide the information and refer it back to the groups so that they could explore how best to solve each issue and make recommendations to the GWAC.

Laurie spoke up and said that as a result of the deep soil sampling many grower participants came back once they received the results of the tests to find out what they could do better. She felt this had been a very good tool.

5. Assist with education/outreach group. Ginny said the group could make another request for provisio monies to help with this. This could focus on precision water delivery – what you need with surface area. A member pointed out that fertilizer application is the other half of water application and should be addressed too. Fertilizer is the nail and the hammer is water.

A member wondered if the ditch riders could help with the education. Ron Cowin added that the only time irrigation user's supply is cut back is if they are flooding out, but that a farmer has a minimum or maximum amount they can order. Another member thought it would be difficult for someone from the outside to tell a farmer how much water they should use as they don't know the whole story. They went on to say that farmers are just doing their best mixture of art and science.

6. It was suggested that dilution is the solution and that the group should find opportunities to do groundwater recharge. One potential avenue was to fill the irrigation canals with water and just let them sit. It was noted that this would be difficult for those managing the irrigation system. However, they do this in Idaho. They don't deliver the water to anyone – the water just sits in the canal. Ron Cowin responded and said the irrigation districts do maintenance in the winter. Another member asked could we increase the staff? Ron added that you would have to continually put water in the system and would have to increase the staff to do it. Another member asked how this strategy addresses nitrates and the response was that it would dilute them. Ralph spoke up and said that he could get names of the Idaho Department of Water Resources personnel as they actively do this and the group could learn more. Another member questioned how would it work politically, how would irrigation districts be compensated and how would it work with water rights. Ron voiced a concern about laterals because they don't completely seal up and water can get to the flow meters and they can freeze. Someone else said that the group would need to work with the Bureau of Reclamation and would need funding to make the changes in the infrastructure.

Another member asked if there had been a cost/benefit analysis of this?

What can the Irrigated Ag Working Group do about it – List and Prioritize Potential Working Group Priorities for the Coming Year?

Jim Davenport said that the group could come up with a list for the GWAC that would contain characterization and strategies for solutions. Then the list could be filtered down to the items the group felt by consensus that they could engage in. The larger list could be created in one or two meetings and then the group could whittle it down – tossing out those ideas they could not settle on. This would look similar to what the group just did, but look at coming up with more ideas. It was his hope that the group would come back with more plans so they would be able to say definitively – this is what we want to do. A member suggested that this not be just regulations, but voluntary actions as well as these could be more effective.

Troy felt education, outreach and cost share were both good ideas because of public benefit and public harm. He felt this could be done in the area of irrigation water management, nutrient management plans could be a win/win if we didn't hit with a hammer, as well as dilution.

A member felt that the group also needed to consider how the ideas are going to be administered and monitored.

Chair Troy Peters adjourned the meeting adjourned at 3:30 PM.

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

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

When: May 17, 2016, from 1:30 pm to 3:30 pm.

Call: (509) 574-2353 – Pin # 2353

Participants

Troy Peters (Chair), Kathleen Rogers, Jean Mendoza, Scott Stephen*, Ron Cowin, Dan McCarty, Anthony Dorsett, Jim Davenport, Dave Cowan, Chelsea Durfey*, Bobbie Brady (Yakima County support staff)

*via telephone

Key Discussion Points

Chair Troy Peters opened the meeting at 1:30 PM. He asked everyone to introduce themselves including those on the phone. He also asked if anyone else had additional agenda items – there were none.

List Potential Solutions to High Nitrates in the Groundwater that are in the Purview of the Irrigated Ag Committee

Troy reminded everyone of the group's list of potential solutions formulated at last month's meeting:

1. Irrigation management education;

2. Giant database;
3. Subsidize soil sampling and analysis to ensure that the right amount of nutrients is being applied;
4. Subsidize irrigation management plans (similar to nutrient management plans);
5. Education and outreach;
6. Winter recharge/dilution is the solution.

The first agenda item was to brainstorm more practical solutions and then to narrow the list to the best. Solutions could be in the form of education which would change grower behavior as they become aware of the benefits they are not realizing. Solutions could also be incentives (where the action is not economical) that would cause different behaviors. Further, he explained that a solution might be regulatory which would require the change in behavior. The following solutions were suggested and discussed by the group:

1. Jim Davenport said that he had heard an idea recently that would have the Irrigation Districts ask the landowner to demonstrate that they do annual soil testing, i.e., answering a question yes, I have done it or no, I have not. This could be done simultaneously with the confirmation by the Irrigation District that the landowner's water bill had been paid. The goal would be to put the Irrigation Districts in the position of gatekeeper not enforcer. Troy commented that the Irrigation Districts had already demonstrated the proven ability to do this effectively when they required cleanup of the return flows to drains. A member pointed out that not everyone in the valley gets their water from Irrigation Districts but it was acknowledged that most do.

   The members discussed average costs of soil sampling, where the tests were presently performed and the number and depth of the samples. The group learned that the number of samples per field is dependent on topography; the depth was dependent on the crop as the goal of the sample is to be in the root zone of that specific crop; and, the tester may procure 10 to 15 core samples, mix them together and send in one sample giving them an effectively representative sample.

2. Jim Davenport thought that since there are studies of crops which include information on which "need/use" the most nitrogen it could be presumed that some crops are better than others and a "quota" system could be developed. Jim pointed out that there was a zoning device already in place that regulates land use and that would allow for those areas zoned agriculture to be divided into categories to provide a structure for this idea. He did realize however that this idea may not be good economically and might be extreme.

3. The group discussed the following points which they felt were important to address through education:

   - Which areas can tolerate more nitrogen and which are more vulnerable to its application.

   - A high priority to educate people so that they could determine the agronomic rate of application. The member felt that if more people were educated it would be better for the soil, cost less money and potentially create a return sufficient to

cover the investment of soil sampling or hiring an independent consultant. The member went on to point out that a soil sample allows you to know what you have first and allows for better data based decisions.

The group was unsure as to how to deliver this message. Jim explained it would be important to identify the subject audience and who would best serve as the educator. Other members pointed out 1) that classes are frequently offered with varying incentives and they fail to draw a good number of people; 2) efforts like the deep soil sampling provided a great opportunity for education as people saw their results and asked what to do about it; 3) incentives could be given to those who attended educational meetings; and, 4) it is important to show growers that they could profit from education.

Jim Davenport pointed out that other groups, i.e., lawyers and doctors, were required to earn a certain number of mandatory continuing education credits annually and that perhaps this requirement would be good for growers as well.

Jim Davenport explained that he had asked Lisa Freund, Chair of the Education Public Outreach, to be prepared to do a cost analysis of public education programs.

4. Jim Davenport posed the question – "where is a good place to interject new ways of doing things so growers can be helped in the future?" It was agreed that the Conservation District has a lot of programs that help growers. Perhaps if it were better funded and better staffed it could provide education, information, sampling in a more complete manner to better back up the farmer in these areas. The Conservation District is already set up to do this and are technical experts to other groups. Most of their funding comes from the writing of grants and most of these grants come from the Department of Ecology. It makes it very hard to take on long-term employees with this kind of soft funding.

5. Another member suggested moisture sensors might be subsidized for growers to help with monitoring and management. The group felt this was important as water moves nitrogen. Troy explained that in his experience it wasn't enough to just have data but growers would need help interpreting it too. Moisture monitoring costs were estimated to be between $1,200-$2,000/site for a season.

6. Jim Davenport suggested it would be important over the long term to collect data on how many acres in the GWMA were fertilized with manure and how many were fertilized with commercial fertilizer. An irrigated agriculture nutrient management plan could require everyone who farms over a half acre to provide the source and type of their fertilizer and how many acres it was applied to. He also desired to see representatives of the commercial fertilizer industry at the table to talk more about this issue.

7. It was suggested that a graph or chart be prepared and money procured for its distribution. The chart would list volumes of water, soil types, compaction rate, depth of water applied and preceding moisture levels. The group all agreed that this was be very helpful and an easy reference for farmers.

8. The group also discussed the issue of subsidizing some of these efforts. A member noted that this had been done in the Columbia GWMA and the consultants submitted the

paperwork for the grower. Jim Davenport pointed out that agency law prohibits the gift of public funds. One suggestion was to charge the grower less and get funding from another source. Another suggestion was to tax everyone and then pass a loophole. An assessment could provide hard-money funding for the Conservation Districts.

9. A member voiced a concern about offering another subsidy to one of the most heavily subsidized industries. The group discussed the flaws of the dairy nutrient management act, what that act is, the fact that it is not regulated and its impact on irrigated agriculture. It currently requires that the dairy provide the landowner with a copy of the manure analysis and how many acres applied to but currently no soil sampling is required from the third party. It was suggested that soil samples from the third party could be required before a dairy would be allowed to export the manure. Additionally no data is collected as to how many acres are impacted by manure exportation. It was suggested that this be addressed as well.

Discuss and Prioritize for Recommendation to the GWAC

The group contemplated what needed to be done with these ideas. Jim passed around a handout he had prepared entitled "Winnowing of Alternatives" and went through it with a group. It provided a methodology to winnow down potential solutions to high nitrates in the groundwater that are within work group purview.

The group agreed to follow this format and to get cost estimates of initiating each suggested solution. They would also need to determine if the solution would be eligible for a subsidy and how this would work.

Conclusions. Review of Action Items. Dismiss.

Troy added that WSU has funding that might be available for education.

It was agreed that the group would continue to consider and formulate more ideas in the interim time. Further suggestions can be emailed to Troy/Bobbie and compiled for the next meeting.

It was also agreed that the group would hold another brainstorming session next month that would hopefully include more of the members of the Irrigated Ag working group. Then the group would begin to winnow out as described in the handout so that they would have a list of solutions to submit to the GWAC.

Chair Troy Peters adjourned the meeting adjourned at 3:00 PM.

The following is a record of the white board lists prepared by Troy Peters during the meeting:

List One

1. Irrigation Management Education target . . . who, when and how (row crops, liquid applied).
2. Giant database.
3. Subsidize soil sampling and analysis.
4. Subsidize irrigation management plans.
5. Education and Outreach.

6. Winter recharge? Dilution is the solution?
7. Evidence of annual soil testing required for water deliver.
8. Crop mix – regulated crop acres for different crops.
9. USGS model to target hot spots with education.
10. Agronomic rates.
11. Better funding to Conservation Districts.
12. Soil moisture monitoring.
13. Mandatory continuing education? For growers?
14. Depth of water penetration.

List Two

1. Education and outreach
2. Encourage better irrigation management
3. Encourage better nutrient management

List Three

1. Better funding to Conservation Districts:
   - Hard-money funding
   - Increase property tax assessment
   - Create exceptions for behavioral change like testing and monitoring
2. Require evidence of these things
3. Require soil samples from those who apply dairy waste
4. WSU Extension help

Recommendations for GWAC

Resources Requested

Deliverables/Products Status

Proposed Next Steps

- Jean brought up manure application. Scott said that there are a lot of good models out there that will tell you what to expect – he will send information directly to Jean on this.
- Dan McCarty pointed out that NRCS has a specific pot of money for air quality improvements in certain counties and wondered if this was available to the GWMA. He was asked to write up his idea and send it via email to Troy.
- Jean spoke about a list of BMP's drafted by the Department of Ecology in 1996. Several members agreed that Irrigated Ag already have an analysis of BMP's that Jim Trull did at the first meeting – Troy will find this list for the group.

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

When: June 28, 2016, from 1:30 pm to 3:30 pm.

Call: (509) 574-2353 – Pin # 2353

Participants

Troy Peters (Chair), Jean Mendoza, Scott Stephen, Ben Sullivan, Ron Cowin, Dan McCarty, Anthony Dorsett, Jim Davenport, Laurie Crowe, Frank Lyall, Stuart Crane, Eric Weber, Ben Lee, Ralph Fisher*, Chris Saunders (Yakima County support staff)

*via telephone

Key Discussion Points

Chair Troy Peters opened the meeting at 1:35 PM. After the customary introductions, the group listened to a presentation from Eric Weber and Ben Lee of Landau Associates, the geotechnical firm the South Yakima Conservation District (SYCD) had sub-contracted with to conduct deep soil sampling in the GWMA.

Landau Associates – Deep Soil Sampling Presentation

After noting at the outset that everything contained in their presentation should be considered still in draft stage, Eric and Ben outlined their methodology. Four rounds of sampling were conducted: fall 2014, spring 2015, fall 2015, and spring 2016. Each one was timed to correspond with the beginning and end of harvest season. Sample sizes would vary, from a low of 163 fields

sampled in fall of 2014, to a high of 324 in the fall of 2015. The same crew and the same lab was used in each round of sampling. The crew's field notes contain information regarding the weather, crop type, irrigation technique, comments made by the farmer, whether two samples were taken nearby each other, whether the farm was adjacent to a dairy, and generic maps of the premises. Specific details about locations were not recorded. Fields sampled in one season were not resampled in another.

The data Landau collected was sliced in various ways. Four histograms, one for each season, showed similar results. The highest bars, in regards to number of fields, were all located at the lowest end of the graph, in terms of nitrate concentration in the soil. As nitrate concentration increased, the number of farms associated with them declined, sharply at first, and then slowly levelling off. Broken down by percentiles, a nitrate concentration of 20.6 mg/kg was associated with the 50th percentile.

Each field was also broken down by depth. Shallow: 0-1 ft., Medium: 1-3 ft., Deep: 3-6 ft. Most of the nitrates were consistently located in the shallow to medium depths. Nitrates were especially strong in the shallow layers in the fall. In the spring results, the shallow layers showed lower concentrations of nitrates, and there were significantly more outliers in the medium-to-deep layers. Eric was careful to note that it would take more work to determine causation of these trends.

Broken down by crop type, asparagus, hops, and barley were the top three in terms of highest nitrate concentrations of the fields that were sampled. Cherries, pears, mint, and pasture grass had the lowest concentrations. Corn and triticale crops produced the largest number of outlier results. The highest median value of nitrate concentration was in wheat crops. There were some limitations to the study, with most of the tree fruit farmers at the north end of the GWMA unwilling to participate. Eric replied, in response to a question from a group member, that he felt pretty confident they would see similar trends if they sampled in another year. One of the group members involved with the testing noted that many longtime non-dairy farmers who had high nitrate levels in their soil, such as hop growers, were "shocked" at the results, and many had been converted to drip irrigation, which cuts down on fertilizer, as a result.

Eric then showed the group nitrate concentration levels broken down by irrigation type. Rill irrigation tested high in the spring of 2016. Wheel lines tested low.

In summary, Eric and Ben thought this was a good data set to work with, but that more work would need to be done to estimate background conditions, causation factors, and recommend best management practices. In their opinion, it would take about ten years before people in the Lower Valley would see nitrate levels go down.

Landau's contract with the SYCD expires on the 30th of June, with $50,000 left unspent. Moving forward, the firm would like to prepare a summary report, more descriptive than analytic in nature, to gather expert input on determining some of the factors listed above, and to lay the basis for further evaluations of some of the same fields five years from now. This would necessarily involve deep soil sampling.

As of the meeting, such a summary report had not been discussed with Vern Redifer. Under GWMA procedure, the Irrigated Ag group would have to make a recommendation to the GWAC

to authorize the expenditure of funds towards this purpose, the GWAC would have to agree to recommend it to Vern, and Vern would then make the final decision. Troy expressed caution at using the word "causation" with reference to high nitrate levels, noting that certain factors may only indicate correlation. Troy also noted that in past meetings, he had offered to take a look at statistics and write up results, and that he wanted to work with Landau to come up with a format that could be submitted for peer review. Jim Davenport stated that Vern was in possession of the Landau database, including field logs, although not the field notes. The spring 2016 questions were not all in yet.

Jim asked the group whether they thought the self-selecting nature of the participants was a fatal defect in the report. Troy believed that caveat should be clearly stated upfront. While acknowledging that self-selection was a problem, (a subject of discussion in other working groups as well) this was the best the group could do, since non-dairy farmers are not required to conduct soil sampling, and there is no existing legal authority to compel them to do so. Therefore, any sampling would, by necessity, have to be voluntary in nature.

Potential Solutions to High Nitrates in Groundwater (IAWG Purview)

The group revisited the list of potential solutions formulated at the April 19th meeting, and discussed at the May 17th meeting.

Irrigation Management Education: Jim wanted to know who specifically needed this kind of education and outreach. Such knowledge would be necessary in order to keep costs reasonable.

Giant database: A member of the group wanted to make sure that any database kept track of long-term trends to determine whether GWMA's efforts were making any difference regarding groundwater, deep soil sampling results, or both.

Subsidize soil sampling and analysis to ensure that the right amount of nutrients are being applied: A member of the group had submitted a funding request for various items totaling $1.5 million to Senator Honeyford. The funding request, if authorized, would not kick in until the start of the 2017 fiscal year at the earliest. The money involved in the request would not be GWMA funds.

Education and outreach: Jim believed that this was the best route to go. Other members agreed, arguing that it provided the best bang for the taxpayers' buck. A number of possibilities were suggested as to who would conduct the outreach efforts to irrigated agriculture - the South Yakima Conservation District, the WSU Extension Office, or commodity commissions.

Evidence of annual soil testing required for water delivery: Jim had discussed this with SVID, and was told that enforcement would be a non-starter from their perspective. A member added that the Farm Bureau would hold the same view. Jim brought up a suggestion raised in a different working group that perhaps farmers should be required to present evidence of soil sampling before they could purchase nitrogen-rich products for use on their fields. Members raised concerns about the workability of this approach, such as the potential for a conflict-of-

interest if the fertilizer dealers are conducting the tests, as well as the perception of regulatory over-reach on the part of the government.

Crop mix – regulated crop acres for different crops: Troy recalled that this idea had taken a lot of fire the last time he brought it up. Growers would widely see it as overreach for the government to attempt to determine crop mixtures on their acreage.

Troy brought up the efforts of the Columbia Basin GWMA to manage nitrate concentration in its area. While it was unclear where the Columbia GWMA had gotten the funds to carry out their efforts – or whether the group was still active as their website, www.cbgwma.org, was last updated on November 14, 2013 – they had a number of suggestions that could be useful, if the funds could be found to support them.

Some of the ideas included:

1) A Deep Soil Sampling program, where growers could sign up for five-year period to have their soil tested, at a limit of $150 per-composite sample, and $1,000 per property owner.

2) A GIS Database Mapping project, making available to the public overlay maps describing crop types, irrigation methods, soil sample results, etc. The GIS project also gives farmers a formula to calculate their vulnerability to penetration by nitrates.

3) An Irrigation Water Management Cost-Share program, wherein growers would work out a management plan with the Conservation District. The Columbia Basin GWMA funds 50 percent of the program cost for each grower at a rate of up to $7.50 per-acre, and a maximum limit of $5,000 per-grower.

4) An ongoing water sampling project, along the lines of the soil sampling already done.

5) Water on Wheels (WOW), an educational program aimed at K-12 students about groundwater and best management practices. A truck with a trailer would visit schools and community events, and distribute grade-appropriate material.

Ralph Fisher notified the group that he had to sign off at this point.

The items on the list that involved a direct subsidy to growers prompted the most discussion from the group, especially #1 and #3. Some members felt that subsidizing growers on a per-acre basis would not be as fair or cost-effective as other methods, since most of the money could wind up going to the largest growers who didn't need it. Another member felt that any public subsidy for an ongoing deep soil sampling program should be contingent upon the property owners sharing their results on a public database. It was their opinion that if the public is helping to pay the bills, they should get to see the results. Other members saw the potential for a participation problem. In the words of one member, "the threat of litigation hangs over many people's heads" in the Lower Valley. In their view, growers would be very reluctant to join any program that could result in their getting sued if the results came back high.

Jim Davenport brought up the idea of creating an Aquifer Protection Area, which would charge a per-acre fee to do education and outreach programs to the public. Creating such an area would require the Yakima County Board of Commissioners to refer the matter to the ballot, where it

would need the approval of a majority of Yakima County voters. (See RCW 36.36; http://app.leg.wa.gov/rcw/default.aspx?cite=36.36&full=true for details.) [*While this was not discussed during the meeting, Spokane County has had one since 1985. See* www.spokanecounty.org/1009/Aquifer-Protection-Area *for details.*] Most members preferred to let existing organizations like the Conservation District or the WSU Extension office do the work.

Discuss and prioritize recommendations to the GWAC.

Education and public outreach efforts had the strongest support from the group, including potentially the Water on Wheels idea. Troy would contact the EPO working group to coordinate any proposals that go before the GWAC asking for funds.

Conclusions. Review of Action Items.

The group ended the final minutes of the meeting discussing the over-application of nitrogen-rich products on fields, the effectiveness or ineffectiveness of the state's Nutrient Management Plans, whether market conditions and shrinking profit margins would force down the application of nitrogen products on their own, the Department of Ecology's proposed draft CAFO permits, still in the public comment phase, and the challenge of differentiating between dairy producers, who are required to conduct soil sampling, and other agricultural producers, who are not. Everyone agreed it was a big challenge for anyone to get their arms around, with many members reiterating that education and public outreach was the best approach.

The meeting was adjourned at 3:40 PM.

Recommendations for GWAC

Resources Requested

Deliverables/Products Status

Landau Associates will make copies of their presentation available to the working group.

Proposed Next Steps

Troy will contact the EPO working group and inform them of their recommendations as to public education and outreach efforts, and develop a proposal to bring to the GWAC at a future date.

Troy will keep in touch with Landau Associates about writing up a summary report of their deep soil sampling results to present to the public.

Data Collection, Characterization, Monitoring

Charge from Groundwater Management Area Advisory Committee

A discussion of timelines and details regarding the Nitrate Loading Assessment

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; Jim Trull; John Van Wingerden, Kevin Lindsey; Laurie Crowe; Lino Guerra; Kirk Cook; 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, April 13, 2016, 10:00 AM

Call Number: 509-574-2353 pin: 2353#

Participants

Present: Melanie Redding (Chair), Gary Bahr*, Jim Davenport, Steve George, Jean Mendoza,* Ginny Stern*, David Bowen, Stu Turner, and Bobbie Brady (Yakima County Support Staff). Pony Ellingson, Glenn Mutti-Driscoll and Wayne Rennick from PGG were present by phone as well. *via phone

Key Discussion Points

Chair, Melanie Redding, opened the meeting at 1:04 PM. Everyone introduced themselves and Jim Davenport specifically introduced David Bowen the new Water Quality Section Manager from the Department of Ecology. David spoke briefly about his four week tenure at the Department noting that this was his first GWMA working group meeting. He also shared a bit about his background as a Kittitas County Commissioner (which included working through water issues), Auditor, and his 25 year participation in the family farm with his grandmother. He included that his goal was to be helpful to the group and help solve issues.

Melanie Redding drew the group's attention to the Technical Memorandum received from Pacific Groundwater Group (PGG) and introduced Pony to the conversation. Pony advised that two others from PGG were on the conference line as well – Glenn Mutti-Driscoll and Wayne Rennick. Pony explained that they had been asked to provide the group with a groundwater monitoring plan that left the group with a variety of options. As he understood it, the group's goal was to determine if the groundwater nitrate concentrations were declining. Further, it was his understanding that the GWAC had decided to focus on an ambient groundwater monitoring system in order to figure this out. Pony then began an overview of the Technical Memorandum

provided by Pacific Groundwater Group (PGG) that had been emailed to the working group on Tuesday, April 12. This was the first report due to the group. Pony stated that the goal of this meeting was to get feedback and that the next deliverable would include more detail on each spot. Pony provided an explanation as to how each spot was identified on Figure 1 Initial Random Proposed Sample Locations (Number 1-30) – that process is outlined in the Technical Memorandum which presents details of the draft methodology for selecting sampling locations for review by the Data Committee. The first monitoring point selected is the farthest from the GWMA boundary and approximates the centroid of the GWMA. The second monitoring point is the random point that is farthest from the combination of the boundary and first monitoring location. This is the middle of the largest un-sampled area. Each subsequent monitoring point selected is the one in the center of the largest un-sampled area. This evenly distributed monitoring locations throughout the GWMA and ranks them by size of the un-sampled areas.

Figure 1 presents the location of the first 30 well locations as selected and prioritized by the method presented above. Once the ranked set of prioritized locations are chosen, preliminary drill sites can be selected based on nearby public land locations, local land use, and availability of monitoring sites.

Pony went on to discuss the factors that would be considered in selecting preliminary drilling sites based on the prioritized points outlined in Figure 1. He stated that public lands, selected land uses, and known existing water table sampling stations will be mapped to help select actual drilling locations. The use of each coverage type will be as follows:

- Proposed drilling sites will be moved to the nearest public land, subject to the additional criteria below. Final selection of drilling sites will be performed after field inspection.
- Irrigation canals often leak and may influence groundwater quality in their vicinity. Monitoring sites will not be located within one-quarter mile downgradient from irrigation canals.
- Monitoring sites will not be located within one-quarter mile downgradient from facilities that may result in anomalous groundwater concentrations.
- Groundwater flow directions, canals, and drains will be mapped to assist in identifying groundwater gradients.
- Existing publicly-owned water table monitoring wells will be included to assess use of pre-existing wells. The accuracy of the monitoring well map coverage is likely imperfect. Use of existing wells is subject to field verification and agreement with the (public) well owner.
- Existing agricultural drains will be mapped as potential alternative sampling stations but the map coverage is likely incomplete. PGG's tentative recommendation is that drains be considered as a separate sampling station network. Therefore proposed drilling locations will not be altered by the presence or absence of agricultural drains.

As the review of the Technical Memorandum progressed, members of the group asked questions for further clarification as follows:

One member asked how PGG felt about the confidence factor in choosing only 30 sites for an area this size. The response was they would need 1,000 samples to gain confidence. The member also expressed a concern about depth – it was his belief that the group should be targeting the exact depth that is in proximity to domestic wells. His concern was that "first water" would be different later in the irrigation season (August) then it would be early on (February). He felt it was a mistake to go to first water instead of drilling to where productive water could be tested year round. Pony explained that the sampling network was intended to fill a gap in other data already available since no data was available currently at the water table level. He went on to explain that PGG will accommodate first water levels when considering what time of year they drill the wells. He expressed belief that this target would uniquely provide the opportunity for the GWMA to evaluate BMP effectiveness as things change and the process moves forward.

A member noted that the Department of Ecology could provide information already available as they have a whole program oriented around low nitrate water. Jim Davenport asked if this analysis could be done when the sites are determined. Pony expressed concern that there is some uncertainty depending on the quality of the State records. He explained that this would require a fairly substantial analysis which was not budgeted in the contract as they were contracted for first water testing.

Jim Davenport explained that he and Vern had talked at great length about the testing water level before entering into the contract with PGG. He went on to explain that the long-term goal was to determine if the nitrate levels were improving so the desire was to get a set of well sites identified that would them to detect problems and pursue those issues in greater magnitude as they arose. To do both at the same time would be very difficult. The goal initially is to get started. More could be added over time and hopefully the GWAC would propose this as we continue to move forward.

A member suggested that the group test a mixture of the sites proposed and additionally existing private wells. Ginny Stern expressed that she was not concerned about attaining the GWMA's final testing network strength at this time. She went on to explain that PGG's proposal would provide the beginning elements of a dedicated group of testing sites that meet certain criteria. She felt that what PGG had proposed provided a straightforward foundational piece to the group's work. She did not believe it would be a problem to not have water at the site year round.

Jim Davenport reported that Vern was concerned that private ownership of private wells would not necessarily provide 100 percent right-of-way access and existing privately owned wells added the variable that we didn't know how they were drilled.

A member spoke up and said that there were building logs for all privately owned wells constructed in the last 25 years which would allow the group to determine up front whether or not these wells met the criteria. In addition, he could see from the map that he was familiar with 80 to 90 percent of the owners and believed he could find two to three wells that could work.

Jim Davenport expressed that the group had already found it was difficult to get private venturers to allow access to procure data because of concerns of what would happen depending on the data that was found. The group needed to know for sure that data could be obtained from each system. Another member felt that the County could obtain right-of-way easements from private property owners and ensure long-term access so that was not an issue. It would require an agreement, easement and deed and the purpose would be required on the title.

Melanie noted that in the documents that were previously prepared existing wells were acceptable between the County and PGG.

A member voiced concern about some of the site locations as some of these could be road side areas and he saw these as highly contaminated with pollution, i.e., salt, metals, oil, grease and roadside storm water from runoff. It was also mentioned that the site could be dangerous for the person testing the well. Another member added that he had spoken with consultant, Kevin Lindsey, who had concerns that these sites were circumspect from his perspective and also from peer review journal articles that he had read. Jim Davenport suggested that the group should wait until PGG had completed its analysis of the sites as not all County rights-of-way were road side - some were parks, baseball fields, etc., and would easily work. Pony added that he would like to see the peer review journal articles referred to and speak with consultant Kevin Lindsey personally.

Ginny Stern expressed that as long as road side sites aren't the only sites chosen then we can include them in the evaluation. She cautioned the group from excluding sites for any reason besides those listed. They should not be categorically excluded as this could lead to bias as well. However, it would not be her recommendation to choose road side sites exclusively, but to choose others as well.

Another member noted that the draft Technical Memorandum didn't read that way and the group was asked for their input and therefore he felt they were just reacting to the draft.

Pony added that sampling well time and personnel were the biggest costs in the contract. Roadside ditch wells are easy – two of these could be done in the time it takes to do another at a more remote location.

Jim Davenport spoke up and noted that the next work done by PGG would be more specific to sites at each location. He pointed out that the diameter of the circles are big and hopefully would allow us not to deviate from randomness.

A member expressed concern that the locations at the northwest side had no up or down gradient. Pony reminded the group that the sites were purely a function of the program and that the GWMA is skinny. Another member thought it might be necessary to contact the SVID for an electronic version of their canals as some sites might need to be moved, i.e., Sample 28 appears to be straddling the canal. Pony informed the group that the map provided in Figure 1 was clean, but they had more detailed maps that would show this kind of information.

Pony and Jim reminded the group that part of the contract was to examine drains for additional information. They will also recommend a set of surface water stations (that reflect shallow groundwater conditions e.g., wasteways and drains during the non-irrigation season) that could be monitored in concert with the groundwater well locations. Agricultural drains can be sampled. You could map a list of places sampled historically. They would propose to the group independent samples be taken in addition to wells but the results be recorded independent of wells so it didn't skew the informational data from the wells. This is inexpensive data which the project should include. A member spoke up and said that drain samples are easy to do and provide a log of data which would allow someone to connect the chain of cause on the land from ¼ mile away. Jim Davenport said that he would talk with Vern but preliminarily it sounded like a good idea. The member continued and said drains are tattle-tails.

Another member spoke up and said they had a list of questions noting first that they were uncomfortable since they were not clear on the written goal and wondered what the GWAC was going to answer by doing this.

Pony responded and said that the GWAC's goal was to provide an ambient groundwater monitoring system that doesn't target parcels. It would calculate averages and the desire was to have it in the ground early to track long-term changes.

Melanie noted that this goal had been brought up in April, 2015, at a GWAC meeting and there was discussion on how this would work at the meeting. Additionally, the primary focus feeds back to the GWAC's goal to reduce nitrate levels. The ambient monitoring system gives the GWAC the ability to look at a set of wells over a long period of time. Then if a hot spot were to be identified the GWAC could move to figure out why. It will indicate the quality of the aquifer over time.

The member's next question was what about hot spots, they felt these was settled on because of finances. Melanie responded and said that it wasn't time to talk about BMP's at this time – that was a separate monitoring network.

The member followed up with the following question: Given the limited resources concern was expressed about some of the monitoring stations. It was their opinion that some sites were more important than others because the Lower Valley has a higher nitrate level then say Konnawac Pass. Others expressed concerns about other locations – some they felt should have higher priority and others lower. Melanie reminded the group that the goal was to make sure we don't have an inappropriate bias when determining where we sample. She went on to say that the group can't say we have issues here and none there because then bias exists. The question instead is how to we get the most representative data. A study can been done to look at trends in the future and wells can be put where the problem is. The GWAC did not approve trend wells. The ambient monitoring system network is about meeting the GWAC's goals. If we try to make it do too much we will fail. While Melanie didn't necessarily disagree with the member's points, she explained they weren't applicable to the goal at this time.

Conversation went on that was pertinent to specific spots – it was noted that some of the sites were publicly installed wells on private property. Pony stated that as the group moved forward PGG would look at owner's information and pointed out that they had used the Ecology data base, but that wasn't iron clad. Another was in close proximity to the Port of Sunnyside Wastewater Treatment field and it would need to be moved.

A member wanted to know what anomalies they were talking about - the response was canals, application areas, large onsite septic systems, MATCA site, dairy application areas and ponds – they would want to keep the ambient monitoring system wells ¼ mile away from these.

They did not go through an upgradient evaluation – these sites were purely random.

Another member expressed concern about priorities. Will they drill starting at spot 1 so that if there wasn't money for spots 20 through 30 these wouldn't get done? Jim Davenport responded and said that it was the goal to spend what money was possible while in the GWMA phase so that as the need for more is identified it can be recommended by the GWAC when completed so someone can fund it.

Questions were asked about pricing before determining locations and if PGG will give the group a figure. Pony said that from the time the Data group says proceed it might take six weeks to get the next product, but the group was to agree on well locations before costing was done. One member wanted PGG to price all 30 sites plus 30 private approved sites and also 60 private approved sites. Jim Davenport noted that this must be discussed with Vern first since sampling of existing wells was not part of the current scope of the contract. This is not off the table, but Jim would need to talk with Vern first.

Another member voiced concern to Jim and Melanie that the group was going to end up with a whole bunch of data and no plan to analyze it. The member felt that this had already happened with the deep soil sampling. Jim responded and said that they had not talked about the analytic period and who would do this as that would happen post-GWMA. It was his guess that the GWMA would ask the Department of Ecology to analyze the information.

It was pointed out that Melanie was an expert in the field of ambient monitoring systems as she is a monitoring person. If she says this has what we're looking for, she is the expert.

A member asked what would happen post-GWMA. They thought that the concept of a public/private partnership in evaluating water would be good. They wanted to see it continue as a peer-to-peer professional review board not a public agency. They felt that two sets of eyes should be monitoring the situation. It was their desire to bring this up to the GWAC with the question – "how do we stay engaged in this"?

Melanie thanked PGG for their work and noted it was in line with the GWAC approved directive on the ambient monitoring system.

NITROGEN LOADING ASSESSMENT

All three chapters must go through the peer review process; must have consistent methodology for all three pieces and the percentage of loading must line up in all sources so we can compare apples to apples. The peer review is done on the livestock piece and it has been returned to Gary Bahr at the Department of Ag. The peer review team has the piece from Irrigated Ag and is reviewing it now. The County is doing the atmospheric deposition portion of the RCIM piece which was newly assigned to them. Melanie was not sure when this draft would be available, but it should be soon.

Stu Turner wanted Melanie to call him as he has information on livestock sites one end of pen livestock and on the other nothing. Melanie responded and asked Stu to contact Kelly McClain directly by phone or email as she wants to keep separate the information the author receives from the information received by the peer reviewer.

A member voiced that they were disappointed by the nitrogen loading assessment going slow.

Chair, Melanie Redding adjourned the meeting at 2:20 PM

Resources Requested

-

Recommendations for GWAC

-

Deliverables/Products Status

-

Proposed Next Steps

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, May 11, 2016, 1:00-3:00 PM
Call Number: 509-574-2353 pin: 2353#

Participants

Present: Melanie Redding (Chair)*, Jim Davenport, Steve George, Steve Swope*, Gary Bahr, Jean Mendoza, Laurie Crowe*, Ginny Stern*, David Bowen, Cynthia Kozma, Sandy Braden, and Bobbie Brady (Yakima County Support Staff). Pony Ellingson and Glenn Mutti-Driscoll from PGG*. *via phone

Key Discussion Points

Chair, Melanie Redding, opened the meeting at 1:00 PM and noted that there were several large items on the agenda. Everyone then introduced themselves.

Nitrogen Loading Assessment
Melanie advised that the Department of Agriculture had taken the lead and will work with Yakima County to synthesize all three chapters into one document. Gary Bahr reported that his team was still going through the Livestock chapter reviewing all of the comments made by the peer reviewers and also looking back at the history of the document, reviewing the background literature, calculations, formulas, spreadsheets and all other documents rewriting as necessary based on the peer reviewers' comments. The Irrigated Ag piece is also back from the peer reviewers. Some updating is necessary but not as much as the Livestock piece. WSU will also look at the piece again in order to provide a more thorough review. Gary explained that WSU had reviewed everything preliminarily and found it to be good, but they wanted a second chance since there was now more time to devote to the effort as school's semester had closed.

Melanie added that Mike Martian from the County GIS office was compiling the RCIM component. He and Cynthia Kozma are in the process of adding a table similar to the Irrigated Ag piece which will list each source and document total N by tons/year and a low, average and

high range. Jim Davenport reported that the RCIM working group met with Mike and Cynthia earlier in the week. Vern said that most of the inputs to the piece had originated from RCIM with no surprises except for septic tanks. The group was working on validating the input numbers and had held a great discussion about septic. Mike and Cynthia are now looking at some research on input for septic tanks. They are also looking at the report paper Melanie had written and those input values.

Vern added that the issue of bio-solids had been dealt with in the Irrigated Ag piece. He also said that they continued to get good material about atmospheric deposition and were sorting through it to find the best information. The goal was to wrap up the report into final format in the next couple of weeks so that it could be sent on to the Department of Ag and Melanie for the peer review team.

Everyone had benefitted from the comments on the Livestock piece because it pointed out how important it was for each piece to include the background work (not just the answers) and references. In the end, someone reading all three pieces will be able to understand exactly who, what, where, when, why and how of each document.

A member asked Gary if the Livestock piece had been updated as it had originally been written under the assumption (because of the lack of data) that every lagoon was 10 feet deep. Gary assured everyone that they were updating the piece with the work done this past year on lagoons by Ginny Stern. She had completed a thorough assessment including intricate measurements, dimensions, a clarification of lagoons vs. fresh water holding ponds, earthen vs. synthetic liners and so on. A member asked Gary if the geographical information on the lagoons would be available to the County for their work as well – Gary will provide it.

Vern and Melanie agreed that it would be good to get this new information into the GIS data base and to continue to process updates as this would allow the group to further refine what they know. The goal had been to set everything up in a format that would allow them to: 1) follow along behind in reports because they have everything there; and 2) to provide the ability to make a change in the spreadsheet automatically repopulating the GIS layer. The information would be dynamic as more or better information becomes available. A member wanted to know what the cost would be to maintain the system and if 15 years from now Yakima County would have maintained the information. Vern said the cost would be minimal and that the information would be maintained until the problem no longer remained or there is another entity managing the issue.

Ambient Monitoring Network

Melanie desired to begin the discussion with a brief overview of the conversations and reports that led to the GWAC's February 19, 2015, direction for the Data Working group to develop an ambient monitoring network plan. While it was understood that this wouldn't meet the long-term monitoring plan objectives the GWAC realized that with its limited resources an ambient plan would begin to gauge whether the GWAC was meeting their goal. The group should also understand what the plan would and would not do and that not everything can be done with one plan. Other systems can be built off of this one that could be up-gradient or down-gradient of any hot spots. She felt that the group must keep these things in mind as they moved forward in

their discussion. Vern and Jim agreed that this overview was consistent with the minutes and their memories.

Melanie then turned the meeting over to Steve Swope from PGG. He let the group know that they had begun to evaluate the locations of the monitoring wells and will develop a follow-up report over the next few weeks. In addition, they submitted their drain sample design for the group's consideration which would be wrapped into the same report if approved.

A member desired to explore the option of private wells further. Jim Davenport noted that the GWAC had already made the decision at the February 10, 2015, meeting when they issued a directive that the monitoring network was to be "purpose built" so there would be complete control thus insuring reliability of access. The GWAC had been concerned that access could be denied if the private well property changed hands and that the effort to obtain long-term data would be lost. Jim went on to say that he agreed another step could be added to look at hot spots and that private wells in addition to the purpose built wells suggested by PGG would acquire richer data. However, he felt it was important to remember the purpose – this is an ambient system not an analytical system. The desire is to get the process going and hopefully funding can be procured for additional locations. The task now, however, was to prioritize locations and identify costs.

A member voiced concern that the GWAC hadn't been well enough informed about an ambient monitoring system when it made its decision in February, 2015. Jim and Pony responded to this concern and said that the goal was to provide water quality characterization that couldn't be done with existing data. Therefore, purpose drilled wells at the water table built on County right-of-way (not at various points) met this need, made the most sense and would be cost-effective. This would allow the GWAC to collect data at a location where there would be a plain of water to monitor over time at the point where the nitrate gets into the water.

The member expressed an additional concern about the number of wells on Konnowac Pass and that the data would be averaged or fudged. Melanie agreed that at this time the GWAC did not know how this would be funded or monitored long-term. She also agreed with the member's point that you can't take data points and average them and say this is how water is now. You must look at individual data points over time. Melanie suggested that when PGG gets its next version of the report done and the group has had a chance to review it the group could request that a discussion be had at a GWAC meeting as to how these programs would be funded. Vern agreed but felt it was important to move forward with what could be implemented over the life of the GWMA with the funding already available. He was anxious to make good decisions and get holes in the ground so that data collection was initiated.

Steve spoke up and reminded the group that the intent of this work plan was to look at purpose built wells. Melanie stated that the GWAC had already heard both sides of the argument including information about the work she had done in Whatcom County which included only private wells which produced both good and bad outcome. Vern added that the GWAC's funding of PGG for purpose built wells was in the minutes and also in the contract.

Steve went on to say that the numbers on the map are in priority order. The model presumes that the entire GWMA is unmonitored when the first well is installed. PGG tried to choose a method as objective as possible to alleviate criticism for being subjective in order to defend the statistical analysis that would make data questionable. In a nutshell they adopted a random approach that was designed to cover the aquifer. A member responded that the boundaries of the GWMA are not the boundaries of the aquifer. It was the member's belief that the lower valley had the biggest nitrate problem and the middle valley had less of a problem; therefore, they believed that a line could be drawn through Zillah and testing could be done only in the lower valley. The member also desired a feasibility analysis for two different studies 1) purpose built and 2) private built wells and high risk well testing to identify where issues are. Vern said that he wasn't arguing against the use of private wells. His desire was to obtain the highest quality data from wells we could control. He always thought the group would come back and do more testing especially in hot spots. Jim Davenport said this project wouldn't change but it could be added onto in the future as the Data group decides. Then the group could make a recommendation. This could be a future agenda item, but would not be discussed and decided at the present meeting.

Proposed Groundwater Monitoring Locations from Irrigation Drains

Glen explained that during the non-irrigation season, water diversion from the Yakima River ceases, and water present in the drains is predominantly groundwater that continues to enter the drains. This allows drains to be good test sites, requires no pumps, incurs no additional installation costs and can be sampled in minutes. PGG looked at accessibility and identified 25 potential sites. 19 of these have historical data so trends are already available and the group could move on them quickly. PGG did not prioritize locations because cost sensitivity is lower – they will wait for field verification to decide. He also explained that they did look at concerns raised by Kevin Lindsey but they just want to sample without surface water as the major emphasis is groundwater.

The group held a discussion about obtaining testing for items other than nitrates. David Bowen pointed out however that the GWMA's directive was to determine nitrates and tests for other items would have to be approved by Olympia. The costs for these other tests was estimated at $20,000 per year (40 wells x 4 times per year). A member proposed the funding for augmented testing come from the remainder of the deep soil sampling funding. Vern pointed out that the RCIM group was going to use it for deep soil sampling of septic systems and that the decision would need to be taken to the GWAC.

Another member desired more information about the augmented tests so that the group could determine its relevancy before any decisions were made. He agreed that the mandate had been to look strictly at nitrates. Vern agreed and said that the only exception had been on the well assessments – there were tests done for coliform/bacteria because they may have revealed additional information that was pertinent to the nitrate study. Melanie agreed and stated that as the group moved forward its directive had been to concentrate on the state of the nitrates in the aquifer.

Melanie liked the idea of sampling drains. She didn't feel it would replace the ambient system but would provide immediate information and is less expensive. Jim added that at the last GWAC meeting when the group compiled its list of "what more it needed to know" one of the responses was that there was a need to learn more about drains and creeks. Testing drains would provide this information for Figure 2, Site Characterization of the GWMA.

Steve noted that 20 drain locations can be sampled at minimal expense – approximately $2,000.00 for a field study and $200.00 for lab costs whereas each monitoring well installation was $2,000.00 and approximately $20,000.00 annually for four samples of 30 to 40 locations. Drains provide the most information at the least cost.

A member voiced concern about water runoff from fields into drains during irrigation season. He pointed out that in Moxee they had seen an increase in flow when the canals are open. Pony said that he understood this to be true as well. They will look at it site by site and make a determination from there

Jim asked for the group's consensus on proceeding and the group agreed to go ahead with the project. PGG will now integrate drains and wells in their next report. They will also provide enlarged maps of specific well locations as the first map only contained random locations. Slight adjustments will also be made to the nearest public access/right-of-way. The goal is to get everything to the group before the next meeting so that the plan can be reviewed and considered in time to be presented at the next GWAC meeting. PGG will continue to work with Cynthia and Mike at GIS to confirm depth to groundwater and groundwater contours.

A member wanted a drain site down just a bit from No. 11 and up from No. 12 on the map where there was a wildlife refuge. Concern was again expressed that this was not related to nitrates in the groundwater as the drain flows down to the river and away from people and thus does not affect humans which is the focus of the GWMA study. The discussion was tabled. Melanie reminded everyone again to keep in mind goals/objectives given in developing a groundwater monitoring system. She also thanked PGG for their efforts.

Chair, Melanie Redding adjourned the meeting at 2:46 PM.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

Gary Bahr will provide the geographical information on the lagoons to the County for their work.

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, June 8, 2016, 1:00-3:00 PM
Call Number: 509-574-2353 pin: 2353#

Participants

Present: Melanie Redding (Chair)*, Jim Davenport, Steve George, Gary Bahr*, Jean Mendoza, David Bowen, Cynthia Kozma, Vern Redifer and Bobbie Brady (Yakima County Support Staff). Pony Ellingson, Steve Swope and Glenn Mutti-Driscoll from PGG*.

*via phone

Key Discussion Points

Chair, Melanie Redding, opened the meeting at 1:10 PM. Everyone introduced themselves.

Nitrogen Loading Assessment

Melanie reminded everyone the goal was a quality product and the authors were working to get this done as quickly as they can. Gary Bahr reported on the progress the Department of Agriculture was making. With regard to the livestock piece they met with the Dairy Nutrient Management Plan group and went over the field data accumulated on the lagoons. They are getting the GPS data in updated format, performing an overall review of the comments made by the peer reviewers, completing a literature check of those items cited in the original report to make sure they are appropriate and rewriting and enhancing the chapters. As for the Irrigated Ag piece they are waiting for WSU to complete their final review and to provide their comments. Gary explained that the goal is combine all three pieces into broader cohesive report which they hoped to have completed by the end of summer. Vern informed Gary that David Bowen would be calling him (if he hadn't already) to talk about the literature review as a result of a recent conversation in the Livestock/CAFO group to ensure there wasn't any overlap. Vern also let everyone know that the RCIM piece would be in draft to the Department of Ag no later than July 1. Vern said that they are continuing to do write-up and validating – checking a lot of references

and will push for it to arrive prior to July 1. Vern noted that Gary may need to change the introduction of the RCIM piece to allow for a better flow between all three pieces.

Ambient Monitoring Network
Melanie asked PGG to provide an update on their work on the ambient groundwater monitoring network. They reported that they had just completed their draft that day and sent it on to Melanie. Melanie said she had just received it and would forward it on to the County for distribution. The report combines the previous reports on wells and drains with additions including estimated costs and network installation process and schedule.

The group discussed how it wanted to receive and process comments to the report. Vern noted that the contract with PGG required that all comments be consolidated first. He suggested that the individuals on the Data working group be allowed to review the draft and then meet for discussion. A member was concerned that those who don't regularly attend would be allowed to review and comment. Melanie pointed out that no one person would be able to make a change. Vern affirmed that all on the Committee would have a chance for review. Jim recommended that the report with the group's recommendation be to the GWAC prior to the August meeting. The group agreed and further concluded that the draft would be sent to the Data Collection working group for their review and comments (with a time-frame to respond) for discussion at the group's next meeting.

Vern suggested that the group begin to consider what entity should champion the monitoring in the future and how it would be funded as this would be an ongoing program well after the GWMA/GWAC had fulfilled their duties. He encouraged the group to also consider what else would require funding so that a request could be formalized in time for the upcoming legislative session. He pointed out that at this point the three institutions eligible (because of State funding) to monitor the program would be Yakima County, the Department of Ecology and the Department of Health. However, Vern was open to other suggestions and the monitoring could be done by PGG or in some other format. He went on to say that if Yakima County was in charge of oversight they would most likely contract with someone like PGG as the County would require an entity to perform the monitoring duties. However, the Department of Health and Department of Ecology may have someone on staff that could do this. Presumably costs would be the same regardless of who would handle the oversight – sampling costs, labor, laboratory fees, someone to maintain data and publish annual reports. Also after several years a trend-line process would need to be started. Another member asked what other GWMA's had done – what entity kept tract of this for them and were they please with their performance. Melanie was aware of several other GWMA's and believed that this information was posted on the Ecology website.

Pony gave the group an overview of the draft report. He noted that the process had not change and this report was really a compilation of the last two. It also addressed some of the comments already made by the group.

Preliminary drill sites were refined from the general well locations by evaluating surrounding land use. They were moved to the nearest public land as explained in the report. The table

illustrates why and how they moved locations. Most moves were small, but in any case no more than 1,000 square feet. In addition, the report includes estimated costs for well drilling and sampling and drain sampling. He noted that not all personnel costs are reflected, i.e., hydrogeology/sampling personnel. Also, in order to help the group the report includes a network installation process and schedule. Pony reviewed an outline of the process with the group in detail and pointed out several components the group needed to plan for (public bid and award process for the drilling, development of drill specs, and as-built documents for the group of wells). Some of these plans may require addenda to PGG's original agreement with the County.

He emphasized that if the group stayed on the schedule as outlined in the report he believed it would be optimistically doable to begin drilling in the spring of 2017 during the lower water season and at the end of the non-irrigation season with sampling to begin in July, 2017. However, if GWAC decisions were pushed off it would push back the start date of the sampling.

Vern asked if the report included cost estimates. It includes drilling, sampling, devices, lab fees, six samples in the first year and 2 inch monitors - $250,000. This does not include sampling personnel and no hydrogeologist to log geology. In addition someone must make field decisions during the original construction of wells and also when drilled and write a document report.

Vern spoke about passive samplers and whether they were a good deal in the long-term since they are not reusable. Pony explained that once the wells were installed active or passive sampling could be done. Active sampling requires someone who is trained. Passive sampling works well for non-specialist samplers. Vern thought that $250,000+ had been set aside in the GWAC budget for the work required by the ambient monitoring network.

A member spoke up and said that in their memory PGG was to provide cost estimates to test for a few other chemicals other than nitrates. Pony explained that this would require added perameters and things like extra bottles if the volume bag was too big and could require an extra fee for data. The member explained that they believed these chemicals pertained to nitrates and the nitrification process and that the data wouldn't be acquired if passive sampling was utilized. Jim Davenport reminded the member that this was a nitrate project. Melanie concurred reminding that the ambient monitoring project as approved by the GWAC was tasked to look at nitrates. The GWAC could decide they wanted to test other items, but until then the project was limited to nitrate testing. This could also be part of the Legislative request – the GWAC could decide how we springboard from the current testing and what the priorities would be for source identification and hot spots. Jim Davenport stressed that the group should first accomplish what it was tasked to do as this was the monitoring program that was authorized.

Melanie asked PGG when they would need to hear from the group – Pony indicated the end of June/beginning of July in order to hit the drill date and encouraged the group to consider other critical paths and realities of the schedule as well. Melanie noted the group should have the document ready to present to the GWAC at the August 18 meeting and Pony agreed that if this were accomplished he felt PGG could make the schedule. He also pointed out that the group should begin to think how to generate the specs which lead to the bidding process and what the bidding process would require – the timing of this makes this a critical path as well.

A member asked for a one page outline reminding them what the ambient monitoring system was supposed to do – Steve believed the introduction to the report just provided would meet this need. Melanie thanked PGG for their work.

Other Issues – Groundwater primer/Long-term support

Melanie explained that she had been thinking about what else the GWAC might need in addition to the nitrogen loading assessment and ambient monitoring network and had been considering a display that would act as a groundwater primer answering basic questions. The model requires a tank, sand, dye and water. Melanie was going to talk with Ginny about helping with such a display before a GWAC meeting. It would be interactive and questions could be asked and answered. A member mentioned that something like this could be recorded and loaded onto YouTube and used for educational purposes as the group moves forward. A member suggested that the display be coordinated through EPO and scheduled to be done prior to the August 18 meeting. The group agreed.

Jim and Vern felt it was very important for the group to begin to think about recommendations it would like to make to the GWAC for inclusion in the final program. These recommendations must be specific in order to procure funding, i.e., suggested things to do, funding sources and cost analysis. Melanie agreed and desired to talk with the GWAC soon about the elements of the monitoring program so it didn't die after the 2017 funding was expended. Vern said the group should begin thinking about what they already know that they desire to add. Melanie asked how the group gets the legislative proposals for groundwater monitoring network on the GWAC agenda for discussion. Vern responded and said if the request is for Yakima County the group has until the end of the year. If the request is for Ecology the money comes through an agency budget request and would need to be done sooner as the Department is working on their budgets already. Melanie will discuss how to do this with her boss. Vern thought there were two ways to do it if the GWAC thought Ecology should supervise the activity in the long-run. A provision could be given to Yakima County to contract with Ecology to do the work or Ecology could put it in their budget request. That's why it is important to begin to look at what needs to be funded and who will oversee it. Melanie was going to introduce Vern to her boss to talk about deadlines. Vern noted that the Yakima County Commissioners are assuming that Yakima County will ask the legislature for something and the lobbyist is ready to be involved.

A member noted that they had a wide range of opinions on what the final project should look like and wanted to know when to speak up - specifically on the data that needed to be gathered and the data base that needed to be developed. They also felt it was important to analyze the impact of BMP's from a variety of angles in order to come to good conclusions. Jim said data collection proposals should be made to the Data working group to consider and then the Data group could make a recommendation to the GWAC or the member could make a recommendation directly to the GWAC. Melanie suggested that BMP effectiveness monitoring could be on the agenda for the next meeting. Jean will send the paper she wrote to the Regulatory working group on to Melanie. Vern believed a method measurement and performance measurement of BMP's was important as a method could be very efficient but not effective or there could be 100 percent

participation and no change. Jean will list ways data could be gathered and what data needs to be collected. Jean will get her list to the group before the next meeting.

Melanie said that the next meeting agenda will include: soil nitrate level discussion with a presentation by expert Matt Buchanan, monitoring, data discussion with Jean and NLA update. She adjourned the meeting at 2:46 PM.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

Melanie will discuss with her boss how the Department of Ecology makes budget requests. She will also introduce Vern to her boss to talk about the deadline requirements.

Jean will send the BMP paper she wrote to the Regulatory group to Melanie. She will also list ways data could be gather and what data needs to be collected – she will provide that list to the group before the next meeting.

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: March 9, 2016, 5:00-7:30 PM

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

Participants

Present: Jean Mendoza (Chair), Jim Davenport, David Bowen, Larry Fendell, Ginny Prest, Dan DeGroot, Stuart Crane, Jason Sheehan, Steve George, Jim Dyjak, Sandy Braden and Bobbie Brady (Yakima County Public Services Support Staff) Guest Presenter: Brent Barnes, Assistant Director, Pesticide Management Division, WSDA. No one was present by phone.

*via phone

Key Discussion Points

Chair, Jean Mendoza, opened the meeting at 5:06 PM and explained that the first half of the meeting would be dedicated to the presentation on chemigation and fertigation and the second half to discussing a plan on how to analyze the data. Jean then introduced the teenagers from Granger who were filming the meeting and noted that hopefully it would be available for viewing on cable television. Next Jean took the time to introduce David Bowen the new Water Quality Section Manager from the Department of Ecology. David spoke briefly about his four week tenure at the Department noting that this was his second GWMA working group meeting as he had attended the Data Collection Working Group earlier that day. He also shared a bit about his background as a Kittitas County Commissioner (which included working through water issues), Auditor, and his 25 year participation in the family farm with his grandmother. He noted that his goal was to be helpful to the group and assistant in solving issues. He also explained it was his understanding that Charlie McKinney (his predecessor) had headed up the CAFO group. He was

not sure he should take over the leadership of this group since he was joining everything part way through but was willing to serve as the group desired. In addition, Jean asked Sandy Braden to introduce herself – she said she was a teacher currently tutoring in the private sector. She had been born and raised in the White Swann area where the groundwater level is high and was concerned about pollution of wells. She moved back to the County to retire and doesn't want to see things get worse courtesy of the mega dairies/CAFO's.

Part 1, Presentation by Brent Barnes, WSDA

Finally, Jean asked Ginny Prest to introduce her supervisor – Brent Barnes, who is the Assistant Director of the Pesticide Management Division of the WSDA Brent informed the group that he had been in the position for eight months. He was very thankful for the job as he was in the position to be part of a team doing great stuff. He had transitioned from the army this last year and had been a civil servant prior to his reenrollment in the military after 9/11.

He explained that he had been given a series of questions and intended to answer the first five that were provided as follows:

1. Which specific regulation are you addressing? Provide the citation where it may be found. Identify the responsible agency personnel. EPA delegates primary responsibility for enforcement to the states, the Federal Insecticide, Fungicide, Rodenticide Act is the governing regulation. WSDA authority for regulating chemigation and fertigation comes from: RCW 15.54.800 Fertilizers, Minerals and Limes (adoption of rules), RCW 15.58.040 Washington Pesticide Control Act (director's authority to make rules) and RCW 17.21.030 Pesticide Application Act (Director's authority). Washington Administrative Code – WAC 16-202-2001 Fertigation Rule – establishes performance standards for fertigation that are protective of existing and future uses of surface water and groundwater quality. WAC 16-202-1001 Chemigation Rule – establishes performance standards for fertigation that are protective of existing and future uses of surface water and groundwater quality. Secondary containment requirements. For Fertigation enforcement, the Registration & Licensing Program is responsible for inspections and investigations. For Chemigation enforcement, the Pesticide Compliance program is responsible.
2. What issue or problem is the regulation designed to solve? What activity does the regulation limit, regulate or control? How is that activity related to the potential for nitrate to be discharged to groundwater? Does the activity contribute to the increase or decline of groundwater contamination? The fertigation rule requires that systems must have the appropriate safety devices in-place and must be installed, maintained, and operated in accordance with the manufacturer's specification, established industry standards, and departmental rule. The fertigation rule requirement and the associated back flow prevention equipment was primarily promulgated to protect the water source whether it be surface or ground water. The intent of these provisions is to protect human health and safeguard the environment from misapplication and equipment malfunction. It is the applicator's responsibility to demonstrate that an operation will not result in foreseeable harm to humans, surface water or groundwater, desirable plants or animals, or to sensitive areas. The overarching mandate of the fertigation rule is signified by two

provisions: a chemigation or fertigation system cannot draw water from any water supply unless that source is protected from contamination and the operator is responsible for the proper operation of both the irrigation and the injection systems.

3. How does the regulation work, i.e., through licensing, registration, standard setting, recommendation of best management practices, reporting, technology, performance monitoring, planning, funding, other approach? The core purpose of the WSDA Chemigation and Fertigation Technical Assistance Program is to assist operators in protecting human health and in safeguarding the environment from the potential hazards of applying pesticides and fertilizers by means of irrigation water. Although the target audience is primarily those who practice chemigation that design or install irrigation systems or supply equipment, agrochemical companies that provide agrochemical products, and equipment manufacturers of irrigation and backflow safety equipment. Programmatic and consulting relationships are longstanding with USEPA, USDA-NRCS, Conservation Districts, Department of Ecology, Department of Health – Drinking Water Division, WSU, commodity organizations, and Departments of Agriculture in many states. Enhancing awareness and developing core skills of both growers and service industries are being realized by the following activities. When corrective action is indicated, a conformational inspection is conducted. While voluntary compliance is the desired strategy, regulatory action is also an option.
4. What metrics does the agency use to measure whether the regulation is effective in reducing nitrate concentrations in groundwater? What means are used to apply those metrics, e.g., inspection programs, monitoring reports, field samples? What data is available reflecting the application of those metrics? None for groundwater, sampling is done as part of an investigation to determine if drift occurred (pesticides), if fertilizers escaped secondary containment or entered source water systems.
5. What does the agency do to inform the regulated community or the public of the existence of the regulation? What is the agency doing to make it easier for the public to contact the agency (ensure that it is accessible) in order to learn what to do about groundwater contamination? How much has education of the regulated community improved regulatory effectiveness? How is this measured? Statutes and rules are easily accessible at http://aps.leg.wa.gov.
    - System inspections are concentrated in Grant, Adams, Lincoln, Franklin, Benton, Walla Walla, Grays Harbor, and Pacific Counties. Inspections have also been conducted in Skagit, Whatcom, and Yakima Counties.
    - Over the past 15 years, system compliance among mid to large-scale growers has increased from less than 15% to about 65%. As systems are voluntarily retrofitted, compliance will increase.
    - In-field consultations are conservatively estimated to have exceeded 640 contacts.
    - AG-ASSIST-WSDA, a chemigation and fertigation webpage, has approximately 285 subscribers located throughout the western U.S.
    - Educational activities that are specific to chemigation and fertigation include the following (conservative figures).

        13 articles for trade publications and WSU Newsletters

7 proceedings or symposia
9 worksheets or checklists
2 joint WSU-WSDA publications
9 fact sheets or bulletins
155 presentations, demonstrations, or workshops with an emphasis on chemigation and fertigation. Many other presentations contained an aspect of this topic. Educational activities have been focused in the Columbia River Basin, the Yakima and Skagit River Water Basins, and Pacific and Grays Harbor Counties.
WA State Potato Commission and WSDA designed and outfitted a 21-foot demonstration trailer that has been staffed during at least eight trade shows and used in conjunction with several on-site training programs.

The group asked many questions as the presentation progressed. They are summarized as follows:

How does the regulation work – is this voluntary compliance? The WSDA does not permit the systems, regulations just require inspections. They do not permit the site or the equipment. The equipment specifications are in the WAC. Oftentimes, WSDA is called out to help with the design. If they inspect a system and it fails, they can pull licenses or impose fees (this is the teeth of the statutes). About 1,100 systems have been inspected since 2000. About 140 more systems are scheduled to be inspected in the next two to three years.

If you are not in compliance what is the penalty? The maximum penalty by statute that can be imposed is $7,500 for each infraction. There is a matrix that has been developed and is used to determine the penalty and the severity of each infraction is taken into consideration. If the fine isn't paid a NOI is issued. A hearing can be chosen and the Director signs off on the order. If the fine is not paid the Agency has a procedure to send it to collections.

Is the fine imposed to the equipment owner or the person operating the equipment? The owner. The applicator must be licensed in order to purchase the product. To obtain a license a test pertaining to application rules is required.

Is there a license for fertigation? Brent was not aware of one specifically, but he will check and get back to the group on this issue which he did and no license is required.

What was the cost of the education trade show trailer designed by the Washington State Potato Commission? Brent did not have this information as the cost was funded by the Potato Commission. The member thought this might be something the EPO Working Group might be interested to learn more about.

What characteristics of regulations that apply to fertigation/chemigation might be useful, relevant and/or helpful in the reduction of nitrogen? If you look at safeguards these rules were well written; there are no restrictions concerning application rates of fertilizers. Self-regulation works well because fertilizer is expensive and over application would not benefit a producer economically.

Could licensure requirements work for fertilizer? No – there are no application limits just judgment based on economics and good stewardship of the land.

There is more knowledge now regarding fertilizer application and the price of fertilizer is up. Both of these factors drive better fertilizer usage. This unfortunately does not help with legacy issues and fixing the problems inherent to this.

What about compliance issues? From 2013-2016 (three years) in chemigation there have been three investigations, 80 inspections, 56 notices of correction (most of these were in 2014 and pertained to the cranberry bogs). In addition, most of the 56 notices of correction had to do with construction or maintenance. Sometimes these notices required that WSDA return and inspect the corrections. There are still two open cases. There is one open now and it is a marijuana grow related case. There are two inspectors that handle this in the State. Most of this is driven by drive bys or complaints. There were no secondary containment investigations.

Can you estimate the number of people in Yakima County that apply synthetic fertilizers and do you know if it is applied at appropriate rates? No, the Department does not have this data and Brent was not aware of anyone keeping these records. He was aware some are doing soil samples at the same geographic location which provides them with historical data so they might better determine appropriate application rates. However, this information is not shared with any governmental entities. It is merely good for business and helps determine moisture levels.

A member commented that people are following a new standard. Testing is not cheap, but application isn't either. GPS technology now allows for zonal spray, fields to be mapped and variable spray rates so that applications at corners are applied at the same rate. In addition, member Steve George commented that he recently heard a presentation by Laurie Crowe from the South Yakima Conservation District in Sunnyside. The presentation was funded by the Legislature to help with application education. In it she described a new mass balance sheet which allows you to take soil samples, plug in the crop requirements, and factors in organic material in the soil. When you come to the end of the balance sheet you can see what you need and then apply it. There is a lot of new information coming out on this. Another member suggested that Laurie Crowe make this presentation to the Irrigated Ag group.

A member asked if Brent was saying that people were not over-applying. Brent clarified and said that he was not saying this, but that he believed more people were testing and mapping lands from season to season. It was not his belief that they were over-applying on purpose based on the economics – any over-application may be inadvertent or a result of miscalculation.

Is there data on fertilizer usage? The only data kept by the State is for commercial sales as the Department charges license fees based on tonnages. However, it would be difficult if not impossible to translate this statewide data to Yakima County alone since this is state-wide and not broken down to counties or areas. Therefore, tonnage records cannot be used to verify amounts of any fertilizer sold in the GWMA.

Do you test fertilizers? Yes – the components listed on the label must be approved. They test that the components on the labels are the guaranteed minimum since there is a greater chance

that the components are under the rates stated on the label than they are over. If they do not meet the guaranteed minimum number the sale can be stopped.

Do you test compost? No, compost requirements are handled through Solid Waste at the Department of Ecology. Another member noted that someone had already made a presentation on this topic and that it is not a guaranteed analysis as it is not a registered product.

Do you test for pesticides in compost? Compost on farms is exempted. On dairies there are requirements if a farm is using the compost or selling it – then the compost will be tested for nutrients. It was noted that all dairies are required to register under the Dairy Nutrient Management Act.

How do the various agencies work together? There are MOU's in place (Memorandum of Understanding) between the WSDA and other agencies, i.e., the Department of Health, Labor and Industry, and the Department of Ecology. The MOU's define where the authorities lie and when the agencies hand-off to each other in order to determine jurisdiction.

There are four programs in Brent Barnes division: Dairy Nutrient Group, Registration/Licensing Group, Licensure – testing, Pesticide Compliance, Technical Services and Education which includes Farm Worker Education, Pest/Waste Disposal and now expanding to Farm Management Owners.

Chair Jean Mendoza brought up WAC 246-203-130 Keeping of Animals. Ginny Prest noted that David DeLong, Policy Person, of the Washington State Board of Health is looking at the WAC currently in order to update it. It wasn't possible to do this before because there had been a moratorium in place since 2009 on rule making until 2013. The Board of Health is now trying to finish up this rule. He may be interested in talking to the group.

Jean then asked the group to go around the room to see if anyone else had any remaining questions and/or comment as follows:

There was a discussion about zoning issues – people living next to dairies in what is now agriculturally zoned areas. Someone asked why not change the zoning laws. Jim Davenport reminded the group that these were land use problems and the GWMA was charged to work through groundwater contamination problems and issues.

One member voiced a concern and asked for clarification from Brent on a question – do you believe people are over-applying now? Brent responded and said no because economics don't allow for it. He went on to say that in the past there may have been over-application because people/agencies didn't know then what they know now. A lot has changed as advances came quickly in the past 10 to 15 years. The member further pointed out that while there may be more being grown now the crops that are grown require less use of nitrogen while the crops grown in the past were smaller in quantity they required a higher use of nitrogen. He went on to say that now that's not the case as much. Discussion and disagreement ensued regarding the variety of crops, the amount of acreage in production and the quantitative use of nitrogen.

Another member summarized what he heard Brent report: There is no formal inspection process. Any inspections are more complaint driven, as a result of a drive-by, or because contact has been made for technical assistance. No inspections are done on the compliance side and overall there aren't that many complaints. There is a formalized process for actually performing the inspection once the Department is on site but there is no formalized inspection process. There is no license category on fertigation.

What drive-by complaints do you get? Smell when the wind comes up or drive by – see leaky system.

Part 2, How Do We Analyze the Data We Have Gathered?
Chair Jean Mendoza passed out several items to the group – a draft timeline for Goals and Objectives and a Regulatory Framework Checklist for Goals and Objectives per GWMA Work Plan. On the reverse side, Jean had typed in blue her analysis of where the group was at. She asked the group to comment.

Section 3.1 Problem Definition – Jean felt the group was more or less complete and could add more information as needed. For the most part the group agreed.

Section 3.2 Evaluate Existing Regulatory Framework – Jean felt that the group needed to begin this task and potentially complete it over the next six months. Another member disagreed and felt that 3.1 and 3.2 had happened at the same time. They felt it has been accomplished when people addressed the group on each topic and they answered the question is the system working well. It was pointed out Jim Davenport had already provided a chart of each source and the regulations in existence applicable to each. In addition, the group had been given Vern's modification of Jim's larger charts, which did not show all of the gaps, but did provide the group with a written copy of the sources and the regulations. Ginny noted that she had a few additional items to add to Vern's draft.

The group discussed how to evaluate the different provisions and what standard would be applied as to how each agency was enforcing the standard. The goal was to answer the question: "Is the problem the regulation was designed to deal with being addressed"? The concern was that the answers to this question would contain lots of opinions. One member felt it was good to look at the gaps in the regulations and another felt it was more positive to ignore gaps which seemed to increase regulations and instead focus on ways to solve problems without regulations. It was suggested too that the speakers provide what they think would be a good regulation to have regarding the issue they discussed. Then if a hole is found perhaps the group can provide a fix. Other comments included a desire to be more positive than negative and that gaps are harder – subjective to see. It was suggested that the other sources could be compared to pesticide – the enforcement is good, it is reactionary and they are trying to do more education in an attempt to be on the learning edge rather than the "kick butt" edge with more regulations.

Another member suggested that the next step would be for the Regulatory Working Group to analyze and organize the information they had gathered from the presenters. At that point the information could be delivered to the other applicable working groups to process. That way Regulatory wouldn't be making decisions for Irrigated Ag (for instance) since they are the ones

most familiar with the issues pertaining to the people they represent. The decisions could be made within the context of that working group and any alternate solutions could be proposed to the GWAC by the people who have intimate knowledge of the field. This perhaps could be accommodated by joint working group meetings – Regulatory could prepare presentations.

Another pointed out that this suggestion would help achieve GWAC wide goals and not just this group's goal since Section 3.5 on is broader than just this working group. It was also noted that it would be hard to discuss regulations the group didn't have first-hand experience with.

A member questioned if the groups are ready and if this group should prepare presentations in advance. Jean Mendoza stated that she was on the EPO, Irrigated Ag and most of the group present was on the Livestock committee. In addition, Dan DeGroot who was present is on RCIM.

Various members spoke up and said it made sense to let the applicable working groups include this in what they are doing – Regulatory should give them the information and let them make the decisions. Chair Jean Mendoza spoke up and pointed out the group needed a plan to interact with the other working groups. Jim Davenport suggested that they convene a Working Group Chairs meeting. He also thought it was obvious as to how to split up the spreadsheet by source as follows:

RCIM: Onsite sewage systems, lawns, industrial facilities, atmospheric deposition, private wells, underground injection control, municipal facilities, biosolids.

Livestock: Compost, dairy, dairy lagoons, dairy settling ponds, dairy pens and corrals, livestock/CAFO

Irrigated Ag: Fertilizer agriculture, manure land application, irrigation management

Further, Jim Davenport agreed to talk with Vern Redifer about this issue when he returns.

Jean wanted to discuss CAFO/Livestock regulations next month at the Regulatory meeting. One member thought the group should organize the information first before making presentations to any of the groups.

There was also a discussion about RCRA and its relevance, applicability, precedental value and enforceability to nutrients in the valley, There was some discussion about having Lucy Edmonton from the EPA talk to the group about it or perhaps the State's Assistant Attorney General as to how it is being dealt with within this State for a legal determination of her agency's approach to dealing with it.

The meeting was adjourned by Jean Mendoza at 7:20 PM

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

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: May 11, 2016, 5:00-7:30 PM

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

Participants

Present: Jean Mendoza (Chair), Jim Davenport, David Bowen, Larry Fendell, Ginny Prest*, Dan DeGroot, Stuart Crane, Steve George, Vern Redifer and Bobbie Brady (Yakima County Public Services Support Staff). *via phone

Key Discussion Points

Chair, Jean Mendoza, opened the meeting at 5:06 PM and everyone introduced themselves.

Review Key Questions from Group Members

Jean passed around the list of "priority questions for the group to ask and answer" that had been compiled at the March 9, 2016, Regulatory meeting. Her goal was for the group to go through the questions one-by-one and discuss whether or not the question belonged.

The Regulatory group had already decided to make presentations to other working groups (Livestock/CAFO, Irrigated Ag, and RCIM). The goal was to inform each working group about the regulations pertaining to their industry so that the groups could begin to strategize voluntary measures, incentives, bmp's, educational tools, regulations, etc., that would help improve nitrates in the GWMA. As the group reviewed the questions on the list it was ultimately decided that many of the questions were good to pose during the presentations the Regulatory working group would be making. Further, it was decided that Jim Davenport would refine, reorganize and consolidate the list of questions. His goal would be to first compile a list of questions that would be asked to each group and second, put together list(s) specific to each group. He will email his

work to the group before the next meeting. Additionally, it was decided that the group would work on its presentation to the Livestock/CAFO group at the next Regulatory meeting. The goal was to make a presentation to Livestock/CAFO at their July 7 meeting.

A great deal of valuable discussion surrounded each question and led to other topics important to the group which is summarized as follows:

- A member desired to define "gap." Another member believed that the term gap was meant to identify something that was missing that should be there. Another member believed that the missing items should be filled with non-regulatory strategies first, i.e., voluntary measures or incentives before looking at regulatory strategies. An alternate expression could be: "what regulatory gaps if filled would benefit groundwater quality?"
- Jean felt that a glossary of terms should be added to the GWMA page on the County website. "Gap" could be one of those items included in the glossary.
- A member pointed out that it would be difficult to determine the gaps before the nitrogen load assessments came out. Vern believed that the reports would reveal that some sources were de minimus contributors to nitrates in the groundwater supply which would allow some sources to be eliminated. Vern's example was atmospheric deposition as it would be very difficult to regulate.
- A member thought it would be important for each group, as it considered regulatory and non-regulatory strategies, to also contemplate recommending what agency should implement the policy.
- The group felt some of the questions would be generic – not specific to certain venues and others would be specific.
- Jean mentioned a law she heard of from the 1990's that required Ecology to come up with a list of BMP's which was eventually rejected. Steve asked for a copy of the law noting that BMP's by their very nature could not be regulated.
- A member pointed out that a proposal for a monitoring program (or anything else the group desired to carry forward) would need to be to Jim Honeyford by September or October so that funding could be requested from the legislature in the January, 2017, session. It was agreed Jim Davenport would put this item on the June GWAC agenda. The group would need a figure from PGG by that time in order to accomplish this task.
- The group realized that there was a concern about the over-application of commercial fertilizers (Mineral N). They discussed whether there was any way to get reasonable data on the application of chemicals or manure. They believed this was an issue that needed to be brought to the attention of the Irrigated Ag group so that they can work on a way for the data to be gathered in the future.
- A member felt it was important for the groups to remember that there can be unintended consequences for any regulations that might be proposed.
- Jim Davenport felt it was important to encourage the groups to implement regulations only when they must and to only regulate the factors that require regulation.
- A member suggested that data gathering would be important to precision agriculture. Another member pointed out that the data may be proprietary. This led to a discussion about stewardship programs and how these might be beneficial.
- A member believed that BMP's should not be suggested unless a group knows that they will work.

- It was suggested that Irrigated Ag might consider strategizing how to get farmers to perform field tests. One suggestion was to have the irrigation districts require proof of a completed field test (perhaps on an annual basis for fields larger than an acre) before they supply water. A concern was voiced that it may be necessary for the legislature to give the districts the ability to incorporate this requirement in their bylaws. This would be a non-regulatory matter.
- Another suggestion was to add to State water rights an assurance that water is applied in a way that doesn't cause a problem to be determined through a soil test.
- Vern pointed out that if you give people the opportunity/information to do the right thing they will do it. The deep soil sampling was proof of that already. "They have to know what they are doing" includes moisture/soil sampling. Another member added that he had encountered situations in his business where he had been required by a government entity to do something but had been able to recoup the cost of fulfilling the requirement in other ways. He felt this might be true in this instance as well and also suggested that a cost share program could be considered.
- The group desired Irrigated Ag to look at the feasibility of a nutrient management plan and irrigation management plan for farmers. There was a consensus that an annual soil test should be performed by farmers of a certain size and larger. This could be part of the plan. The group agreed to examine ways to facilitate this.
- Jim Davenport said that Vern would furnish copies of the large spreadsheets he had prepared. However, first Jim was trying to simplify the document.
- The group had a discussion again about writing up the full history of the GWMA as this could be helpful with community education. Others added they would be supportive if the purpose of the history was to tell everyone how the GWMA got from point A to point B, but if the purpose was to lay blame they were not interested. Jim Davenport encouraged the group to read the history Laurie Crowe had prepared and cautioned that it was important to be careful of history as it generally was written for a reason and writing one might be hard to satisfy everyone's expectations.
- Another person noted that laws have unintended consequences, i.e., dairy farmers were told the way to solve problem was to build lagoons and it seemingly facilitated the growth of dairy farms.
- A member felt that enforcement deserved discussion by the group and should also be added as a glossary term. Another member thought the discussion of enforcement should center on an agency's effectiveness of what they are doing with what they have to work with. They felt a discussion on enforcement was warranted as it pertains to implementation. Vern explained that it was the County Code Enforcement Department's desire/goal to bring people into voluntary compliance and that their last resort was to issue a citation or to take the case to court. He also noted that resource issues always cause them to prioritize the ability to enforce much like the Department of Agriculture and the Department of Ecology. Jim Davenport believed that a discussion on this matter needed to be specific, i.e., is an existing law in place - is it being enforced. Also, it was agreed that the work groups could discuss the practicality of enforcement of a regulation that is being suggested.
- A member suggested a format for presentation to the working groups be: 1) What they think is not in place or not strong enough (their preconceived notions); 2) what the

Regulatory group has learned from the presentations applicable to the working group; 3) More discussion.

Jean then invited the group to comment on anything they might like to add and thanked everyone for their contributions. Group members thought it was a good meeting with respectful conversation.

County Webpage

Jean said that she had spoken with Vern about having a place on the County website with information for all the groups so they would be looking at the same thing. This would include, but is not limited to: 1) a glossary; 2) presentations from different entities made to the Regulatory group (Note: Ginny wants to edit and update her presentation with tracking to correct some minor things largely in the content. The group felt this was a good idea); 3) meeting summaries (Vern desired to make this more accessible); 4) Pertinent RCW, WAC and County regulations; 6) various papers like those Ecology places on its website. (The group did not agree to No. 6 as it desired to see first if the papers were relevant before placing them on the website – the issue needs to be revisited).

A member reminded everyone that December, 2017, is not that far away and that even if an extension could be granted it would be a shortened amount of time. David Bowen encouraged the group to finish its regulatory work by October or November.

The meeting was adjourned by Jean Mendoza at 7:40 PM

Resources Requested

Recommendations for GWAC

Jim Davenport will put a legislative funding request for the proposed monitoring program (or anything else the group desired to carry forward) on the June GWAC agenda.

Deliverables/Products Status

Proposed Next Steps

Jim Davenport will refine, reorganize and consolidate the lists of questions for each group. He will email his work to the Regulatory group before the next meeting.

Jean will add to next month's agenda "work on the presentation to the Livestock/CAFO group."

Jim Davenport will simplify the large spreadsheets so that they could be furnished to anyone in the group that wants them.

Jean will provide a copy of the law she heard of from the 1990's that required Ecology to come up with a list of BMP's which was eventually rejected.

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: June 8, 2016, 5:00-7:30 PM

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

Participants

Present: Jean Mendoza (Chair), Jim Davenport, David Bowen, Larry Fendell, Ginny Prest*, Dan and Carolyn DeGroot, Stuart Crane, Jim Dyjak, Steve George, Sue Wedam, Patricia Newhouse, Vern Redifer and Bobbie Brady (Yakima County Public Services Support Staff). *via phone

Key Discussion Points

Chair, Jean Mendoza, opened the meeting at 5:07 PM and everyone introduced themselves.

Finish Review Key Questions from Group Members

The group discussed Question Nos. 1-10 on page 2 of "Priority Questions for the Group to Ask and Answer" handout from the May meeting.

#1 – What are the regulatory gaps that would benefit groundwater quality? Members voiced that they couldn't define "regulatory gaps" before receiving the assessments identifying the biggest potential sources. Vern referred the members to No. 1H of Jim Davenport's handout "Questions for the Group to recommend to other Work Groups considering regulatory approaches." Jim defined a regulatory gap as "absence of legally enforceable provision of statute, regulation or governmental policy, or governmentally-recommended voluntary action (e.g., "best management practice") that, if established, would promote realization of the target objective."

Jim Davenport suggested that the group look at the problems that had been identified, determine non-mandatory cost effective strategies to solve the problem and if this was not possible look at regulatory solutions. The group developed the following suggested protocol: 1) Identify a particular problem; 2) Identify voluntary solutions; 3) Prioritize voluntary solutions by effectiveness, cost, and practicality; and, 4) Look at effective enforcement if nothing else works. A member voiced that he believed that the other groups (Livestock/CAFO, RCIM, and Irrigated Ag) should be working through these items. The group also discussed the differences between "may, shall, and will" strategies and the difference in these terms and the behaviors they produce.

#2 How to assist with education related to lowering nitrogen loading in aquifers. *AND* #3 What new policy or regulations are needed? Members felt these questions should also be answered down the road.

#4 How can we encourage BMP's that have the greatest impact on nitrate levels without new regulations? A member voiced a concern that voluntary solutions don't require people to do the right thing and that enforcement actions were necessary. Jean brought up a concern she had about BMP's that had been employed since the 1970's and noted that she had sent the group a three page letter outlining her concerns. A discussion ensued. One member suggested BMP's should be static and be able to change as more is learned. Another member felt that they are not static because what was effective in one field may not be effective in another or can be dependent upon application. A member also felt that there needed to be an educational component to go along with this that should include "negative components" – educating people about what doesn't work, reiterating the problems that need to be solved, and solutions with a given time frame to make the changes.

A member asked if NRCS standards are BMP's – Ginny said yes, they are called practice standards and are governmentally recommended voluntary actions. Jean noted that there had been an ongoing dispute about BMP's between the Department of Ecology who believe BMP's should be measurable and objective and the Conservation District who felt they were not clear enough.

Vern knows that a long list of BMP's was compiled by HDR. Jean said that Irrigated Ag was working on shortening the HDR list and felt that Livestock/CAFO could do this too.

A member wanted to know what will happen at the end of 2017 and how and when a conversation on this should take place. Vern said the groups would need to determine solutions, the costs associated with each solution, a determination as to who should implement the solutions and the source of funding for each. As the momentum picks up this will then be an agenda item for the GWAC.

#5 What are the consequences beyond lowering nitrates? Levels of BMP's? A member didn't understand the question and believed it meant if the group is successful at reducing nitrates – what will be the side effects? Another member was concerned that with the decreasing levels of water in the aquifers less nitrates could still be too much. Another member disagreed and said that the aquifer does not store nitrates instead the water pushes nitrates down from where they are stored in the soil. Another member said more land is now being farmed but didn't know how much more. Jim Davenport was asked when the area characterization would be done – he said it

was still a work in progress. A member was concerned that a lot of it had been done on a County-wide basis when it should be specific to the GWMA.

#6 How can we best promote improved economics of our agriculture while lowering nitrate levels? A member felt this question was premature. Another member believed that the group would need to find a balance so that the outcome of the GWAC didn't have a negative impact on the main driver of the economics of the County. A member asked for a definition for "promote improved economics." Another member thought that once the main sources had been identified greater understanding would come through the acquisition of data and more information resulting in new technology that would have a positive impact. Efficiencies will also help offset costs, i.e., crops are better and it's easier to manage water as a result of technological improvements in irrigation. Another member mentioned that a participant in the Irrigated Ag group mentioned moisture sensors would be a great asset. She felt these technological advancements fell under the heading of precision ag and the group needed to develop good descriptions of technologies to get the word out, also determine who would be promoting it and what carrots or sticks needed to be applied.

#7 Would regulating well quality (not water quality) construction, depth, promote less nitrates to people? Vern said yes all of these things would promote less nitrates. A member was concerned that this was nice to say but not economically viable for many homeowners. If it were economically viable it would be a good solution.

#8 Who is the lead agency for any particular rule that can/will impact nitrate levels? We don't know yet.

#9 What possible mitigation measures can be developed or are they necessary with existing regulatory oversite? A member expressed the concern that if the problem hadn't been identified yet this would need to happen later down the road.

#10 What measurement can be used to track performance (reduction in nitrate levels)? Jean asked Jim to respond. Jim was not aware of a strategy to track performance. David sent out a paper describing the problem and the short answer is through monitoring and analyzing data. A member asked if there is a way to measure nitrates in the aquifer or a way to measure nitrates going into the aquifer – could deep soil sampling be utilized. Jim responded and said that the ambient monitoring system measures at the top of the water table which would be the first sign of a potential problem. A member asked if it would be helpful to measure at the root level – Jim thought that this could be an additional strategy but cautioned against being too simplistic as the route of travel varies. The first strategy was to measure the condition at the water table and then add other strategies from there. A member voiced a concern that there was a need to look at what is coming into the aquifer. Another member pointed out that some of the sample wells were at the boundaries in order to check on what's coming in.

Preparation for Discussion with Livestock/CAFO Working Group

Jean explained that she wanted the group to go around the room and speak out one good idea. A member asked if there was a meeting set up with Livestock/CAFO. Jean explained no meeting had been scheduled as it was her goal to complete the list first and she wasn't sure how long this

would take. Another member pointed out that the majority of those on the Regulatory group were also on the Livestock/CAFO group. Another member thought that the purpose of the Regulatory group was to research regulatory information from the various agencies. Regulatory would then pass the information on to the applicable working groups and it would be then up to that group to say yes we have laws that cover or no we don't.

Another member thought it would be good for Regulatory to also visit the EPO group since they will focus on a design for education. Jim Davenport added that to date EPO has focused on the health effects of nitrates because it was an educational strategy that could be accomplished immediately. EPO wants to know what other messages they could educate people about. Specifically EPO will need to know from each group who is suggesting an educational component who the audience is, what the message is, and the group's recommendation as to the best way to deliver it. From there EPO will design a plan and provide estimated costs.

Jim Davenport had five regulatory ideas that pertained to Livestock/CAFO that he shared. The group, during the course of the remainder of the meeting, added to the list.

1. Educational needs
2. Density limitations
3. Building codes for farm structures
4. More complete disclosure of DNMP's
5. Development standards
6. Technology incentives
7. CAFO Permit
8. Manage fertilizers and manures
9. Summary of agency's oversight
10. Codes and laws
11. Compliance level

Ginny added that a draft of the CAFO permit would be out in the next week and although it would not be finalized it would address a gap. She also pointed out that in the DNMP they want nitrates to be under 45 parts per million to be considered compliant. At 30 they will start having conversations and if the test exceeds 45 they will move toward enforcement. She added that the test is done at 0-12 inches and this is the only requirement.

Jean said that she would also like more information from producers on how manure is managed. In addition, she read a USDA article that said that corn crops are a large contributor to the nitrate problem. She believed that this was confirmed by the deep soil samples as the levels were high for corn and triticale. She wanted the group to discuss it and look for ways to address the problem. A member asked if the USDA research data was from Washington State or from the Midwest. He noted that most likely the study was done in the Midwest where they use synthetic fertilizers on non-irrigated land. Therefore these issues do not correlate with the issues in Yakima County.

Jean also believed there is a gap in the DNMP because livestock owners have no regulation on exporting manure. A member pointed out that if livestock owners aren't allowed to export manure, chemical or synthetic fertilizer will be used and this won't necessarily result in a better outcome. They believed that if manure is regulated synthetic fertilizer and the amount of water used must be regulated as well.

A member felt that the group needed to refer back to the GWAC work plan otherwise the group tended to drift off task leading to purposeless meetings. Other members agreed they didn't think it was the job of the Regulatory group to come up with solutions but just to inform the other groups of the gaps in the regulations and laws.

Vern spoke up and said that he had authored the plan and it was his intent that this group would research and educate the GWAC, but that the other work groups would develop solutions. In Vern's opinion the Regulatory group was close to being done with its homework assignment. David, as the Livestock/CAFO Working Group Chair, concurred – he believed it was his working group's responsibility to come up with solutions. The group agreed to proceed in this manner.

Another member pointed out that according to the work plan the Regulatory group was to provide the regulations and applicable agencies to each work group. Jim Davenport advised that he had read the HDR list and the statutes and regulations cited in that list and had written up a description. He believed that the group could go through the document he had prepared, strike out what was unnecessary and come up with a list of regulations for each working group. Then it would be easy to incorporate the comments of the presenters from previous Regulatory meetings. Jim was asked by the members to look at the report and subdivide it by group. Ginny will also review the parts she knows something about to make sure everything is accurate. A member asked Jim to share the document with the group in Word format marked draft so that they could review it as well. Jean will work on a list of agencies with contact information for people to use if they have problems.

A member stated that he felt it was also the group's job to report status/compliance levels and he wanted to know if Jim had incorporated this information into his document. Jim stated that he had not listed compliance levels. Further, he thought that the compliance information provided by the presenters was spotty and imprecise as it is difficult to get any agency to disclose compliance statistics. David noted that absent a permit that gives you benchmarks compliance can be very difficult to measure. Ginny said the same is true with OFM and soil test compliance information. There are penalties and notices of warning.

The group agreed that it was a good plan to leave the solutions to the other working groups and to proceed as outlined above. The meeting was adjourned by Jean Mendoza at 7:00 PM.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

Jim Davenport will divide his document by working groups and provide it to the working group in Word format for their review. Jean will work on a list of agencies and contact information.

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

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Ryan Ibach, Chair (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), Dan DeGroot (Yakima Dairy Federation)

Meetings/Calls Dates

Meeting: May 9, 2016, 2:00-4:00 PM
Sunnyside School District Administration Building, 1110 S. 6th Street, Conference Room 20, Sunnyside, WA 98944
Call in: 509-574-2353 (pin 2353#)

Participants

Present: Ryan Ibach, (Chair), Jim Davenport, Dan DeGroot, Kathleen Rogers, Jim Dyjak, Vern Redifer, Sandy Braden, Mike Martian, Cynthia Kozma, and Bobbie Brady (Yakima County Support Staff)

Key Discussion Points

The meeting was called to order at 2:02 PM.

Status of RCIM component of the Nitrogen Loading Assessment (also included discussion of the number for applied fertilizers to schools, golf courses, etc.)

Chair Ryan Ibach opened the meeting and introduced Mike Martian and Cynthia Kozma from the Yakima County GIS Department. A chart they had prepared was distributed to the group. Mike explained that GIS recently met with Jim Davenport to talk about adapting the information already assembled for the RCIM component of the nitrogen loading assessment into the tabular format used by the Irrigated Ag working group in their component as this would allow people to more easily compare the reports in the future. Mike explained he and Cynthia were present at the meeting to outline their processes and the data they utilized as they prepared the chart, to confirm the group's approval of both and to solicit input and suggestions from the working group to refine and add to the information they had already obtained.

Mike then led a discussion of each source of nitrogen applicable to the RCIM and the numbers that had been inserted into each column following each source. Those sources were: domestic septic systems, large on-site septic systems, UIC wells, lawns, hobby farms, and permitted bio-

solid fields. He also had added atmospheric deposition as it had been requested that this topic be incorporated into the RCIM component of the nitrogen loading assessment.

Mike and Cynthia explained the data and how they had reached conclusions, estimates and/or assumptions for each piece of data. The group made the following comments:

- It was agreed that some of the columns utilized by the Irrigated Ag group in their piece did not apply and that when they did not apply to a source in the Irrigated Ag piece "-o-'" was inserted into the column. The group adopted this same format.

- GIS incorporated the use of a range (low, medium, and high) as the Irrigated Ag piece presumed this as well. Jim Davenport felt this was important for comparison of the three studies in the future since no one knew what number would be used in the long-term when all the reports were consolidated.

- Vern informed the group about an article he had read ("Onsite Sewage Treatment and Disposal Systems: Nitrogen") which had been prepared by the University of Florida. He had provided the article to GIS for their consideration as they were updating the RCIM piece. Vern would also distribute it to the working group. The article provides information on research and data collected by the University of Florida that would allow for the weight of nitrogen per person per day generated by onsite septic systems. Vern and Mike discussed converting the measures into the same units as the Irrigated Ag piece and spreading the calculations over the applicable acreage.

- A member raised a concern that if 120 lbs. of nitrate is pumped into a drain field from a septic system each year, year after year for say, 50 years in a row, this number becomes quite high especially as there is no system to take out the nitrates. He also pointed out that a septic system provides daily water, 365 days per year, with which to move the nitrogen. Of greater concern to the member was the potential proximity of acreages with septic systems which would create a larger concentration of nitrates.

- The member also expressed concern about commercial septic systems missing from the equation in the RCIM piece. He reminded the group that he had previously shared that there were businesses he was aware of in his neighborhood that were on septic systems, but he did not see them on the map GIS had previously provided. Unfortunately, he felt this presented an incomplete picture of the septic systems. The group brainstormed how commercial septic systems could be included and various ways to go about estimating both the number of systems present in the GWMA and the number of employees utilizing the systems especially with the variation in the farm labor workforce.

- Vern did not believe that UIC wells should be listed as he did not believe they were a source as they don't generate any nitrates but rather could be a conduit as a place of injection like drains. In addition, they are predominately found only in urban areas. He went on to say that most were being retrofitted with pretreatment devices.

- The group looked at the number for applied fertilizers to schools, golf courses, etc. It was the consensus of the group to keep the 2-3 lbs. per acre per year loading rate (although a member had suggested a higher number) since it was in line with the research Kathleen Rogers had done in the Sunnyside area and the experience of others in the group. Kathleen reminded everyone that she had specifically called schools, parks and golf courses in addition to residential homeowners and had learned on average they only applied fertilizer once per year if at all. Also, there was no accounting in its provision for its application to a source that would utilize the nitrogen (grass) before it reached the groundwater.

- Vern suggested that permitted bio-solid fields be taken out of the RCIM piece as they were already included in the Irrigated Ag component.

- Mike and Cynthia stated that atmospheric deposition was still blank as they had not yet completed their research. They were still working on finding data from the right type of region to compare atmospheric deposition in the GWMA to. Vern noted that over the long-term there would be very little the GWMA could do to effect atmospheric deposition.

- Vern reminded the group that the RCIM report and data have not been to peer review as of yet.

Discuss how a septic study in the GWMA would look and who could do it.
Chair Ryan Ibach noted that Stu Turner had suggested a small-scale research septic study be done on representative fields concerning potential nitrate contamination attributable to improperly-operated septic systems. Stu had volunteered to consult with experts in the private and public sector and return with details concerning cost and implementation of his proposed field sampling project. He had explained that he had prepared a list of questions that need to be answered and said he would get back to the group with this information. To date, Ryan had not heard from Stu. The group agreed to wait for Stu to respond and not to move forward with the project until that happened. A member expressed concern that this study does not need to be done as other studies, i.e., the Chesapeake Bay study (which included 20 years of testing) could be used. The member went on to suggest the group look at the numbers in this study to see if they are applicable to the situation in the GWMA. He also believed that should the group do its own septic study he felt the people allowing testing to be done on their septic systems should remain anonymous as the GWAC had done with the deep soil sampling.

What have we accomplished and what direction do we go.
The group is continuing to work on nitrogen loading rates for residential, commercial, industrial and municipal entities as they had done earlier in the meeting. When this task is done they will begin focusing on strategies to recommend to the GWAC to improve nitrogen loading rates. Jim Davenport pointed out that earlier a member had suggested an issue in the Health District's tracking of commercial septic systems as currently they are not differentiated from residential septic systems. A proposed strategy could include the implementation of technology that would allow this to happen.

Resources Requested

-

Recommendations for GWAC

-

Deliverables/Products Status

-

Proposed Next Steps

- From Vern Redifer: Copies of the study done by the University of Florida.
- From Stu Turner: Details concerning cost and implementation of his proposed field sampling project regarding septic systems.
- Next meeting to be held on June 13, 2016, at Sunnyside School District Administration Building, Room 20, from 2:00 to 4:00 PM.

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

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Ryan Ibach, Chair (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), Dan DeGroot (Yakima Dairy Federation)

Meetings/Calls Dates

Meeting: June 13, 2016, 2:00-4:00 PM
Sunnyside School District Administration Building, 1110 S. 6th Street, Conference Room 20, Sunnyside, WA 98944
Call in: 509-574-2353 (pin 2353#)

Participants

Present: Ryan Ibach, (Chair), Jim Davenport, Dan DeGroot, Steve George and Bobbie Brady (Yakima County Support Staff)

Key Discussion Points

The meeting was called to order at 2:02 PM by Chair Ryan Ibach.

List potential solutions to high nitrates in the groundwater that are in the purview of the RCIM Working Group.

Jim Davenport suggested that the group begin by making septic tanks a primary point of discussion and encouraged everyone to be creative and list all possible strategies.

SEPTIC TANK/WELL DISCUSSION

A member suggested that it might be wise to bring in an expert to explain how existing and new septic tanks and drain fields work and explain what options might be available in lieu of a leaching drain field. The member felt he had a basic understanding, but no clear picture of potential solutions. He had heard about mound systems and sand filters used in Western Washington but was unclear as to what their purposes were. Ryan stated that these systems are used when there is either a high water table or when the soil drains poorly.

Jim pointed out that Vern was researching septic tanks and as an engineer would have a better understanding. Another member thought that in addition to hearing from an expert on septic tanks it might be good to look and see what options other GWMA's tried. He also believed that the group could ask PGG or other County personnel.

Dan thought that potentially the installation of hybrid treatment plants like found in Buena might be an option. This hybrid plant was put in by the County. They repaired the tanks that were corrupt, hooked them up to a County system and put the whole town on it. There are four cleaning tanks. There are no drain fields anymore. The County has a lot of information on this and could be a resource if the group desired more information. They also drilled a new community well and took control of that. Jim believed that Vern had been responsible for the installation of this when it was first put in. Jim also noted that he had just received a notice that the County was coming to pump the tanks in Buena this summer – regulations require that this be done every three years. Systems in Outlook and Crewport were installed as well.

A member said this could be put on the list of solutions for areas where there are larger clusters of homes but was concerned that the cost would be out-of-line and it would be difficult to fund. A concern was voiced too that in a rural economy this didn't seem like an economically viable option.

Dan wanted to know how many homes needed to be in an area to put together a treatment plant. This knowledge would allow the group to look at map and decide where to put them. He believed that this would help determine what percentage of septic drain fields could be taken out of play.

Jim pointed out that this solution would increase the number of treatment plants in the GWMA and wondered what level of treatment could safely then go in the river or drains. The group also asked if the liquids could be applied to agricultural lands in the same manner as irrigation water. If so, it would require additional lagoons and the ability to pump to appropriate locations. The group discussed as well how much storage would be required for approximately 200 days (as there would be approximately 165 days of application).

Another member suggested density limitations could be added to the urban growth plan as a possible solution option. The density limitation could require that if you desire to subdivide your land you must put in one septic system for all of the new parcels so that when a City structure expands to that region and sewer is made available there would only be one system to eliminate. A member pointed out density is a remedy but it doesn't fix the problem it just pushes it around. Density becomes an issue where there are clusters of houses causing cumulative loading. As long as there is enough acreage between systems there is less of an issue.

Another idea for a solution was a planning concept – push density to the UGA then you would be in a better position to set up a central system like they did in Buena.

A member noted another solution could be the restoration/retrofit of older septic systems or wells. Jim added that incentives or tax breaks could help make retrofitting wells and/or septic systems possible.

An additional item on the solution list could be drilling new deeper wells and wells away from drain fields. Wells could draw water from the deeper parts of the aquifer where lesser levels of nitrates are found. In addition, drilling wells farther away from drain fields may also be a solution. However, the group agreed these solutions don't address or help the nitrogen load at a

more shallow point in the aquifer nor do they solve the nitrate levels. Jim reminded everyone that the GWMA WAC asked the group to recommend best things but the group may also have to recommend ideas that are hard to do and may seem odd.

Jim suggested that a solution could be to require a builder to demonstrate that a septic design would not add to the nitrogen loading problem if they want to develop and build. This would be managed similar to the Groundwater Management Act where in order to issue a permit you must prove that there is a legal adequate supply of water.

Dan added another possible solution could be to require cities to take on the management of septic systems close to urban areas potentially with hybrid systems. He also pointed out that this would be a huge expense and might not be a popular solution with the County as it would affect their tax base. Another member noted that while there would be a decrease in the tax base, there would be less services to provide which would reduce costs.

A member suggested aquifer protection area districts. This would need to be put to a vote and would create a tax on the property owner's tax bills every year similar to a flood tax or noxious weed tax. People could be exempt from this for behaviors that would reduce nitrates like pumping your septic system every two or three years. This kind of program has been utilized in King and Snohomish Counties. The program would allow the group to provide incentives and raise money at the same time. The income could help fund education, county systems, consultants to advise people and so on. There was a concern that this wouldn't pass but Jim pointed out that lots of education would get done in the process. Another member said that they didn't favor tax structures and preferred voluntary incentives with payoffs.

The group also discussed improperly constructed wells and abandoned wells. Jim said abandoned wells were difficult to locate, but thought that if a recent permit had been issued to construct a well on an older site, it would be safe to assume that there was an abandoned well on the property. A search could be performed and the property owners could be contacted. This would require an administrative person to do this. He went on to say that people don't usually know if there is an abandoned well on their property. There could also be a voluntary program with incentives to have a well inspected and retrofitted or to report an abandoned well. Another member pointed out that people are required by law to decommission their wells and this would have to be addressed. Others felt that if enough exemptions were provided to give people the incentive to take corrective action they would respond.

It was suggested that the group acquire more information and data on each well reported to have a high nitrate problem, i.e., how old is the well, how it was built, are they cased above and below the ground, and the well's depth. Someone asked if GIS could provide this information as good data like this may help provide better solutions.

Another person wondered if pumping or cleaning out the sand filter more frequently would make a difference.

One last solution was offered - don't farm around a well.

LAWN DISCUSSION

Dan is still concerned about the 2 lbs. per acre loading number adopted in the RCIM piece. Dan felt the number should be higher. He looked at some websites and determined that mulching adds 75 lbs. of nitrogen. He knew that Kathleen called maintenance people at schools, parks and golf courses. One member noted that there weren't many golf courses in the GWMA – just the one in Sunnyside. Another member felt that over-application was probably not a huge problem on public areas but might be an issue with private lawns. They did feel that overwatering might be an issue.

Jim said that in Las Vegas they gave a money incentive to property owners to change to a yard that used less water. The program worked quite well. Another member thought that it was important to educate people about nitrogen applications to lawns and to cut back on watering.

The group agreed that it was also important to amend the "use it or lose it" watering program in high nitrate areas. It was suggested that someone could talk to Senator Honeyford and talk about this. It would also be important to think through Irrigation District and Tribal issues but the group felt the solution warrants talking about it.

Status of RCIM component of Nitrogen Loading Assessment

Dan wanted to know if the report included information from the Port District for their processing plants. Jim said that the Department of Ecology was going to try to get the information and pass it on to GIS as the Port is regulated – Ecology has this information.

Jim mentioned that Vern had indicated in the latest Data working group meeting that the RCIM component would be to WSDA by the end of June.

Discuss Septic Study in the GWMA

Stu Turner had proposed a study of septic systems to this working group. Recently, at another working group meeting he volunteered that a study that had been privately funded was under way. Not everyone agreed that this private study should stand in lieu of one done by the RCIM working group. Jim liked Dan's idea to bring in an expert with known credentials into one of the RCIM working group meetings so that the group could ask questions specific to the GWMA about septic systems. Jim felt that this would allow the group to better determine if they needed to do a septic study. The group felt it was critical to find an expert who could help explain how septic systems work and help with strategies to mend the problem.

Review Section 2.3 of the Work Plan to determine progress.

Dan proposed this agenda item as he believed it gives the group a "to do" list as it moves forward. He felt like most of section one was done. Dan pointed out that the group had never put together a purpose statement and he wondered if it was necessary. Jim said that would depend on his personal approach and the ability to prioritize the work that needs to get done.

Selecting a new chairperson

Jim let the group know that Dan had volunteered to be the new chairman. He said that the procedure for replacing a chairperson in a working group was for the meeting participants to

decide. The group agreed that Dan would be the new chairman. Ryan said his replacement at the Yakima Health District will become a member of the working group. Both will attend next month's meeting so that Ryan can make introductions.

Conclusions. Review of Action items

Commercial septic systems are not a part of the RCIM piece of the nitrogen loading assessment. Dan felt it was important to think about this some more as he felt the piece would be incomplete without it.

The group agreed that Jim Davenport should find a septic engineer who could bring expert advice to the next meeting to help the group better understand how septic systems work and to talk about possible solutions. They also asked Jim to make sure the Department of Ecology turned in the information on septic loading.

Several members had conflicts with next month's meeting date and suggested it be moved from July 11 to July 18 at the same time (2:00-4:00 PM) and location (Sunnyside School District Administration Building). Bobbie Brady, Yakima County Support Personnel, will work on the logistics and rescheduling the meeting.

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

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, June 2, 2016 5:00 – 7:00 PM

Participants

David Bowen, Dan McCarty, Jim Dyjak, Stu Turner, Larry Fendell, Jean Mendoza, Laurie Crowe, Steve George, Jim Davenport, Jason Sheehan, Vern Redifer, and Bobbie Brady (Yakima County).

Key Discussion Points

Chair David Bowen opened the meeting and asked everyone to introduce themselves. He explained that Items 1 and 2 on the agenda were designed to help him get up-to-speed and to ensure everyone was on the same chapter since the group had not met since April, 2015.

No. 1 – Status/Nitrogen Loading Study: Jim Davenport updated the group on the process for this study. There was some discussion about the RCIM piece and the septic study that had been discussed at the last RCIM meeting. A member of both groups reported that funding from a source outside the GWMA had been identified and they were now looking for experts to staff it. The report would be available to the GWMA for their use and prepared in a manner that would withstand peer review. A presentation could be made to the group as well if that was desired.

Another member asked when the nitrogen loading study would be available – Jim and Vern explained that the objective was to have the study to the GWAC at its October, 2016, meeting which meant that everything would need to be through the peer review process, to the Data working group for their consideration and also to each applicable working group for their comments as well. The GWAC could then consider the study with the confidence that it had been reviewed by everyone.

A member spoke up and made a motion to abandon the nitrogen loading assessment as it had delayed the process too long and to return to the 2013 EPA study that had been previously discarded. Another member seconded the motion. A discussion ensued as follows:

a. A member voiced that it was their recollection that the study done by the EPA was not specific enough as it utilized literature values for the work whereas a study done by the GWMA would allow the group to move forward with specific values and better facilitate discussions on how to solve the problems within the group's target area.
b. Another member didn't feel they could comment as they didn't remember the 2013 EPA study.
c. David noted that he believed the study was done in 2010 and that the modeling lacked specificity. Another member said that they appreciated the loading assessment the group was doing as it would have quantified rates.
d. A member commented that the completion of the group's nitrogen loading assessment was taking too long – the group had been told 90 days and it had taken a year.
e. Vern pointed out that the completion of the study had not in fact kept the group from moving forward as Irrigated Ag had already begun talking about solutions to the problems. He added that other groups could easily hold these discussions now as well since percentage allocation of loading would not cause a change in solutions but may only cause a difference in the allocation of resources.
f. David pointed out that the agenda for the evening (No. 5) already allowed for a discussion about solutions to make the situation better.
g. Another member could not see any valid reason for abandoning the assessment now as relevant information continued to come in.

The group also discussed the WSDA industry testing of pens and corrals at the requests of landowners which were performed by scientists and experts in the fields. A member was concerned that citizens had been left out of this testing. It was noted that it was not the standard to bring in non-scientists into the scientific process. The dairy farmers who granted access were not present and did not participate either. David noted that there are standard "quality assurance" procedures which would allow the testing to pass muster with peer reviewers. Another member felt this and the lack of completion of a literature review led to a lack of trust. Vern pointed out that Kirk Cooke had said that they could get research from pens and corrals which would negate the need to use literature data. It was Vern's belief that actual data was the better choice. He suggested the group could now consider some literature review if they desired and see how it compared to the actual data. He also pointed out that the group could just agree that there is a contribution and move forward with their discussions about solutions. David ended the discussion and put the motion to a vote. Three voted for, one abstained and the remainder of those present voted against the motion.

Vern reported that the RCIM piece had been revised several times due to suggestions or literature provided in various working group meetings. GIS researched the suggestions and literature and added to the piece where appropriate. It would have been completed a while ago, but it was strengthened by this process. An example would be the data on the septic tanks – a member had noted that the population in the GWMA changed season to season. GIS obtained information from the Department of Agriculture and the Employment Division. As a result GIS was able to capture in the RCIM piece the change in the demographics within the GWMA boundaries from season to season. Vern believed the product will be better and there would be an acceptance of the data within the group because their input had been validated.

Jim Davenport added the group had also benefited because the nitrogen loading assessment information exists in a geographic format and the group witnessed this firsthand at the last GWAC

meeting when the GIS department made their presentation. The nitrogen loading from septic systems, for example, allowed the group to move from hearing "40 tons over the whole GWMA" to seeing density loading maps providing the option to visualize the density of septic tanks in their specific locations. The maps will also allow for an overlay of differing sources.

A member pointed out that based on their personal studies they were concerned atmospheric deposition was as big of an issue as septic. Vern said that they had found through literature research a map of the US in GIS which could be requested in geographical blocks. This could be enlarged and would reflect the points in the GWMA with wet, dry, and wet and dry atmospheric deposition at 3 to 6 lbs. per acre. Vern would send this out if it was desired.

Laurie Crowe said that she had read an article that had been distributed worldwide that said that livestock was the least contributor of nitrates. She will look for the article and circulate it.

Jim Davenport asked the member what they wanted to talk about as the group had already assumed atmospheric deposition was a source in the same manner as septic and lawns and included it in the RCIM report. Vern pointed out that it was presumptive to hand out the RCIM report at this time as it was still in draft stage. He would provide the background studies, but had a problem releasing work that hadn't gone to peer reviewers. Another member noted that atmospheric deposition wasn't pertinent to the discussion of the livestock group but should be contained to the RCIM group.

No. 1 – Status/Literature Review: Vern recalled conversing with the Department of Agriculture to ask them what they were doing relative to literature and/or studies on pens and corrals. A member recalled very little literature out there and none relative to this region which is why the group did its own testing. Jim Davenport believed pens, corrals, composting and lagoons had been discussed. Another member was concerned that the NPDS permit Ecology is working on due out in final format in November would be in conflict with what would be proposed by the GWAC. David said that some review was done, mostly out of the region so he was concerned it was not applicable and thought it was good the group had done their own. David indicated that he had met with persons at Ecology and the NPDS draft will be out June 15. They are on schedule and November is the worst case scenario completion date.

A member expressed concern that little help had been given those people with polluted wells and that little would be done to solve the issues they believe to be caused by livestock/CAFO's. Another member pointed out that there were hot spots near the Tri-Cities as well (on maps provided to the working group by David) in areas that contained no livestock or CAFO's and suggested that if trust in the group was the goal it was important for members to refrain from offering their opinions because it causes distrust as well.

A member suggested a website would be convenient with links to go look at literature. Vern stated that the County was revamping a website page for the Regulatory group and is developing a policy to check the links every two weeks to insure that they are still viable.

The group had talked about hiring several experts. Vern remembers Charlie talking about it and a start-up budget of $10,000 to do some deep soil sampling of pens and corrals and also to pay someone to look through the literature. However, it was his recollection that Kirk Cooke talked Charlie out of it. A member wondered if there was some modest way to do this and felt that the

group needed a 5-10-20 year study that could better inform the group where to put the money. David and Vern will talk about this. It was also mentioned that the Department of Agriculture may already be doing this and David agreed to call and find out how thorough the data review was. Vern suggested he call Melanie Redding first as she had done the peer review. A member said that they want to meet about literature to see what goes on the web. Another member asked that criteria for literature be established.

No. 1 – Determine how various studies should be evaluated for credibility, relevance, etc.: Jim Davenport felt it was important to find the literature to be reviewed before determining what credibility meant to everyone in the room and that relevance was easy to determine. David agreed that the group should have the studies in front of them. Another member noted that when an article is cited by others the article is more credible. Journal ranking, what other sites say about that issue and who did the peer review also add to an article's credibility. A member voiced that it was important to discuss the issues if there was a problem with a piece of research.

No. 1 – Other: No other issues.

No. 2 – Status on Working Group Plan: David explained that the group needed to ascertain whether or not the work plan (A-I) was done. He had read through the minutes from 2014-15 and couldn't tell if this had been completed - Jim Davenport did not believe so. A member felt that some of 2.1.3 had been done. Another member felt that 2.1.2 needed to be source specific. Another member believed 2.1.1 and 2.1.2 were GWMA goals that the GWAC would answer.

Another member wondered if 2.1.7 was what PGG was doing. A discussion ensued. One member believed that the strategies for this would come out of this work group since each potential source is work group specific. Examples for monitoring for the Livestock/CAFO group may include ideas on how to monitor compost and/or pens. Vern said monitoring could also be the PGG program itself which was trying to assess a sense of overall groundwater quality in GWMA. However, it wasn't designed to monitor the success of a particular strategy unless it does so by coincidence.

A member suggested a two-step monitoring program. The first step would be to monitor if people were participating in the solutions and gain information on early values and the second step would be to monitor the groundwater. Another member thought this would be a good idea as it would provide early results.

A member wondered if under 2.1.3 BMP's would be monitored as well. David noted that he believed 2.1.5, 2.1.6 and 2.1.7 should be read together in this context.

Vern suggested that a possible monitoring effort by the Irrigated Ag group would be to perform deep soil sampling tests again in two years. It would provide an easy way to see if there was improvement. If the numbers remained predominately the same it would make it clear that the solutions (BMP's) didn't work. A monitoring program should see if the "we participated, we were educated, we were assisted with the goal of making a change" efforts were accomplished.

David indicated he was going to attempt to go through the status goals (highlighted in bold) in order to better see where the group is at now that he had received everyone's input. A member believed that there had been a master list of best management practices and that a lot had been

crossed off in order to winnow the list down. David will look at this. Vern thinks he has a master list – electronically provided to everyone on paper.

No. 3– Ecology Washington Nitrate Prioritization Project: David reported that early information had been sent out to the group prior to this meeting. He noted that there are data limitations. A link had been provided and a request for comments. It had not yet been to peer review. They had tried to be neutral. David would appreciate the group's thoughts.

No. 4 – Ecology CAFO General Permit Update – mid-June draft release for public comment: (release June 15) David had spoken with them – there will be a 60 day comment period with public comment meetings held July 26 – 28. One will be a webinar. The meeting on the 28th will be held at the Department of Ecology in Union Gap at 6:00 PM. More information about the meetings will be on the Ecology website on June 15.

No. 5– Other topics . . . Next steps: David encouraged the group to proceed with nitrate solutions (education and technical assistance with financial motivations), not focusing on percentages without waiting for the nitrogen loading assessment to be finalized.

David pointed out that several members were a part of the EPO working group committee. Jim Davenport encouraged the group to answer the questions: "who do we need to educate" and "what do we want them to know" when preparing its list of solutions. He then advised the group to tender the information to the EPO to design a program as they were better equipped to ascertain who is best to help educate, education management programs and the costs involved.

Stu Turner indicated that there are ready-made educational programs in place through the Tri-Societies (which includes the American Society of Agronomy, Crop Science Society of America, Soil Science Society of America) and about half to two-thirds are free. Stu had already checked and believed that they may grant the GWMA a license to use the programs. He will forward on a link so that the group might have more information.

There was a discussion about meeting twice a month. The group decided to email more frequently and meet once per month. Next meeting: Thursday, July 7, 5:00-7:00 PM, Department of Ecology, Union Gap, WA

Resources Requested

Recommendations for GWAC

Deliverables/Products Status

Proposed Next Steps

- David will call Melanie Redding and the Department of Agriculture (if necessary) to determine if they had done a thorough review of data on pens and corrals.
- David will go through the status goals again now that he had received everyone's input.
- Vern will look for a master list of best management practices the group had been editing.
- Stu Turner was going to forward on a link about the Tri-Societies' ready-made educational programs.

Attachment B

1. Landau Associates "Deep Soil Sampling Program Fall 2014; Spring 2015; Spring 2016 Preliminary Data Analysis" document dated June 28, 2016.

Deep Soil Sampling Program Fall 2014: Spring 2015: Fall 2015: Spring 2016 PRELIMINARY DATA ANALYSIS

June 28, 2016

Eric Weber, L.Hg.
Ben Lee, E.I.T.

LANDAU ASSOCIATES

Sample Timing

- Fall 2014
- Spring 2015
- Fall 2015
- Spring 2016

Sample Timing

- ***Fall 2014:***
  Oct 28 to Nov 7
- Spring 2015
- Fall 2015
- Spring 2016

Sample Timing

- Fall 2014
- ***Spring 2015:***
  Apr 27 to May 8
- Fall 2015
- Spring 2016

Sample Timing

- Fall 2014
- Spring 2015
- ***Fall 2015:***
  Oct 12 to Oct 27
- Spring 2016

Sample Timing

- Fall 2014
- Spring 2015
- Fall 2015
- ***Spring 2016:***
  Apr 25 to May 4

Data Set

Lab Data

Nitrate

- Well controlled
  - Prescriptive approach
  - Strict adherence to methods
  - Same sampling crew
  - Same laboratory
- High quality
- Well documented

Other Data (0-1 ft interval only):

- Ammonium
- Soil organic mater

Controlling Factors

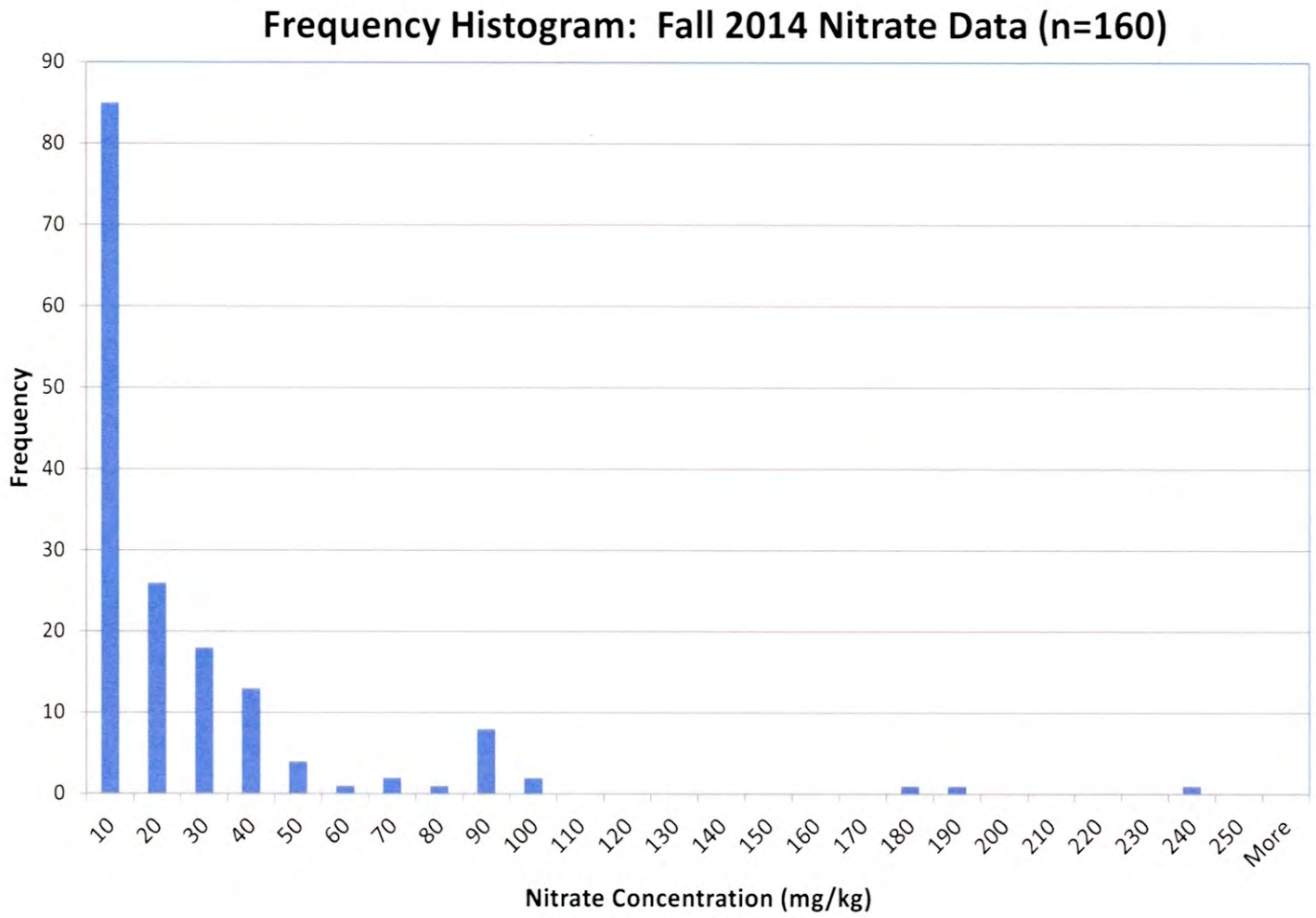
Sources of Information

- Questionnaire
- Field Notes
- Field Logs

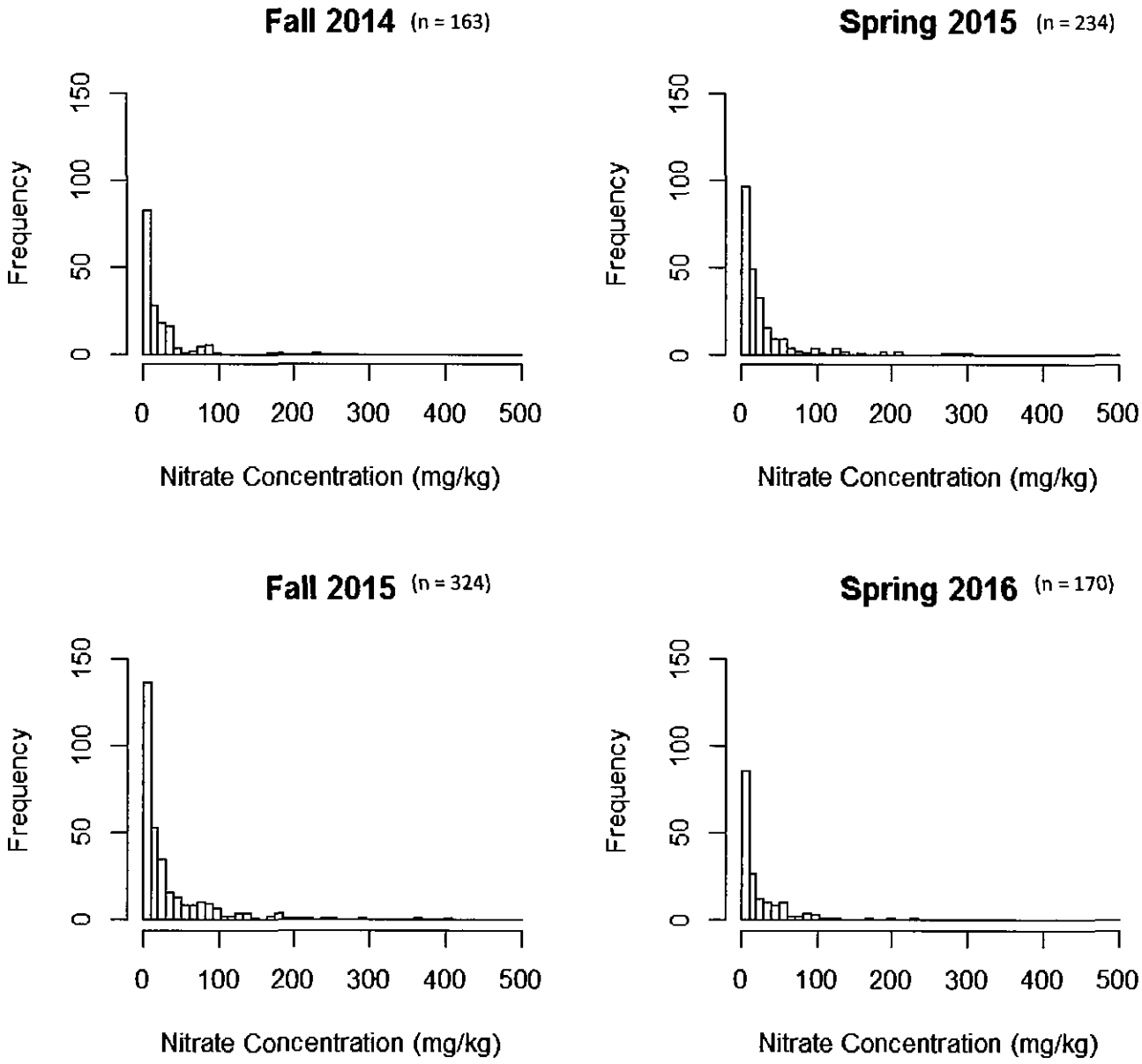
Factors

- Crop type
- Crop history
- Irrigation type
- Irrigation history
- Soil type
- Fertilizer type and amount
- Fertilizer history
- Weather

Fall 2014: All Data



Histogram of Nitrate Concentrations



Box Plots and Percentiles

f_x =(D2-0.375)/(33+0.25)

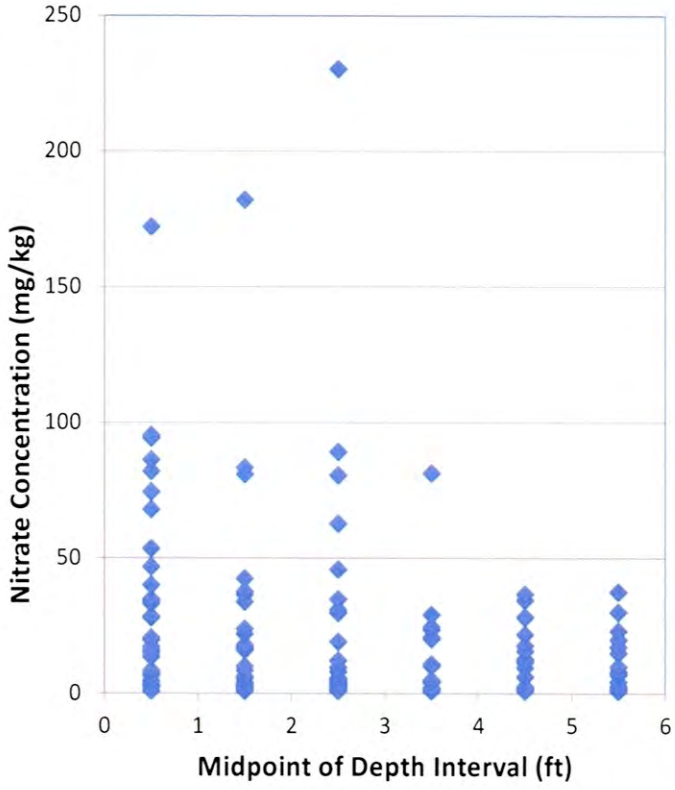
A	C	D	E
Depth Interval (	Nitrate (mg/kg)	Rank	Percentile
0-1	172.2	33	0.98
0-1	95.4	32	0.95
0-1	94.4	31	0.92
0-1	86.4	30	0.89
0-1	86.4	29	0.86
0-1	82.1	28	0.83
0-1	74.5	27	0.80
0-1	68.0	26	0.77
0-1	53.6	25	0.74
0-1	46.9	24	0.71
0-1	40.2	23	0.68
0-1	34.9	22	0.65
0-1	34.2	21	0.62
0-1	33.3	20	0.59
0-1	28.6	19	0.56
0-1	28.1	18	0.53
0-1	20.6	17	0.50
0-1	19.8	16	0.47
0-1	17.4	15	0.44
0-1	16.2	14	0.41
0-1	15.1	13	0.38
0-1	15.0	12	0.35
0-1	13.6	11	0.32
0-1	8.6	10	0.29
0-1	7.5	9	0.26
0-1	6.6	8	0.23
0-1	4.8	7	0.20
0-1	3.6	6	0.17
0-1	3.2	5	0.14
0-1	3.0	4	0.11
0-1	2.5	3	0.08
0-1	2.4	2	0.05
0-1	1.0	1	0.02

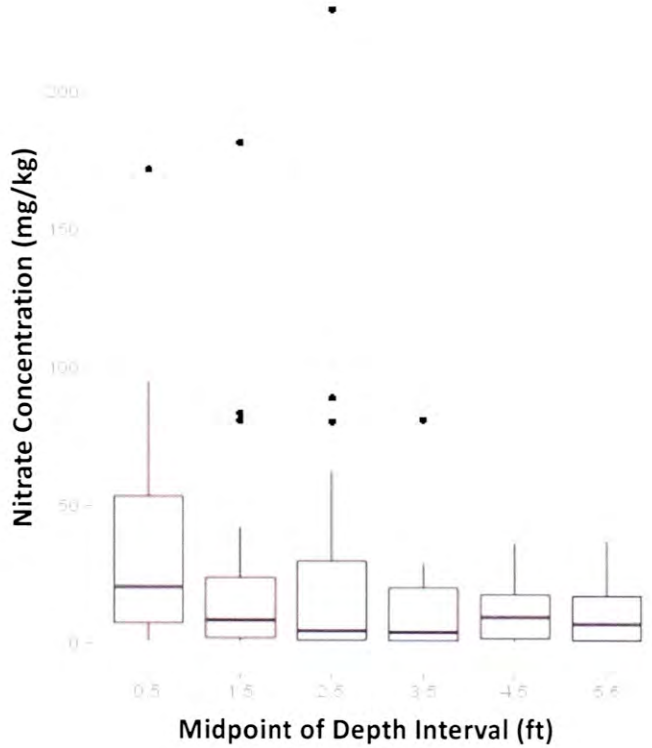
75th Percentile

50th Percentile

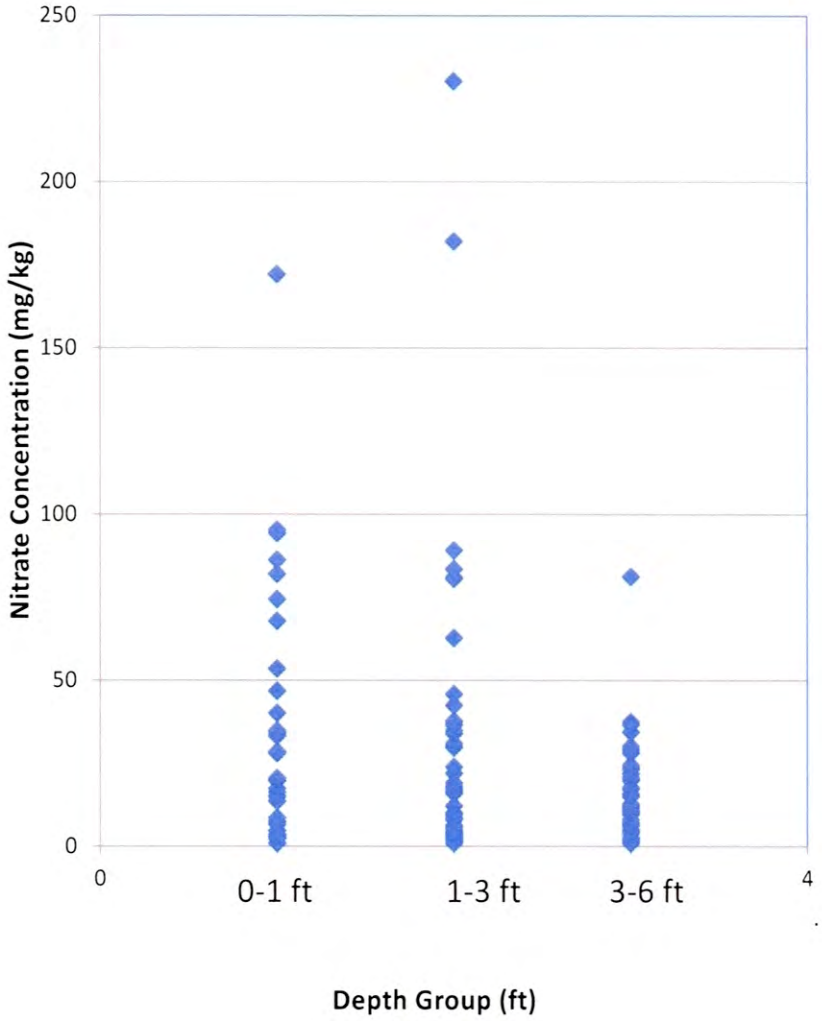
25th Percentile

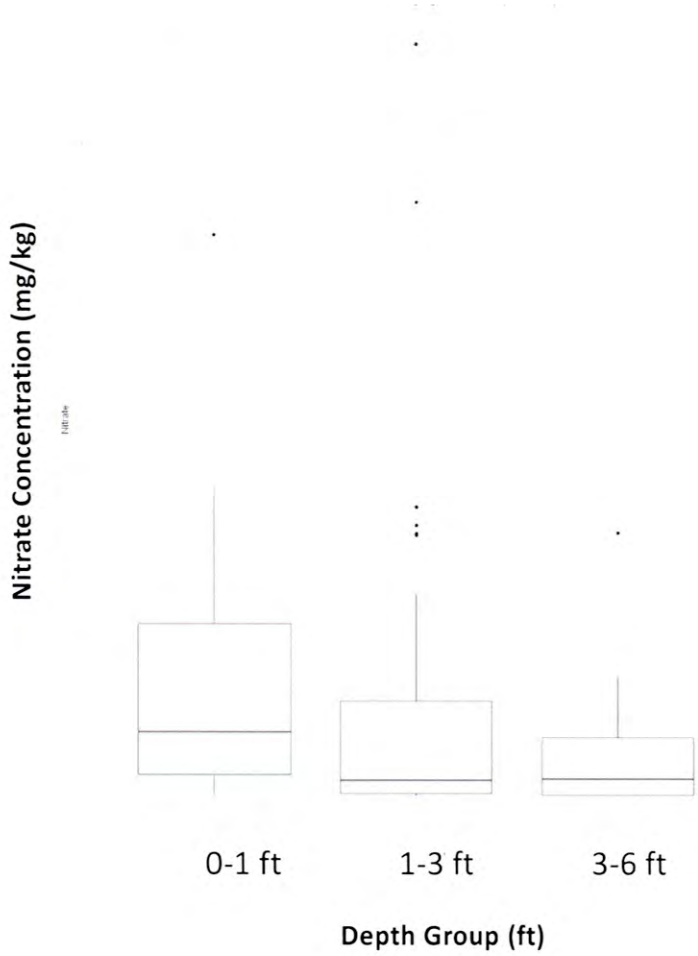
Fall 2014: Nitrate by Depth Interval
Scatter Plot and Box Plot



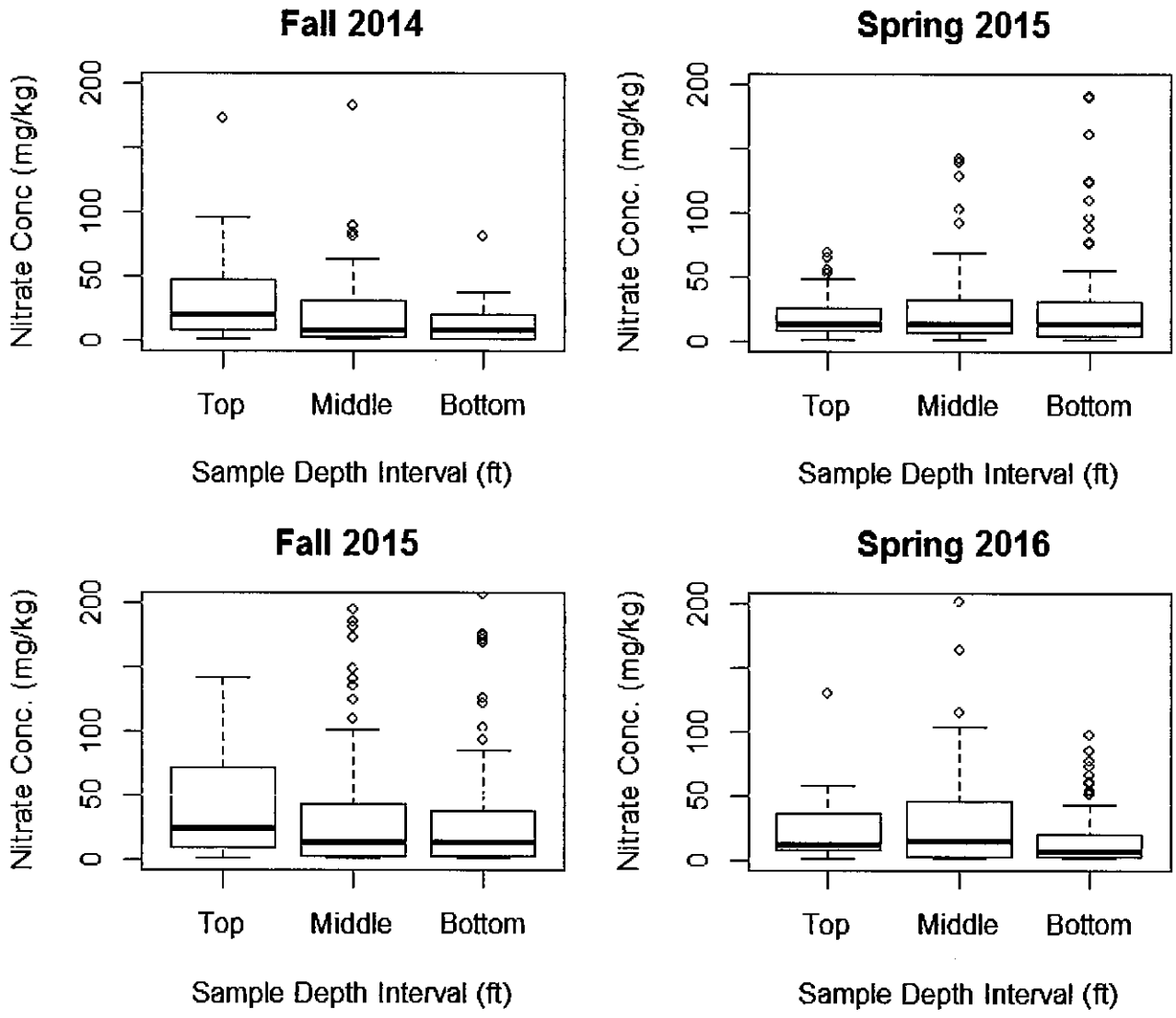


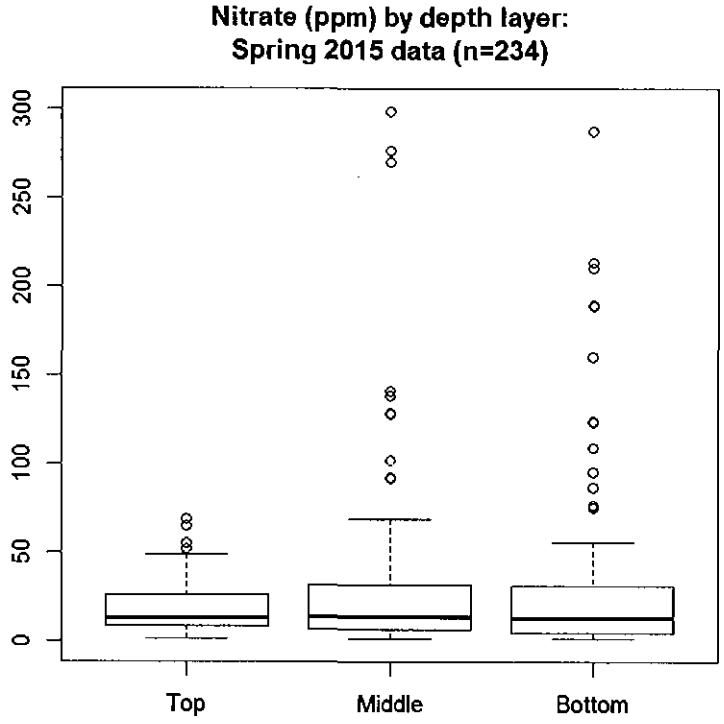
Fall 2014: Nitrate by Depth Group
Scatter Plot and Box Plot

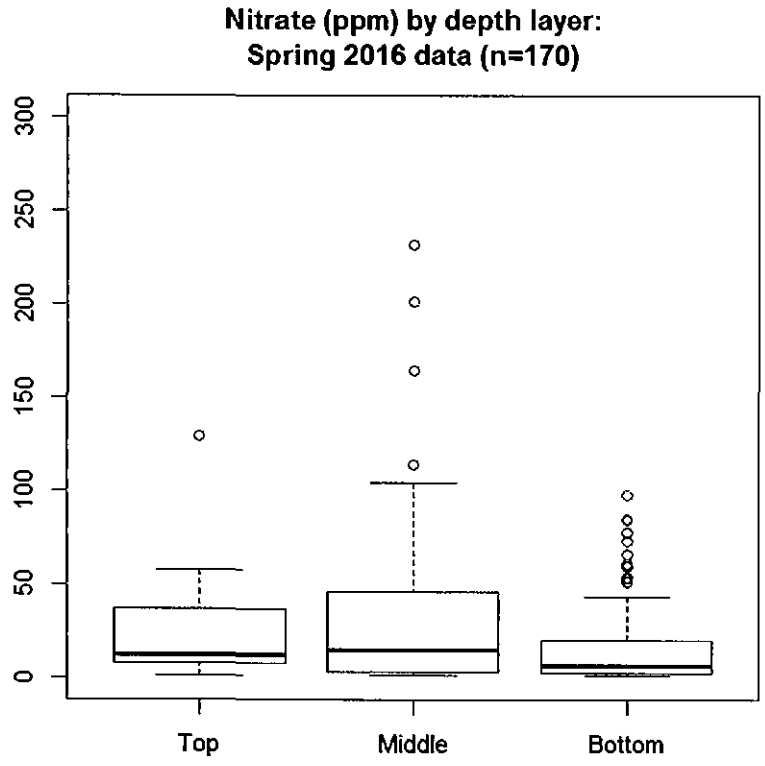




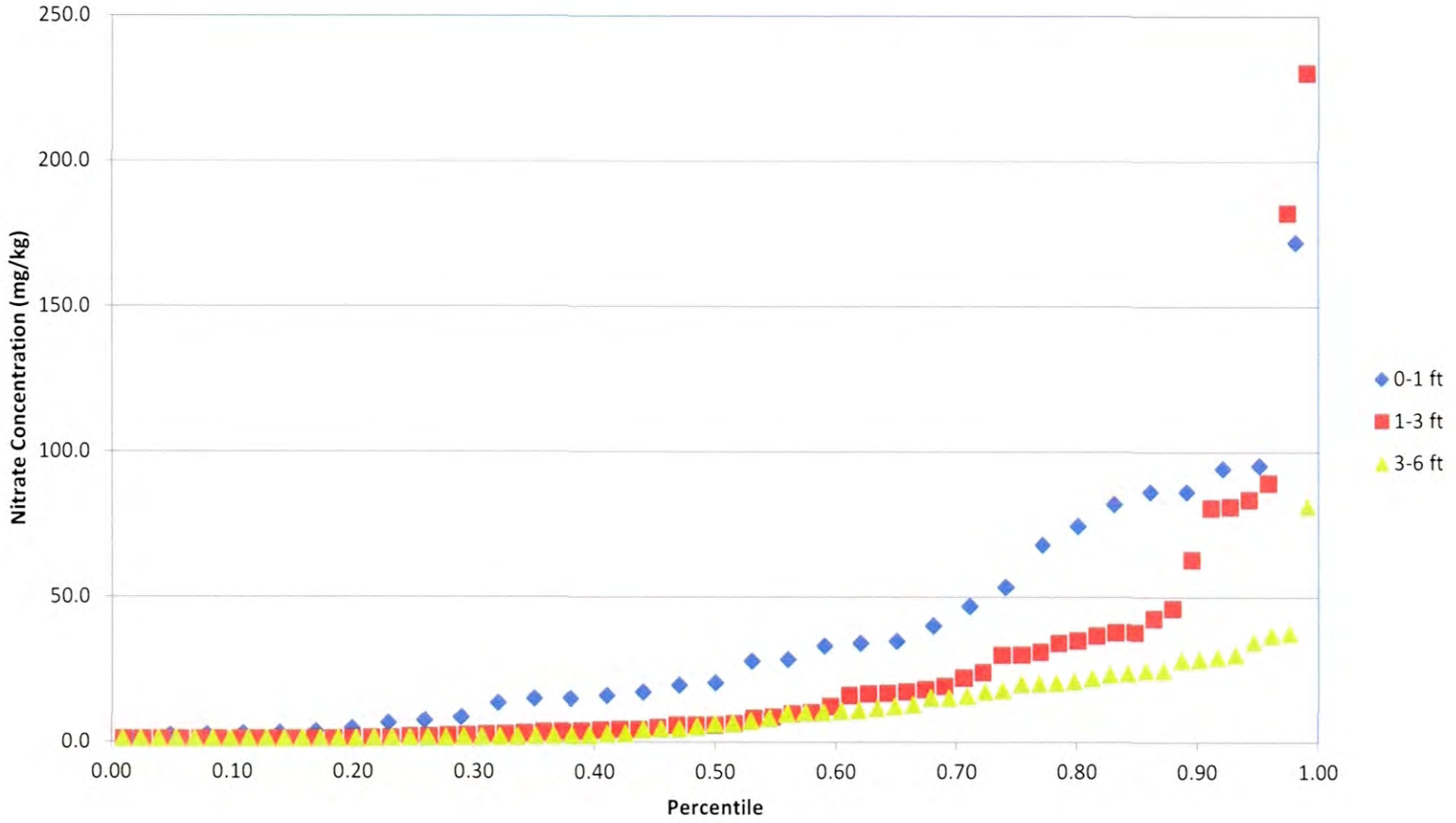
Nitrate Concentrations at Depth Across All Sampling Events




Nitrate (ppm) by depth layer:
Spring 2015 data (n=234)
0
50
100
150
200
250
300
Top
Middle
Bottom
Top = 0-1 ft, Middle = 1-3 ft, Bottom = 3-6 ft

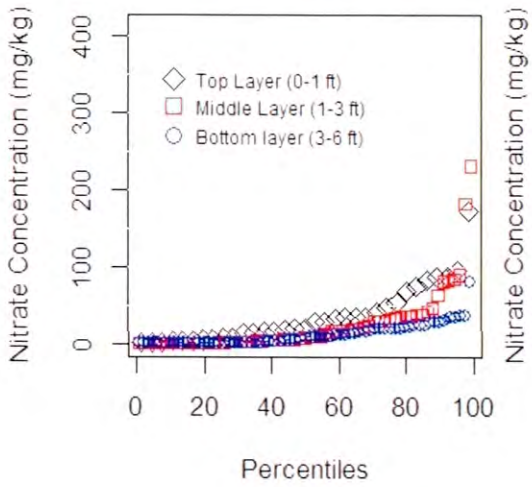

Nitrate (ppm) by depth layer:
Spring 2016 data (n=170)
0
50
100
150
200
250
300
Top
Middle
Bottom
Top = 0-1 ft, Middle = 1-3 ft, Bottom = 3-6 ft

Fall 2014: Nitrate by Depth Group Percentile Plot

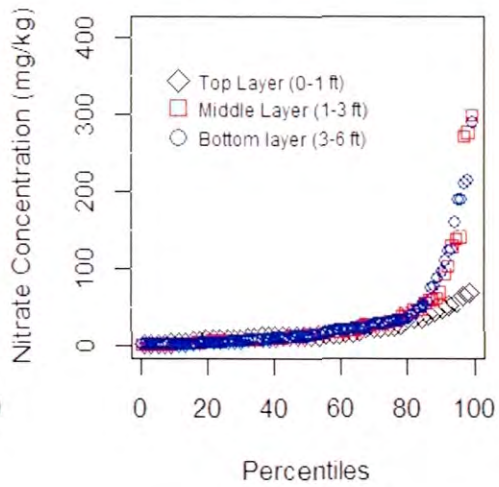


Nitrate Concentration Percentiles by Depth Layer for Each Sampling Event

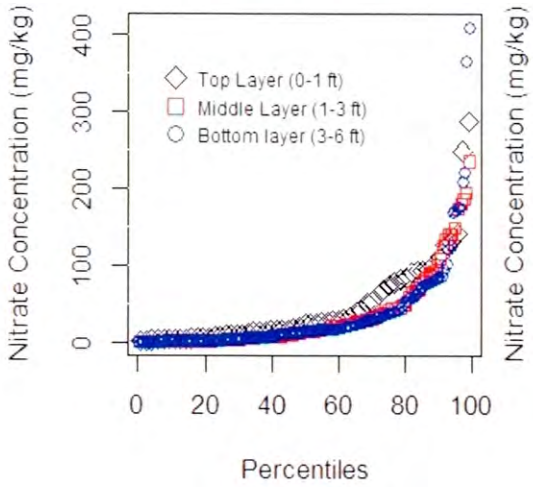
Fall 2014 (n=163)



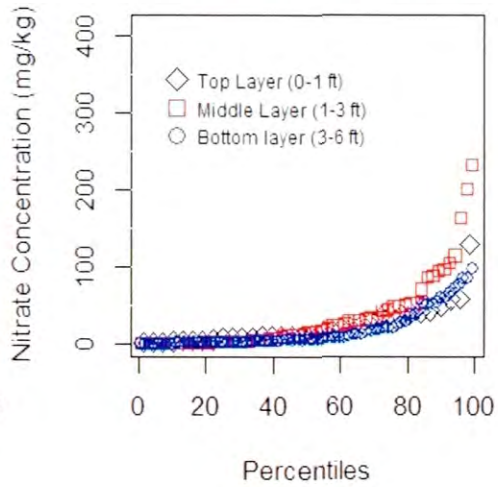
Spring 2015 (n=234)

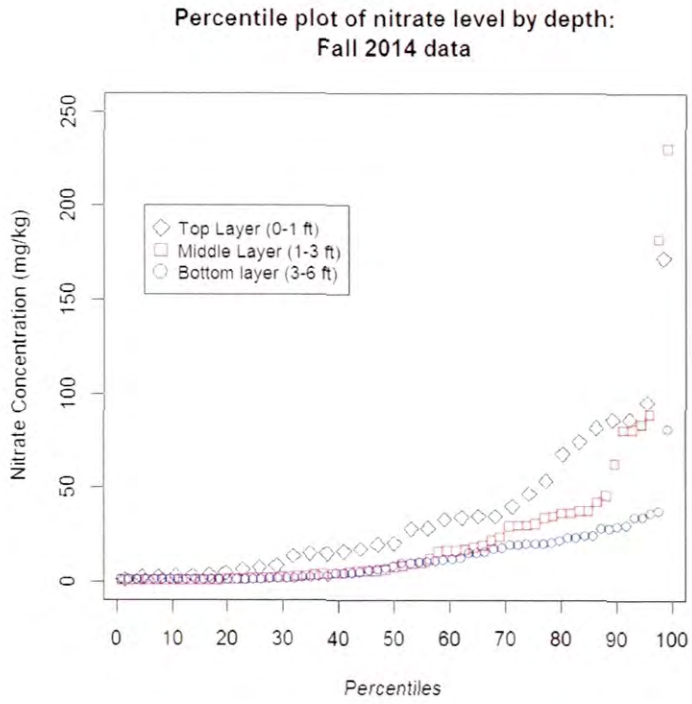


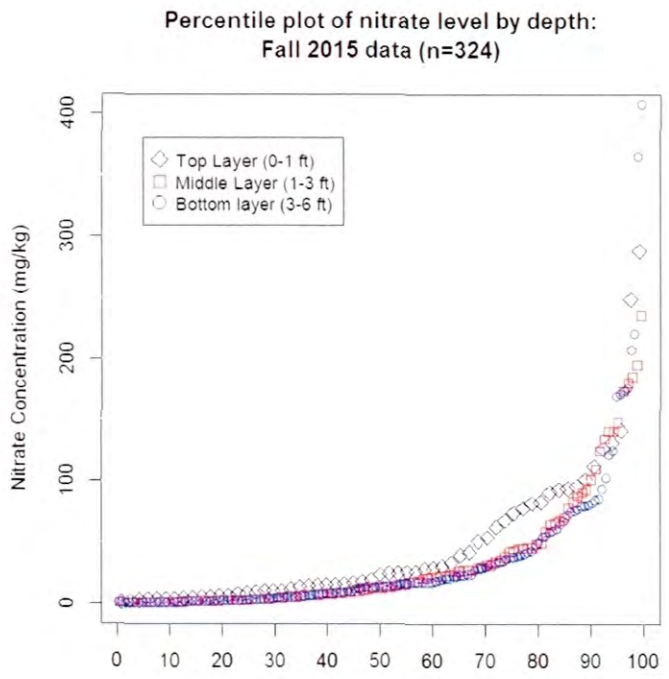
Fall 2015 (n=324)

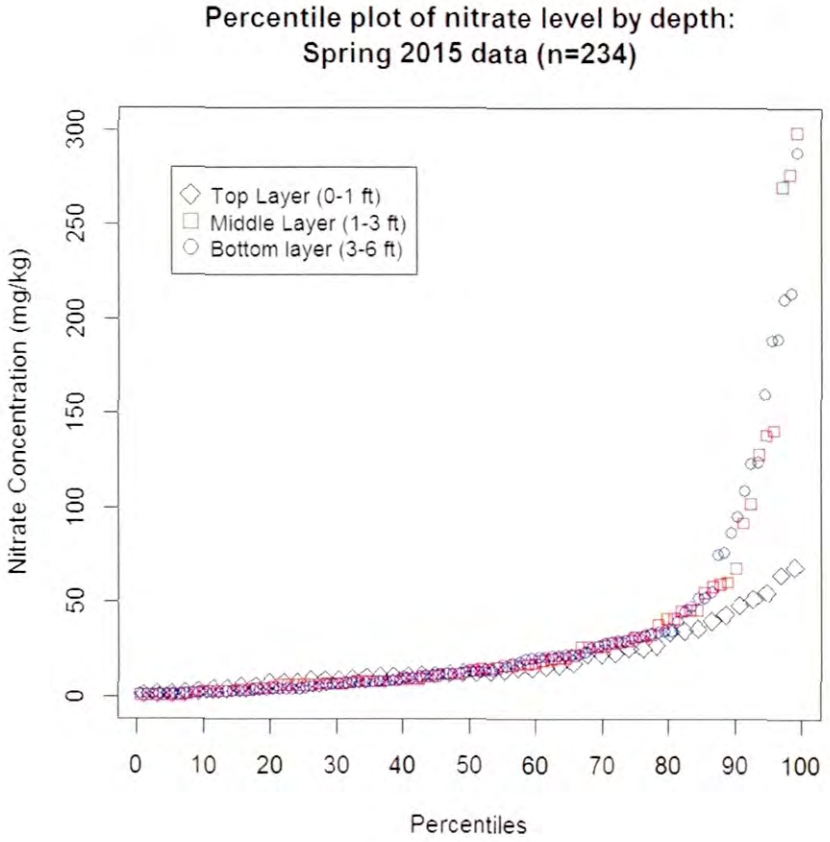


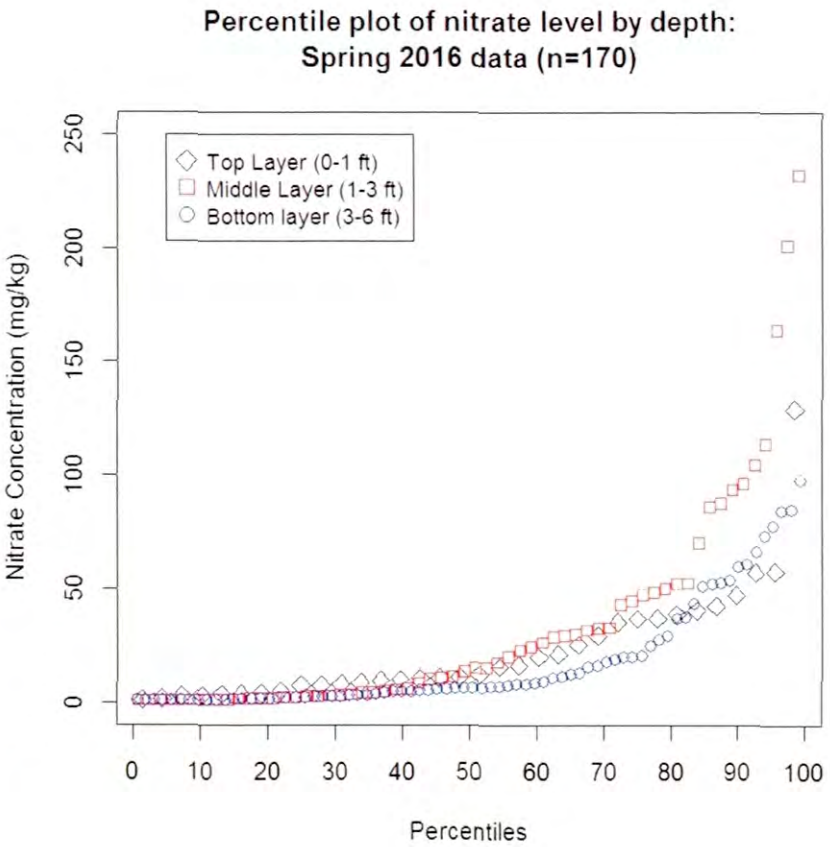
Spring 2016 (n=170)



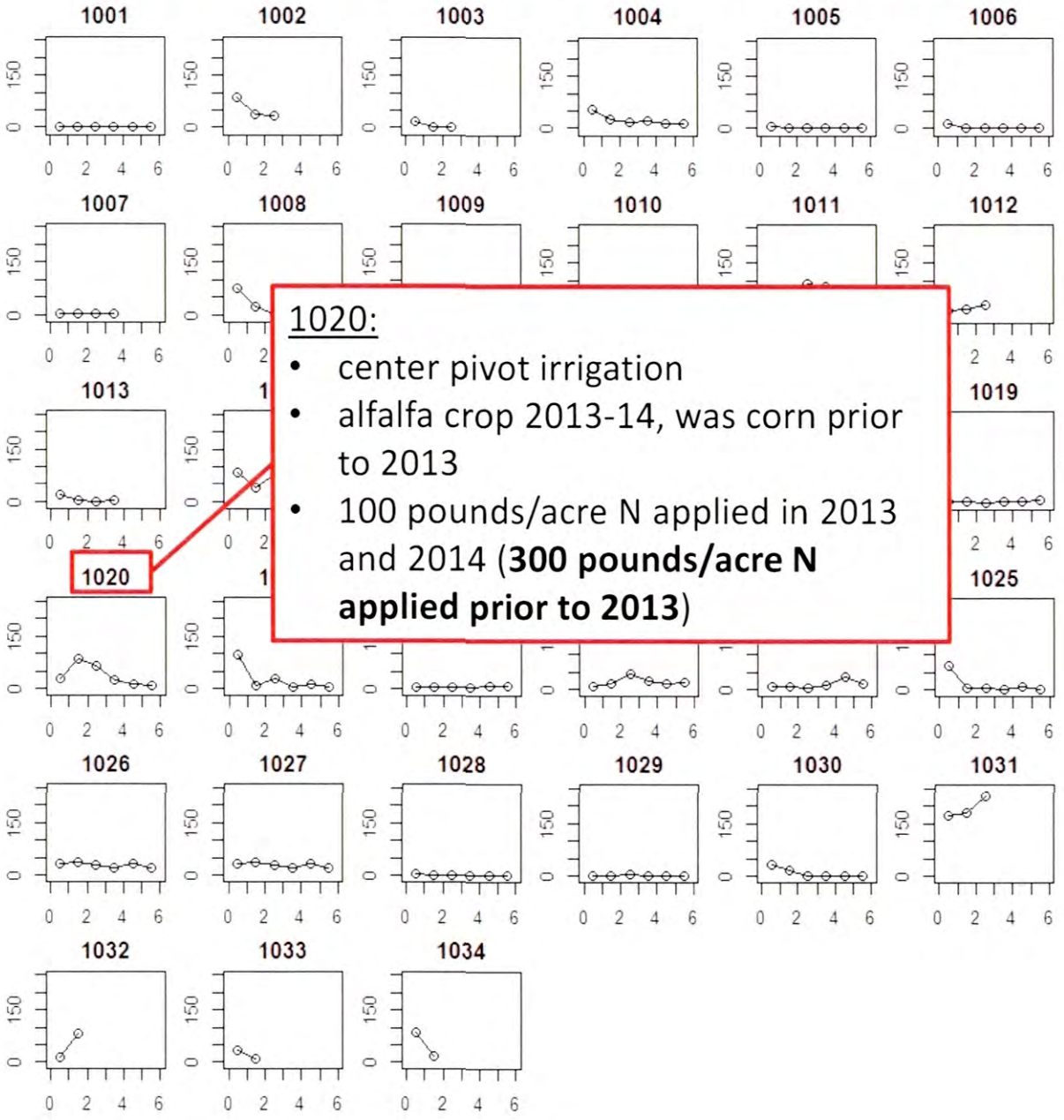

Percentile plot of nitrate level by depth:
Fall 2014 data
Nitrate Concentration (mg/kg)
0
50
100
150
200
250
Top Layer (0-1 ft)
Middle Layer (1-3 ft)
Bottom layer (3-6 ft)
0
10
20
30
40
50
60
70
80
90
100
Percentiles


Percentile plot of nitrate level by depth:
Fall 2015 data (n=324)
Nitrate Concentration (mg/kg)
0
100
200
300
400
Top Layer (0-1 ft)
Middle Layer (1-3 ft)
Bottom layer (3-6 ft)
0
10
20
30
40
50
60
70
80
90
100


Percentile plot of nitrate level by depth:
Spring 2015 data (n=234)
Top Layer (0-1 ft)
Middle Layer (1-3 ft)
Bottom layer (3-6 ft)
Nitrate Concentration (mg/kg)
0
50
100
150
200
250
300
0
10
20
30
40
50
60
70
80
90
100
Percentiles


Percentile plot of nitrate level by depth:
Spring 2016 data (n=170)
Top Layer (0-1 ft)
Middle Layer (1-3 ft)
Bottom layer (3-6 ft)
Nitrate Concentration (mg/kg)
0
50
100
150
200
250
0
10
20
30
40
50
60
70
80
90
100
Percentiles

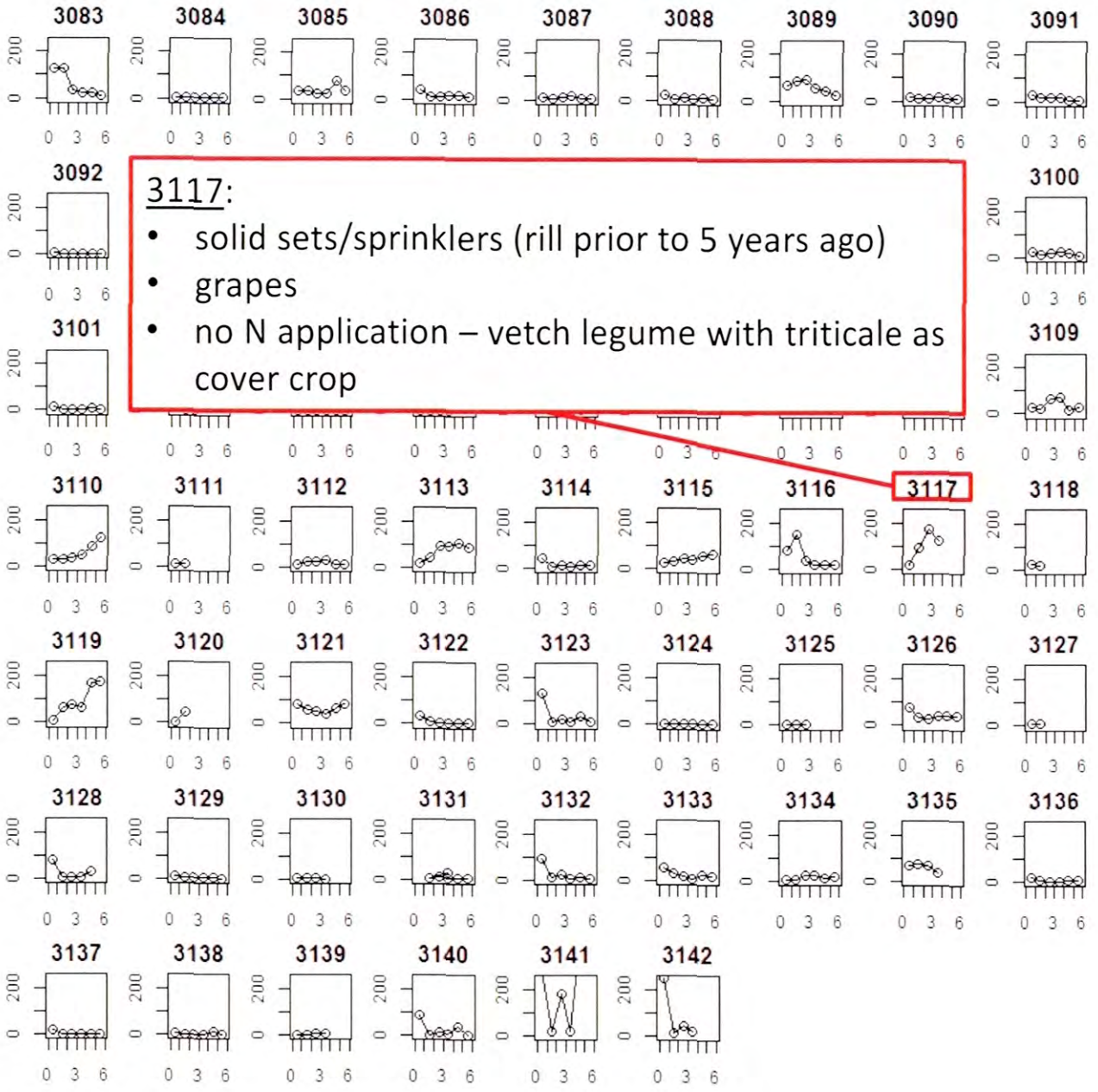
Fall 2014 Nitrate (mg/kg) by Depth Interval Midpoint



1020:

- center pivot irrigation
- alfalfa crop 2013-14, was corn prior to 2013
- 100 pounds/acre N applied in 2013 and 2014 (**300 pounds/acre N applied prior to 2013**)

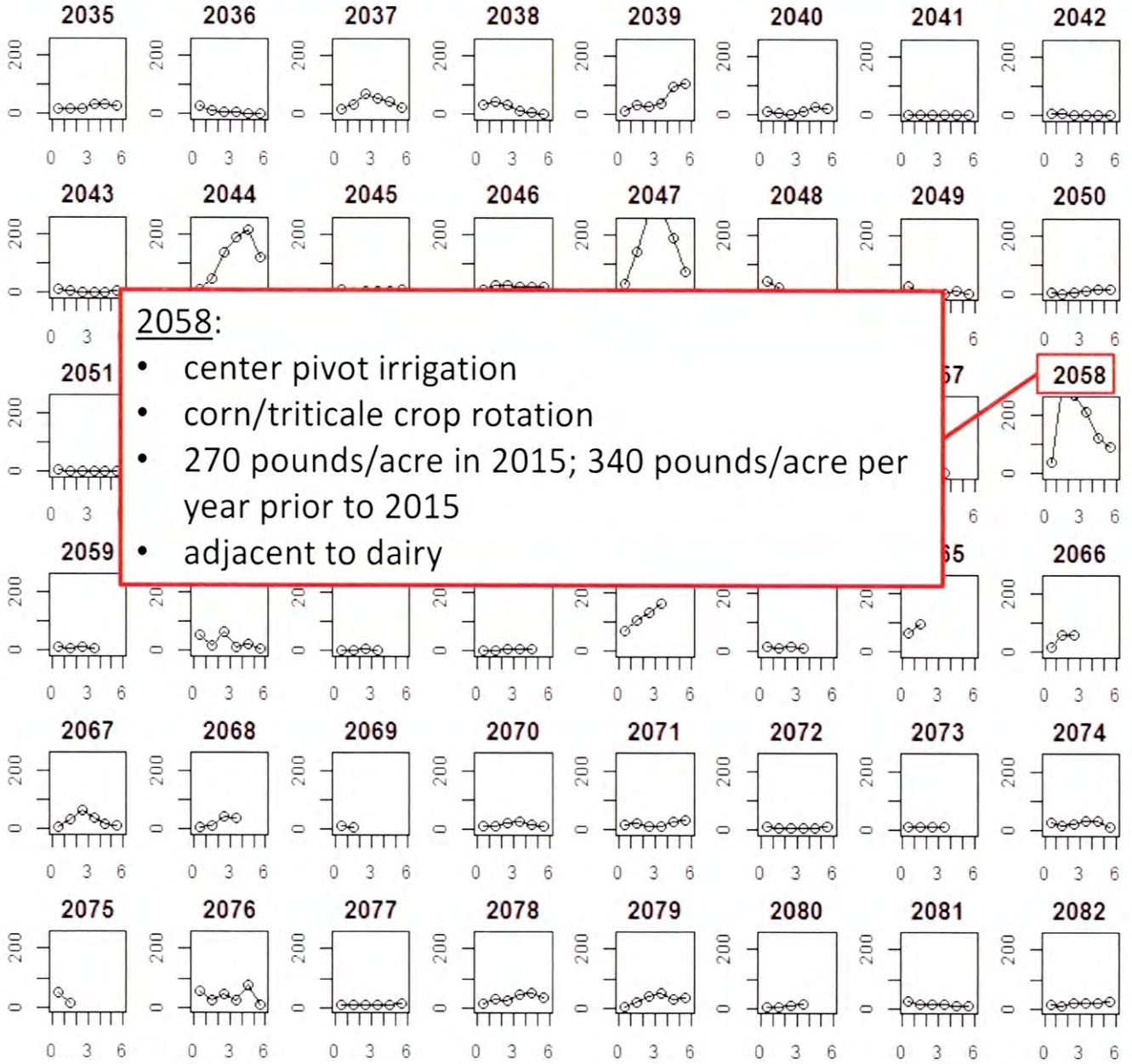
Fall 2015 Nitrate (mg/kg) by Depth Interval Midpoint



3117:

- solid sets/sprinklers (rill prior to 5 years ago)
- grapes
- no N application – vetch legume with triticale as cover crop

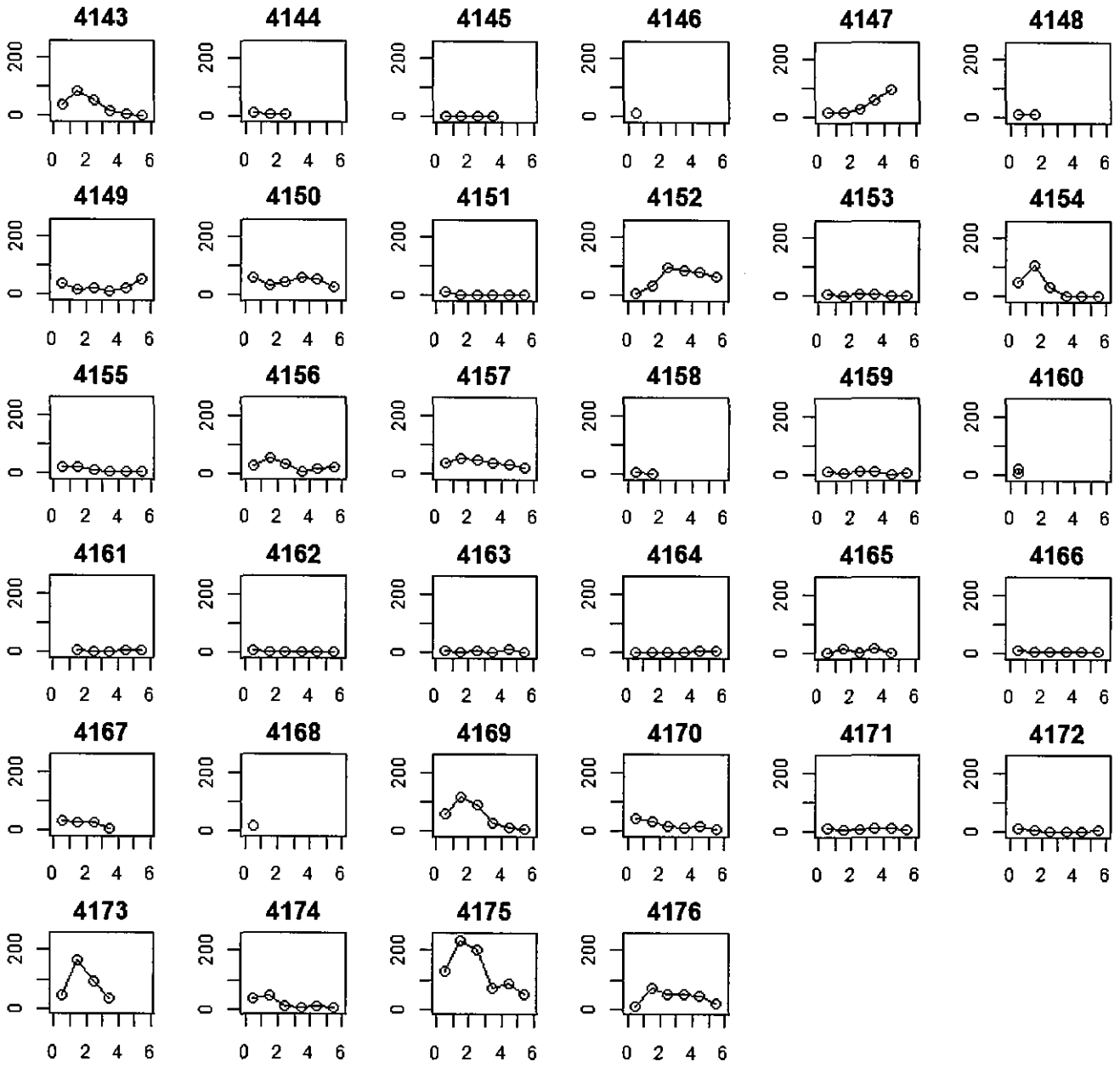
Spring 2015 Nitrate (mg/kg) by Depth Interval Midpoint

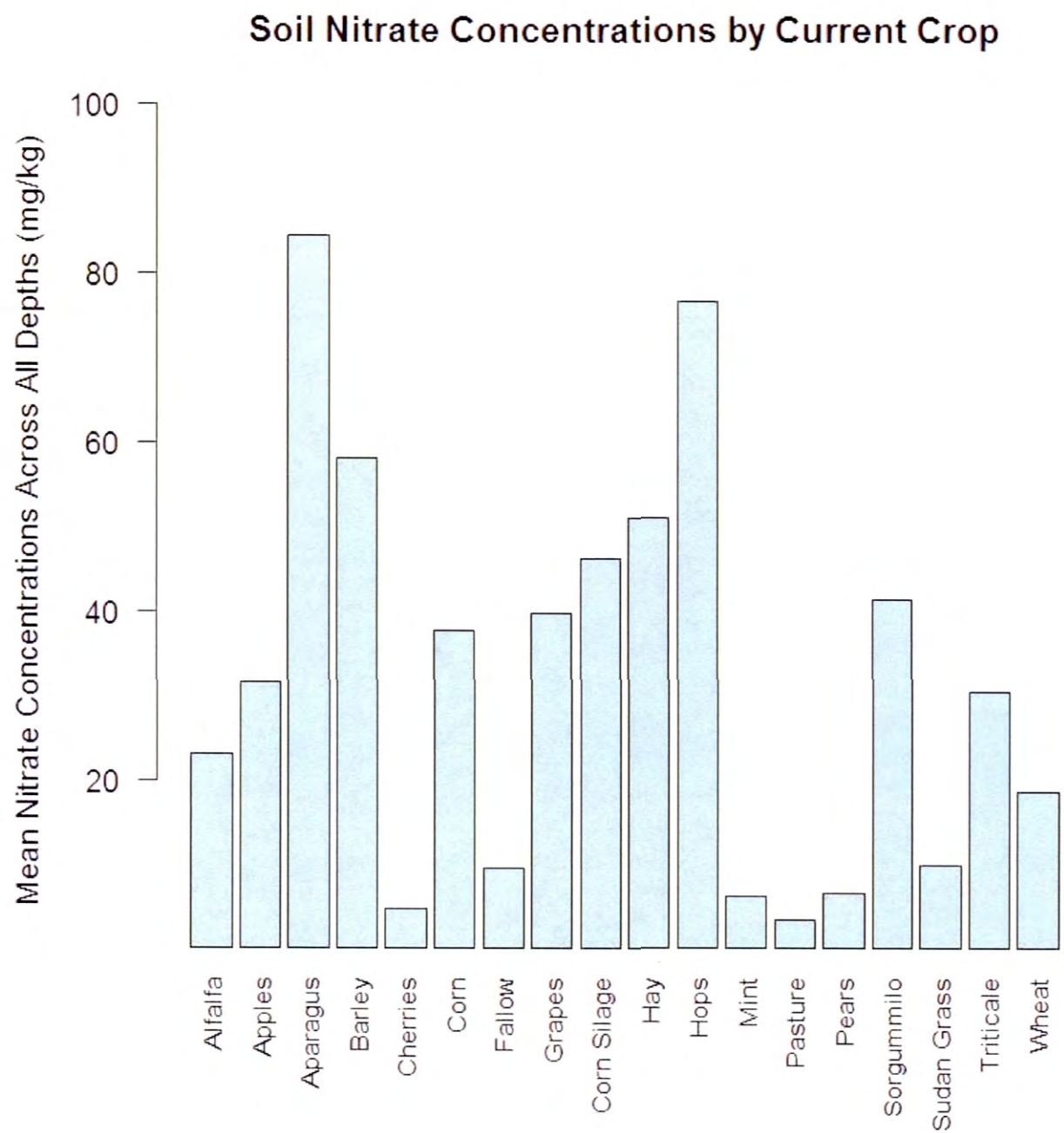


2058:

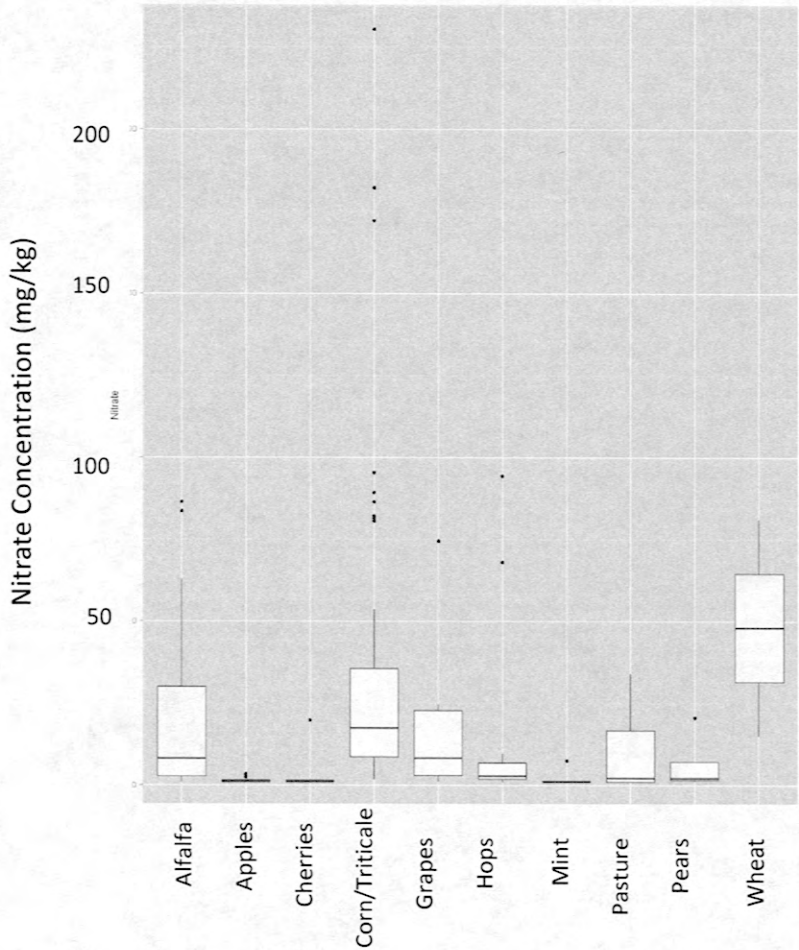
- center pivot irrigation
- corn/triticale crop rotation
- 270 pounds/acre in 2015; 340 pounds/acre per year prior to 2015
- adjacent to dairy

Spring 2016 Nitrate (mg/kg) by Depth Interval Midpoint

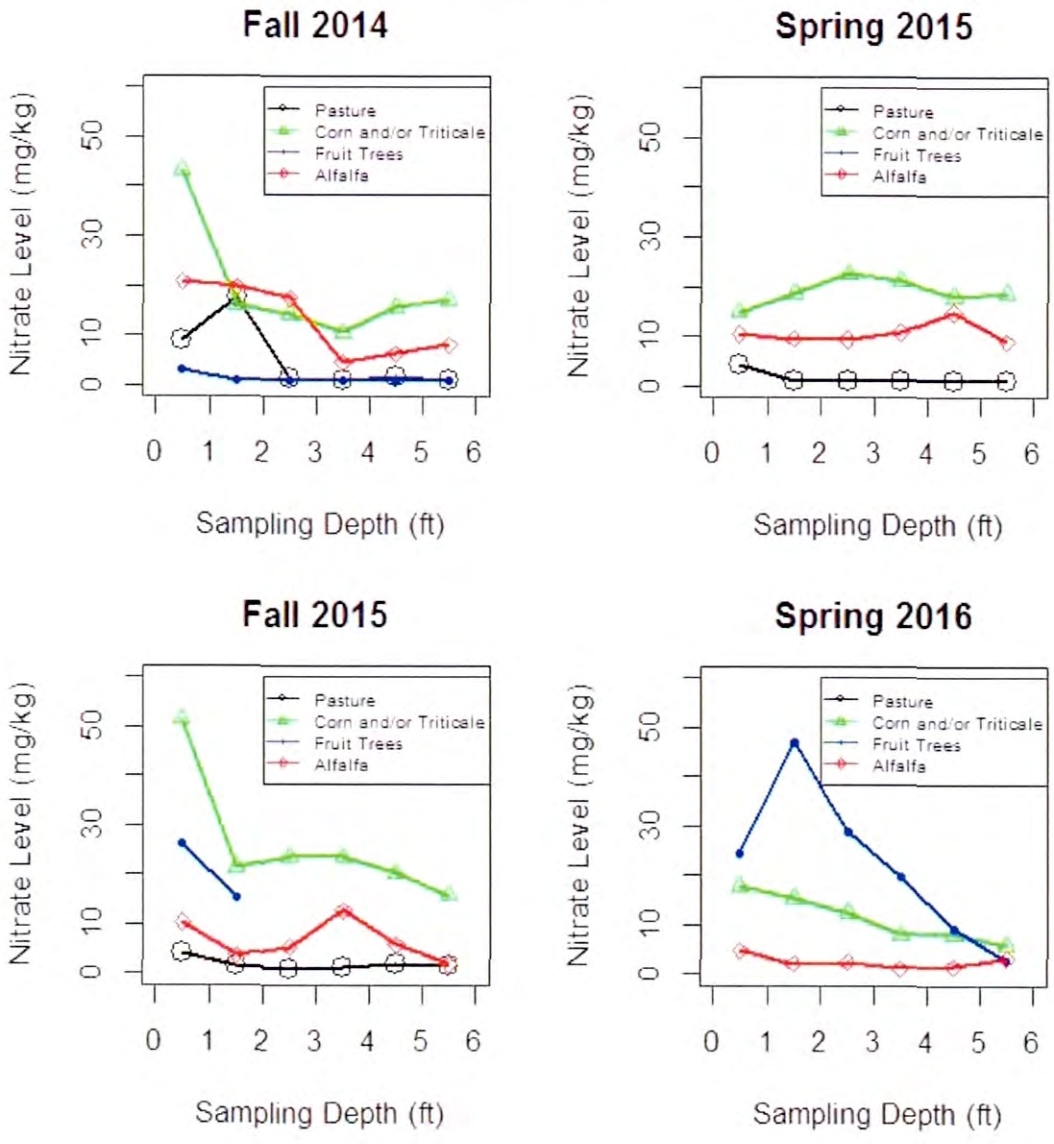



Soil Nitrate Concentrations by Current Crop
Mean Nitrate Concentrations Across All Depths (mg/kg)
100
80
60
40
20
Alfalfa
Apples
Aparagus
Barley
Cherries
Corn
Fallow
Grapes
Corn Silage
Hay
Hops
Mint
Pasture
Pears
Sorgummilo
Sudan Grass
Triticale
Wheat

Fall 2014: Nitrate in the 0 to 1 Foot Range by Crop Type

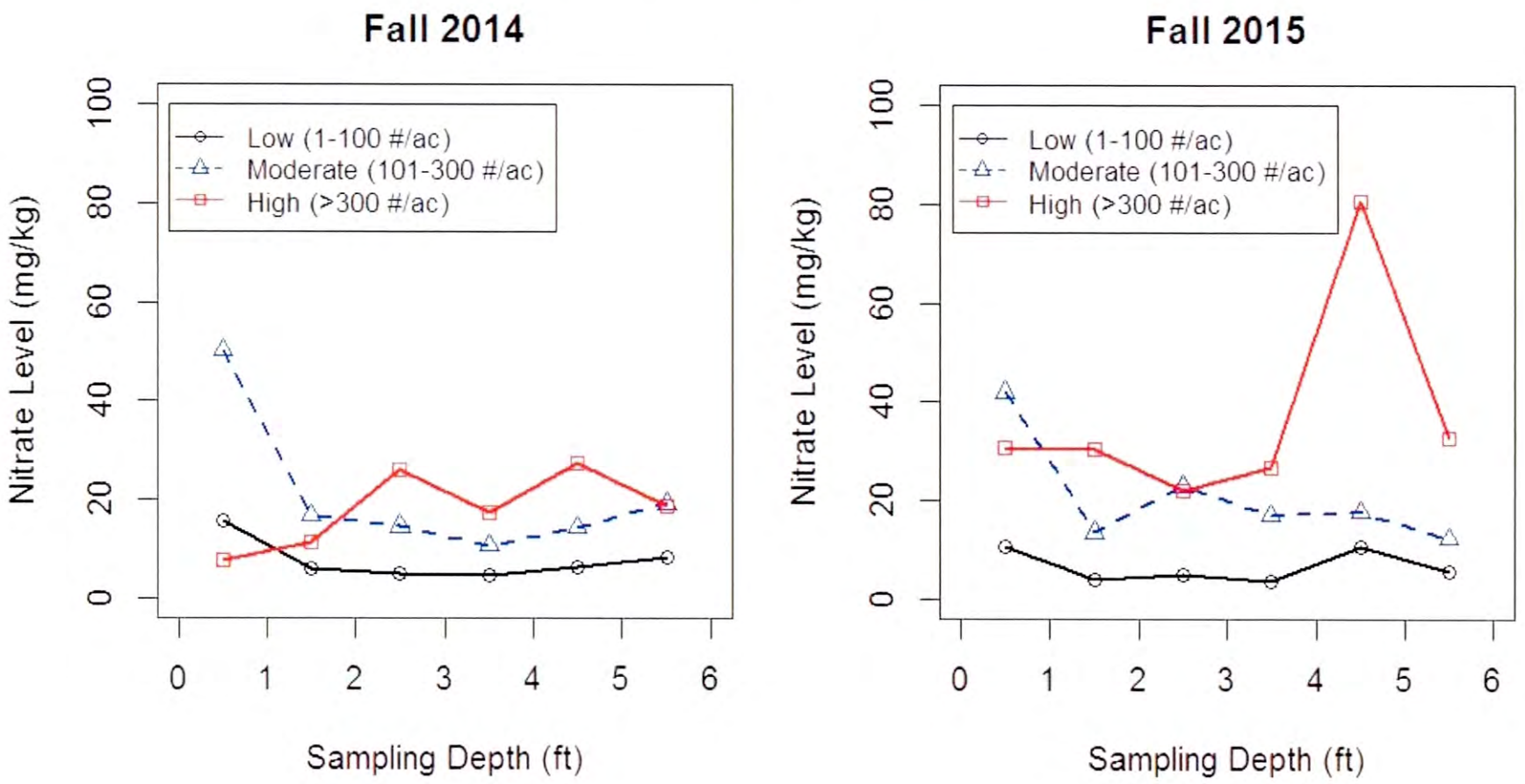


Median Nitrate Concentration at Depth by Crop (simplified)



Median Nitrate Concentration at Depth by Irrigation Type

Median Nitrate Concentration at Depth by Pounds N Applied



Summary Thoughts

- Goals
  - Establish Background Conditions
  - Establish Causation
    - Outlier Analysis
    - Graphical Analysis
    - Statistical Analysis
    - Need to Develop an Effective Treatment/Factor Data Set
  - Recommend BMPs
- Moving Forward
  - A summary report is needed to get input
  - Summary can serve as a basis for further evaluations
  - We can prepare that summary cost effectively.

Attachment C

1. PGG's report "Draft Lower Yakima Valley GWMA Proposed Ambient Groundwater Monitoring Network (June 8, 2016).

DRAFT LOWER YAKIMA VALLEY GWMA PROPOSED AMBIENT GROUNDWATER MONITORING NETWORK

June 8, 2016

DRAFT 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:

Pacific Groundwater Group
2377 Eastlake Avenue East, Suite 200
Seattle, Washington 98102
206.329.0141
www.pgwg.com

June 8, 2016
JE1512
GWMA Ambient Monitoring Network Report v4

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

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 stipulated by the GWAC for the proposed monitoring network were:

- 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 calculating basin wide average conditions at the water table, and 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. This network alone will not address all the goals of the GWMA. For instance, protection of public health is best addressed by sampling of municipal and domestic supply wells; and analysis of nitrate loads from small sites is best addressed by sampling small-scale networks designed around the specifics of such sites.

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 monitoring network criteria, 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). These interior points created a pool from which *General Well Locations* were selected.

2.2 GENERAL WELL LOCATION SELECTION AND RANKING

General Well Locations were selected from the pool of Initial Random Monitoring Points and ranked. 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. 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]
- 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 no existing wells are proposed for monitoring.
- 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;

[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.

however, these well depths are estimates, and actual depths are expected to differ. A 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 s 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.

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 additional 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 moni-

[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.

toring 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 temporally vary based on 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 time 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, groundwater 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.

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

[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.

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 not included 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.

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, but the method does not perform as well at depth (therefore a sonic drill rig 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.

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 sam-

pling – 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 only nitrate is analyzed.

6.3 DRAIN SAMPLING COSTS

We assume no GWMA costs related to establishment of drain sampling stations. As for well sampling, sampling costs in Table 4 are for six rounds over one year. Samples would be obtained by filling bottles in the field. Sampling personnel have not been determined, and their cost is not 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 sampling 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,	Develop a Drain Sampling and Analysis

including traffic control during field work. (November – December 2016).	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).	

8.0 REFERENCES

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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 Annual Monitoring Cost Estimate

Wells	Estimated Drilling Costs	Estimated Lab Costs, Wells[1]	Passive Sampling Devices[2]	Total Well Sampling Costs	Total Cost[3]
1 - 5	$24,580	$900	$2,750	$3,650	$28,230
1 - 10	$56,802	$1,650	$5,071	$6,721	$63,523
1 - 15	$114,426	$2,550	$7,821	$10,371	$124,797
1 - 20	$148,442	$3,300	$10,142	$13,442	$161,884
1 - 25	$188,861	$4,200	$12,892	$17,092	$205,953
1 - 30	$232,043	$4,950	$15,213	$20,163	$252,206

Drain Sampling Locations	Estimated Lab Costs, Drains[1]
1 - 25	$4,200

[1] Estimated laboratory costs are for one year of sampling with six sampling events. For quality assurance purposes, this estimate includes duplicate sample analyses, and assumes one duplicate is collected every 10 samples.

[2] Passive sampling device costs are estimated for one year with six sampling events. Passive sampling device costs will be slightly less (roughly 8 percent) following year one since hanging assemblies and weights will not need to be purchased.

[3] Total Costs are for well installation and one year of monitoring.

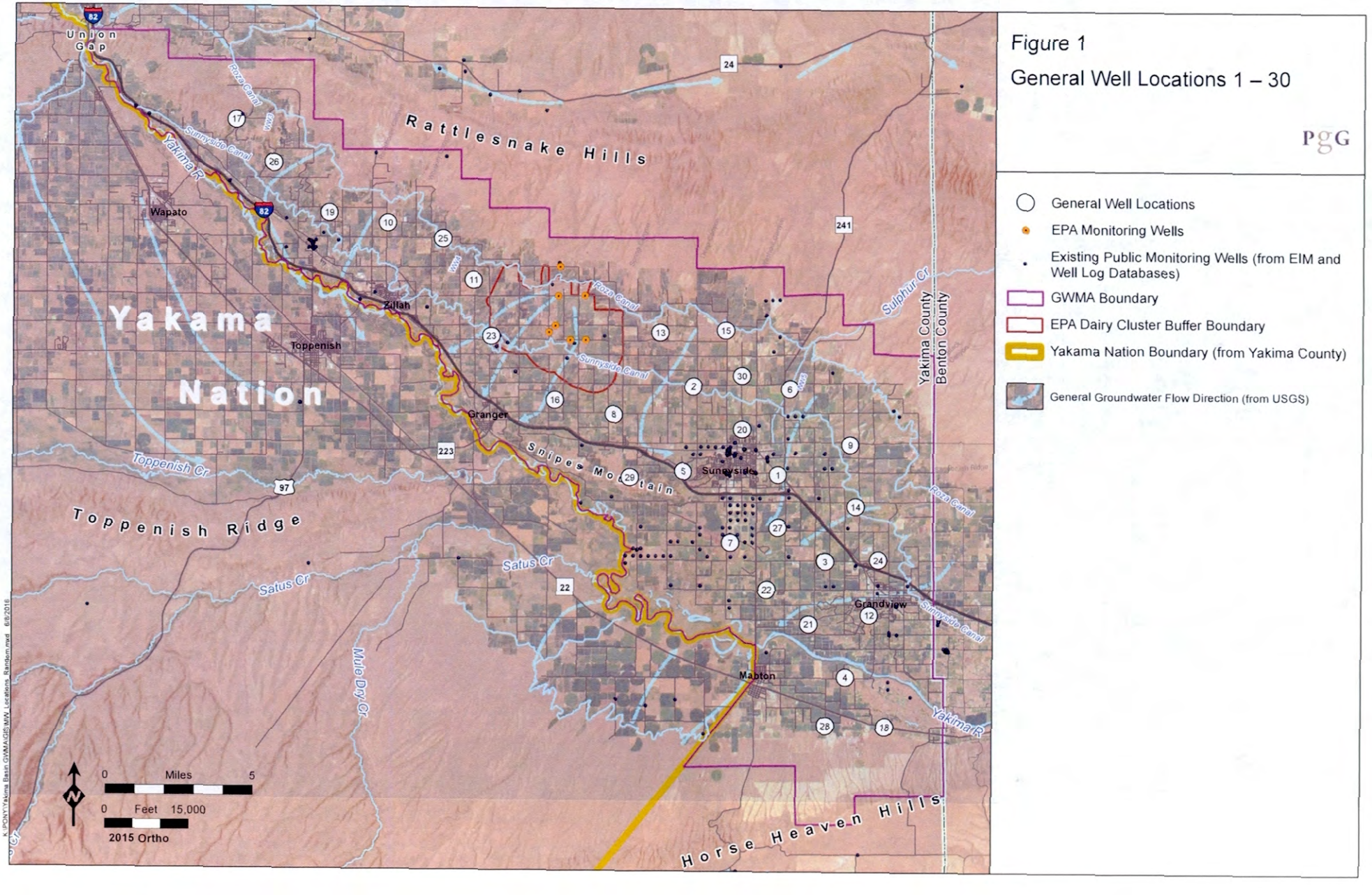
Figure 1
General Well Locations 1 – 30
PgG
General Well Locations
EPA Monitoring Wells
Existing Public Monitoring Wells (from EIM and Well Log Databases)
GWMA Boundary
EPA Dairy Cluster Buffer Boundary
Yakama Nation Boundary (from Yakima County)
General Groundwater Flow Direction (from USGS)
Union Gap
Wapato
Toppenish
Zillah
Granger
Sunnyside
Grandview
Mabton
Yakama Nation
Rattlesnake Hills
Toppenish Ridge
Horse Heaven Hills
Snipes Mountain
Yakima R
Roza Canal
Sunnyside Canal
Toppenish Cr
Satus Cr
Mule Dry Cr
Sulphur Cr
Yakima County
Benton County
0 Miles 5
0 Feet 15,000
2015 Ortho
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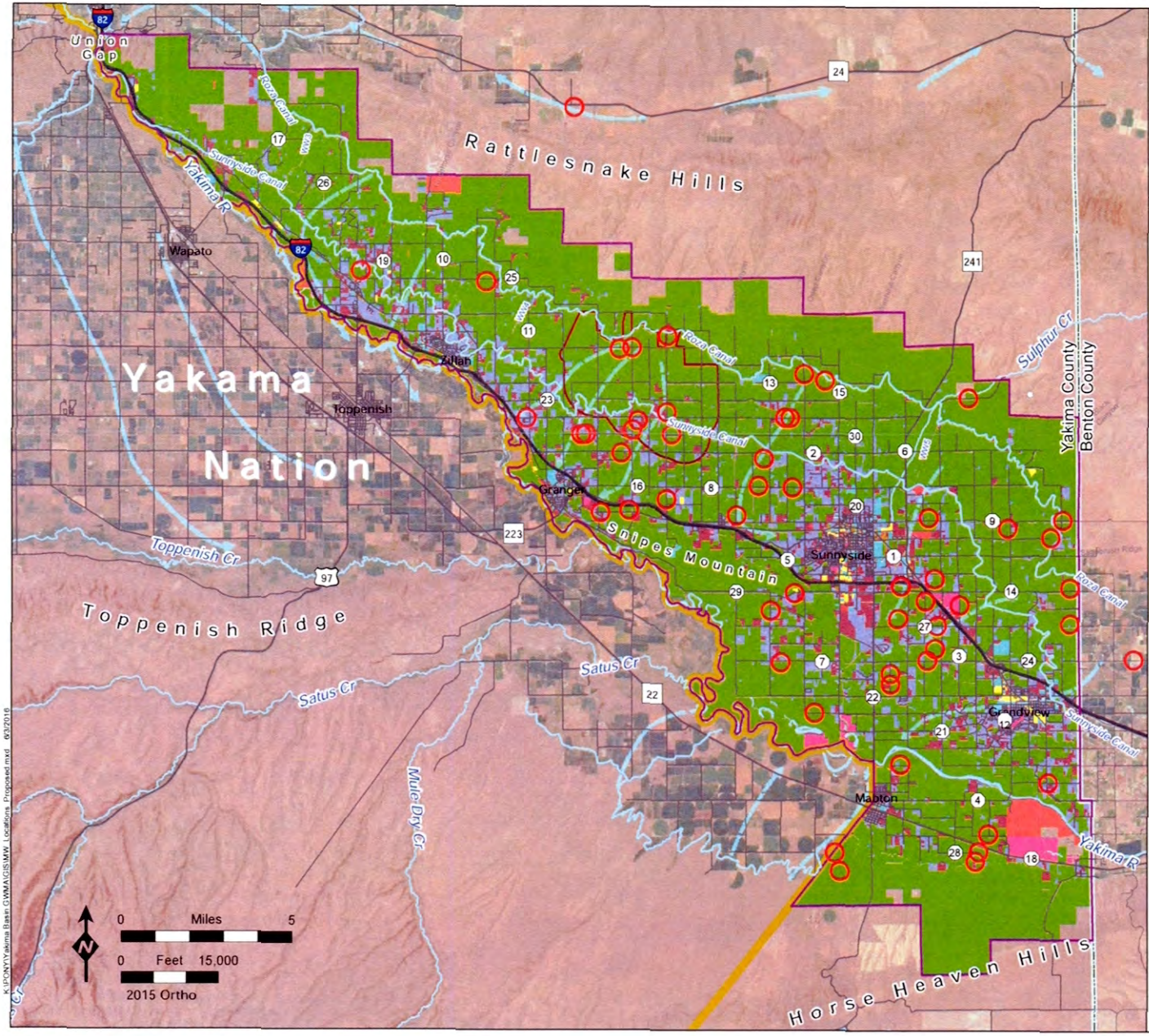


Figure 2

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)

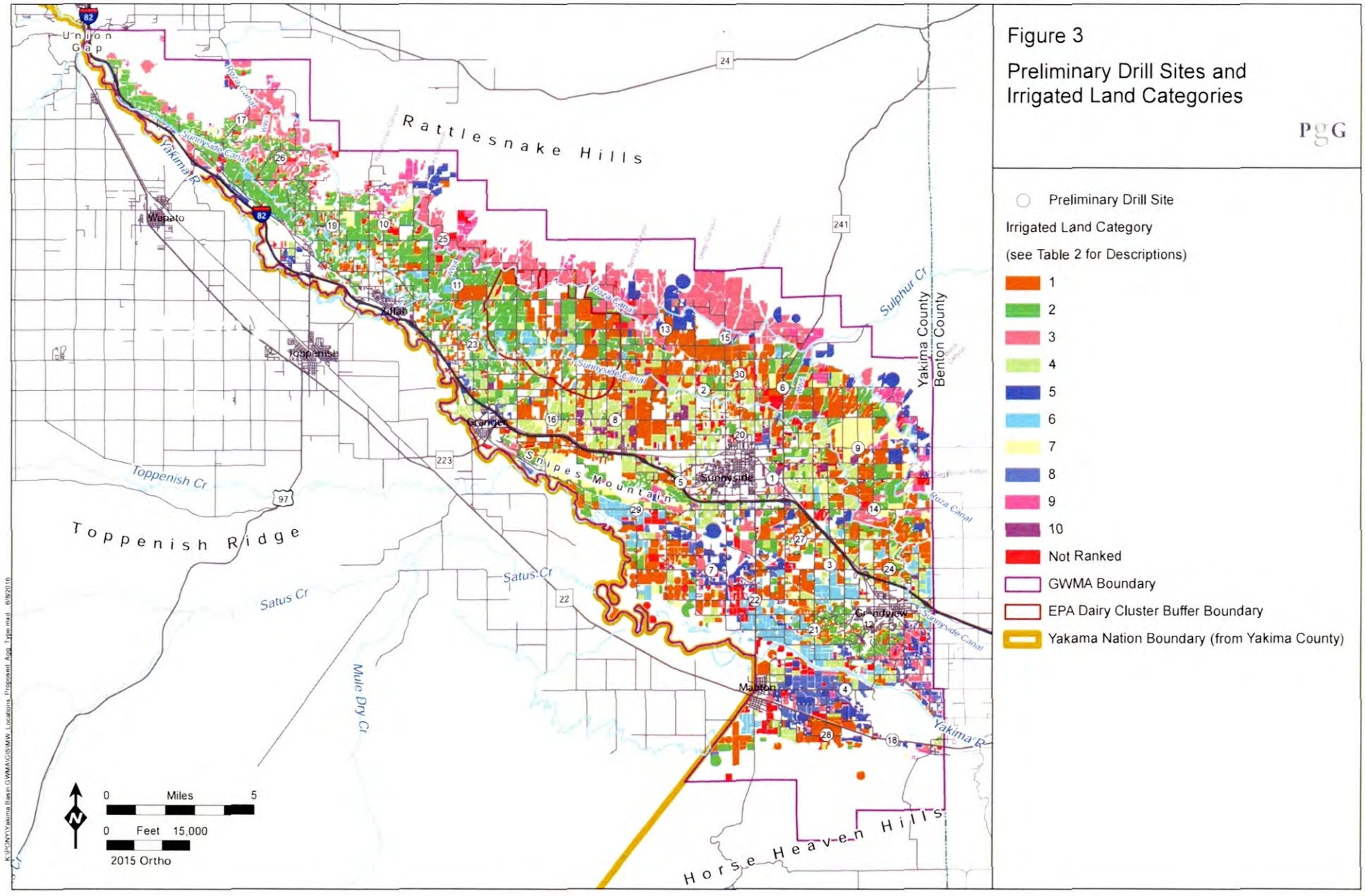
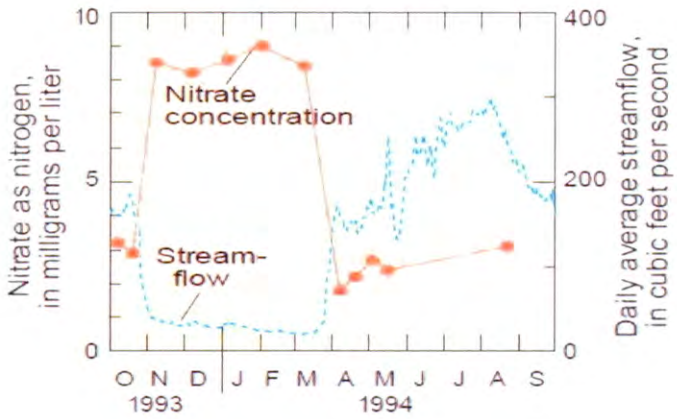
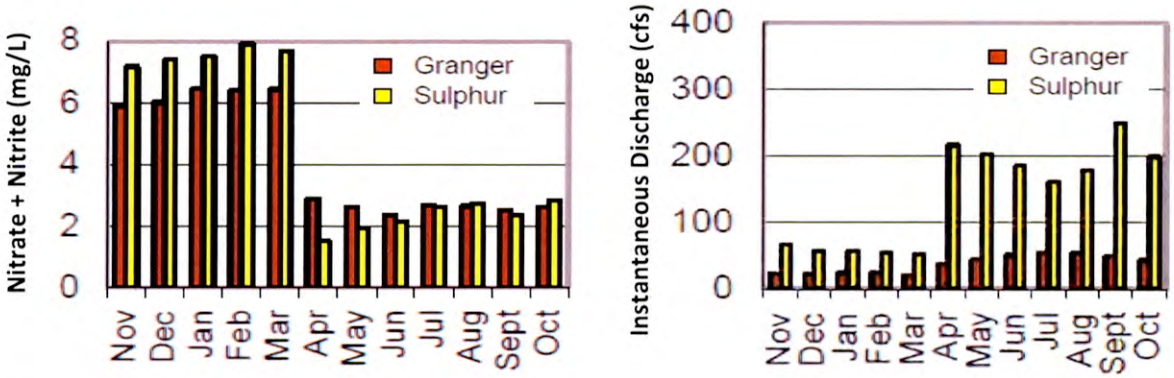


Figure 3
Preliminary Drill Sites and Irrigated Land Categories
PgG
Preliminary Drill Site
Irrigated Land Category
(see Table 2 for Descriptions)
1
2
3
4
5
6
7
8
9
10
Not Ranked
GWMA Boundary
EPA Dairy Cluster Buffer Boundary
Yakama Nation Boundary (from Yakima County)
Rattlesnake Hills
Toppenish Ridge
Horse Heaven Hills
Union Gap
Wapato
Zillah
Toppenish
Granger
Sunnyside
Grandview
Mabton
Yakima County
Benton County
Yakima R
Sunnyside Canal
Roza Canal
Toppenish Cr
Satus Cr
Mule Dry Cr
Sulphur Cr
Snipes Mountain
0 Miles 5
0 Feet 15,000
2015 Ortho



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

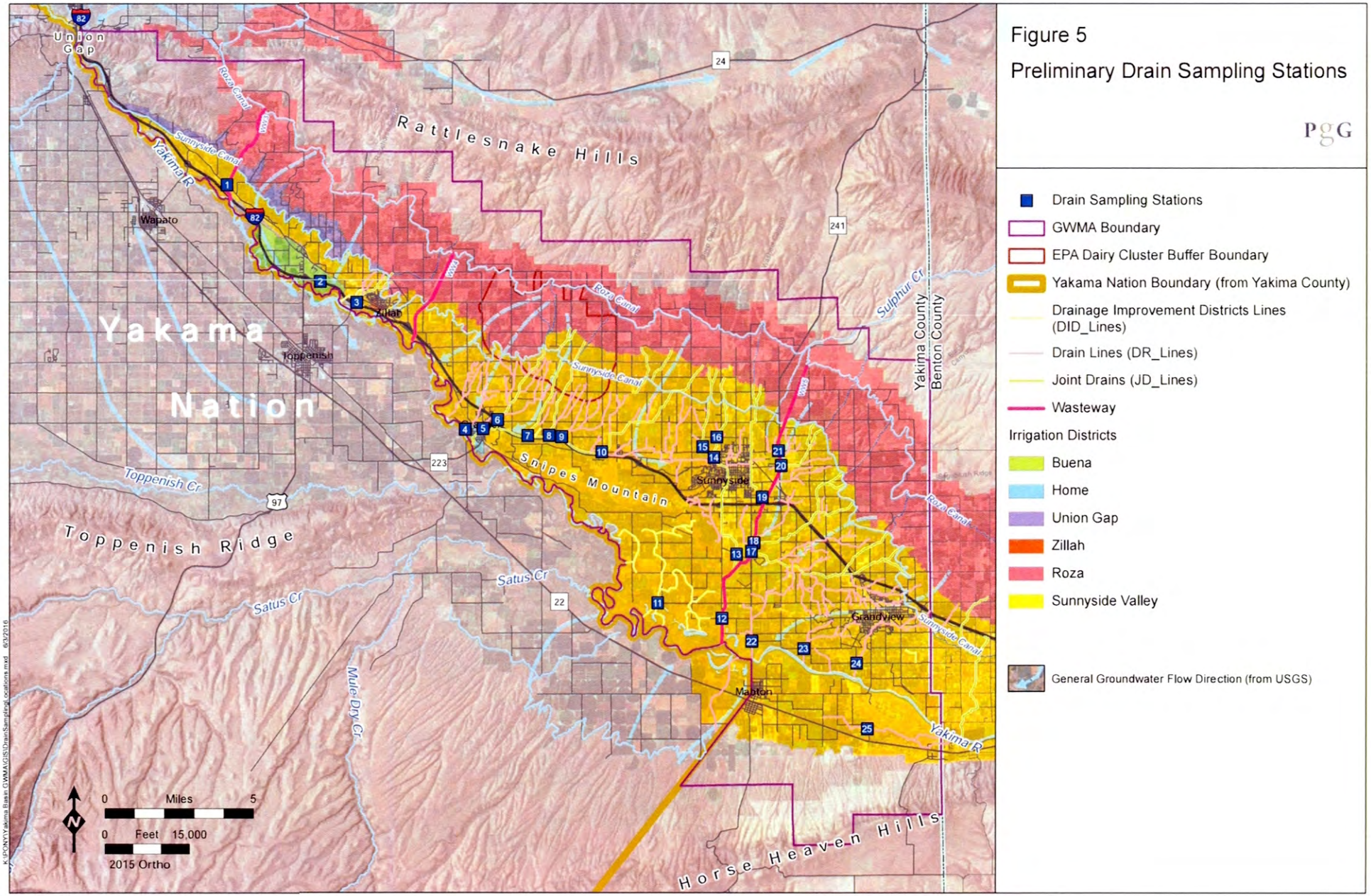


Figure 5
Preliminary Drain Sampling Stations
PgG
Drain Sampling Stations
GWMA Boundary
EPA Dairy Cluster Buffer Boundary
Yakama Nation Boundary (from Yakima County)
Drainage Improvement Districts Lines (DID_Lines)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Wasteway
Irrigation Districts
Buena
Home
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
Roza Canal
Sunnyside Canal
Yakima R
Toppenish Cr
Satus Cr
Mule Dry Cr
Sulphur Cr
0 Miles 5
0 Feet 15,000
2015 Ortho

APPENDIX A
LOCAL MAPS OF PRELIMINARY DRILL SITES

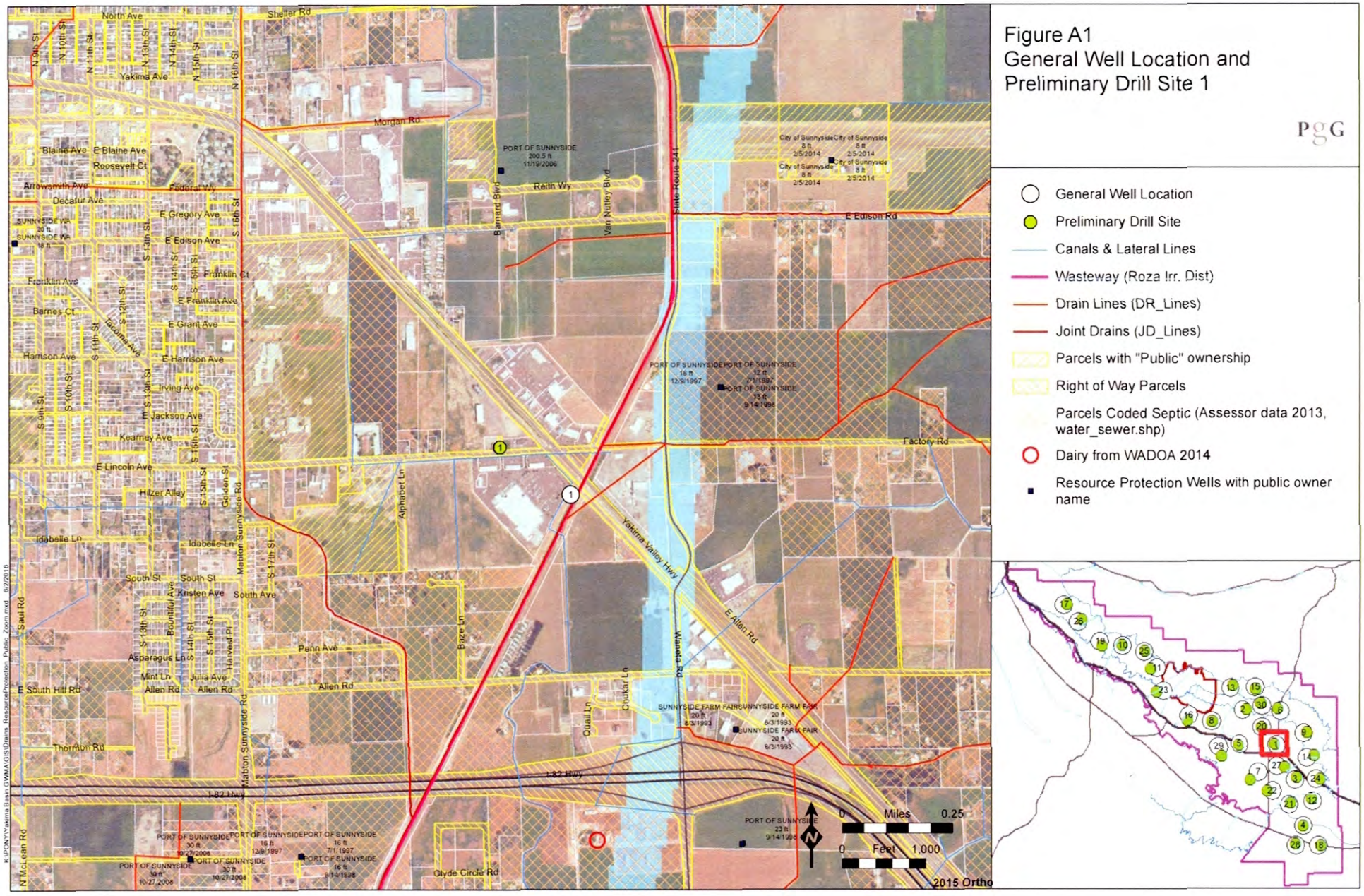


Figure A1
General Well Location and
Preliminary Drill Site 1
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Miles
0
0.25
Feet
0
1,000
2015 Ortho
K:\PGN\Yakima Basin GWMA\GIS\Drains Resource\Protection_Public_Zoom.mxd 6/2/2016

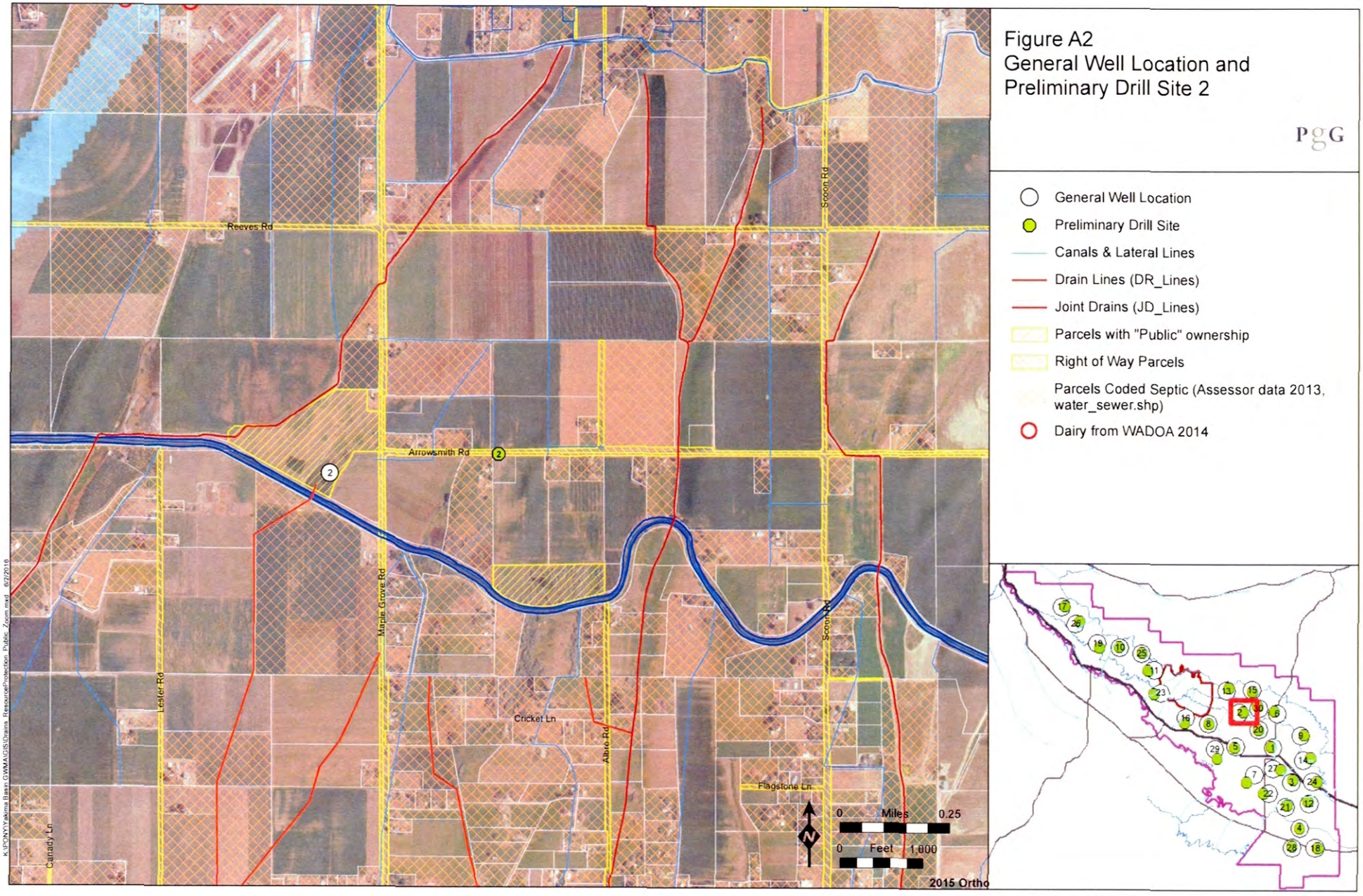


Figure A2
General Well Location and
Preliminary Drill Site 2
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Reeves Rd
Arrowsmith Rd
Scoon Rd
Maple Grove Rd
Lester Rd
Cricket Ln
Albro Rd
Flagstone Ln
Canady Ln
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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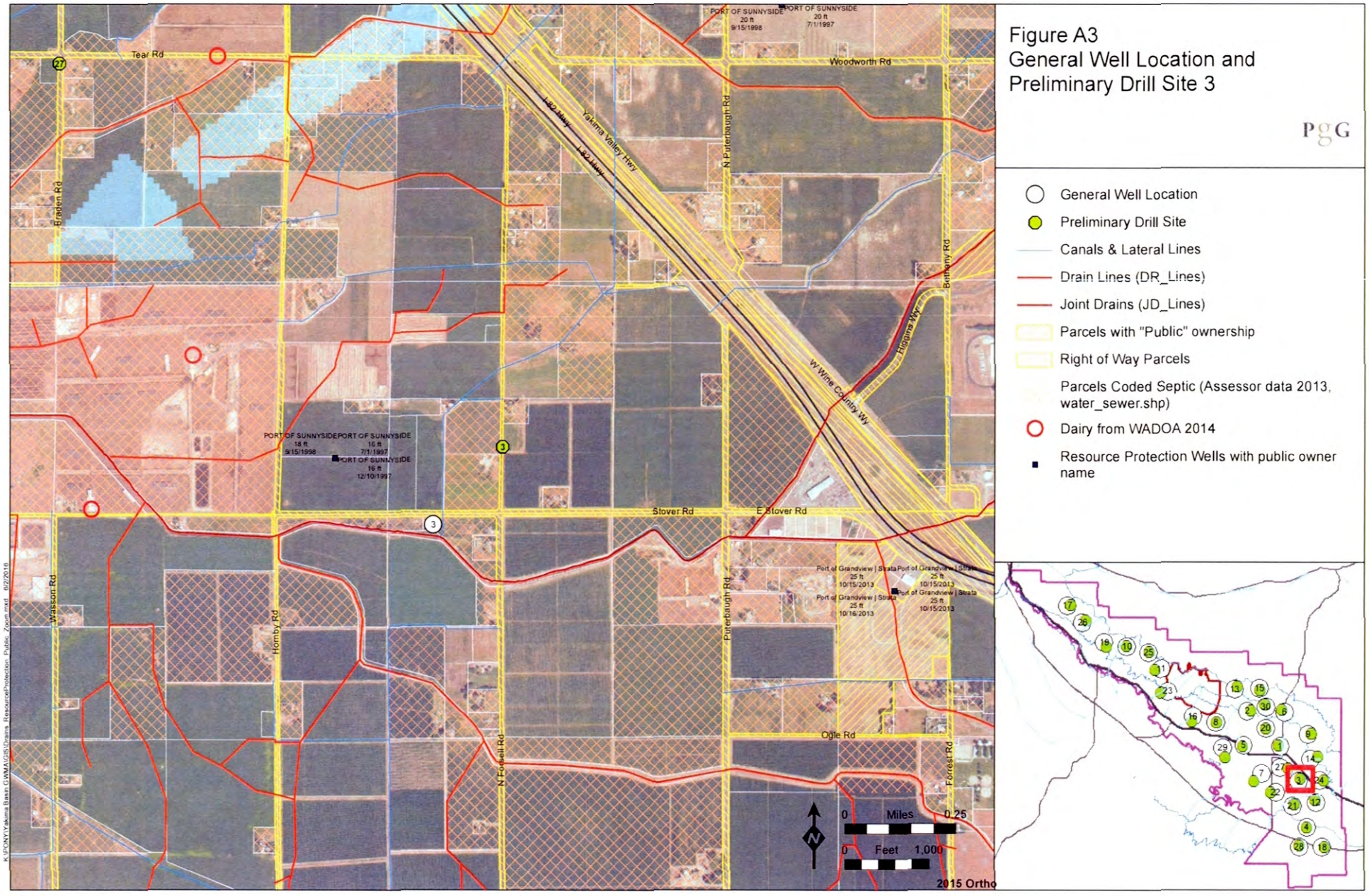
Figure A3
General Well Location and
Preliminary Drill Site 3
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Tear Rd
Woodworth Rd
Braden Rd
I-82 Hwy
Yakima Valley Hwy
N Puterbaugh Rd
Bethany Rd
Higgins Wy
W Wine Country Wy
Stover Rd
E Stover Rd
Watson Rd
Hornby Rd
N Fordell 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 10/15/2013
Port of Grandview | Strata 25 ft 10/16/2013
Port of Grandview | Strata 25 ft 10/15/2013
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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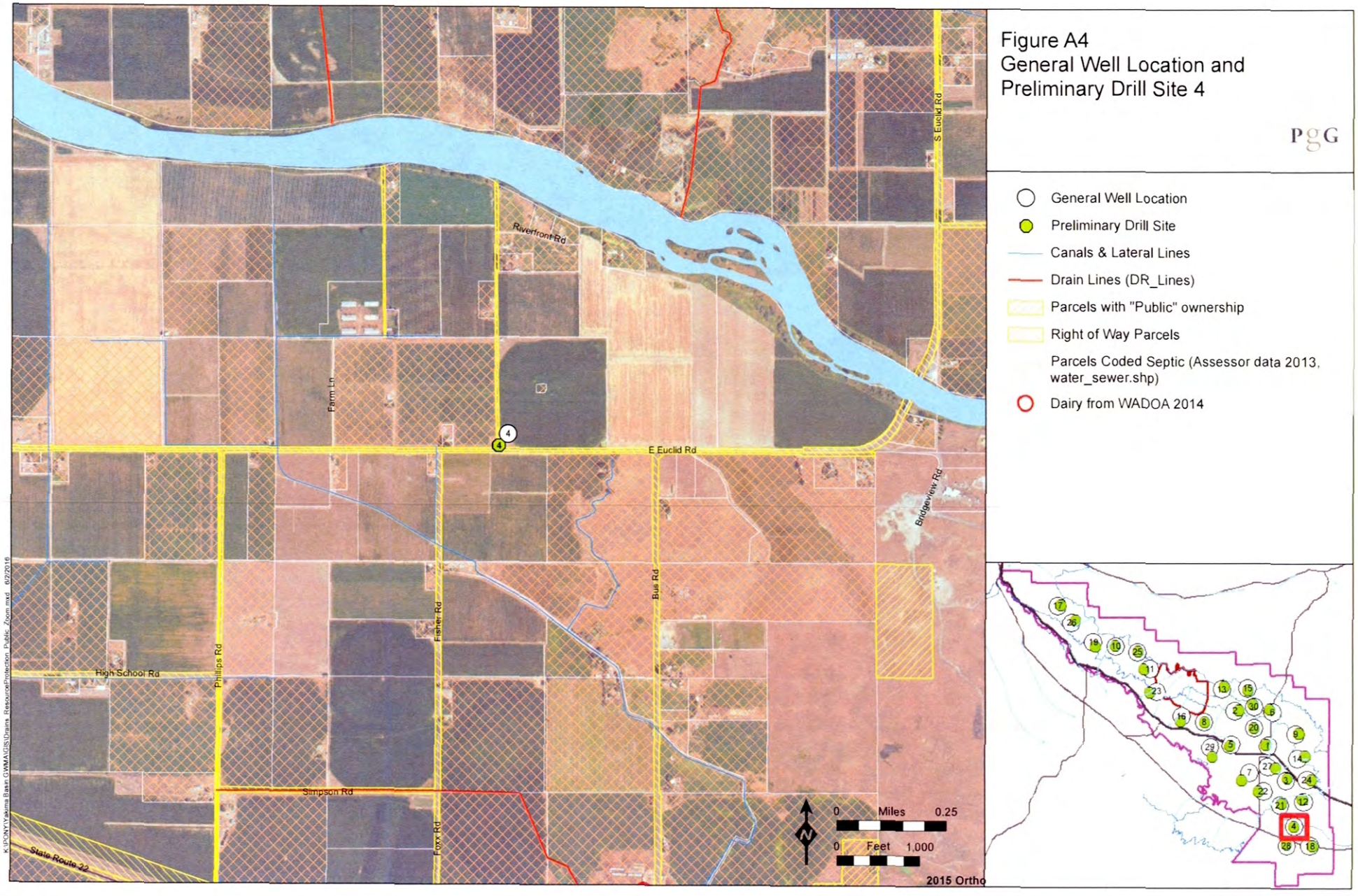
Figure A4
General Well Location and
Preliminary Drill Site 4
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Riverfront 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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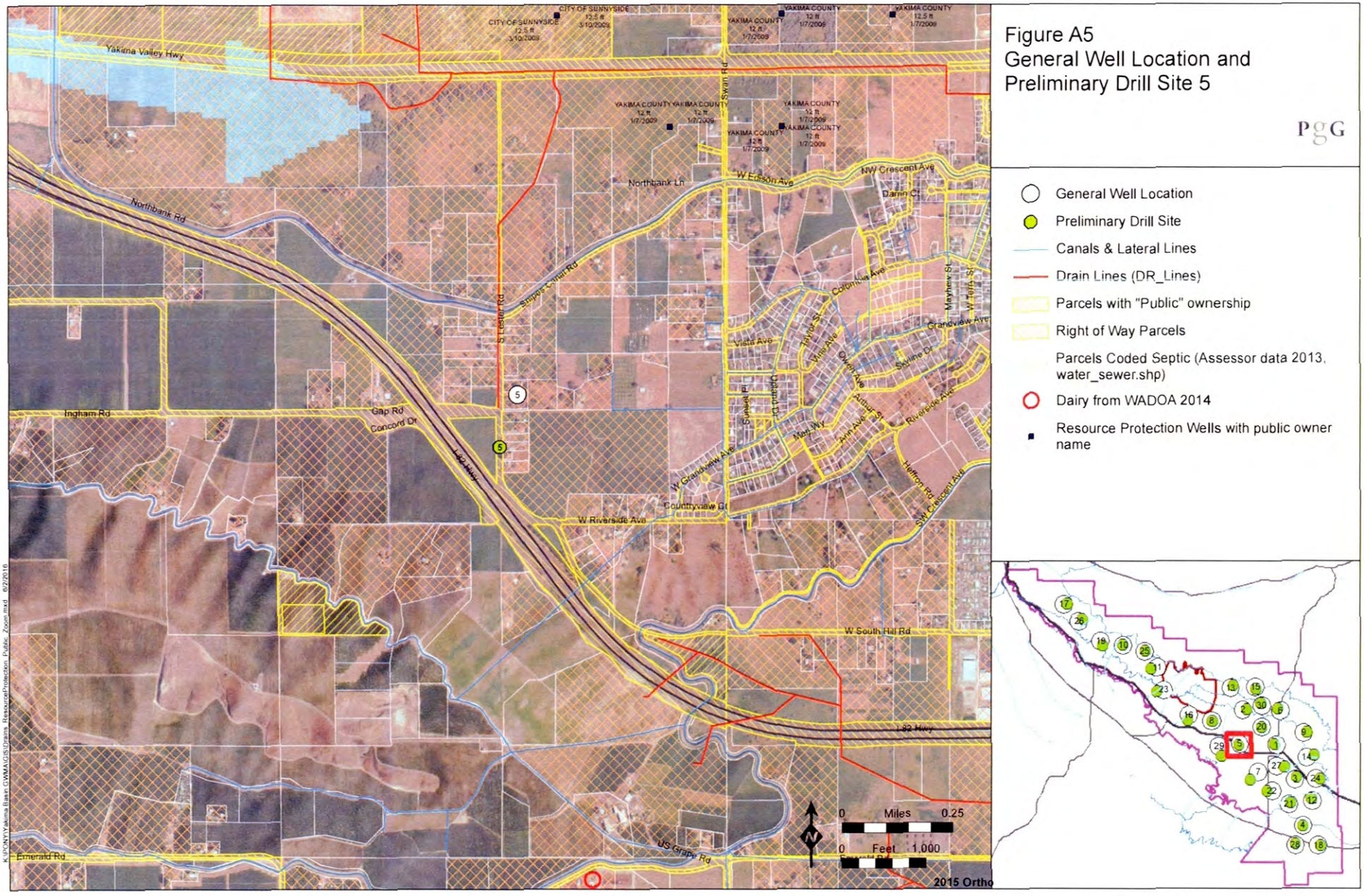
Figure A5
General Well Location and
Preliminary Drill Site 5
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Yakima Valley Hwy
Northbank Rd
Northbank Ln
W Edison Ave
NW Crescent Ave
Swan Rd
S Lester Rd
Snipes Canal Rd
Ingham Rd
Gap Rd
Concord Dr
I-82 Hwy
W Grandview Ave
Countryview Dr
W Riverside Ave
Riverside Ave
SW Crescent Ave
Hefron Rd
W South Hill Rd
US Grape Rd
Emerald Rd
Vista Ave
Grandview Ave
Skyline Dr
Colonial Ave
Mayhew St
Taylor St
Ames Ave
Owen Ave
Dudley Dr
Sunset Rd
Mary Wy
Ann Ave
Arthur St
Damn Ct
CITY OF SUNNYSIDE 12.5 ft 3/10/2009
YAKIMA COUNTY 12 ft 1/7/2009
0 Miles 0.25
0 Feet 1,000
2015 Ortho
N
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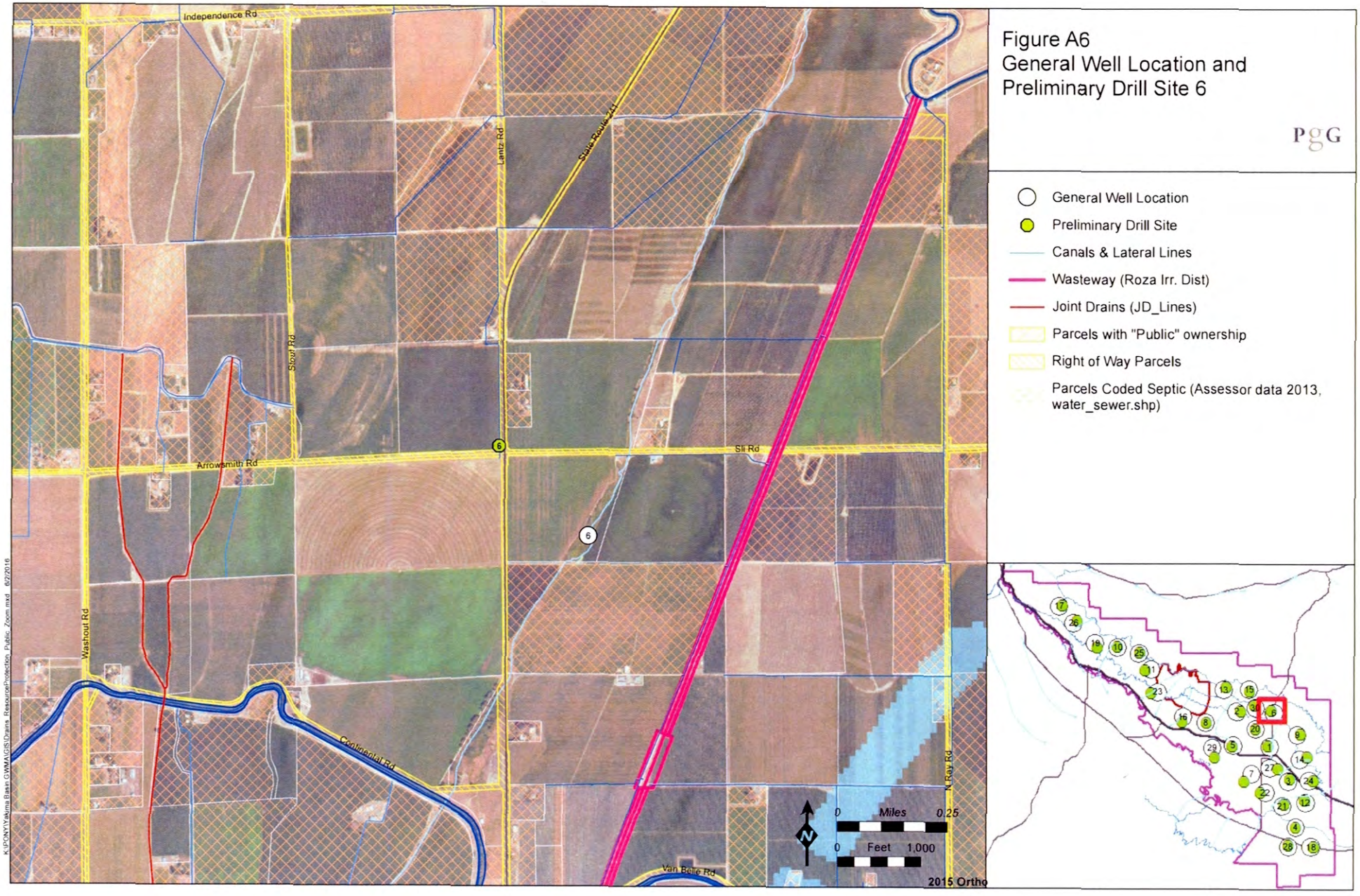
Figure A6
General Well Location and
Preliminary Drill Site 6
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Independence Rd
Lantz Rd
State Route 241
Stout Rd
Arrowsmith Rd
Sli Rd
Washout Rd
Continental Rd
N Ray Rd
Van Belle Rd
6
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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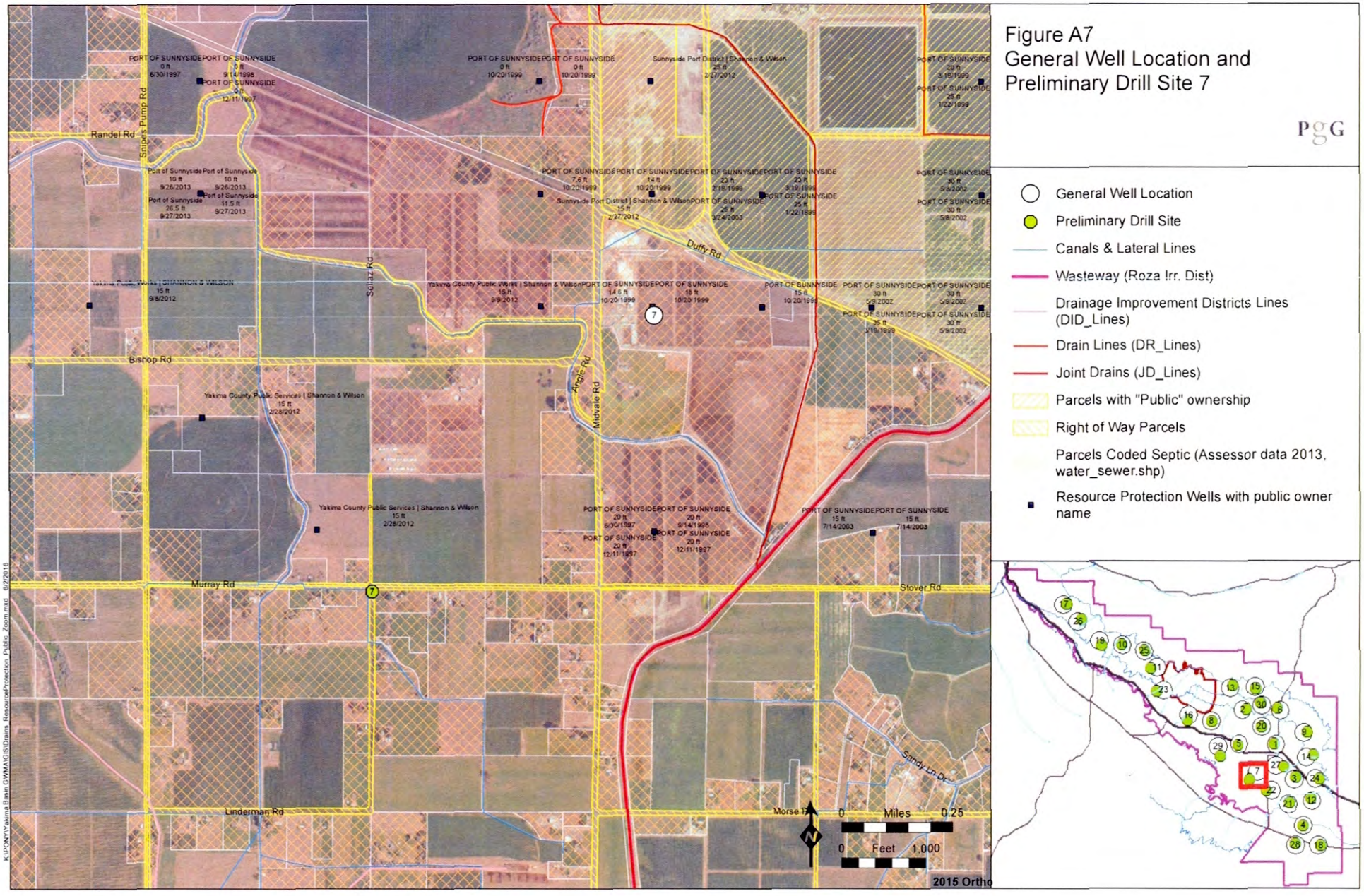
Figure A7
General Well Location and
Preliminary Drill Site 7
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Drainage Improvement Districts Lines (DID_Lines)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with public owner name
Randel Rd
Bishop Rd
Murray Rd
Linderman Rd
Stover Rd
Duffy Rd
Midvale Rd
Angle Rd
Sandy Ln Dr
Snipes Pump Rd
Sollaz Rd
Morse Rd
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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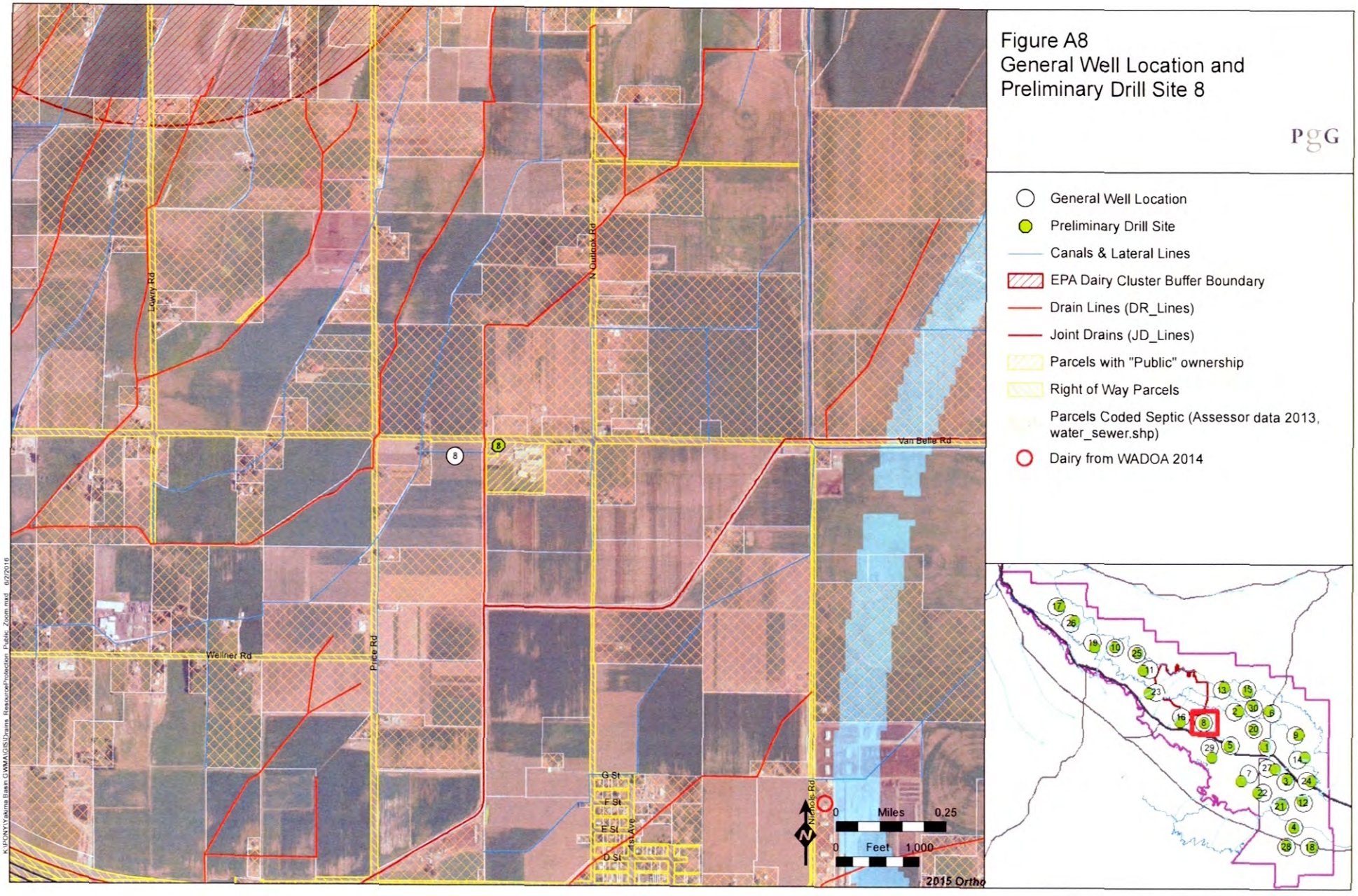
Figure A8
General Well Location and
Preliminary Drill Site 8
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
EPA Dairy Cluster Buffer Boundary
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Lowry Rd
N Outlook Rd
Van Belle Rd
Wellner Rd
Pyle Rd
G St
F St
E St
D St
1st Ave
Nichols Rd
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\P\CNY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

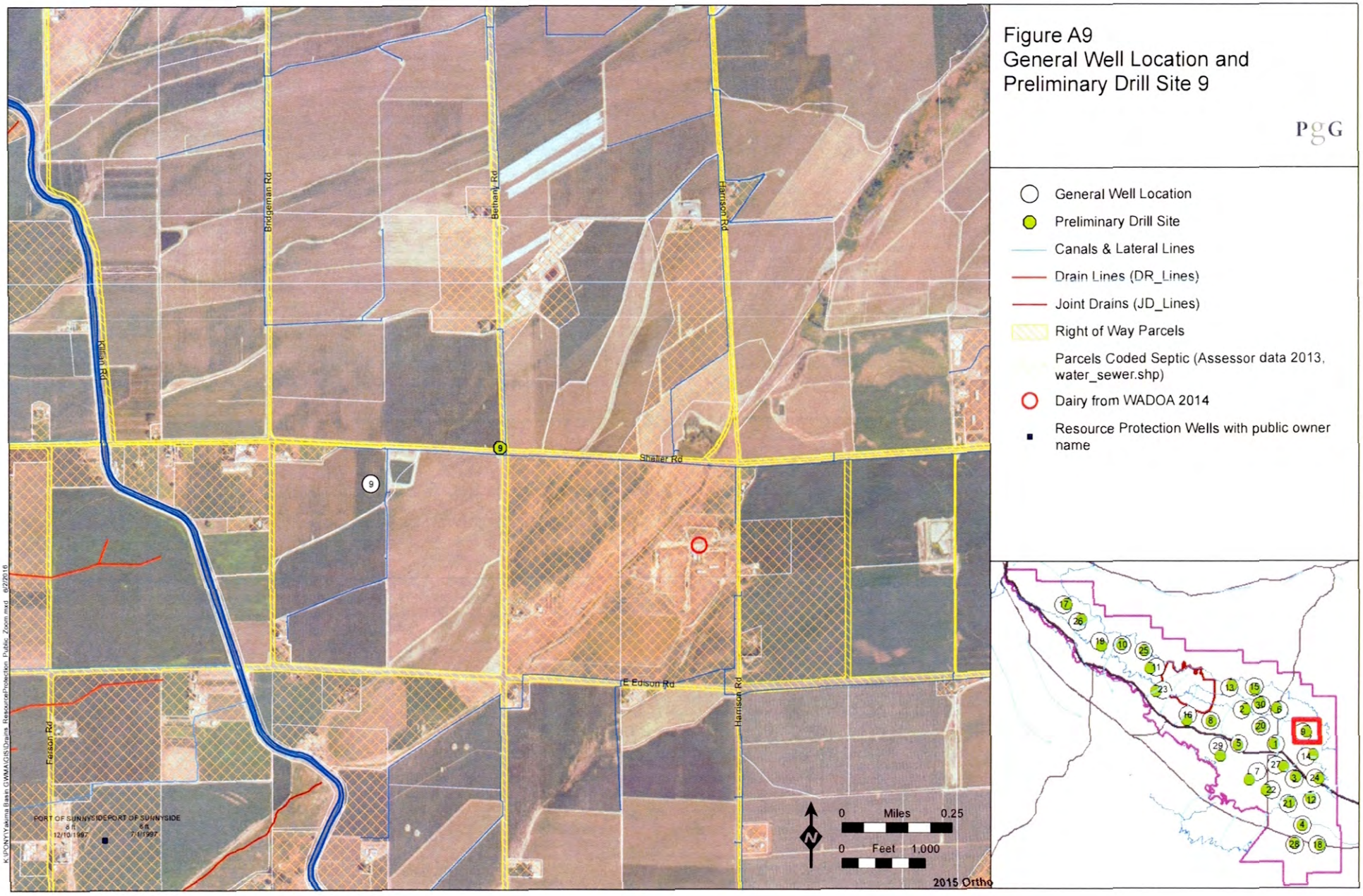
Figure A9
General Well Location and
Preliminary Drill Site 9
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Bridgeman Rd
Bethany Rd
Harrison Rd
Killam Rd
Shelter Rd
E Edison Rd
Edison Rd
9
PORT OF SUNNYSIDE
PORT OF SUNNYSIDE
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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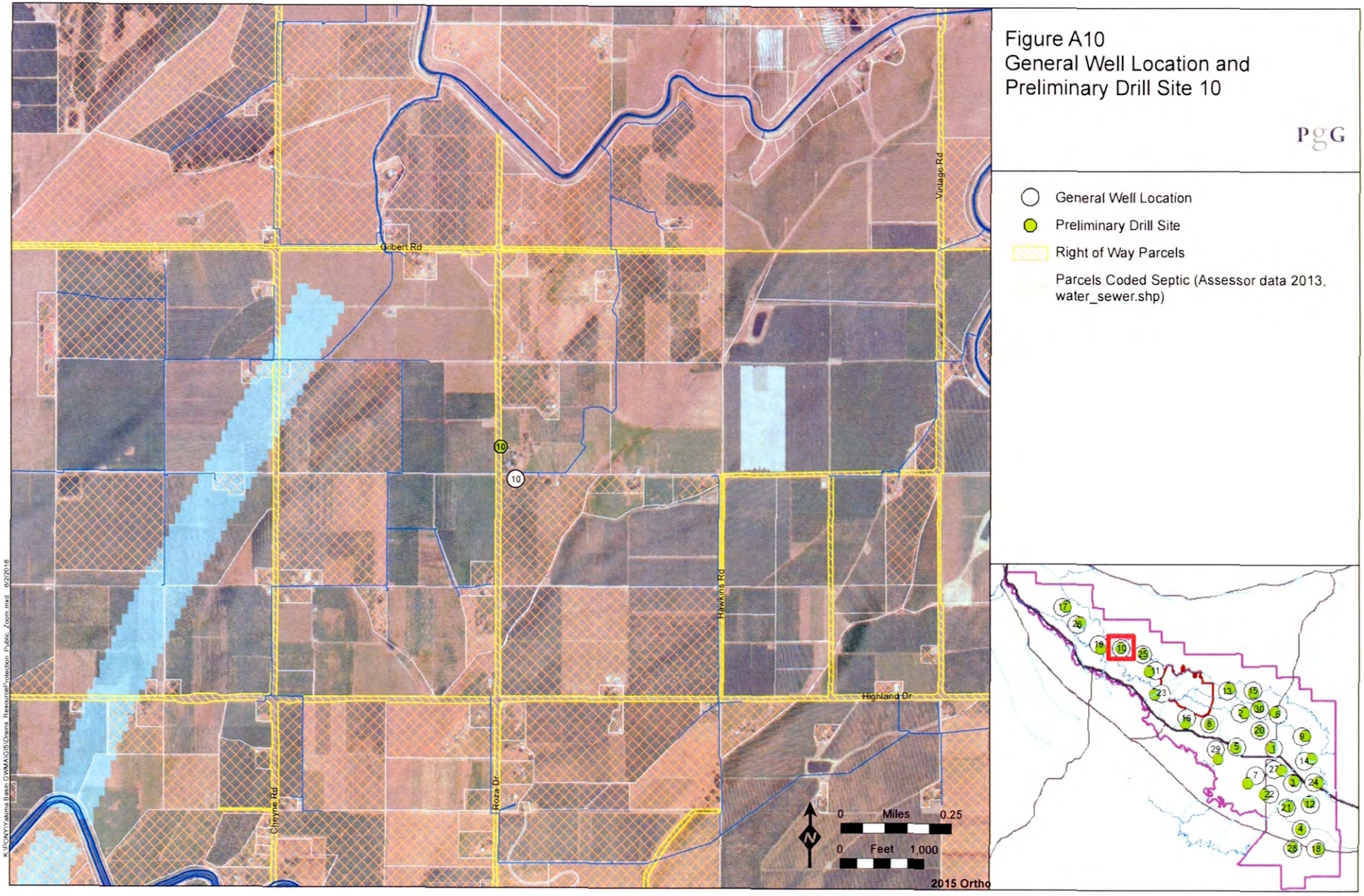
Figure A10
General Well Location and
Preliminary Drill Site 10
PgG
General Well Location
Preliminary Drill Site
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Gilbert Rd
Vintage Rd
Hawkins Rd
Highland Dr
Cheyne Rd
Roza Dr
10
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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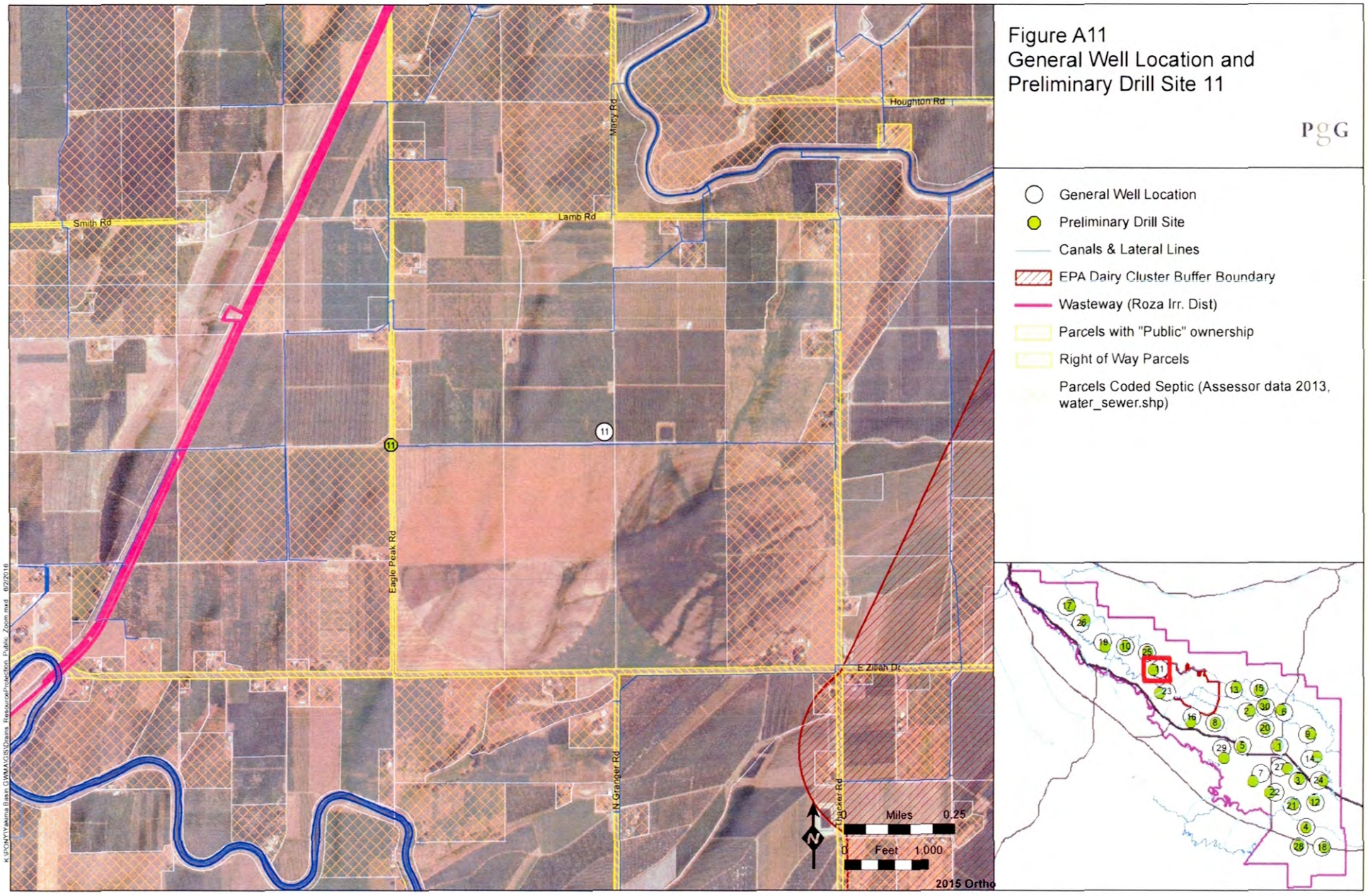
Figure A11
General Well Location and
Preliminary Drill Site 11
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
EPA Dairy Cluster Buffer Boundary
Wasteway (Roza Irr. Dist)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Smith Rd
Lamb Rd
Houghton Rd
Macy Rd
Eagle Peak Rd
N Granger Rd
Thacker Rd
E Zillah Dr
11
0 Miles 0.25
0 Feet 1,000
N
2015 Ortho
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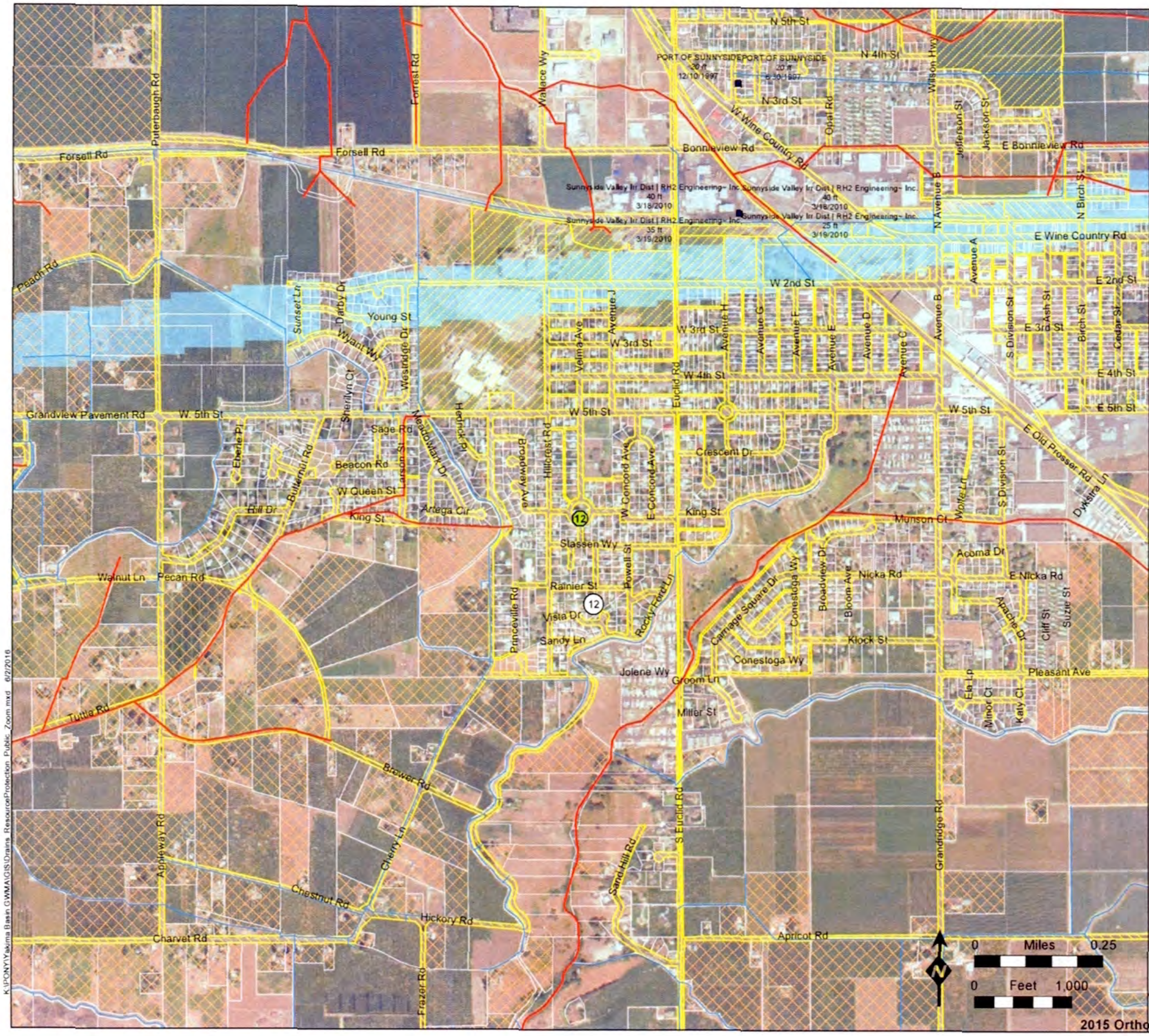
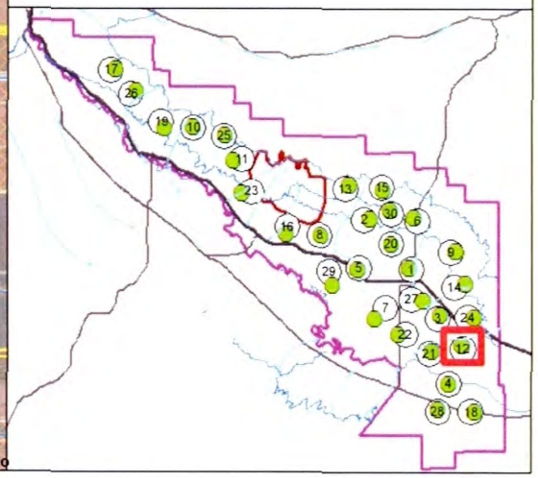
Figure A12
General Well Location and Preliminary Drill Site 12

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



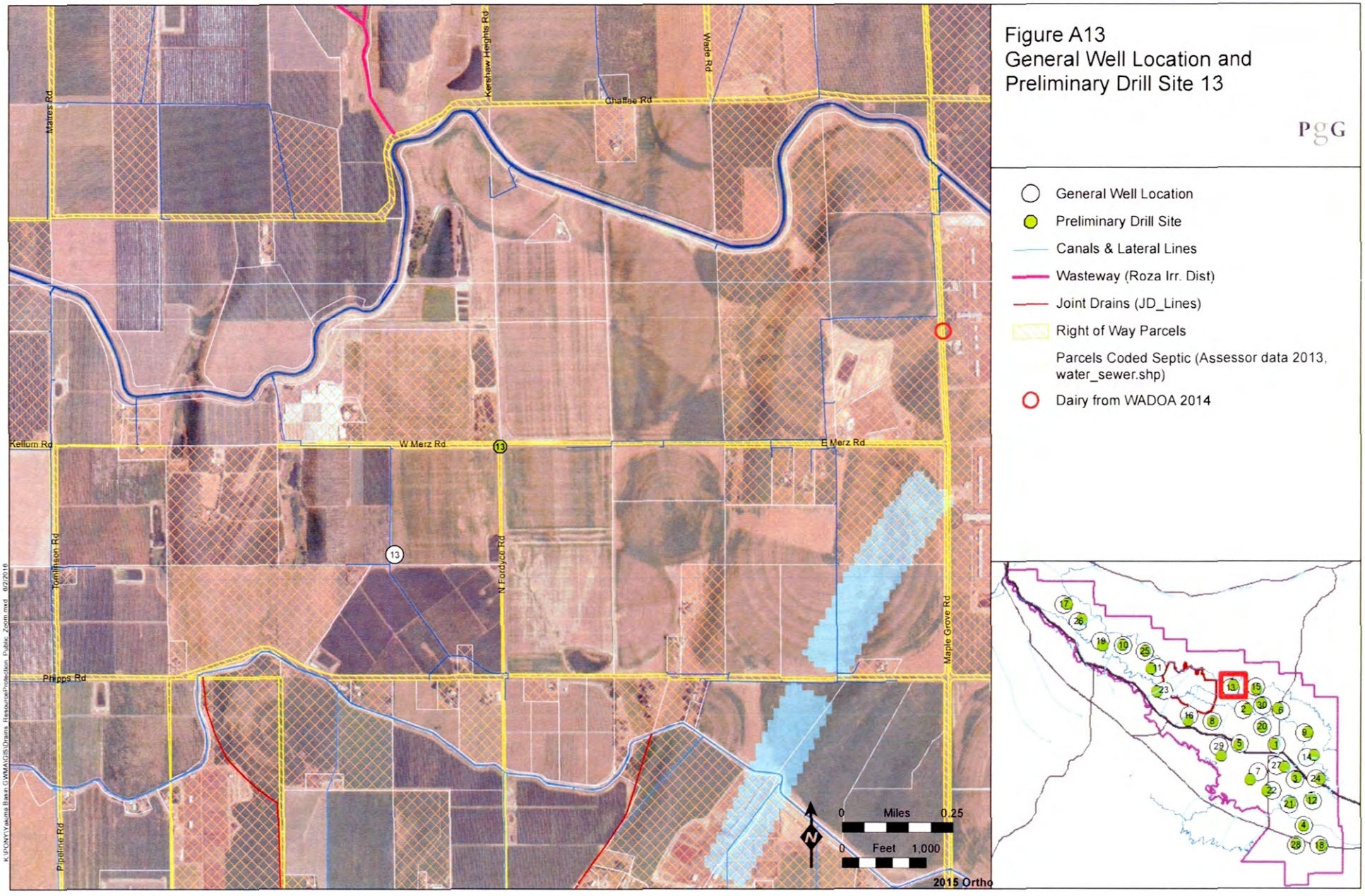


Figure A13
General Well Location and
Preliminary Drill Site 13
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Joint Drains (JD_Lines)
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Maires Rd
Kershaw Heights Rd
Chaffee Rd
Wade Rd
Kellum Rd
W Merz Rd
E Merz Rd
13
Johnson Rd
N Fordyce Rd
Maple Grove Rd
Phipps Rd
Pipeline Rd
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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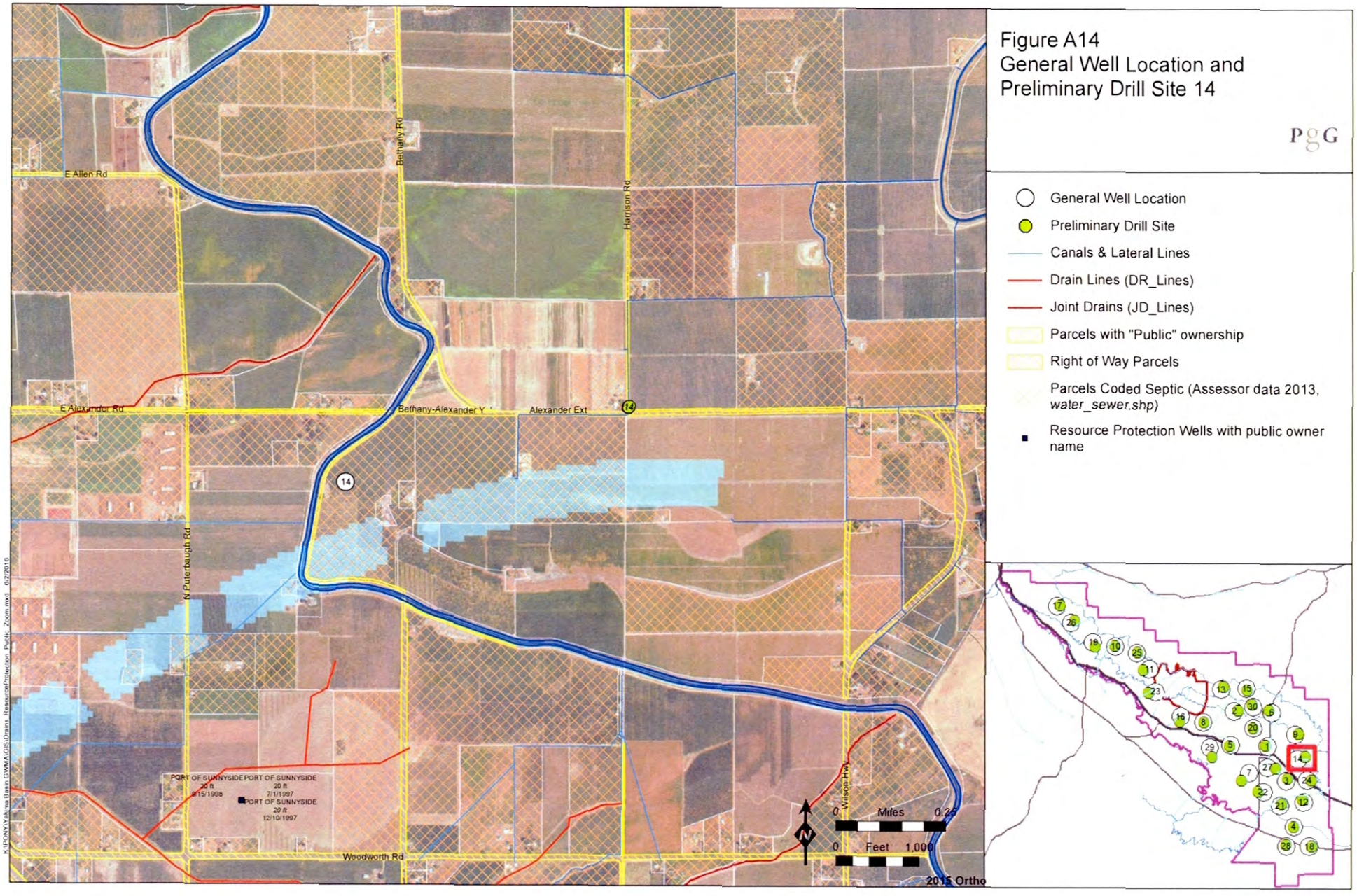
Figure A14
General Well Location and
Preliminary Drill Site 14
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with public owner name
E Allen Rd
Bethany Rd
Harrison Rd
E Alexander Rd
Bethany-Alexander Y
Alexander Ext
14
N Puterbaugh Rd
Wilson Hwy
Woodworth Rd
PORT OF SUNNYSIDE 20 ft 8/15/1998
PORT OF SUNNYSIDE 20 ft 7/1/1997
PORT OF SUNNYSIDE 20 ft 12/10/1997
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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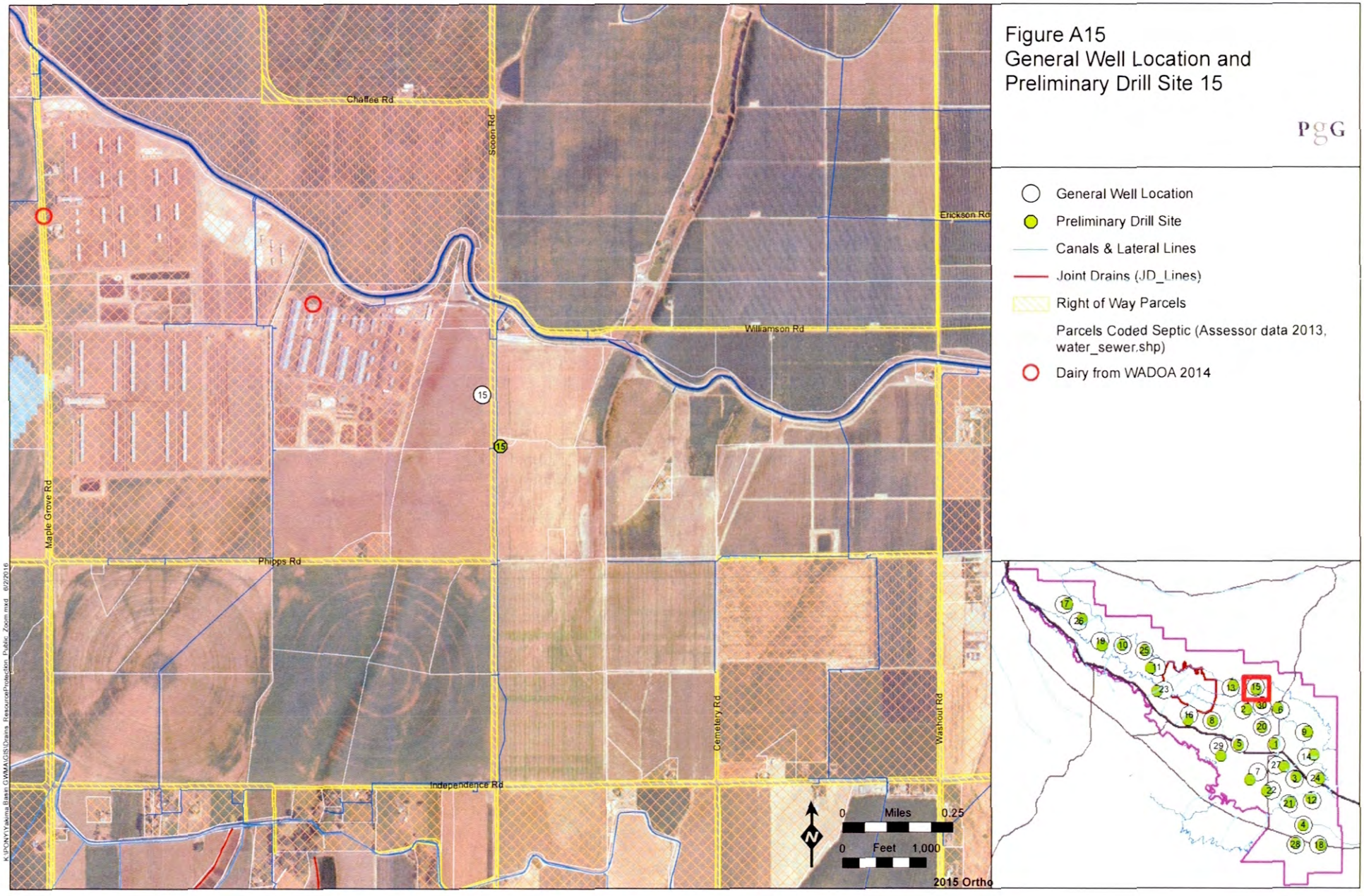
Figure A15
General Well Location and
Preliminary Drill Site 15
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Joint Drains (JD_Lines)
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Chaffee Rd
Scoon Rd
Erickson Rd
Williamson Rd
Maple Grove Rd
Phipps Rd
Cemetery Rd
Washout Rd
Independence Rd
15
0 Miles 0.25
0 Feet 1,000
2015 Ortho
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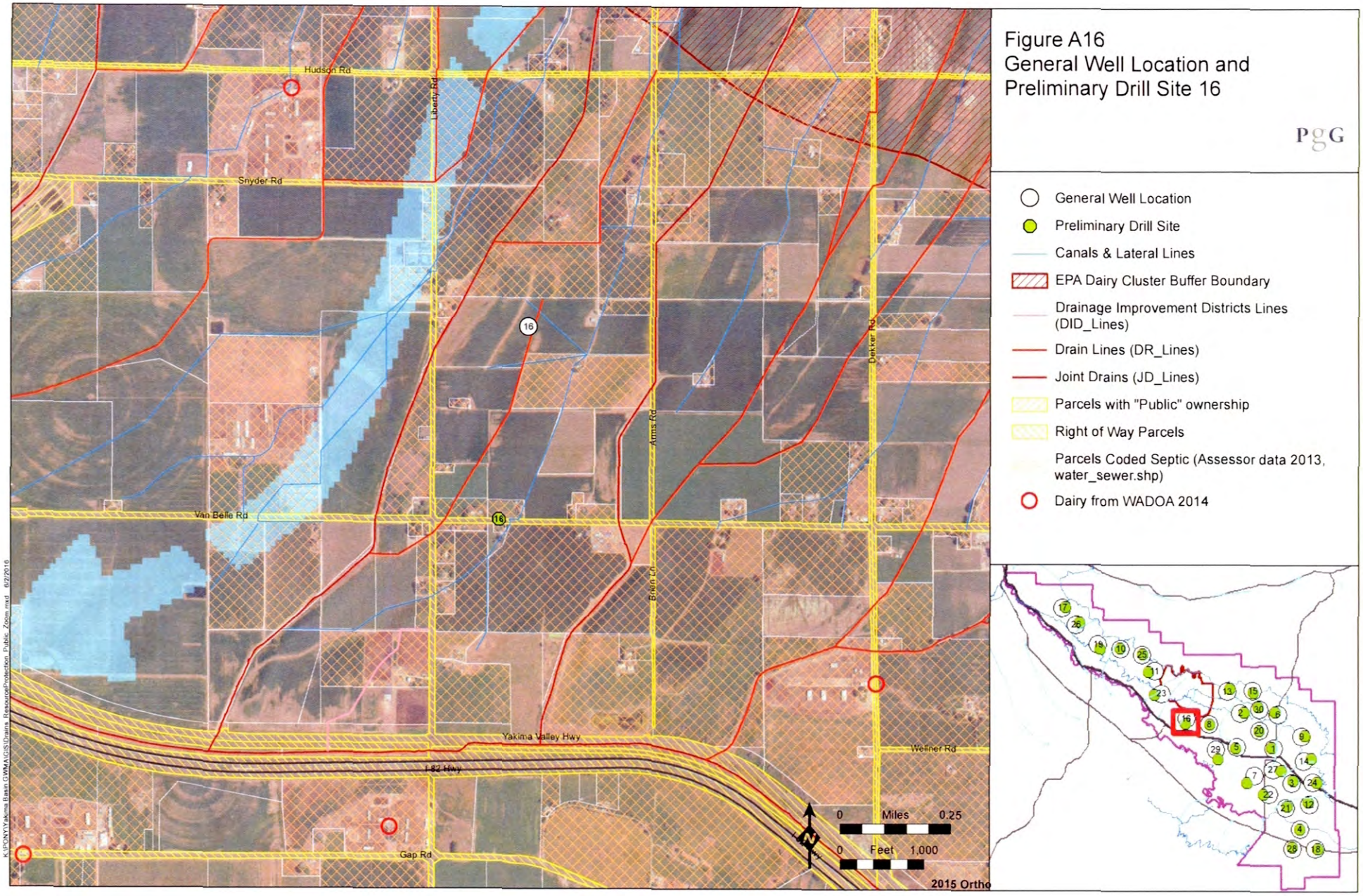


Figure A16
General Well Location and
Preliminary Drill Site 16
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
EPA Dairy Cluster Buffer Boundary
Drainage Improvement Districts Lines (DID_Lines)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Hudson Rd
Liberty Rd
Snyder Rd
Van Belle Rd
Ams Rd
Dekker Rd
Yakima Valley Hwy
I-82 Hwy
Wetmer Rd
Gap Rd
16
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PDNYY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

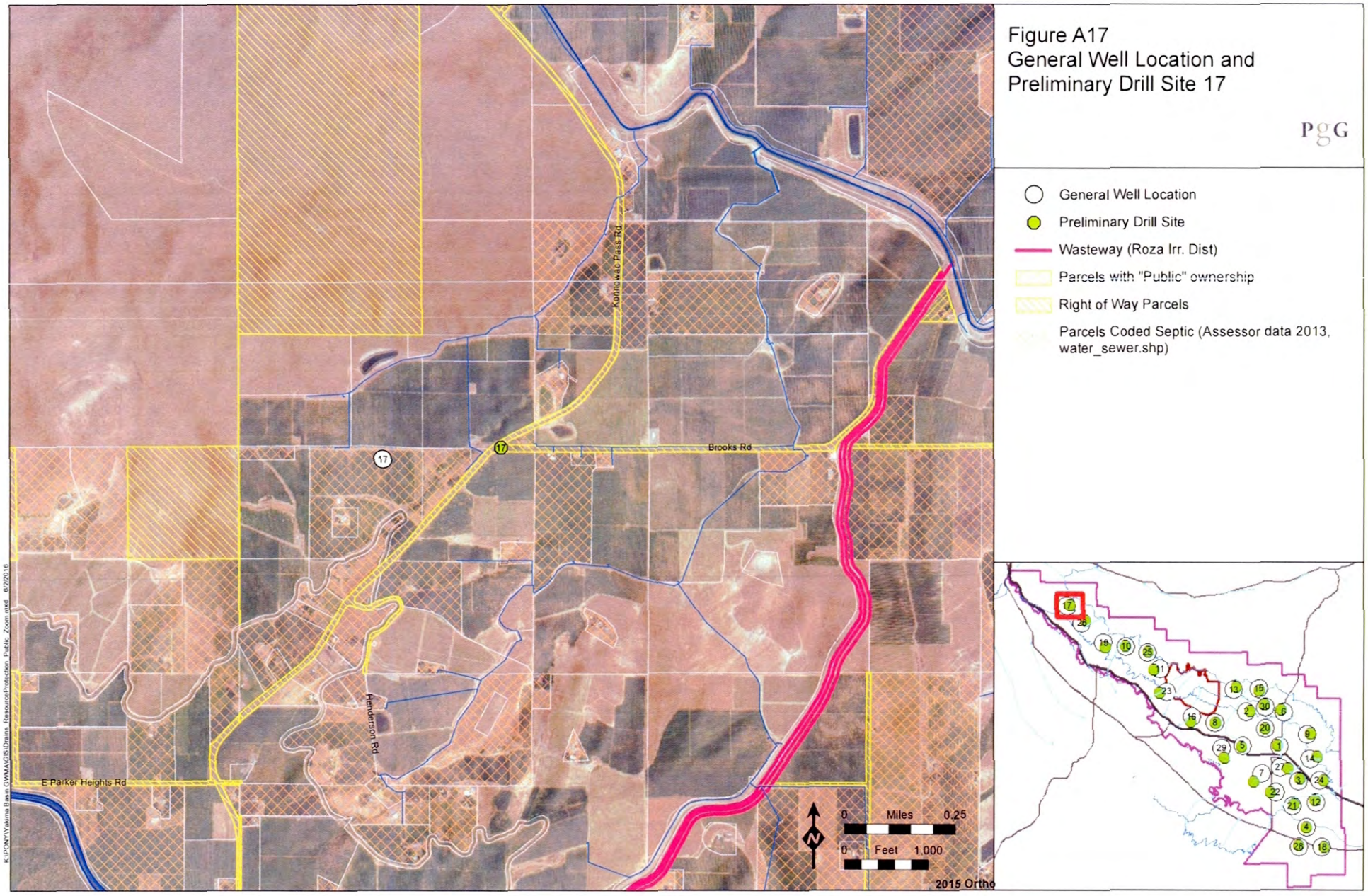


Figure A17
General Well Location and
Preliminary Drill Site 17
PgG
General Well Location
Preliminary Drill Site
Wasteway (Roza Irr. Dist)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Brooks Rd
Konnowac Pass Rd
Henderson Rd
E Parker Heights Rd
17
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PCNY\Yakima Basin GWMA\GIS\Drains Resource\Protection_Public_Zoom.mxd 6/2/2016

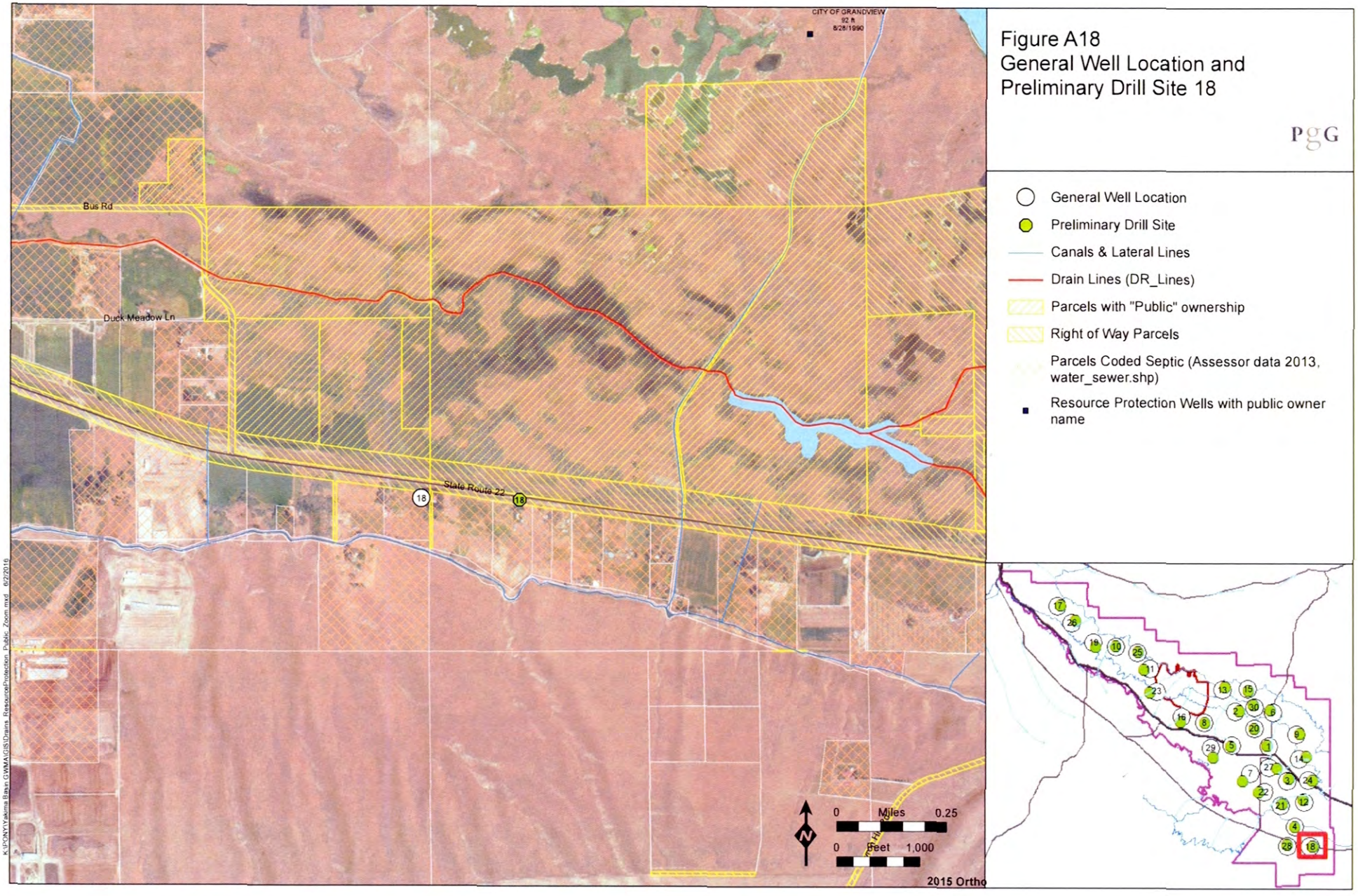


Figure A18
General Well Location and
Preliminary Drill Site 18

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

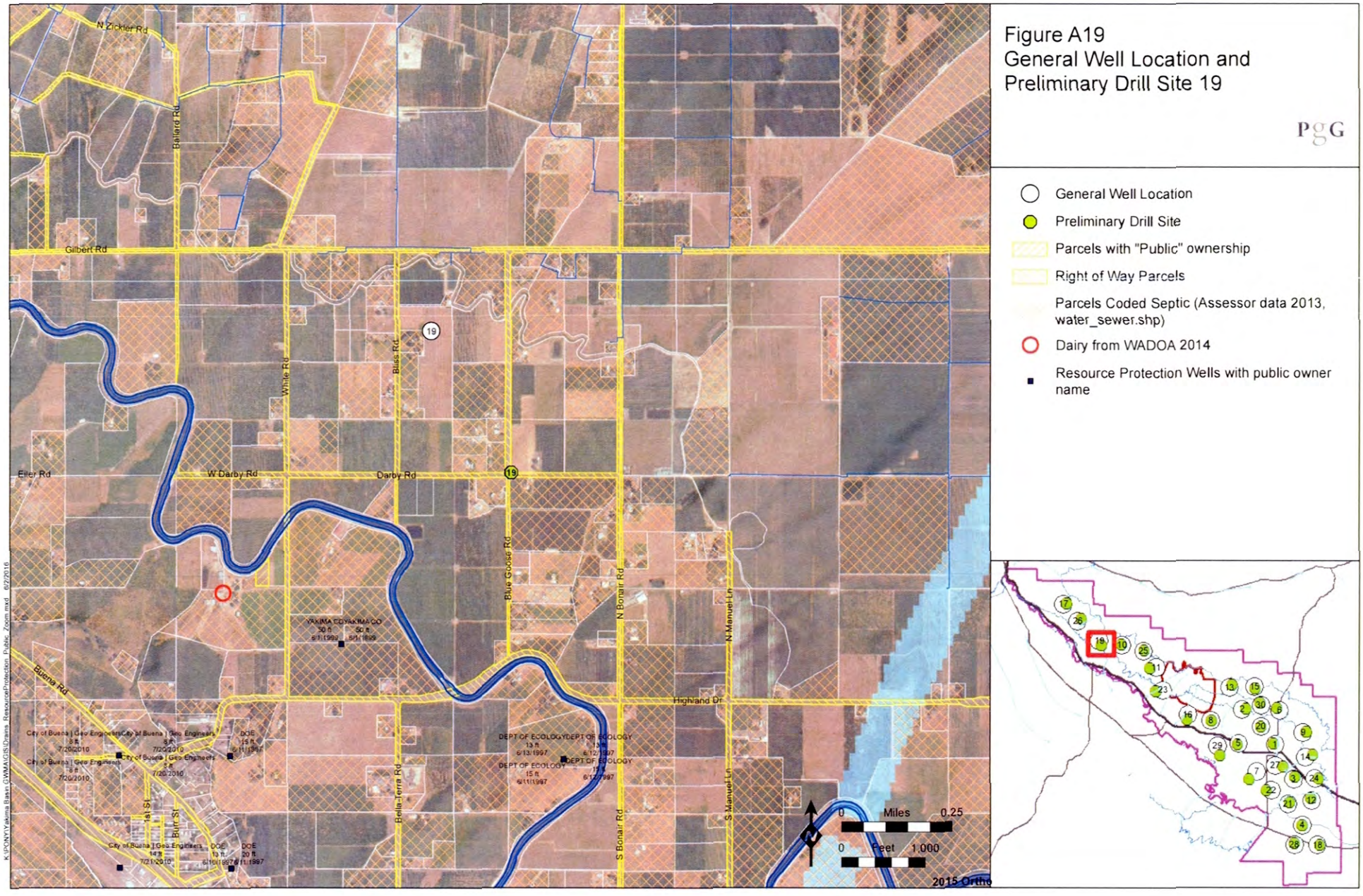


Figure A19
General Well Location and
Preliminary Drill Site 19
PgG
General Well Location
Preliminary Drill Site
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
N Zickler Rd
Ballard Rd
Gilbert Rd
White Rd
Bliss Rd
Eiler Rd
W Darby Rd
Darby Rd
Blue Goose Rd
N Bonair Rd
N Manuel Ln
Buena Rd
Highland Dr
Bella Terra Rd
S Bonair Rd
S Manuel Ln
1st St
Burr St
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PCNY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

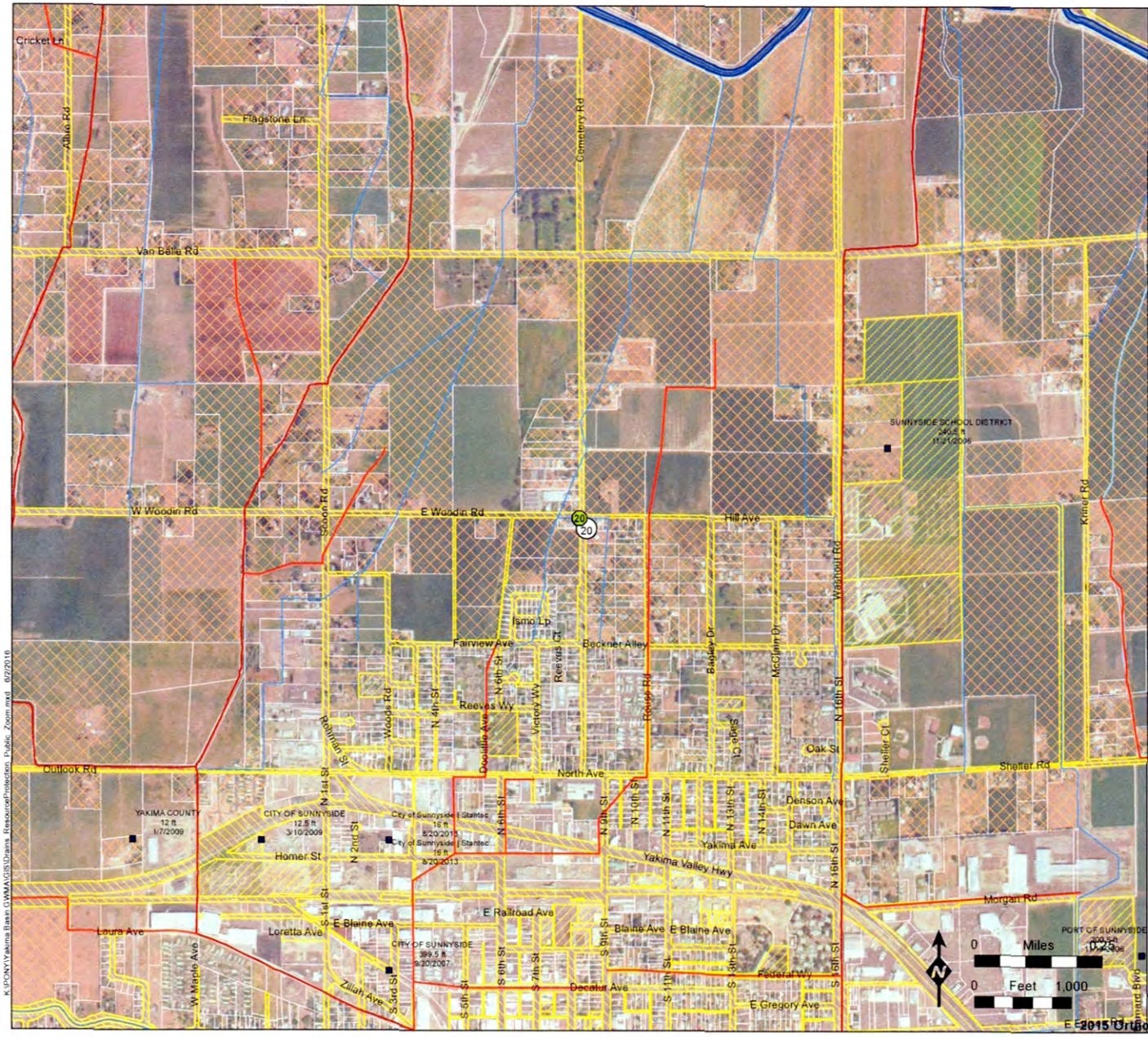
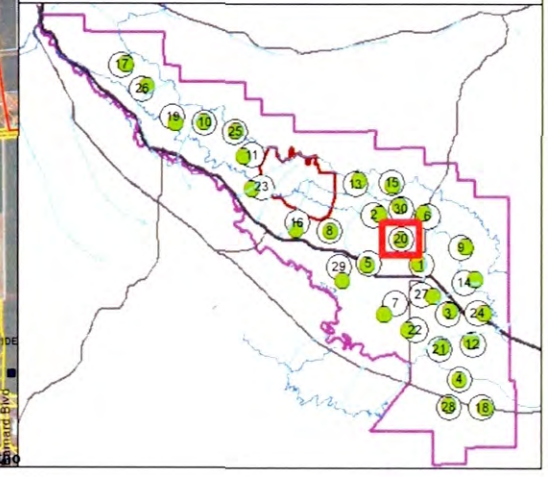


Figure A20
General Well Location and Preliminary Drill Site 20

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



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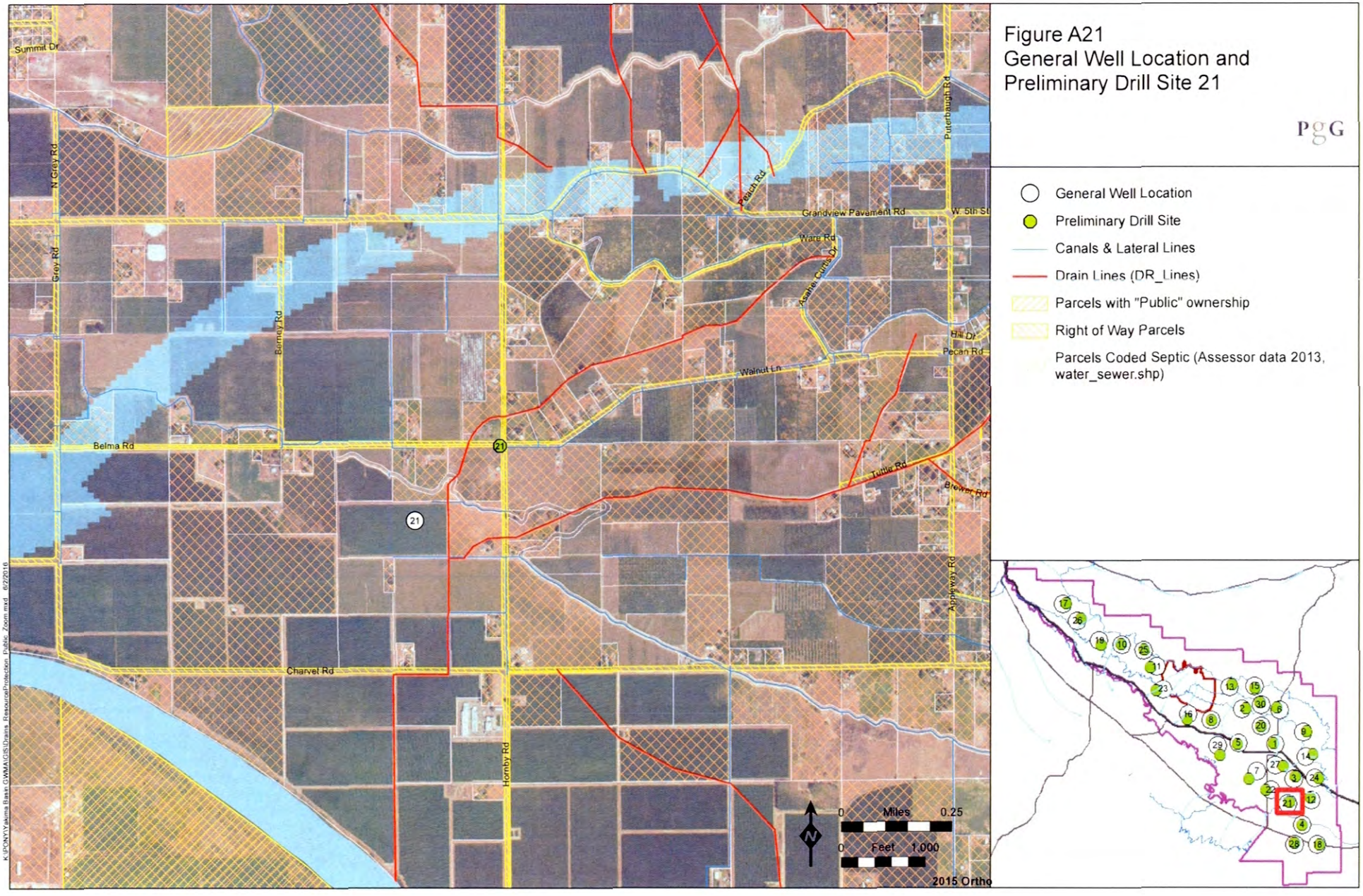


Figure A21
General Well Location and
Preliminary Drill Site 21
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Summit Dr
N Grey Rd
Grey Rd
Barney 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
Appleway Rd
Puterbaugh Rd
21
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

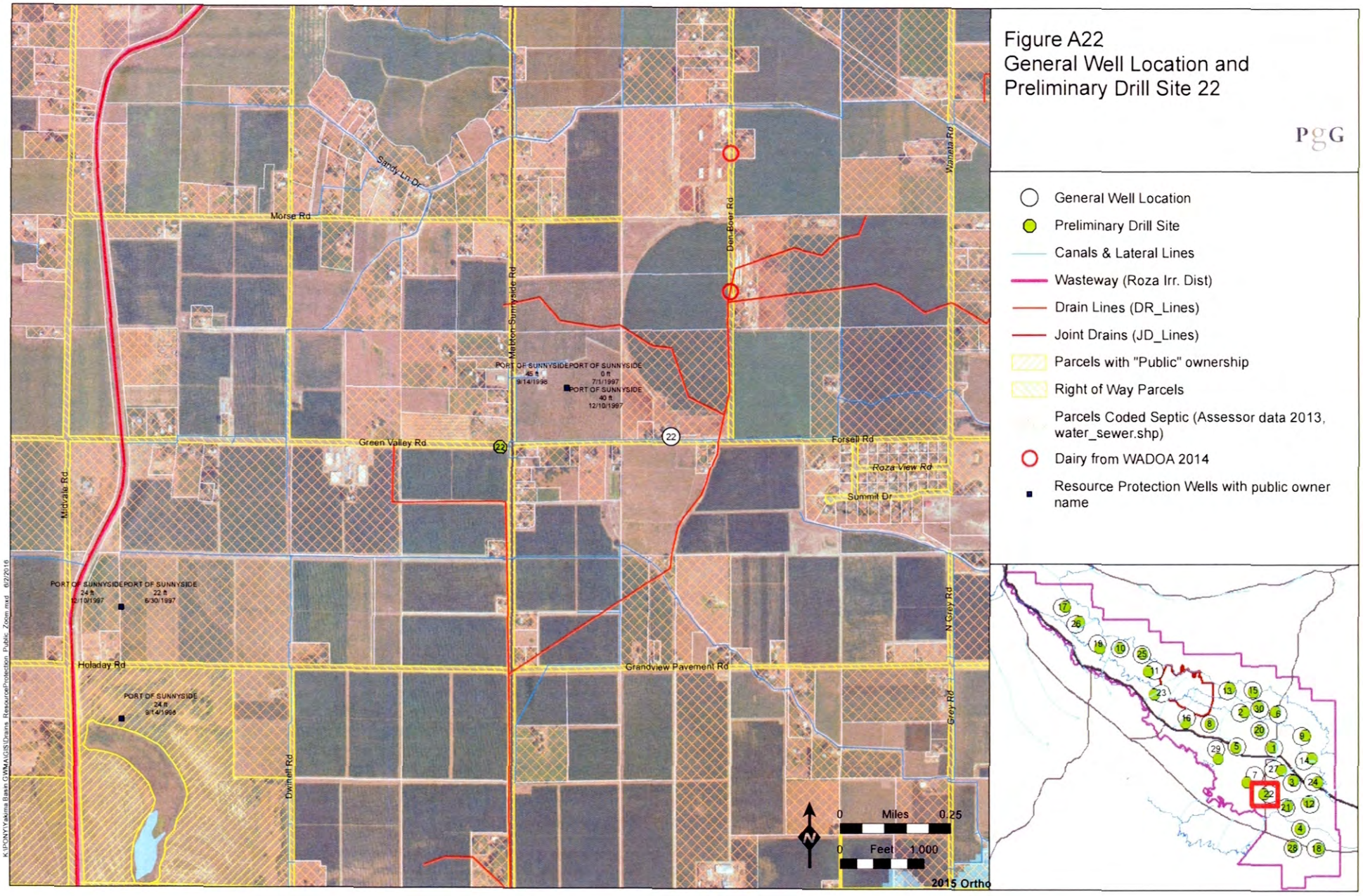


Figure A22
General Well Location and
Preliminary Drill Site 22
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Resource Protection Wells with public owner name
Morse Rd
Sandy Ln Dr
Midvale Rd
Melton Sunnyside Rd
Dan Boer Rd
Wanata Rd
Green Valley Rd
Forsell Rd
Roza View Rd
Summit Dr
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:\PONY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

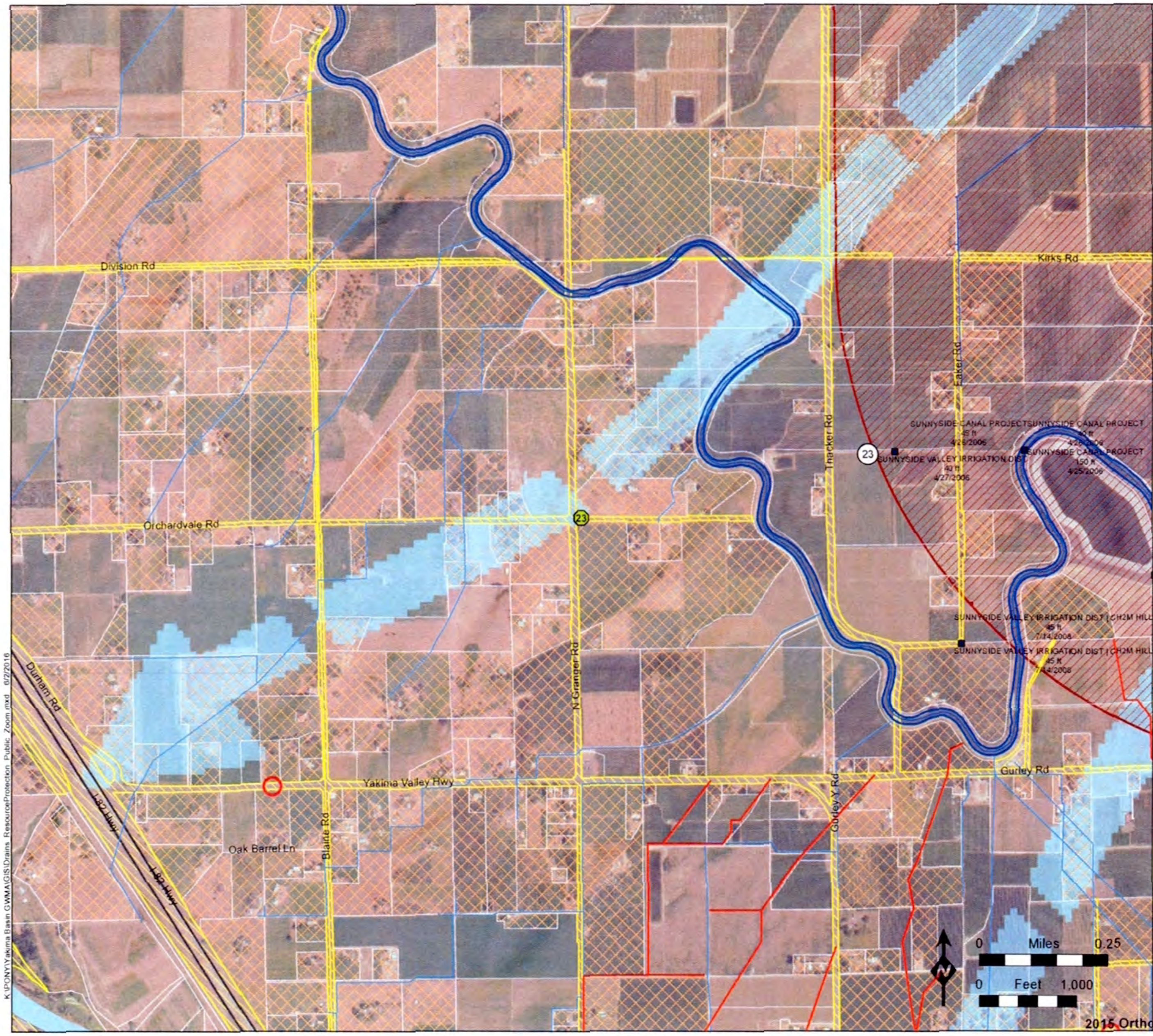
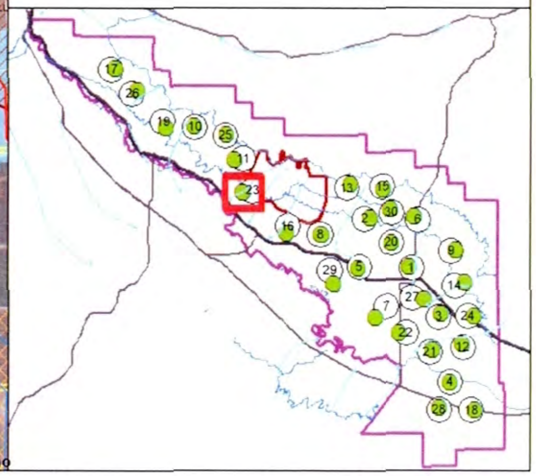


Figure A23
General Well Location and Preliminary Drill Site 23

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



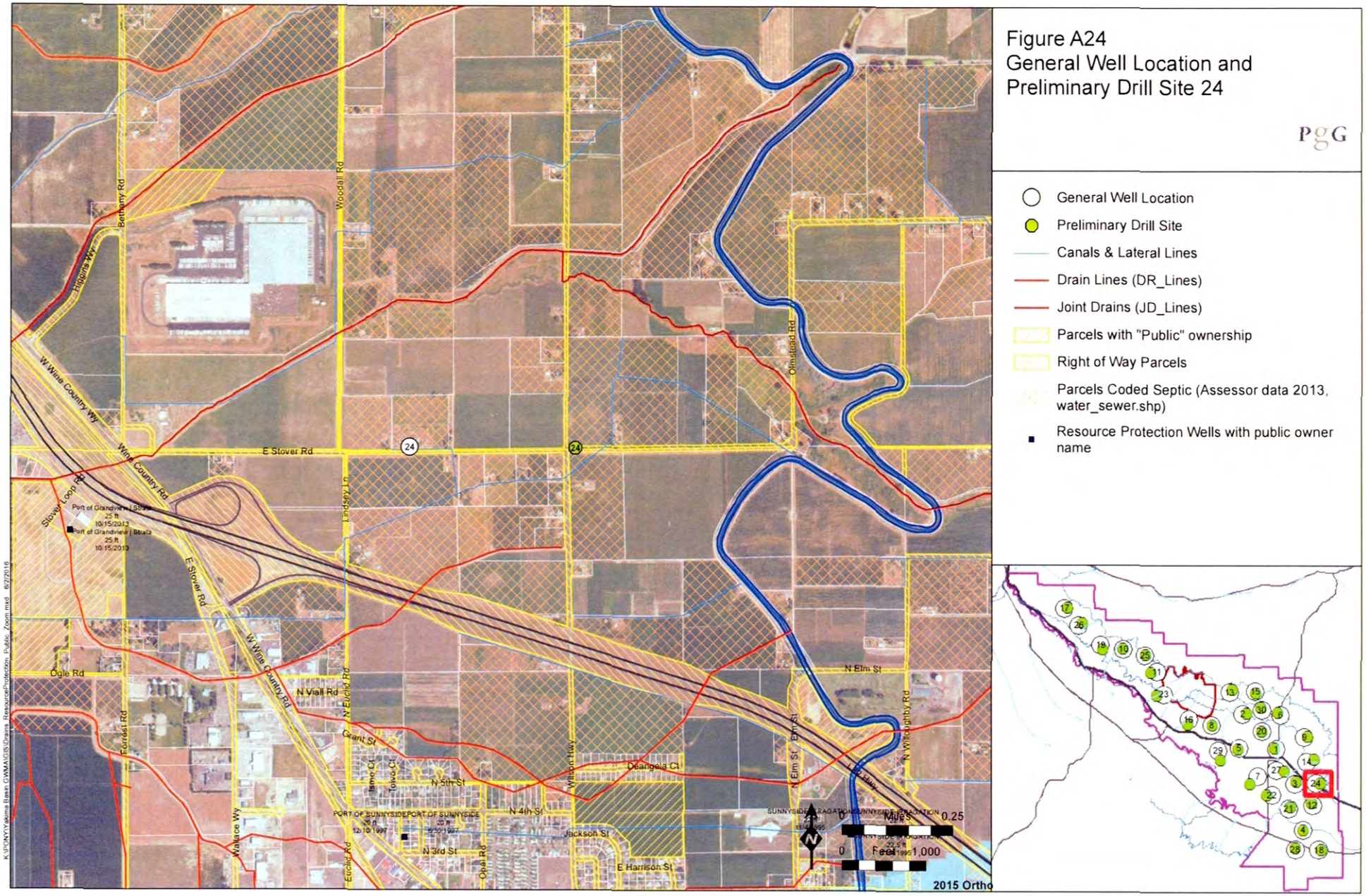


Figure A24
General Well Location and
Preliminary Drill Site 24
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with public owner name
Bethany Rd
Woodall Rd
Higgins Wy
W Wine Country Wy
Olmstead Rd
E Stover Rd
Stover Loop Rd
Wine Country Rd
Lindsey Ln
Port of Grandview | Strata 25 ft 10/15/2013
Port of Grandview | Strata 25 ft 10/15/2013
E Stover Rd
W Wine Country Rd
Ogle Rd
N Viall Rd
N Euclid Rd
Forrest Rd
Grant St
Timo Ct
Toivo Ct
N 5th St
Wilson Hwy
Deangeld Ct
N Elm St
Elm St
N Willoughby Rd
Wallace Wy
PORT OF SUNNYSIDE 20 ft 12/10/1997
PORT OF SUNNYSIDE 20 ft 9/30/1997
N 4th St
Jackson St
N 3rd St
Euclid Rd
Opal Rd
E Harrison St
SUNNYSIDE IRRIGATION 20.5 ft 11/14/1995
SUNNYSIDE IRRIGATION 20.5 ft 11/14/1995
0 0.25 Miles
0 1,000 Feet
2015 Ortho
K:\PONY\Yakima Basin GWMA\GIS\Drains_ResourceProtection_Public_Zoom.mxd 6/2/2016

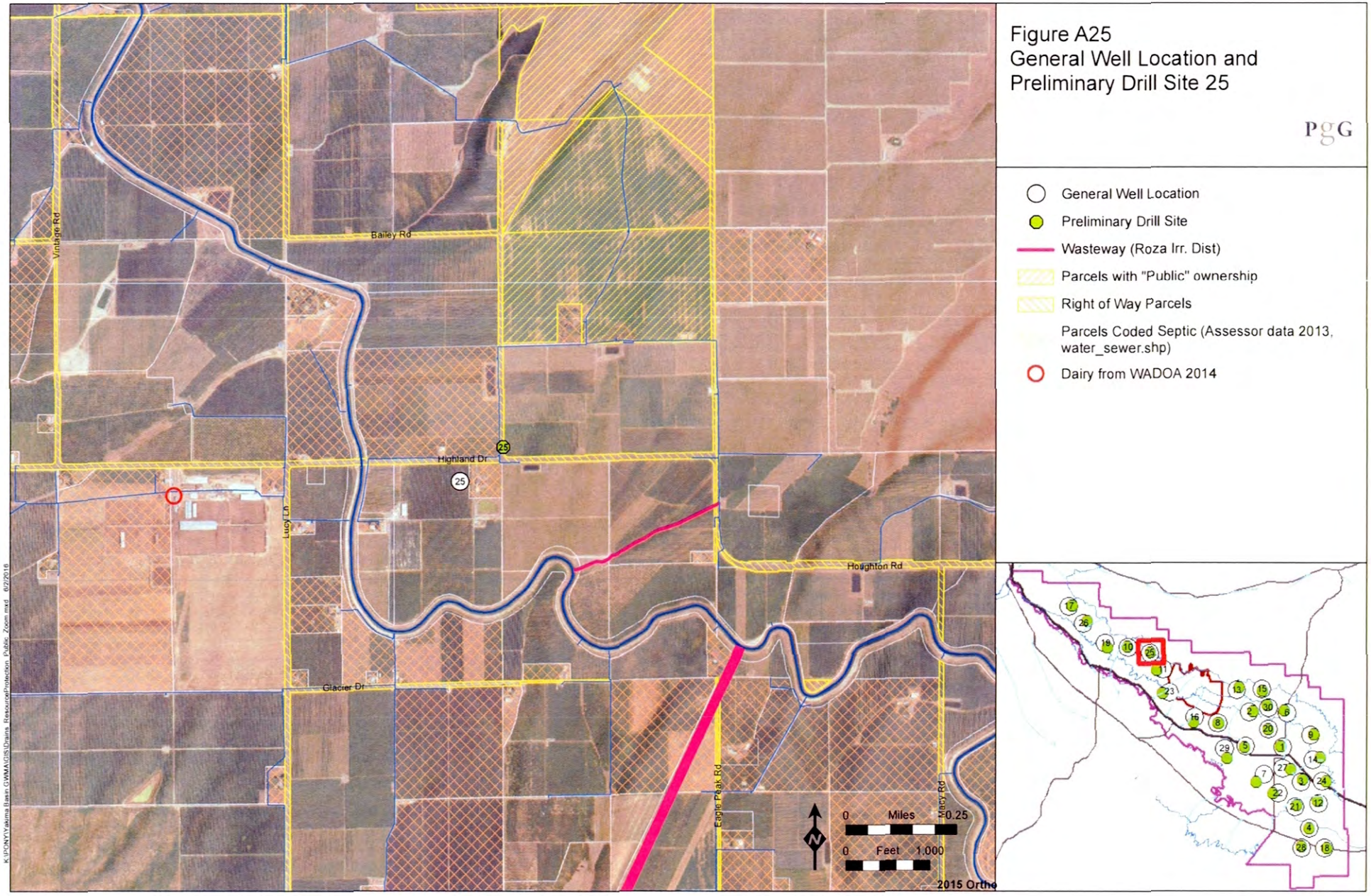
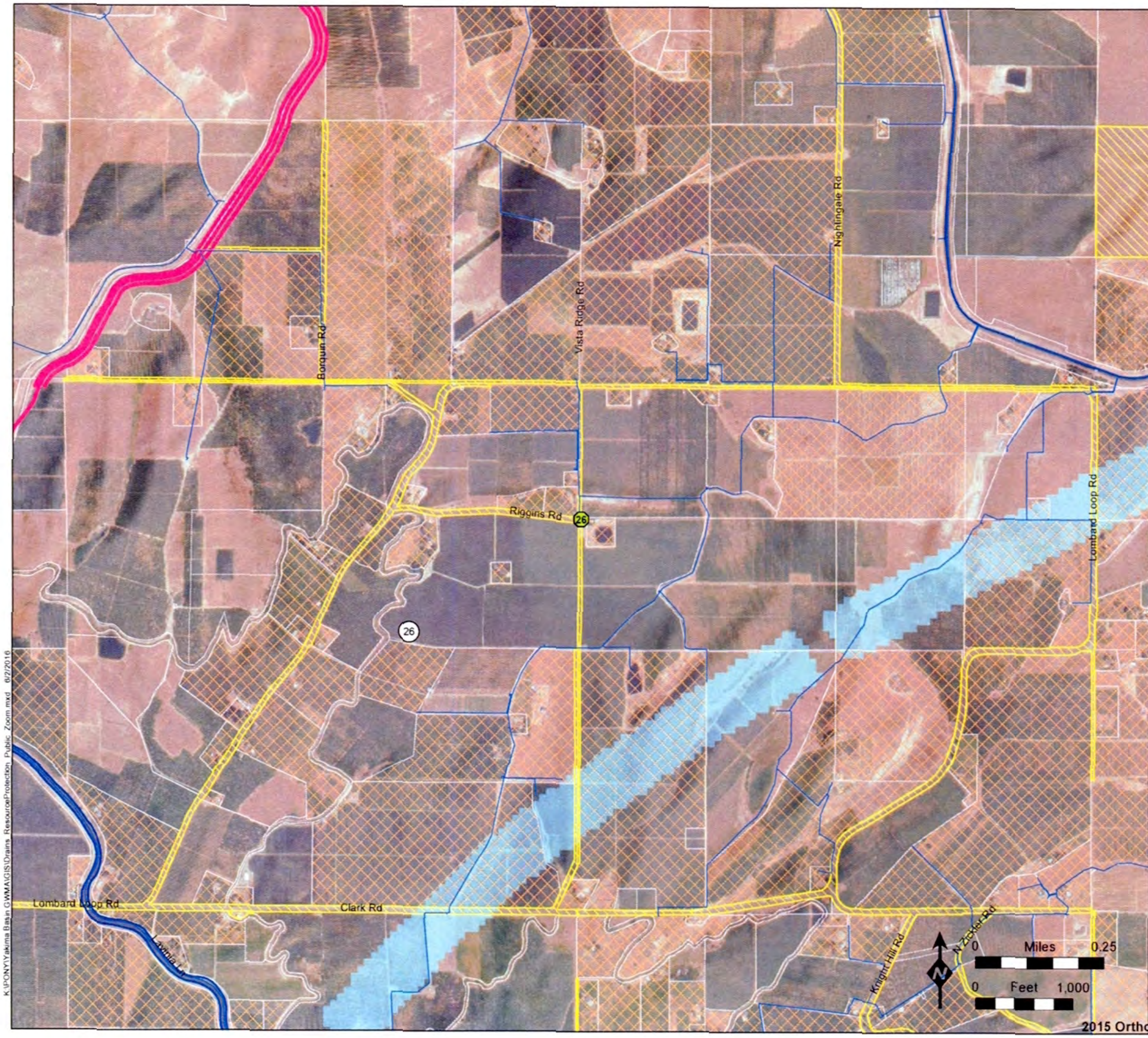


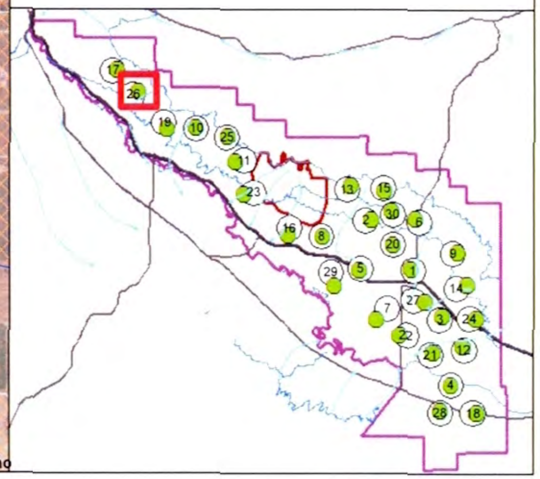
Figure A25
General Well Location and
Preliminary Drill Site 25
PgG
General Well Location
Preliminary Drill Site
Wasteway (Roza Irr. Dist)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Vintage Rd
Bailey Rd
Highland Dr
Lucy Ln
Houghton Rd
Glacier Dr
Eagle Peak Rd
Mace Rd
25
N
0 Miles 0.25
0 Feet 1,000
2015 Ortho
K:\PGNV\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)





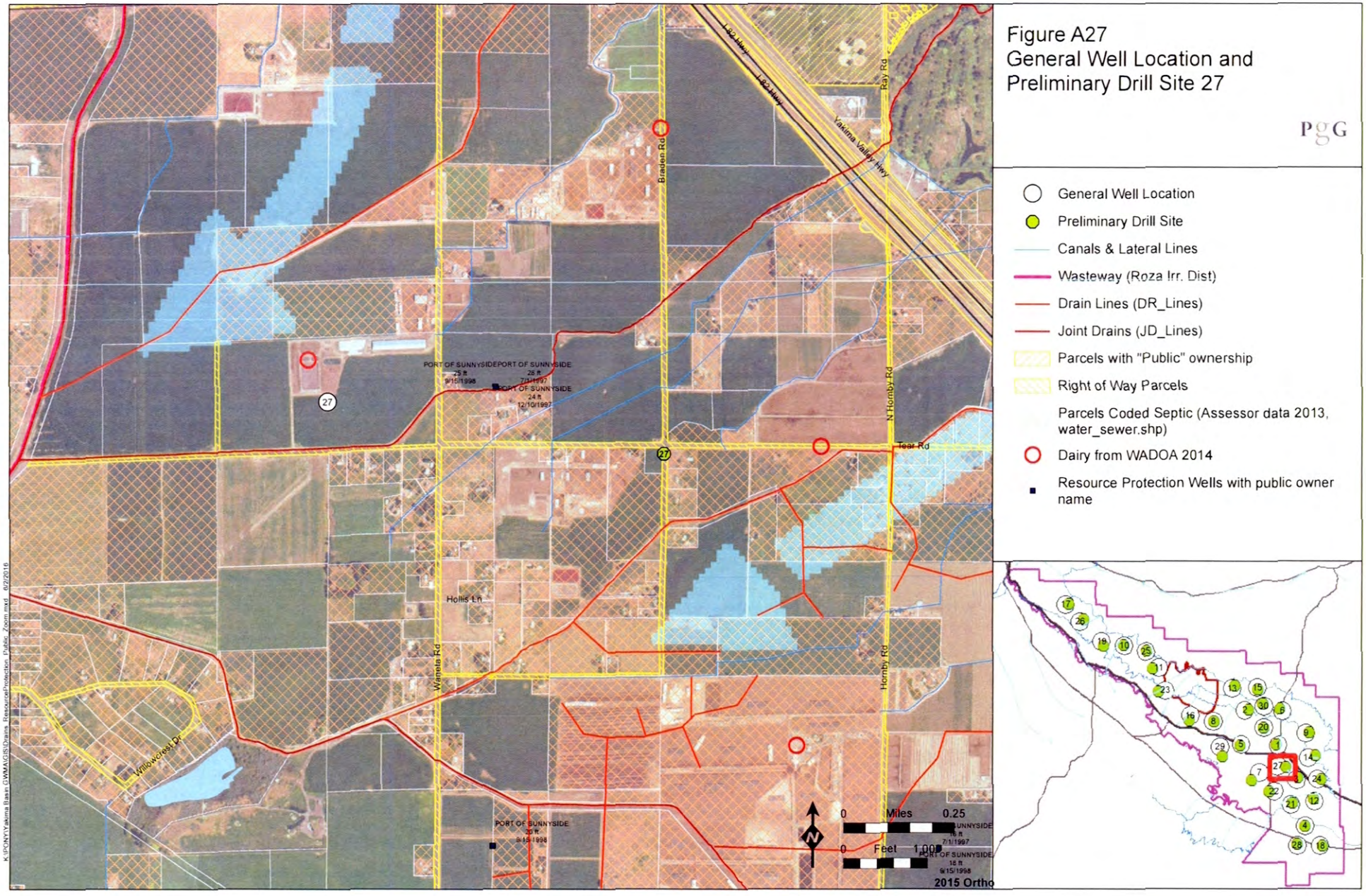


Figure A27
General Well Location and
Preliminary Drill Site 27
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Wasteway (Roza Irr. Dist)
Drain Lines (DR_Lines)
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013,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

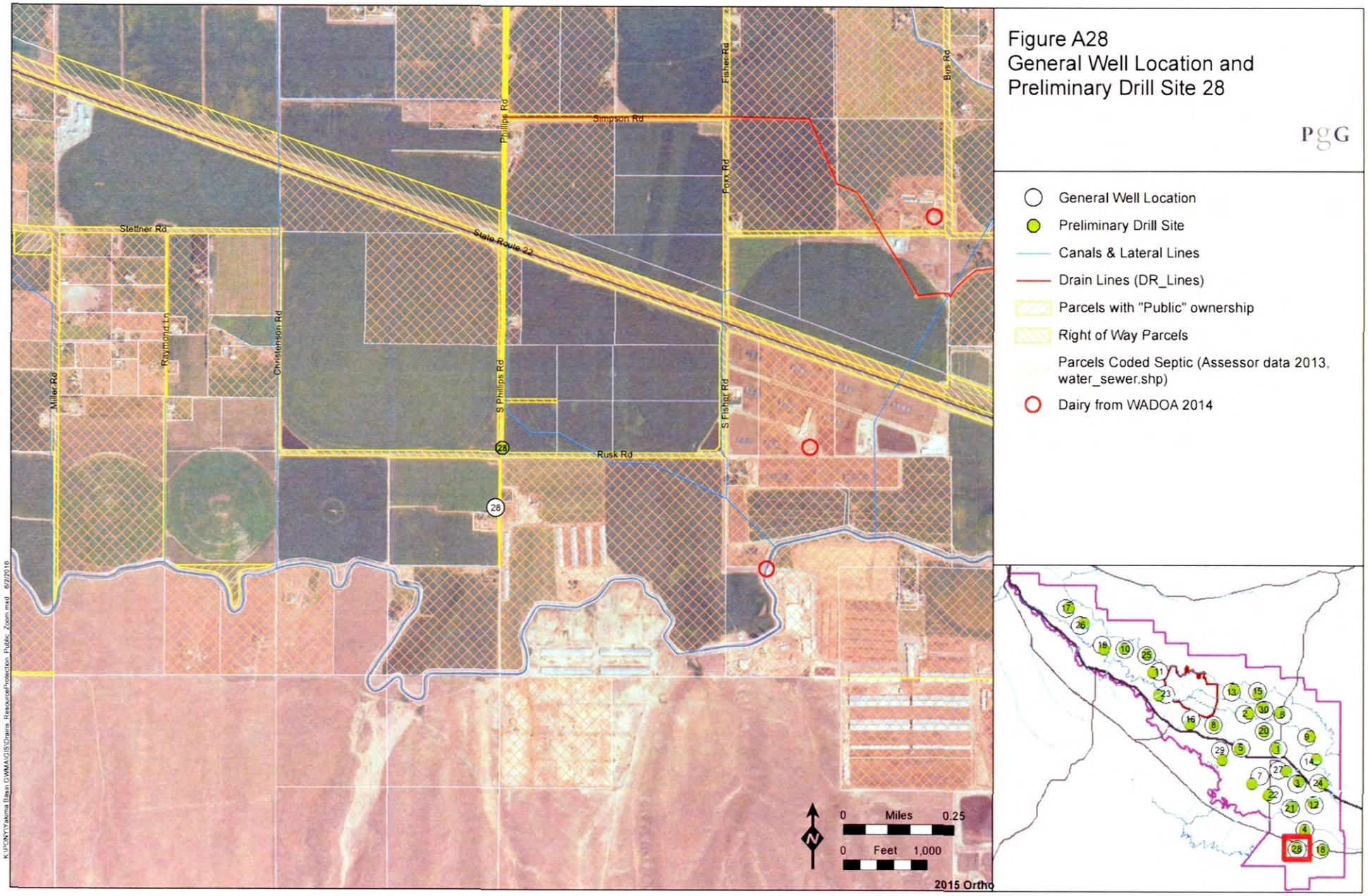


Figure A28
General Well Location and
Preliminary Drill Site 28
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drain Lines (DR_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy from WADOA 2014
Stettner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

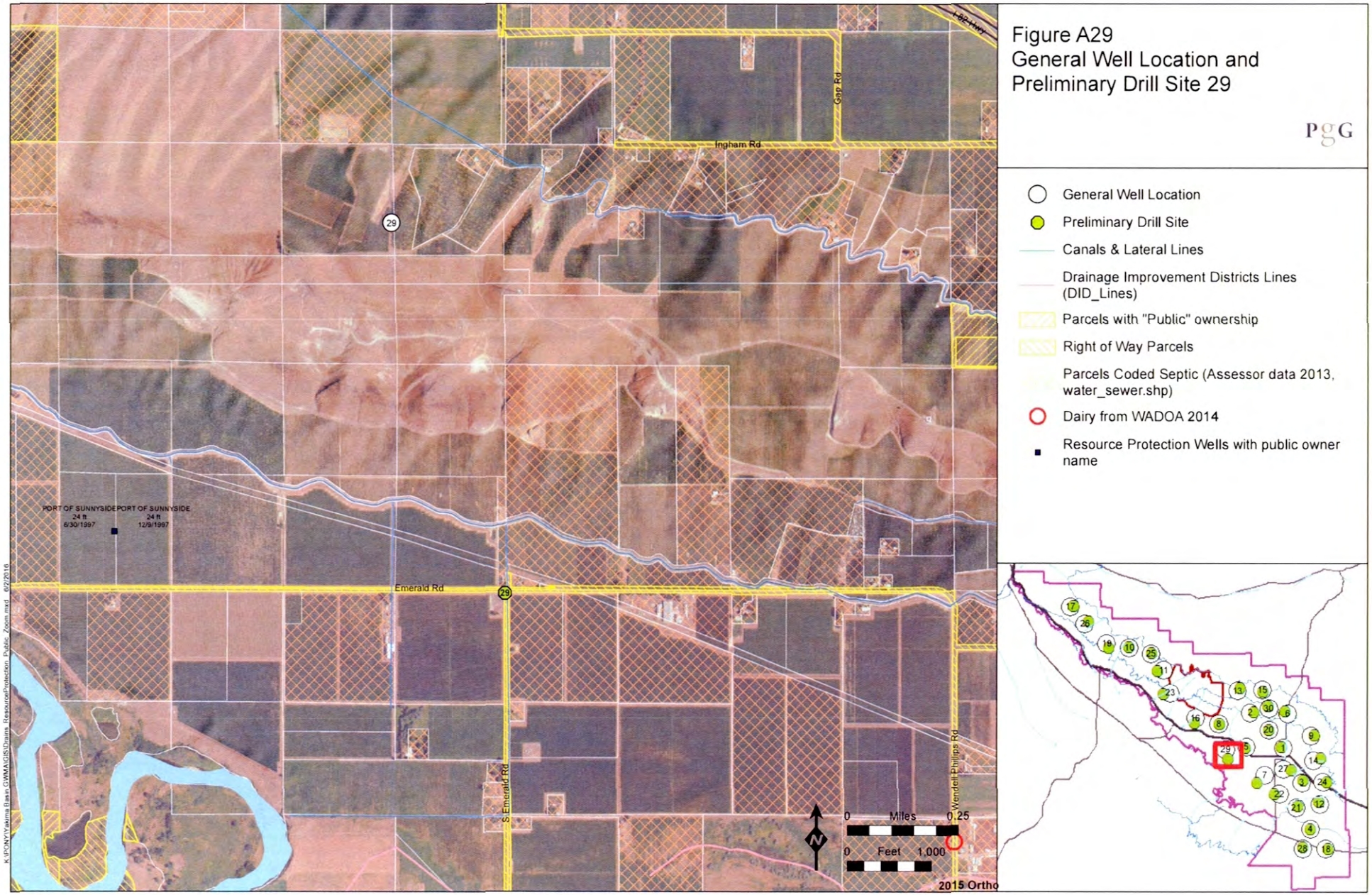


Figure A29
General Well Location and
Preliminary Drill Site 29
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Drainage Improvement Districts Lines (DID_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Dairy 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:\PGNKY\Yakima Basin GWMA\GIS\Drains ResourceProtection Public Zoom.mxd 8/2/2016

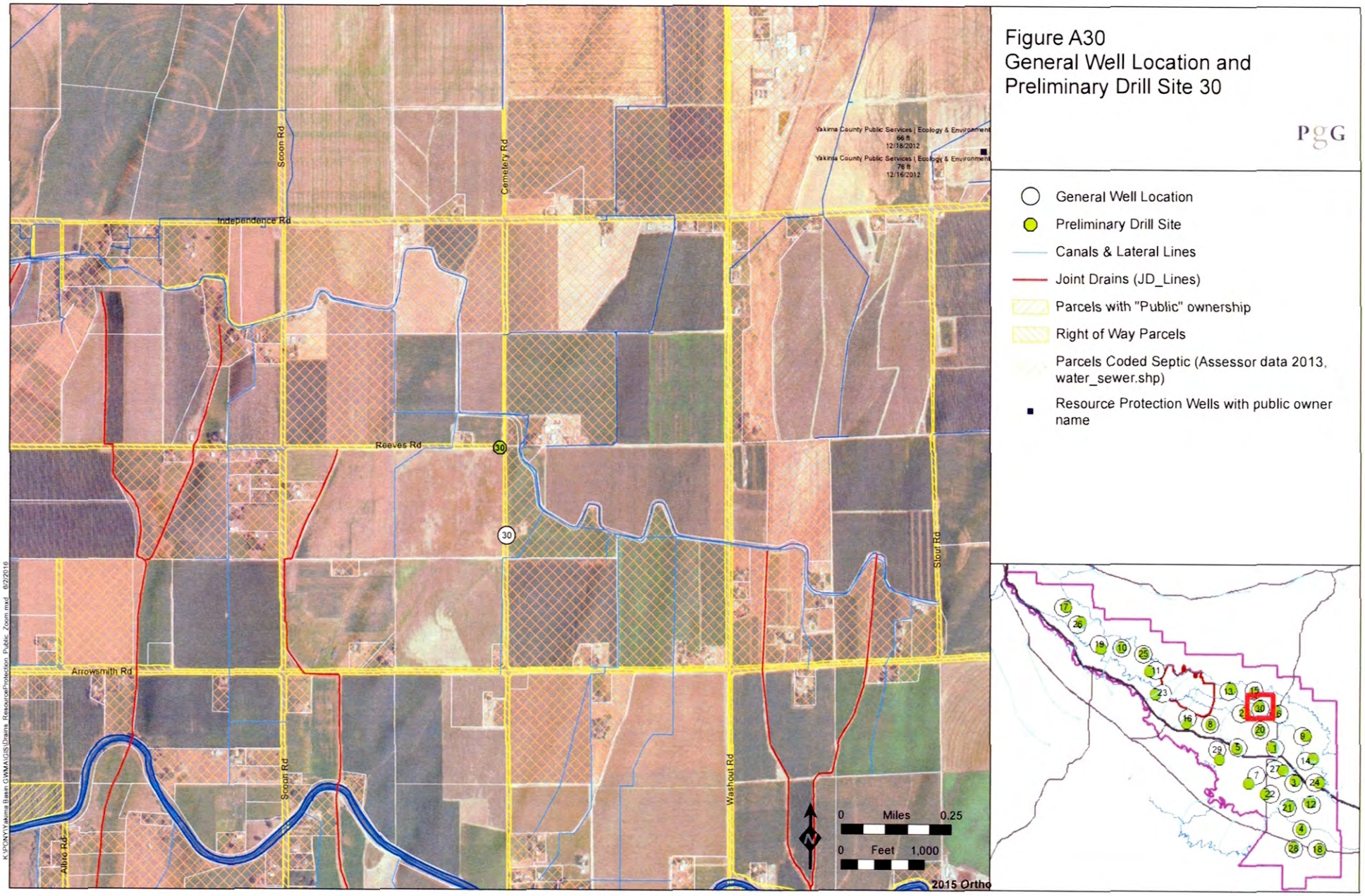


Figure A30
General Well Location and
Preliminary Drill Site 30
PgG
General Well Location
Preliminary Drill Site
Canals & Lateral Lines
Joint Drains (JD_Lines)
Parcels with "Public" ownership
Right of Way Parcels
Parcels Coded Septic (Assessor data 2013, water_sewer.shp)
Resource Protection Wells with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

Attachment D

1. Amendment No. 2 to the Yakima Health District Agreement dated April 12, 2016.

AMENDMENT #2
AGREEMENT BETWEEN YAKIMA HEALTH DISTRICT AND YAKIMA COUNTY PUBLIC SERVICES DEPARTMENT

THIS AMENDMENT No. 2 is entered into this 12th day of April 2016 by and between the County of Yakima, Washington (hereinafter called the "County") whose address is Yakima County Courthouse, 128 N. 2nd St., fourth floor, Yakima, WA 98901 and the Yakima Health District (hereinafter referred to as the "Health District") 1210 Ahtanum Ridge Dr., Yakima, WA 98903.

WHEREAS, the Agreement dated September 8, 2015 retained the Health District to provide up to 200 well assessment sampling surveys; and

WHEREAS, Amendment No. 1 was executed on February 16, 2016 to extend services by the Health District to provide up to 80 additional sampling surveys at the same rate of $250 lump sum per completed survey as described in the September 8, 2015 Agreement; and

WHEREAS, Amendment No. 1 revised Item #15 of the ILA is as follows: Term. The term of this agreement is for six (6) months, commencing upon entry of this agreement but shall not be in effect beyond March 31, 2016; and

WHEREAS, the County now requests to extend services by the Health District to provide up to 10 additional sampling surveys at the same rate of $250 lump sum per completed survey as described in the September 8, 2015 Agreement; and

NOW THEREFORE, It is mutually agreed that the terms, stipulations and conditions of the Agreement, dated September 8, 2015 and Amendment No. 1 dated February 16, 2016 shall be binding upon the parties hereto, except for the following modifications:

1. Item 2 of the Interlocal Agreement (ILA) is revised as follows: Payment. The Yakima County Department of Public Services, located at 128 N. 2nd St., Yakima, WA 98901 agrees to pay to the Yakima Health District a fee for these services in a lump sum of $250 per completed site survey, not to exceed a total contract amount of Seventy Two Thousand Five Hundred Dollars ($72,500)
2. Attachment A Item #1 is revised as follows: The YAKIMA HEALTH DISTRICT shall provide resources sufficient to conduct up to 290 household sampling surveys using the form "High Risk Well Assessment Survey - Lower Yakima Valley GWMA" Questionnaire (Attachment B).

IN WITNESS THEREOF, the parties hereto have executed this Amendment No. 2 by having their representatives affix their signature below.

DONE this 12th day of April 2016

YAKIMA HEALTH DISTRICT

Ryan Ibach, Director
Environmental Health

Attest: Tiera L. Girard
Clerk of the Board

Approved as to form:
Deputy Prosecuting Attorney

BOARD OF YAKIMA COUNTY COMMISSIONERS

Michael D. Leita, Chairman

Kevin J. Bouchey, Commissioner

J. Rand Elliott, Commissioner
Constituting the Board of County Commissioners
for Yakima County, Washington

SEAL OF THE BOARD OF YAKIMA COUNTY COMMISSIONERS STATE OF WASHINGTON

BOCC105-2016
April 12, 2016