

MEMORANDUM

To: Project Manager
Attn: Jennifer McConnell

From: John Anderson
Hydrologist

SUBJECT: Drawdown Cone of Depression from Troutlodge AEM Drain Model

Please find attached a graphical representation of the cone of depression for the Troutlodge Analytical Element Model (AEM) generated by Brandon House (2020) at the TSC. These figures were generated using Aqtesolve forward solution and Surfer Contouring Software to show visually the cone of depression which can be expected at different pumping rates.

Drawdown was calculated using a line of pumping wells in Aqtesolve. The wells were pumped at a predetermined pumping rate (5, 10, 20, 30, 40, 50, and 60 gpm) set at 5-foot increments along the length of the proposed drain. There are 81 wells total for a length of 400 feet. This corresponds to 0.9, 1.8, 3.6, 5.4, 7.2, 9.0, and 10.8 cfs shown in the attached figures. A constant head boundary condition is located parallel to the drain offset 200 ft to the north and 670 ft to the south of the drain. The aquifer conductivity was set at 1000 ft/day with aquifer thickness of 30 ft. The wells modeling the drain partially penetrate the aquifer to a depth of 15 feet. The drawdown cone of depression was output using a GRID file and displayed in Surfer. Contours shown are for displacement greater than 0.5 ft. Constant head boundaries are modeled using an infinite array of image wells per (Ferris et al, 1962)

Drawdown cannot occur below the bottom of the drain. The maximum discharge which can be provided by the drain is approximately 5.4 cfs according to current conditions. If the water table were to rise by 2 additional feet, the drain has capacity for the additional water surface elevation. The higher flows have been tabulated to provide this as reference. The maximum capacity of the discharge pipe is 10.0 cfs.

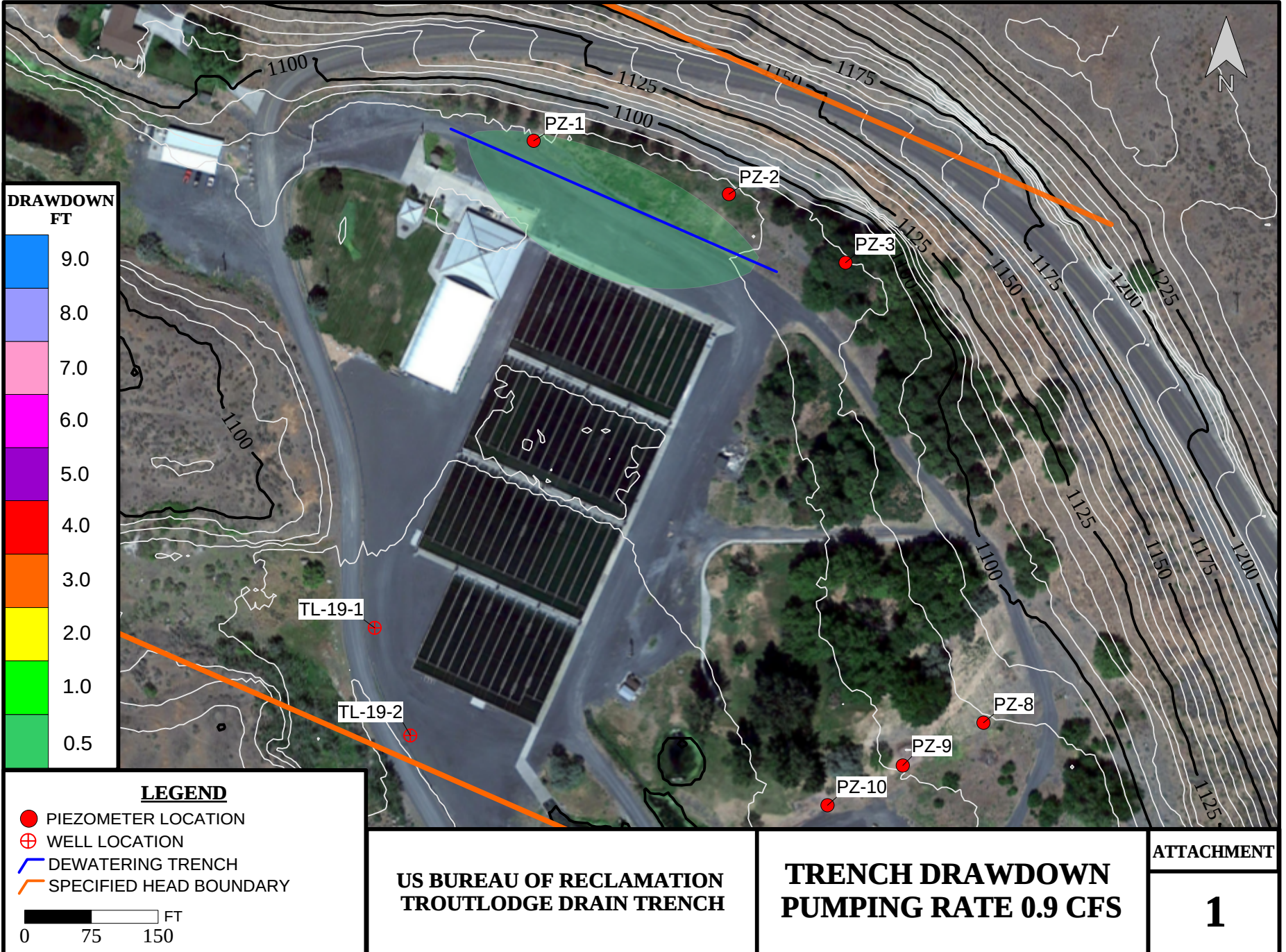
References

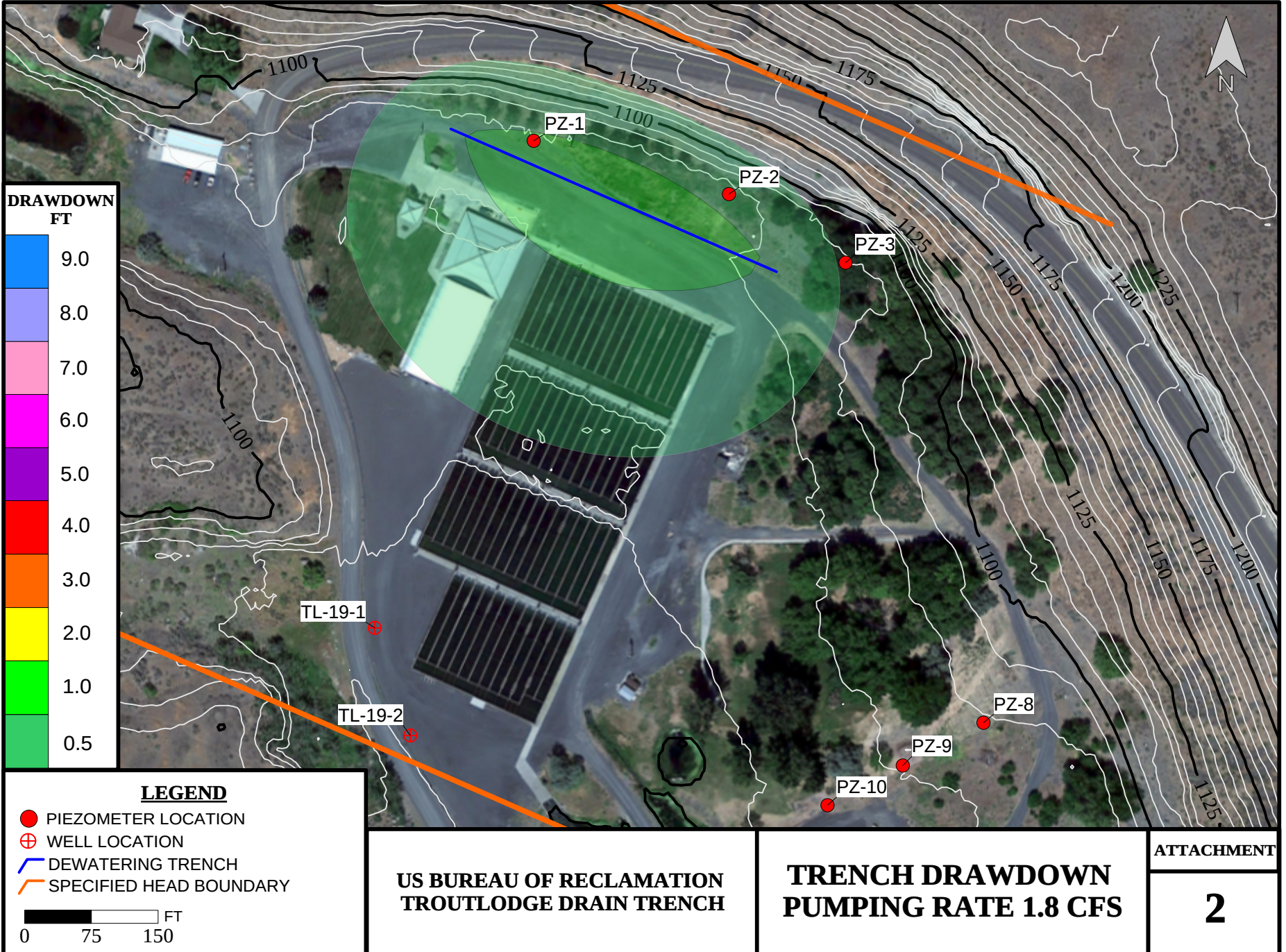
Ferris, J.G., D.B. Knowles, R.H. Brown and R.W. Stallman, 1962. Theory of aquifer tests, U.S. Geological Survey Water-Supply Paper 1536 E, 174p.

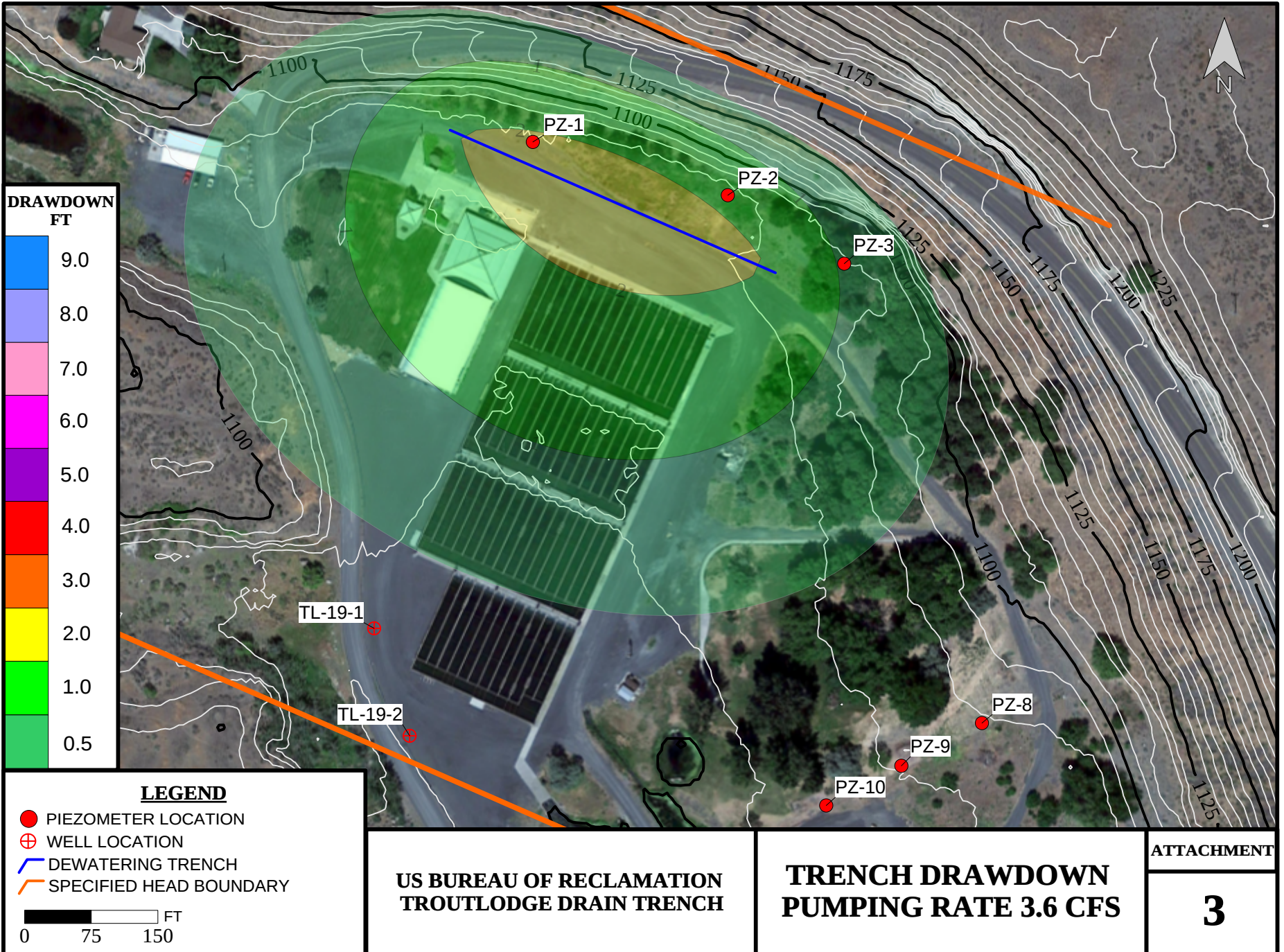
House, Brandon, 2020. 2-D Analytic Element Groundwater Flow Model for Troutlodge Interceptor Drain, US Bureau of Reclamation.

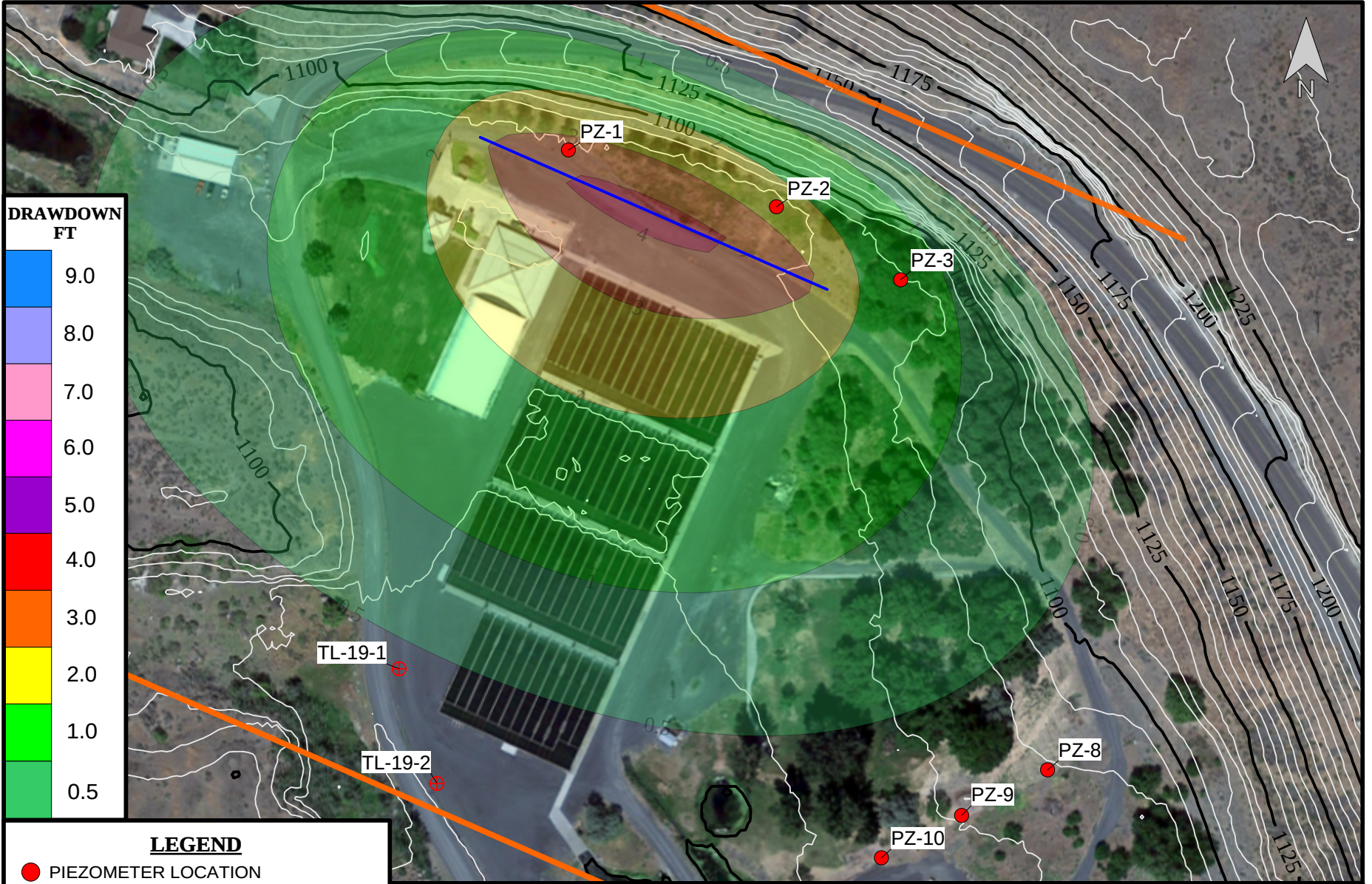
LIST OF FIGURES

ATTACHMENT 1 – TRENCH DRAWDOWN PUMPING RATE 0.9 CFS
ATTACHMENT 2 – TRENCH DRAWDOWN PUMPING RATE 1.8 CFS
ATTACHMENT 3 – TRENCH DRAWDOWN PUMPING RATE 3.6 CFS
ATTACHMENT 4 – TRENCH DRAWDOWN PUMPING RATE 5.4 CFS
ATTACHMENT 5 – TRENCH DRAWDOWN PUMPING RATE 7.2 CFS
ATTACHMENT 6 – TRENCH DRAWDOWN PUMPING RATE 9.0 CFS
ATTACHMENT 7 – TRENCH DRAWDOWN PUMPING RATE 10.8 CFS









LEGEND

- PIEZOMETER LOCATION
- ⊕ WELL LOCATION
- DEWATERING TRENCH
- SPECIFIED HEAD BOUNDARY

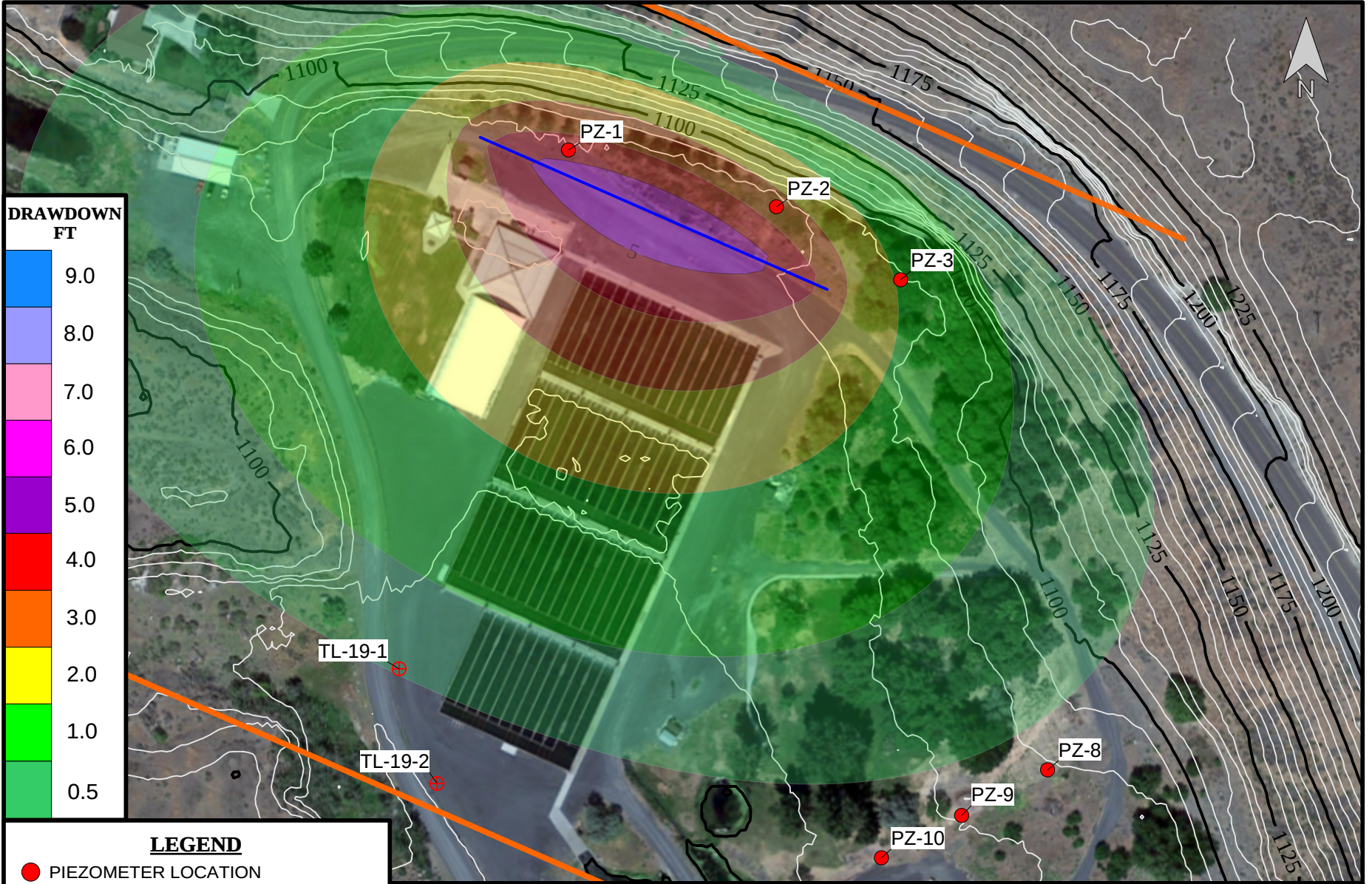
0 75 150 FT

**US BUREAU OF RECLAMATION
 TROUTLODGE DRAIN TRENCH**

**TRENCH DRAWDOWN
 PUMPING RATE 5.4 CFS**

ATTACHMENT

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**US BUREAU OF RECLAMATION
 TROUTLODGE DRAIN TRENCH**

**TRENCH DRAWDOWN
 PUMPING RATE 7.2 CFS**

ATTACHMENT

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