COLORADO
Colorado Water Conservation Board
Department of Natural Resources

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John Hickenlooper, Governor

Mike King, DNR Executive Director

James Eklund, CWCB Director

TO: Colorado Water Conservation Board Members

FROM: Emily LoDolce, Water Resources Engineer
Interstate, Federal and Water Information Section

DATE: January 25-26, 2016 Board Meeting

AGENDA ITEM: 9. HB15-1178 Dewatering Grant Application from the Town of Gilcrest

Introduction

There have been increased occurrences of high groundwater issues since 2008 in several areas in the lower South Platte River Basin. HB12-1278 resulted in a report 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.

Then in 2015, the General Assembly, through 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. This grant program provided $165,000 in Fiscal Year 2015/2016 and $290,000 in Fiscal Year 2016/2017 from the General Fund to support dewatering activities in the South Platte River basin; in addition, at Rep. Saine's request, $125,000 was made availabe to the grant program from last year's Projects Bill. The Town of Gilcrest has been particularly hard hit, with damaging high groundwater affecting basements, nearby agricultural fields, and the wastewater treatment plant. In July 2015, the Board approved criteria and guidelines for this grant program. These criteria and guidelines are attached to this memo for your convenience (first attachment).

This agenda item concerns an application submitted by the Town of Gilcrest (Town or Gilcrest) for $139,800 from the emergency dewatering grant program for the engineering analysis leading to a long-term solution to their high groundwater problems. A team of engineers and hydrogeologists from JVA and Bishop Brogden Associates (JVA-BBA) provided the detailed work proposal for this application, and these firms would be hired by the Town to complete the analysis if the grant is approved.

Background

The Technical Committee has discussed the Gilcrest issues extensively over the last several months. Options for dewatering have been proposed, and early in 2015 CWCB provided $20,000 (from funding sources other than the grant program funding) to Gilcrest to initiate the dewatering; DOLA matched this with $15,000. This initial option involved pumping the Lorenz 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. The Lorenz well pumped for six weeks over the summer 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.

Governor Hickenlooper signed HB15-1178 on June 5, 2015, and it went into effect on July 1, 2015. This Board approved Criteria and Guidelines for this grant program at the July 2015 board meeting. At the same Board meeting in July, the Board approved a grant application from Gilcrest for $90,000 for emergency dewatering using the School well on the north side of the Town. As proposed, the dewatering water pumped from this well would be discharged to the South Platte River via the Farmer's Independent Ditch. The Board approval was contingent on Gilcrest obtaining the necessary permissions to convey the School well water to the ditch and hence to the South Platte River.

One of the permissions Gilcrest needed, in order to convey water from the dewatering well to the South Platte, was from the Farmer's Independent Ditch Company (FIDCo). Initial impressions in July 2015 were that FIDCo was amenable to this agreement. Gilcrest held numerous meetings over the next several months with FIDCo representatives to try to get an agreement allowing Gilcrest to discharge water into the FIDCo ditch. However, at its December 2015 shareholder meeting, the FIDCo shareholders voted against allowing Gilcrest to use the Farmer's Independent Ditch to convey dewatered water to the South Platte River. Consequently, Gilcrest is relinquishing the $90,000 awarded in July 2015 for their initial grant application. Through the advisement of the Technical Committee, Gilcrest will continue to investigate intermediate solutions to the emergency high groundwater levels while a plan for a long-term solution is developed through this new application.

Although intermediate emergency dewatering actions are still needed in Gilcrest, it is evident from the initial dewatering effort at the Lorenz well that dewatering wells can only go so far in solving the problem. Additionally, the difficulties in dealing with nearby ditches in order to convey the dewatered water to the river have shown that a conveyance solution (e.g., a pipeline) that goes directly to the river is necessary. In this new application, Gilcrest is seeking $139,800 from the HB15-1178 emergency dewatering grant fund for an engineering study to look at dewatering and conveyance alternatives that could lead to a long-term solution to the continuing high groundwater issues in the Town of Gilcrest. At this point, the full $165,000 from the General Fund for this fiscal year remains in the emergency dewatering grant fund.

Application Summary

The application submitted by Gilcrest proposes the following analysis:

- Review previous studies, quantify current groundwater levels beneath the town, document existing and proposed areas of groundwater recharge near the town, and establish the initial target dewatering rates and groundwater levels.
- Develop three conceptual dewatering and conveyance systems, and evaluate these systems against economic and non-economic criteria.
- Recommend a preferred dewatering and conveyance alternative.

This scope of work will include a review of previous studies for stormwater design information, groundwater level data, groundwater recharge data, geologic characterizations, and other information pertaining to shallow groundwater conditions beneath Gilcrest. The starting point to the design will be to create a depth-to-groundwater map specific to the Town that will allow identification of areas that are most impacted by shallow groundwater conditions, and quantify the amount by which the groundwater table needs to be lowered. The Town, with input from JVA-BBA and the Technical Committee, will decide upon a target depth for lowering the groundwater table for subsequent development of dewatering and conveyance alternatives. The data collection effort will also identify sources of groundwater recharge that may most directly impact groundwater levels beneath the Town, for example, recharge ponds, irrigation ditches, and irrigated lands.

Using the information collected through previous studies and existing data, JVA-BBA will prepare an initial estimate of the dewatering rate required to achieve the target groundwater level. Groundwater modeling using one or both of the existing groundwater models in the area (the SPDSS regional model and a local, change model developed by Dr. Willem Shreüder at Principia Mathematica) will refine the target discharge rate and location of discharge points. Existing stormwater retention ponds, infrastructure, and town wells will also be considered during identification of proposed discharge points; an inventory of these existing structures will be created.

Based on the results of the aforementioned work, JVA-BBA will develop dewatering and conveyance system alternatives. This evaluation will include consideration of gravity drainage with either direct discharge to the South Platte River or discharge to a common collection point. JVA-BBA will summarize the results from this work in a memo that describes the facilities, dewatering rates, and estimated cost for dewatering alternatives. JVA-BBA will develop conceptual layouts for three dewatering alternatives, and will present this information in a map and table format. As of now, proposed conveyance alternatives include:

- A dedicated pipeline to the South Platte River,
- A combination pipeline/open channel to the river along County Road 42, and
- A combination pipeline/open channel to the river via existing ditch or drain systems north of town.

Other items the analysis will include are:

- A recommendation for a preferred dewatering and conveyance alternative based upon both economic and non-economic criteria,
- Consideration of the impact on the dewatering and conveyance alternative on existing groundwater contamination within the town,
- A recommended network of groundwater level monitoring wells within the town to measure the success of the dewatering system, and
- Measurable outcomes at which the project may be deemed “successful”.

JVA and Bishop Brogden Associates are able to proceed with the study immediately upon receiving a Notice to Proceed from the Town of Gilcrest. They anticipate needing 14 to 18 weeks to complete all tasks.

Criteria and Guidelines

CWCB staff, in consultation with the State Engineer’s Office, reviewed this application based on the following criteria:

1. Existence of high groundwater and the need for emergency dewatering,
2. Project location within the boundaries of the area eligible for the grant program,
3. Compliance with permission requirements,
4. Compliance with permitting requirements,
5. Compliance with monitoring requirements,
6. Effectiveness of proposal at lowering groundwater table,
7. Reasonableness of the requested grant value,
8. Completeness of application, and
9. Matching funding provided by the Applicant or others.

Gilcrest’s application meets the requirements of the criteria and guidelines. Regarding Items 1 and 2, Gilcrest’s high groundwater problems have been documented in several studies (see: HB12-1278 groundwater report, Colorado Geological Survey Hydrogeologic Characterization Report, Brown & Caldwell High Groundwater Analysis), and the area Gilcrest proposes to study for dewatering and conveyance solutions falls within the eligible program boundary. Items 3 and 4 have not yet been defined, only because the physical network for dewatering is not yet defined, but Gilcrest intends to

obtain all necessary permissions and permits before implementing the final design that results from this study. Item 5, monitoring, will be accomplished via a network of existing groundwater wells. This network will be using early in the study to create the detailed map of groundwater elevations beneath the Town. Later, the groundwater monitoring network will be used to monitor the success of the project. Regarding Item 6, this analysis will result in a plan for implementation of a dewatering program with a more efficient conveyance system. Staff are confident that this plan, once implemented, will be effective at lowering the groundwater table. For Item 7, Gilcrest presented this proposal to the Technical Committee, and the Technical Committee endorsed it as a reasonable request. For the Board's reference, the itemized grant request is included on Page 3 of the Gilcrest application (second attachment). The application is complete and satisfies Item 8. There are no matching funds provided by the Applicant, but as of now there is no competition for the existing grant funds (Gilcrest has been the only applicant so far), removing the need for Item 9 as a means to choose between two or more otherwise eligible applicants.

Attachments

The HB15-1178 Criteria and Guidelines and the Gilcrest application are attached to this memo. Within the Gilcrest application, Figure 1 (on page 16 of the application) shows an aerial photograph of the Town of Gilcrest, along with the location of their current dewatering well (the Lorenz well), the alignment of County Road 42, the location of the wastewater treatment plant, and the existing pipeline from the wastewater treatment plant to the South Platte River. Figure 2 (on page 17 of the application) shows the calculated depth to groundwater based on measurements made in the fall of 2014. Much of Gilcrest, including the wastewater treatment plant, is underlain by groundwater less than 5 feet below the surface. Table 1 (on page 3 of the application) is the itemized grant request.

Staff Recommendation

This grant will allow the Town of Gilcrest to move forward on finding a long-term dewatering and conveyance solution that will ultimately alleviate their damaging high groundwater problems. This application satisfies the requirements under the statute and the Board's criteria and guidelines. The CWCB staff recommends that the Board approve the Town of Gilcrest's emergency dewatering grant application in the amount of $139,800.

CRITERIA AND GUIDELINES
FOR EMERGENCY DEWATERING GRANT PROGRAM
IN AREAS OF GILCREST, COLORADO AND STERLING, COLORADO

Colorado Water Conservation Board and Colorado Division of Water Resources
Approved by CWCB: July 15, 2015

A. Purpose of the Criteria and Guidelines Document

House Bill (HB) 15-1178, signed into law by the Governor on June 5, 2015, authorizes the Colorado Water Conservation Board (the "CWCB" or the "Board"), in collaboration with the State Engineer, to administer a grant program for emergency dewatering of areas in and around Gilcrest, Colorado and Sterling, Colorado. Emergency dewatering is intended for areas that the Board and the State Engineer determine are experiencing damaging high groundwater levels. The duration of this grant program is from July 1, 2015 until October 1, 2017.

HB 15-1178 charges the Board, in consultation with the State Engineer, to establish criteria and guidelines for the grant program and accompanying real-time data collection, including selection criteria and grantee reporting criteria. This criteria and guidelines document provides information regarding the application, selection, and approval process for emergency dewatering projects. This document, hereinafter referred to as the "Criteria and Guidelines," was developed through the collaboration of the CWCB and the State Engineer in accordance with that legislative directive.

Diversions from dewatering wells that return the diverted water to the stream system with no beneficial use do not constitute an appropriation of groundwater. Therefore, diversions from dewatering wells that meet those standards, are approved under this process, and are operated in accordance with the Board and SEO's conditions of approval, are not subject to priority administration and may operate without a plan to replace delayed depletions to the stream.

These Criteria and Guidelines are effective upon Board approval.

B. Background

Due to a combination of natural geology and hydrology, average to above-average precipitation in the South Platte watershed, increased recharge for augmentation purposes, and decreased groundwater pumping, high groundwater within and near the town of Gilcrest and the city of Sterling is causing damage to private and public property and agricultural land. The General Assembly has determined that the water table needs to be lowered immediately to a level that is no longer damaging. HB15-1178 authorizes the CWCB to distribute grant money for the emergency pumping of wells that meet the following requirements:

1. Located within or near the areas of Gilcrest, Colorado and Sterling, Colorado
2. Are or can be permitted for dewatering
3. Additional requirements specific to the grant

Requirements for obtaining a dewatering permit are detailed in Section E. Additional grant requirements are outlined in Section F.

C. Definitions

"Applicant" means the individual or entity applying for grant money for the purpose of emergency dewatering to lower the groundwater table as part of HB15-1178, either on behalf of themselves or on behalf of a private company or public entity.

"Damaging high groundwater" means the water table in the South Platte alluvial aquifer that has risen in recent years to the point of causing damage to private and public property, such as agricultural fields or infrastructure, and is present for more than three months. Duration may be considered on a case-by-case basis provided the Applicant can show the problem is due to regional groundwater rise.

"Dewatering system" means a well, drain, sump, or other excavation used for the purpose of keeping the water table below a desired level or elevation where the water produced is returned back to the stream system and not put to beneficial use. Note: A dewatering system is not the same as a dewatering well, defined in Section 37-91-102(4.5), C.R.S.

"Monitoring system" means a well, series of wells, or other structures that will be used to monitor groundwater levels in the vicinity of the dewatering system and will be used to measure success of the project. Any structure used for monitoring must not divert water within 30 days of a groundwater level measurement.

"the River" means the South Platte River, its alluvium, or a tributary or drainage of the South Platte River.

"Real-time" means at least one measurement every 24 hours the system is being used for dewatering purposes.

"Technical Committee" means the South Platte Basin Roundtable's groundwater technical committee.

"Within or near Gilcrest, Colorado" means that area inside the Study Area Boundary around Gilcrest and LaSalle as defined in the 2014 Gilcrest/LaSalle Pilot Project Hydrogeologic Characterization Report by the Colorado Geological Survey (detailed boundary map included as Attachment 1).

"Within or near Sterling, Colorado" means that area inside the Study Area Boundary around Sterling as defined in Attachment 2.

D. Application Process

Applicants should submit their applications no later than the 15th of the month *prior* to the month in which the next regularly scheduled Board meeting is to be held, in order to guarantee the application will be

considered for approval at that meeting. Board meetings are held in the months of July, September, November, January, March, and May. For example, all applications submitted by August 15th, 2015 will be reviewed and presented at the Board meeting held in September 2015. The funds from this grant program cannot be used for reimbursing dewatering efforts completed prior to grant approval.

Applicants are encouraged to reach out to the Technical Committee with concept ideas prior to submitting a formal application under these Criteria and Guidelines.

A sample timeline for the application process is as follows:

- **Prior to application submittal:** Applicants approach the Technical Committee with a conceptual dewatering proposal. During this time, the Applicant should work closely with the Technical Committee and the Division Engineer to address all feasibility and administration concerns.
- **Day 0:** Applications for grant and dewatering permit are submitted to the CWCB and State Engineer's Office (SEO), respectively.
- **Days 0-30:** SEO confirms with Division Engineer and Water Commissioner that the project is administrable from a water rights standpoint and develops terms and conditions to assist with administration.
- **Days 0-30:** CWCB staff takes application to Technical Committee for feedback on grant money amount.
- **Day 30:** SEO advises CWCB staff whether the dewatering permit will be approved.
- **Day 35:** At the next regularly scheduled Board meeting and with dewatering permit feedback from the SEO, CWCB staff makes recommendation to the Board to approve or deny the application grant request. The Board may conditionally approve applicants pending final dewatering permit decision from SEO.
- **Day 45:** SEO issues decision on dewatering permit. If permit is approved, and conditional approval was granted from the Board, dewatering may begin under the grant program.

E. Dewatering Permit Requirements

The Applicant must obtain a dewatering well permit or permits for the proposed project from the SEO, or have reasonable assurance that a permit or permits will be issued, prior to distribution of grant funding by the CWCB. Emergency dewatering wells in the context of HB15-1178 will be considered "dewatering systems", as defined in Section B. The form to permit a dewatering system is Form GWS-45, which is attached at the end of this document as Attachment 3. The form must be submitted with a non-refundable $100 filing fee.

Applicant must show that their operation will return the pumped water to the River without beneficial use to qualify for a dewatering permit. The Applicant will be responsible for following the conditions on the dewatering well permit.

As a part of the permit evaluation process, the SEO must determine if the Applicant has met the 600-foot spacing criteria described in C.R.S. 37-90-137(2)(b). If there are production wells within 600 feet of the proposed well location, the Applicant may consider obtaining 600-foot spacing waivers from the well owners. If 600-foot spacing waivers are not submitted with the well permit application and the SEO has to send 600-foot spacing notices to well owners, the permit application process timeline may be extended.

To qualify for a dewatering well permit, the Applicant must demonstrate the following:

1. Well Ownership

The Applicant must either be the owner of the well or have an agreement with the well owner to pump the well. If an agreement is required, include a copy of the agreement with the application for a dewatering permit. Examples of an acceptable agreement include: a document signed by all parties giving permission to the Applicant to pump the well, or a letter from the well owner addressed to the Board stating that the owner approves of this use of his or her well. If there are any conditions to the granted permission, those must be clearly stated in the document or letter.

2. How Water Will Be Returned to the River

The Applicant must show how the pumped groundwater will return to the South Platte River. This could be a written description with accompanying map or diagram. The Applicant must have an agreement with the owner of the proposed conveyance to use their property to carry pumped groundwater to the South Platte River or other drainage. If an agreement is required, include a copy of the agreement with the application for a dewatering permit. Examples of an acceptable agreement include: a document signed by all parties giving permission to the Applicant to convey water across the owner's property, or a letter or email from the owner of the conveyance addressed to the Board stating that the owner approves of this use of his or her conveyance. If there are any conditions to the granted permission, those must be clearly stated in the document or letter.

3. Beneficial Use of Water

The Applicant must demonstrate that there will be no beneficial use of the water.

4. Monitoring and Accounting

At a minimum, the Applicant must install a totalizing flow meter and maintain daily records of the volume of water diverted while the dewatering system is operating and submit the records weekly to the Water Commissioner as a condition of the dewatering permit. If the dewatering system will also divert water for other purposes (under a different permit), the SEO requires two meters on the dewatering system; one to measure water diverted for dewatering and one to measure water diverted for beneficial use. The Division Engineer must approve of the metering configuration.

Data must be submitted to the Division One office on an accounting form approved by the SEO. Applicants may create an accounting form or use the sample accounting form included with these Criteria and Guidelines as Attachment 4. The Division Engineer will identify final monitoring and accounting requirements, which will be incorporated into the approved well permit.

F. <u>What to Include in the Application for the Grant Program</u>

This section provides an outline the Applicant may wish to follow in preparing material and applying for the grant program. Much of the detail necessary for the grant application, including information about the proposed operation that provides for its feasibility and ability to be administered, should occur during the process of preparing the dewatering permit application, but there are additional requirements specific to the grant that are included here, including the monitoring of groundwater levels around the affected area.

1. Introduction

In the introductory paragraph(s), include the Applicant's full name, business (if applicable), physical and mailing addresses, phone number, and email address. Briefly describe the area experiencing damaging high groundwater, how long the problem has been going on, and whether the area experiences continual high groundwater or if it is observed to be a seasonal problem. Describe the need for the emergency dewatering. Provide the location of the dewatering system component(s) that will be pumped for emergency dewatering. Briefly explain how the pumped groundwater will be conveyed to the River. Detailed explanations will come in later sections; the intent of the introduction is to describe the problem and proposed solution in general terms.

2. Figure

Following the introductory paragraph, attach a figure showing the dewatering system, monitoring system, and conveyance system to return the dewatering water to the River. This can be as simple as a hand-drawn diagram, but the figure should be clearly labeled and have enough detail to show where the infrastructure is with relation to other major landmarks, e.g., the South Platte River, highways, main streets, etc.

3. Proposed and/or Existing Infrastructure

Provide a detailed description of the infrastructure needed to successfully divert water for dewatering and how it will operate. Here are some sample questions to answer:

- Does the well to be pumped already exist or does it need to be drilled?
- What is the proposed pumping rate?
- How will the pumped water be conveyed to the River? List all conveyances that will carry the water, their location, their material, and the approximate length in which pumped groundwater will travel in them. Include in the attached figure, if appropriate.
- Describe the proposed monitoring system.

If groundwater will be pumped by the dewatering system under another well permit at any time during the dewatering project, describe how the water diverted under the other well permit will be recorded separately from the water diverted for dewatering purposes.

4. Permissions

Include a paragraph describing the ownership of the dewatering system and monitoring system, the infrastructure that will convey the pumped water to the River, and any private property the infrastructure may need to cross. If any part of the system, conveyance infrastructure, and/or property is owned by someone other than the Applicant, include written documentation of the owner's consent to use his or her property in the way proposed in this application. This can be a signed written agreement or a letter or email from the property owner to the Board authorizing use of and/or access to his or her property.

5. Permitting

Attach a copy of the permit received from the SEO authorizing the well for dewatering, or if the dewatering permit has not yet been approved, attach a copy of the dewatering permit application that was submitted to the SEO. Attach a copy of any well permits related to the proposed monitoring system.

6. Real-time Monitoring for Data Collection

As a requirement of HB15-1178, real-time data collection must accompany the emergency pumping of dewatering wells. Describe how the dewatering system will be monitored and reported and how the monitoring system will operate. If the Applicant has worked closely with the Technical Committee and the Division Engineer to address all feasibility and administration concerns, the real-time monitoring and administration requirements will be known. At a minimum, the Applicant must have:

1. A flow meter (e.g. a totalizer) installed on the pumping well to record the flow rate and volume of water that has been pumped, and
2. A monitoring system to record depth-to-water measurements. The approval of monitoring system designs will be case-specific.

The monitoring system must not be actively diverting water and must have a valid well permit. The Applicant may, with approval of the SEO, identify one or more monitoring wells within the State's existing monitoring well network to use to meet the monitoring requirement instead of installing a new well or new equipment in an existing well.

Usage and access to the monitoring system must be approved by the owner of the system and/or the property, if the owner is not the Applicant. As with the dewatering system and other property, the Applicant must have an agreement with the owner of the monitoring system and/or the property in place prior to applying for this grant. If an agreement is required, include written documentation of the owner's consent to use his or her property in the way proposed in this application. This can be a signed written agreement or a letter or email from the property owner to the Board authorizing use of and/or access to his or her property

In this section of the application, include the brand and model of totalizer that will be used to track the volume of water diverted. Include the brand and model of data logger that will be used to record depth-to-groundwater. (Note: if the State's monitoring well network will be used for monitoring, the brand and model of data logger is not required.)

7. Measurable Outcome and Duration of Pumping

Include a paragraph describing the anticipated outcome of the emergency dewatering project. If possible, provide a specific, measurable outcome at which the project will be deemed "successful". Describe the benchmark that will signal the end of the need for emergency dewatering.

Indicate the date when pumping will begin. Will pumping be continuous or will it only occur during certain times? The proposed pumping scheme can be flexible.

8. Itemized Grant Request

Finally, provide a monetary value of the grant request. Support this request with an itemized table of anticipated costs associated with the proposed pumping scheme. Include matching funds, if any. The availability of funding for the grant request is not guaranteed due to the possibility of other grant requests and fiscal year funding constraints. Matching funds provided by the Applicant or others are not required but will be a favorable factor in the review process, particularly if funds are limited.

G. Summary of Application Review and Approval Process

CWCB staff, in consultation with the SEO, will review applications based on the following criteria:

- Existence of damaging high groundwater, and the demonstrated need for emergency dewatering,
- Project location within the boundaries of areas eligible for the grant program,
- Compliance with permission requirements,
- Compliance with permitting requirements,
- Compliance with monitoring requirements,
- Effectiveness of proposal at lowering groundwater table,
- Reasonableness of the requested grant value,
- Completeness of application (*see* Section F), and
- Matching funding by provided by the Applicant or others.

During the application review process, CWCB staff will seek input from the Technical Committee on the general costs associated with dewatering within and near Gilcrest and Sterling, and the infrastructure needed to implement the dewatering project. This will serve to verify that the requested value of the grant is appropriate for the proposed project.

At the Board's next regularly scheduled meeting, CWCB staff will present applications to the Board. Upon the Board's review and consideration, the Board may approve the proposed project for grant funding, request that the Applicant provide more information for reconsideration by the Board at its next regularly scheduled meeting, or deny an application. The Board, at its discretion, may also extend conditional approval to applicants who satisfy all requirements of the application and have submitted an application to the SEO for a dewatering permit but have not yet obtained the dewatering permit due to required processing time by the SEO. This conditional approval is intended to allow the Applicant to concurrently submit applications for the dewatering permit and this grant, in an effort to expedite the process. If the dewatering permit application is denied, conditional approval will be revoked.

H. Reporting Requirements

The Applicant shall provide the CWCB with an annual report on the status of the dewatering project for each fiscal year (July 1 to June 30) the project is operating; the report will be due by July 31st following the end of the relevant fiscal year. The report will include a short narrative of the status of the project, successes to date, and any issues or concerns the Applicant has encountered, as well as an electronic file containing all monitoring system and pumping data collected during the previous fiscal year. These reports will inform the Board's 2016 annual report and 2017 final report to the Water Resources Review Committee, as per HB15-1178's requirements.

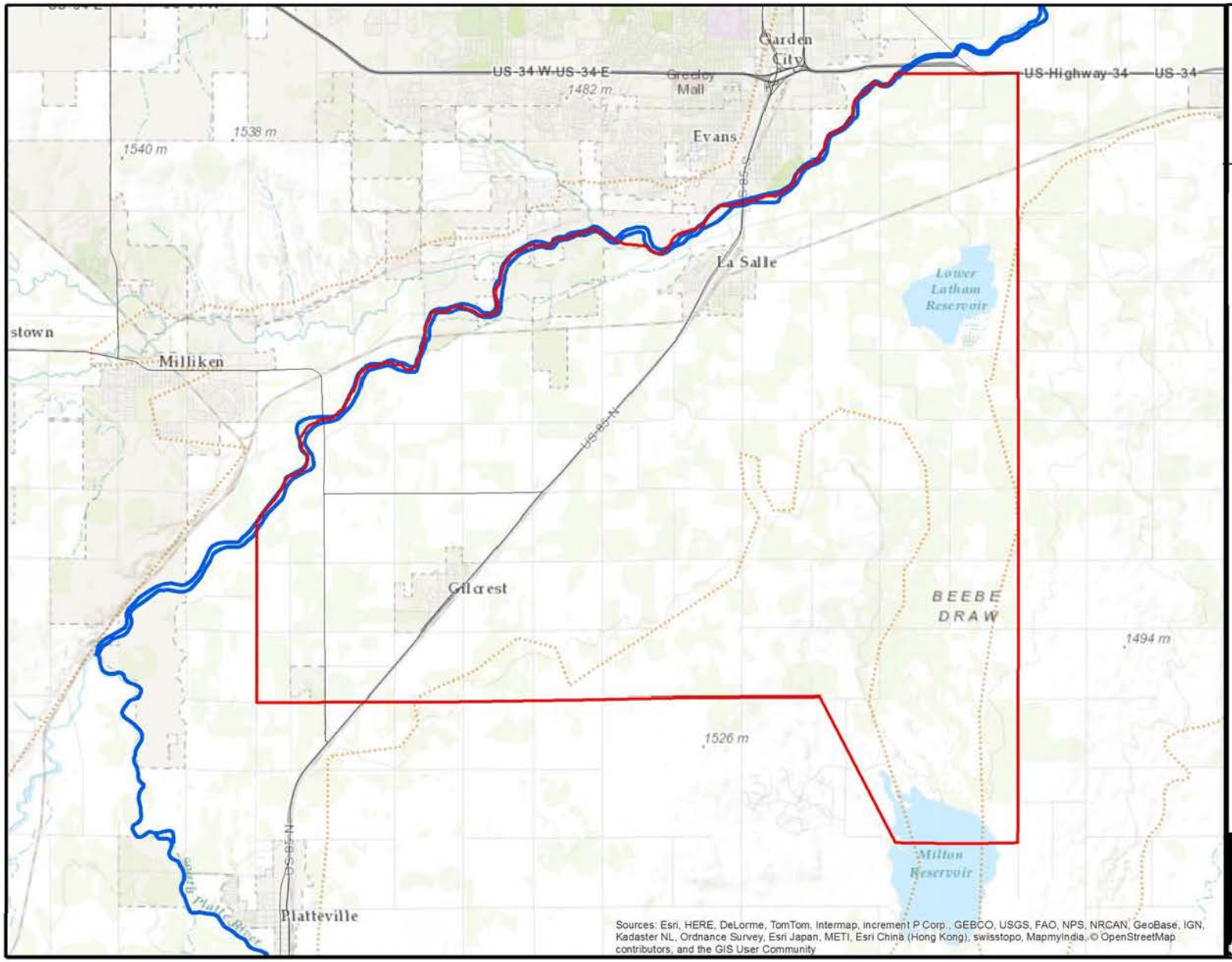
I. How to Apply

Applicants should submit the application to the CWCB, either by emailing the application as a *single* PDF file to the **Dewatering Grant Program, c/o Emily LoDolce** at emily.lodolce@state.co.us or by mailing a hard copy of the application to the address given below:

Attn: Dewatering Grant Program c/o Emily LoDolce
CWCB

1313 Sherman St., Room 718
Denver, CO 80203

HB15-1178 requires the Board, in collaboration with the State Engineer, to provide the Water Resources Review Committee with a final report on the grant program on or before October 1, 2017. Therefore, October 1, 2017 will be considered the end of the grant program.



Attachment 1 Gilcrest Study Area Boundary

Legend

- Study Area Boundary
- South Platte River
- Alluvial Aquifer Extent (SPDSS)*

***Data Source Reference:**

Regional Alluvial Aquifer Mapping From SPDSS (2012)

Adapted from the Gilcrest/LaSalle Pilot Project Hydrogeologic Characterization Report

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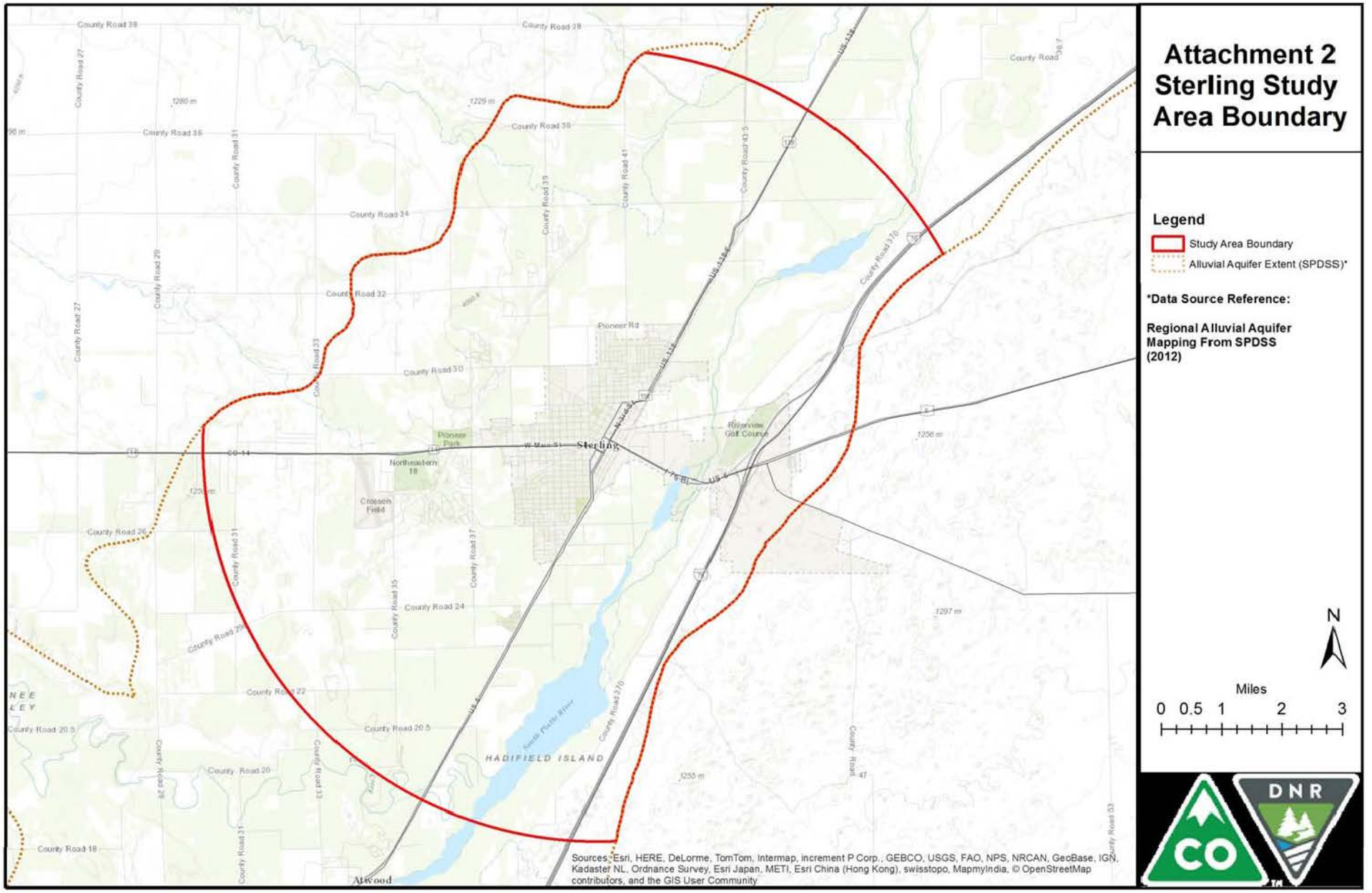
CO DNR


Attachment 2
Sterling Study Area Boundary
Legend
Study Area Boundary
Alluvial Aquifer Extent (SPDSS)*
*Data Source Reference:
Regional Alluvial Aquifer Mapping From SPDSS (2012)
N
Miles
0 0.5 1 2 3
Sterling
Atwood
HADIFIELD ISLAND
Pioneer Rd
Riverview Golf Course
Pioneer Park
Northeastern JC
Crossen Field
County Road 38
County Road 36
County Road 34
County Road 32
County Road 30
County Road 26
County Road 24
County Road 22
County Road 20.5
County Road 20
County Road 18
US 138
US 6
CO-14
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

ATTACHMENT 3

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST, RM 821, DENVER, CO 80203
Main: (303) 866-3581 Fax: (303) 866-2223 dwrpermitsonline@state.co.us

Office Use Only

Form GWS-45 (07/2013)

GENERAL PURPOSE
Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be computer generated, typed or in black or blue ink.

1. Applicant Information

Name of applicant

Mailing address

City | State | Zip code

Telephone # (area code & number) | E-mail (online filing required)

2. Type Of Application (check applicable boxes)

- ☐ Construct new well
- ☐ Replace existing well
- ☐ Change source (aquifer)
- ☐ COGCC Well
- ☐ Use existing well
- ☐ Change or increase use
- ☐ Reapplication (expired permit)
- ☐ Other: _____

3. Refer To (if applicable)

Well permit # | Water Court case #

Designated Basin Determination # | Well name or #

4. Location Of Proposed Well

County

_____ 1/4 of the _____ 1/4

Section | Township N or S ☐ ☐ | Range E or W ☐ ☐ | Principal Meridian

Distance of well from section lines (section lines are typically not property lines)

Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well

feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as in Item 1.

Optional: GPS well location information in UTM format You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☐ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☐ YES

Easting _____

Northing _____

Remember to set Datum to NAD83

5. Parcel On Which Well Will Be Located
(PLEASE ATTACH A CURRENT DEED FOR THE SUBJECT PARCEL)

A. Legal Description (may be provided as an attachment):

B. # of acres in parcel | C. Owner

D. Will this be the only well on this parcel? ☐ YES ☐ NO (if no list other wells)

E. State Parcel ID# (optional):

6. Use Of Well (check applicable boxes)

Attach a detailed description of uses applied for.

- ☐ Industrial
- ☐ Municipal
- ☐ Irrigation
- ☐ Commercial
- ☐ Dewatering System
- ☐ Geothermal (production or reinjection
- ☐ Other (describe): _____

7. Well Data (proposed)

Maximum pumping rate gpm | Annual amount to be withdrawn acre-feet

Total depth feet | Aquifer

8. Land On Which Ground Water Will Be Used

Legal Description of Land (may be provided as an attachment):

(If used for crop irrigation, attach a scaled map that shows irrigated area.)

A. # Acres | B. Owner

C. List any other wells or water rights used on this land:

9. Proposed Well Driller License #(optional):

10. Sign or Entered Name Of Applicant(s) Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign or enter name(s) of person(s) submitting application | Date (mm/dd/yyyy)

If signing print name and title

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

AQUAMAP
WE
WR
CWCB
TOPO
MYLAR
SB5

DIV _____ WD _____ BA _____ MD _____

GENERAL PURPOSE WELL PERMIT APPLICATION INSTRUCTIONS

Applications must be computer generated on-line, typewritten or printed in BLACK or BLUE INK. ALL ITEMS in the application must be completed. Incomplete applications may be returned to the applicant for more information. Applications are evaluated in chronological order. Please allow approximately six weeks for processing. This form may be reproduced by photocopying or computer generation. Reproductions must retain margins and print quality of the original form. If filing online see online filing instructions! You may also save, print, scan and email the completed form to: dwrpermitsonline@state.co.us For further information please visit www.water.state.co.us

FEES: This application must be submitted with a $100 filing fee. Acceptable forms of payment are check or money order, payable to the Colorado Division of Water Resources. Visa, MasterCard or Discover are accepted by phone through our Records Section at 303.866.3581. **Fees are nonrefundable.**

USES: This form (GWS-45) is to be used to apply for commercial, industrial, municipal, irrigation, feed lot, geothermal (see Geothermal Rules for fee requirements), recovery wells, and other uses not otherwise noted in the following list:

RESIDENTIAL use wells – Use of form GWS-44 is required
LIVESTOCK watering on a farm, ranch, range or pasture (not feedlots) – Use form GWS-44
MONITORING/OBSERVATION wells – Use form GWS-46
GRAVEL PITS – Use form GWS-27
REGISTRATION of an existing well – Use form GWS-12 (must have been in use prior to May 8, 1972)
GEOEXCHANGE SYSTEM LOOP FIELDS – Use form GWS-72
REPLACEMENTS OF WELLS FOR THE ABOVE USES

ITEM INSTRUCTIONS: (numbers correspond with those on the front of this form)

1. The applicant is the entity for whom the permit is to be issued. Provide the applicant name and the mailing address where all correspondence will be sent.

2. Check all boxes that apply.

3. Complete all boxes that apply. If the permit is to be issued pursuant to a water court decree or a Designated Basin determination of water right, the case number or determination number must be indicated. If applying to replace or change the use of an existing well, the permit number of the existing well must be indicated.

4. The county, ¼ of the ¼ section designation, section #, township, range, principal meridian, and distances from section lines for the proposed well must be provided. (An option to providing distances from section lines and the ¼ of the ¼ section designation is to provide an accurate GPS location in UTM format. The required GPS unit settings must be as indicated on this form.) Colorado contains two (2) UTM zones. Zone 13 covers most of Colorado. The boundary between Zone 12 and Zone 13 is the 108th Meridian (longitude). West of the 108th Meridian is UTM Zone 12 and east of the 108th Meridian is UTM Zone 13. The 108th Meridian is approximately 57 miles east of the Colorado-Utah state line. On most GPS units, the UTM zone is given as part of the Easting measurement, e.g. 12T0123456. Check the appropriate box for the zone. Provide the property address of the well location if one exists. If it is the same as the mailing address, check the box next to the well location address.

5. **Please attach a current deed for the subject parcel.** Complete all boxes and provide a complete legal description of the parcel of land on which the well will be located. **If filing online please see online filing instructions for how to submit deed and or legal description attachments.**

6. Check all boxes that apply and attach a detailed description of the uses applied for.

7. Complete all boxes.

8. Complete all boxes and provide a legal description of the land areas on which ground water from the proposed well will be used. If agricultural irrigation is a proposed use, provide a map of the land area with proposed irrigated areas accurately drawn, including section numbers and section lines. A list of all other wells or water rights used on the described land must be provided.

9. The well must be constructed by a Colorado licensed well driller, an authorized individual in accordance with the Water Well Construction Rules, 2 CCR 402-2, or under the "private driller" provision as defined in CRS 37-91-102(12). A listing of licensed well drillers/pump installers is available at: http://water.state.co.us/groundwater/BOE/Pages/LicensedContractors.aspx

10. The individual signing the application or entering their name and title must be the applicant or an officer of the corporation/company/agency identified as the applicant or their attorney. An authorized agent may also sign the application, if a letter signed by the applicant or their attorney is submitted with the application authorizing that agent to sign or enter their name on the applicant's behalf. If you filled the form out on-line you may save or print, sign, scan and email the form to the Division of Water Resources. Payment must be received via phone, fax or mail prior to processing the application.

IF YOU HAVE ANY QUESTIONS regarding any item on the application form, please call the Division of Water Resources Ground Water Information Desk (303-866-3587), or the nearest Division of Water Resources Field Office located in Greeley (970-352-8712), Pueblo (719-542-3368), Alamosa (719-589-6683), Montrose (970-249-6622), Glenwood Springs (970-945-5665), Steamboat Springs (970-879-0272), or Durango (970-247-1845), or refer to our web site at http://www.water.state.co.us for general information, additional forms, and access to state rules or statutes.

SAMPLE DEWATERING ACCOUNTING FORM

Structure Name: Dewatering Well 1 Water District: 1
Well Permit no: 999999-F
Comments: Water Year: 2015

Flowmeter multiplier: Ac/ft

DAY	Nov. Flowmeter		Dec. Flowmeter		Jan. Flowmeter		….. Flowmeter		Oct. Flowmeter	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
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17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
Total										
Count Reading	0		0		0		0		0	
Max Reading	0.000		0.000		0.000		0.000		0.000	
Min/Max Chk	0		0		0		0		0	

Infrequent Diversions

	Nov		Dec		Jan		Feb		Mar	
Total for Month	0.000		0.000		0.000		0.000		0.000	
Dly Avg For Month(CFS)	0.00		0.00		0.00		0.00		0.00	

Total for Year | Avg. Daily For Year(CFS)

HB15-1178 Grant Application

Project: Dewatering and Conveyance Improvement Analysis
Applicant: Town of Gilcrest
Total Grant Request: $139,800

Contact Information:
Trudy Peterson
P.O. Box 128, 304 8th Street
Gilcrest CO 80623
Phone: 970-737-2426
Email: trudy@townofgilcrest.org

1. Introduction:

This application is being submitted by Trudy Peterson, Town Administrator for the Town of Gilcrest, P.O. Box 128, 304 8th Street, Gilcrest CO 80623 – 970-737-2426 – trudy@townofgilcrest.org. Through this application, the Town of Gilcrest requests $139,800 from the HB15-1178 emergency dewatering grant fund for a dewatering and conveyance improvement analysis that will lead to a long-term solution to continuing high groundwater issues in the Town. The high groundwater, despite a short-term dewatering effort with the Lorenz Well on the northeast side of the Town, continues to cause an emergency situation in the Town.

Additionally, another planned short-term dewatering effort is now infeasible. The School Well Project received approval for $90,000 from the Colorado Water Conservation Board in July 2015, contingent upon various agreements and permissions being obtained. However, due to a vote of the Farmer's independent Ditch Company shareholders on December 7th, denying the use of their ditch for carriage of dewatering water from the School Well on the north side of Town, Gilcrest will not be able to move forward with the School Well Project. Therefore, Gilcrest will relinquish the $90,000 awarded in July for that initial grant application. Through the advisement of the South Platte Basin Roundtable Groundwater Technical Committee, the Town will continue to investigate intermediate solutions to the emergency high groundwater levels, while a plan for a long-term solution is developed through this application.

The groundwater levels in Gilcrest have been rising for the past 10 years. Noticeable damage started occurring at the wastewater treatment plant in 2010, as large bubbles appeared in the lagoon liner material. The bubbles were later determined to be caused by rising groundwater. In the same year, the retention pond in Municipal Park began holding groundwater continually, limiting its capacity for storm water retention. This pond must now be pumped to additional storm water ponds at the wastewater treatment facility. These storm water ponds are also full with groundwater, so the storm water and groundwater needs to be pumped alternately with the wastewater effluent. Additionally, in 2010 the town constructed a large regional storm water retention pond on the west side of town. In the summer of 2014 basement flooding began occurring seasonally, while all of the ponds have had varying levels of

groundwater year round. Please Attachment 2, Figure 2 for a more detailed look at groundwater levels as of the Fall of 2014.

The Town needs to begin to look for a permanent dewatering solution as soon as possible to bring the groundwater levels down whenever emergency conditions exist. The Town needs to be able to construct the improvements at the wastewater treatment plant to protect those facilities from further damage, and dewatering is required for that purpose. Additionally, our water distribution lines and sewer collection lines are sitting in water. In 2009, the Town experienced a collapse of 380 feet of sewer collection line along with four manholes. We still have a significant amount of clay pipe in the ground and we fear that another collapse is in our future if the groundwater level is not brought back to a level below our utility lines. Dewatering through the Lorenz well was shown to have an impact on the water table immediately surrounding the well and near the waste water treatment facility. However, permissions from ditch companies to carry the water have proven to be difficult to obtain and the need for a more permanent and reliable solution independent of ditch companies has become apparent. The Town wishes to hire JVA Engineering to develop a permanent and reliable dewatering and conveyance solution. This analysis will facilitate the emergency pumping of dewatering wells in the Town of Gilcrest as per HB15-1178 (§ 37-60-121 (10)(a)(III), C.R.S). The proposal for the Engineering Analysis (hereby referred to as analysis) in its entirety can be found as Attachment 1.

2. Figure: Please see Attachment 2, Figure1 for the general location; and Attachment 2 Figure 2 for water table levels provided by Colorado Geologic Survey.

3. Proposed and/or Existing Infrastructure:

Tasks 8-11 of the analysis (referenced in Attachment 1) will be investigating the feasibility of current and potential new infrastructure to provide the Town with the most efficient dewatering system. This includes analysis of wells in town, siting of potential new wells, investigating current drainages, potential pipeline routes, etc.

4. **Permissions**

No permissions are necessary to complete the analysis. The full scope of needed permissions for implementation will not be known until after the study is complete. Currently, the Town is anticipating a need to obtain easements from property owners for any recommended pipeline installation. The Town will acquire proper permissions for implementation.

5. **Permitting:**

Permitting will not be needed as this project is the design of a dewatering system. Once the study and proposed system are finalized, the Town will acquire Dewatering Well and Dewatering System permits as appropriate. Currently, the Town does have a dewatering permit for a well east of Highway 85, and just south of County Road 42, referred to as the Lorenz well (Attachment 3).

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

Task 14 of the analysis is to develop a recommended network of groundwater level monitoring wells within the Town to monitor groundwater levels and measure success of the dewatering system. The groundwater level monitoring network will rely first on existing wells and may include new proposed monitoring well locations. The results from this task will be presented in a map that illustrates the location of the groundwater level monitoring points and a table identifying existing wells, new monitoring wells and estimated cost for new monitoring wells used in the monitoring system.

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

Task 15 of the analysis is to develop specific, measurable groundwater level targets at which the project will be "successful." Based upon previous studies, the need for dewatering will be permanent due to the groundwater budget and hydrogeological setting of the Town unless there are dramatic changes in local water use.

8. Itemized Grant Request

Table 1. Town of Gilcrest – Dewatering Improvements Study
Estimated Fee Schedule by Task

Task	Description	Fee
1	Kick-Off Meeting and Field Visit	$3,900
2	Obtain Source Data from Previous Studies	$2,130
3	Prepare Depth to Groundwater Map	$14,170
4	Inventory of Existing and Proposed Groundwater Recharge near Town	$3,080
5	Prepare Initial Estimate of Dewatering Rate	$2,720
6	Groundwater Analysis	$20,510
7	Stormwater Evaluation	$10,240
8	Evaluate Gravity Dewatering	$4,090
9	Identify Existing and New Dewatering Structures including 600-foot Setback	$4,730
10	Develop Dewatering Alternatives (Memorandum)	$13,060
11	Develop and Evaluate Conveyance Alternatives	$17,810
12	Memorandum Summarizing Alternatives, OPC	$13,350
13	Consider Impacts on Contaminant Plumes	$2,090
14	Develop Groundwater Monitoring System	$3,680
15	Measureable Outcomes and Duration of Pumping	$1,830
16.1	Initial Review Meeting with Town	$3,460
16.2	Meeting with Technical Committee and Division Engineer	$3,750
16.3	Three Progress Meetings with Town and Stakeholders	$11,440
16.4	Presentation to Town Board at Public Meeting	$3,760
Subtotal		**$139,800**

Attachment 1

JVA-BBA Engineering Proposal

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
303.444.1951
info@jvajva.com

www.jvajva.com

November 10, 2015

Ms. Trudy Peterson, Town Administrator
Town of Gilcrest
PO Box 128, 304 8th Street
Gilcrest, CO 80623

RE: Dewatering and Conveyance Improvement Study- Town of Gilcrest
Letter Agreement for Engineering Services

Dear Trudy:

As requested, the JVA Inc. (JVA) has prepared a scope of work and associated fees to provide engineering services to the Town of Gilcrest (Town) for the Dewatering and Conveyance Improvement Study. For this proposal, JVA has teamed with Bishop-Brogden Associates, Inc. (BBA) as a subconsultant. The JVA and BBA team (JVA-BBA) will work closely with the Town to deliver the proposed services to develop a permanent dewatering and conveyance solution for the Town. High groundwater has caused damage throughout Town (e.g. flooding basements and damaging the liners at the wastewater treatment facility). The ultimate goal of this study is to develop an alternative to help lower the high groundwater experienced throughout all parts of Gilcrest and convey the dewatered groundwater to the South Platte River. The scope of work is based on the Town's Request for Engineering Services Proposal, dated September 2, 2015, as well as our numerous discussions with the Town throughout the development of the liner replacement project, and recent discussions with the Colorado Water Conservation Board (CWCB).

The JVA-BBA team understands the Town plans on seeking funding through the Emergency Dewatering Grant Program (HB15-1178) for the engineering study, detailed design, and construction. This letter outlines the proposed study tasks for quantification of the extent of shallow groundwater conditions, identification of conceptual dewatering and conveyance solutions, and refinement of the preferred dewatering and conveyance solution. The dewatering system may include recommendations for improved stormwater management to capture runoff before it recharges the groundwater system, and recommendations for use of existing stormwater ponds, existing and new wells and/or underdrains to lower the groundwater table. The conveyance system may include a pipeline and/or open channel to the South Platte River either along County Road 42 or via existing ditch or drain systems north of Town. Due to the research and design aspects of this project, there are a number of unknowns that make precise quantification of engineering effort difficult.

The Town's stormwater management and existing stormwater ponds may become a central part of alleviating high groundwater conditions. Those ponds were initially designed to dispose of stormwater through a combination of infiltration and evaporation with additional recommendations for a pumped discharge from the main retention pond located northwest of Starbird Avenue. In 2013, the Town obtained a permit allowing discharge 500 gallons per minute of groundwater from the stormwater ponds through the existing wastewater facility's outfall to the South Platte River. However, the capacity of the existing outfall for

groundwater/stormwater discharge is limited by its 6-inch diameter, pressure rating, and need to also convey wastewater plant effluent to the river. The recommended dewatering solution will consider impacts on or synergies with the stormwater system throughout the Town and conveyance alternatives to deliver both stormwater and shallow groundwater away from the Town.

JVA has developed a close relationship with the Town throughout the design of the Wastewater Treatment Plant Liner Replacement project, and has become intimately familiar with a number of the key issues related to this important problem. Our subconsultant BBA are very familiar with recent shallow groundwater conditions and many Division of Water Resources, CWCB and CGS staff, as well as members of the South Platte Basin Round Table Technical Committee. Together, the JVA-BBA team brings strong relationships with key project stakeholders, technical expertise in groundwater analysis, hydrogeology, well design, well testing, Colorado water rights engineering, hydraulic analysis, pump station design, forcemain design, distribution systems design, and infrastructure planning/design. We bring practical experience with the Town and recent groundwater dewatering projects near Woodman Hills, and in Westminster Highlands to develop a permanent solution for the Town.

SCOPE OF WORK

The initial tasks include review of previous studies, quantification of current groundwater levels beneath the Town, understanding existing and proposed areas of groundwater recharge near the Town, and establishment of initial dewatering rates and target groundwater levels. JVA-BBA will then develop conceptual dewatering and conveyance systems, evaluate these systems against economic and non-economic criteria and recommend a preferred dewatering and conveyance alternative. The preferred alternative will include consideration for the Town's stormwater infrastructure and impacts on the existing contamination plume within the Town. JVA-BBA will provide recommendations for a groundwater monitoring system to monitor groundwater levels and measure success of the dewatering system, as well as recommendations for specific, measurable groundwater level targets at which the project will be considered "successful. The proposed evaluation will include the following tasks:

1. Kickoff Meeting: Prepare and meet with Town, discuss project approach, goals, objectives, milestones, lines of communication, and gather existing information.

2. Obtain Source Data from Previous Studies: Obtain and review stormwater design information, studies, groundwater level data, groundwater recharge data, groundwater models, mapping, geologic characterizations and other information pertaining to shallow groundwater conditions beneath the Town.

3. Prepare Depth to Groundwater Map for Town and Surrounding Areas: The starting point for developing the Town dewatering plan is to identify the areas within the Town that are affected by shallow groundwater conditions. While there has been substantial regional study of groundwater levels, we understand that refined groundwater mapping has not been prepared that identifies depth to groundwater

within the Town. In addition, we understand that regional groundwater maps do not agree with actual water level measurements within the Town.

We understand that a substantial amount of groundwater level data has been collected in and around the Town by Town staff, Palmetto Environmental, Tetra Tech, Central Colorado Water Conservancy District, the Division of Water Resources, Colorado State University and individuals. This task will include compiling existing water level data to prepare two maps of groundwater elevation and depth to groundwater: historical low ground-water condition and recent high-groundwater condition. These maps will be used to identify areas within the Town where water levels need to be lowered and to quantify the amount the groundwater table needs to be lowered beneath the Town. The target depth for lowering the groundwater table will be agreed with the Town for subsequent development of dewatering and conveyance alternatives.

Good control data of ground level elevation within the Town is also needed to complete this task. We understand that a high resolution 2013 LiDAR survey completed by the U.S. Army Corps of Engineers, Colorado Department of Transportation and CWCB does not cover the Town, but that the CWCB may be purchasing a high-resolution ground surface survey of the Town and we have assumed that this information is available for JVA-BBA's use. Additional survey data may be needed if high-resolution land surface elevation data are not available, which would require additional fees beyond the scope of this letter.

This task includes collection of additional water level data and installation of up to four new monitoring wells at strategic locations. This task does not include preparation of water level hydrographs for each well data set; however hydrographs will be prepared for selected representative wells. Further, this task does not include costs for water quality testing of samples from the existing and new monitoring wells. The Town may wish to consider setting aside funding for some water quality testing. Further, this study does not include provisions for design of groundwater treatment systems.

4. Inventory Existing and Proposed Groundwater Recharge near the Town: The purpose of this task is to identify sources of groundwater recharge that may most directly impact groundwater levels beneath the Town. JVA-BBA will inventory the location and infiltration rate of ponds (including recharge ponds), irrigation ditches and irrigated lands located near the Town. We will review water rights decrees to identify the proposed location of additional structures and future potential infiltration (recharge) rates for all structures. Results from this task will be summarized in mapping of existing and proposed groundwater recharge facilities and a table identifying recharge facility location, historical recharge amount and maximum recharge amount.

5. Prepare Initial Estimate of Dewatering Rate: Calculate the approximate rate of dewatering necessary to lower the groundwater level beneath the Town to the agreed

target depth established under Task 3. The approximate dewatering rate will be calculated using three methods: (a) groundwater underflow calculation based upon groundwater mapping prepared in the 2013 CGS Study and 2015 addendum to that study, (b) superposition well drawdown analysis and (c) calculations based upon the water budget mass balance presented in the 2015 Brown and Caldwell High Groundwater analysis. The analytical methods proposed under this task allows the team to estimate the magnitude of dewatering required. The results from this task will be summarized in a table and concise memorandum.

6. Prepare Groundwater Model Analysis: Building on information from previous tasks, numerical groundwater modeling is proposed to better evaluate the necessary location of dewatering wells to reach target water levels and to evaluate various dewatering structure locations. Hydrogeologic conditions can be quite variable over relatively short distances and we understand that there is limited aquifer test data in the vicinity of the Town. For these reasons, the results from groundwater modeling will provide a range of possible dewatering rates, recommended dewatering locations and the expected timing of water level changes occurring within the Town at the time of system installation. To the extent that existing nearby wells of concern are identified in previous tasks, the model can also be used to estimate possible impacts to those wells resulting from the dewatering system.

   We understand that two existing groundwater models of the alluvial aquifer cover the Town: (1) the SPDSS South Platte groundwater model, which has relatively coarse 100-foot grid spacing and (2) a model developed by Willem Schreüder, PhD of Principia Mathematica, Inc. We have assumed that the input files for those models are available. Using inputs from existing groundwater models, we will prepare a groundwater model of the alluvial aquifer beneath the Town and complete the following groundwater simulations: (a) future depth to groundwater without dewatering, (b) future depth to groundwater using existing dewatering structures, (c) future depth to groundwater using existing dewatering structures and new dewatering structures. The results from the groundwater model analysis will be used to estimate dewatering rate, identify preferred dewatering locations and to identify changes in groundwater gradients that could affect known groundwater contaminant plumes. The results from this task will be summarized in a concise technical memorandum that presents mapping of groundwater levels, summarizes the range of dewatering rates necessary to lower the groundwater table to the agreed target level, any refined locations for dewatering structures and recommended monitoring points.

7. Review Town Stormwater Collection System and Recommended Upgrades: Review the location of existing stormwater and runoff collection facilities. Identify locations where uncontrolled stormwater and agricultural runoff is recharging groundwater and contributing to shallow groundwater conditions. Identify conceptual infrastructure to control stormwater and agricultural runoff to prevent shallow groundwater impacts. We anticipate using previous stormwater calculations as part of the 2003 Comprehensive Plan and subsequent FEMA stormwater work undertaken in 2010. This task includes some evaluation of stormwater hydrology and using Civil 3D to

evaluate the anticipated volumes available in the existing basins. We will present the results in map and table of existing and proposed facilities.

We will evaluate Town's existing stormwater retention ponds and develop estimates for anticipated stormwater during 5-year and 100-year storm events. These flows will be considered in conjunction with dewatering alternatives which may utilize existing stormwater facilities. We will include discussion on any recommended conceptual upgrades to the infrastructure needed to capture uncontrolled runoff in the Town and prepare an opinion of probable cost for any recommended upgrades.

8. Evaluate Gravity Dewatering: Identify practical discharge points for gravity drainage dewatering system (if any). Although we understand the Town has experienced limited success related to use of existing drainage ditches for conveyance, gravity drains may offer a reliable and low operational cost alternative dewatering system. If practical gravity discharge points can be identified and deemed feasible, develop conceptual design for gravity dewatering infrastructure and present results in map and table of proposed facilities.

9. Identify Existing and New Structures for Dewatering: Inventory existing wells and stormwater ponds that may be used for dewatering (initial review indicates that 3 of the Town's 4 wells may be too old to be usable). Identify the approximate number and location of new dewatering structures taking into account 600-foot spacing from existing permitted water supply wells. Evaluate 600-foot spacing for any existing Town wells included in conceptual dewatering system. Calculate estimated dewatering withdrawal rates based upon estimated aquifer characteristics and well test data, if available. The results from this task will be presented in a table that presents the expected yield and estimated cost for dewatering structures and a map that illustrates potential future dewatering structure locations.

10. Develop and Evaluate Dewatering Alternatives: Based upon initial results of the groundwater model analysis and information collected in the tasks above, develop alternatives for a dewatering system that will lower the groundwater table beneath the Town to the target level below ground surface. This evaluation will include consideration for use of gravity drains with either direct discharge to the River or discharge to a common collection point. We propose to use high-resolution land surface survey data for the Town and potential groundwater discharge points to determine if gravity discharge is practical and, if so, develop a approach to gravity dewatering along with identifying facilities needed for a gravity dewatering system. The results from this task will be concisely summarized in the memorandum that describes the facilities, dewatering rates and estimated cost for dewatering alternatives.

11. Develop and Evaluate Conveyance Alternatives: Develop conceptual layout and size for a maximum of three alternatives to deliver dewatering discharge. Includes consideration for use of existing/new structures used for dewatering, and how

structures may be interconnected. Present results in map and table of existing and proposed facilities. Proposed conveyance alternatives include:

- Dedicated pipeline to South Platte River
- Combination pipeline and/or open channel to the South Platte River along County Road 42
- Combination pipeline and/or open channel via existing ditch or drain systems north of Town.

12. Summarize Conceptual Dewatering and Conveyance Alternatives: Based upon information collected in the steps above, identify preferred dewatering and conveyance alternatives based upon both economic and non-economic criteria including ease of implementation, capital cost and expected operation and maintenance cost. We will prepare a conceptual design for the preferred alternative which will include a process flow diagram, design criteria, hydraulic profile, general process plans and sections, as well as an updated cost estimate for the recommended dewatering system, monitoring system and conveyance system. Summarize results in a technical memorandum.

13. Consider Impact on Contaminant Plumes: During consideration of dewatering alternatives, JVA-BBA will communicate with the environmental engineers that are completing remediation of LNAPL and Nitrate contaminant plume to present conceptual dewatering systems and projected effects on groundwater gradient from groundwater modeling. Initial indications are that lowering the groundwater table will enhance contaminant remediation efforts. Include consideration/discussion for anticipated impacts of conceptual dewatering system(s) on contaminant plumes based on comments from environmental engineer. JVA-BBA will meet with the environmental engineers to present the selected conceptual dewatering alternative. This scope of work does not include evaluation of effects of dewatering on contaminant plumes.

14. Develop Groundwater Level Monitoring System: We will develop a recommended network of groundwater level monitoring wells within the Town to monitor groundwater levels and measure success of the dewatering system. The groundwater level monitoring network will rely first on existing wells and may include new proposed monitoring well locations. The results from this task will be presented in a map that illustrates the location of the groundwater level monitoring points and a table identifying existing wells, new monitoring wells and estimated cost for new monitoring wells used in the monitoring system.

15. Measurable Outcomes and Duration of Pumping: Using the groundwater level monitoring system described above, develop specific, measurable groundwater level targets at which the project will be “successful.” Based upon our review of previous studies, it appears that the need for dewatering will be permanent due to the groundwater budget and hydrogeological setting of the Town unless there are dramatic changes in local water use (e.g. increased well pumping, decreased recharge,

decreased irrigation). The results of this task will be presented in a concise memorandum.

16. Project Meetings: This proposal includes time to attend a number of progress and review meetings with the Town and stakeholders. This task excludes additional meetings with external stakeholders (Ditch companies, Palmetto) unless clearly specified. Any input sought from outside stakeholders is assumed to be coordinated by the Town to coincide with one of the planned meetings/site visits. Additional meetings can be provided if desired by the Town for an additional fee. Proposed meetings include:
    - Initial Review Meeting with the Town: Attend a meeting with the Town to discuss depth to groundwater mapping, target dewater depth, estimated dewatering rate, existing stormwater infrastructure, existing well locations, potential location for new dewatering structures and conceptual conveyance systems.
    - Meeting with the Town and Technical Committee, CWCB and/or State Engineer: Attend meeting to present groundwater level mapping and the conceptual dewatering and conveyance systems.
    - Three progress/review meetings with the Town (and the Technical Committee and/or CWCB as appropriate), plus one meeting for presenting the findings of the report to the Town Board at a public meeting.

The main deliverable for this work will be an evaluation memorandum containing the following information:

1. Description of the existing stormwater holding ponds, pump station, and pipeline to the South Platte River
2. Map of dewatering structures and 600-foot spacing to water supply wells
3. Map of groundwater recharge areas in and around the Town
4. Groundwater model description and results
5. Summary of dewatering, monitoring, and conveyance alternatives including financial and non-financial considerations such as feasibility and constructability, and recommendation for preferred alternative(s)
6. Develop a conceptual design of the recommended alternative, including preliminary calculations, process flow diagram, design criteria, hydraulic profile, general process plans and sections, as well as an updated cost estimate (+/- 20%) for the recommended dewatering system, monitoring system and conveyance system including anticipated O&M costs and operational considerations
7. Discussion of anticipated impacts of recommended alternative(s) on Town stormwater systems and existing contaminant plume
8. Description of recommended measureable outcomes for successful dewatering solution

SCHEDULE

JVA-BBA is able to proceed with the study immediately upon Notice to Proceed, and anticipate 14 -18 weeks needed to –complete all tasks. This assumes all grant funding is in place through

HB15-1178 and no additional time is needed for external agency review/approval, and that all data sought from external sources is readily available. Key milestones would be established with the Town during project kickoff. We are also able to postpone the study to allow the Town to submit the grant application for engineering study assistance through HB15-1178 and confirm funding is available to undertake the study. Assuming a Notice to Proceed is issued by January 2016, we anticipate completing our proposed work by June 2016.

ASSUMPTIONS AND EXCLUSIONS

The scope of work includes the following key assumptions and exclusions:

- We assume the existing stormwater ponds are adequate for handling the design storm flows. The scope does not include provisions for modification to the ponds, but will consider the capacity of the ponds and whether pumping from the ponds may form part of an acceptable conveyance alternative.
- The effort will provide recommendations for improvements/upgrades to the stormwater facilities if deficiencies are identified. This offer does not include the conceptual design of additional stormwater facilities unless specifically included with the recommended dewatering/conveyance alternative.
- Assumes the Town can provide JVA-BBA all background information on existing stormwater basins and existing wells (location, suitability for consideration as part of the dewatering solution, capacity, condition, suitability for expansion, etc.). This includes Town owned wells as well as individual wells utilized as part of the temporary solution (Lorenz well, other temporary wells) currently employed.
- Excludes preparation of permit applications and associated fees for the recommended solution
- Excludes survey, geotechnical evaluations, and environmental assessments.
- Excludes coordination/assistance with easements
- Implementation of the dewatering system and monitoring system may require inspection of existing wells, installation of new wells or underdrains, excavations, well testing and implementation of groundwater level monitoring. These activities are excluded, but JVA-BBA is available to assist as needed.
- We assume a high resolution ground surface survey will be available to support our evaluation. If unavailable, additional survey may be required for additional fees.

BASIS OF PAYMENT

Due to the research and design aspects of this project and the high number of unknowns that make quantification of the engineering effort difficult, JVA-BBA proposes to complete the scope of work described above on a time and materials basis. The estimated cost for the work is $139,800. Table 1 summarizes the estimated fees for each task. Basis of the payment will be monthly billings for the work completed to date, plus reimbursable expenses. Terms of payment are net thirty days, and services are subject to be discontinued on the project if payment on an invoice is not made within 45 days of the date of that invoice, unless prior arrangements have been made.

JVA-BBA's proposed scope and fees include coordination with the Town, research, and conceptual level design efforts for the recommended improvements. We will work closely with Town staff to determine the most economical, sustainable, and reliable improvements and provide opinions of probable costs for each project. We welcome input from the Town if modification to any of the proposed scope items is desired.

Table 1. Town of Gilcrest – Dewatering Improvements Study
Estimated Fee Schedule by Task

Task	Description	Fee
1	Kick-Off Meeting and Field Visit	$3,900
2	Obtain Source Data from Previous Studies	$2,130
3	Prepare Depth to Groundwater Map	$14,170
4	Inventory of Existing and Proposed Groundwater Recharge near Town	$3,080
5	Prepare Initial Estimate of Dewatering Rate	$2,720
6	Groundwater Analysis	$20,510
7	Stormwater Evaluation	$10,240
8	Evaluate Gravity Dewatering	$4,090
9	Identify Existing and New Dewatering Structures including 600-foot Setback	$4,730
10	Develop Dewatering Alternatives (Memorandum)	$13,060
11	Develop and Evaluate Conveyance Alternatives	$17,810
12	Memorandum Summarizing Alternatives, OPC	$13,350
13	Consider Impacts on Contaminant Plumes	$2,090
14	Develop Groundwater Monitoring System	$3,680
15	Measureable Outcomes and Duration of Pumping	$1,830
16.1	Initial Review Meeting with Town	$3,460
16.2	Meeting with Technical Committee and Division Engineer	$3,750
16.3	Three Progress Meetings with Town and Stakeholders	$11,440
16.4	Presentation to Town Board at Public Meeting	$3,760
Subtotal		**$139,800**

LIMITATION OF LIABILITY

The Town agrees to limit JVA-BBA's liability and its employees' liability on account of property or consequential damages to the Owner, Client and all construction contractors on the project arising from JVA-BBA's negligence, professional acts, errors, or omissions, such that the total aggregate liability of JVA-BBA to all those named shall not exceed $ 100,000.

If you are in agreement with this proposal, please indicate by signing below and returning a copy to our office, confirming our authorization to proceed. We appreciate the opportunity to propose on this project and look forward to continuing our work with the Town of Gilcrest on this challenging issue.

Sincerely,
JVA Inc.

By: _____
Michael Katalinich, P.E.
Senior Project Manager

Accepted By:
Town of Gilcrest:

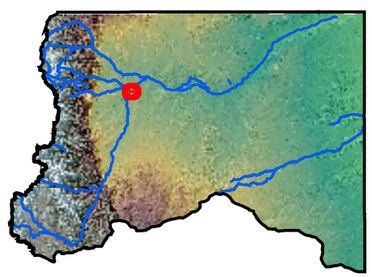
_____
Name

_____
Title Date

Attachment 2

Project Maps

Figure 1: Town of Gilcrest General Area and Current Dewatering Efforts



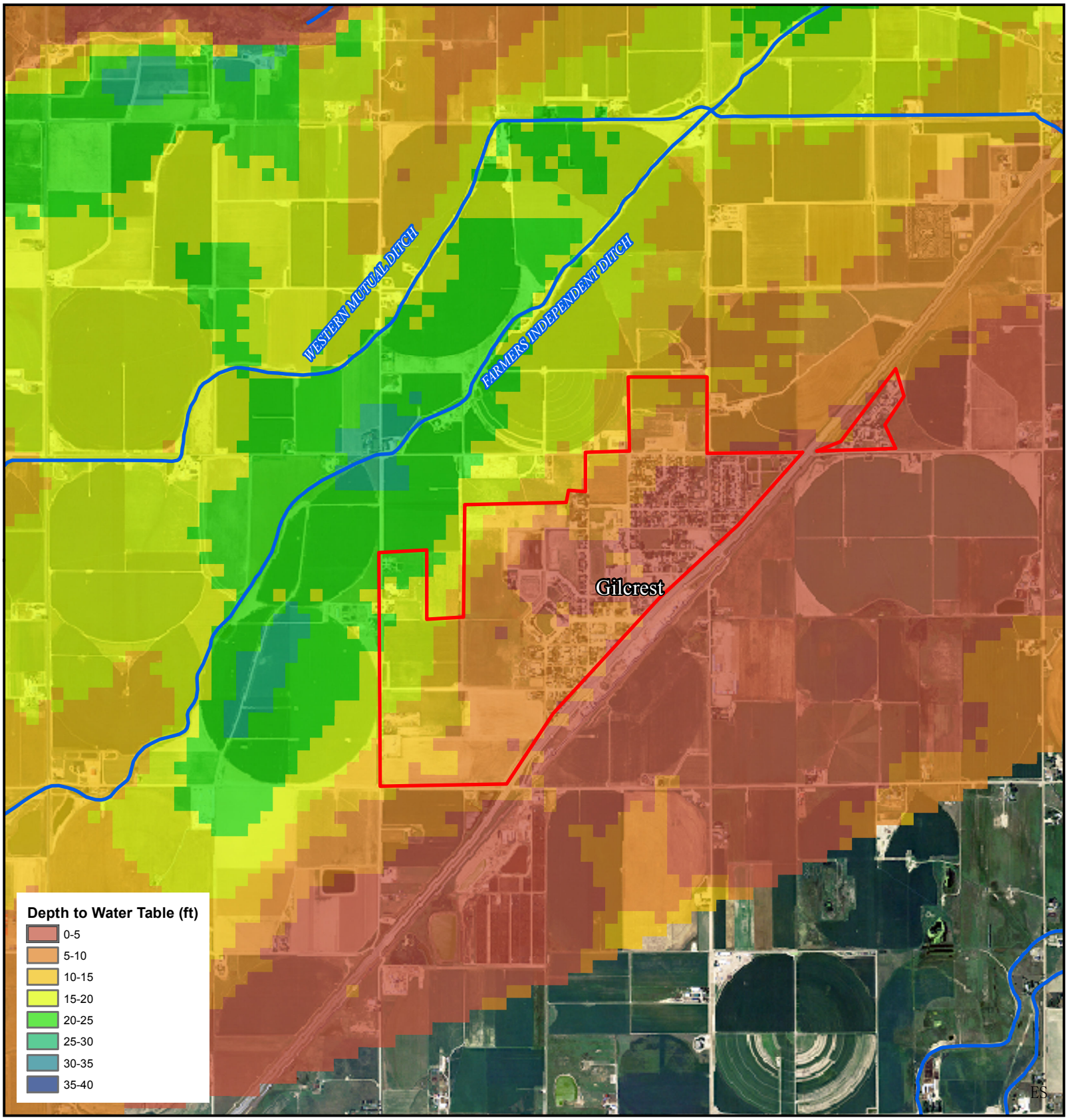
Big Bend Drain
Pipeline
Waste Water Pipeline
Monitoring Wells
Lorenz Well
Wastewater Treatment Plant

N
W E
S

0 2,600 5,200 7,800 10,400 Feet

NAD 1983 Zone 13N
Data Provided by Town of Gilcrest, and CWCB

Figure 2: Fall 2014 Depth to Water Table In and Around Gilcrest



Ditch Systems

Gilcrest

N
W E
S

0 0.45 0.9 1.35 1.8 Miles

NAD 1983 Zone 13N
Water Table Data Provided by, CGS
NAIP2011 Imagery and Other Data by CWCB

Attachment 3

Lorenz Well Dewatering Permit and Monitoring Well Data

Form No.
GWS-25

OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES

818 Centennial Bldg., 1313 Sherman St., Denver, Colorado 80203
(303) 866-3581

EXST

WELL PERMIT NUMBER 78949 -F -
DIV. 1 WD 1 DES. BASIN MD

APPLICANT

TOWN OF GILCREST
P.O. BOX 125
GILCREST, CO 80623-

(970) 737-2426

APPROVED WELL LOCATION
WELD COUNTY
NE 1/4 NW 1/4 Section 27
Township 4 N Range 66 W Sixth P.M.

DISTANCES FROM SECTION LINES
1110 Ft. from North Section Line
1637 Ft. from West Section Line

UTM COORDINATES (Meters,Zone:13,NAD83)
Easting: Northing:

PERMIT TO USE AN EXISTING WELL

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.
2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.
3) Approved pursuant to CRS 37-90-137(2) for the use of of an existing well, permit no. 12939-R (decreed by the Division 1 Water Court as Lorenz Trust Well No. 4-R12939, case no. W-6689) as a dewatering well to withdraw ground water tributary to the South Platte River.
4) All ground water pumped under the conditions of this permit must be discharged to South Platte River without consumptive use or evaporative losses.
5) The owner shall mark the well in a conspicuous place with well permit number(s), name of the aquifer, and court case number(s) as appropriate. The owner shall take necessary means and precautions to preserve these markings.
6) A totalizing flow meter must be installed on this well and maintained in good working order. Since well permit no. 12939-R can also be pumped for irrigation, the Applicant shall install two (2) flow meters on the well to separately record all pumping for irrigation use and all pumping for the dewatering purposes. Permanent records of all diversions must be maintained by the well owner (recorded at least annually) and submitted to the Division Engineer upon request.
7) Upon completion of the dewatering program, this permit will be canceled and diversion of ground water from this well under this permit must cease immediately.
8) This well shall be located at least 600 feet from any existing well, completed in the same aquifer, that is not owned by the applicant.
9) This well shall be located not more than 200 feet from the location specified on this permit.
10) This well is subject to administration by the Division Engineer in accordance with applicable decrees, statutes, rules, and regulations.

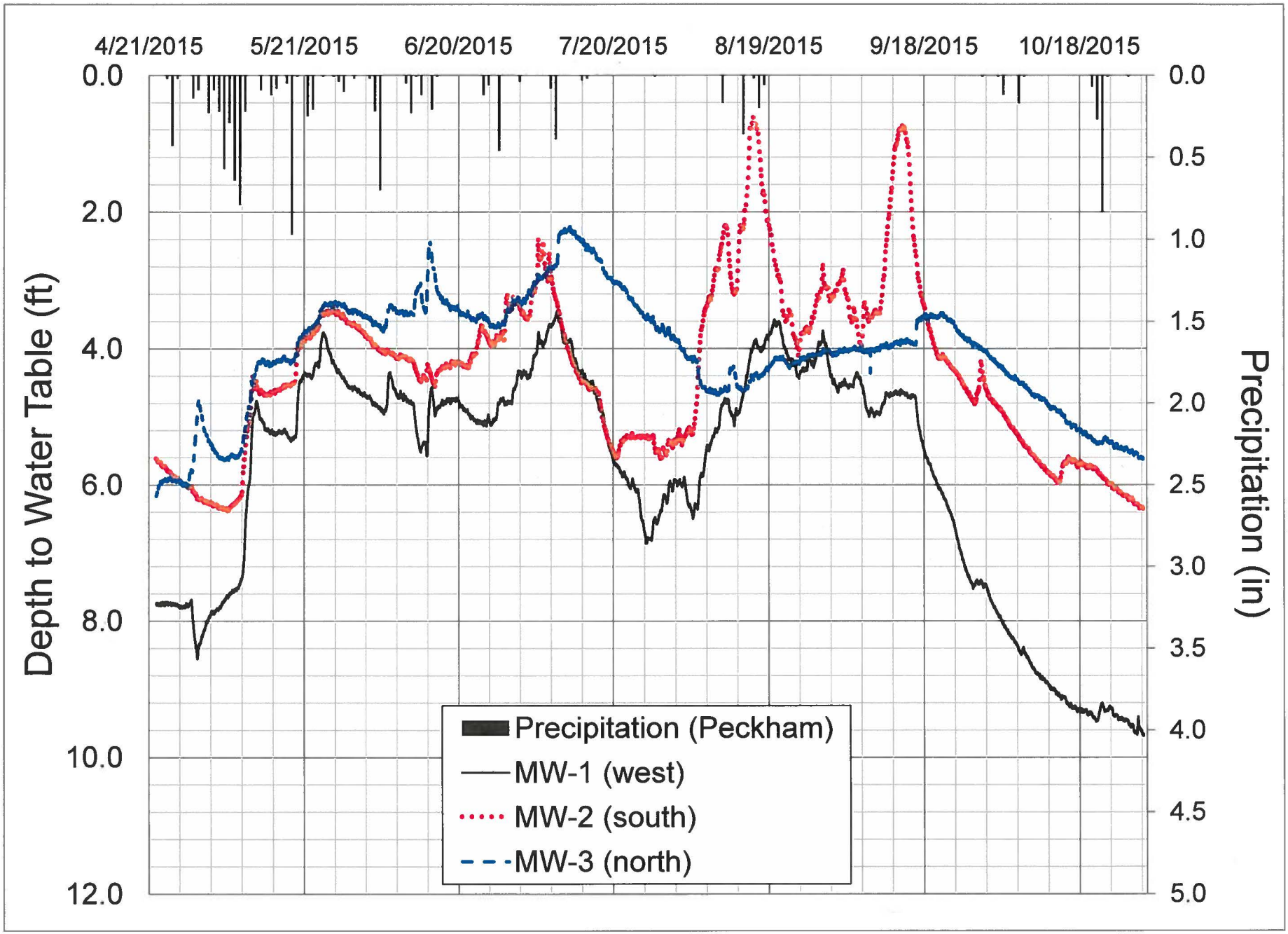
APPROVED
IDC

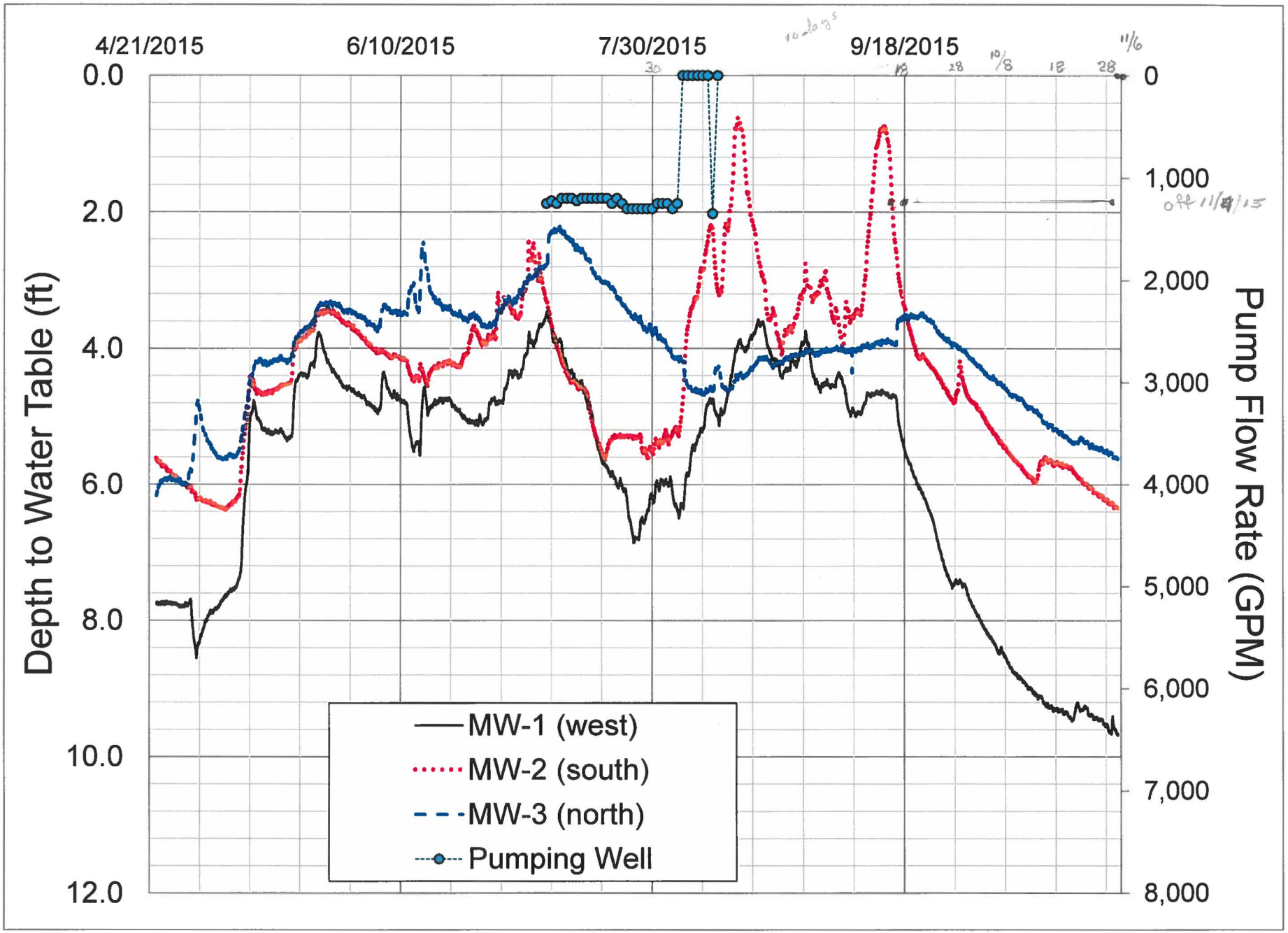
Dick Wolfe
State Engineer

By

Receipt No. 3669050F DATE ISSUED 04-06-2015 EXPIRATION DATE N/A

well ok
11/5/2015




well off 11/5/2015
4/21/2015
6/10/2015
7/30/2015
9/18/2015
10 days
30
18
28
10/8
18
28
11/6
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Depth to Water Table (ft)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Pump Flow Rate (GPM)
off 11/9/15
MW-1 (west)
MW-2 (south)
MW-3 (north)
Pumping Well

Ground water levels at monitoring wells at the GILCREST WASTEWATER TREATMENT PLANT

NOTE: In 1996 when the well for Municipal Park was drilled
Static water level was 33'

NOTE" In 2007 the water level on 12th Street where the sewer line collapsed was at 11'.

DATE	WET WELL	SOUTH CORNER	EAST CORNER
8/26/2014	6'2"	7'4"	5'5"
8/28/2014	6'0"	7'4"	5'4"
9/2/2014	5'11"	7'4"	5'4"
9/5/2014	5'11"	7'6"	5'10"
9/8/2014	5'11"	7'6"	5'1-1/2"
9/15/2014	5'10-1/2"	7'10-1/2"	5'5-1/2"
9/22/2014	5'11"	7'11"	5'7-1/2"
9/29/2014	5'11"	8'	5'8"
10/6/2014	5'7"	7'7"	5'4"
10/14/2014	5'8"	7'9"	5'7"
10/22/2014	5'9"	7'11"	5'8"
10/27/2014	5'6"	7'9"	5'6"
11/4/14	5'11"	7'11"	5'7 1/2"
11/10/14	5'10"	7'10"	5'8"
11/17/14	6'	8'1"	5'11"
11/24/14	6'1/2"	7'2"	6'1/2"
12/1/14	6'4"	8'4"	6'4"
12/8/14	6'4"	8'6"	6'5"
12/16/14	6'6"	8'8"	6'7 1/2"
12/23/14	6'7 3/4'	8'9"	6'9"
12/29/14	6'10"	9'3/4"	6'11 3/4"
1/6/15	7'	9'4"	7'11 1/2"
1/12/15	7 ' 1/2"	9' 4"	7' 2 1/2"
1/20/15	7' 2 1/2"	9'6"	7'5"
1/26/15	7'5"	9'8"	7'7"
2/2/15	7'5 1/2"	9'9"	7'9"
2/9/15	7'71/2"	9'11 1/2"	7' 11"
2/17/15	7' 8 1/2"	10' 1"	8'
2/23/15	7' 9 3/4"	10' 2"	8' 2"
3/2/15	7' 10"	10' 2 3/4"	8' 3 3/4"
3/9/15	8'	10' 4 1/2"	8' 5 1/4"
3/16/15	8'2"	10' 7"	8' 7"
3/23/15	8' 3"	10' 8 1/4"	8' 8 1/2"
3/30/15	8'6"	10' 10 1/4"	8' 10 1/2"
4/6/15	8' 6 1/4"	10' 10 1/2"	8' 11"
4/13/15	8'6' 1/2"	10' 10 3/4"	8' 1/2"

Date	wet well	south corner	east corner	
4/20/15	8.06	10.52	8.62	
4/27/15	8.25	10.64	8.73	
5/4/15	8.15	10.63	8.59	
5/11/15	7.23	9.05	7.27	
5/18/15	6.82	8.77	6.87	
5/26/15	6.29	7.93	6.15	
6/1/15	6.35	8.21	6.28	
6/8/15	6.28	8.18	6.27	
6/15/15	6.45	8.67	6.49	
6/22/15	6.46	8.42	6.43	
6/29/15	6.52	8.47	6.45	
7/6/15	6.42	8.22	6.31	7/9/15 start Lorenz
7/13/15	6.78	8.77	6.72	well
7/15/15	6.92	9.03	7.03	
7/20/15	7.36	10.02	7.57	
7/27/15	7.72	10.55	7.90	
8/3/15	8.11	10.54	8.20	
8/5/15	Lorenz well shut down			
8/10/15	7.58	9.33	7.60	
8/11/15	Lorenz well on			
8/12/15	Lorenz well off			
8/17/15	7.04	8.48	7.08	
8/24/15	6.92	8.61	6.81	
8/31/15	6.78	8.35	6.55	
9/8/15	6.82	8.71	6.49	
9/14/15	6.59	8.43	6.29	
9/16/15	Lorenz well on			
9/21/15	6.96	9.55	6.90	
9/28/15	7.49	10.47	7.47	
10/2/15	7.62	10.79	7.99	
10/2,3/15	3/4"rain			
10/5/15	7.63	11.01	8.18	
10/13/15	8.07	11.52	8.62	
10/19/15	8.29	11.80	8.89	
10/21,22,23 @ 1 1/4" rain				
10/26/15	8.21	11.79	8.92	
11/2/15	8.55	12.09	8.22	
11/2/15	G.M.P. & 5th st. wells off for season			
11/4/15	Lorenz dewatering well OFF			
11/5/15	1" rain			
11/9/15	7.78	10.54	8.26	