

Agenda Item 8a
Bank Storage Withdrawal &
Aquifer Storage and
Recovery
Water Appropriation
Applications

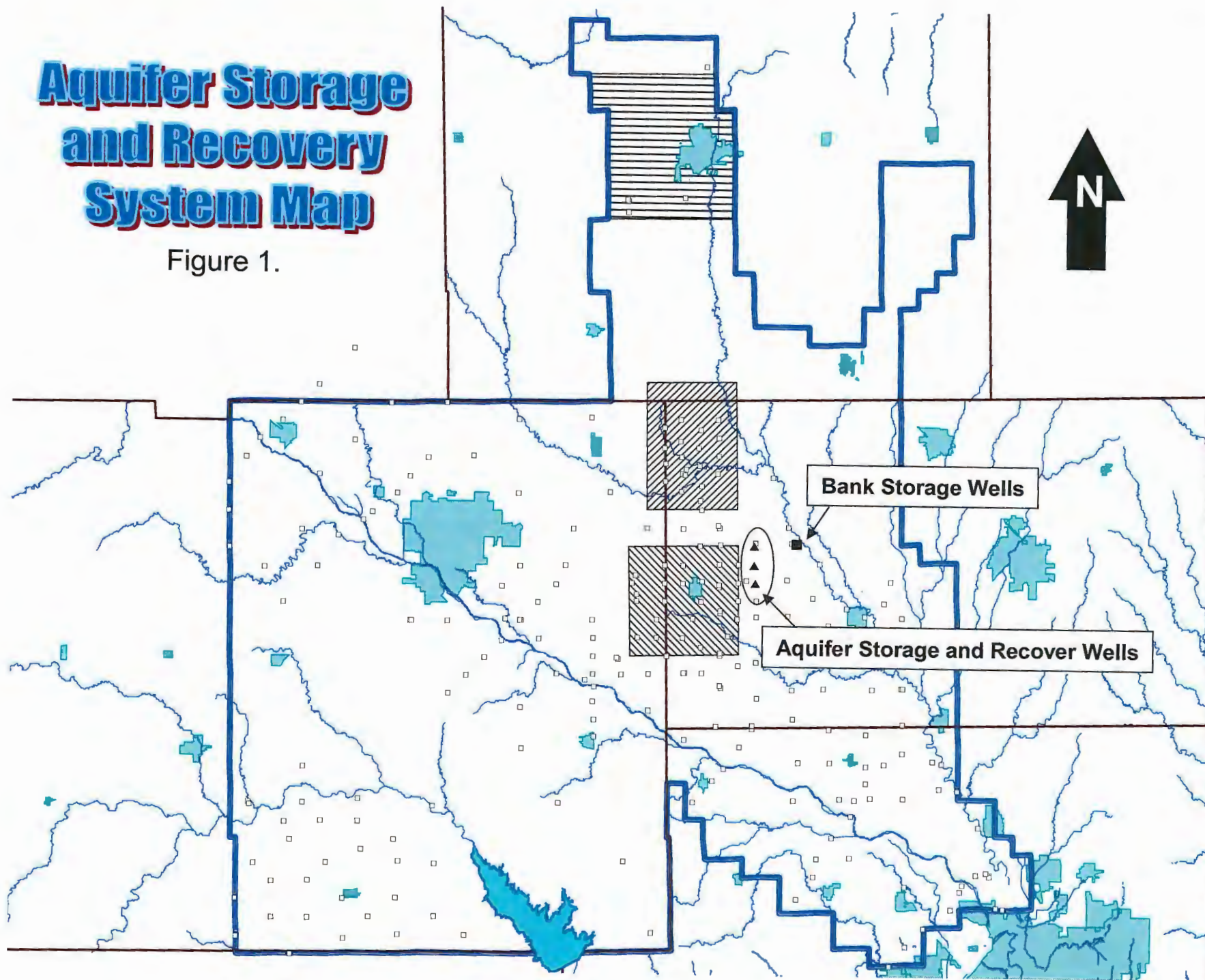


Bank Storage Withdrawal Well Applications 45569 and 45572

The City of Wichita is requesting the locations of the proposed points of diversions for applications 45569 and 45572 are moved to improve the quality of bank storage water diverted by the two bank storage wells.

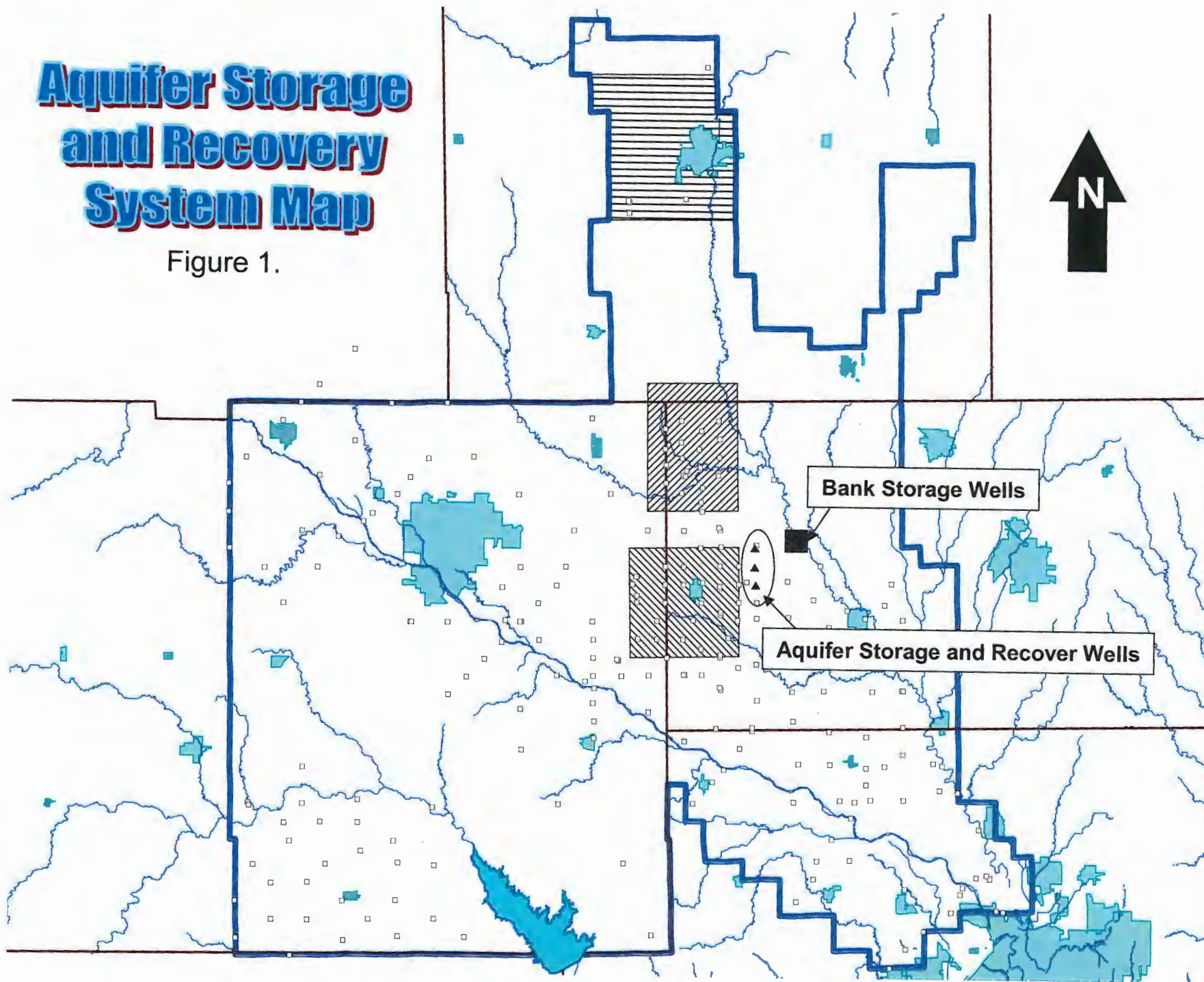
Aquifer Storage and Recovery System Map

Figure 1.



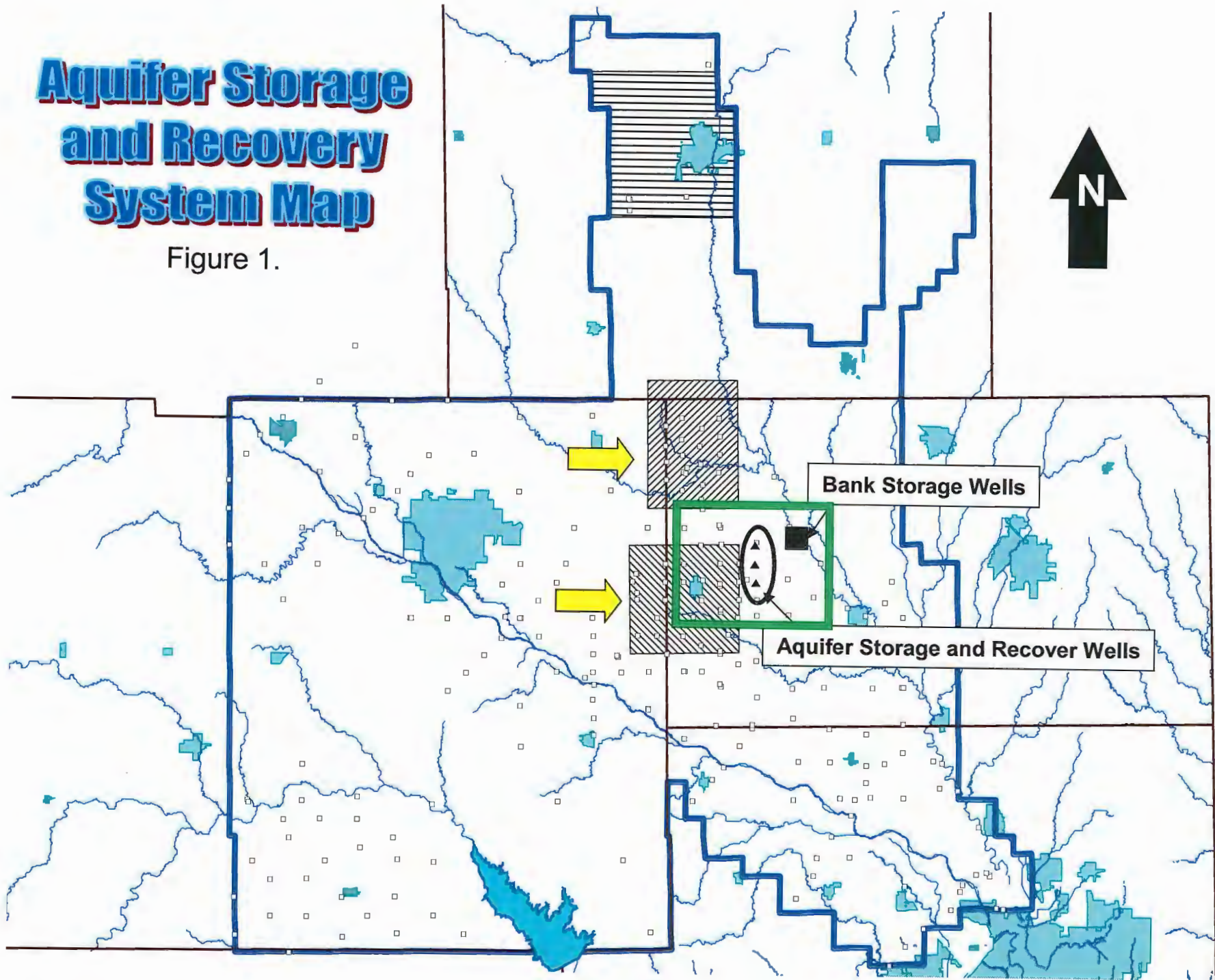
Aquifer Storage and Recovery System Map

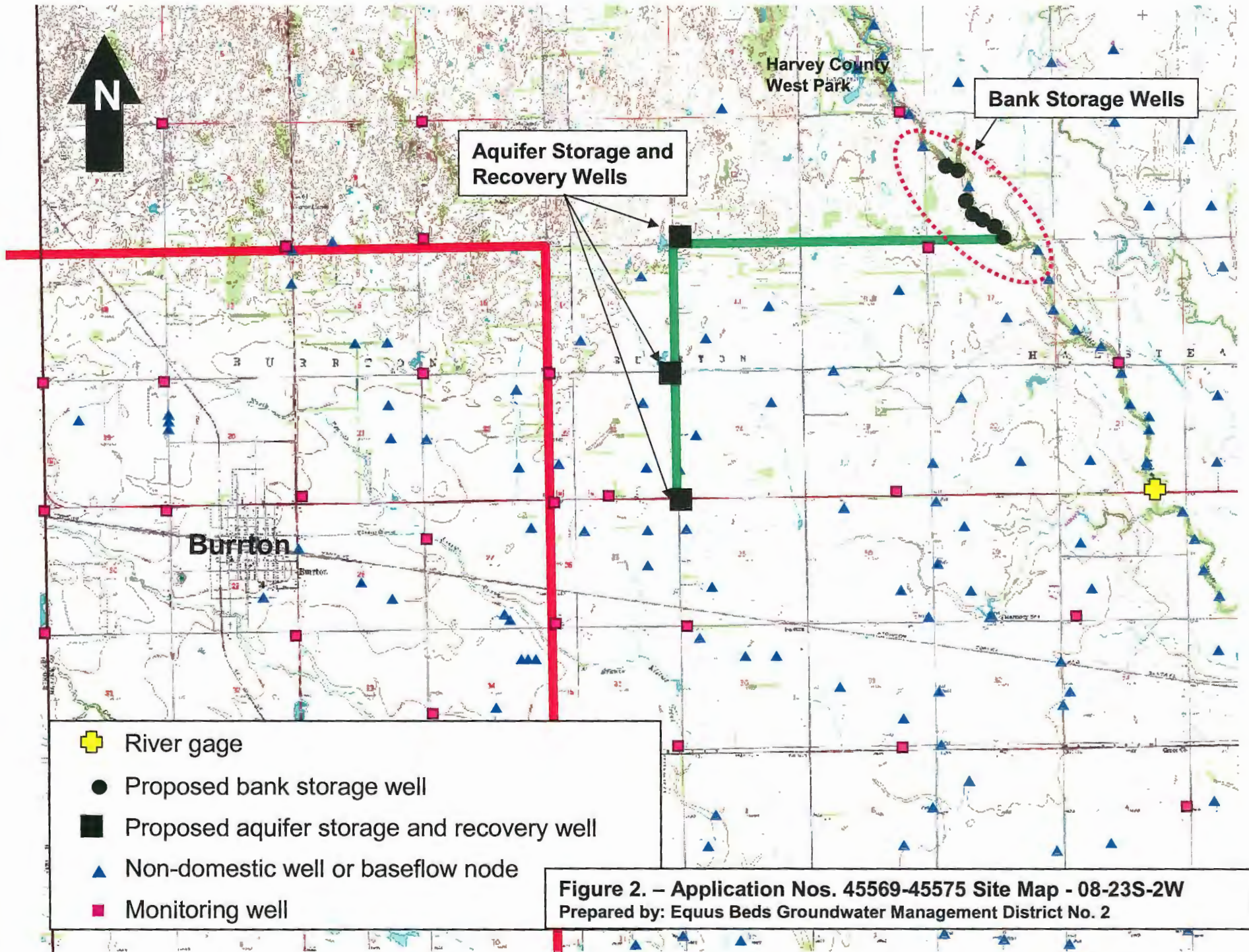
Figure 1.

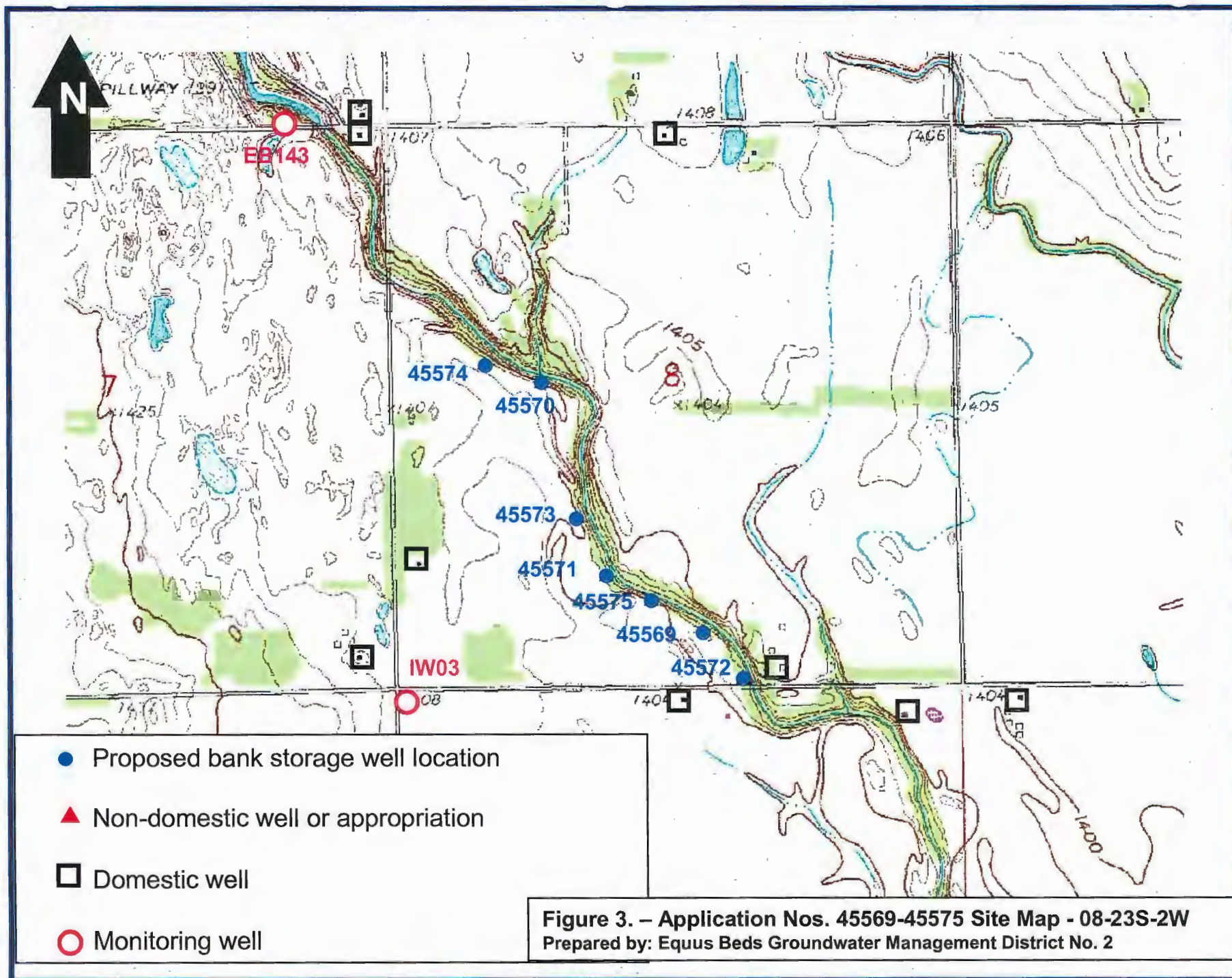


Aquifer Storage and Recovery System Map

Figure 1.







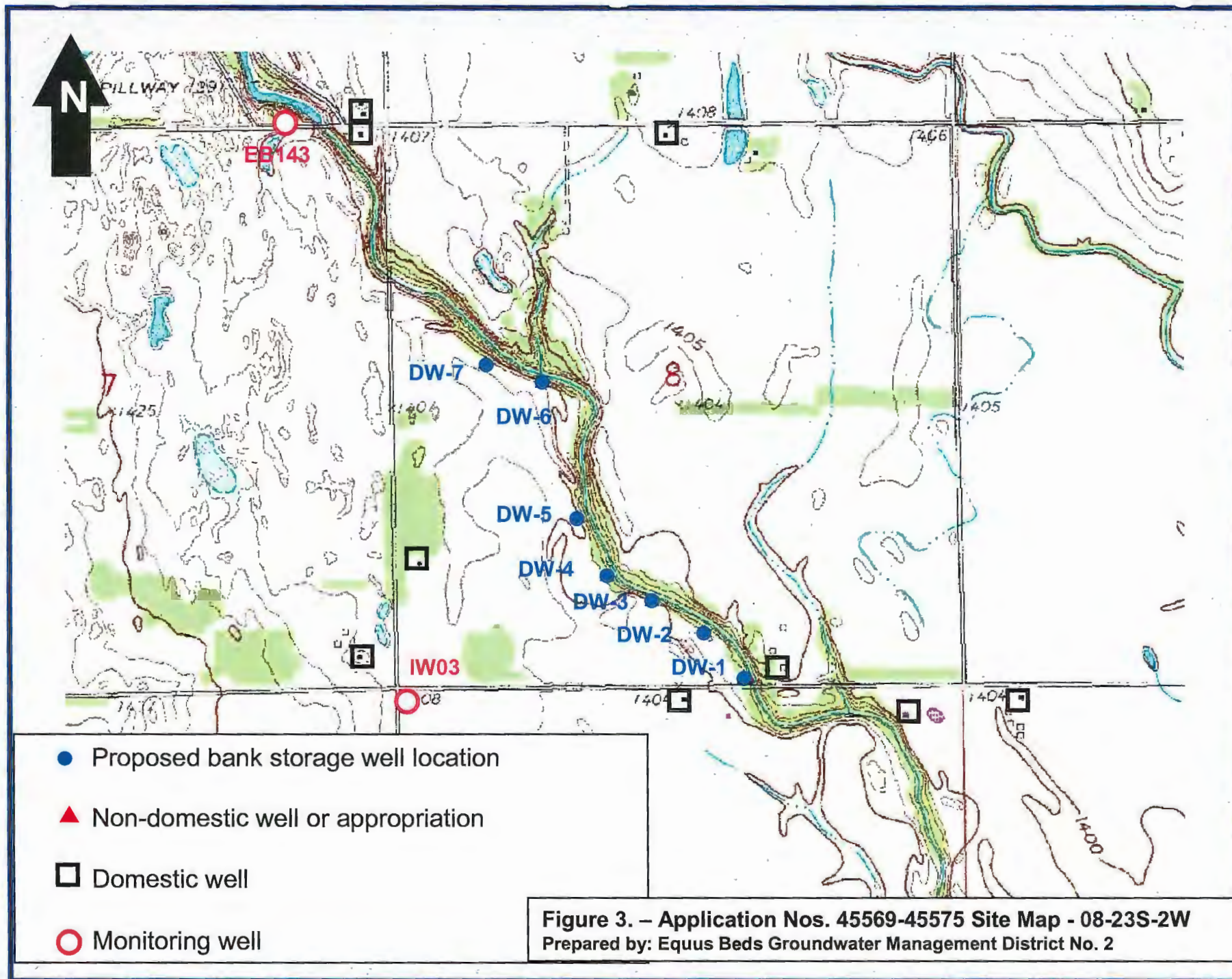
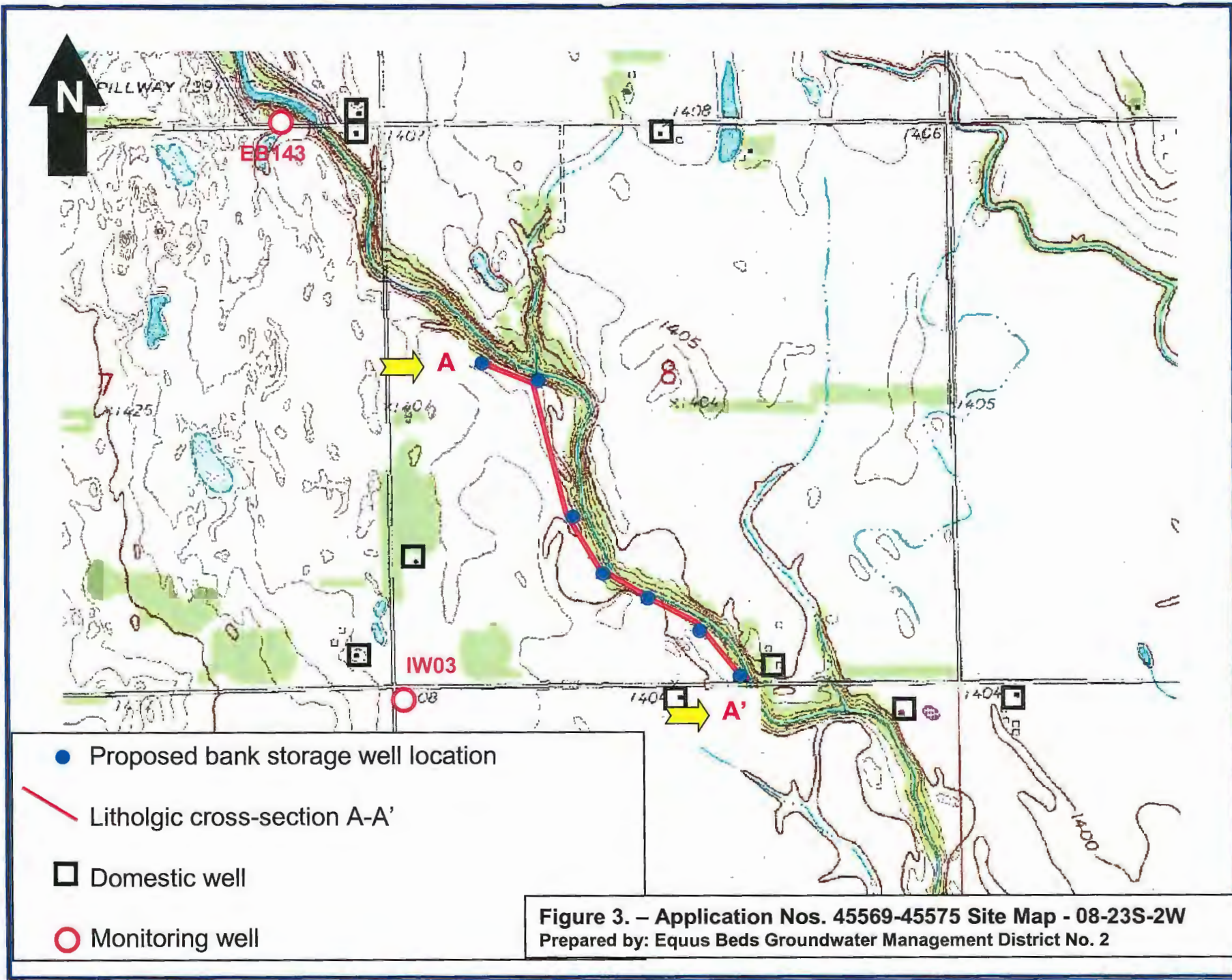


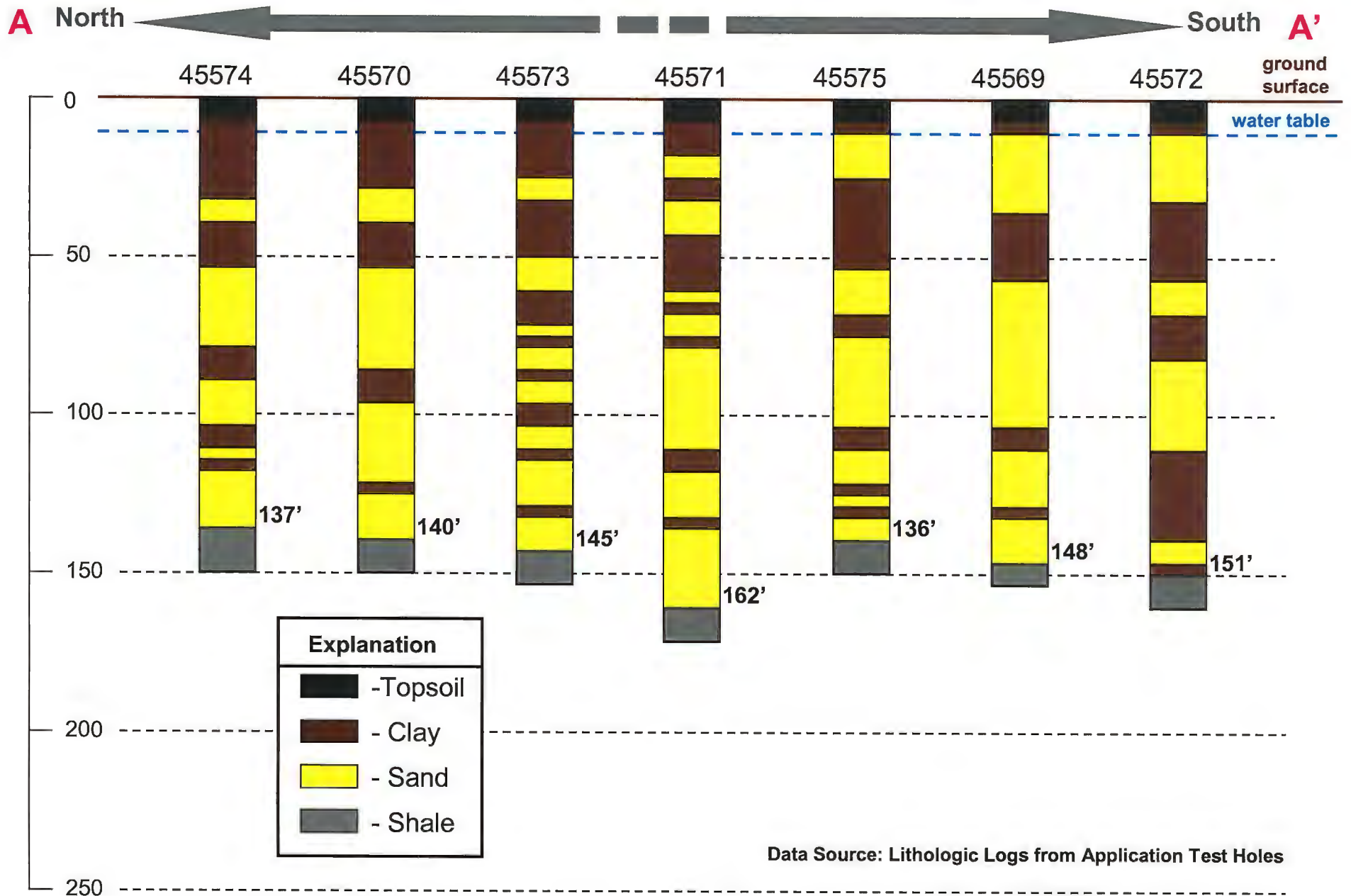
Figure 3. – Application Nos. 45569-45575 Site Map - 08-23S-2W
 Prepared by: Equus Beds Groundwater Management District No. 2

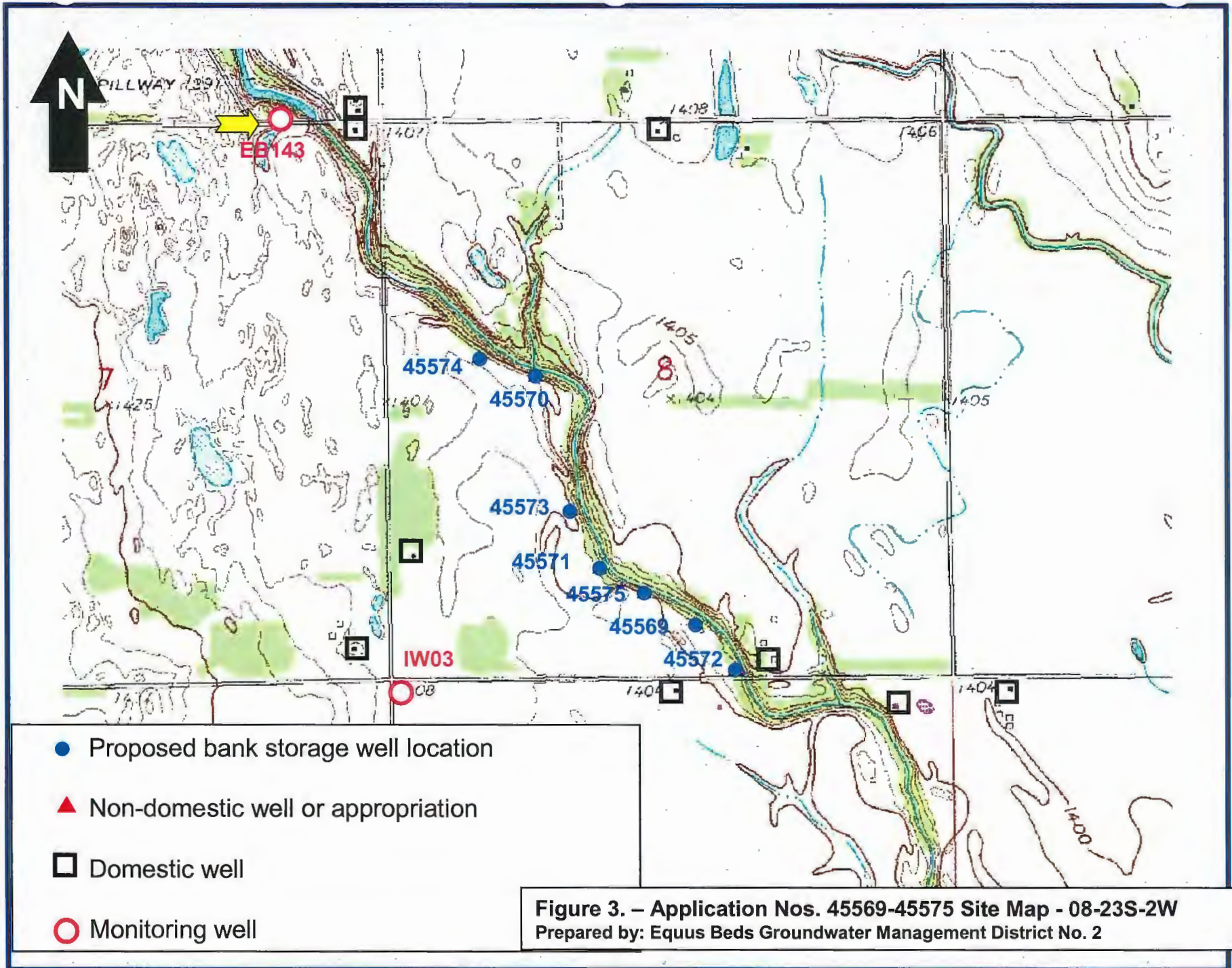


- Proposed bank storage well location
- Lithologic cross-section A-A'
- Domestic well
- Monitoring well

Figure 3. – Application Nos. 45569-45575 Site Map - 08-23S-2W
 Prepared by: Equus Beds Groundwater Management District No. 2

Generalized Lithology of Equus Beds Aquifer at Bank Storage Withdrawal Site, Sec. 8, T23S, R2W

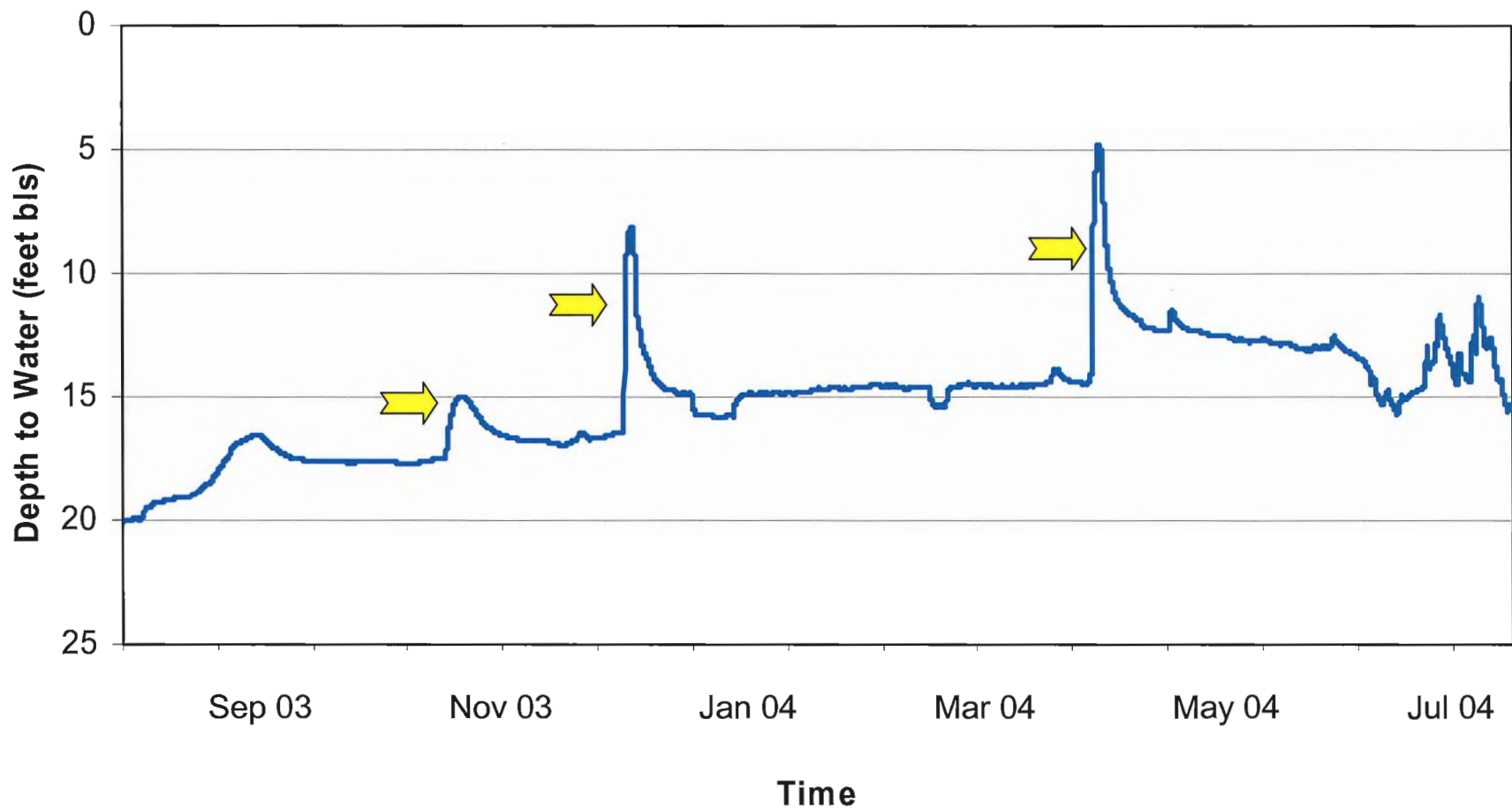




- Proposed bank storage well location
- ▲ Non-domestic well or appropriation
- Domestic well
- Monitoring well

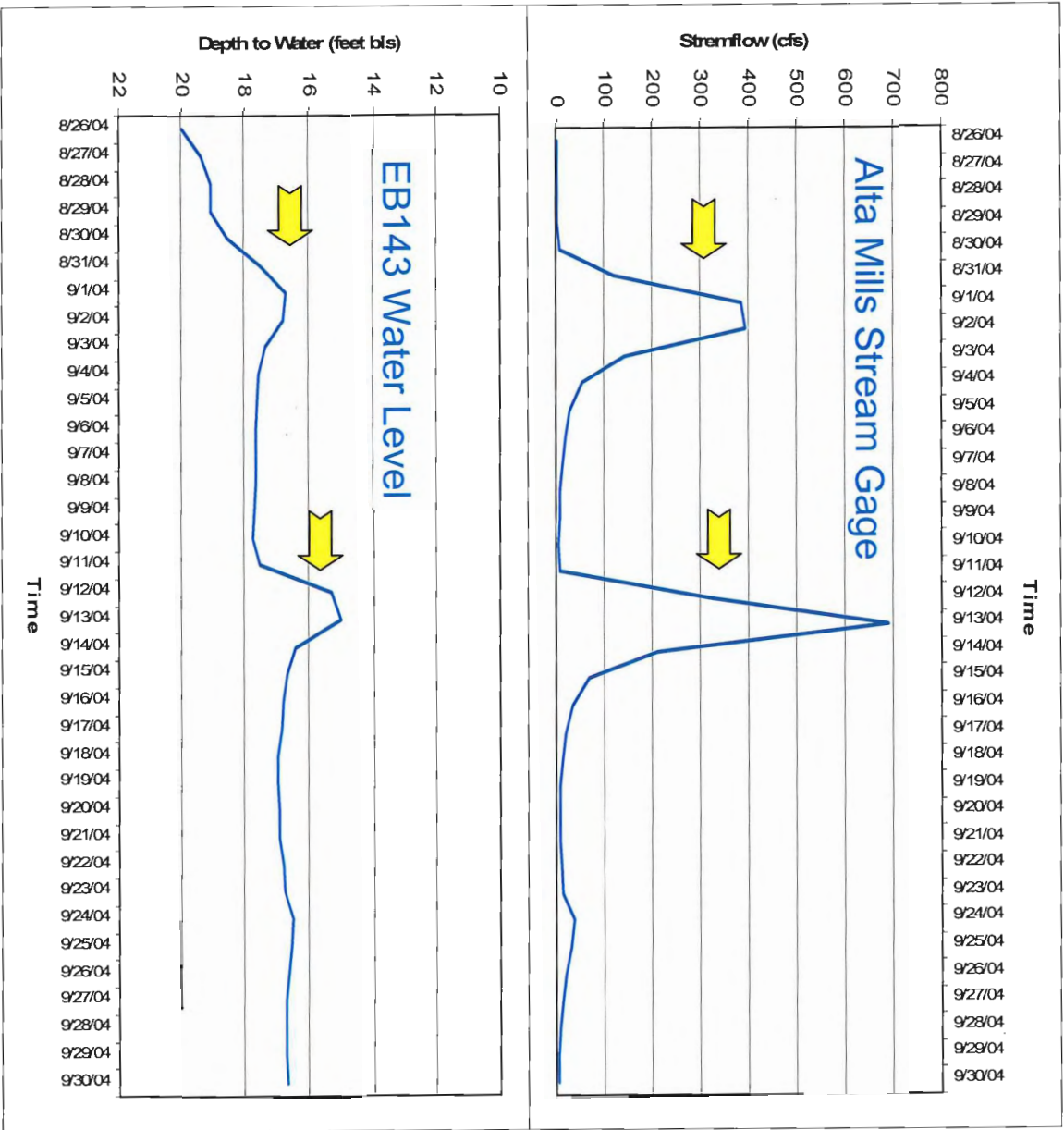
Figure 3. – Application Nos. 45569-45575 Site Map - 08-23S-2W
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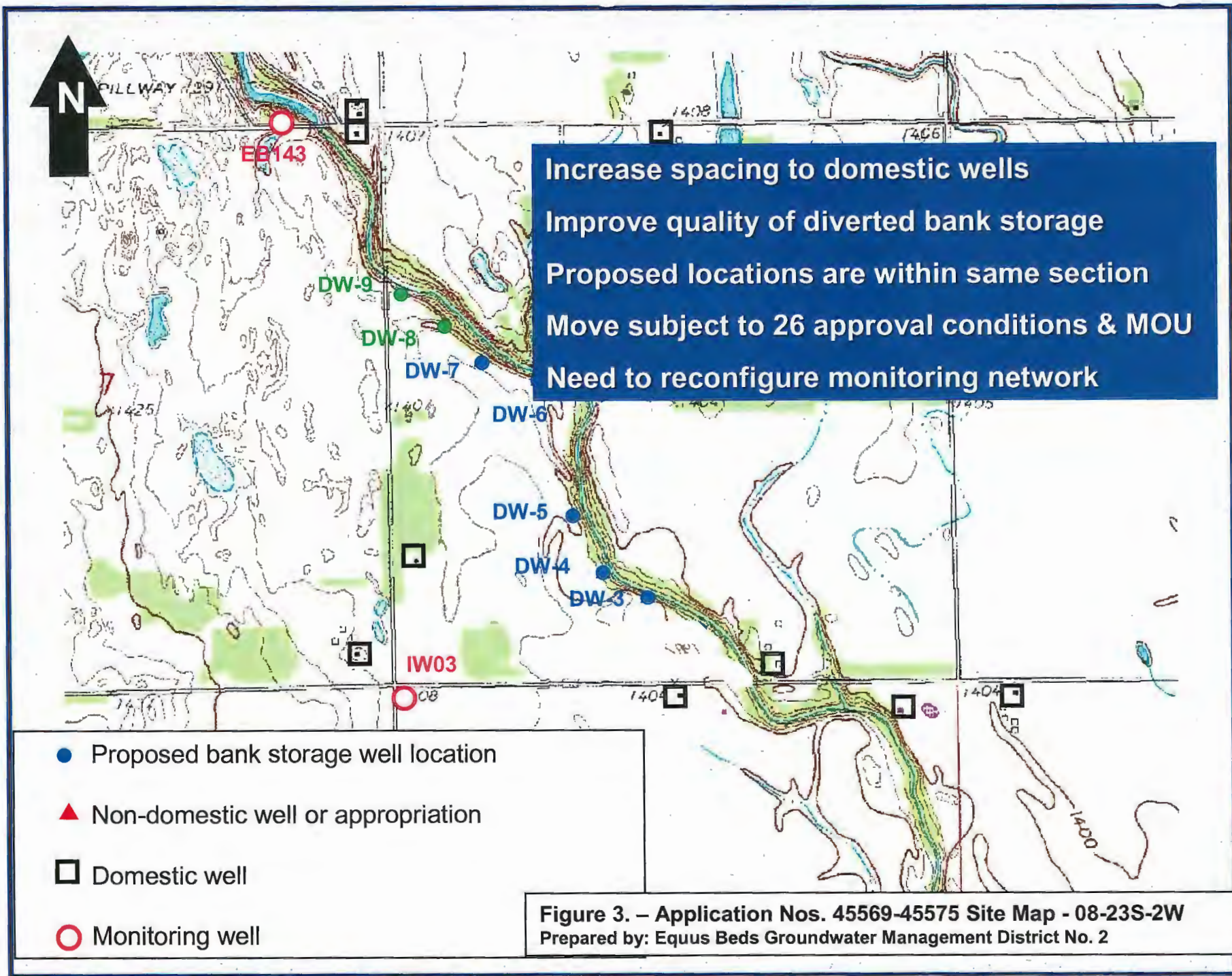
EB143 Hydrograph, August 2003-July 2004



EB143A Depth – 59 feet

Water Table/Stream Flow Comparison Graph





Aquifer Storage and Recovery Well Application 45567

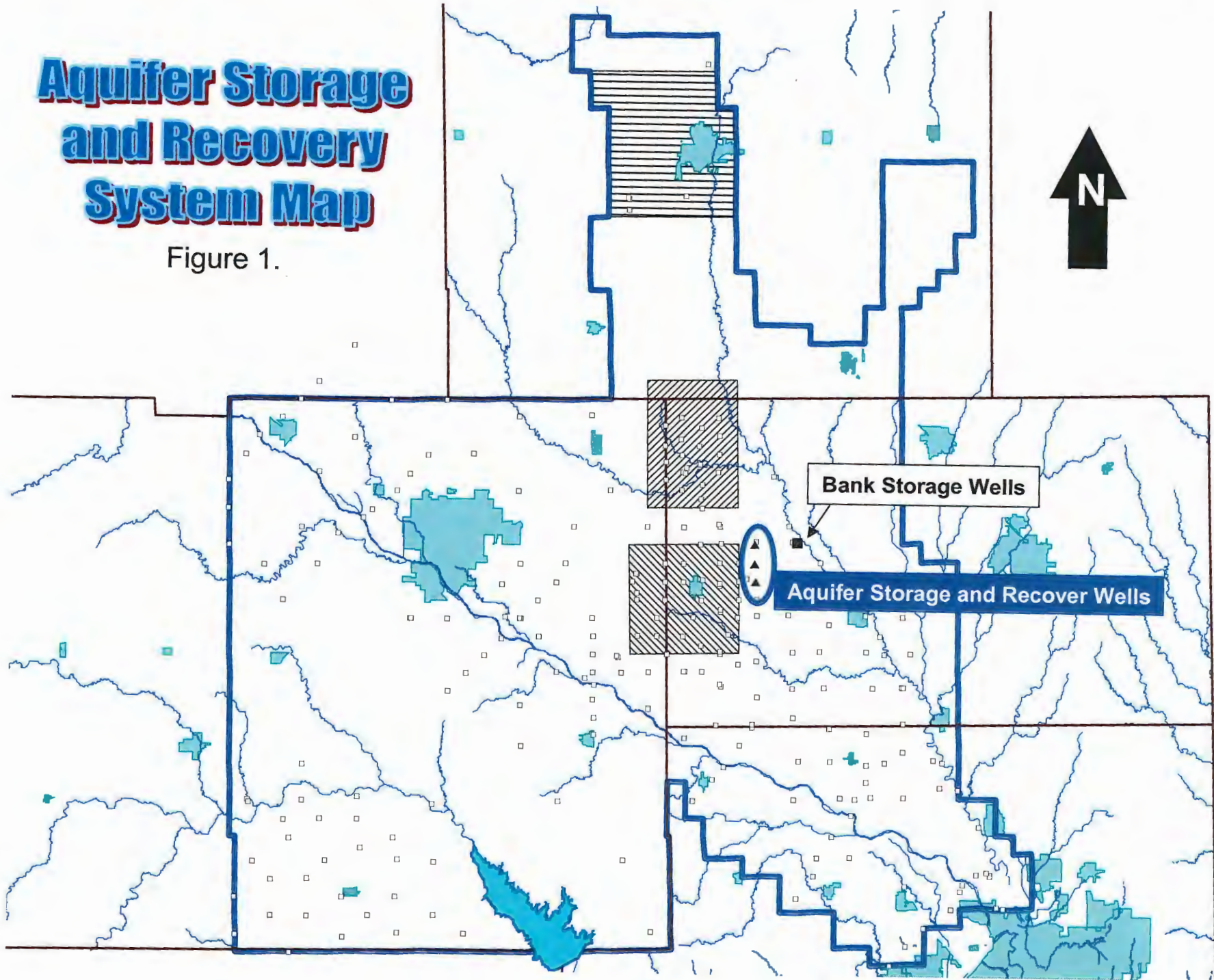
Proposed Change in Point of Diversion

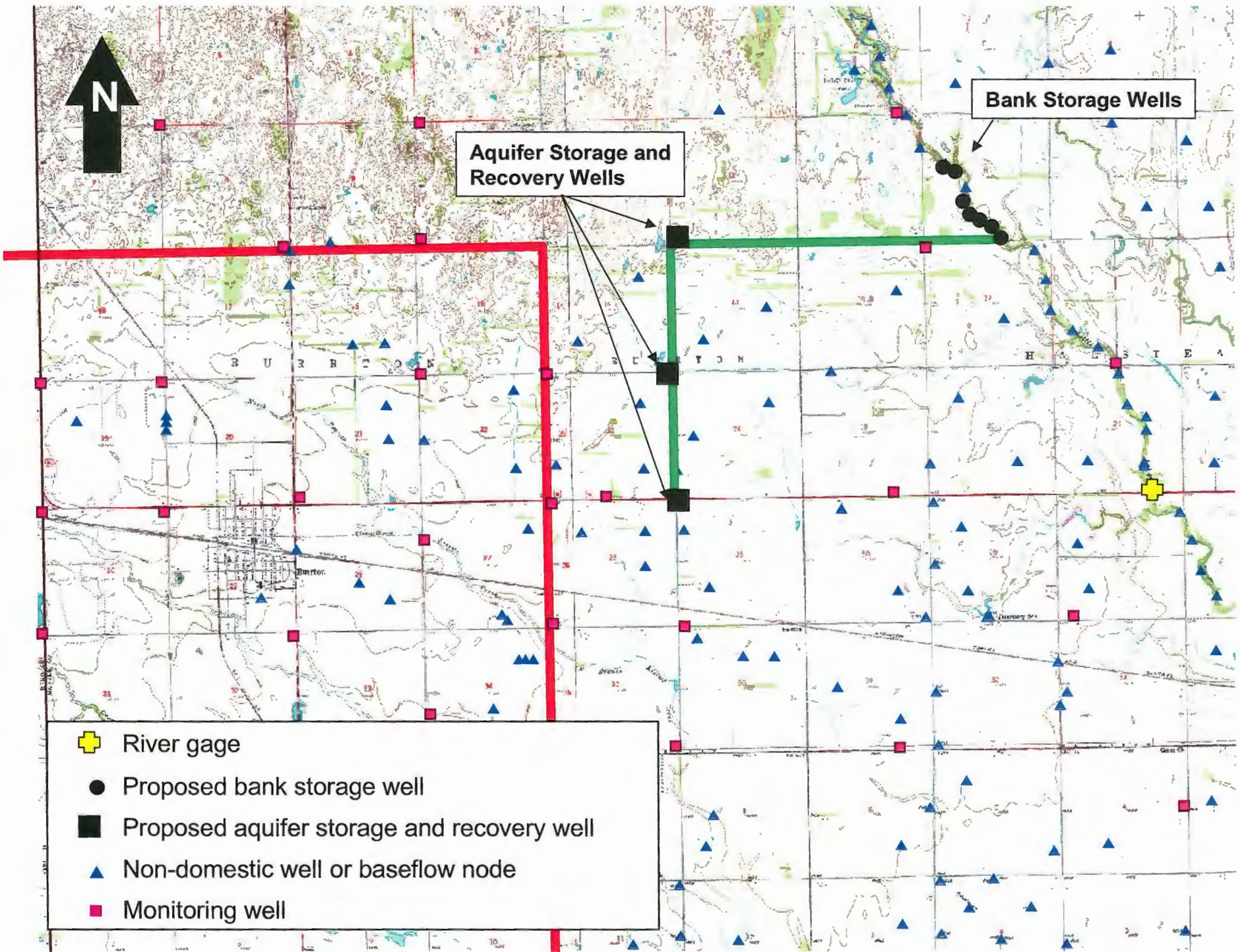
Aquifer Storage and Recovery Well Application 45567

The City of Wichita is requesting the location of the proposed point of diversion for application 45567 is moved to about 200' north of the proposed point of diversion for site access.

Aquifer Storage and Recovery System Map






Figure 1.

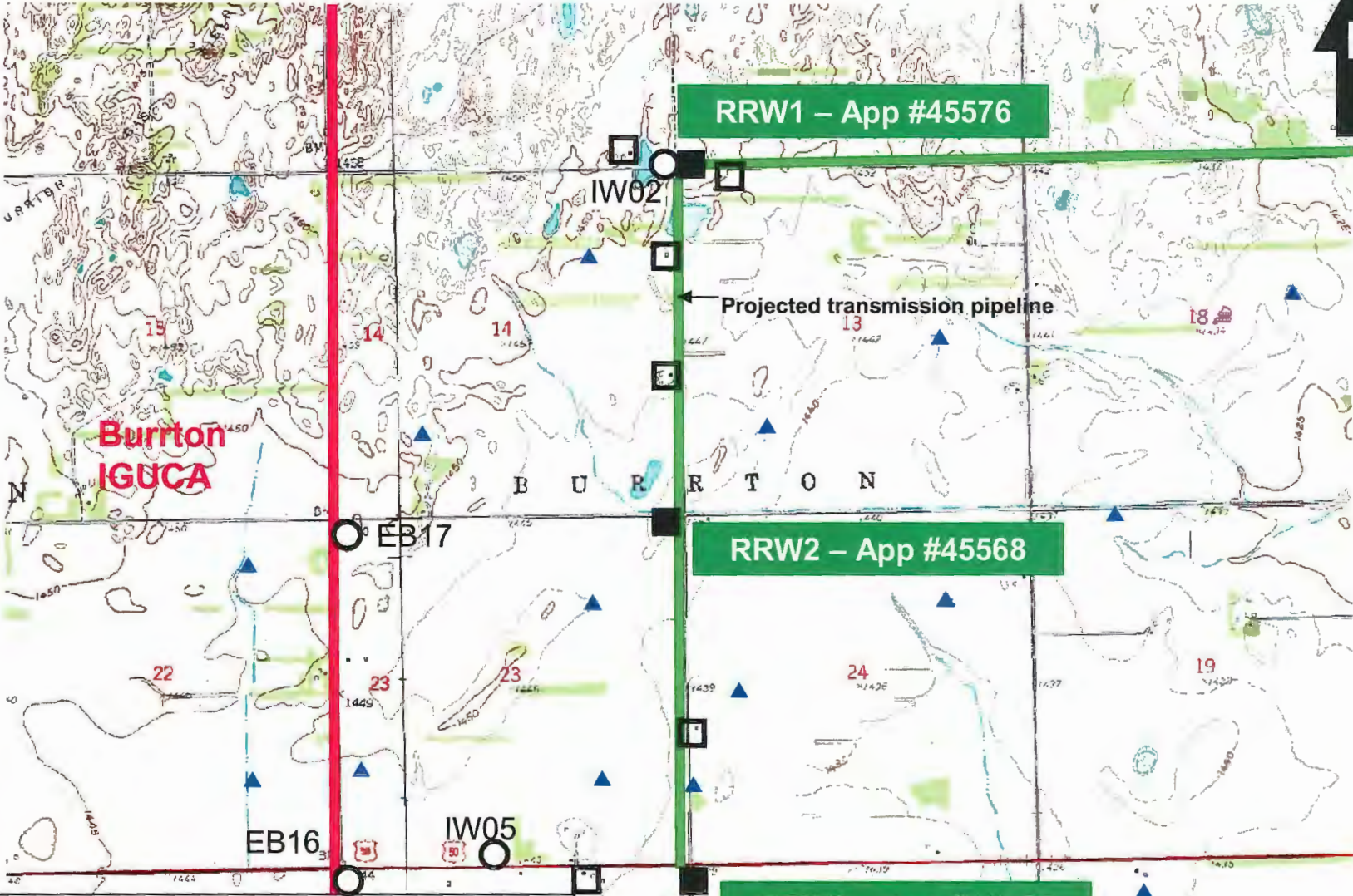
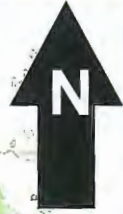




Aquifer Storage and Recovery Wells

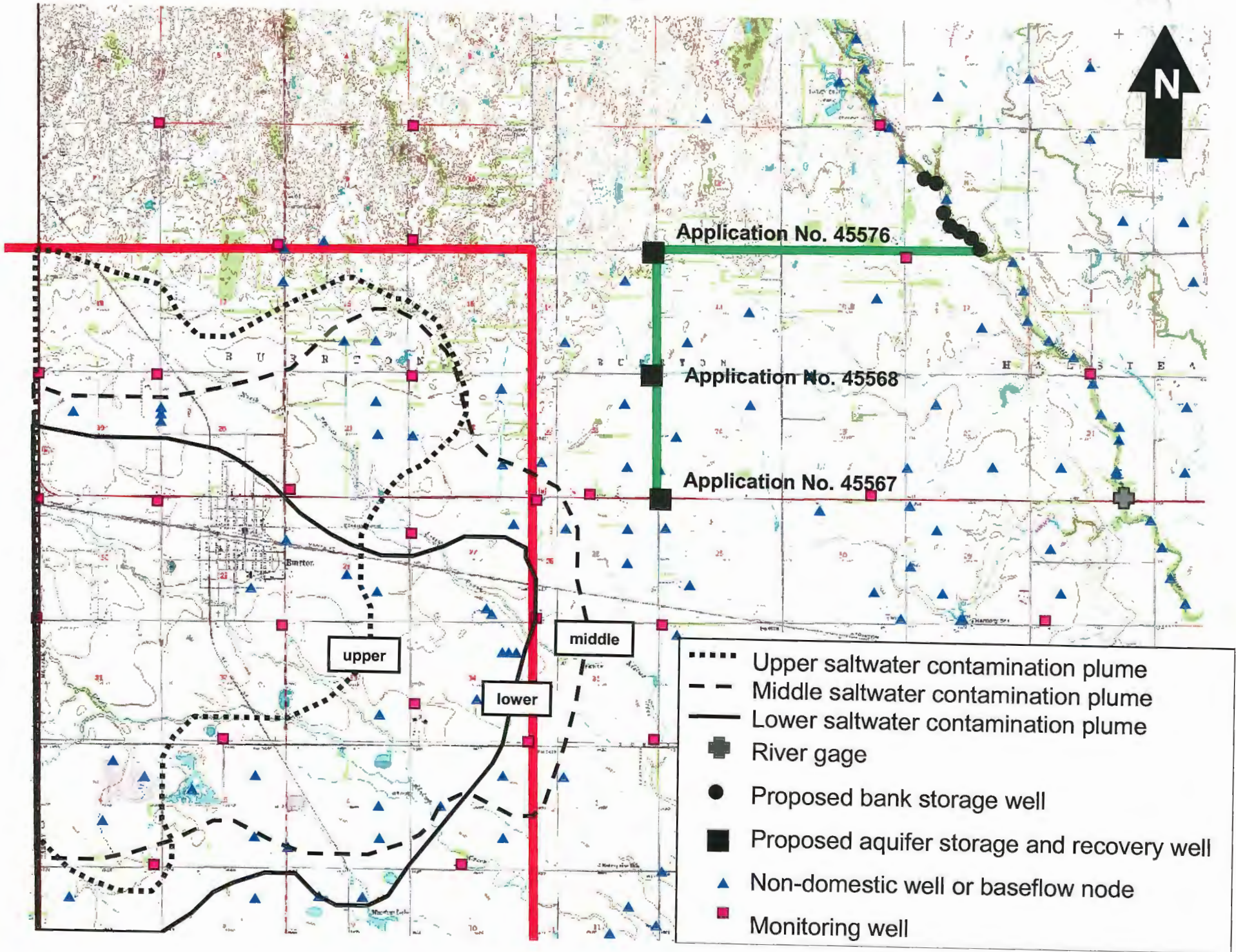
Bank Storage Wells

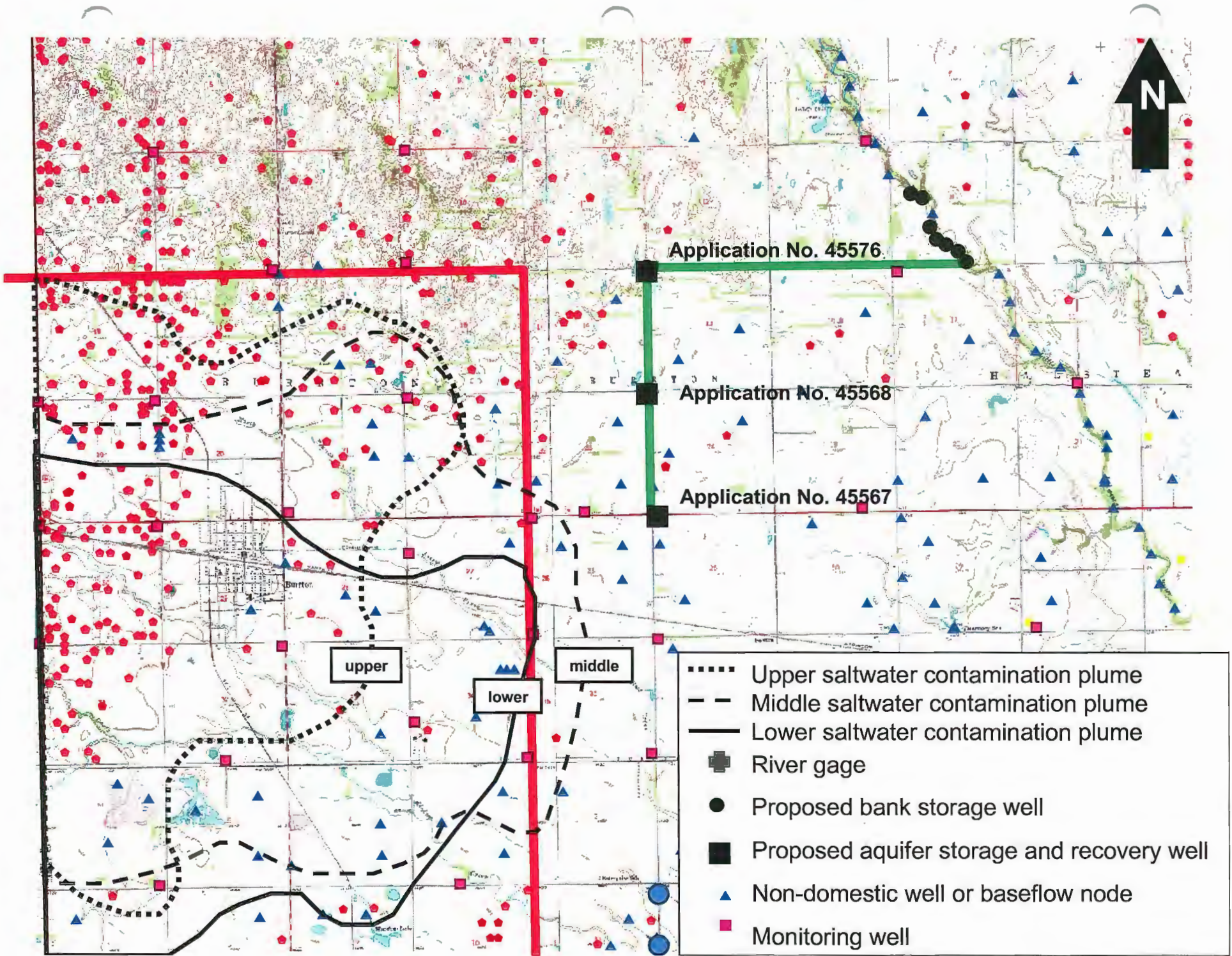
-  River gage
-  Proposed bank storage well
-  Proposed aquifer storage and recovery well
-  Non-domestic well or baseflow node
-  Monitoring well

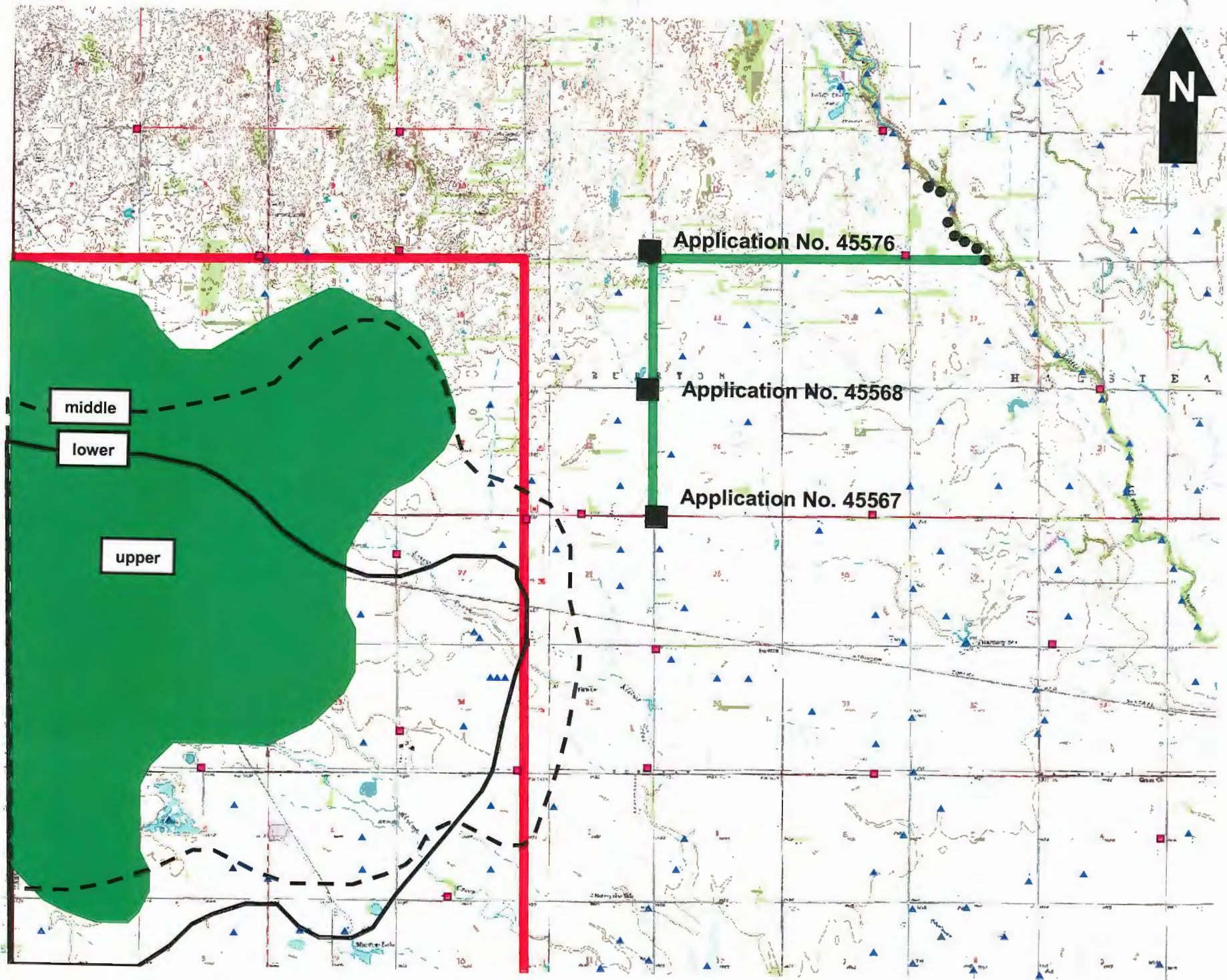


- Proposed ASR well
- ▲ Non-domestic well or appropriation
- Domestic well
- Monitoring well

Permit No. 37898







middle

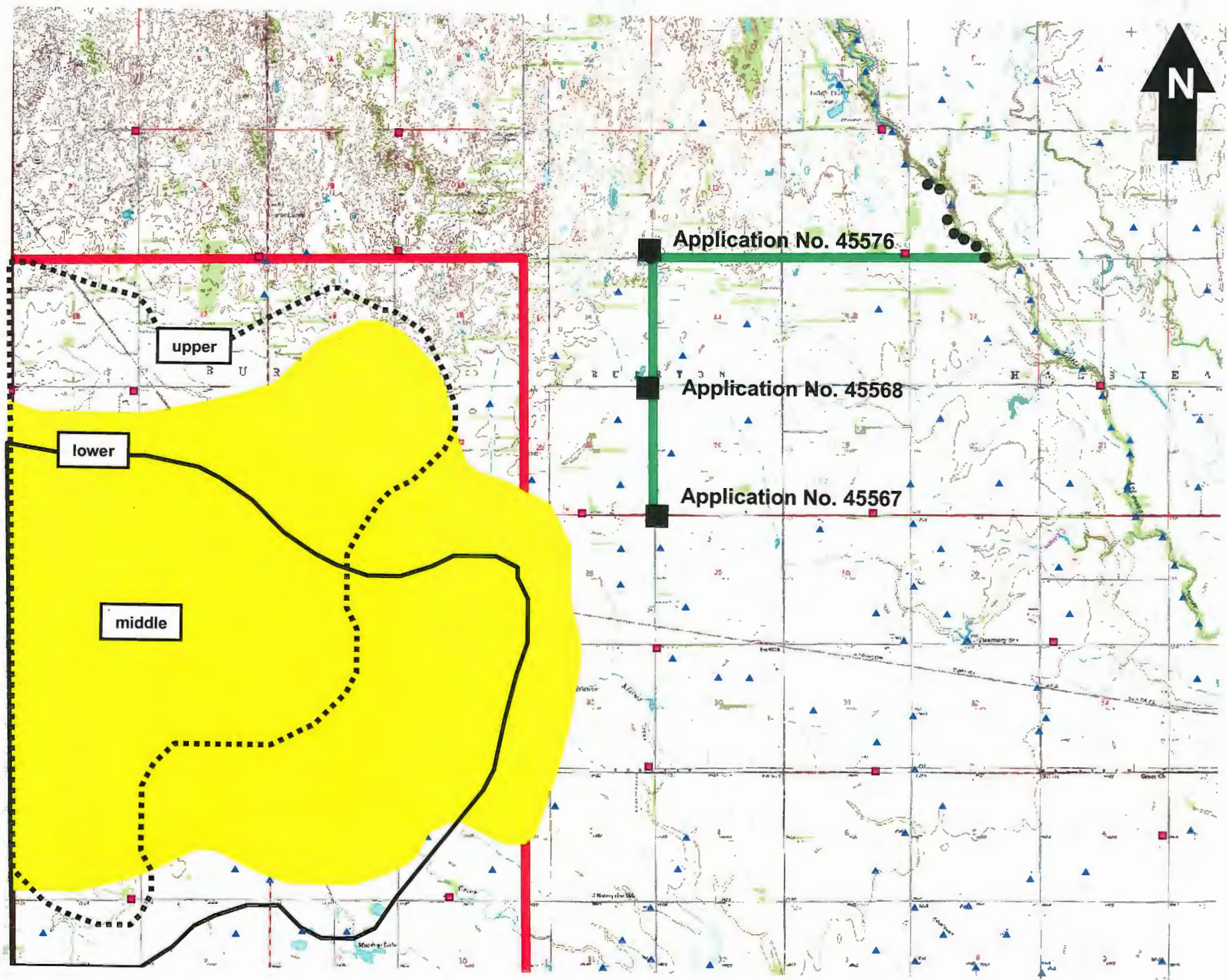
lower

upper

Application No. 45576

Application No. 45568

Application No. 45567



upper

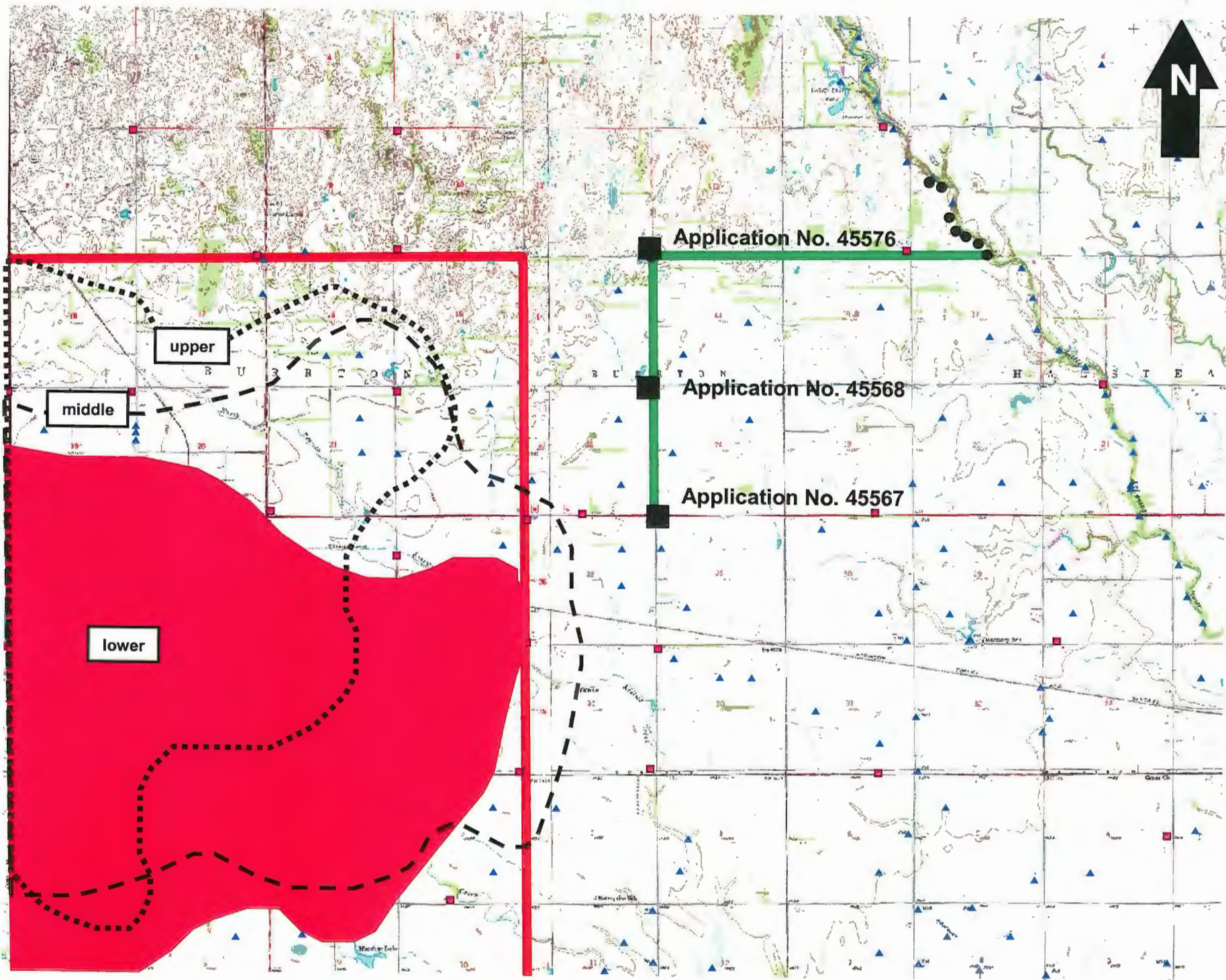
lower

middle

Application No. 45576

Application No. 45568

Application No. 45567



upper

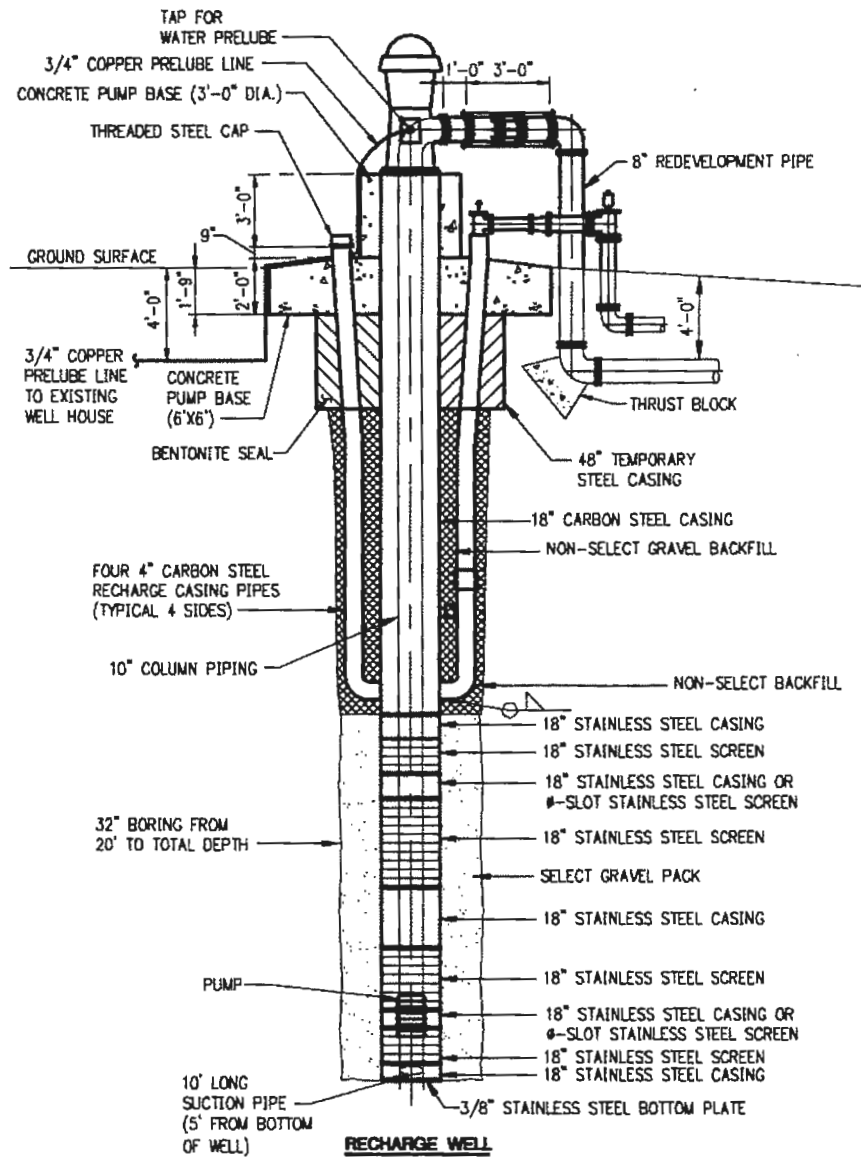
middle

lower

Application No. 45576

Application No. 45568

Application No. 45567



**Figure 9. –
Example of
Construction
Design for
Recharge and
Recovery Well**

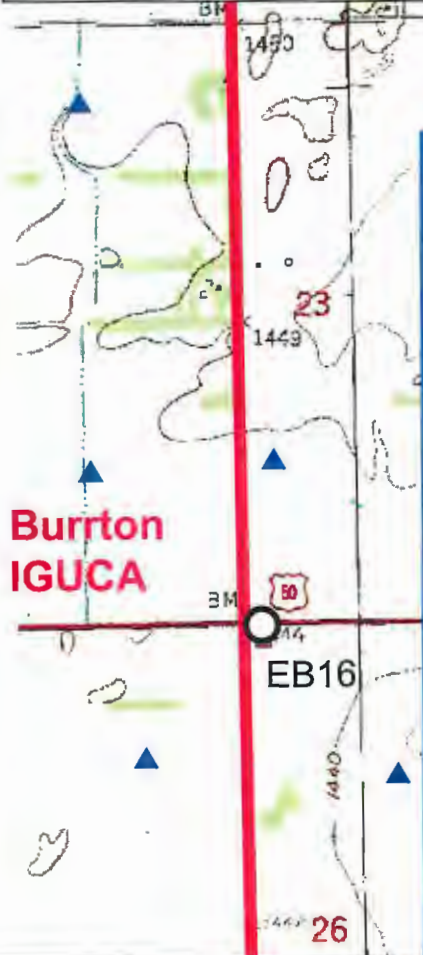
Image source - Equus Beds Groundwater Management District No. 2
Take by - MT Dealy
Date - 11 Oct 97
Subject - Halstead Recharge Facilities



Attachment 45567-A.

Application No. 45568
RRW2

N



- 1) Any future application for change in point of diversion filed on permit no. 45567, shall comply with the minimum well spacing requirements set forth in Well Spacing Rule and Regulation K.A.R. 5-22-2;
- (2) When it is determined by the Division of Water Resources that impairment of the existing prior rights, was caused by the applicant's well, the applicant agrees to either:
 - (a) regulate the well's diversion to secure water to satisfy the needs of a prior right; or
 - (b) any other requirement as specified by the Chief Engineer.
- (3) Subject to 30 approval conditions & MOU
- (4) Subject to reconfiguring the monitoring network

- Proposed aquifer storage
- ▲ Non-domestic well or
- Domestic well
- Existing monitoring well
- Proposed monitoring well

Attachment 45567-A. – Application No. 45567 Site Map - NW 25-23S-3W
Prepared by: Equus Beds Groundwater Management District No. 2 - 07/06/04

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 1. the withdrawal wells are equipped with water meters pursuant to K.A.R. 5-22-4(a);**
- 2. the operation of the withdrawal wells shall not impair existing water rights nor prejudicially affect the public interest;**
- 3. the proposed bank storage wells are positioned at locations within 300 feet of the centerline of the Little Arkansas River;**
- 4. The diverted bank storage water must comply with the source water regulation K.A.R. 5-1-1(sss);**

STAFF RECOMMENDATIONS:

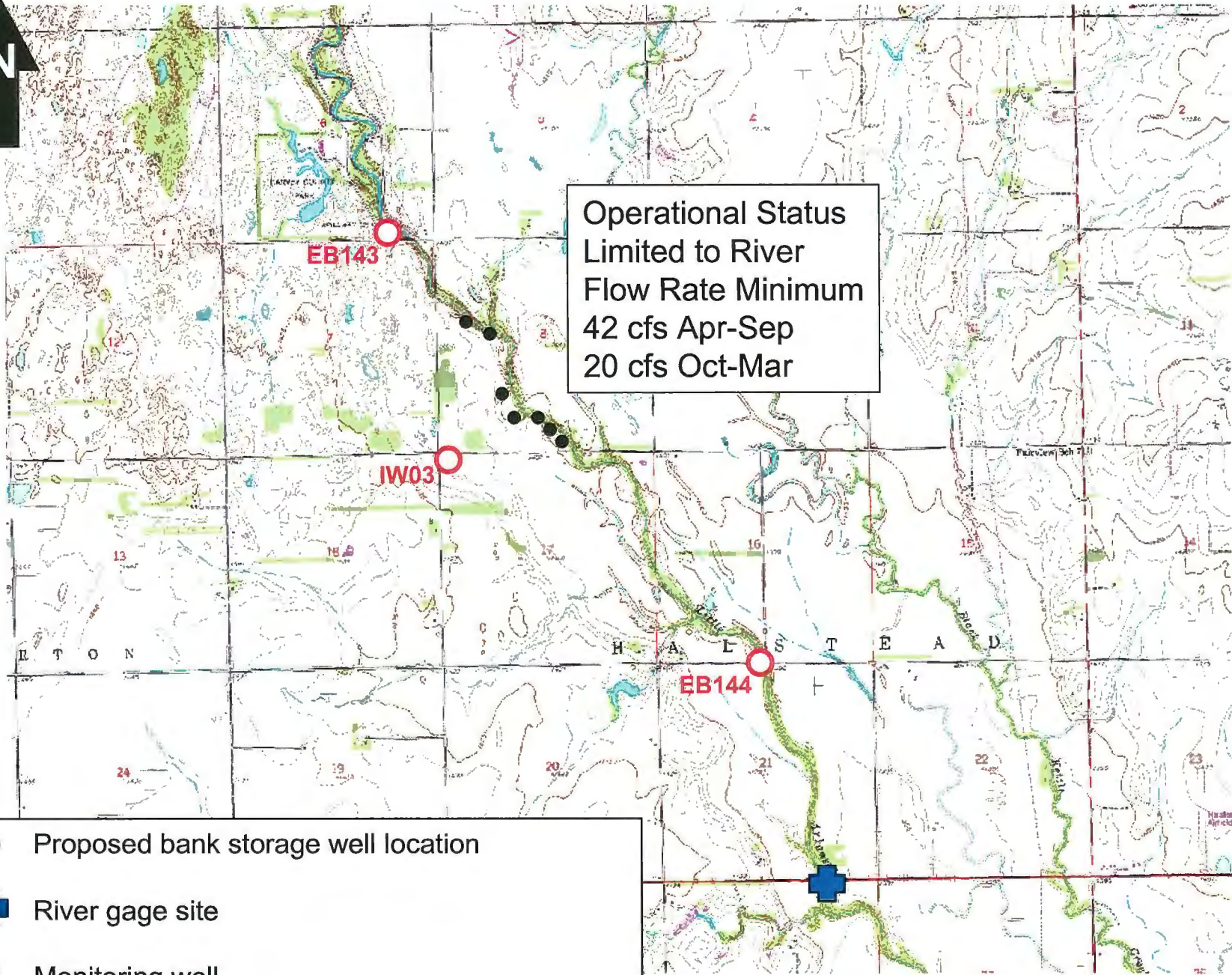
Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 5. the withdrawal wells shall operate only during bank storage events in the Little Arkansas River, as determined by measured river flow and evidence correlating the increase of river stage to the increase of water level in the bank storage wells or adjacent monitoring wells;**
- 6. bank storage, for the purpose of permit conditions, is limited to flows in the Little Arkansas River equal to or greater than 20 cfs during the months of October through March, and 42 cfs during the months of April through September;**

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 7. streamflow data utilized to determine flow conditions and bank storage well utilization shall be collected from the USGS Halstead gage site located at Highway 50, and from an upstream gage site to be established under the same parameters as the Halstead gage site;**
- 8. the upstream streamflow gaging station shall be installed between one-half mile and one mile of the northernmost bank storage well (identified as DW-7);**



Operational Status
Limited to River
Flow Rate Minimum
42 cfs Apr-Sep
20 cfs Oct-Mar

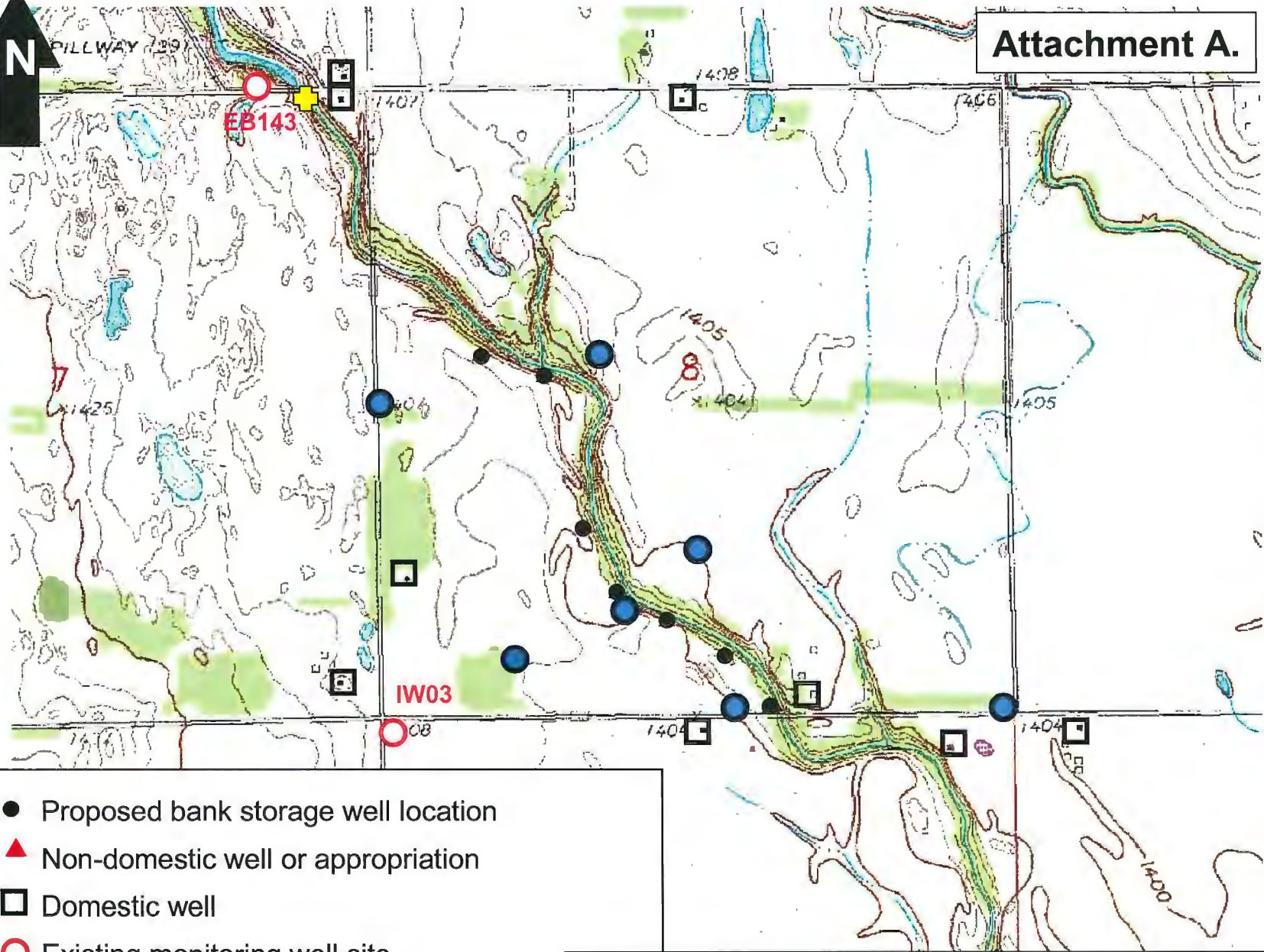
- Proposed bank storage well location
- ⊕ River gage site
- Monitoring well

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 9. a monitoring well network is completed at the bank storage pump site as shown on Attachment A, and shall include existing monitoring well sites IW03, EB143 and EB144;**

Attachment A.



- Proposed bank storage well location
- ▲ Non-domestic well or appropriation
- Domestic well
- Existing monitoring well site
- Proposed monitoring well site

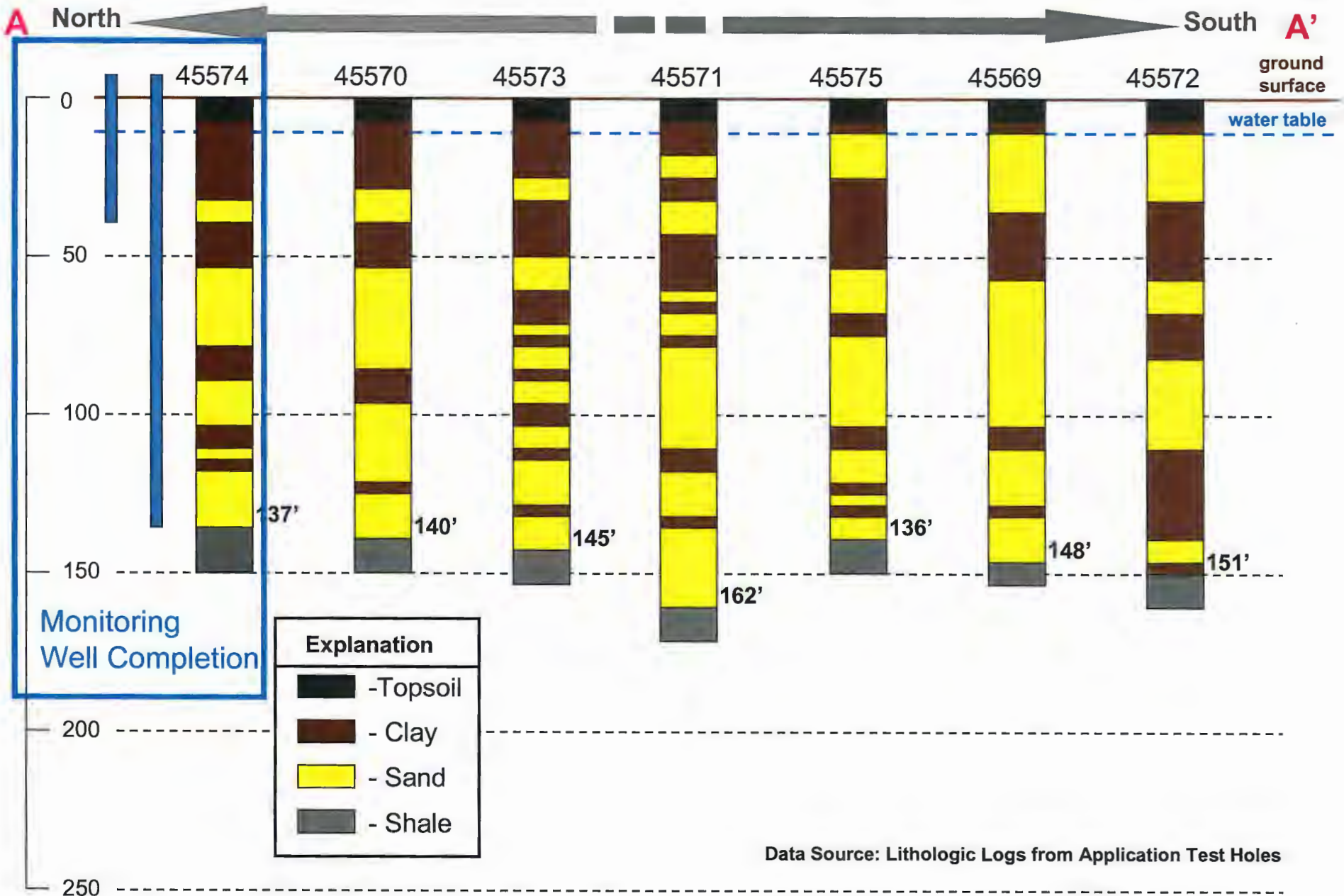
Attachment A. – Application No. 45570 Site Map - NW 08-23S-2W
Prepared by: Equus Beds Groundwater Management District No. 2 - 07/06/04

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 10. the monitoring wells are drilled and completed at depths correlating to the upper and lower zones of the aquifer for water sample collection, water level measurements and testing purposes;**

Generalized Lithology of Equus Beds Aquifer at Bank Storage Withdrawal Site, Sec. 8, T23S, R2W



STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 11. water quality analyses shall be completed for samples collected from: a) domestic wells located within one-quarter mile of the proposed bank storage well, b) the proposed withdrawal well, and 3) all monitoring wells located at the bank storage diversion site to establish baseline ambient groundwater quality prior to bank storage withdrawal;**
- 12. the quality of surface water induced into the river bank shall not degrade the ambient groundwater quality in the bank storage withdrawal area;**

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

13. storage water shall meet or exceed the minimum drinking water standards specified by the Kansas Department of Health and Environment for artificial recharge;
14. the applicant conduct aquifer pump testing to determine the well's capture zone, the hydraulic connection between the aquifer's upper and lower zones at the well site, and submit said data and test results to the Division of Water Resources and the District within a specified time period;
15. no water shall be pumped from the lower unit of the aquifer, if determined by the Division of Water Resources and the District that a hydraulic connection does not exist between the aquifer's upper and lower zones;

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 16. based on the findings and conclusions of the Division of Water Resources and the District, the well is constructed to allow only withdrawal of bank storage water;**
- 17. within seven days after the pumping of all bank storage wells has ceased, the water level in each bank storage well, or monitoring well located within 100 feet of the bank storage well, will recover to an elevation equal to or greater than the water level elevation immediately before the bank storage well began to pump, adjusted for any regional groundwater level changes not caused by pumping of the bank storage well;**

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

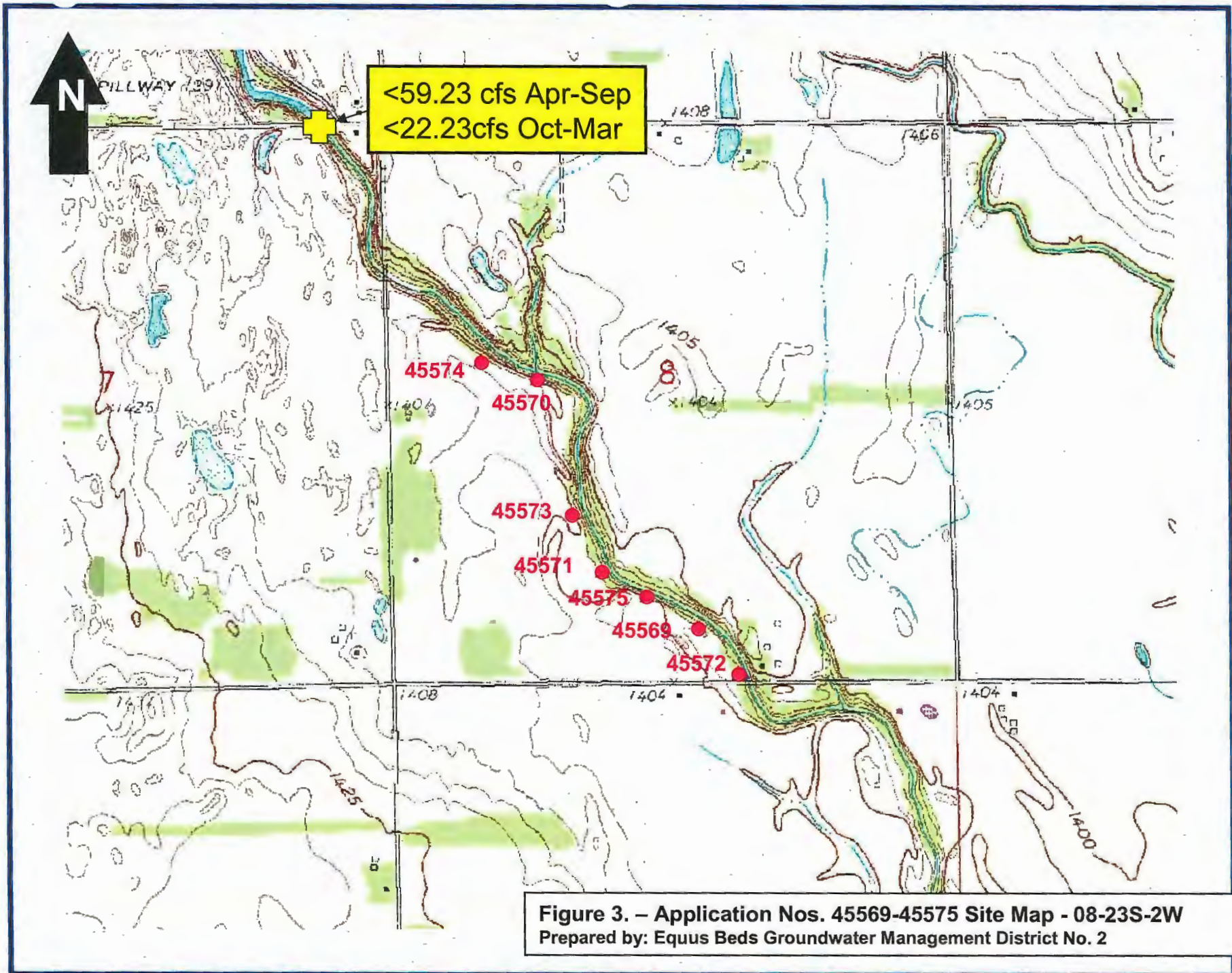
- 18. the naturally occurring and artificially induced rate of infiltration from the bed and banks of the stream when bank storage is occurring will be sufficient to meet the following conditions: a) equal or exceed the authorized rate of diversion of all bank storage wells, b) prevent impairment caused by all bank storage wells, and c) prevent groundwater mining caused by all bank storage wells;**
- 19. the maximum pumping rate for each proposed point of diversion be limited to 1200 GPM;**

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

20. the well shall not be operated during baseflow conditions, and operation of the bank storage wells shall be subject to the following flow conditions and plan:

River Flow (cfs)		Maximum Number of Wells Operating	Bank Storage Well Withdrawal Rate (cfs)
Apr-Sep	Oct-Mar		
59.23	22.23	1	2.23
61.46	24.46	2	4.46
63.69	26.69	3	6.69
65.92	28.92	4	8.92
68.15	31.15	5	11.15
70.38	33.38	6	13.38
72.61	35.61	7	15.61



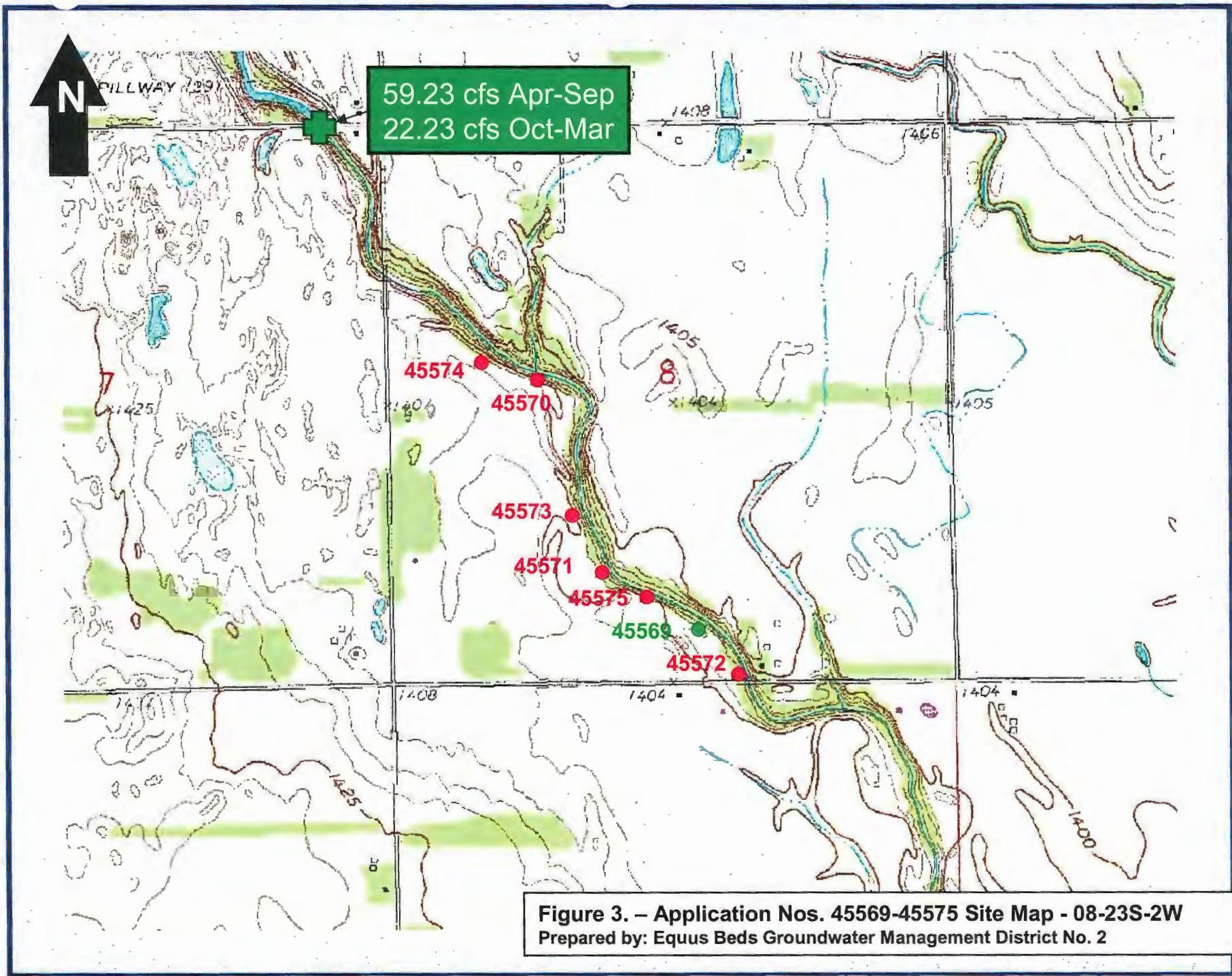


Figure 3. – Application Nos. 45569-45575 Site Map - 08-23S-2W
Prepared by: Equus Beds Groundwater Management District No. 2

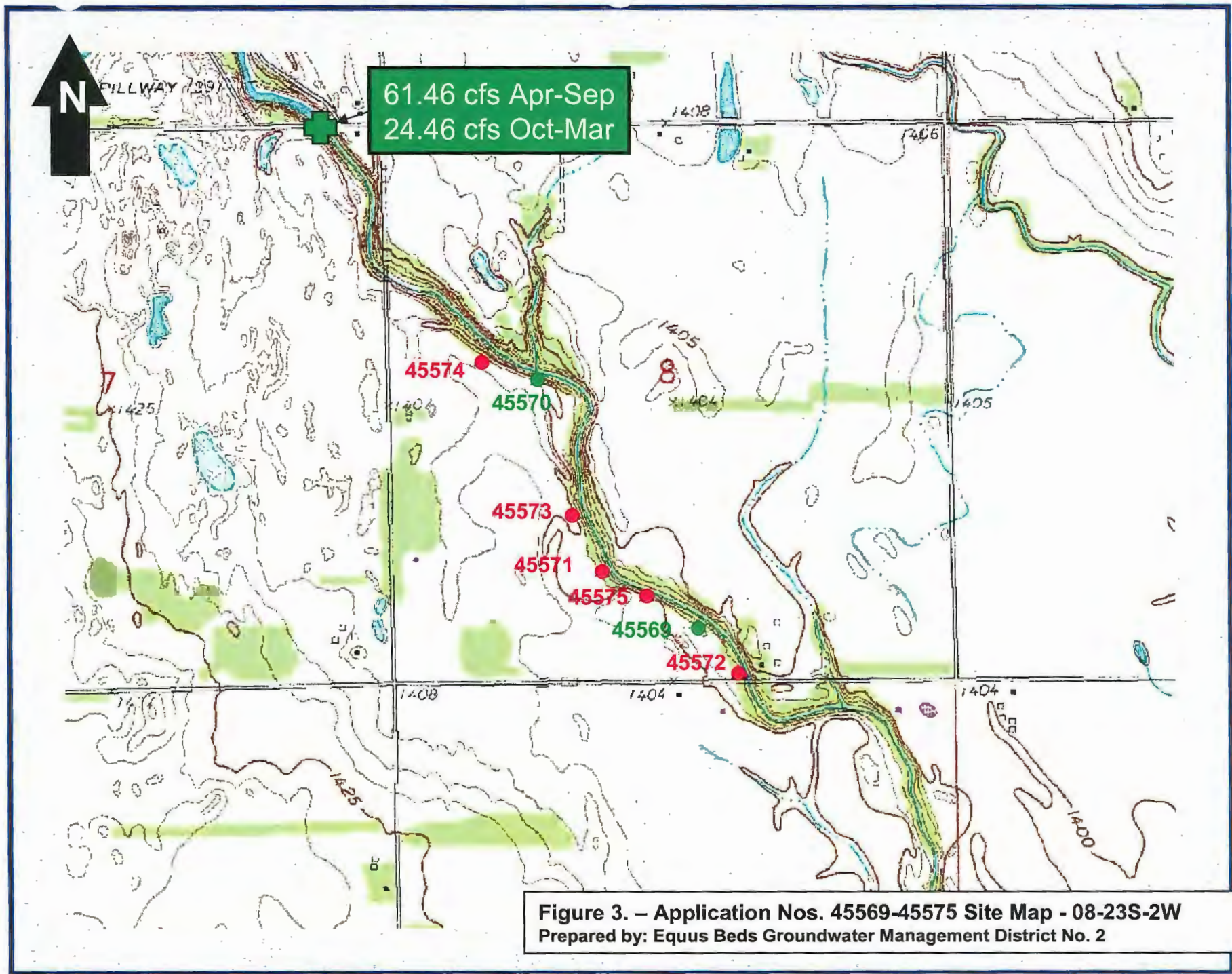


Figure 3. – Application Nos. 45569-45575 Site Map - 08-23S-2W
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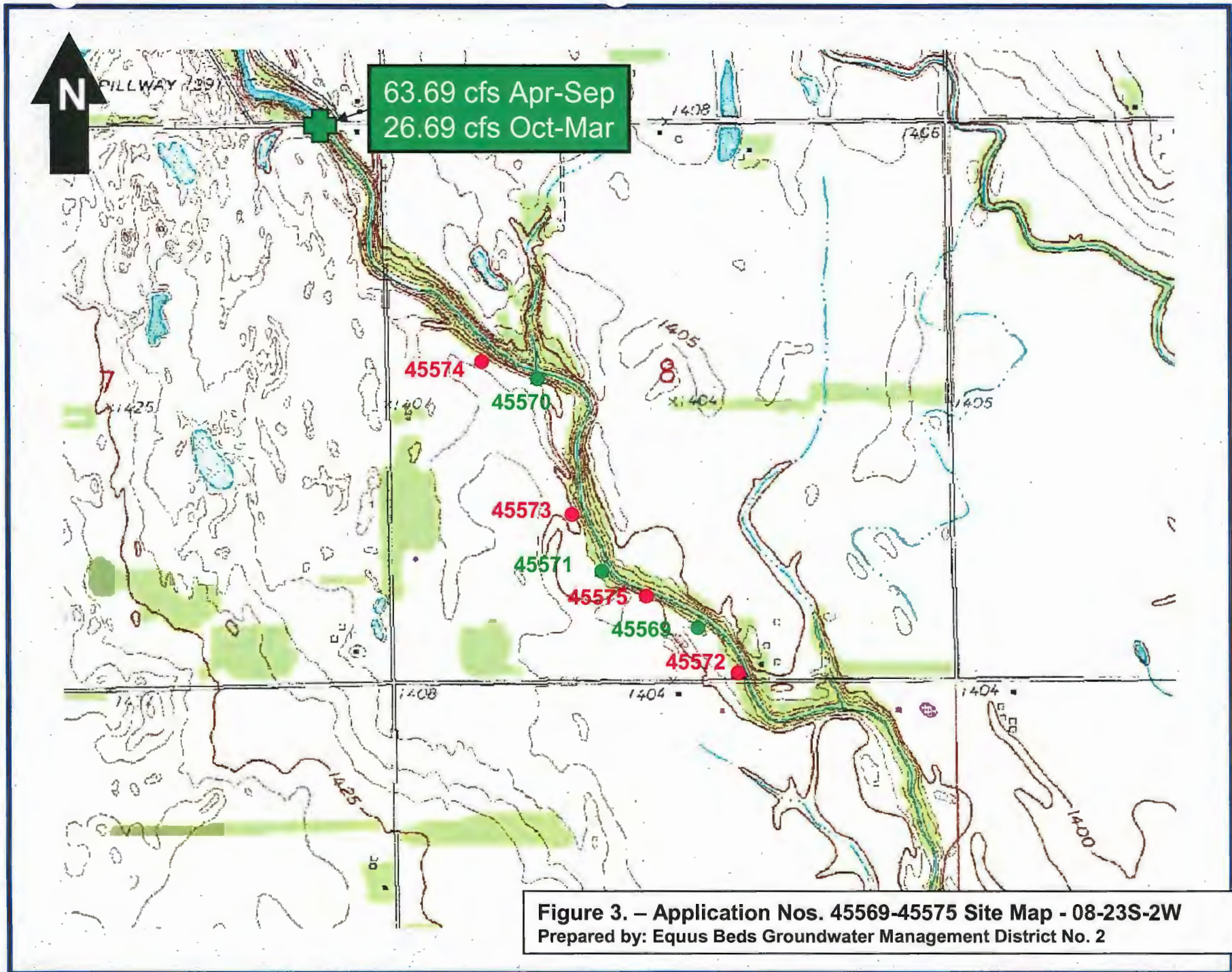
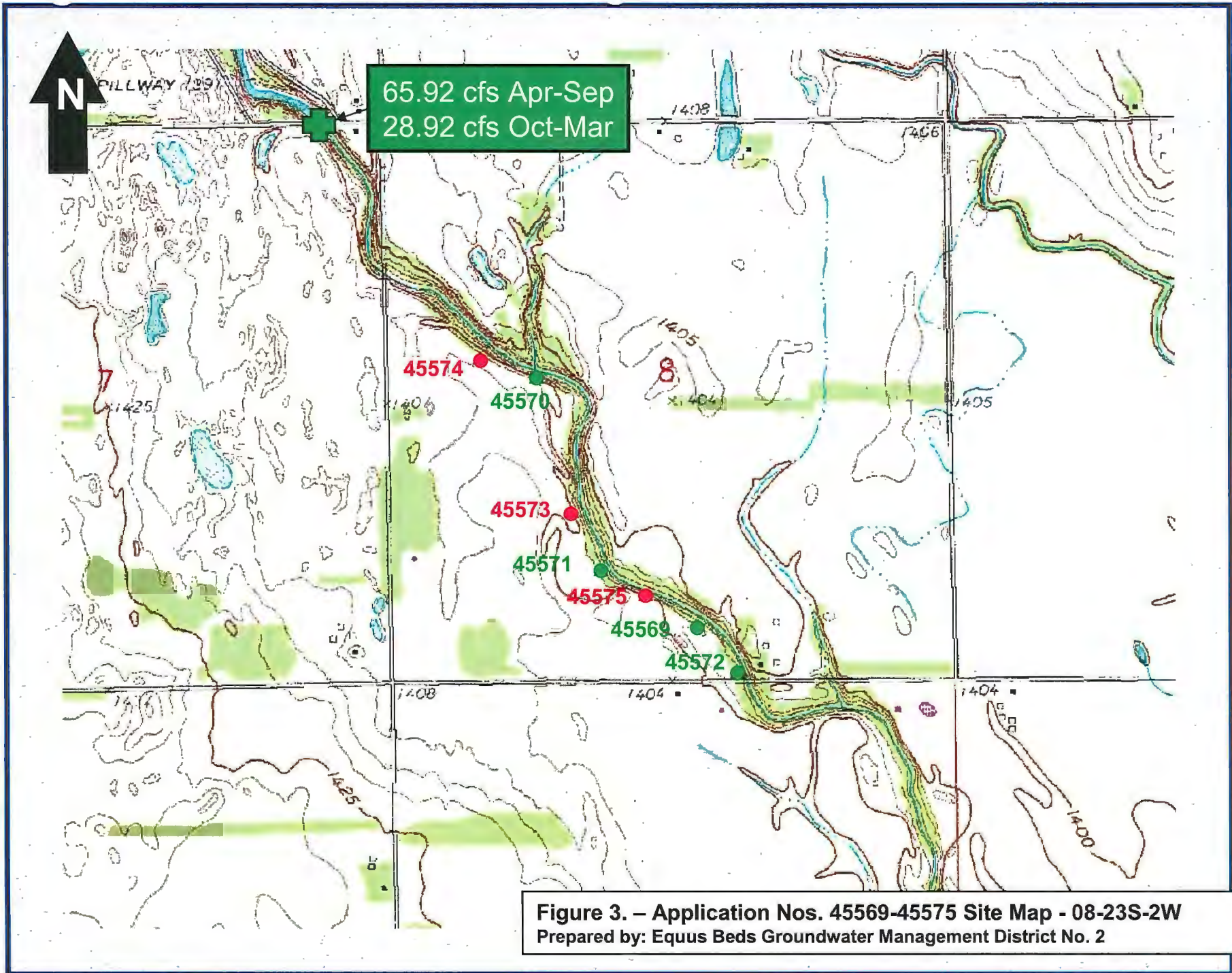


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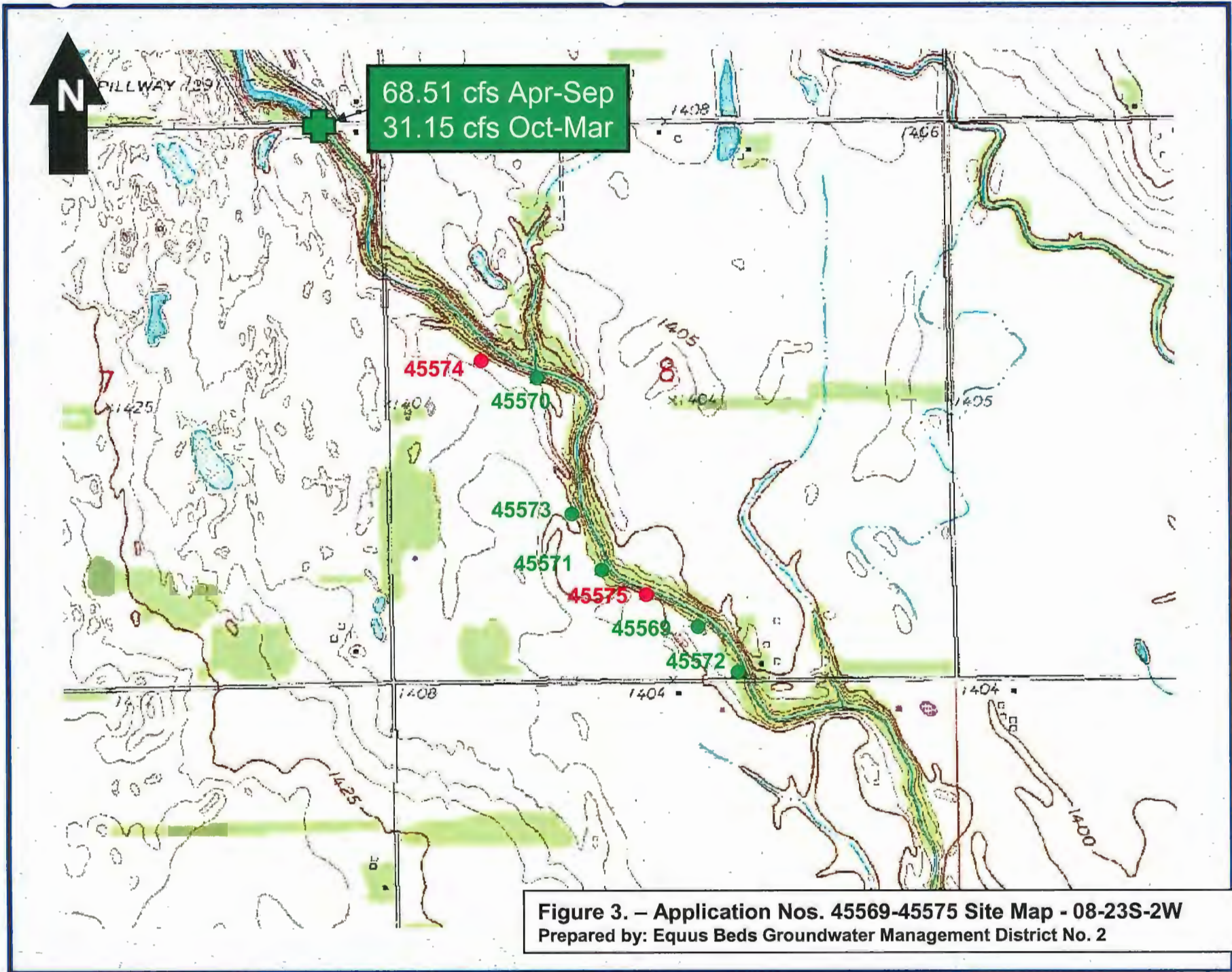


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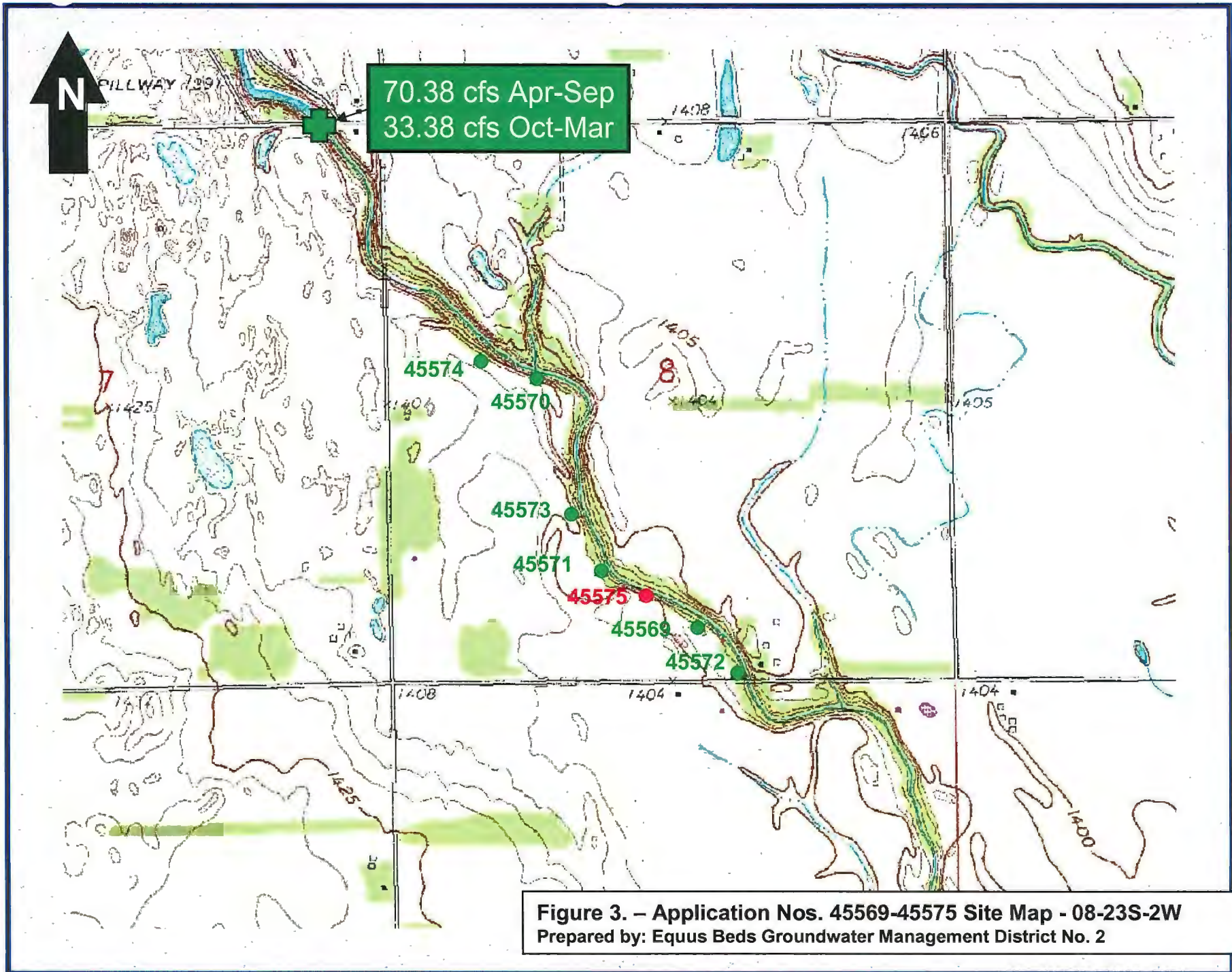
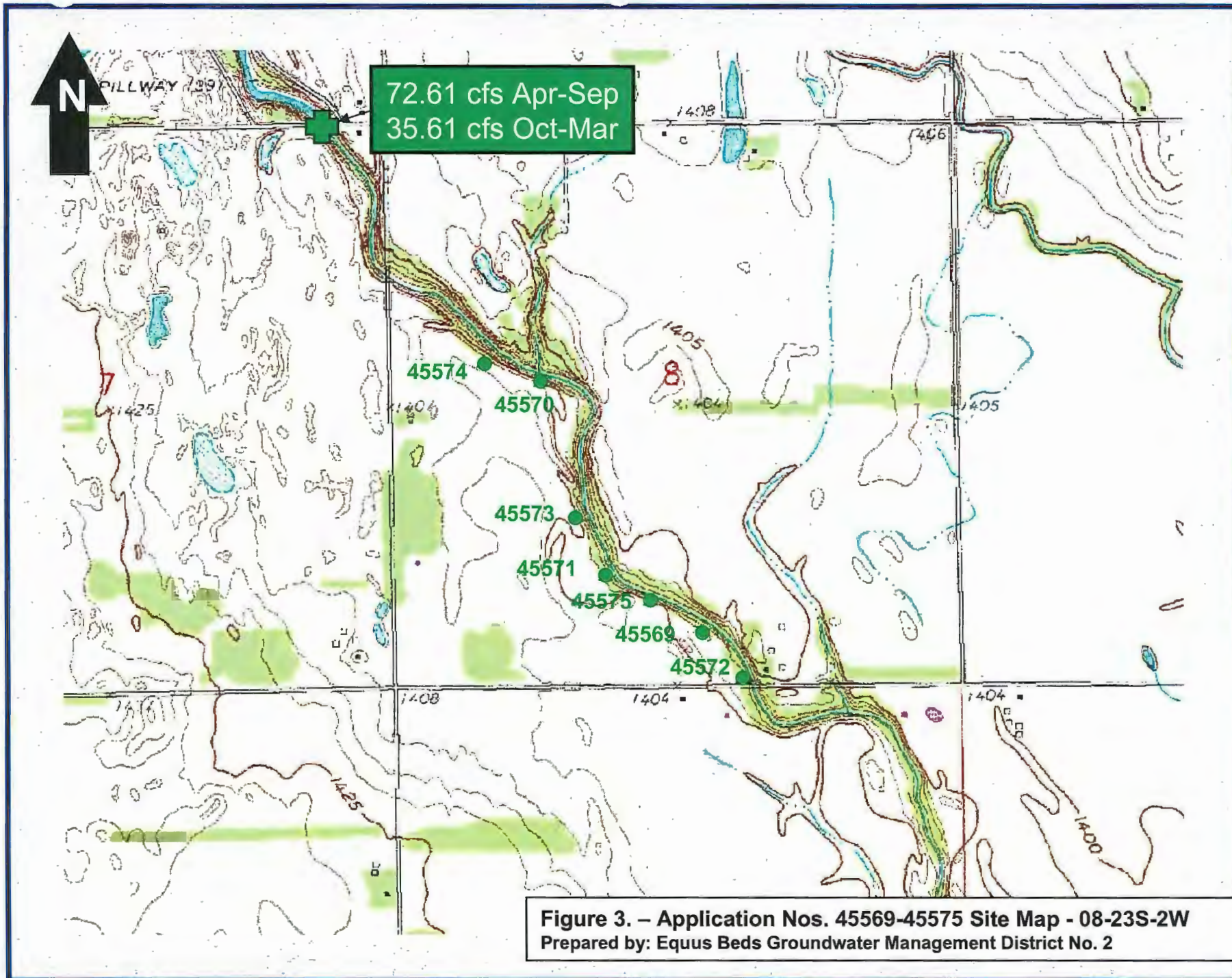


Figure 3. – Application Nos. 45569-45575 Site Map - 08-23S-2W
Prepared by: Equus Beds Groundwater Management District No. 2



STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 21. the applicant shall submit a water level and water quality monitoring plan to be approved by the District Board of Directors and the Chief Engineer, DWR;**
- 22. the water quality monitoring shall provide necessary chemical, physical, radiological and biological data, and include but not be limited to continuous monitoring of specific conductance, PH, turbidity, dissolved oxygen, temperature;**
- 23. water level monitoring at the bank storage site shall be automated with a frequency not to exceed six hours;**

STAFF RECOMMENDATIONS:

Based on data submitted by the applicant and District findings, staff recommends that the applications be approved subject to additional conditions that:

- 24. the applicant shall submit a well field operation monitoring and reporting plan to be approved by the District Board of Directors and the Chief Engineer, DWR;**
- 25. the operational plan shall include utilization of monitoring wells and the proposed upstream river gage in an automated system; and**
- 26. bank storage diversion quantities, aquifer injection quantities, water level data and water quality analyses are reported to the Division of Water Resources and the District each month for the 1st year of operation, each calendar quarter for the 2nd year of operation, and annually thereafter by March 1, of each year.**

