

City Of Deer Lodge
Test Well TW-2
Drilling and Hydrogeology

Presentation to
Deer Lodge City Council
September 8, 2020

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PRESENTATION OUTLINE



- Present Test Well TW2 results
 - Drilling
 - Well Construction
 - Aquifer Testing
 - Water Quality
- Provide Recommendations for Future Water Supply Development

PROJECT OBJECTIVE

- Complete one or two test wells to evaluate location for a new municipal water supply well
- Location based on results from
 - Favorable hydrogeology, water quality, and high-yield aquifer data from publicly available information
 - Select water quality sampling
 - Favorable physical location, access, well head protection, and space for limited well field



Location of Test Well TW2, Public Water Supply Wells, and Aquifer Test Observation Wells



Location of Test Well TW2



- Drilling TW2 boring began April 20 and completed April 21, 2020
- Air rotary drill rig
- Total Borehole Depth = 278 feet



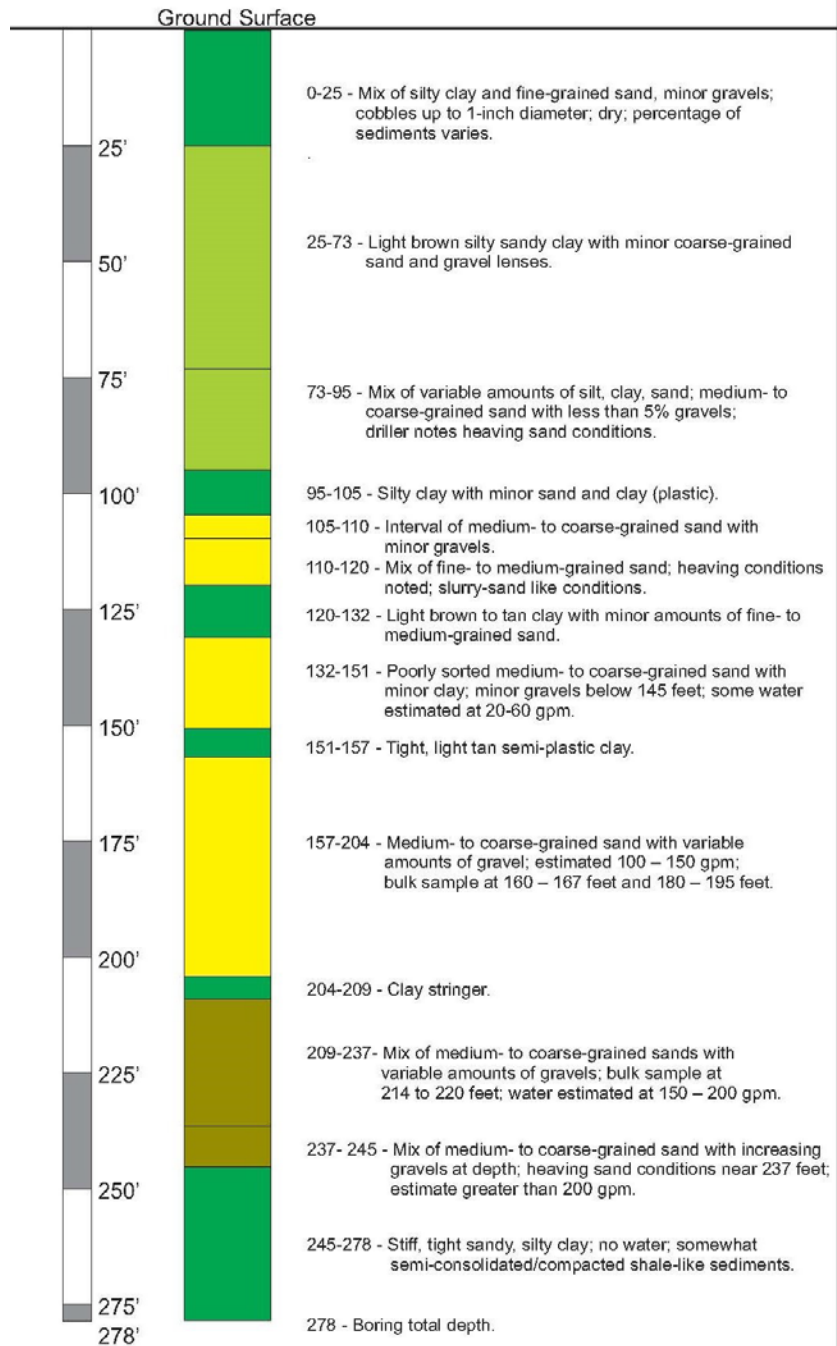
TW2 - Aquifer Materials



Test Well TW2

Lithologic Log

City of Deer Lodge



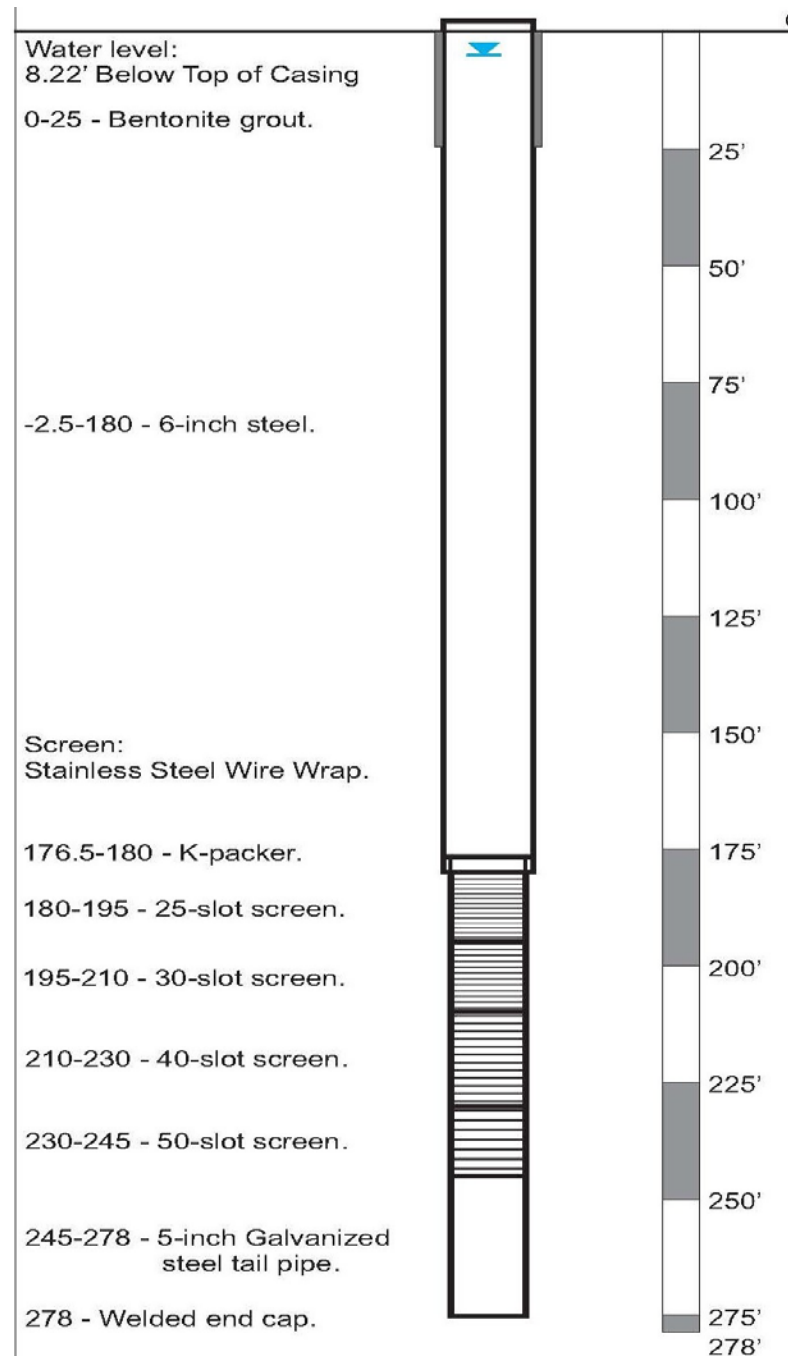
Screens and K-Packer Installed in TW2



Test Well TW2

Well Construction Diagram

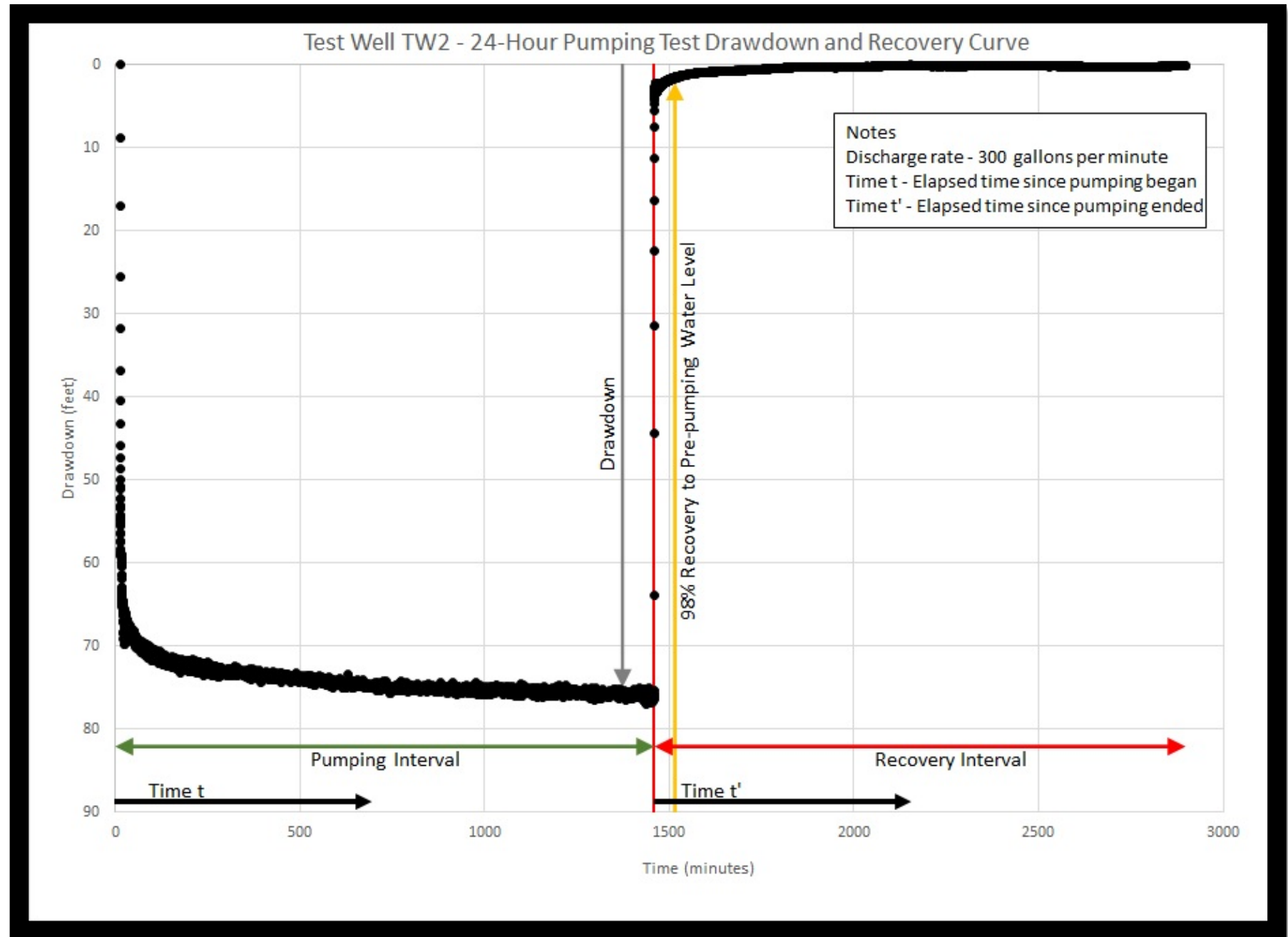
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AQUIFER TESTING



DRAWDOWN AND RECOVERY CURVE



TW2 Aquifer Test Analysis

Analytical Solution	Aquifer Model	Transmissivity Feet ² / Day	Hydraulic Conductivity Feet / Day
Theis	Confined	2,014.1	31.0
Neuman-Witherspoon	Leaky	1,362.0	21.0

Note: Hydraulic conductivity calculated using aquifer thickness = screen length (65 feet).
Storativity is not analyzed from single well pumping test data.

WATER QUALITY

Parameters	
Alkalinity	531-Pesticides, Carbamates SDWA
Anions by Ion Chromatography	524-Purgeable Organics, SDWA
Inorganics (Chloride, Sulfate, Fluoride)	525-Semi-Volatile Organic Compounds, SDWA
Hardness	Semi-Volatile Organic Compounds E525.2 Extraction
Nitrogen, Nitrate + Nitrite	Total Uranium
pH	Gross Alpha, Calculated
Turbidity	Gross Alpha, Gross Beta
Mercury, Drinking Water, and Mercury Digestion by E245.1	Radium 226 + Radium 228
Metals by ICP/ICPMS, Drinking Water, and Metals Digestion by E200.2	Radium 226, Total
Herbicide Liquid-Liquid Microextraction E515.4	Radium 228, Total
515.4-Herbicides, Chlorinated SDWA	

Conclusions

- Test Well TW2 is completed in a moderately high-yield aquifer with good production well expectations
- Water quality results acceptable
- No measurable impact to Old Prison well (1,600 feet away)
- 71 feet of drawdown during 24-hour test; 75 feet of water remained above the pump
- Expected safe pumping rate could be on the order of 400 to 500 gpm
 - must be verified with an aquifer test in the proposed production well.

Recommendations Based on Drilling Test Well TW2

1. Move forward with access agreements, design, permitting, and installation of new PWS (Greg will speak in more detail about this)
2. Prepare technical summary and submit to DNRC to start water rights discussion
3. Evaluate water rights opportunity at this location
4. Follow up consideration of additional recommendations provided in Technical Memorandum

QUESTIONS

