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GREATROCK NORTH WATER AND SANITATION DISTRICT
ENGINEER'S REPORT
FEBRUARY 23, 2015

Concentrate Disposal and Discharger Specific Variance

TZA Water Engineers, Lisa Johnson, and Director John Wyckoff met with the Water Quality Control Division to discuss our concept for a Discharger Specific Variance (DSV). The Division's Standards Unit Manager, Sarah Johnson, and staff, although intrigued by the District's predicament, indicated the DSV process is only for existing permitted dischargers. The Division did suggest a couple of options to research. I have contacted the Division's Permits Section Manager and the Town of Castle Rock's Water Resources Manager for additional information.

Parallel to the discharge permit efforts, TZA has met with Director Wyckoff and Director Rob Fleck to discuss alternatives to a discharge permit. These alternatives will be discussed at the March Board meeting.

Curb Stops

The two form letters previously drafted will be issued, pending the District Manager's assessment of the water meter locations in Box Elder Creek Ranch in relation to the platted utility easements and the Board's direction.

Greatrock North Pump Station Improvements

High Plains Engineering & Design has conducted the geotechnical investigation of the pump station site. TZA is awaiting the foundation recommendations from High Plains. PWSI, Inc. has conducted the topographic survey of the existing improvements on Tract A and provided a CAD file with the survey. TZA has reviewed the CAD file and presented a few questions to PWSI. TZA Water Engineers has developed preliminary plans for the new pump station, and will present the updated plan and profile views at the March Board meeting.

Reverse Osmosis Condition Assessment

Pure Water Solutions has presented a proposal to inspect the RO unit in greater detail and attempt to calibrate the unit's parameter sensors, including inlet conductivity, permeate conductivity, permeate temperature, inlet pH, inlet oxidation reduction potential (ORP), permeate flow, and concentrate flow. Other items to be discussed with Pure Water while on-site include anti-scalent and dosing procedures, membrane replacement options, change in pre-filters, and back-washable multi-media filtration addition.

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Well, Pump, and Motor Replacements

The District has recently initiated efforts to better understand its well infrastructure and the potential need for replacement of pumps and motors, as well as the well structures themselves. As a part of that effort, TZA Water Engineers is working with Bishop-Brogden Associates to compile the historical aspects of the wells constructed, the pumps installed, and any other improvements (i.e. water level measuring devices) integrated at each site. This information will be used to evaluate the benefits of a pump, motor, and well maintenance program to detect changes in well performance. Early detection of deterioration in well performance will allow less expensive repairs, rehabilitation, or treatment procedures in order to maximize production capacity. This preventative maintenance program will be discussed with the District's Manager, and a formal proposal will be brought to the Board if deemed appropriate.

Other Activities

Water Quality and Hardness – Below are tables of water quality data from a series of sampling events:

The total dissolved solids tabulated below show improved water quality as a result of reduced outdoor water usage and the ratio of reverse osmosis permeate to unfiltered water. The current ratios are approximately:

- 48% reverse osmosis permeate
- 42% unfiltered Upper Arapahoe well water
- 10% unfiltered alluvial well water (Alluvial Well No. 1)

Total Dissolved Solids (TDS)			
Date	BECR Tanks	RHF Tank	GN Tank
02/02/15	350 mg/l	394 mg/l	383 mg/l
01/14/15	350 mg/l	394 mg/l	417 mg/l
12/03/14	417 mg/l	552 mg/l	511 mg/l
10/01/14	538 mg/l	603 mg/l	594 mg/l
07/11/14	565 mg/l	597 mg/l	599 mg/l
03/05/14	586 mg/l	543 mg/l	566 mg/l
01/08/14	553 mg/l	559 mg/l	575 mg/l
10/28/13	677 mg/l	643 mg/l	594 mg/l

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The total hardness results tabulated below also show improved water quality as a result of reduced outdoor water usage and the ratio of reverse osmosis permeate to unfiltered water.

Total Hardness (as CaCO3)			
Date	BECR Tanks	RHF Tank	GN Tank
02/02/15	83.4 mg/l	113.8 mg/l	104.6 mg/l
01/14/15	105.2 mg/l	123.0 mg/l	111.7 mg/l
12/03/14	115.3 mg/l	194.5 mg/l	169.8 mg/l
10/01/14	188.8 mg/l	231.7 mg/l	225.6 mg/l
07/11/14	221.5 mg/l	222.7 mg/l	220.4 mg/l
05/16/14	165.2 mg/l	209.6 mg/l	198.1 mg/l

For comparison, the hardness values are generally classified as:

Classification	Mg/l
Soft	0 – 60
Moderately hard	61 – 120
Hard	121 – 180
Very hard	GTE 181

Utility Billings and Energy Costs – TZA Water Engineers continue to track the United Power utility bills and associated water operations. For 2014, the District used 48% of the electricity and reduced its costs by 62% over the last two years.

Energy usage (kWH)				
	2012 YTD	2013 YTD	2014 YTD	2015 YTD
Alluvial Wells	2,970	2,136	2,341	2,185
RO WTP and BECR Pump Station	13,520	13,680	15,360	15,160
GN Pump Station	4,200	5,400	5,440	6,160
RHF Pump Station	3,960	17,520	2,400	2,200
Totals	**24,650**	**38,736**	**25,541**	**25,705**

Billing Amounts				
	2012 YTD	2013 YTD	2014 YTD	2015 YTD
Alluvial Wells	$547.88	$358.98	$277.72	$260.28
RO WTP and BECR Pump Station	$1,651.60	$1,725.12	$1,108.54	$1,197.57
GN Pump Station	$467.45	$670.70	$435.45	$516.66
RHF Pump Station	$372.28	$1,596.64	$226.87	$213.20
Totals	**$3,039.21**	**$4,351.44**	**$2,048.58**	**$2,187.71**

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Water Operations ($/1000 gallons)		
	2014 YTD	2015 YTD
Alluvial Wells	$0.1614	$0.1595
RO WTP and BECR Pump Station	$0.5170	$0.5435
GN Pump Station	$0.8028	$0.6640
RHF Pump Station	$0.5114	$0.4454

Draft Storage Tank Rule – The Water Quality Control Division has drafted a Storage Tank Rule (https://docs.google.com/file/d/0B0tmPQ67k3NVUzAyd2dEekt5Tnc/edit) that will be considered by the Water Quality Control Commission in January of 2015 and will become effective January of 2016. In addition to quarterly periodic (visual) inspections, this rule will require comprehensive inspections to be scheduled at least every five years.

Warranty Inspections – Ramey Environmental Compliance is tracking the 11-month warranty inspections for the following projects:

- Rocking Horse Farms Pump Station – The warranty inspection was conducted by Jeff Rabas on July 18, 2014.
- Box Elder Creek Ranch Pump Station – The warranty inspection was conducted by Brad Simons on January 26, 2015.
- Rocking Horse Farms Tank Repainting – The improvements were inspected and accepted on June 11, 2014.

Greatrock North Flow Meter – TZA Water Engineers is supporting Ramey Environmental Compliance with the procurement of a magnetic flow meters to replace the suspect and/or failed meters at the Greatrock North water facilities.

Quarterly Operations Review – TZA Water Engineers will continue to participate in the Quarterly Operations Reviews at the request of the District Manager. Action items from the January 26, 2015 meeting are highlighted below:

1) Discuss service matters with Timber Line Electric and Control Corporation since Anthony's departure.
2) Confirm curb stop specifications and communicate to the group. Recommendations communicated to District Manager via e-mail on January 27, 2015.
3) Contact Pure Water Solutions to request quote to calibrate Thornton display and RO probes, etc. Pure Water Solutions presented a proposal to the District on February 20, 2015 which was forwarded to the District Manager via e-mail on the same date.