

City of



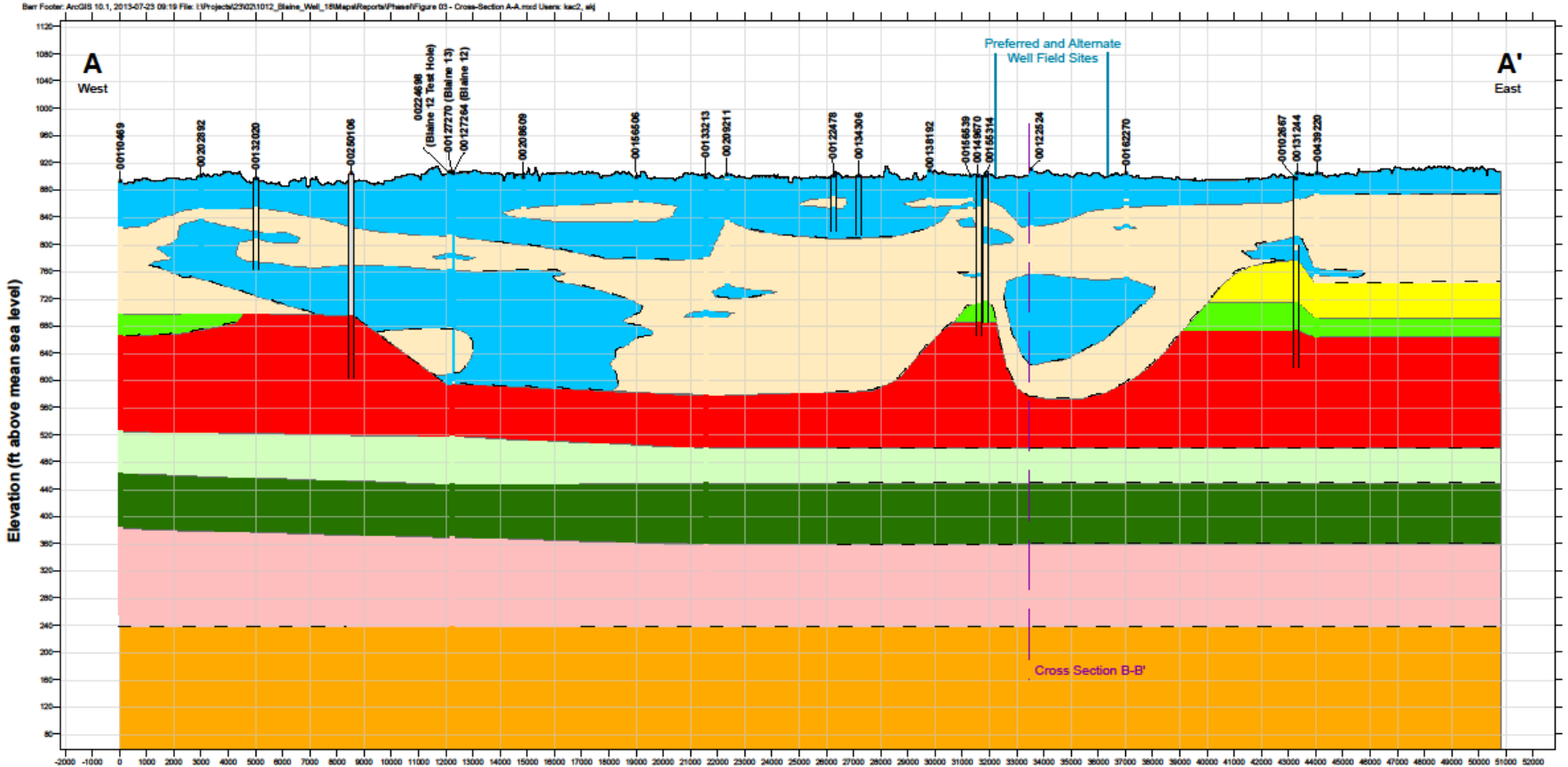
NORTHEAST AREA WELL FIELD PROJECT STATUS UPDATE










MARCH 20, 2014

WHERE WE STARTED

- Well Siting Study – Dec. 2012
 - The local groundwater model that was developed, based on Metro Model 2 regional groundwater model, indicated the proposed well field could have significant impacts to surface waters of concern (wetlands, significant natural resource areas). If these impacts turned out to be valid, the DNR could limit the pumping rate of any new wells after they were installed.
 - The conclusion was to do a more detailed three phase study to build data for a more refined model and attempt to confirm presence of a clay layer that isolates surface waters from the proposed well field. The phases consisted of:
 - Detailed paper study
 - Pumping test using existing City wells
 - Site specific pumping test using a newly drilled well #18 as a test well .

THE CLAY LAYER



- | | |
|--|--|
|  Unconsolidated Sand and Gravel |  Wonevoc Sandstone |
|  Unconsolidated Clay and Silt |  Eau Claire Formation |
|  Jordan Sandstone |  Mt. Simon Sandstone |
|  St. Lawrence Formation |  Solor Church Formation |
|  Tunnel City Group | |

Distance Along Cross Section (ft)
 Note: 25x Vertical Exaggeration
 Dashed lines are inferred contacts



Figure 3

CROSS SECTION A-A'
 Northeast Well Field Study: Phase I
 City of Blaine
 Anoka County, MN

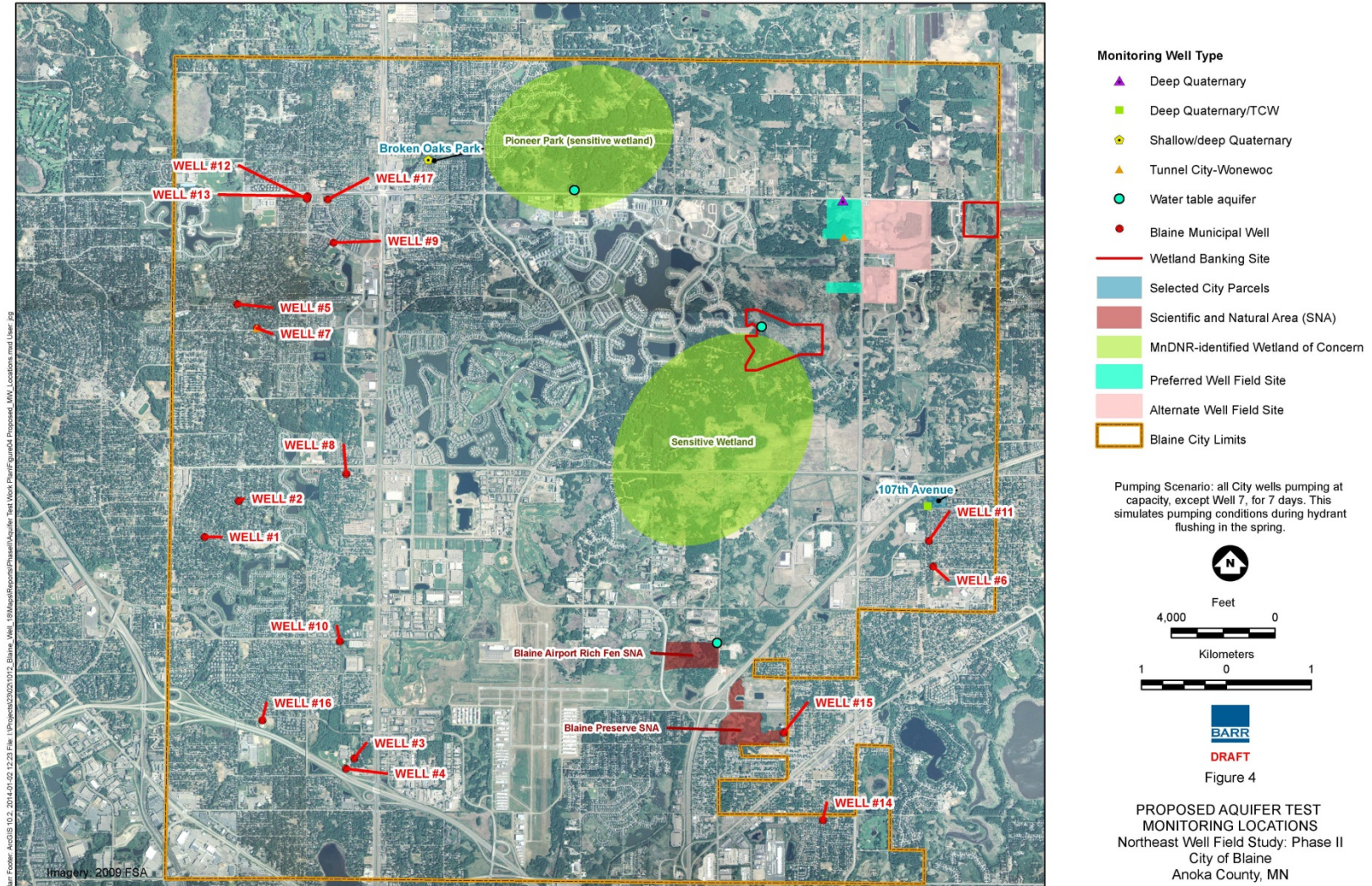
PHASE I COMPLETED

- Phase I – Detailed Paper Study – Nov. 2013
 - More detailed local groundwater model was created using new Metro Model 3 regional groundwater model and existing private well boring logs.
 - Updated model shows little anticipated interaction between surface waters and proposed well field due to likely presence of a continuous clay layer.
 - Barr Engineering presented the report to the DNR in November.
 - DNR recommended a pumping test be done to further verify model findings and confirm the presence of a continuous clay layer.
 - DNR had several natural areas of concern that needed to be monitored during the pumping test.

CURRENT STEP – PHASE II

- Phase II – Existing Well Pumping Test
 - Barr developed a pumping test plan utilizing existing City wells and submitted it to the DNR for review.
 - Pumping test plan consists of:
 - Installing a combination of nine shallow (surface water) and deep (aquifer) monitoring wells on six sites in the City at an estimated cost of \$150,000.
 - Running all existing City wells (except well 7) at full capacity for 7 days during hydrant flushing time – late May.
 - Data is gathered from the new monitoring wells and existing wells from 2 weeks before start of pumping test to 2 weeks after.
 - Use data gathered to further refine model and determine what effects on surface waters and other wells may be expected.
 - Monitoring well installation contract is currently out for bid.

PHASE II PUMPING TEST



Barr Footer: ArcGIS 10.2, 2014/01/02 12:23 PM, I:\Projects\2010\1012_Blaine_Well_18\MapReports\PhaseII\Aguler_Test_Work_Plan\Figure04_Proposed_MW_Locations.mxd User: P3

FUTURE STEP – PHASE III

- Phase III – Site Specific Pumping Test:
 - Barr Engineering will prepare a work plan for Well #18.
 - Data from Phase II and several pilot holes drilled into bedrock around the proposed well #18 location will be used to determine what aquifer to install well #18.
 - Well #18 will be drilled as a test well and an aquifer pumping test will be run (fall of 2014 or spring of 2015).
 - Data from pumping test and monitoring wells will be gathered and integrated into the model.
 - A detailed report will be prepared, including a final recommended configuration for the northeast area well field.
 - Report will be submitted to the DNR for review.
 - Well #18 infrastructure (pump, motor, piping, etc.) will be installed and brought online once pumping test is complete and final report is submitted to DNR.
 - Discussion on development of remainder of well field will be held after Phase III is complete and well #18 is brought on line.