**MEMORANDUM**

TO: Water Right File 63-34660

FROM: Daniel Nelson – Analyst 3

DATE: July 10, 2020

SUBJECT: Additional Questions Review for Water Right 63-34660

Some additional questions came up that need to be addressed. I determine it would be best to answer these questions with a separate memo.

The first question concerned the pond. The pond is an irrigation regulation pond. There are only 2 acre being irrigated with supplemental irrigation water, but there are up to 19 acres that can still be irrigated from the Farmer's Union Ditch Company water rights. Therefore, to determine if the pond fits the 24 hour rule for an irrigation pond, we must determine the amount of water that can be diverted to the entire 19 acres. I calculated this by multiplying the 19 acres by 0.02 cfs/acre to determine an estimated diversion rate of 0.38 cfs. I then multiplied the 0.38 cfs by 1.9835 to attain the volume of water this diversion rate could produce in a 24 hour period or 0.75 af. The pond surface are is 0.04 acres. I divided the 0.75 af by the 0.04 acres of surface area to get the maximum possible depth of the pond or 18.75 ft. This pond is only an irrigation regulation pond, and is only deep enough to provide adequate suction for the pump. These ponds are generally only 2 to 4 feet deep, so this pond clearly fits within the 24 hour rule.

The application for permit and the field examiner describes the filling of the water truck for sewer clean out throughout the district. A concern was raised as to why we didn't include the sewer district boundary as the place of use. I consider this system is similar to cement mixing and road construction industrial uses. Cement trucks are filled with water and cement and taken to another location for distribution, and water trucks are filled for road construction and taken to different locations. We don't count the places the cement is taken to or where road construction takes place as part of the place of use for an industrial use in these instances. The industrial use is generally considered the location where the trucks are filled, not where the water is used. The permit approval and the field examiner determined that the place of use should be where the trucks are filled. Requiring an amendment and $100 fee to change the place of use to the sewer district service area would be a burden on the permit holder.

The field examiner's acres per 40 acre tract did not match the acres that I found when trying to recreate the place of use. We both found 2 acres, but the acre amounts per 40 acre tract varied slightly. The field examiner doesn't have access to the Department's mapping capabilities, so I used our acre amounts per 40 acre tract to ensure the shape files I created match the acre amounts being irrigated. This was corrected at licensing.

I inadvertently added in the volume that the field examiner calculated for fire protection (0.74 af) into the industrial use. Therefore, the 21.8 af I calculated in my memo should be reduced to 21.1 af.

I should have changed condition R65 to R61 due to the overlapping surface water rights. This will be corrected on the license. The water bearing zone will also be corrected to 206 to 268 feet.

The application for permit was originally received on January 14, 2019. The application was complete, but an amendment to the application was received with a payment to increase the diversion rate for the fire protection portion of the permit on March 11, 2019. The priority date was changed to March 11, 2019, the date the permit was received showed a different date. The date an acceptable permit was received was March 11, 2019 for the amounts that were approved in the permit. Therefore, the application received date should be March 11, 2019.

**MEMORANDUM**

TO: Water Right File 63-34660

FROM: Daniel Nelson – Analyst 3

DATE: May 13, 2020

SUBJECT: Licensing Review of Water Right 63-34660

The field exam for this right was performed by Certified Water Right Examiner Kevin Boggs of Jacobs Engineering. Mr. Boggs Recommended 1.11 cfs and 0.74 af for fire protection, 0.03 cfs and 0.33 af for domestic, 0.03 cfs and 20.73 af for industrial, and 0.03 cfs and 9 af for irrigation.

**History and Overlap:**

This permit was filed to cover a new sewer processing plant in the Eagle area. There is an existing plant south of this plant in Government Lots 2 (NWNE) and Lot 1 (NENE). According to Mr. Boggs this plant is covered by an exempt well that is not connected into the same system as this facility. The site plans supplied by Mr. Boggs confirm this issue. There are two existing domestic rights that appear to cover the same place of use. The first right 63-17217 supplies water to a home that was part of the original property, but the home is not owned by permit holder.

The second right, 63-17216 was for a home that was torn down to make way for a change in Highway 44. A portion of the home was located where the irrigation pond for this permit is located, and part of the home was in right of way for Highway 44. Therefore, the highway district or the permit holder could lay claim to this domestic right, but it appears to have been abandoned for approximately 20 years. This right was decreed at about the same time as the home was torn down for the highway adjustment.

The only true overlapping water right are the canal company water rights. The Department's records show the place of use is within the New Dry Creek Ditch Company borders, but the application states they use Farmer's Union Ditch Company rights used for irrigation purposes. Mr. Boggs didn't include these rights in the field report, but he does confirm that the Farmer's Union Ditch Company water is used to irrigate the berm along the highway. There are a number of ditch companies in this area and they interchange water often, so this property could be supplied by either organization. Regardless of which company delivers the irrigation water, the well water is only used for supplemental purposes by filling water trucks to fill the pond when there isn't sufficient canal company water available.

**Water Uses Analysis:**

The permit and Mr. Boggs separate out the office use (domestic) and the industrial use as two separate uses. The office is part of the same facility, so I am going combine the domestic use and industrial use at licensing to show just a single industrial use. It really doesn't make sense to separate this single facility into two uses on the water right.

**Place of Use:**

The place of use described by Mr. Boggs seems reasonable. I am concerned that he describes a future building on the property, but his calculations of the water uses are based on current uses, so there shouldn't be an issue at this point with the proposed future construction. If they need additional water after the new building is constructed, they will need to acquire a new water right to accommodate that use. The pumping system was designed so that it cannot divert the low diversion rates authorized by this permit. Therefore, it would be in the best interest of the permit holder to file a new water right once the new construction is completed to cover any additional uses and bring the diversion rate up for the industrial use to the minimum capacity of pumping system.

I was able to recreate the 2 acres shape file for the irrigation use, so I agree with the recommendation of 2 acres of irrigation. There could actually be a bit more irrigation, but it is difficult to tell how wide the irrigated area on the berm actually is due to the drip irrigation.

**Diversion Rate:**

Mr. Boggs recommended a diversion rate of 1.11 cfs for fire protection, 0.03 cfs for domestic, 0.03 cfs for industrial and 0.03 cfs for irrigation. The permit limits the diversion rates to 3.34 cfs for fire protection, 0.04 cfs for domestic, 0.03 cfs for industrial and 0.03 cfs for irrigation.

As stated above, the domestic and industrial use are the same use, so I recommend that they be limited to 0.06 cfs as recommended by Mr. Boggs. The permit and Mr. Boggs limit the diversion rate of the supplemental irrigation use to 0.03 cfs, which is reasonable, since they use the water trucks to fill the pond.

I don't agree with the 1.11 cfs or 498 gpm recommended for the fire protection. Mr. Boggs supplied a pump curve of the pump system that shows that the pump is rated for a maximum of 320 gpm, which is in excess of Mr. Boggs recommendation. In reviewing the information available, I can't see where this pump would provide anywhere near the 1.11 cfs recommended.

The Well Driller's Report it appears as though the Pumping Water Level (PWL) is between 27 and 46 feet. Please see the Well Test on the Well Driller's Report and Static Water Levels. Most domestic type systems operate at between 40 and 60 psi, so using an average of 50 psi that would be approximately 105 feet pressure (50 X 2.31 = 105 ft psi). That would leave a TDH of somewhere between 132 and 151 feet. Using the pump curve, that is somewhere between 284 and 263 gpm or 0.63 to 0.59 cfs. The pump curve shows that the maximum capacity of the pump is around 320 gpm or 0.71 cfs, and a designed operating flow of 100 gpm or 0.22 cfs.

I contacted Mr. Boggs to determine what the actual TDH actually is for this pump. Mr. Boggs supplied information in an email that shows that when fire flows are in place, the system only needs approximately 10 psi of pressure for the fire protection system, and the actual maximum diversion rate is 1.00 cfs or 450 gpm. I have attached an analysis of this flow rate to this memo. To attain 1.00 cfs of flow rate for the fire flows, this system will be operating close to 40% efficiency. I have also included some internet documents that show that pumps can operate below 50% efficiency, but it is warned that it should only be done for short periods of time. Operating below 50% efficiency can cause cavitation and damage the pump. The fire flows would only be used for short bursts, so it seems reasonable that they could push the pump this hard.

From my analysis it is obvious that this pump system will probably not be able to attain the lower flow rates authorized by the permit for the domestic and industrial uses. The pump curve shows that the 0.06 cfs or 26 gpm is at the 20% efficiency rating, and would probably destroy the pump if the pump was reduced to that flow rate according to the pump efficiency information included with this memo. This pump was designed to operate at a minimum flow rate of approximately 100 gpm or 0.22 cfs, and operates at approximately 220 to 260 gpm at maximum efficiency. Operating at this flow rate is pushing the efficiency factor down to the 43% percent range, so trying to pump less than the 100 gpm consistently would probably damage the pump system.

I am recommending that this permit be licensed for 0.06 cfs for the industrial use and 0.03 cfs for the irrigation use, and 1.00 cfs for the fire protection use. The industrial use flow rate is based on the combined diversion rates for domestic and industrial uses recommended by Mr. Boggs. I have also informed Mr. Boggs that it would be in the best interest of his client to seek to increase the diversion rate for the industrial use to match the pumping system once the new building is constructed at the site to ensure they are not exceeding the authorized diversion rates. Mr. Boggs informed me that the higher diversion rate was designed into the pumping system for fire flows and to fill the water trucks in a more reasonable time frame. At 26 gpm, the filling of the 4,000 gallon water trucks would take approximately 2 ½ hours (4,000 gal / 26 gpm / 60 min/hr = 2.56 hours). At the peak efficiency, filling of the trucks would only take approximately 17 minutes (4,000 gal / 240 gpm = 16.7 minutes).

**Diversion Volume:**

As stated above, I am recommending that the domestic use and the industrial use be combined. Therefore, the total volume for industrial use would be 20.73 + 0.74 + 0.33 = 21.8 af. Mr. Boggs recommended a volume for the supplemental irrigation use and the fire protection. We don't include a volume for supplemental irrigation or fire protection. Therefore, no volume will be recommended for these uses. There will need to be a WB7 condition that limits the water use for irrigation of the place of use to 0.06 cfs and 9 af. A 943 condition will also be needed. The fire protection volume will be limited by condition 077 that limits the use of fire protection to fight an existing fire.

A total volume will not be shown on the license, since the volume for the irrigation use will addressed in the conditions, and the fire protection use will not have a volume. Therefore, in order to avoid limiting the overall use, no total maximum volume will be recorded on the license.

**Conditions:**

Conditions R65, 930, 165, 077, and the industrial use description condition will be carried forward to licensing. The remainder of the conditions will be removed and/or replaced. Condition 930 will be updated to the developed water bearing zone 220 to 265 feet. With the removal of the domestic use, the industrial use description condition will altered to say the following:

> Industrial use is for an office, sewer cleanout, and a waste water processing facility.

Condition 121 will be replaced with condition 103 per Department standards. Condition 943 was not included on the permit, but the irrigation use is a supplemental irrigation use. Therefore, condition 943 will be added to the license. Condition WB7 will also be needed to be added to the license with a diversion rate of 0.03 cfs and 9 af as the limits in the permit.

THEORETICAL HORSEPOWER EQUATION WORKSHEET (cjh 1/92)

Water Right No.: 63-34660
Reviewer: Dan Nelson
Date of Review: 5/14/2020

| P/D No.: | Using normal efficiency | Using Adjusted Efficiency of 40.3% | Using Pump Curve Efficency of 43.4 % at 100 ft TDH | Adjusting Efficency of 54 % at 100 ft TDH |
|---|---|---|---|---|
| PUMP HORSEPOWER | 15 | 15 | 15 | 15 |
| BOOSTER HORSEPOWER | 0 | 0 | 0 | 0 |
| PUMPING LEVEL | 30 | 30 | 76.9 | 76.9 |
| DISCHARGE PRESSURE | 10 | 10 | 10 | 10 |
| RATE OF FLOW (cfs) | 1.74 | 1.00 | 0.57 | 0.71 |
| | 781 | 450 | 257 | 320 |

The above calculates the formula = $Q = \frac{\text{Efficiency) * hp}}{\text{ter + 2.31*(psi)+friction}}$

Assumptions: %70 efficiency.
No Friction

Examiners Notes:

The certified water right examiner stated that this pump can run at approximately 1.00 cfs. The pump curve supplied shows that the pump isn't designed to run beyond a flow of approximately 320 gpm. However, the fire suppression system is designed to operate at 10 psi, and the lift is very small at 30 feet. When this particular pump is operating at 320 gpm, the efficiency rating according to the pump curve is approximately 43.4 %. According to our theoretical equation, the pump should actually be pumping 257 gpm at 100 feet of Total Dynamic Head (TDH) with the 43.4% efficiency shown in the pump curve. That is approximately a 20% difference our equation and the pump curve, so there is significant room for error in these calculations. Using our equation, I estimated the efficiency at 320 gpm and 100 feet head to be approximately 54% efficient. According to our equations, the pump would have approximately 40.3 % efficiency at the diversion rate and total dynamic head for the fire flows.

CONCLUSION: This pumping system was designed to have a minimum diversion rate of approximately 100 gpm, and 220 gpm to 260 gpm at maximum efficiency. Maximum efficiency according to the pump curve is about 60% for the pump and motor. The pump installed was oversized to allow for the fire protection needs. It obvious to attain the 450 gpm needed is possible, but the efficiency of the system is greatly diminished at that high of a diversion rate. Although the efficiency would be diminished, the pump should still be able to maintain a 450 gpm diversion rate for a short time. It is recommended that pumps only be operated for short periods below 50% efficiency, and that they should never be operated below 20% efficiency. It is expected that operating this pump at this low of efficiency rating for an extended time would cause the pump to cavitate and quickly break down. However, the fire protection portion of this permit will only be used in the case of an emergency. Although the pump would probably fail if it was run for an extended period, it would be able provide the 1.00 cfs flow rate for a short period of time before it began to self destruct.

RECEIVED

DEC 09 2019

WATER RESOURCES
WESTERN REGION

Form 238-7
6/07

63

# IDAHO DEPARTMENT OF WATER RESOURCES
# WELL DRILLER'S REPORT

1. WELL TAG NO. D 0082889
Drilling Permit No 89Ø151
Water right or injection well # 63-34660

2. OWNER: EAGLE SEWER DISTRICT
Name
Address 44 NORTH PALMETTO AVENUE
City EAGLE State ID Zip 83702

3. WELL LOCATION:
Twp. 4 North ☒ or South ☐ Rge. 1 East ☒ or West ☐
Sec. 7 - 1/4 SE 1/4 SE 1/4
Gov't Lot County ADA
Lat. 43° 41.5552 (Deg and Decimal minutes)
Long -116° 22.7520 (Deg and Decimal minutes)
Address of Well Site 1995 W. HIGHWAY 44 BY PASS
City EAGLE
Lot Blk. Sub. Name

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☒ Other INDUSTRIL, COMMERCIAL

5. TYPE OF WORK:
☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other

6. DRILL METHOD:
☐ Air Rotary ☒ Mud Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES:

| Seal material | From (ft.) | To (ft.) | Quantity (lbs or ft³) | Placement method/procedure |
|---|---|---|---|---|
| 3/8 CHIP | 200 | 205 | .125 YRD | POURED THRU TRIMY |
| CEMENT GROUT | 10 | 200 | 6.15 YRD | PUMP THRU TREMY |

8. CASING/LINER:

| Diameter (nominal) | From (ft.) | To (ft.) | Gauge/ Schedule | Material | Casing | Liner | Threaded | Welded |
|---|---|---|---|---|---|---|---|---|
| 10" | +3' | 17' | .315 | STEEL | ☒ | ☐ | ☐ | ☐ |
| 10" | 17' | 220 | SDR17 | PVC | ☒ | ☐ | ☐ | ☐ |
| | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | ☐ | ☐ | ☐ | ☐ |

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s)

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☐ N Method
Manufactured screen ☒ Y ☐ N Type JOHNSON
Method of installation

| From (ft.) | To (ft.) | Slot size | Number/ft | Diameter (nominal) | Material | Gauge or Schedule |
|---|---|---|---|---|---|---|
| 220 | 265 | .030 | 45 | 10' | SS | .375 |
| | | | | | | |
| | | | | | | |

Length of Headpipe 0 Length of Tailpipe Ø
Packer ☐ Y ☒ N Type

10. FILTER PACK:

| Filter Material | From (ft.) | To (ft.) | Quantity (lbs or ft³) | Placement method |
|---|---|---|---|---|
| 10X20 | 205 | 275 | 2.9 YRDS | POURD THRU TRIMY |
| | | | | |

11. FLOWING ARTESIAN:
Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)
Describe control device

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft.) 16 Static water level (ft.) 12
Water temp (°F) 68 Bottom hole temp (°F) 67
Describe access port STEEL PLATE

Well test:

| Drawdown (feet) | Discharge or yield (gpm) | Test duration (minutes) | Test method: Pump | Bailer | Air | Flowing artesian |
|---|---|---|---|---|---|---|
| 11 | 2586 PM | 660 | ☒ | ☐ | ☐ | ☐ |
| 30 | 6506 PM | 90 | ☒ | ☐ | ☐ | ☐ |

Water quality test or comments:

13. LITHOLOGIC LOG and/or repairs or abandonment:

| Bore Dia. (in) | From (ft) | To (ft) | Remarks, lithology or description of repairs or abandonment, water temp. | Water Y | Water N |
|---|---|---|---|---|---|
| 19 | 0 | 2 | TOP SOIL | | X |
| 19 | 2 | 14 | SAND TAN | | X |
| 15 | 14 | 16 | CLAY TAN | | X |
| 15 | 16 | 47 | GRAVEL | X | |
| 15 | 47 | 52 | CLAY TAN | | X |
| 15 | 52 | 63 | SAND TAN | X | |
| 15 | 63 | 105 | SANDY CLAY TAN | X | |
| 15 | 105 | 109 | CLAY TAN | | X |
| 15 | 109 | 123 | SAND TAN | X | |
| 15 | 123 | 148 | CLAY TAN | | X |
| 15 | 148 | 155 | SAND TAN | X | |
| 15 | 155 | 168 | CLAY TAN | | X |
| 15 | 168 | 174 | SAND TAN | X | |
| 15 | 174 | 182 | CLAY TAN | | X |
| 15 | 182 | 184 | SAND TAN | X | |
| 15 | 184 | 220 | CLAY TAN | | X |
| 15 | 220 | 245 | SAND TAN | X | |
| 15 | 245 | 252 | CLAY TAN | | X |
| 15 | 252 | 268 | SAND TAN | X | |
| 15 | 268 | 275 | CLAY TAN | | X |
| | | | ADITIONAL SEAL 3/8 CHIP FROM 0-10. .54 YRD POURED FROM TOP | | |

Completed Depth (Measurable) 275
Date Started 06/24/19 Date Completed 8/26/19

14. DRILLER'S CERTIFICATION:
I/We certify that all minimum well construction standards were complied with at the time the rig was removed

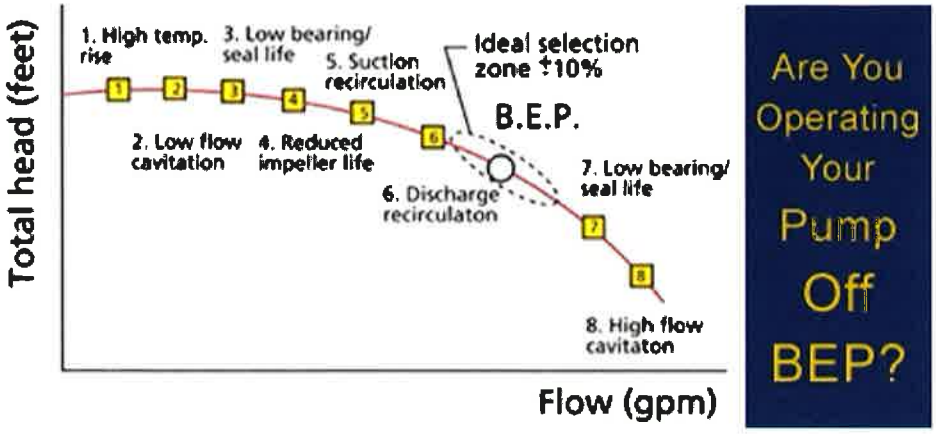
Company Name HC DRILLING Co. No. 775
*Principal Driller Tom Mitchell Date 9/16/19
*Driller GREG MITCHELL Date
*Operator II Date
Operator I Date

* Signature of Principal Driller and rig operator are required.

English

# Some Effects of Operating Pumps Away from Best Efficiency Point

February 20, 2013




***Author**: Bob Jennings, Hydro Inc.*

The Best Efficiency Point, or BEP, is a term that is used quite often in pump vernacular. Like the terms Shut-off (SO) or Run-out (RO), the Best Efficiency Point identifies an operating region or point along the pump performance curve. The Best Efficiency Point is defined as the flow at which the pump operates at the highest or optimum efficiency for a given impeller diameter. When we operate a pump at flows greater than or less than the flow designated by the BEP, we call this "operating pumps away from the Best Efficiency Point". Therefore, operating a pump at flows higher or greater than the flow at the BEP is called "operating to the right of the BEP", and conversely, operating a pump at flows lower or less than the flow at the BEP is called "operating to the left of the BEP."

Under ideal circumstances, a pump will not operate at flows greater than BEP plus 10% or flows less than BEP minus 10%. While we try not to stray too far from the BEP, in general, most pumps operate away from the BEP to one degree or another, and this is acceptable for intermittent duty. There are many consequences, however, to operating your pump too far to the left or right of its Best Efficiency Point for a sustained period of time.

Some of these effects can include:

Cavitation is caused by the formation of vapor bubbles which violently collapse, eroding impeller surfaces and resulting in reduced mean-time-between-repair. Cavitation can occur when operating the pump to the far right of the BEP. For most centrifugal pumps, as the flow increases beyond the BEP, the Net Positive Suction Head required (NPSHr) also increases; and when the NPSHr exceeds the Net Positive Suction Head available (NPSHa), cavitation occurs. Remedies are limited to increasing the NPSHa, which is not always possible, reducing the flow to values resulting in lower NPSHr, or installing special impellers which are designed to operate under low NPSHr conditions.

Vibration can be caused by many factors and can create bending moments on the shaft, pump performance and risk of shaft failure. Excessive vibration can occur when pumps operate too far to the right of BEP, due in part to cavitation which causes hydraulic imbalances within the impeller as voids are formed by the vaporization of the liquid. Excessive vibration can also occur due to higher bearing loads associated with pump operation closer to run-out or shut-off conditions.

Impeller Damage can be caused by cavitation, and excessive vibration could potentially cause the rotor to make contact with the casing. As the vapor bubbles, formed during the onset of cavitation, migrate to the higher pressure regions of the impeller, they implode with enough force to send shock waves to the surrounding area which in turn breaks molecules from the parent metal, leaving behind the telltale signs of cavitation – pitting and erosion.

Suction & Discharge Recirculation, which can occur depending on the hydraulic design of the pump, happens when the fluid does not flow through the pump properly. This phenomenon can cause significant instability and can reduce flow. The damage caused by suction or discharge recirculation resembles cavitation and can lead to catastrophic failure of the pump when portions of the impeller inlet or discharge vanes fatigue and fail by breaking off.

Reduced Bearing and Seal Life can occur as a result of recirculation and cavitation and will increase the maintenance costs as these components will need to be frequently replaced. The rotor instability that occurs at off-BEP operation can lead to shaft failures, premature packing wear, mechanical seal failures, or simply higher bearing temperatures leading to premature lubrication breakdown.

In our quest for higher efficiencies and increased reliability resulting in longer mean-time-between-failure, we often make modifications to the existing pumps so we can get their BEP to coincide with the duty point of the pumping systems. If you are not aware of your pump's Best Efficiency Point for your specific application, consider testing your pump. Consider getting a certified performance test, from shut-off to run-out, to identify the BEP for your pumps.

View HI Approved Pump Test Labs or post an inquiry in our Industry Forum!

- Motor Size (Power Rating)
- Motor Class: Standard Efficiency vs. Energy-Efficiency vs. Premium-Efficiency

**Motor Part Load Efficiency**

The efficiency of an induction motor changes with the relative load on the motor, compared to the motor rating, as shown in figure 2. Down to a motor load of about 50%, the efficiency of most motors remains relatively flat, even peaking around 75% load for some motors. Motors should only be operated below 50% load for short periods, and not be operated below 20% of the rated load. Therefore, when trimming impellers or operating pumps back on their head-capacity curves, the impact on the motor relative load should be evaluated.

## Nelson, Dan

**From:** Nelson, Dan
**Sent:** Thursday, May 14, 2020 1:43 PM
**To:** 'Boggs, Kevin/BOI'
**Subject:** RE: Field Report for permit 63-34660

Good Morning Kevin,

I just reviewed the data you sent, and it does appear as though the pump could actually run at the flow rate for a short time. I went through a couple of different analysis and determined that the pump would operate at an efficiency level of approximately 40% at 1.00 cfs. The literature that I have says that a pump can be run for a short period between 20% and 50%, so it is possible that they could operate the pump at that flow rate. I work this information into my report. I think this is all I will need to submit my review to my supervisor. She may have some other questions, but I won't know until I submit the draft license.

It probably wouldn't hurt to speak with them when they build the new building if they bring the diversion rate up to the normal operating diversion rate.

Dan Nelson

**From:** Boggs, Kevin/BOI [mailto:Kevin.Boggs@jacobs.com]
**Sent:** Thursday, May 14, 2020 9:25 AM
**To:** Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
**Subject:** RE: Field Report for permit 63-34660

Good morning Dan,

Here's the information you requested.

- The well is equipped with a pump with a variable speed drive
- The pump intake is at 66 feet below ground surface.
- Initial pump testing produced the following data:
  - Static water level prior to pumping = 11.56 feet below ground surface.
  - Pumping rate = 450 gpm, producing 18.60 feet of drawdown (pumping water level = 30.16 feet below ground surface)
- The total dynamic head for a fire event is approximately 53 feet, based on the following data/assumptions:
  - Pumping water level of 30 feet bgs.
  - A pressure assumed at hydrants = 10 psi (23 feet)

Please let me know if there's any additional information I can provide.

Thanks,
Kevin

208-340-1753

**From:** Nelson, Dan <Dan.Nelson@idwr.idaho.gov>
**Sent:** Monday, May 11, 2020 11:40 AM
**To:** Boggs, Kevin/BOI <Kevin.Boggs@jacobs.com>
**Subject:** [EXTERNAL] Field Report for permit 63-34660

Hello Kevin,

I just performed a quick review of the field report you submitted for permit 63-34660. I am having a hard time finding what the Total Dynamic Head (TDH) is for this pump. The pump curve doesn't help at all without the TDH for that particular pump system. I may be missing something, so I wanted to contact you for help before I get much farther.

From the Well Driller's Report it appears as though the Pumping Water Level (PWL) is between 69 and 98 feet. Please see the Well Test on the Well Driller's Report and Static Water Levels. Most domestic type systems operate at between 40 and 60 psi, so using an average of 50 psi that would be approximately 105 feet pressure (50 X 2.31 = 105 ft psi). That would leave a TDH of somewhere between 174 and 203 feet. Using the pump curve, that is somewhere between 180 and 230 gpm or 0.40 to 0.45 cfs.

The pump curve shows that the maximum capacity of the pump is around 320 gpm or 0.71 cfs, and a designed operating flow of 100 gpm or 0.22 cfs. I have no idea where you came up with 1.20 cfs when it appears that the pump design and maximum capacity of the pump is much less than what you recommended.

You can't recommend more than the capacity of the pump, so I am really concerned with the recommendation in the field report. At this point, anything more than a diversion rate of 0.40 to 0.45 cfs doesn't seem reasonable.

Please let me know what I am missing as soon as possible.

Thank you.

Dan Nelson

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Jacobs TRANSMITTAL

**To:** Idaho Department of Water Resources
322 East Front Street
Suite 600
Boise, ID 83702

**From:** Kevin Boggs
Jacobs
999 W. Main St. Suite 1200
Boise, ID 83702
208-340-1753

**Attn:** Dan Nelson

**Date:** 4/29/2020

**Re:** Eagle Sewer District Water Right 63-34660 Beneficial Use Field Report

| **We Are Sending You:** | | Method of shipment: | |
|---|---|---|---|
| X | Attached | Under separate cover via | |
| | Shop Drawings | Documents | Tracings |
| | Prints | Specifications | Catalogs |
| | Copy of letter | Other: | |

| Quantity | Description |
|---|---|
| 1 | Eagle Sewer District Water Right 63-34660 Beneficial Use Field Exam Report |

If the material received is not as listed, please notify me at 208-340-1753.

Copy To: Lynn Moser/General Manager, Eagle Sewer District

Form 219 07/11

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

# BENEFICIAL USE FIELD REPORT

A Beneficial Use Field Report is prepared by a water right examiner as the result of an examination to clearly confirm and establish the extent of the beneficial use of water established in connection with a permit during the development period authorized by the permit and any extensions of time previously approved.

## A. GENERAL INFORMATION

Permit No. 63-34660

1. Owner Eagle Sewer District Phone No. 208-939-0132
   Current address 44 N. Palmetto Ave., Eagle, ID 83616
2. Examiner's name Kevin Boggs EXAM DATE 4/29/2020
3. Accompanied by NA Email
   Address
   Relationship to permit holder Phone No.
4. Source Groundwater tributary to NA

## B. OVERLAP REVIEW

1. Other water rights with the same place of use None
2. Other water rights with the same source and point of diversion None

## C. DIVERSION AND DELIVERY SYSTEM

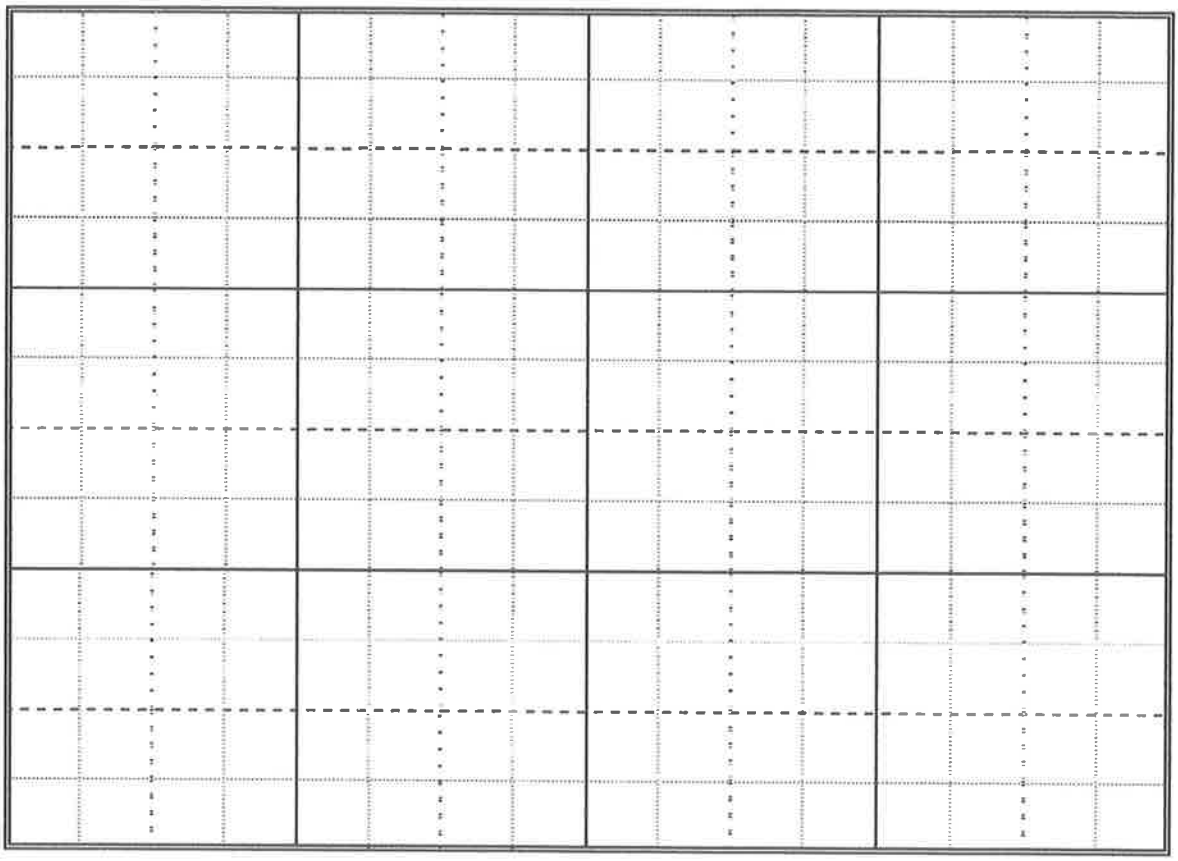
1. **Point(s) of Diversion:**

| Ident. No. | Gov't Lot | ¼ | ¼ | ¼ | Sec | Twp | Rge | County | Method of Determination/Remarks |
|---|---|---|---|---|---|---|---|---|---|
| Well 2 | | SE | SE | | 7 | 04N | 01E | Ada | Records review and site visit |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

2. **Place(s) of Use:** Method of determination Records review and site visit - see attached map and site plan

| Twp | Rge | Sec | NE | | | | NW | | | | SW | | | | SE | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | NE | NW | SW | SE | NE | NW | SW | SE | NE | NW | SW | SE | NE | NW | SW | SE | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

3. **Delivery System Diagram**: Indicate all major components and distances between components. Indicate weir size/ditch size/pipe diameter (inside), as applicable. Use the space provided or ☒ see attached.



***Scale: 1" = _____***

☒ Copy of USGS Quadrangle attached showing location(s) of point(s) of diversion and place(s) of use (**required**)
☒ Aerial photo attached (required for irrigation of 10+ acres)
☒ Photo of diversion and system attached

4.

| **Well or Diversion Identification No.*** | **Motor Make** | **Hp** | **Motor Serial No.** | **Pump Make** | **Pump Serial No. or Discharge Size** |
|---|---|---|---|---|---|
| Well 2 (See attached) | Grundfos type | 15 | 00239592 | Grundfos | 3-inch |
| | MS6000 | | | 15B73604 | |
| | 96166164 | | | 230S150-4 60 Hz | |

****Code to correspond with no. on map and aerial photo***

## D. FLOW MEASUREMENTS

1.

| **Measurement Equipment** | **Type** | **Make** | **Model No.** | **Serial No.** | **Size** | **Callb. Date** |
|---|---|---|---|---|---|---|
| No flow meter | | | | | | |
| See attached field notes | | | | | | |

2. **Measurements:** _____

See attached.

## E. NARRATIVE/REMARKS/COMMENTS

See attached.

Has the permit holder met all conditions of permit approval, including any mitigation requirements and/or measuring device installation requirements? ☒ Yes ☐ No If no, what must be done to meet the permit requirements?

## F. FLOW CALCULATIONS

☒ Additional computation sheets attached

Measured Method:

See attached

## G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$V_{I.R}$ = (Acres Irrigated) x (Irrigation Requirement) = 2 acres x 4.5 acre-feet per acre = 9 acre-feet

$V_{D.R}$ = [Diversion Rate (cfs)] x (Days in Irrigation Season) x 1.9835 = =0.03 x 259 days x 1.9835 = 15.41 acre-feet

V = Smaller of $V_{I.R.}$ and $V_{D.R.}$ = 9 acre-feet

2. Volume Calculations for Other Uses:

See attached

## H. RECOMMENDATIONS

### 1. Recommended Amounts

| Beneficial Use | Period of Use From | Period of Use To | Rate of Diversion Q (cfs) | Annual Volume V (afa) |
|---|---|---|---|---|
| Fire protection | 1/1 | 12/31 | 1.11 | 0.74 (per 8 hr event) |
| Domestic | 1/1 | 12/31 | 0.03 | 0.33 |
| Industrial | 1/1 | 12/31 | 0.03 | 20.73 |
| Irrigation | 3/1 | 11/15 | 0.03 | 9 |
| | | | | |
| | | **Totals:** | 1.20 | 30.80 |

### 2. Recommended Amendments

☐ Change P.D. as reflected on page 1 ☐ Add P.D. as reflected on page 1 ☐ None

☐ Change P.U. as reflected on page 1 ☐ Add P.U. as reflected on page 1 ☐ Other

## I. AUTHENTICATION

Field Examiner's Signature Kevin Boggs Date 4/30/2020

Reviewer _____ Date _____

REGISTERED PROFESSIONAL GEOLOGIST * STATE OF IDAHO * KEVIN G. BOGGS NO. 1085 4/30/2020

**EAGLE SEWER DISTRICT BENEFICIAL USE FIELD EXAM ATTACHMENTS:**

A. NARRATIVE – BENEFICIAL USE FIELD REPORT
B. WELL COMPLETION DIAGRAM
C. FIELD PHOTOS
D. WATER SYSTEM SCHEMATIC
E. PUMP AND MOTOR DETAILS

# Attachment A.

# Beneficial Use Field Exam Narrative – Eagle Sewer District Water Right No. 63-34660

## Water Right 63-34660 Background Information

Water Right No. 63-34660 is associated with Eagle Sewer District's (District) wastewater treatment facility located south of ID-44, in Eagle, ID 83616 (Figure 1). The District has an existing domestic well (Well 1) on site that has historically provided domestic supply to a building in Township 4N, Range 1E, Section 18, NW¼ NE¼ under a domestic exemption (that is, not water right license). Well 2 (Attachment B – well diagram) is the point of diversion for Water Right 63-34660, and is located in Township 4N, Range 1E, Section 7 (SE¼ of the SE¼), approximately N 43° 41.5552', E 116° 22.7520' (Figure 1).


**Figure 1. Well 2 Location**

Well 2 is located in the SE quarter of the SE quarter of Township 4N, Range 1E, Section 7, to the west of the District's blower building

### *Existing Water Rights*

There are two water rights in Eagle Sewer District's name, water from neither of which are used on the property associated with this application for permit.

- 63-2960
- 63-17822

The district has used irrigation water from Farmer's Union Ditch Company to irrigate the berms (trees and grass) along the northern border of the District's property. This water continues to be available. In addition, the District has irrigated the land using water diverted from Well 2 into a 4,000 gallon water

tanker truck, and then filled their on-site pond with well water that was subsequently pressurized and used to irrigate the berms (see Attachment C – field photos).

## Water Right 63-34660 Place of Use

The places of use for water right No 63-34660 include the following:

- Irrigation: 1.1 acres in Township 4N, Range 1E, Section 7, SW¼SE¼
- Irrigation: 0.9 acre in Township 4N, Range 1E, Section 7, SE¼SE¼
- Domestic, industrial, and fire protection: 4N, Range 1E, Section 7, SW¼SE¼ and SE¼SE¼

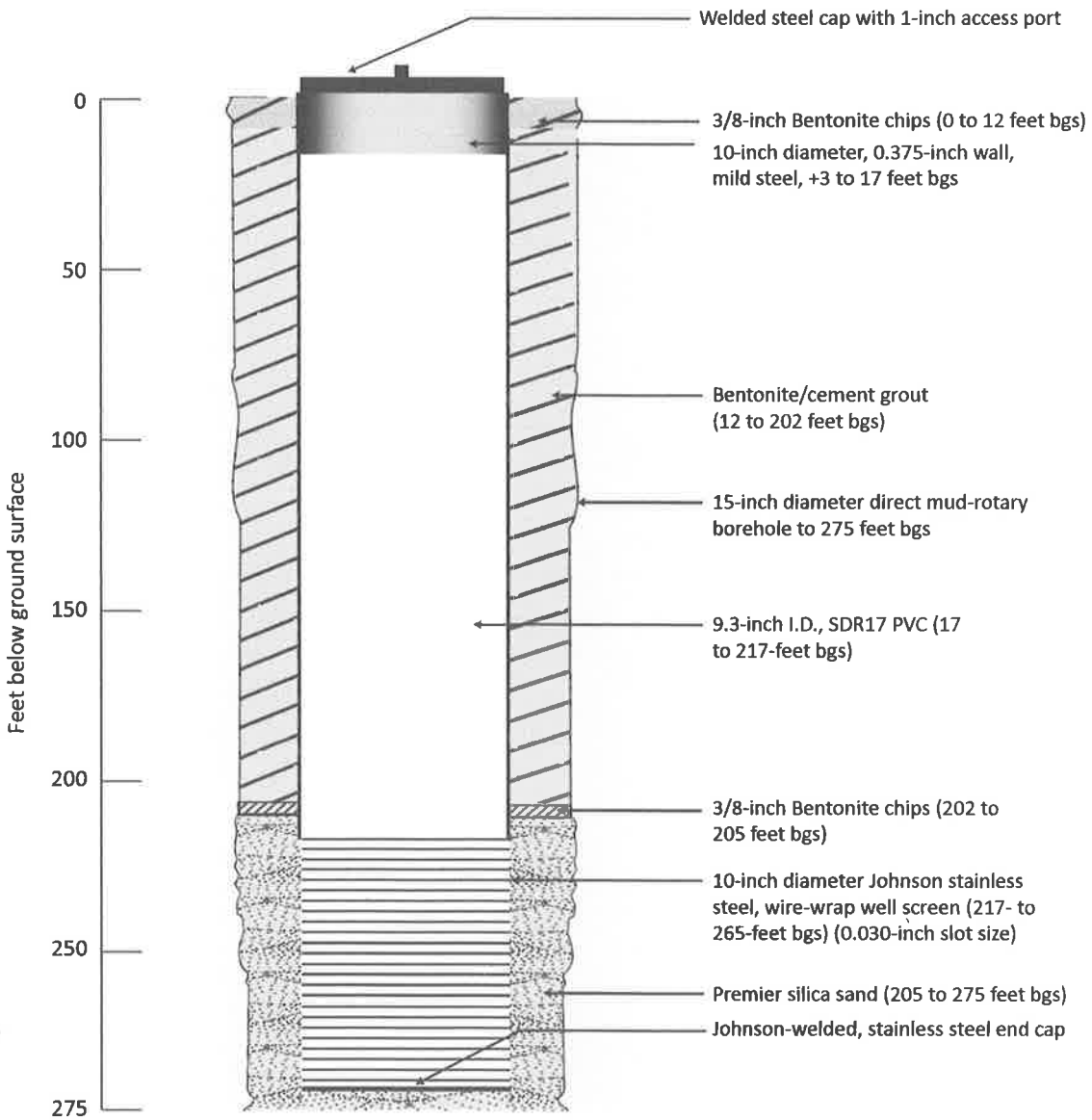
## Delivery System and Water Usage

Water from Well 2 is distributed to several locations on site (Attachment D – water system schematic and layout), including:

- fire hydrants,
- blower building with a restroom and hose bibs,
- headworks building that includes headworks screens, washer/compactor, and grit classifier,
- water tanker truck fill station; water from these tanker trucks is used for sewer cleanouts,
- a stubbed-in water line that will be extended to the newly designed operations building that has two showers for on-site construction workers and a clothes washer.
- a 40-ft diameter irrigation pond that is equipped with a pump station for a pressurized irrigation system to irrigate an approximate 2-acre area on the northern boundary of the plant site.

| Water Use | Period of Use | Water Use Calculations | Rate of Diversion (cfs) | Annual Volume (acre-feet) |
|---|---|---|---|---|
| **Industrial** | | | | |
| • Sewer Cleanout | 1/1 through 12/31 | • Fill two, 4,000 gallon water trucks twice per work day (Monday through Friday) from May 1 through Sept. 30 (4000 gallons x 4 truck fills per day x 22 work days per month x 5 months = 1,760,000 gallons<br>• Fill one, 4,000 gallon water truck once per work day (Monday through Friday) from October 1 through April 30 (4000 gallons x 1 truck fill per day x 22 work days per month x 7 months = 616,000 gallons<br><br>TOTAL sewer cleanout water volume = 2,376,000 gallons **(7.29 acre-feet per year)** | 0.029 (avg rate over period of use) | 20.73 (total industrial) |
| • Headworks grit classifier | 1/1 through 12/31 | 5 gpm x 60 min/hr x 8 hours/day x 365 days per year = 1,095,000 gallons per year **(3.36 acre-feet per year)** | | |
| • Headworks screen washer/ compactor | 1/1 through 12/31 | 15 gpm x 60 min/hr x 4 hours/day x 260 days per year = 3,285,000 gallons per year **(10.08 acre-feet per year)** | | |
| Fire suppression | 1/1 through 12/31 | 6 hydrants x 50 gpm/hydrant x 8 hour fire event (demand) plus 200 gpm available from truck fill line = 240,000 gallons per assumed 8-hour fire event **(0.74 acre-feet per 8 hour fire event)** | 1.11 (avg rate over period of event) | 0.74 (per event) |
| Domestic | 1/1 through 12/31 | 5 construction workers x 50 gallons per shift x 365 shifts per year = 91,250 gallons per year **(0.28 acre-feet per year)**<br><br>3 office ("day") workers x 15 gallons per shift x 365 shifts per year = 16,425 gallons per year **(0.05 acre-feet per year)** | 4.6E-4 (avg rate over the year); 0.03 cfs diversion to pressure tanks for domestic system | 0.33 |

# Attachment B.



# Attachment C. Field Photos

Well head and well piping/valve vault

View of the inside of the well piping/valve vault

4,000 gallon water tanker truck used to haul water for sewer cleanouts.

Offloading water from Well 2 into the irrigation pond on site.

View of drip irrigation on berm

Attachment E.

PUMPTECH INC.

*SERVING THE PACIFIC NORTHWEST*

*PUMP SALES & SERVICE*

# EQUIPMENT DESCRIPTION

*(ITEMS INCLUDED IN SCOPE OF WORK)*

## EAGLE SEWER DISTRICT WELL PUMP & SAND

## SEPARATOR:

WELL PUMP ASSEMBLY CONSISTING OF THE FOLLOWING:
1EA. 230S150- 4 3NPT 6"3X440-480/60
1EA. BAKER MONITOR STANDARD PITLESS UNIT 4PS1012WBWE06T4E NSF RATED
3EA. 4" GALV T&C DROP PIPE 20'
1EA. 6"M TO 4"F ADAPTER
1EA. 4"M TO 3"M ADAPTER
75' 12/3 W/G PAIGE PLUS HD FLAT JKT PUMP CABLE UL 600V Paige Spec P7271-SP
7EA. FLUSH THREAD, 1IN x 10FT SCHEDULE 80
1EA. FLUSH THREAD, CAP 1IN

1 ROLL BANDING, SS, .75IN
1 BOX BANDING, SS, CLIPS, .75IN
4EA. #8AWGRedButtSplice
3' 12AWG48"BlkHWDW HST

---

AS-Built

**Attachment D.**

# EAGLE SEWER DISTRICT

# WASTEWATER LAGOON TREATMENT FACILITY WELL NO. 2 PUMP PROJECT

## EAGLE, IDAHO

## VOLUME 2

## NOVEMBER 2019

INDEX TO DRAWINGS

### GENERAL

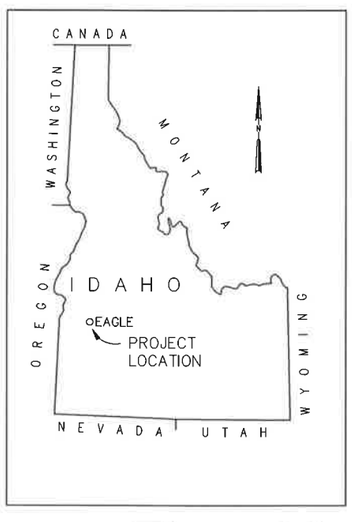
| SHEET NO. | DRAWING NO. | DESCRIPTION |
|---|---|---|
| 1 | G-001 | COVER SHEET, AND INDEX TO DRAWINGS |

### SITE

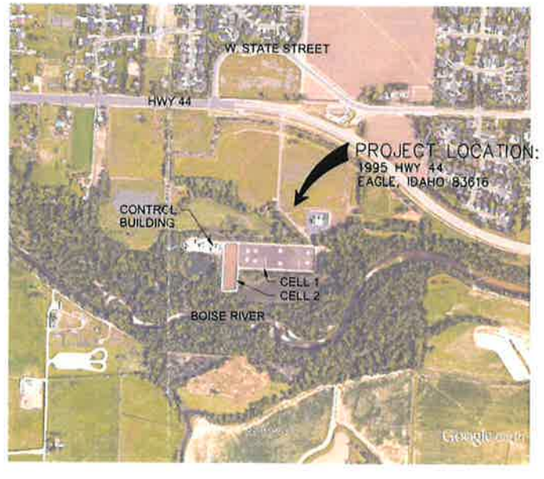
| SHEET NO. | DRAWING NO. | DESCRIPTION |
|---|---|---|
| 2 | C-001 | GENERAL NOTES AND LEGEND |
| 3 | C-100 | EXISTING CONDITIONS SITE PLAN |
| 4 | C-101 | SITE PLAN |
| 5 | C-401 | WELL VALVE VAULT PLAN & SECTIONS |
| 6 | C-402 | TRUCK FILL VALVE VAULT PLAN AND SECTIONS |
| 7 | C-403 | TRUCK FILL PAD PLAN AND SECTION |
| 8 | C-501 | DETAILS AND SCHEMATIC FLOW DIAGRAM |

### ELECTRICAL

| SHEET NO. | DRAWING NO. | DESCRIPTION |
|---|---|---|
| 9 | ES-101 | SITE PLAN |
| 10 | ES-102 | BLOWER ROOM, WELL VALVE VAULT & TRUCK FILL VALVE VAULT PLANS |
| 11 | ES-103 | ONE-LINE DIAGRAMS |




LOCATION MAP




VICINITY MAP

PROFESSIONAL ENGINEER LICENSED 16872 STATE OF IDAHO
15 November 2019

| NO. | DATE | REVISION | BY |
|---|---|---|---|
| DSGN | J PIGMAN | DR J PIGMAN | CHK L FETTKETHER |
| | | | APVD N JENKINS |



JACOBS
999 WEST MAIN STREET
SUITE 1200
BOISE, IDAHO 83702

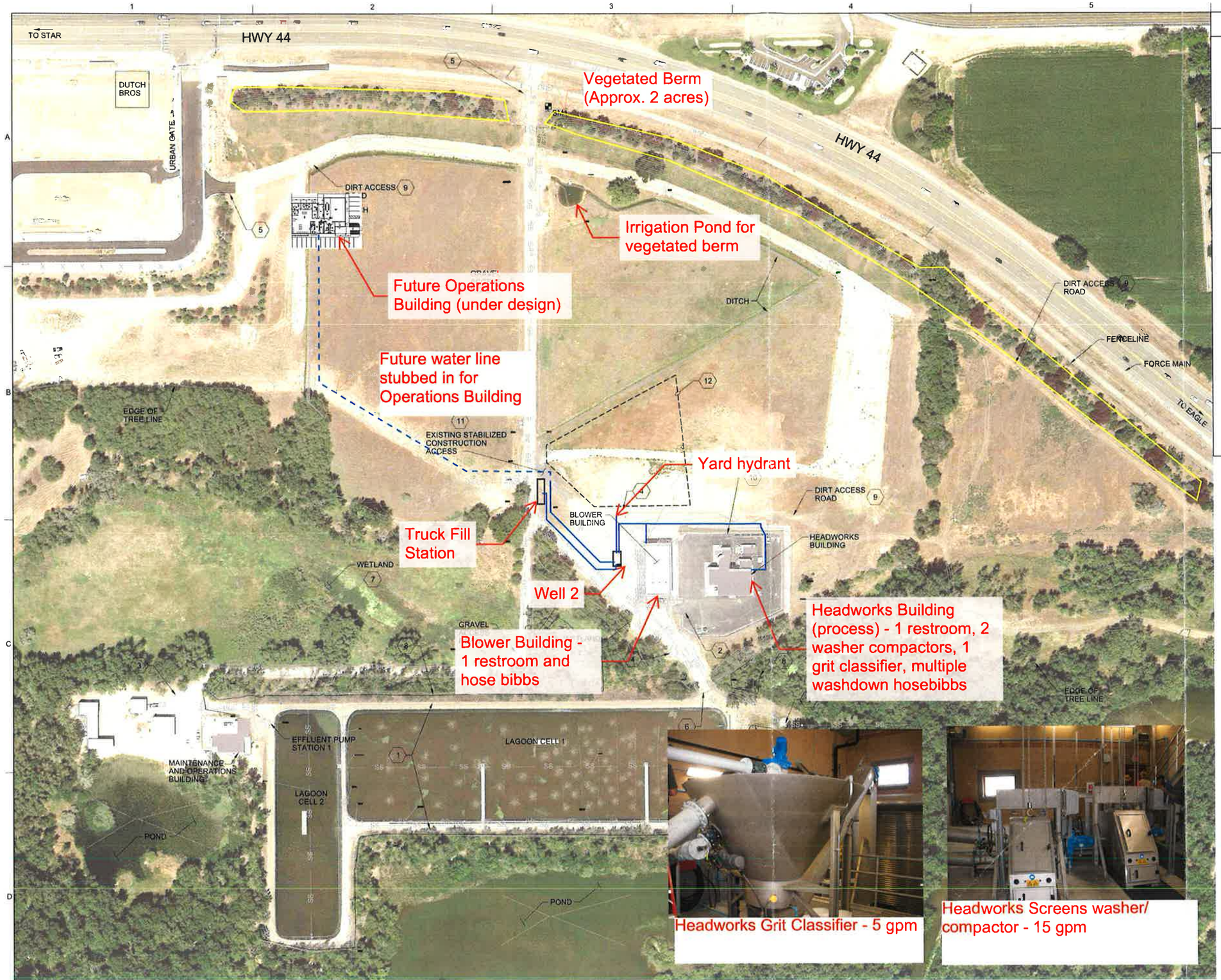
EAGLE SEWER DISTRICT
WELL NO. 2 PUMP PROJECT
EAGLE, IDAHO 83616

GENERAL
COVER SHEET AND INDEX TO DRAWINGS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

| | |
|---|---|
| DATE | NOV 2019 |
| PROJ | D3130900 |
| DWG | G-001 |
| SHEET | of |

BID DOCUMENTS




## GENERAL NOTES

A. SEE VICINITY MAP FOR PROXIMITY OF SITE TO BOISE RIVER.

B. CONTRACTOR TO KEEP EQUIPMENT AND VEHICLES OFF ASPHALT SURROUNDING BLOWER BUILDING & HEADWORKS BUILDING AND IS RESPONSIBLE FOR DUST CONTROL AND REPAIRING ANY DAMAGE CAUSED BY CONTRACTOR TRAFFIC ON ALL EXISTING ASPHALT (INCLUDING HIGHWAY 44).

## SHEET KEYNOTES

1. EXISTING POST AND WIRE FENCING SURROUNDS LAGOONS
2. CHAIN LINK GATE
3. EXISTING CONCRETE PAVEMENT
4. EXISTING UNDERGROUND VAULT
5. MAIN ENTRANCE GATE
6. SWING GATES
7. RETAIN AND PROTECT
8. BOISE RIVER 100 YEAR FLOOD ELEVATION: 2542
9. DIRT ACCESS ROADS LOOP PERIMETER OF PROPERTY
10. EXISTING CHAIN LINK FENCE SURROUNDS THE LIMITS OF ASPHALT PAVEMENT AT HEADWORKS AND BLOWER BUILDINGS
11. ALL CONSTRUCTION TRAFFIC SHALL PASS THROUGH CONSTRUCTION ACCESS.
12. APPROXIMATE LOCATION OF CONTRACTOR STAGING AREA; COORDINATE WITH OWNER.

| CONTROL POINT TABLE | | | |
|---|---|---|---|
| POINT | NORTHING | EASTING | ELEVATION |
| BM1 | 140000.06 | 458492.18 | 2553.02 |

AS-Built

PROFESSIONAL ENGINEER LICENSED 16872 MATTHEW D. JENKINS
15 November 2019

| NO. | DATE | DSGN | DR | CHK | APVD | BY |
|---|---|---|---|---|---|---|
| | | A. TOLMAN | J. PIGMAN | L. FETTKETHER | APVD | N. JENKINS |

REVISION





JACOBS
999 WEST MAIN STREET
SUITE 1200
BOISE, IDAHO 83702

CIVIL

EAGLE SEWER DISTRICT
WELL NO. 2 PUMP PROJECT
EAGLE, IDAHO 83616

# EXISTING CONDITIONS SITE PLAN

N

0 100 200 300
Scale In Feet

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

| | |
|---|---|
| DATE | NOV 2019 |
| PROJ | D3130900 |
| DWG | C-100 |
| SHEET | of |

BID DOCUMENTS

$PWURL $PWPATH FILENAME: C-100.dgn PLOT DATE: 2019\11\12 PLOT TIME: 8:26:52 PM

AS-Built

## GENERAL NOTES

A. SEE C-001 FOR GENERAL NOTES, LEGEND, AND ABBREVIATIONS.

B. LOCATION INFORMATION SHOWN ON THIS SHEET IS FOR REFERENCE AND SHALL BE VERIFIED PRIOR TO CONSTRUCTION.

C. TRENCHING FOR PIPE INSTALLATION SHALL CONFORM TO ISPWC SD-301. PIPE BEDDING SHALL CONFORM TO THE REQUIREMENTS OF ISPWC SECTION 306 AND SD-302, CLASS A-1; 3/4" MINUS GRAVEL AND SAND.

D. BACKFILL SHALL BE NATIVE TRENCH BACKFILL MATERIAL AND COMPACTION OF PIPE TRENCH SHALL CONFORM TO THE REQUIREMENTS OF ISPWC SECTION 306; TYPE A-1.

E. SEE ES-101 FOR ELECTRICAL INFORMATION.

F. SEE C-100 FOR BENCHMARK BM-1 LOCATION & DATA.

## SHEET KEYNOTES

1. RETAIN AND PROTECT
2. SEE C-401 FOR WELL VALVE VAULT PLAN AND SECTIONS.
3. SEE C-402 AND C-403 FOR TRUCK FILL PAD AND VAULT PLAN AND SECTIONS.
4. SEE DETAIL B/C-403 FOR CONCRETE PAD SECTION & STRUCTURAL INFORMATION.
5. 2" W STUB OUT FOR FUTURE OPERATIONS BUILDING.
6. 1-1/2" V301 WITH VALVE BOX. CONNECT TO EXST 1-1/2" W TO BLOWER BLDG. SEE ISPWC SD-406.
7. CLOSE AND CAP EXST VALVE, REMOVE METER, AND PLUG VALVE. RETURN METER TO EAGLE WATER CO.
8. EXTEND LINE 2' AT END OF 3" W AND CAP FOR FUTURE EXTENSION.
9. 2-1/2" V301 WITH VALVE BOX. CONNECT TO EXST 2-1/2" W TO HEADWORKS. SEE ISPWC SD-406.
10. NEW WATER LINE TO BE INSTALLED ON NORTH SIDE OF THE EXST FENCE AND ROCK-LINED SWALE.
11. PROVIDE COMPACTED GRAVEL ACCESS TO TRUCK FILL PAD SIM TO ISPWC SD-303 TYPE "C".
12. FIELD LOCATE EXISTING WELL & COORDINATE LOCATION WITH C-401.
13. PROVIDE & INSTALL 6" GRAVITY DRAIN. SEE C-401 FOR PIPE MATERIAL. AVOID REMOVAL OF TREES BY USING 22 1/2° ELBOWS TO JOG 6" SD TO MISS TRUNKS BY 5' MINIMUM.
14. PROVIDE & INSTALL STANDARD CONCRETE CATCH MANHOLE PER ISPWC SECTION 602 & SD-611. MANHOLE TO BE PLACED TO AVOID EXST WATER LINE AND BE OUTSIDE THE EXTENTS OF THE ROADWAY.
15. OUTLET PROTECTION CLASS 1 GRADED RIPRAP (d50 = 6").
16. LOCATE WELL VALVE VAULT IN N-S DIRECTION TO ALIGN WITH REQUIRED 4" W PENETRATION LOCATION INTO VAULT.

1" TO YARD HYDRANT

2" Line to Blow Off

1 WATER STRUCTURE
T.O.P. ~2549.0
CORNER OF TRUCK FILL PAD
N 139230.67
E 458493.79
5 FILL PAD DRAIN
RIM = 2548.58
INV (S) = 2545.5
EXST ROAD ~2548.65
11
4" D
3 4
SDMH
RIM = 2548.5
INV IN (N) [6"] = 2545.0
INV IN (E) [3"]2545.0
INV IN (SE) [1.5"] = 2545.0
INV OUT (S) [6"] = 2544.5
N 139173.51
E 458471.39
14
4" W 45° ELBOW (FIELD LOCATE)
2" W 45° ELBOW (FIELD LOCATE)
11
1 1/2" PD
1 1/2" PD 11.25° ELBOW OR DEFLECT PIPE
RETAIN EXST DRAIN PIPE
2" W
4" W
13
205 LF
S=0.5%
SD
6" SD DAYLIGHTED
INV 6" = 2543.47±
N 138981.83
E 458546.03
15
1 EFFLUENT PUMP STATION
3" 90° ELBOW (FIELD LOCATE)
3" W
2" W 45° ELBOW
4" W 45° ELBOW
1 1/2" PD 45° ELBOW
(FIELD LOCATE)
2 12
10'-0"
1 WELL
16
4" W (FROM WELL)
6" D VAULT OVERFLOW
2" 90° ELBOW (FIELD LOCATE)
4" W 90° ELBOW
1 1/2" PD 90° ELBOW
(FIELD LOCATE)
1 ELEC VAULT
BLOWER BUILDING
2" V301 WITH VALVE BOX PER ISPWC SD-406. PLUG VALVE FOR FUTURE USE FOR BACKUP WATER SUPPLY FROM HYDRANT ON EAGLE WATER LINE.
1 1/2"x3"x3" TEE (FIELD LOCATE)
6
1 1/2" W
7
3" W
10
2 1/2"x3"x3" TEE (FIELD LOCATE)
8
7
9
1 ROCK-LINED SWALE
HEADWORKS BUILDING
N
0 20 40 60
Scale In Feet

PROFESSIONAL ENGINEER LICENSED 16872 STATE OF IDAHO
15 November 2019

| NO. | DATE | DSGN | DR | CHK | REVISION | BY | APVD |
|---|---|---|---|---|---|---|---|
| | | A TOLMAN | J PIGMAN | L FETTKETHER | APVD | N JENKINS | |



JACOBS
999 WEST MAIN STREET
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BOISE, IDAHO 83702

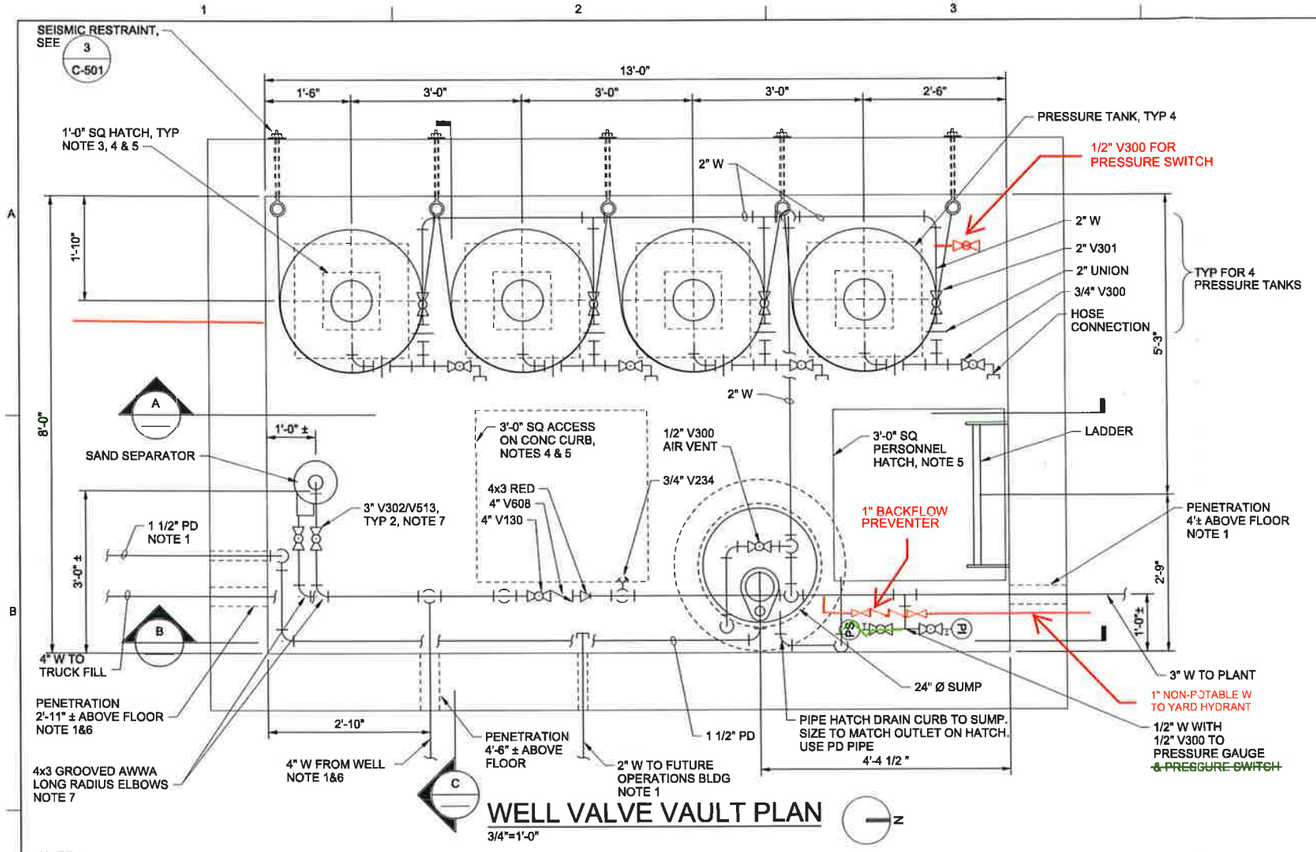
EAGLE SEWER DISTRICT
WELL NO. 2 PUMP PROJECT
EAGLE, IDAHO 83616

CIVIL
SITE PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

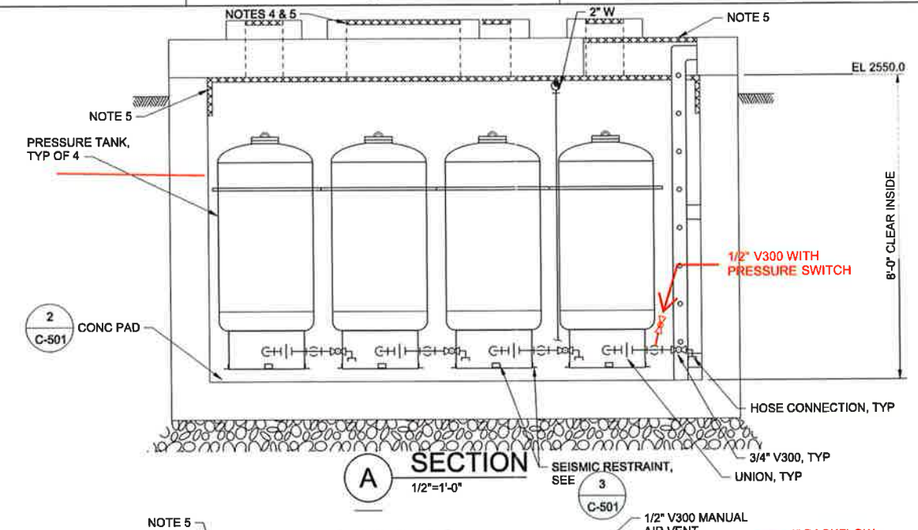
| | |
|---|---|
| DATE | NOV 2019 |
| PROJ | D3130900 |
| DWG | C-101 |
| SHEET | of |

BID DOCUMENTS



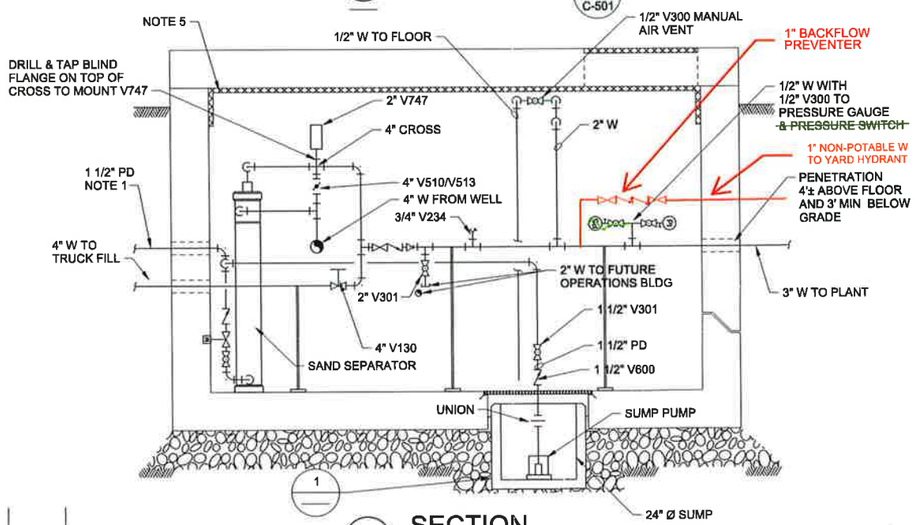

## WELL VALVE VAULT PLAN

3/4"=1'-0"




## A SECTION

1/2"=1'-0"




## B SECTION

1/2"=1'-0"

NOTES:

1. DRY PACK GROUT PIPE PENETRATIONS & SEAL WITH FLEXIBLE SEALANT AT OUTSIDE OF PENETRATION.
2. SUPPORT SAND SEPARATOR FROM FLOOR.
3. COORDINATE HATCH SIZE WITH SIZE OF ACCESS FLANGE ON TANKS TO ENSURE TANK BLADDERS CAN BE REMOVED.
4. COVERS FOR EQUIPMENT ACCESS HATCHES SHALL BE 12 GA GALV STEEL SHEET TURNED DOWN 2" OVER 6"x6" CONCRETE CURB WITH WELDED OR SOLDERED CORNERS. PROVIDE A HASP OR LUG ON 2 OPPOSITE SIDES OF EACH COVER TO SECURE COVER TO VAULT LID.
5. PROVIDE 1 1/2" OF EXTRUDED POLYSTYRENE BOARD INSULATION GLUED TO UNDERSIDE OF VAULT LID, HATCH COVERS & PERSONNEL HATCH. EXTEND DOWN WALLS TO 2' BELOW GRADE.
6. COORDINATE PIPE PENETRATION LOCATION & ELEVATION WITH VAULT PIPE & EQUIPMENT LAYOUT PRIOR TO MANUFACTURE OF VAULT.
7. VALVE & FITTING TYPE DEPEND ON WHETHER SAND SEPARATOR HAS FLANGED OR GROOVED CONNECTIONS.

**PIPING SCHEDULE**

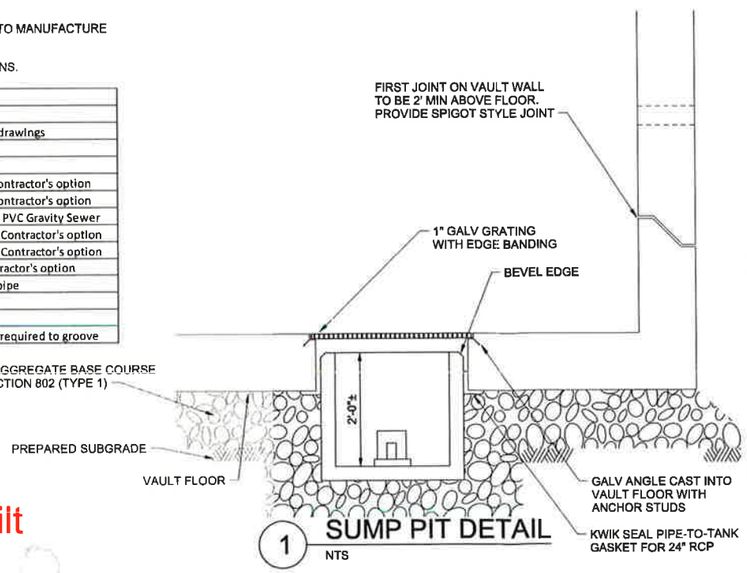
| Flowstream | Service | Size | Installation | Specification | Joints | Notes |
|---|---|---|---|---|---|---|
| D | Gravity Drain | 4" - 10" | BUR | 40 27 00.12 | SW | Where noted on drawings |
| | | | | ISPWC | PO | |
| PD | Pressure Drain | <=2" | BUR | 40 27 00.10 | SW | |
| | | | EXP | 40 27 00.10 | SW | PVC or GALV at Contractor's option |
| | | | | 40 27 00.07 | THD or GR | PVC or GALV at Contractor's option |
| SD | Storm Drain | 6" | BUR | ISPWC | PO | Solid Wall SDR 35 PVC Gravity Sewer |
| W | Potable Water | >=4" | BUR | 40 27 00.01 | MJ or PRJ | DI or C900 PVC at Contractor's option |
| | | | | 40 27 00.11 | Restrained PO | DI or C900 PVC at Contractor's option |
| | | >=4" | EXP | 40 27 00.01 | FLG or GR | FLG or GR at Contractor's option |
| | | | EXP | 40 27 00.03 | W | Use for truck fill pipe |
| | | <4" | BUR | 40 27 00/10 | SW | |
| | | <4" | EXP | 40 27 00.10 | SW | |
| | | | | 40 27 00.07 | GR | Use GALV where required to groove |

Installation Abbreviations:
BUR - Buried
EXP - Exposed above ground or in a vault

Pipe Material Specification:

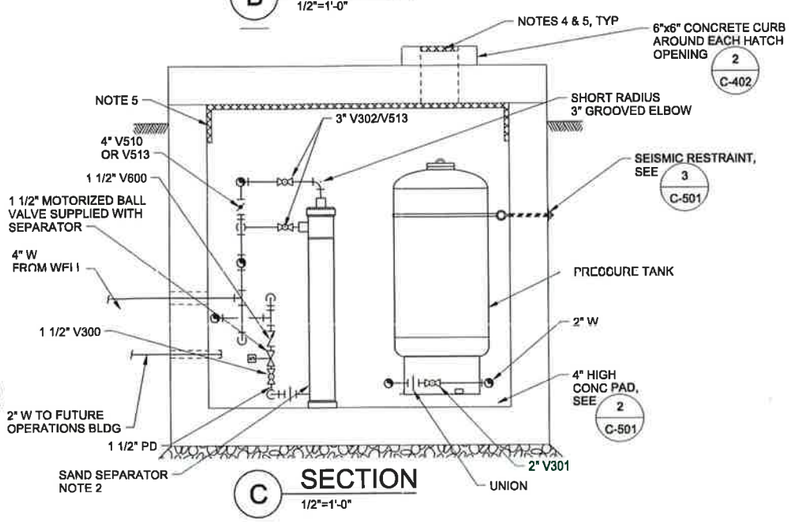
| | |
|---|---|
| 40 27 00.01 | Cement lined ductile iron |
| 40 27 00.03 | Carbon steel |
| 40 27 00.07 | Galvanized steel |
| 40 27 00.10 | PVC |
| 40 27 00.11 | C900 PVC |
| 40 27 00.12 | DWV PVC |
| ISPWC | ID Stds for Public Works C[illegible]ction |

Joint Abbreviations:
FLG - Flanged
GR - Grooved
MJ - Mechanical Joint
PO - Push On
PRJ - Proprietary Restrained Joint
SW - Socket Weld (Glued)
THD - Threaded
W - Welded




## SUMP PIT DETAIL

NTS




## C SECTION

1/2"=1'-0"

AS-Built



| NO. | DATE | DSGN | DR | CHK | APVD | BY | REVISION |
|---|---|---|---|---|---|---|---|
| | | L FETTKETHER | J PIGMAN | L FETTKETHER | | N JENKINS | |



JACOBS
999 WEST MAIN STREET
SUITE 1200
BOISE, IDAHO 83702

EAGLE SEWER DISTRICT
WELL NO. 2 PUMP PROJECT
EAGLE, IDAHO 83616

CIVIL
WELL VALVE VAULT PLAN AND SECTIONS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

| | |
|---|---|
| DATE | NOV 2019 |
| PROJ | D3130900 |
| DWG | C-401 |
| SHEET | of |

BID DOCUMENTS

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Thinking ahead makes it possible
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| | |
|---|---|
| L-SP-SL-002 | 4/06 |
| PRINTED IN USA | |


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Phone: 011-52-81-8144 4000
Telefax: 011-52-81-8144 4010

www.grundfos.com


GRUNDFOS

GRUNDFOS

Company name:
Created by:
Phone:

Date: 11/18/2019

| Count | Description |
|---|---|
| 1 | **230S150-4** |

**Product photo could vary from the actual product**

Product No.: 15B73604
Multi-stage submersible pump for raw water supply, groundwater lowering and pressure boosting. The pump is suitable for pumping clean, thin, non-agressive liquids without solid particles or fibers.

The pump is made entirely of Stainless steel DIN W.-Nr. EN 1.4301 and suitable for horizontal and vertical installation.
The pump is fitted with a built-in non-return valve.

The motor is a 3-phase motor of the canned type with a sand shield, liquid-lubricated bearings and pressure-equalizing diaphragm.

**Liquid:**

| | |
|---|---|
| Pumped liquid: | Water |
| Maximum liquid temperature: | 104 °F |
| Max liquid temperature at 0.15 m/sec: | 104 °F |
| Selected liquid temperature: | 68 °F |
| Density: | 62.29 lb/ft³ |

**Technical:**

| | |
|---|---|
| Pump speed on which pump data is based: | 3450 rpm |
| Actual calculated flow: | 101 US gpm |
| Resulting head of the pump: | 232.2 ft |
| Shaft seal for motor: | SIC/SICNBR |
| Curve tolerance: | ISO9906:2012 3B |
| Motor version: | T40 |

**Materials:**

| | |
|---|---|
| Pump: | Stainless steel<br>EN 1.4301<br>AISI 304 |
| Impeller: | Stainless steel<br>EN 1.4301<br>AISI 304 |
| Motor: | Stainless steel<br>DIN W.-Nr. 1.4301<br>AISI 304 |

**Installation:**

| | |
|---|---|
| Maximum ambient pressure: | 870.23 psi |
| Pump outlet: | 3"NPT |
| Motor diameter: | 6 inch |

**Electrical data:**

| | |
|---|---|
| Motor type: | MS6000 |
| Rated power - P2: | 15 HP |

GRUNDFOS

Company name:
Created by:
Phone:

Date: 11/18/2019

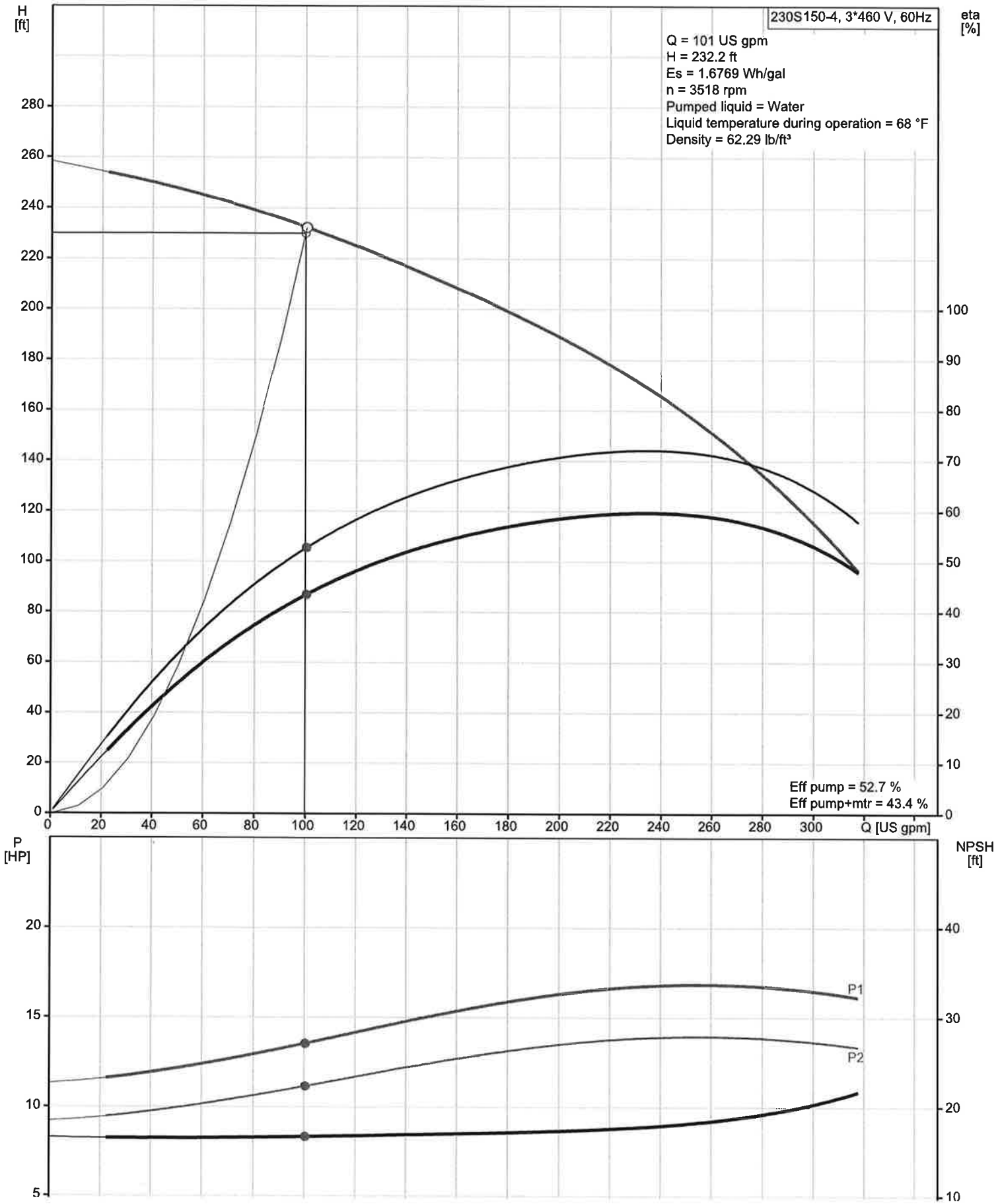
| Count | Description | |
|---|---|---|
| | | 115 A |
| | Cos phi - power factor: | 0.84-0.83-0.80 |
| | Rated speed: | 3450-3470-3480 rpm |
| | Motor efficiency at full load: | 82.5 % |
| | Start. method: | direct-on-line |
| | Enclosure class (IEC 34-5): | IP68 |
| | Insulation class (IEC 85): | F |
| | Built-in temperature transmitter: | yes |
| | Motor Number: | 96166164 |
| | **Others:** | |
| | ErP status: | EuP Standalone/Prod. |
| | Net weight: | 143 lb |
| | Gross weight: | 200 lb |
| | Shipping volume: | 7.06 ft³ |
| | Country of origin: | US |
| | Custom tariff no.: | 8413.70.2004 |

GRUNDFOS

Company name:
Created by:
Phone:

Date: 11/18/2019

# I5B73604 230S150-4 60 Hz

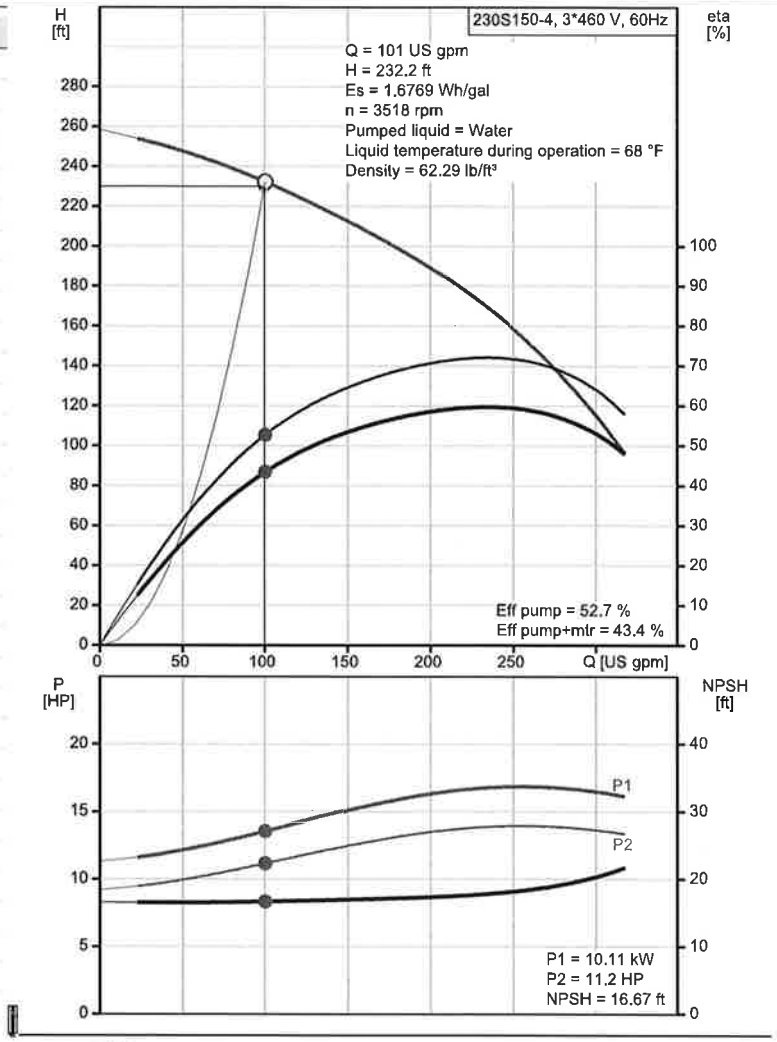


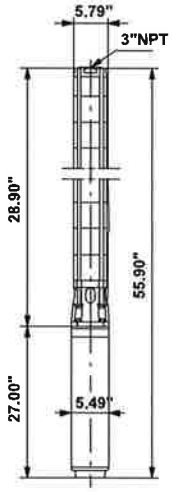
GRUNDFOS

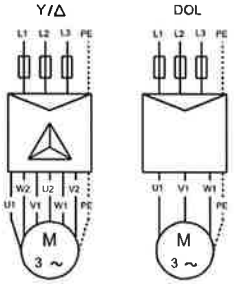
Company name:
Created by:
Phone:

Date: 11/18/2019

| Description | Value |
|---|---|
| **General information:** | |
| Product name: | 230S150-4 |
| Product No.: | 15B73604 |
| EAN: | 5700391831331 |
| | 5700391831331 |
| **Technical:** | |
| Pump speed on which pump data is based: | 3450 rpm |
| Actual calculated flow: | 101 US gpm |
| Resulting head of the pump: | 232.2 ft |
| Stages: | 4 |
| Impeller reduc.: | NONE |
| Shaft seal for motor: | SIC/SICNBR |
| Curve tolerance: | ISO9906:2012 3B |
| Model: | B |
| Valve: | YES |
| Motor version: | T40 |
| **Materials:** | |
| Pump: | Stainless steel |
| | EN 1.4301 |
| | AISI 304 |
| Impeller: | Stainless steel |
| | EN 1.4301 |
| | AISI 304 |
| Motor: | Stainless steel |
| | DIN W.-Nr. 1.4301 |
| | AISI 304 |
| **Installation:** | |
| Maximum ambient pressure: | 870.23 psi |
| Pump outlet: | 3"NPT |
| Motor diameter: | 6 inch |
| **Liquid:** | |
| Pumped liquid: | Water |
| Maximum liquid temperature: | 104 °F |
| Max liquid temperature at 0.15 m/sec: | 104 °F |
| Selected liquid temperature: | 68 °F |
| Density: | 62.29 lb/ft³ |
| **Electrical data:** | |
| Motor type: | MS6000 |
| Applic. motor: | GRUNDFOS |
| Rated power - P2: | 15 HP |
| KVA code: | H |
| Main frequency: | 60 Hz |
| Rated voltage: | 3 x 440-460-480 V |
| Starter: | 1 3/4 |
| Service factor: | 1.15 |
| Rated current: | 25.0-24.4-24.0 A |
| Starting current: | 420-460-490 % |
| | 115 A |
| Cos phi - power factor: | 0.84-0.83-0.80 |
| Rated speed: | 3450-3470-3480 rpm |
| Axial load max: | 59.5 lb |
| Motor efficiency at full load: | 82.5 % |
| Start. method: | direct-on-line |
| Enclosure class (IEC 34-5): | IP68 |
| Insulation class (IEC 85): | F |
| Motor protection: | NONE |
| Thermal protec: | external |
| Built-in temperature transmitter: | yes |
| Motor Number: | 96166164 |
| Cable number: | 96163476 |
| **Controls:** | |



GRUNDFOS

Company name:
Created by:
Phone:

Date: 11/18/2019

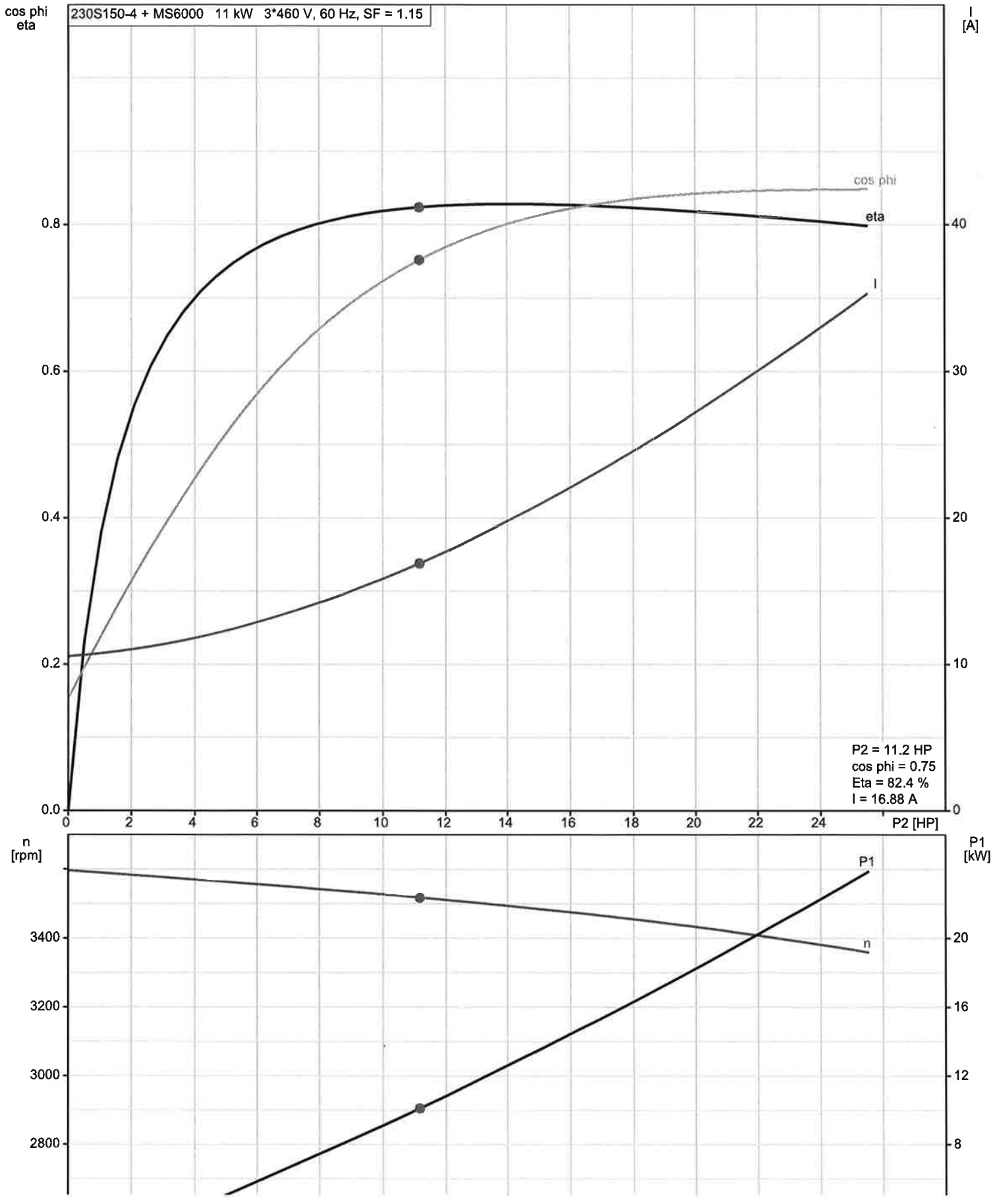
| Description | Value |
|---|---|
| Gross weight: | 200 lb |
| Shipping volume: | 7.06 ft³ |
| Sales region: | Namreg |
| Country of origin: | US |
| Custom tariff no.: | 8413.70.2004 |

GRUNDFOS

Company name:
Created by:
Phone:

Date: 11/18/2019

# 15B73604 230S150-4 60 Hz

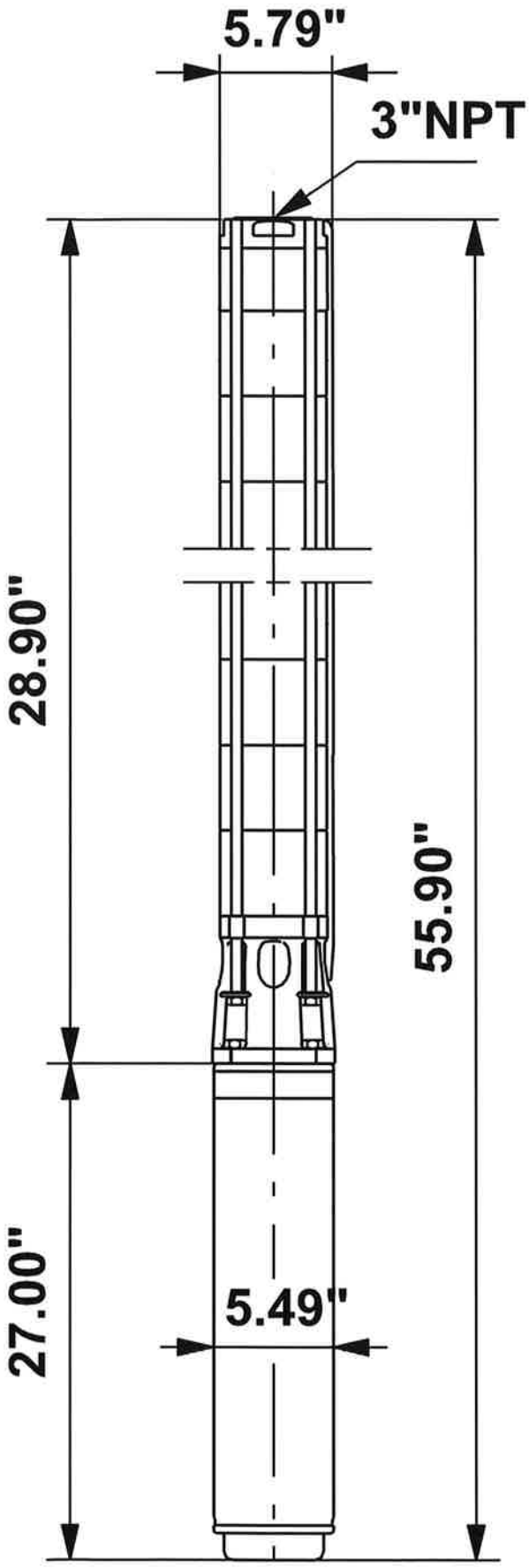


GRUNDFOS

Company name:
Created by:
Phone:

Date: 11/18/2019

# 5B73604 230S150-4 60 Hz

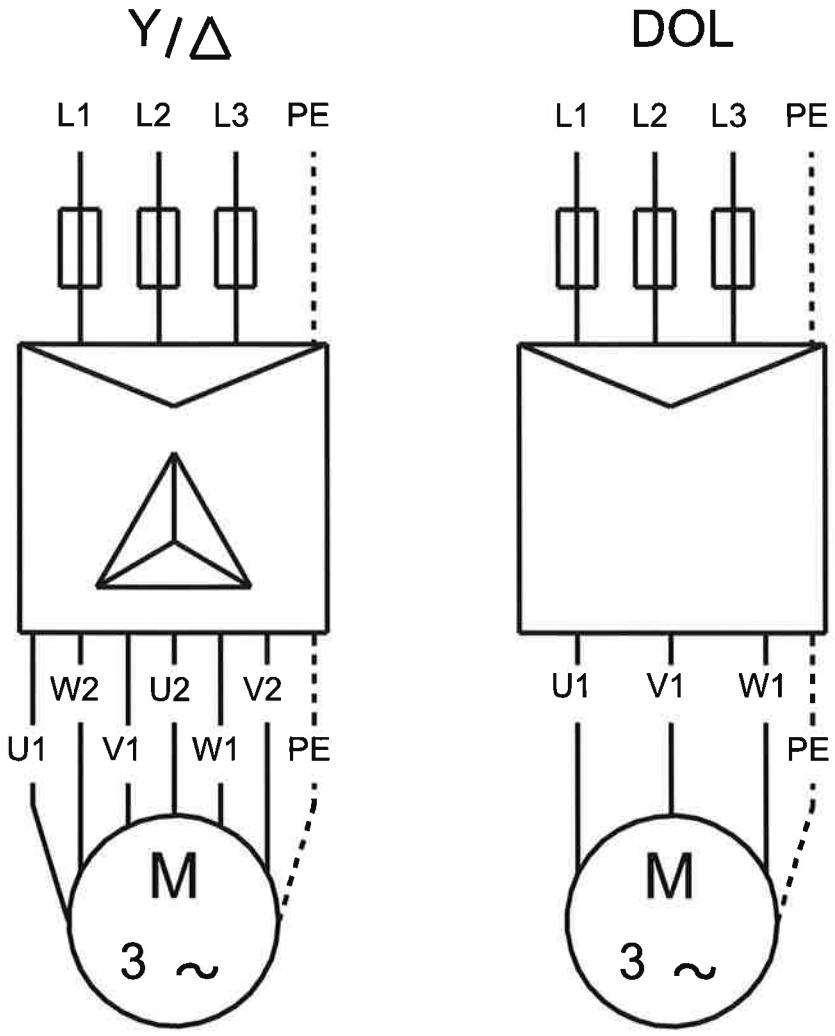


GRUNDFOS

Company name:
Created by:
Phone:

Date: 11/18/2019

# 5B73604 230S150-4 60 Hz

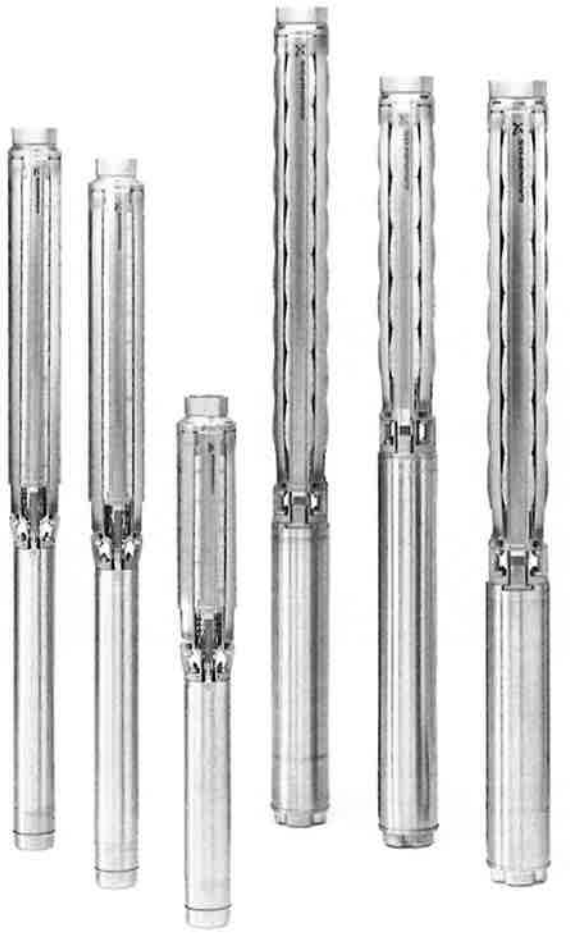



| | |
|---|---|
| U1, W2 | Brown |
| V1, U2 | Black |
| W1, V2 | Grey |

# SP

## Stainless steel submersible pumps 4", 6", 8", and 10"

### Installation and operating instructions



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## 3. Product description

### 3.1 Introduction

Your Grundfos SP submersible pump is of the highest quality. Combined with proper installation, your Grundfos pump will give you many years of reliable service.

To ensure the proper installation of the pump, carefully read the complete manual before attempting to install the pump.

### 3.2 Applications

Grundfos SP submersible pumps are suitable for the following applications:

- groundwater supply to waterworks
- irrigation in horticulture and agriculture
- groundwater lowering (dewatering)
- pressure boosting
- industrial applications
- domestic water supply.

### 3.3 Features and benefits

- State-of-the-art hydraulics provide high efficiency and low operating costs
- 100 % stainless steel components inside and outside for long service life
- sand resistant
- resistant to aggressive water
- monitoring, protection, and communication via protection unit MP 204, and GO remote control.

### 3.4 Type key

| Example | 475 | S | 500 | - | 5 | - | A | B |
|---|---|---|---|---|---|---|---|---|

- 475: Rated flow rate in gpm
- S: Type range. Stainless steel parts of material. S = AISI 304, N = AISI 316, R = AISI 904L
- 500: Hp of motor
- 5: Number of impellers
- A: First reduced-diameter impeller (A, B or C)
- B: Second reduced-diameter impeller (A, B or C)

## 4. Delivery, handling and storage

### 4.1 Delivery

**CAUTION**

Caution Keep the pump in the shipping carton until it is placed in the vertical position during installation.

Handle the pump with care.

Examine the components carefully to make sure no damage has occurred to the pump end, motor, cable or control box during shipment.

### 4.2 Handling

Keep the pump in the shipping carton until it is ready to be installed. The shipping carton is specially designed to protect it from damage. During unpacking and prior to installation, make sure that the pump is not dropped or mishandled.

Do not expose the pump to unnecessary impact and shocks.

The motor is equipped with a power cable.

**CAUTION**

Caution Never use the power cable to support the weight of the pump.

You will find a loose nameplate with an adhesive backing with the pump. If the nameplate is blank, complete it in pen and attach it to the control box.

Note Fix the extra nameplate supplied with the pump at the installation site.

### 4.3 Storage

#### 4.3.1 Storage temperature

Pump: -4 - +140 °F (-20 - +60 °C).

Motor: -4 - +158 °F (-20 - +70 °C).

Store the motors in a closed, dry and well ventilated room.

## CAUTION

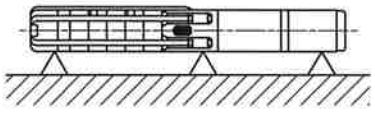
Caution

If MMS motors are stored, the shaft must be turned by hand at least once a month. If a motor has been stored for more than one year before installation, the rotating parts of the motor must be dismantled and checked before use.

Do not expose the pump to direct sunlight.

If the pump has been unpacked, store it horizontally, adequately supported, or vertically to prevent misalignment. Make sure that the pump cannot roll or fall over.

During storage, the pump can be supported as shown in fig. 1.



TM00 1349 2495

**Fig. 1** Pump position during storage

#### 4.3.2 Frost protection

If the pump has to be stored after use, it must be stored on a frost-free location, or the motor liquid must be frost-proof.

## 5. Operating conditions

| | | |
|---|---|---|
| Flow rate, Q: | | Up to 1400 gpm (318 $m^3/h$) |
| Head, H: | | Up to 2657 ft (810 m) |
| Liquid temperature: | | 32-140 °F (0-60 °C) |
| Maximum submersible depth: | MS 402 | 492 ft (150 m) (213 psi) |
| | MS 4000 | 1969 ft (600 m) (852 psi) |
| | MS 6000 | 1969 ft (600 m) (852 psi) |
| | All MMS | 1969 ft (600 m) (852 psi) |

## 6. Installation

Install products in accordance with the local code of the authority having jurisdiction. Installation must be carried out by a qualified person.

## WARNING

Risk of electric shock. Do not remove cord and strain relief. Do not connect conduit to pump.

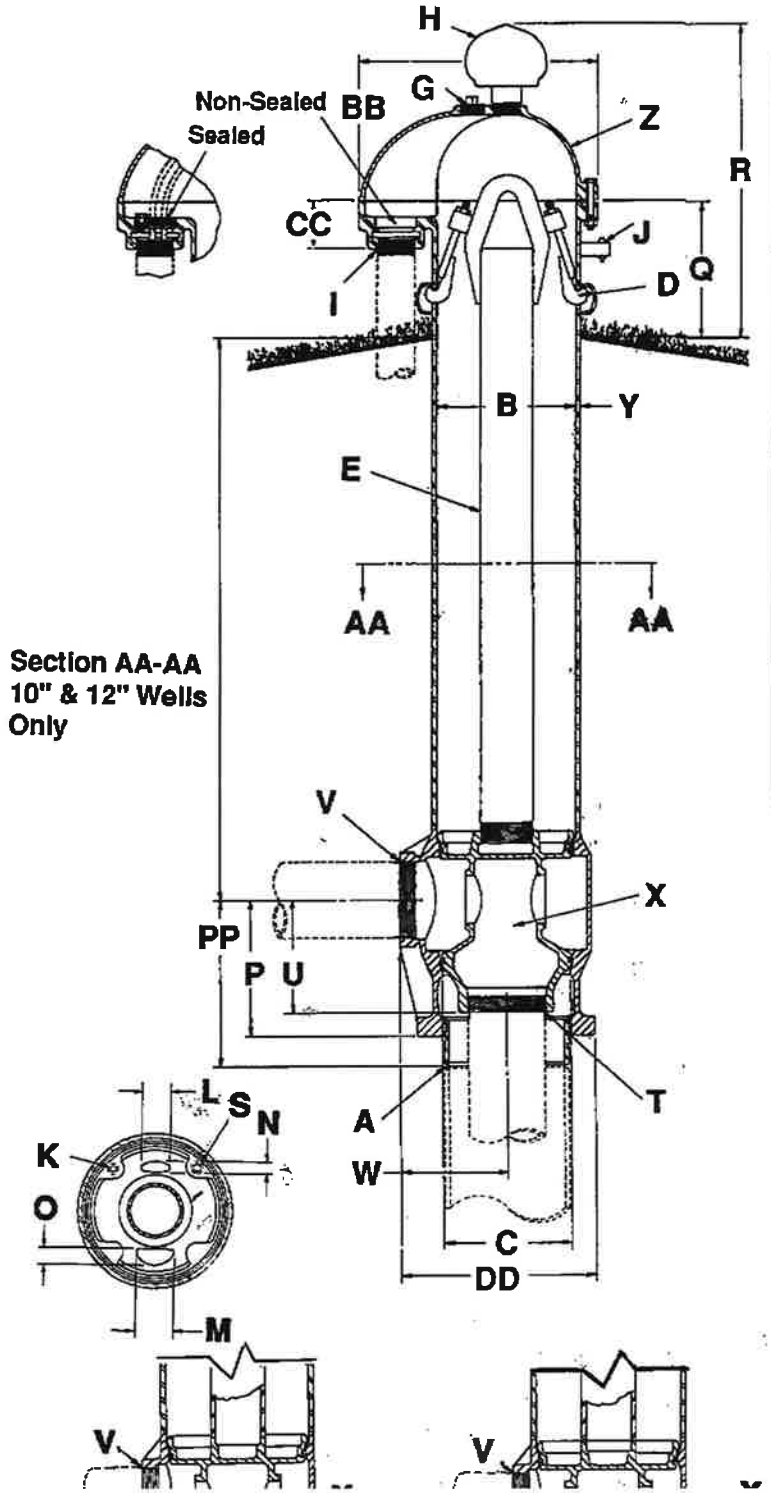
### 6.1 Pre-installation checklist

Make the following checks before beginning installation:

- condition of the well
- condition of the water
- installation depth
- power supply
- cable type.

These checks are all critical for the proper installation of this submersible pump.

# STANDARD MODEL Monitor PS INDUSTRIA




| SPECIFICATIONS | | 10" Well | 12" Well |
|---|---|---|---|
| A | Pitless Unit to Well Casing Connection: | Chamfered for butt weld | Chamfered for butt weld |
| B | Pitless Unit with black upper case standard: | 12" I.D. X 12-3/4" O.D. | 13-1/4" I.D., 14" O.D. |
| C | Discharge body minimum I.D. | 11" | 12" |
| D | Hold-down Mechanism: | Locks spool in place and prevents lifting and turning during pump start-up. Two adjustable hooks on lift-out pipe hook into side of pitless case. | Locks spool in place and prevents lifting and turning during pump start-up. Two adjustable hooks on lift-out pipe hook into side of pitless case. |
| E | Lift-out pipe with lifting bail: | 4" I.P.S. assembly designed for a 45,000 lb. load | 4" I.P.S. assembly designed for a 60,000 lb. load |
| G | | 2" F.I.P. tapping | 2" F.I.P. tapping |
| H | Well vent: | Screws into a 2-1/2" F.I.P. tapping | Screws into a 2-1/2" F.I.P. tapping |
| I | Conduit tappings: | 3" F.I.P. Watertight conduit seals for most common cable sizes are available. | 2" & 1" std. Also available with single 2", 3" or 4" F.I.P. All tapping sizes available with or without electrical cable seal. |
| J | Depth tester block tappings: | 1/4" F.I.P. standard | 1/4" F.I.P. standard |
| K | Pressure switch tapping: | Not Available | 3/8" N.P.T. standard |
| | MOTOR CABLE PASSAGES THROUGH SPOOL (SECTION AA-AA) | | |
| L | | 2-5/8" | 2-3/4" |
| M | | 2-5/8" | 3-5/8" |
| N | | 1-5/16" | 1" |
| O | | 1-5/16" | 1-3/4" |
| P | Dimension from center of discharge outlet to bottom of discharge Body: | 11-7/8" | 11-7/8" |
| PP | Dimension from center of discharge outlet to bottom of weld nipple: | 14-3/8" | 16-1/4" |
| Q | Distance from ground level to top of the pitless case: | 12" | 12" |
| R | Distance from ground level to top of the watertight cap: (Vent height may be increased if necessary) | 28-1/2" | 27-9/16" |
| S | Water sampler tapping: | Not Available | Optional |
| T | SPOOL TO DROP PIPE CONNECTION: | 6" F.I.P. tapping Spool designed for load of 11,750 lbs. at safety factor of 4. | 6" F.I.P. tapping Spool designed for load of 11,750 lbs. at safety factor of 4 |
| U | Dimension from center of discharge outlet to bottom of spool: | 9-5/8" | 10-1/2" |
| V | Discharge connection tapping size: | 6" F.I.P. | 6" F.I.P. |
| W | Dimension from center of well casing to the end of discharge outlet: | 9-1/8" | 9-1/16" |
| X | SPOOL ASSEMBLY -Without check valves- Area of water passages: | 26.73 Sq. In. | 25.12 Sq. In. |
| | Percent area of water passages to area of drop pipe: | 93% | 87% |

**Nelson, Dan**

**From:** Nelson, Dan
**Sent:** Wednesday, May 13, 2020 2:46 PM
**To:** 'Boggs, Kevin/BOI'
**Subject:** RE: Field Report for permit 63-34660

Hello Kevin,

I wanted to let you know that I completed the review of your field report for 63-34660, and other than the diversion rate question in my earlier email, everything else looks really well done. Once I get enough information to allow me to verify the diversion rate, I will move forward with the licensing process. As the file is reviewed by my supervisor, additional questions can arise, but I think you did a very good job.

I also want to let you know that I am going to try to combine the domestic and industrial uses, since they are all for the same industrial facility. I am planning on combining the diversion rates and volumes from the two uses for the industrial use, so you will not lose any total diversion rate or volume. If I can't accomplish this, then we will license the permit with the two uses separated as you recommended them. You will also notice that there will not be a volume for the fire protection or supplemental irrigation on the license when it is issued. There are no limits as to the amount of water that can be diverted to fight an existing fire, so we don't include a volume limitation on the fire protection. The volume for the irrigation use will addressed in the conditions of the license with the 9 af you recommended for the two acres, so you won't see and actual volume for the irrigation use. Supplemental irrigation varies so much from year to year that it is not reasonable to limit the supplemental irrigation to a specific volume.

I will hold this file until the end of next week, and then I will send a formal request clarification of the diversion rate information. If you have any questions, please don't hesitate to contact me.

Respectfully,

Daniel Nelson
Water Right Analyst 3
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

**From:** Nelson, Dan
**Sent:** Monday, May 11, 2020 11:40 AM
**To:** 'Boggs, Kevin/BOI' <Kevin.Boggs@jacobs.com>
**Subject:** Field Report for permit 63-34660

Hello Kevin,

I just performed a quick review of the field report you submitted for permit 63-34660. I am having a hard time finding what the Total Dynamic Head (TDH) is for this pump. The pump curve doesn't help at all without the TDH for that particular pump system. I may be missing something, so I wanted to contact you for help before I get much farther.

From the Well Driller's Report it appears as though the Pumping Water Level (PWL) is between 69 and 98 feet. Please see the Well Test on the Well Driller's Report and Static Water Levels. Most domestic type systems operate at between 40 and 60 psi, so using an average of 50 psi that would be approximately 105 feet pressure (50 X 2.31 = 105 ft psi). That would leave a TDH of somewhere between 174 and 203 feet. Using the pump curve, that is somewhere between 180 and 230 gpm or 0.40 to 0.45 cfs.

The pump curve shows that the maximum capacity of the pump is around 320 gpm or 0.71 cfs, and a designed operating flow of 100 gpm or 0.22 cfs. I have no idea where you came up with 1.20 cfs when it appears that the pump design and maximum capacity of the pump is much less than what you recommended.

You can't recommend more than the capacity of the pump, so I am really concerned with the recommendation in the field report. At this point, anything more than a diversion rate of 0.40 to 0.45 cfs doesn't seem reasonable.

Please let me know what I am missing as soon as possible.

Thank you.

Dan Nelson