

Public Informational Meeting

Wichita Aquifer Storage and Recovery project proposed changes

Welcome and overview

David Barfield, Chief Engineer
Division of Water Resources
Kansas Department of Agriculture

Halstead, Kansas
June 28, 2018



Outline of the meeting

- Welcome & overview
- City of Wichita presentation
- DWR summary of draft, proposed approval documents and process ahead
- GMD 2 Comments
- Questions and Answers

Meeting purpose

- This meeting concerns itself with requests by the City of Wichita to:
 - Add recovery wells to its project and
 - modify the terms of Phase II of its existing, Aquifer Storage and Recovery Project.
- While not a formal part of the review process, due to the significance of the project to the Region and some complexity in the proposal, we are holding this informational meeting to inform the formal review process to come.

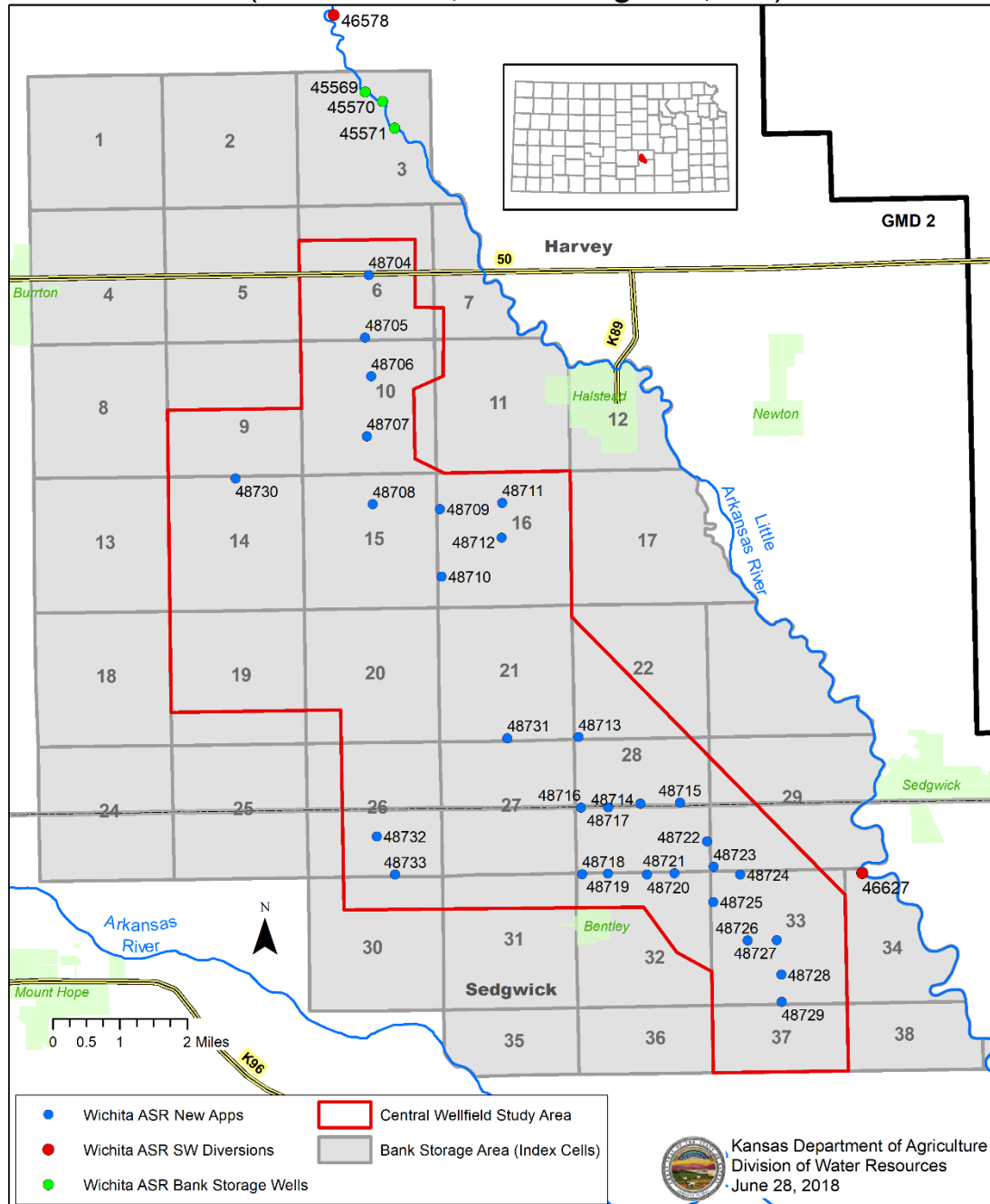
Wichita ASR overview

- State's only Aquifer Storage and Recovery (ASR) Project.
- Permitted in two phases:
 - **Phase I, 2005:** allows recharge of treated Little Arkansas River surface water and bank storage wells to develop recharge credits and slow the migration of salt water contamination moving toward the wellfield from the Burrton area. It includes five recharge recovery permits.
 - **Phase II, 2009/2010:** allows the recharge of treated Little Arkansas River surface water into the Equus Beds wellfield to accumulate recharge credits for subsequent use by the City. Phase II is designed to permit recharge of up to 30 million gallons per day. It includes 30 recharge recovery permits.

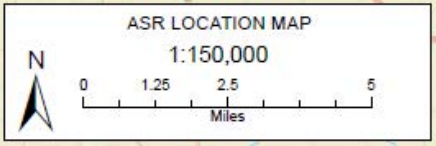
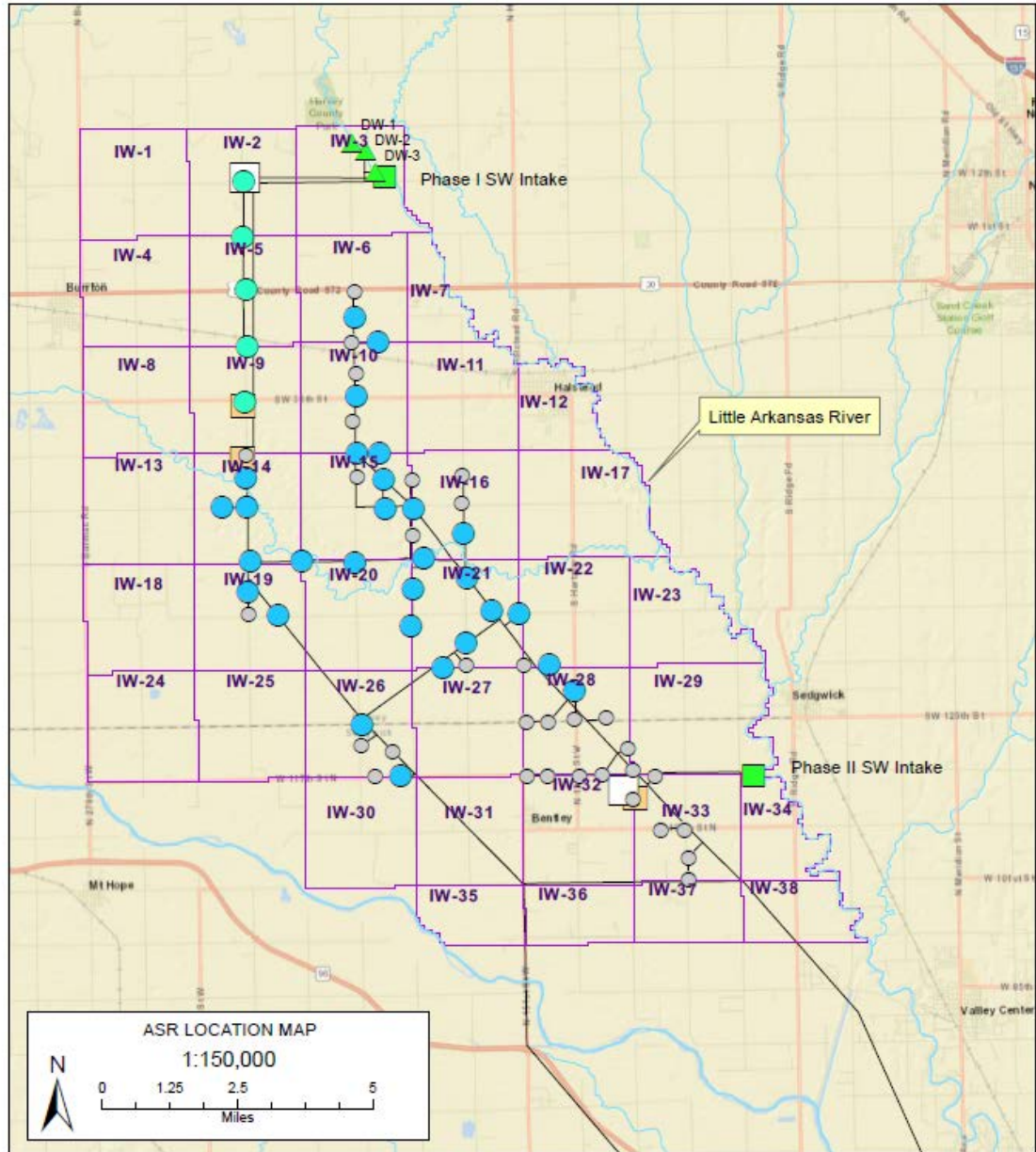
Wichita ASR overview

- The ASR approvals include a rigorous accounting and modeling components to track recharge, recovery and loss of recharge out of the area.
- The approvals define a “Basin Storage Area (BSA)” as part of the accounting, which is the portion of the aquifer used for aquifer storage with defined horizontal boundaries and delimited by a maximum and minimum index levels.

Wichita ASR Project Area and New Applications (File Nos. 48,704 through 48,733)



● Wichita ASR New Apps	 Central Wellfield Study Area
● Wichita ASR SW Diversions	 Bank Storage Area (Index Cells)
● Wichita ASR Bank Storage Wells	



- Legend**
- | | | |
|-----------------------------|----------------------------|------------------------------------|
| ASR Wells Phase I | ASR Recharge Basins | ASR Surface Water Treatment Plants |
| ASR Wells Phase II | Surface Water Intakes | ASR Index Cells (Numbered) |
| Other City of Wichita Wells | Phase I Bank Storage Wells | ASR and Raw Water Piping |

Wichita's proposed changes

Not a new ASR Project; no expansion of ASR authorities requested.

Three changes are sought by the City:

- **New applications for additional recovery wells** to allow the City to recover recharge credits at its existing production wells, not currently authorized to do so.
- Two requested changes in the terms & conditions for Phase II approvals:
 - lowering of the **minimum index levels** used to determine when the City can withdraw its recharge credits, and
 - **authorization for a new type of recharge credit** from project operations: Aquifer Maintenance Credits (AMCs). AMCs would be allowed during times of limited aquifer recharge capacity, where the City would receive recharge credits for treating surface water diverted from the Little Arkansas River and sent directly to town for municipal use, offset by reduced Equus Bed Aquifer use.

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 Wichita ASR

Wichita ASR

News:

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The City of Wichita has the state's only active Aquifer Storage and Recovery project, developed and approved in two phases.

The City has filed a series of new applications that will allow it to recover recharge credits at its existing production wells.

On March 12, 2018, the City forwarded a detailed proposal for changes to the conditions associated with its existing permits for Phase II of the project, including the new applications referenced above (see below).

Also, below is information related to the City's existing ASR permits for reference.

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Proposal development / Initial review

- After significant work with DWR, GMD 2, and stakeholders, the City provided its formal proposal on March 12, 2018. DWR posts on web new page.
- March 22, 2018 – DWR letter providing draft, proposed approval documents for review, start initial review
- April 19, 2018 – Special GMD 2 Board meeting to discuss
- April 27 – GMD 2 initial review comments provided
- May 9, 2018 – DWR letter, amending process to include a formal hearing
- May 22, 2018 – City response to GMD review
- June 1, 2018 – DWR response to GMD review, particularly legal/policy questions; amends proposed approval documents

City's presentations

Public Informational Meeting
Wichita Aquifer Storage and Recovery
project proposed changes

**Overview of Draft, Proposed
Approval Documents**

David Barfield, Chief Engineer
Division of Water Resources
Kansas Department of Agriculture

Halstead, Kansas
June 28, 2018



Why draft, proposed approval documents?

- Due to the significance and complexity of the project, draft approval documents provided to help the GMD and public to fully understand the proposed terms and conditions being considered.
- No decision has been made, but we have worked hard to develop a set of potential terms that meets the City's needs and meets statutory and regulatory requirements.
- The formal public hearing process will affirm or deny this, including determining whether additional terms and conditions would improve the accounting of AMCs or other changes will better serve the public's interest.

Draft June 1, 2018
Proposed Replacement F &O for
ASR Phase II

Findings and Order
In the Matter of the City of Wichita's Phase II
Aquifer Storage and Recovery Project in
Harvey and Sedgwick Counties, Kansas

Findings

1. That in a Findings, Conclusion and Order dated August 8, 2005, on file in the office of Engineer, In the Matter of the City of Wichita's Applications To Operate an Aquifer Storage and Recovery Project in Harvey and Sedgwick Counties, Kansas ("Original Order"), the Chief Engineer approved Appropriation of Water, File Nos. 45,567; 45,568; 45,569; 45,570; 45,571; 45,573; 45,574; 45,575; 45,576; and 46,081 proposing the appropriation of water for beneficial use.
2. That the Order had 24 Conditions including but not limited to designation of the basin storage and index cells for the project area, locations of the index wells, approved model and methodology, and reporting requirements.
3. That in a Findings and Order dated August 1, 2006, ("Modified Order"), the Chief Engineer approved the Original Order approving Appropriation of Water, File Nos. 45,567, 45,568, 45,569, 45,571, 45,572, 45,573, 45,574, 45,575, 45,576, and 46,081, specifically permit Conditions 12, 14, 17, 20, and 23, pertinent to bank storage wells.
4. That on September 18, 2009, the Chief Engineer issued a Findings and Order Approving Appropriation of Water, File Nos. 46,627; 46,714; 46,715; 46,716; 46,717; 46,718; 46,719; 46,721; 46,722; 46,723; 46,724; 46,725; 46,726; 46,727; 46,728; 46,729; 46,730; 46,731; 46,733; 47,178; 47,179; 47,180; and 47,181.
5. That in a Findings and Order dated December 21, 2009, the Chief Engineer modified the Original Order and Modified Order, to be referred to as the "City of Wichita's Aquifer Storage and Recovery Project in Harvey and Sedgwick Counties, Kansas", without referencing specific file numbers of the Original Order and Conditions No. 23 of the Modified Order, and modified to allow for

Draft, June 1, 2018
Example Proposed F &O amending terms & conditions of an
existing ASR Phase II permit

FINDINGS AND ORDER
IN THE MATTER OF
PERMIT CONDITIONS UNDER
APPROPRIATION OF WATER, FILE NO. 46,714

After due consideration, the Chief Engineer, Division of Water Resources, Kansas Department of Agriculture (hereinafter referred to as the "Chief Engineer"), makes the following findings and order:

FINDINGS

1. That on September 18, 2009, the Chief Engineer approved Appropriation of Water, File No. 46,714, for permit to appropriate groundwater recharge credits accumulated in the Equus Beds aquifer for municipal use, authorizing the applicant, subject to vested rights and prior appropriations, to proceed with the construction of the proposed diversion works and to proceed with all steps necessary for the application of the water to the approved and proposed beneficial use.
2. That per Paragraph No. 19 of the Approval of Application and Notice to Proceed for Appropriation of Water, File No. 46,714, the permit was issued with the condition that "the proposed recovery of water artificially recharged by the City shall only occur when recharge credits are determined to be available in Cell No. 6, and the static water level is above elevation 1,387 mean sea level (msl)." This elevation was based on what was considered to be the lowest aquifer water level for this cell as determined by January 1993 water level measurements (i.e. the bottom of the Basin Storage Area).
3. That on May 6, 2015, the Chief Engineer approved a Findings and Order, which defined "static water level" as the water level measured early in the calendar year (normally in January) prior to the irrigation season, and after allowing time for natural aquifer recovery. In addition, the Order modified the minimum index level (groundwater elevation) for Cell No. 6 to be 1,388.74 feet mean sea level.
4. That the City has conducted extensive modeling and data analysis to indicate that during a prolonged drought, groundwater elevations would drop below the current minimum index levels. This would prevent the City from withdrawing recharge credits when they are most needed.

Draft, June 1, 2018
Example proposed individual approval for one of the new applications

**APPROVAL OF APPLICATION
and
PERMIT TO PROCEED**

(This Is Not a Certificate of Appropriation)

This is to certify that I have examined Application, File No. 48,704 of the applicant

**CITY OF WICHITA
PUBLIC WORKS & UTILITIES-WTP
455 N MAIN ST 8TH FLOOR
WICHITA KS 67202**

for a permit to appropriate water for beneficial use, together with the maps, plans and other submitted data, and that the application is hereby approved and the applicant is hereby authorized, subject to vested rights and prior appropriations, to proceed with the construction of the proposed diversion works (except those dams and stream obstructions regulated by K.S.A. 82a-301 through 305a, as amended), and to proceed with all steps necessary for the application of the water to the approved and proposed beneficial use and otherwise perfect the proposed appropriation subject to the following terms, conditions and limitations:

1. That the priority date assigned to such application is **July 23, 2013**.
2. That the water sought to be appropriated shall be used for municipal use within the City of Wichita and immediate vicinity; within the City of Andover and immediate vicinity, within the City of Bel Aire and immediate vicinity, within the City of Benton and immediate vicinity, within the City of Derby and immediate vicinity; within the City of Kechi and immediate vicinity; within the City of Park City and immediate vicinity; within the City of Rose Hill and immediate vicinity; within the City of Valley Center and immediate vicinity; within the City of Bentley and immediate vicinity, within the boundaries of Rural Water District No. 1, Sedgwick County; within the boundaries of Rural Water District No. 2, Sedgwick County; within the boundaries of Rural Water District No. 3, Sedgwick County; and within the boundaries of Rural Water District No. 8, Butler County; within a tract of land in Sedgwick County, Kansas, beginning at the Southeast corner of Section 25, Township 28 South, Range 2 East, then West 22 miles to the Southwest corner of Section 28, Township 28 South, Range 2

Summary of proposed terms and conditions

- **Lower minimum index cell levels** as indicated in Table 2-11 of the City's proposal
- **Physical recharge** activities will continue to occur when there is adequate recharge capacity within the aquifer.
- **AMCs may be accumulated only when** index cell water levels are at elevations that **limit physical recharge** into the BSA as provided in the ASR's operating plan.
- The **AMC accumulation rate** will be dependent on the **quantity of water treated and sent to the City** within the authorization of File No. 46,627.

Summary of proposed terms (con't)

- AMC accounting:
 - AMCs will annually be assigned to index cells by evenly distributing these credits among the total number of points of diversion within the Equus Beds wellfield in service that year.
 - A one-time, five percent (5%) initial loss will be deducted from the total number of AMCs applied in each index cell.
 - A recurring loss to AMCs, as provided in Figure 15 of the City's proposal, would be applied annually across the BSA to account for the migration of recharge credits and losses from the BSA.
 - The total accumulation of recharge credits through PRCs and AMCs combined cannot exceed 120,000 acre-feet, which represents the documented amount of aquifer storage available within the ASR project area in 1993.

Summary of proposed terms (con't)

- The City will develop an **annual ASR Operations Plan** that will be used to evaluate groundwater levels and the aquifer's physical recharge capacity. This information will determine the extent to which AMCs can be accumulated.
- If **water quality in an existing domestic well**, within 660 feet of an existing or new ASR well, is degraded by the ASR project such that it no longer meets the current drinking water standards, then the City will remedy the problem without additional cost to the resident.
- If a **domestic water well**, existing before the filing of these permit applications and within 660 feet of an existing or new ASR well, is **adversely impacted by drawdown** from such ASR well, then the City will re-drill or take other appropriate, affirmative action to restore productivity of such domestic well to the same rate and quality as existed before.
- The draft, proposed approval documents include **additional details** on conditions when AMCs may be withdrawn, as well as metering, reporting, and accounting related to AMCs.

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Wichita ASR - Process ahead

- June 28 – Tonight's public informational meeting
- Within next 2-3 weeks – Pre-hearing conference, set hearing date, location and procedures
- August 2018 – Formal public hearing including GMD 2 recommendation
- Approx. 3 weeks following hearing – Close of written comment period.
- Fall 2018 – Decision after review of the record

Questions

Table 3 – MODSIM-DSS simulation results for the 1% drought resulting in an optimized raw water resource utilization strategy and the sustained viability of Cheney Reservoir

MODSIM-DSS Variable	Drought Year 1	Drought Year 2	Drought Year 3	Drought Year 4	Drought Year 5	Drought Year 6	Drought Year 7	Drought Year 8
Baseline City Demand (AF)	81,690	81,690	81,690	81,690	81,690	81,690	81,690	81,690
Simulated Hydrologic Year of Drought	1933	1934	1935	1936	1937	1938	1939	1940
Revised Demand from Drought Response Plan (AF)	81,262	72,492	71,116	71,890	70,812	70,811	71,116	70,664
Cheney % of Conservation Pool 12 Month Average	110%	92%	62%	59%	62%	53%	53%	63%
Demand Assigned to EBWF & ASR	34,202	45,651	59,907	46,732	56,579	41,980	39,308	39,491
Demand Assigned to Cheney Reservoir	47,060	26,841	11,209	25,158	14,233	28,831	31,808	31,173

Wichita future base demand = 81,690 AF/year

In drought, reduced to approx. 71,000 AF/year

Wichita plans to use its 40,000 AF native rights to full extent in long term drought.

Demands > 40,000 AF to be provided from ASR credits.