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TO: Colorado Water Conservation Board Members

FROM: Erik Skeie
Interstate, Federal and Water Information Section

DATE: May 17-18, 2017 Board Meeting

AGENDA ITEM: 24. HB15-1178 Dewatering Grant Application for a Pilot Project in the Gilcrest Area

Introduction

There have been increased occurrences of high groundwater issues since about 2008 in several areas in the lower South Platte Basin. HB12-1278 authorized astudy of the South Platte alluvial aquifer focusing on these groundwater issues. The South Platte Basin Roundtable formed a Groundwater Technical Committee (Technical Committee) in 2014 to review recommendations from the HB12-1278 report, the first of which concerns mitigation of localized high groundwater conditions.

HB15-1178 (Saine & Humphrey—Marble) established an emergency dewatering grant program for the purpose of lowering the water table in areas in and around Gilcrest and Sterling. HB15-1013 (Coram—Sonnenberg & Hodge) called for two pilot projects, one near Gilcrest or LaSalle in Water District 2 and one near Sterling in Water District 64, to demonstrate proposed methods for effectively lowering the water table.

This agenda item concerns an application submitted by the West Greeley Conservation District (WGCD) for $89,701.60 from the emergency dewatering grant program to continue the Pilot Project in the Gilcrest area originally approved by the CWCB Board at the May 2016 meeting. The funds will be used to administer the pilot project, to lease augmentation water, to monitor and collect data, and to provide incentives for participants to increase groundwater use for irrigation and potentially reduce surface water use. The objective of the pilot project is to lower the groundwater table in the Gilcrest area and encourage cooperation and collaboration between entities and individuals in Water District 2.

Background

The Technical Committee has discussed the high groundwater around Gilcrest extensively over the last two and a half years. Multiple factors are contributing to the high groundwater problems, including: average to above-average precipitation in the South Platte watershed, the lack of adequate surface drainage in and around Gilcrest, subsurface geology, increased recharge for augmentation, and decreased groundwater pumping.

The Town of Gilcrest has taken several steps to mitigate the damage caused by high groundwater levels to town facilities (such as the wastewater treatment plant and residents' basements). Early in 2015 CWCB provided $20,000 to Gilcrest to initiate dewatering by pumping the "Lorenz well", an irrigation well located on the northeast side of town just east of the wastewater treatment plant, and discharging the dewatering water to the Big Bend Drain, which empties into the Union Ditch, through which it is conveyed to the South Platte River. DOLA matched this with $15,000. The Lorenz well pumped over the summer and fall during free-river conditions and groundwater level measurements taken during that time showed a 2-4 ft drop in groundwater levels. When the well was turned off, the groundwater rebounded to original levels within a week or two. The dewatering was generally

considered successful, although the quick recovery time of the aquifer highlighted the need for a more permanent, comprehensive solution to lower the groundwater table. At the January 2016 Board meeting, Gilcrest applied for and was granted $139,800 from the HB15-1178 emergency dewatering fund for an engineering study to look at dewatering and conveyance alternatives that will lead to a long-term solution to the continuing high groundwater issues in the town. This study has been finalized, and the recommendations are currently being investigated for implementation.

Although the high groundwater issues in the Town of Gilcrest are being addressed via dewatering and the engineering analysis, agricultural producers in the area continue to suffer from a high water table that is flooding their fields and basements. The HB12-1278 study concludes that changes in water administration have led to increasing groundwater levels in the basin, but it also acknowledges that "senior water rights must be protected in any adjustments to the systems and… wells cannot be relieved from the obligation to replace out-of-priority depletions that cause material injury to senior surface water rights." The intent of this pilot project is to lower the groundwater table via alternative management strategies, while operating within the existing legal boundaries of prior appropriation. The pilot includes elements of the HB12-1278 study and HB15-1013, and seeks funding from the fund established with HB15-1178.

The WGCD has worked extensively with the Technical Committee, the CWCB, and Central to establish a framework for incentivizing increased pumping and reduced surface water diversion from participating farmers within the pilot project study area (Figure 1). In order to participate, wells must have existing contracts with Central (i.e., their depletions are covered under Central's Groundwater Management Subdistrict [GMS] and/or Well Augmentation Subdistrict [WAS] decreed augmentation plans). To ensure the burden of replacing the depletions caused by additional pumping in the pilot project do not fall entirely on Central, WGCD is contracting with the City Greeley Water and Sewer (Greeley) to lease augmentation water for a period of 10 years. Greeley is interested in helping the WGCD and the State implement this pilot, and so they have reduced their contractual leased water rate of $125 per AF specifically for this pilot project.

Because this pilot project involves voluntary reduction of surface water diversions, it is important to note that participation does not constitute abandonment of water rights. The year(s) in which the farmer is participating in this pilot should not be considered part of a "representative study period" for the calculation of historical consumptive use, should the water right ever be involved in a water court case requiring such calculation.

Although not "dewatering" in the traditional sense of pumping a well and discharging the water to the river, the pilot project meets the spirit of HB15-1178 as it will help "to mitigate the damaging high groundwater levels" in the Gilcrest area. It is the hope of WGCD and the Technical Committee that a successful pilot project in 2016 will lead to a second year of alternative management strategies to lower the groundwater table, and will establish relationships between water management entities and individuals in Water District 2 that will allow for the development of creative and collaborative solutions to high groundwater issues in years to come.

Application Summary

The application submitted by WGCD proposes to lower the groundwater table in the Gilcrest area by offering a choice of two incentives to farmers irrigating land within the seven-section pilot project study area shown in Figure 1. These incentives are:

- Option A: Farmers will be paid $60/AF of water pumped that they would not normally have pumped, up to Central's yearly quota (for the 2017 irrigation season, GMS wells receive a 55% quota, and WAS wells receive a 55% quota).

- Option B: Farmers can pump beyond their quota from Central up to their full contractual pumping amount, and augmentation water will be provided by WGCD (leased through Greeley) for wells pumping under this pilot project.

Under normal operating conditions, the farmers in the pilot project area preferentially use their surface water supplies and opt to save their groundwater quota for later in the irrigation season as insurance in case their ditch goes out of priority. For the last several years, the wet conditions have resulted in area ditches staying in priority for most or all of the irrigation season, which means groundwater pumping has been quite low. Surface water is generally a less expensive way to irrigate, so the incentive offered in Option A is intended to cover at least a portion of the additional costs of pumping groundwater. Option B is geared towards farmers with limited or no surface water supplies, those who have historically pumped their full quota, and/or those who would prefer to use groundwater and having supply above their quota makes it economically worthwhile. The additional pumping quota will allow them to fully irrigate their crop and/or plant more water-intensive but higher value crops.

This pilot project involves many entities fullfilling various roles. These can be summarized as follows:

- **WGCD** – applicant to the HB15-1178 emergency dewatering fund and fiscal agent for the project. Will coordinate with partnering entities and be a point of contact for farmers.
- **Central** – will provide the augmentation plans under which the participating wells will legally pump. Will collect and make available to WGCD monthly pumping volumes from participants.
- **Greeley** –will lease augmentation for a period of 10 years.
- **CWCB** – will provide support staff to coordinate with participating entities and serve as an alternative point of contact for farmers.

Technical Committee – will provide direction and guidance, as well as a regular meeting place to discuss challenges/issues with the pilot project as they arise.

If this grant request is approved, WGCD will immediately contract with Greeley for the augmentation water, and Central will publically notice the inclusion of the water in their augmentation plan. The public notice period is 30 days. Following the public notice, and assuming there are no objections, participating farmers will be alerted that they will either be reimbursed for pumping above a certain volume or they will be able to pump up to their full decreed quota, depending on which option they chose. Total anticipated pumping in the pilot project area is 1243 AF across 6 participants. This represents an increase of 903 AF when compared to annual average pumping in 2013-2015. Based on groundwater modeling done by the GWTC in 2015 and 2016, WGCD anticipates a decrease in water levels on the order of 1to 5 ft across the study area.

Attachments

HB15-1178 Application from West Greeley Conservation District

Staff Recommendation

This grant will allow the WGCD to implement a pilot project for the 2017 irrigation season that is anticipated to lower the groundwater table in the vicinity of the pilot project study area and encourage cooperation and collaboration between entities and individuals in Water District 2. CWCB staff recommends that the Board approve the WGCD's emergency dewatering grant application.

HB15-1178 Grant Application

Project: Continuation of the Pilot Project in the Gilcrest Area
Applicant: West Greeley Conservation District
Total Grant Request: $94,855.60

Contact Information:
Liz Schneider, Executive Director of West Greeley Conservation District
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1. Introduction:

This application is being submitted by the West Greeley Conservation District (District). Through this application, the District requests $94,855.60 from the HB15-1178 emergency dewatering grant fund for continuation of a voluntary dewatering Pilot Project to test alternative water management strategies in the area.

The South Platte Basin Roundtable Groundwater Technical Committee (Committee) has been discussing the second year of the Pilot Project for several meetings.

Year one of the Pilot Project had 6 participants across a 7 section target area. The Pilot Project incentivized participants to pump more groundwater for irrigation purposes via two options. The first option paid farmers $60/AF to pump above their 2013-2015 average pumping amount to the amount allocated by Central Colorado Water Conservancy District (CCWCD) for the 2016 irrigation season. The second option provided augmentation water for participants to pump to their full contractual amount under CCWCD's augmentation plan. Through the first year of the Pilot, pumping in the 7 Section Area was increased by 534 AF.

The continuation of the Pilot Project seeks to demonstrate that high groundwater can be lowered by changing water management practices within the Pilot Project area (Figure 1). This Pilot Project will incentivize farmers to pump more groundwater within the Pilot Project area for irrigation purposes, while forgoing the same amount of surface water diversions. This will be accomplished through one of two options:

Option A: Farmers will be paid $60/AF of water pumped that they would not normally have pumped up to Central Colorado Water Conservancy District's (Central) yearly quota (for the 2017 irrigation season, GMS wells received 55% quota, and WAS wells were given 55%).

Option B: Farmers will be able to pump beyond their quota from Central up to their full pumping amount covered under Central's augmentation plan, and augmentation water will be provided by the District for wells pumping under this Pilot Project.

Under normal operating conditions, the farmers in the Pilot Project area preferentially use their surface water supplies and opt to save their groundwater quota for later in the irrigation season as insurance in case their ditch goes out of priority. For the last several years, the wet hydrologic conditions have resulted in area ditches staying in priority for most or all of the irrigation season, which means groundwater pumping has been quite low. Surface water is generally a less expensive way to irrigate. Pumping groundwater incurs a demand charge (which can be several hundred to one thousand dollars) when the well is first turned on, electricity charge for the power use over the irrigation season, and the cost of upkeep and maintenance on the pump itself. On top of this, farmers participating in the Pilot Project still pay a ditch assessment for their surface water shares regardless of whether or not they use them, so the incentive offered in Option A was necessary to cover at least a portion of these costs. Option B is geared towards farmers with limited or no surface water supplies, those who have historically pumped their full quota, and/or those who would prefer to use groundwater and having supply above their quota makes it economically worthwhile. The additional pumping quota will allow them to fully irrigate their crop and/or plant more water-intensive but higher value crops.

The West Greeley Conservation District has worked extensively with the Committee, the Colorado Water Conservation Board (CWCB), and Central to ensure the success of the Pilot Project. Augmentation supply to cover the additional pumping will be leased from the City of Greeley. The idea for this Pilot Project originates from the Brown and Caldwell High Groundwater Analysis (2015), which concluded that a reduction in surface diversions and increase in pumping would lower the regional water table (B & C, 2015). Given this information, this Pilot Project meets the spirit of HB 15-1178 as it will help “to mitigate the damaging high groundwater levels” in the Gilcrest area.

2. **Figures:**

Figure 1 shows the Pilot Project area, the locations of participating fields, and the irrigation wells that will be pumped. Figure 2 shows the depth to groundwater as calculated by the Colorado Geological Survey for the fall of 2014.

3. Proposed and/or Existing Infrastructure:

This Pilot Project will rely on existing irrigation wells on the properties of the participants. All the wells are included in one of two decreed augmentation plans managed by Central, the Groundwater Management Subdistrict (GMS) or the Well Augmentation Subdistrict (WAS), meaning they are legally allowed to pump. Projected pumping amounts for the Pilot Project can be found in Table 1, on the next page.

The Pilot Project will cover participants’ consumptive use above their 2017 allotment from Central’s GMS and WAS augmentation plans.

Table 1: Pilot Project Participation, Pumping, and Replacement Obligation.

Pilot Project Option	Subdistrict	Participant Name (Landowner, if leased)	Field Efficiency	2013-15 Historical Pumping (AF)	GMS/WAS 2017 Allotment (Metered Pumping, AF)	2017 Pilot Project Increased Pumping (Beyond 2017 Allocation, AF)	2017 Total Pumping by Contract (AF)	Total Consumptive Use Replacement Obligation per Pilot Project (AF)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
B	GMS	Fritzler, Edward J. & Eileen	0.6	111	174	142	316	85
B	GMS	Greiman, Grant G. & Janel	0.78	3	59	49	108	38
A	GMS	Ulrich, Max	0.75	14	71	0	71	0
B	WAS	Webb, Duke (Heitman)	0.6	15	80	40	120	24
B	GMS	Webb, Duke (Nelson)	0.6	8	87	71	158	43
B	GMS	Webb, Grady (Bruce)	0.6	37	46	38	84	23
A	WAS	Wiedeman (Peppler)	0.6	0	92	0	92	0
B	GMS	Wiedeman (Schwindt)	0.73	58	63	51	114	38
B	GMS	Wiedeman, Terry & Janice	0.6	85	78	32	110	19
B	WAS	Wiedeman, Terry & Janice	0.75	8	51	20	71	15
		Totals		**340**	**800**	**443**	**1243**	**284**

Notes:

Pilot Project A Member pumps up to 2017 quota issued by GMS/WAS,

Pilot Project B Member pumps 100% quota issued by GMS/WAS, Pilot Project lease covers pumping in excess of 2017 allotment

Column (d) Field efficiency used to determine total consumptive use replacement obligation.

Column (f) 2017 pumping allotment; the limit of what Option A participants can pump.

Column (g) Extra pumping incentivized by the Pilot Project. The consumptive use portion of this will be added to the augmentation plans.

Column (h) Total anticipated pumping by participants for irrigation season 2017.

Column (i) The amount of consumptive use to be augmented by the Pilot Project.

Shrink In order to deliver 340 AF at the depletion point per the decreed augmentation plans, a total of 478.54 AF of water must be released from the Greeley-Loveland Irrigation Company System to the South Platte.

4. **Permissions**

Table 1 shows the individuals who participated in the Pilot Project in the 2016 Irrigation Season. All participation in this project is on a voluntary basis. Central supports the Pilot Project as long as they aren't required to find or purchase the augmentation water for the additional pumping. They will be required to notice the additional water into their plan, and the administrative costs to do so are a line item in the proposed budget. The City of Greeley and the District are working on a contractual lease agreement for Greeley to cover the lagged depletions plus 4% from Pilot Project pumping over a period of ten (10) years, from 2017 to 2027.

5. **Permitting:**

The irrigation wells are already permitted. Monitoring wells installed as part of the Pilot Project have been permitted for monitoring through DWR.

6. **Real-time Monitoring for Data Collection:**

In order to determine the influence on the aquifer of increased pumping and decreased surface diversions, data will be collected from the various monitoring wells in the Pilot Project area. Currently, data are collected at varying intervals from monitoring wells owned by the Town of Gilcrest, the U.S. Department of Agriculture, and DWR.

As part of year one of the Pilot Project, Dr. Ryan Bailey at Colorado State University installed six monitoring wells on participant properties. These wells, along with the previously installed Lorenz monitoring wells, and wells within the Town of Gilcrest, will be used to collect water level data throughout the duration of the second year of the Pilot Project. CCWCD has offered to download the data from these wells at more regular intervals.

All the irrigation wells participating in the Pilot Project have meters. Pumping data are reported to Central on a monthly basis. Central, the District, and the GWTC will work jointly to maintain a database of pumping specific to the Pilot Project. The District and the GWTC will work with the Division 1 office in Greeley, the ditch companies, and participants to collect surface water diversion data. Participants will be required to submit an estimate of how much surface water was diverted onto their fields throughout the Pilot Project.

7. **Measurable Outcome and Duration of Pumping:**

The Pilot Project has the following objectives:

1) Lower the groundwater table in the vicinity of the Pilot Project study area.
2) Evaluate the effectiveness of increased pumping and reduced surface water use on lowering the groundwater table.
3) Encourage cooperation and collaboration between entities and individuals in the Pilot Project study area.

The measurable outcomes include the following:

1) How much did the groundwater table drop during the Pilot Project, and how does this compare to groundwater level variations in recent years?
2) How much did pumping among participants increase compared to recent years?
3) How much did the water budget change compared to recent years?

The pumping will occur for 10 months during the 2017 irrigation season (June 2016-March 2017).

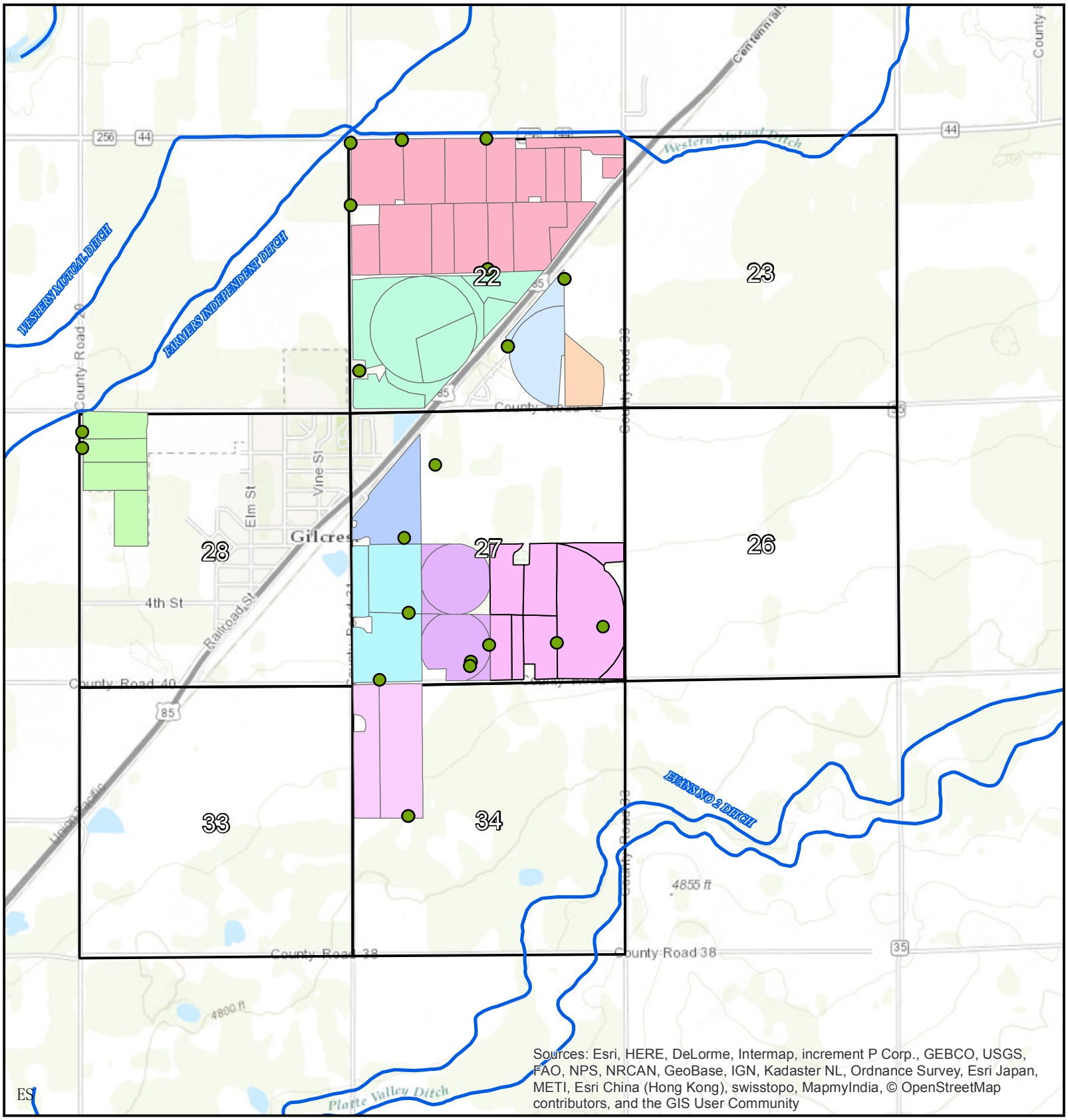
8. Itemized Grant Request

Itemized Budget Request for HB15-1178 Grant Application	
1. Augmentation Water	
Purchase @ $125 / AF	$62,500.00
subtotal	*$62,500.00*
2. Incentive to Option A Participants	
Terry Weideman	$5,526.60
Max Ulrich	$3429.00
subtotal	*$8955.60*
3. Data Collection	
subtotal	*$8,050.00*
4. Administrative Costs (WGCD)	
Invoicing	$1,600.00
Meetings	$3,750.00
subtotal	*$5,350.00*
5. Administrative Costs (Central)	
Add water to existing plans	$10,000.00
subtotal	*$10,000.00*
Grand Total	**$94,855.60**

Itemized Grant Request Notes:

1. Lease 500 AF of water for augmentation at a rate of $125 per AF
2. Option A payments of $60 per AF of increased pumping above participants' 2013-2015 average up to the Central 2016 quota (Weideman Contract 94: 92.11 AF)
5. Administrative costs for Central are dependent on the response to the notice to add augmentation water to their plans. If there are no objections, Central anticipates this will cost approximately $4,000 to $5,000. If there are objections, the cost could double to $10,000. If there are significant objections, the Pilot Project will not be able to proceed.

Figure 1: Pilot Project Area
Particpating Fields



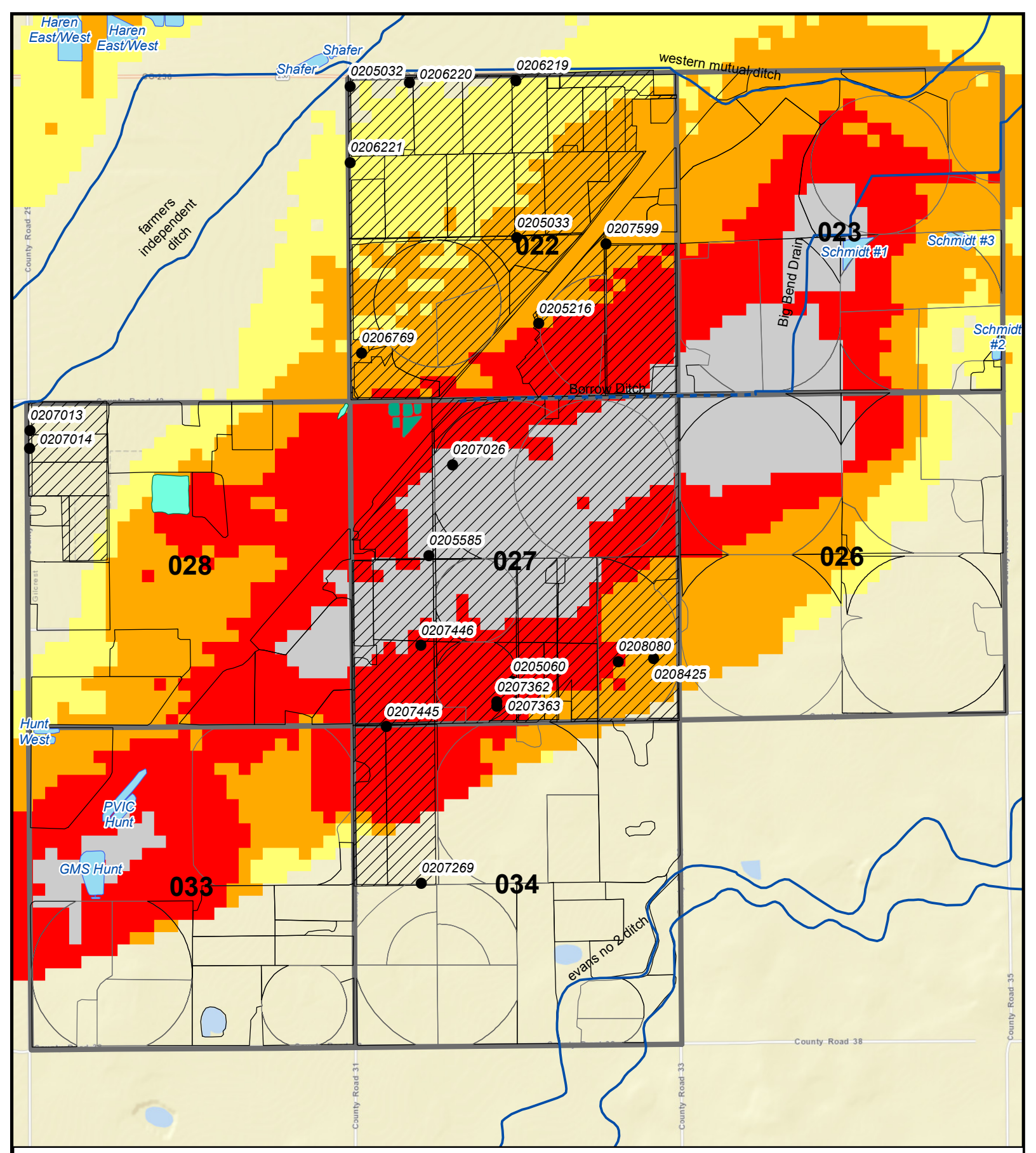


Figure 2. Pilot Project Area and Depth to Groundwater.

- Participating wells (WDID)
- 7 Section Pilot Area
- Recharge Ponds
- Gilcrest Muni WWTP
- Gilcrest Det Pond
- Pilot Participants

GWDepth_2014Fall
ft bgs

- 0 - 0.5
- 0.6 - 5
- 5.1 - 10
- 10.1 - 15
- 15.1 - 34.6

N

0 0.25 0.5 1 Miles