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EXECUTIVE SUMMARY
GLENROCK LEVEL II
WELL AND TANK FEASIBILITY STUDY

Prepared for:
Wyoming Water Development Commission

Submitted by:

WESTON
GROUNDWATER ENGINEERING
EXECUTIVE SUMMARY
FOR:

GLENROCK LEVEL II
WELL AND TANK FEASIBILITY
STUDY

Prepared for the:

Wyoming Water Development Commission
and
Town of Glenrock

Submitted by:

WESTON
GROUNDWATER • ENGINEERING

OCTOBER 2007
EXECUTIVE SUMMARY

GLENROCK LEVEL II WELL AND TANK FEASIBILITY STUDY
TEST WELL NO. 7 REPORT

INTRODUCTION

In 2004 the Town of Glenrock requested funding from the WWDC for a Level II project to site a new municipal well and a tank. The purpose of the new well is to provide redundancy for Well No. 5 and to serve as a replacement supply for Little Deer Creek (LDC) Well Nos. 1 and 2 in the long term. During the summer of 2006, Test Well No. 6 which was located approximately one mile southeast of Glenrock Well No. 5, was drilled into the Paleozoic Aquifer. However, testing determined that the well was capable of producing only 100 gallons per minute (gpm). The Town of Glenrock subsequently expressed interest in siting an additional well near Glenrock Well No. 5. WESTON sited Test Well No. 7 approximately 100 feet from Glenrock Well No. 5 based on the orientation of fractures observed on a video log of Well No. 5.

SCOPE OF THIS REPORT

This report summarizes the groundwater development program completed in 2007 for the Town of Glenrock, Wyoming, including the choice of the drilling target and well site, along with the well design. A summary of the drilling program and the results of long-term well testing and chemical analyses are also provided. The report concludes with a summary of the construction and testing program and provides conceptual-level designs and cost estimates to the WWDC for completing the well and incorporating it into the water supply system.

GLENROCK TEST WELL NO. 7

Contractor mobilization for drilling the exploration well began on February 9, 2007. Drilling and construction of the test well was performed from February 12, 2007 to March 16, 2007 by the drilling contractor, Layne Western of Aurora, Colorado. As depicted in Figure 1, the as-built diagram that provides construction details for Glenrock Test Well No. 7, the well was drilled to a depth of 1,233 feet but due to extensive caving in the well the liner could not be installed to the total depth of the well. As shown on Figure 1, the well was completed with a 10 3/4-inch mill slotted liner from 420 to 1,175 feet.

Following well development by airlifting, the well was pump tested by Weston Engineering, Inc. of Upton, Wyoming at a rate of 1,725 gallons per minute for a period of 56.5 hours in May, 2007. The drawdown at the end of the pump test was 105 feet, which corresponds to a pumping water level of 278 feet below ground level. The effective transmissivity of the aquifer in the vicinity of the well ranged from approximately 91,080 gpd/ft for the late-time pump test data to 25,300 gpd/ft for the late-time recovery data. Specific capacity values calculated for the various discharge rates during the pump test conducted on the Glenrock Test Well No. 7 indicate values ranging from 29.2 to 23.5 gallons per minute per foot of drawdown for the discharge rates higher than 1,000 gpm.

The quality of the water developed by Glenrock Test Well No. 7 during the aquifer testing was assessed through a series of field and laboratory analyses. These analyses indicate that the water developed by the well is suitable to serve as a municipal drinking water supply.
CONSTRUCTION DETAILS

0 - 38 FEET: 20-INCH O.D. STEEL CASING

0 - 475 FEET: TYPE G CEMENT GROUT

+1.5 - 470 FEET: 13 3/8-INCH O.D. STEEL CASING (54.50 LBS./FOOT)

CENTRALIZERS

40 - 480 FEET: 17 1/2-INCH DIAMETER BOREHOLE

420 FEET: LINER-HANGER

470 FEET: GUIDE SHOE

480 - 1,233 FEET: 12 1/4-INCH BOREHOLE

420 - 1,175 FEET: 10 3/4-INCH O.D. STEEL MILL-SLOTTED CASING WITH 0.125-INCH X 20-INCHS, 40 ROWS PER FOOT

1,175 FEET: STEEL CAP

T.D. = 1,233 FEET
NOT TO SCALE

GLENROCK TEST WELL NO. 7
AS-BUILT DIAGRAM
FIGURE 1
CONCEPTUAL DESIGN AND COST ESTIMATES

Based on the results of testing Glenrock Well No. 7 and the need for the Town to have a redundant supply source that will not impact flows in Little Deer Creek, the most cost effective alternative for ensuring a long-term, non-interrupted, water supply is to equip the new well with pumping equipment. Glenrock Well No. 7 will be tied to the storage tank that will be constructed at the site in 2008. Details of these site improvements are provided in the 2006 Glenrock Well and Tank Project Level II Feasibility Study Interim Water Tank and Pipeline Improvements Report (WESTON and CEPI, 2006)

The Interim Water Tank and Pipeline Improvements Report found that the capacity of the three Glenrock wells currently in operation is up to 2,950 gpm. When comparing the capacity of these wells to the projected demands for the year 2027 it appears that these wells can meet the Town's demands. However, the terms of the North Platte settlement with the State of Nebraska limits the quantity of water that the Little Deer Creek Wells can reliably supply to the Town because of interference with flows in Little Deer Creek. Therefore, the current reliable capacity of the system is 1,150 gpm. When Well No. 7 is brought on line the capacity will increase by 1,500 gpm. Equipping Well No. 7 with a pump and motor capable of yielding 1,500 gpm will ensure the water system can meet the peak day demands for the 20-year planning horizon.

The Glenrock Level III Water Project is anticipated to be designed and constructed in two consecutive phases. The first phase, which is the 2007 Glenrock Level III Water Supply Project, will consist of components funded by the legislature during the 2007 session including installation of an on-site 300,000 gallon water storage tank, on-site disinfection facilities, and improvements to the transmission line that allows the Little Deer Creek wells to be isolated from the system. The second phase, which includes, installation of a 200 HP submersible pump and motor in Glenrock Well No. 7, expansion of the existing control building on the site, and installation of pump controls and piping in the well house is anticipated to be funded by the legislature during the 2008 session.

The estimated cost for equipping Well No. 7 and constructing associated appurtenances is $516,577.50. These improvements are eligible for a 67 percent grant from the WWDC in the amount of $346,106.93. Well No. 7 can be purchased from the WWDC for 33 percent of the eligible construction costs, which equals $153,588.60. The well purchase and 33 percent of the site improvement costs will need to be paid for by the Town of Glenrock. The total cost that must be funded by the Town of Glenrock is $324,059.18. A 30 year 4 percent loan from the WWDC or a 2.5 percent 20-year loan from the SRF can be obtained to complete the project financing.