

## Koehler Well History Summary

Attached are the well registrations for the three Koehler wells.

Attached are the receipts for the irrigation well repairs from 2012 in the amount of \$28,048.95. The irrigation well was designed for 1100 gpm.

Attached are the receipts for the installation of a pivot sprinkler in the amount of \$123,926.00. The sprinkler is designed for 950 gpm.

Attached, last sheet, is the data sheet for the design of the irrigation well rebuild in 2012. At the time of the rebuild the well was pumping 1100 gpm, 1760 rpm and a head depth of 71.8 and a static water level of 40.5 feet. As of 2019 the well was pumping 550 gpm, 1760 rpm and a head depth of over 80 feet and the static water level of 50.71. The well is no longer pumping enough water for the pivot sprinkler. The static water level was measured by quality Well and Pump at the time of the well rebuild.

The dewatering of the Loloff Pit started April of 2013 and was continuously dewatered until August 2017. The dewatering of the Derr Pit started July 2019. The static water level went from 40.5 feet to 49.55 feet between Jan 2012 to Oct 2019 with a loss of 9.05 feet. The static water level went from 49.55 feet to 50.71 feet between Oct 2019 to April 2020 with a loss of 1.16 feet. See Attachment "Summary of water Measurements at the Derr Pit"

The dewatering of the Loloff Pit and Derr Pit have depleted the ground water levels in the wells north of the gravel pits. The lowering of the static water levels has lowered the well output. See attached map for the well locations.

## KOEHLER FARM/WELL HISTORY

1948-1950 Farm was purchased by Conrad Koehler. (father of Jim ) House built in 1951.

1948-1950 Domestic and Stock wells were constructed

April 1960 Irrigation well ( #11564) was constructed. Depth 110', Static water 35', 1200 gpm

1965 Farm was purchased by Jim Koehler

2011/2012 Irrigation well rebuilt \$28,048.95 Static water 40.5' 1100 gpm

February 2019 Pivot Sprinkler installed \$123,926

August 2019 Domestic Well and Stock Well were registered #314643 & #314644 respectively  
Water Engineer, Rick Parsons, Informed that the wells should be registered.

September 2019 Flow meter installed indicating 500 gpm

### Conclusion

Well Static water level went from **35.0 feet to 40.5 feet over a period of 52 years -5.5**

Well static water level went from **40.5 feet to 49.55 feet from Jan 2012 to Oct 2019 -9.0**

Well static water level went from **49.55 feet to 50.71 feet from Oct 2019 to April 2020 -1.19**

Total amount of water level **loss 14.71 feet.**



SEP 15 1960  
Form F (Rev.)  
7-57/5M

Ret to check Well work  
Hruby

APR 14 1960

STATE OF COLORADO  
DIVISION OF WATER RESOURCES  
OFFICE OF THE STATE ENGINEER, GROUND WATER SECTION  
REGISTRATION NO. 11564 OF WELL #2  
COLORADO  
STATE ENGINEER

Registrant Conrad Koehler

Date April 13 19 60

P.O. Address Route 1 Box 17 - Greeley, Colo.

WELL LOCATION  
County Weld 62

WELL DATA  
Depth 110 ft. Diameter 18 in.

NE  $\frac{1}{4}$ , SE  $\frac{1}{4}$ , Section 33

Casing : 65 ft. Plain; 35 ft. Perfor.

Twp. 6 N, Rge. 65 W 6 PM

Static Water Level 35 ft. from top

Yield 1200 (gpm)(cfs) from 60 ft.

Used for Irrigation on/at

E $\frac{1}{2}$ , SE $\frac{1}{4}$ , Sec. 33, Twp. 6 N, Rge. 65 W  
(legal description of land or site)

Water conveyed by Pipe, size 12 inch

PUMP DATA  
Type Turbine Size 8 inch

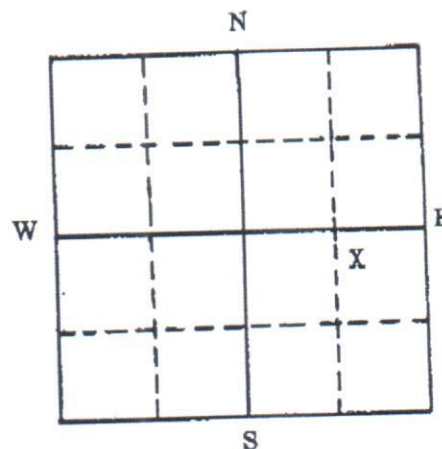
Driven by 25 H.P. Elec. at 1760 RPM

Well was first used July, 19 55

for Irrigation using 1200 gpm

Well enlarged                     , 19    to  
deepened                      (gpm)(cfs)(ft)

LOG SHOULD BE GIVEN ON REVERSE  
SIDE IF AVAILABLE



WELL TO BE LOCATED AS ACCUR-  
ATELY AS POSSIBLE WITHIN A  
SMALL SQUARE WHICH REPRESENTS  
40 ACRES; OR IF IN A TOWN OR  
SUBDIVISION FILL IN THE FOLLOW-  
ING:

Town or Subdivision

Street address or Lot and Block

The above well (~~XXX~~) (has not) been registered in the Office of the State Engineer prior  
to May 1, 1957. If Registered give Filing No.                     

If NOT Registered prior to May 1, 1957, a \$5.00 filing fee accompanies this form.

The above statements are true and correct to the best of my knowledge and belief.  
Subscribed and Sworn before me

this 13<sup>th</sup> day of April, 19 60.

My commission expires Dec 11, 1961

(SEAL) Wilma M. Meeker  
Notary Public

CONRAD KOEHLER  
BY: Conrad Koehler  
Registrant

FOR STATE ENGINEER'S USE  
Located in 1-3 district, Weld County for IRRIGATION  
Registration No. 417 in 1-3, on                     , 19 60



**COLORADO**  
Division of Water Resources  
Department of Natural Resources

WELL PERMIT NUMBER 314644-  
RECEIPT NUMBER 3693098B

**ORIGINAL PERMIT APPLICANT(S)**

JAMES R KOEHLER REVOCABLE TRUST (KOEHLER,  
JAMES R.)

**APPROVED WELL LOCATION**

Water Division: 1 Water District: 3  
Designated Basin: N/A  
Management District: N/A  
County: WELD  
Parcel Name: N/A  
Physical Address: 1001 EAST C STREET GREELEY, CO 80631  
SE 1/4 SE 1/4 Section 33 Township 6.0 N Range 65.0 W Sixth P.M.

**UTM COORDINATES (Meters, Zone: 13, NAD83)**

Easting: 528712.2 Northing: 4476182.3

**REGISTRATION OF 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) Construction details for this existing well have not been provided to this office; therefore, it is not known if the construction of this well is in compliance with the Water Well Construction Rules, 2 CCR 402-2. The issuance of this permit does not relieve the well owner of responsibility or liability in the event contamination of the groundwater source results from the construction or use of this well, nor does the State Engineer assume any responsibility or liability should contamination occur.
- 3) This well is recorded and permit approved in accordance with CRS 37-92-602(5) for historical use as indicated herein and described in CRS 37-92-602(1)(b), being a well producing 7 GPM and used for the watering of livestock on a farm or ranch.
- 4) The date of first beneficial use, as claimed by the applicant, is December, 1949.

NOTE: The uses identified in condition #3 above are based on the Applicant's written claim regarding the historical use of this well prior to May 8, 1972. These uses have not been verified or confirmed by field inspection from DWR staff. Any expanded use of this well occurring on or after May 8, 1972, or any use that had been abandoned by 10 or more consecutive years of non-use, shall not be covered by this permit.

*Javier Vargas-Johnson*

Issued By JAVIER VARGAS-JOHNSON

Date Issued: 8/26/2019

Expiration Date: N/A





**COLORADO**  
Division of Water Resources  
Department of Natural Resources

WELL PERMIT NUMBER 314643-  
RECEIPT NUMBER 3693098A

**ORIGINAL PERMIT APPLICANT(S)**

JAMES R KOEHLER REVOCABLE TRUST (KOEHLER,  
JAMES R.)

**APPROVED WELL LOCATION**

Water Division: 1 Water District: 3  
Designated Basin: N/A  
Management District: N/A  
County: WELD  
Parcel Name: N/A  
Physical Address: 1001 EAST C STREET GREELEY, CO 80631  
SE 1/4 SE 1/4 Section 33 Township 6.0 N Range 65.0 W Sixth P.M.

**UTM COORDINATES (Meters, Zone: 13, NAD83)**

Easting: 528582.2 Northing: 4476192.4

**REGISTRATION OF 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) Construction details for this existing well have not been provided to this office; therefore, it is not known if the construction of this well is in compliance with the Water Well Construction Rules, 2 CCR 402-2. The issuance of this permit does not relieve the well owner of responsibility or liability in the event contamination of the groundwater source results from the construction or use of this well, nor does the State Engineer assume any responsibility or liability should contamination occur.
- 3) This well is recorded and permit approved in accordance with CRS 37-92-602(5) for historical use as indicated herein and described in CRS 37-92-602(1)(b), being a well producing 7 GPM and used for the irrigation of not more than 0.33 acres of home gardens and lawns.
- 4) The date of first beneficial use, as claimed by the applicant, is December, 1949.

NOTE: The uses identified in condition #3 above are based on the Applicant's written claim regarding the historical use of this well prior to May 8, 1972. These uses have not been verified or confirmed by field inspection from DWR staff. Any expanded use of this well occurring on or after May 8, 1972, or any use that had been abandoned by 10 or more consecutive years of non-use, shall not be covered by this permit.

*Javier Vargas-Johnson*

Issued By JAVIER VARGAS-JOHNSON

Date Issued: 8/26/2019

Expiration Date: N/A



Quality Well & Pump

970.353.3118

## PROPOSAL: Turbine Repair

**Zimmatic**

Name: **Koehler Brothers - Perry Wiedeman**

Date: **October 13, 2011**

Address:

City, ST, ZIP:

Phone:

Location:

We hereby submit specifications and estimates for:

Well collapsing. Pull pump and install liner. 30' of galvanized Johnson Screen and 55' of 14" plain casing. Sonar Jet well with 2 - 25' charges. Sandbucket liner into place without bottom on.

### DESIGN POINT

GPM (total)

PSI (at pump)

Pumping Level

Column Losses

Design TDH

Estimated BHP

Est. Pumpbowl Eff.

Est. Pumping plant HP

75

105

84.0%

Not all pump repairs and service which may be necessary can be anticipated until the pump is removed from the well and thoroughly inspected. All changes or modifications to this proposal will be approved by the customer as the job progresses.

Quantity	Description	Price each	Total
30	Mileage charge, Sonar Jet/Camera	\$ 2.80	\$ 84.00
1	Sand Bucket/Bailing Setup charge	\$ 161.25	\$ 161.25
1	Sand Bucket Hourly charge	\$ 147.50	\$ 147.50
1	Sonar Jet Setup charge	\$ 795.00	\$ 795.00
2	Sonar Jet Device, 25 ft	\$ 980.00	\$ 1,960.00
85	Install 14" liner, per foot	\$ 32.80	\$ 2,788.00
55	Liner, Steel 14"dia x .25" wall plain per ft	\$ 72.20	\$ 3,971.00
30	Liner, Johnson Screen - 20' per ft	\$ 122.40	\$ 3,672.00

The stated price on this proposal is an estimate only. Upon removing the pump and after further inspection, additional repairs may be warranted,

which cannot be anticipated at this time. The customer shall be informed of and approve any charges above the estimated price shown on this proposal.

All materials are guaranteed to be as specified. All work shall be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs shall be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control Owner shall carry fire, tornado, and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.

Customer's Acceptance of Proposal: The above prices, specifications, and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as stated above.

Customer Signature:

Date

Chris Jones  
Quality Well and Pump

**Total \$ 13,578.75**

28,048.95





**Quality Well & Pump**

**970.353.3118**

# PROPOSAL: Turbine Repair

**Zimmatic**

Name: **Koelher Brothers - Perry Wiedeman**

Date: **October 13, 2011**

Address:  
City, ST, ZIP:  
Phone:

Location:

We hereby submit specifications and estimates for:

Well showing signs of caving in...pumping gravel. Pulled pump and found bowls full of rock and gravel. Oil tube, lineshaft, and column pipe all thin and rusted out. Replac all 80' of COTS and replace bowl with single stage 12" MS. Replace headshaft, add bowl screen and 5 gallon drip tank. Remachine packing gland and motor to be rebuilt at Greeley Electric

## DESIGN POINT

GPM (total)	1100
PSI (at pump)	
Pumping Level	65
Column Losses	
Design TDH	73
Estimated BHP	24.1
Est.Pumpbowl Eff.	84.0%
Est. Pumping plant HP	25.7

Not all pump repairs and service which may be necessary can be anticipated until the pump is removed from the well and thoroughly inspected. All changes or modifications to this proposal will be approved by the customer as the job progresses.

Quantity	Description	Price each	Total
1	American Marsh 12MS Bowl Assy, 1 stage	\$ 3,517.64	\$ 3,517.64
1	Headshaft nut, 1"	\$ 87.40	\$ 87.40
1	Headshaft Gib Key, 5/16"	\$ 3.91	\$ 3.91
1	Headshaft, machine charge	\$ 188.00	\$ 188.00
37	Headshaft, 1" per inch	\$ 3.75	\$ 138.75
8	Col/Tube/Shaft 8/1.5 x 10 ft	\$ 880.00	\$ 7,040.00
1	Greeley Electric Motor Repairs	\$ 1,080.00	\$ 1,080.00
1	Drip Oil and Cleaning Fluid	\$ 56.50	\$ 56.50
1	Re-Machine Packing Gland	\$ 284.00	\$ 284.00
1	Flange Gasket, 8"	\$ 22.90	\$ 22.90
1	Basket Strainer 8"	\$ 463.00	\$ 463.00
5	Drip oil, gallon	\$ 11.30	\$ 56.50
1	Drip Oil Poly Tank 5 Gallon w/ Manual Drip Valve	\$ 288.00	\$ 288.00
3	Pull turbine pump, hourly rate	\$ 167.50	\$ 502.50
4	Set turbine pump, hourly rate	\$ 167.50	\$ 670.00
18	Mileage charge, rig only	\$ 3.95	\$ 71.10

The stated price on this proposal is an estimate only. Upon removing the pump and after further inspection, additional repairs may be warranted,

**Total \$ 14,470.20**

which cannot be anticipated at this time. The customer shall be informed of and approve any charges above the estimated price shown on this proposal.

All materials are guaranteed to be as specified. All work shall be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs shall be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control Owner shall carry fire, tornado, and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.

Chris Jones  
Quality Well and Pump

Customer's Acceptance of Proposal: The above prices, specifications, and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as stated above.

Customer Signature:

Date

**Valley Irrigation of Greeley**

P.O. Box 307  
Greeley, CO 80632  
USA

**INVOICE**

Invoice Number: 66701  
Invoice Date: Feb 28, 2019  
Page: 1  
Duplicate

Voice: 970-351-7930  
Fax: 970-351-7932

**Bill To:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

**Ship to:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

Customer ID	Customer PO	Payment Terms	
KOEJA		ON RECEIPT	
Sales Rep ID	Shipping Method	Ship Date	Due Date
			2/28/19

Quantity	Item	Description	Unit Price	Amount
1.00		VALLEY PIVOT, 7 TOWER 1275'	78,598.00	78,598.00
		*THIS 1 MORE SPAN & 130' LONGER THAN CONTRACT SINCE OIL FACILITY WILL BE COMING OUT. IT COST ADDITIONAL \$8988		
100.00		12" 80# PVC	5.70	570.00
1.00		CONCRETE FOR ENDS @ POND	525.00	525.00
1.00		25HP CENTRIFLOAT PUMP WHOSE & CORD	10,900.00	10,900.00
1.00		700A CLEMONS FILTER	1,375.00	1,375.00
1.00		2 1/2" BRASS BALL VALVE	100.00	100.00
2.00		8" PVC 90 ELBOWS	90.00	180.00
3.00		8" VAN STONE FLANGES	95.00	285.00
2.00		8" BUTTERFLY VALVE	260.00	520.00
1.00		12" 90 PVC ELBOW	200.00	200.00
225.00		#2 POWER WIRE	1.67	375.00
1,475.00		#4 POWER WIRE W/KILL CIRCUIT	1.60	2,360.00
1,400.00		8" 80# PVC	2.35	3,290.00
2.00		2" AIR RELIEF VALVE	34.00	68.00
1.00		2" PRESSURE RELIEF VALVE	139.00	139.00
3.00		2" HALF NIPPLES	11.00	33.00
Subtotal				Continued
Sales Tax				Continued
Freight				
Total Invoice Amount				Continued
Payment/Credit Applied				
<b>TOTAL</b>				<b>Continued</b>

Check/Credit Memo No:

Overdue invoices are subject to late charges.

123,926.31



**Valley Irrigation of Greeley**

P.O. Box 307  
Greeley, CO 80632  
USA

**INVOICE**

Invoice Number: 66701  
Invoice Date: Feb 28, 2019  
Page: 2  
*Duplicate*

Voice: 970-351-7930  
Fax: 970-351-7932

**Bill To:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

**Ship to:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

Customer ID	Customer PO	Payment Terms	
KOEJA		ON RECEIPT	
Sales Rep ID	Shipping Method	Ship Date	Due Date
			2/28/19

Quantity	Item	Description	Unit Price	Amount
3.00		8" STEEL 90 ELBOWS	90.00	270.00
8.00		8" STEEL FLANGES	25.00	200.00
5.00		8" RED RUBBER GASKETS	5.00	25.00
13.00		8" OD STEEL PIPE	15.00	195.00
1.00		8 5/8 X 8 HEX FLANGE	50.00	50.00
1.00		8" CHEM CHECK VALVE	520.00	520.00
1.00		8X6 CONE	18.00	18.00
1.00		6" STEEL 45 ELBOW	50.00	50.00
1.00		6" STARTER BELL	20.00	20.00
1.00		6" RINGLOCK	16.00	16.00
1.00		6" BARB	60.00	60.00
1.00		10X8 TEE	110.00	110.00
1.00		12X10 REDUCER	63.00	63.00
1.00		10" PVC 90 ELBOW	145.00	145.00
1.00		10" GLUE COUPLER	35.00	35.00
1.00		10" ALFALFA VALVE	200.00	200.00
1.00		10X10 UNIV HYDRANT	502.00	502.00
40.00		10" 80# PVC	4.00	160.00
2.00		10" DRAW BANDS	8.00	16.00
1.00		12" CLAY X PVC BOOT COUPLER	75.00	75.00
2.00		IDEAL BANDS	2.00	4.00

Subtotal	Continued
Sales Tax	Continued
Freight	
Total Invoice Amount	Continued
Payment/Credit Applied	
<b>TOTAL</b>	<b>Continued</b>

Check/Credit Memo No:

Overdue invoices are subject to late charges.

**Valley Irrigation of Greeley**

P.O. Box 307  
Greeley, CO 80632  
USA



Voice: 970-351-7930  
Fax: 970-351-7932

**INVOICE**

Invoice Number: 66701  
Invoice Date: Feb 28, 2019  
Page: 3  
*Duplicate*

**Bill To:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

**Ship to:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

Customer ID	Customer PO	Payment Terms	
KOEJA		ON RECEIPT	
Sales Rep ID	Shipping Method	Ship Date	Due Date
			2/28/19

Quantity	Item	Description	Unit Price	Amount
2.00		1" BRASS BALL VALVE	20.00	40.00
2.00		1X3 NIPPLE	2.50	5.00
2.00		1" COUPLER	4.00	8.00
1.00		3" AIR RELIEF	65.00	65.00
1.00		3" HALF NIPPLE	12.00	12.00
1.00		10X8 CONE	28.00	28.00
1.00		10" OD STARTER	40.00	40.00
1.00		EXCAVATION LABOR, POND, CONCRETE WORK, DIG UP/REPAIR LINE @ WELL	12,300.00	12,300.00
1.00		VALLEY WELDING PUMP, PIVOT WELL	950.00	950.00
1.00		ELECTRICIAN TIE IN & MATERIALS	6,800.00	6,800.00
1.00		PRE PAYMENT CHECK #475	100,000.00	-100,000.00
		*7 TOWER PIVOT WAS \$8988 ADDITIONAL. THE WELL PIPELINE, TIE-IN AND ALFALFA VALVE OUTLET, PLUS FLOOD OUTLET AT PIVOT WAS \$2237 ADDITIONAL.		
Subtotal				22,500.00
Sales Tax				
Freight				
Total Invoice Amount				22,500.00
Payment/Credit Applied				
<b>TOTAL</b>				<b>22,500.00</b>

Check/Credit Memo No:

Overdue invoices are subject to late charges.



**Valley Irrigation of Greeley**

P.O. Box 367  
Greeley, CO 80632  
USA



Voice: 970-351-7930  
Fax: 970-351-7932

**INVOICE**

Invoice Number: WO21799  
Invoice Date: Sep 30, 2019  
Page: 1

*Duplicate*

**Bill To:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

**Ship to:**

JAMES R. KOEHLER  
1001 EAST C ST.  
GREELEY, CO 80631

Customer ID	Customer PO	Payment Terms	
KOEJA		Net 30 Days	
Sales Rep ID	Shipping Method	Ship Date	Due Date
			10/30/19

Quantity	Item	Description	Unit Price	Amount
1.00	I9	8 5/8 FLOW METER	1,285.31	1,285.31
1.00	#1W	WELDING LABOR	130.00	130.00
0.25	#1TT	TRAVEL TIME	20.00	5.00
3.00	#1TM	MILEAGE	2.00	6.00
		I INSTALLED A FLOW METER.		
Subtotal				1,426.31
Sales Tax				
Freight				
Total Invoice Amount				1,426.31
Payment/Credit Applied				
<b>TOTAL</b>				<b>1,426.31</b>

Check/Credit Memo No:

*Paid 10-4-19*

Overdue invoices are subject to late charges.

Company: Quality Well and Pump, LLC  
 Name: Koehler Brothers - 25HP US  
 Date: 10/13/2011



**Pump:**

Size: 12MS (1 stage)  
 Type: 480 VRT-TURBINE/OPEN  
 Synch speed: 1800 rpm  
 Curve: 2956  
 Specific Speeds:  
 Dimensions:  
 Vertical Turbine:  
 Speed: 1760 rpm  
 Dia: 9.375 in  
 Impeller:  
 Ns: 2489  
 Nss: 7579  
 Suction: 8 in  
 Discharge: 6 in  
 Bowl size: 11.3 in  
 Max lateral: 0.75 in  
 Thrust K factor: 12.5 lb/ft

**Search Criteria:**

Flow: 1100 US gpm  
 Head: 60 ft  
 Fluid:  
 Water  
 Density: 62.37 lb/ft<sup>3</sup>  
 Viscosity: 1.105 cP  
 NPSHa: ---  
 Temperature: 60 °F  
 Vapor pressure: 0.2563 psi a  
 Atm pressure: 14.7 psi a

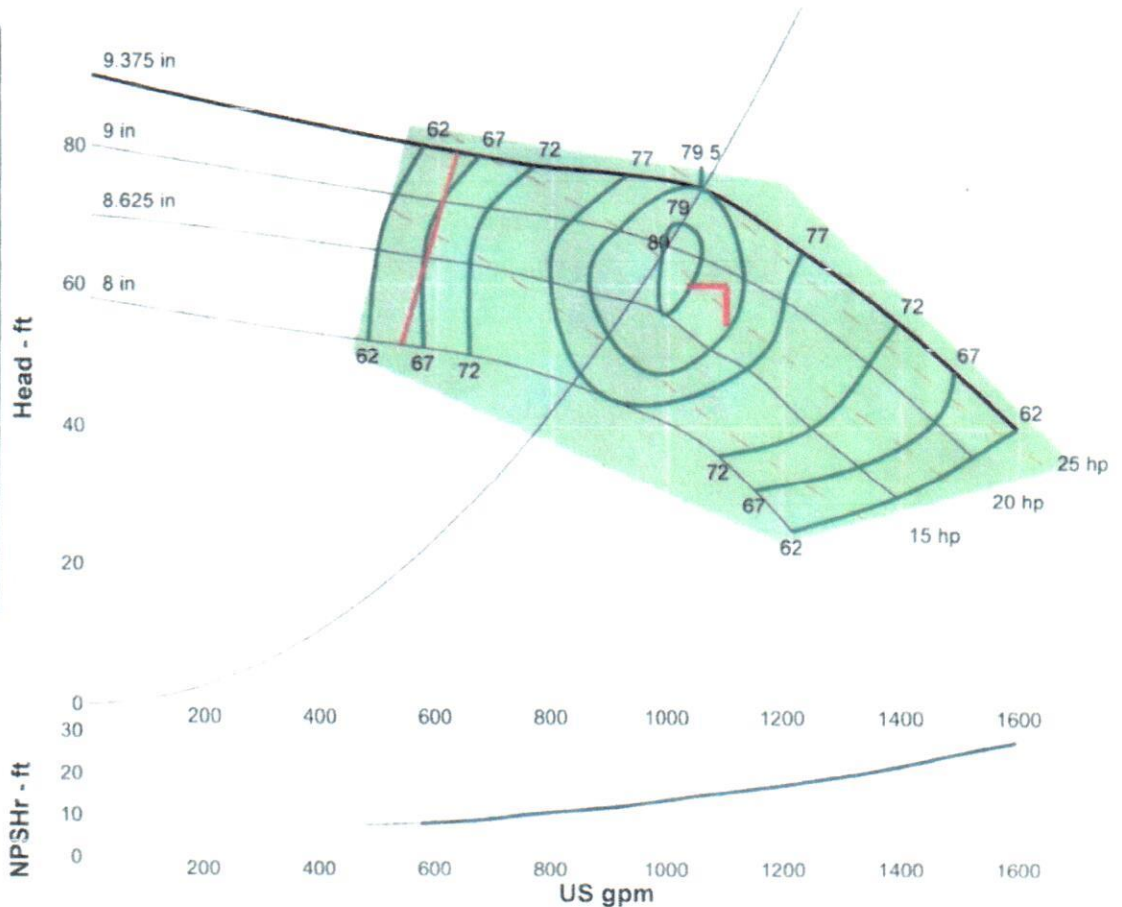
**Motor:**

Standard: NEMA  
 Enclosure: TEFC  
 Sizing criteria: Max Power on Design Curve  
 Size: 30 hp  
 Speed: 1800  
 Frame: 286T

**Pump Limits:**

Temperature: 250 °F  
 Pressure: 584 psi g  
 Sphere size: 0.625 in  
 Power: 450 hp  
 Eye area: ---

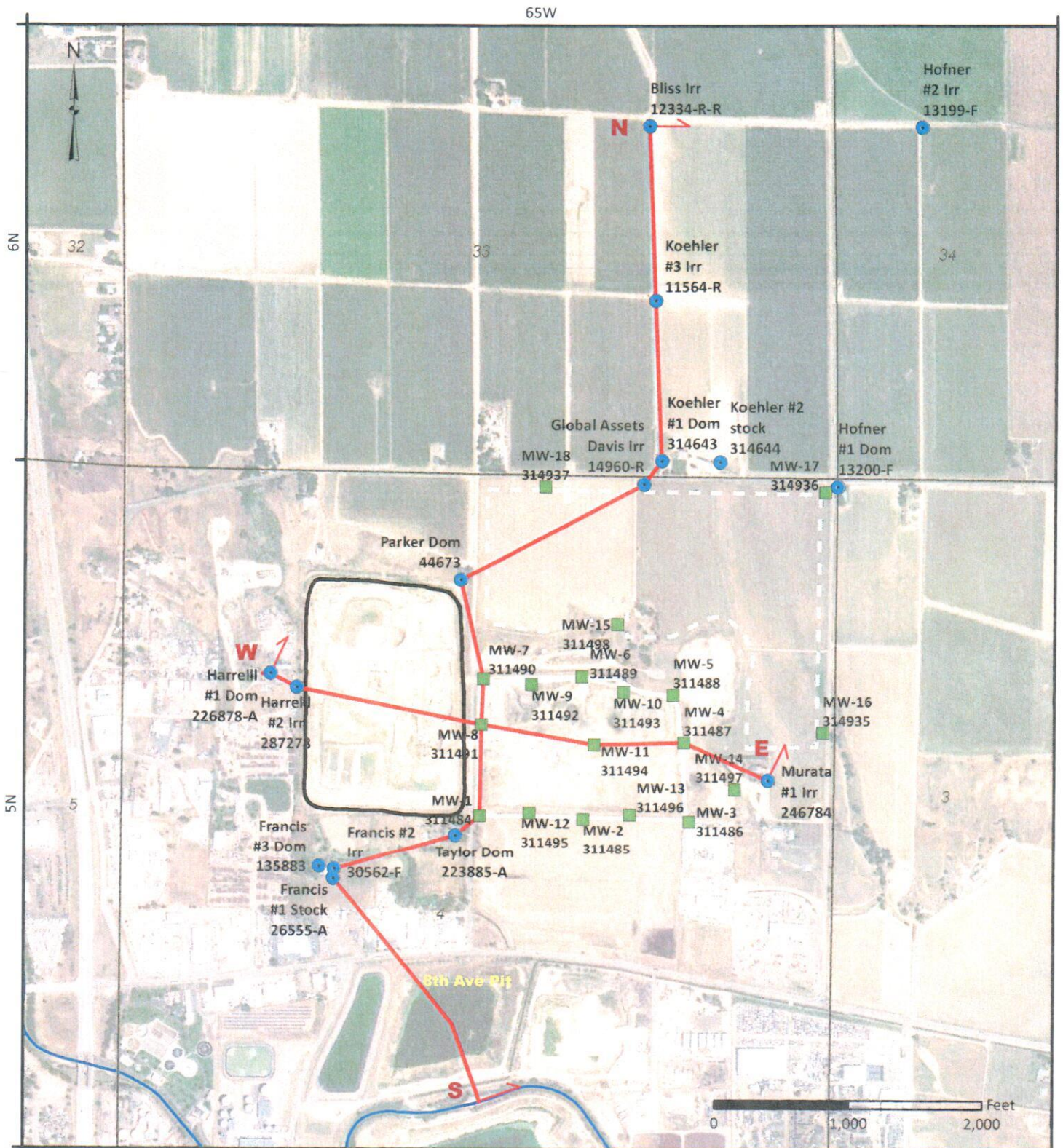
--- Data Point ---	
Flow:	1100 US gpm
Head:	71.8 ft
Eff:	79%
Power:	25.2 hp
NPSHr:	15.8 ft
--- Design Curve ---	
Shutoff head:	90 ft
Shutoff dP:	39 psi
Min flow:	634 US gpm
BEP:	80% @ 1056 US gpm
NOL power:	27 hp @ 1488 US gpm
--- Max Curve ---	
Max power:	27 hp @ 1488 US gpm



**Performance Evaluation:**

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
1320	1760	59.5	74	26.6	20.3
1100	1760	71.8	79	25.2	15.8
880	1760	76.4	76	22.5	11.9
660	1760	78.8	66	19.8	8.89
440	1760	---	---	---	---





**Figure 1**  
**Cross-Section Locations**

Derr Pit  
Weld County, Colorado

**Map Legend**

— Cross-Section

● Registered Well Used for Monitoring

■ Monitoring Well

□ Loloff Pit with Slurry Wall

Derr Pit with Planned Slurry Wall (2020)

Derr Pit Amendment with Future Slurry Wall

Sources:  
CDSS Well Permit Database 100119, JT Consulting  
Monitoring Well Data, Google Earth Image 2018, ESRI  
World Topo, USGS DEM 10m

Date: November 11, 2019  
Datum/Projection: NAD83/Colorado State  
Plane North, feet



**McGrane Water**  
Engineering, LLC