Proposed Expansion of El Paso's Kay Bailey Hutchison Desalination Facility

Multi-State Salinity Coalition- 2016 Summit

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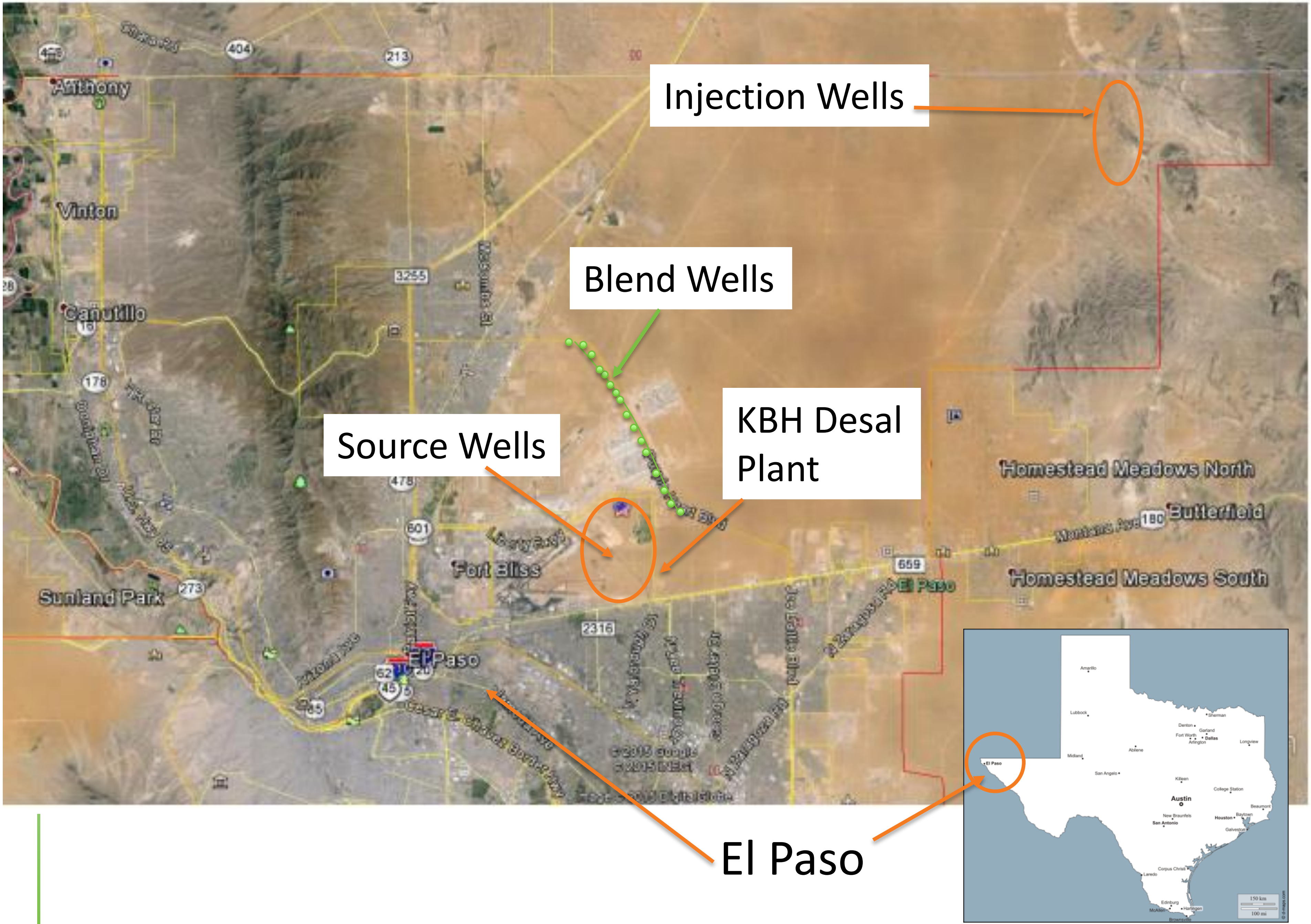
Utility and Facility Background

- The Kay Bailey Hutchison Desalination Facility (KBH) is one tool in El Paso's diverse water supply portfolio which includes fresh groundwater, surface water and desalination. EPWU also has been implementing ASR for over 25 years and is in pilot testing for DPR
  - KBH is critical when surface water supplies are not available
  - Supplements fresh groundwater supply
- Developed to provide a sustainable resource and also to mitigate brackish water intrusion from the east and south
- At 27.5 mgd delivered capacity, KBH was once the largest inland desal facility in the world, since eclipsed by Scottsdale
- In operation since mid-2007

Utility and Facility Background

The KBH facility includes:

- 16 source water wells for treatment through RO
- 16 blend wells for blending with permeate
  - 8 classified as “Fresh Water”
  - 8 classified as “Brackish Water”
- 15 mgd desalination plant (18 mgd feed)
- Clearwell and pump station for distribution of finished water
- 22-mile concentrate disposal pipeline + 3 injection wells



Injection Wells
Blend Wells
Source Wells
KBH Desal Plant
El Paso
Anthony
Vinton
Canutillo
Sunland Park
Fort Bliss
El Paso
Homestead Meadows North
Butterfield
Homestead Meadows South

Current Operations

- Design Capacity is 27.5 mgd total → 15 mgd RO permeate + 12.5 mgd from blend wells
- Designed to produce 15 mgd from 5 RO skids
  - 18 mgd feed
  - 3 mgd to concentrate wells
- Typical operation is 1-2 skids (3-6 mgd permeate)

- Blend wells are on Ft. Bliss and are subject to a “royalty fee” based on quality of water extracted (fresh vs brackish)

Declining Production

- Supply wells are decreasing in performance and water quality
  - Older wells cannot provide adequate flow and pressure to plant
  - TDS has increased in formation from original levels of **1100 mg/L (basis of design)**
- Many re-drilled wells producing 2000-4000 mg/L TDS water
  - Some tapped into deeper formation for production increase
- KBH is not producing at full capacity
  - 2013 max production: 22.3 mgd in August

Well No	Rated Well Capacity (GPM)	Chloride[1] (mg/l)	TDS[1] (mg/l)
47A	500	3000	7000
72A	944	920	1950
97A	500	900	1900
98A	1000	1150	2495
503A	900	1200	2500
504A	820	1625	3476
505A	900	999	2610
506A	1000	1040	2125
507A	1030	1303	2588
508	700	343	743
509A	450	1753	4255
510A	700	1990	4512
511A	502	1770	3828
512A	629	1184	2513
513A	1000	1177	2475
514A	978	1296	2710
515A	1100	1407	2808
Weighted Average Water Quality		1023[3]	2209[3]

Need for Expansion

- Drought conditions mean shorter irrigation season= less surface water available for less time
- KBH is Critical when surface water (Rio Grande) is not available.
  - No surface water in non-irrigation season (winter)
  - Supplements a finite supply of fresh groundwater wells
- In summer, KBH provides peaking capacity to support surface water plants

Phasing Plan for Expansion

Phase 0

- 0 -5 year *Return to Original Capacity*
- Existing Wells → declining quality and quantity
  - TDS increase requires feed pressure beyond current capacity
  - Rehab wells, interstage boosters, replace membranes
  - Hydraulic study of collector network
- Return Production to 27.5 mgd

Phase 1

- 3-7 year *Interim Minor Expansion*
- 6+ new supply wells

- 3 (up to 5) mgd in one new skid in "spare" area at KBH
  - Utilities in place
- Use EWM and/OR 1 new injection well for concentrate disposal
- 30-32 mgd to distribution

Phase 2

- 7-10+ year *Major Expansion*
- 20+ new wells

- 12+ MGD in 3-4 skids in new process building
  - (new utility infrastructure
- 1-2 new injection wells (+EWM)
- 42+ mgd supply to distribution

Phase 0- Immediate Improvements

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Bring facility back to full design capacity of 27.5 mgd

Rehab/Replace Wells

- Wells are not currently providing 18mgd RO Feed
- Hydraulic evaluation of well collector network

Improve RO Performance

- As well water quality declines, TMP has increased
- Replace Membranes: now ~8 years old, some permanent loss in permeability
- Add interstage booster pumps: RO feed pumps running at full speed
- $10 M capital (preliminary estimate)

Phase 1- Near-Term Improvements

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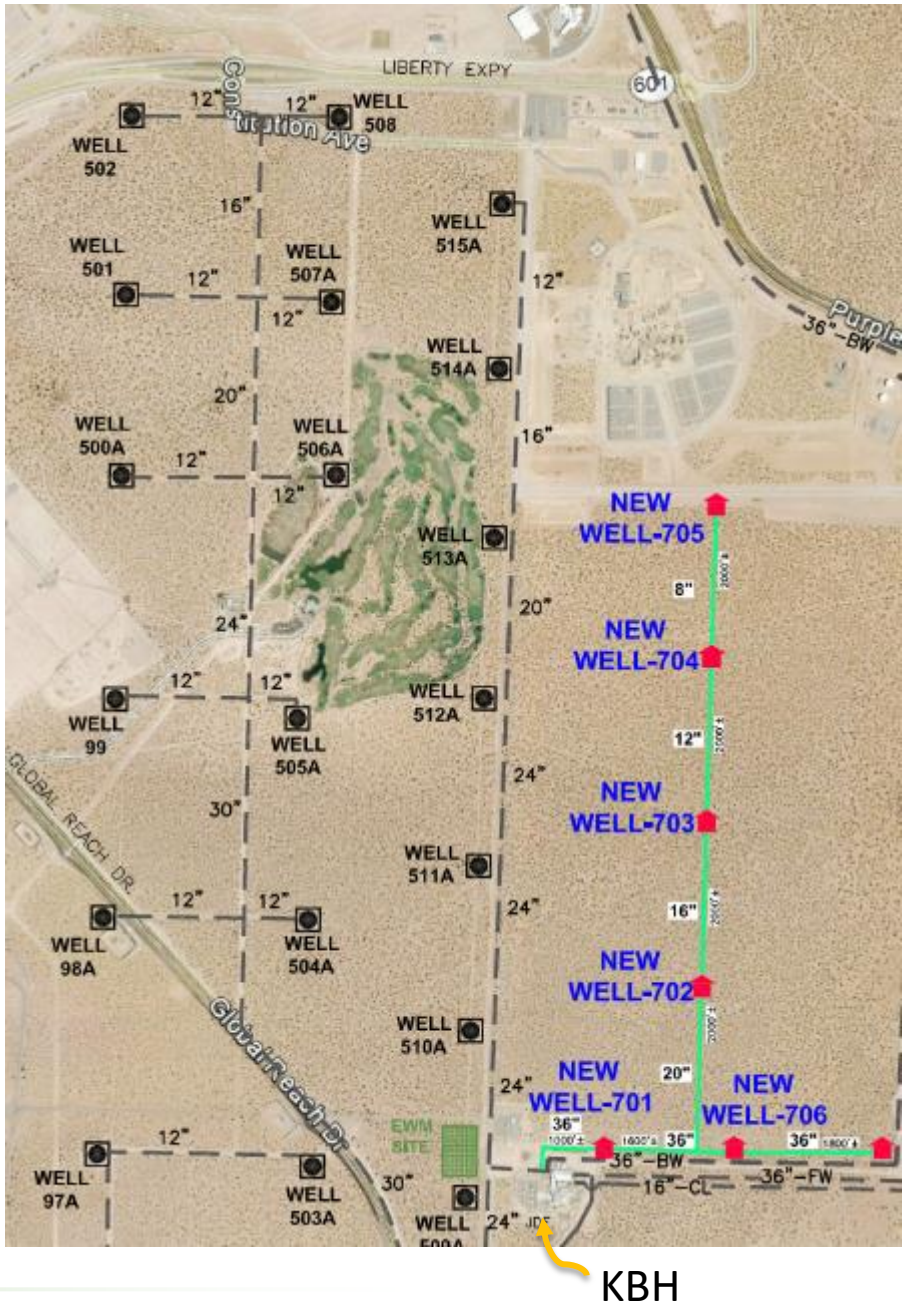
- Add 6th skid in existing building (3 mgd)
- ~7 new wells and collector pipeline (minimum 3.6 mgd supply)
- Manage increase in concentrate with brine minimization (EWM partnership)
  - Well injection currently limited by pipeline capacity and permit restrictions
- 609-616 parallel pipeline
- $20 M capital (preliminary estimate)

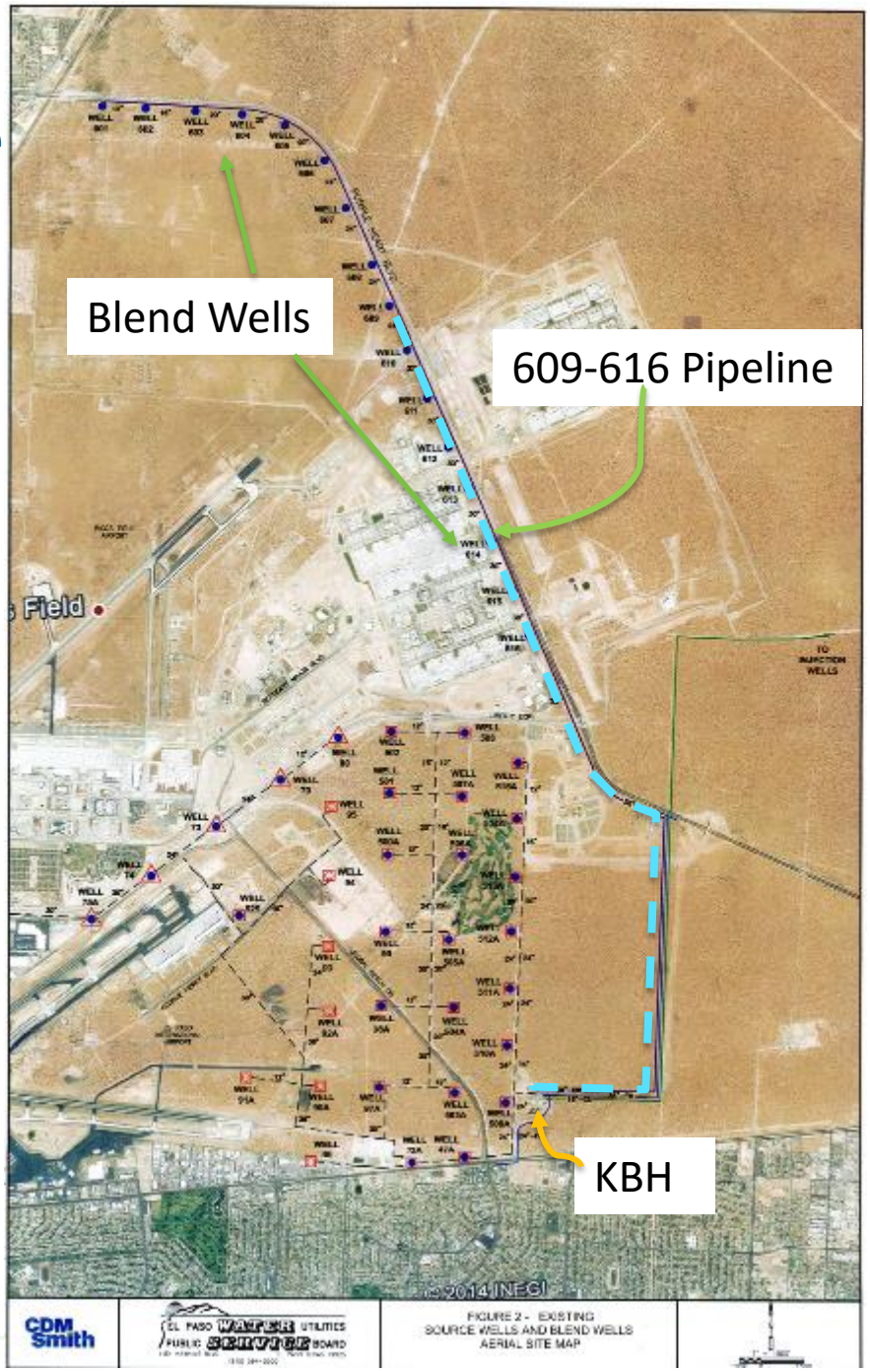
Phase 1- Wellfield Addition

- 7 new wells in short-term
- 500-700 gpm each
- New 2-mile collector pipeline to KBH
- “700 series” wellfield
- Wells located on Ft Bliss, subject to “royalty fee” ($/af TBD)
- Water quality expected: 2000-4000 mg/L TDS



Phase 1- Blend Wells Pipeline

- Add parallel pipeline from well 609 to KBH
- Connect to wells 609-616
- Isolates poor quality “brackish” blend wells for potential treatment through RO
- “Freshwater” blend wells preserved for blending with permeate
- Generally, blending to target 250 mg/L Cl and TDS goals (700 mg/L) are met



Phase 2- Long-Term Improvements

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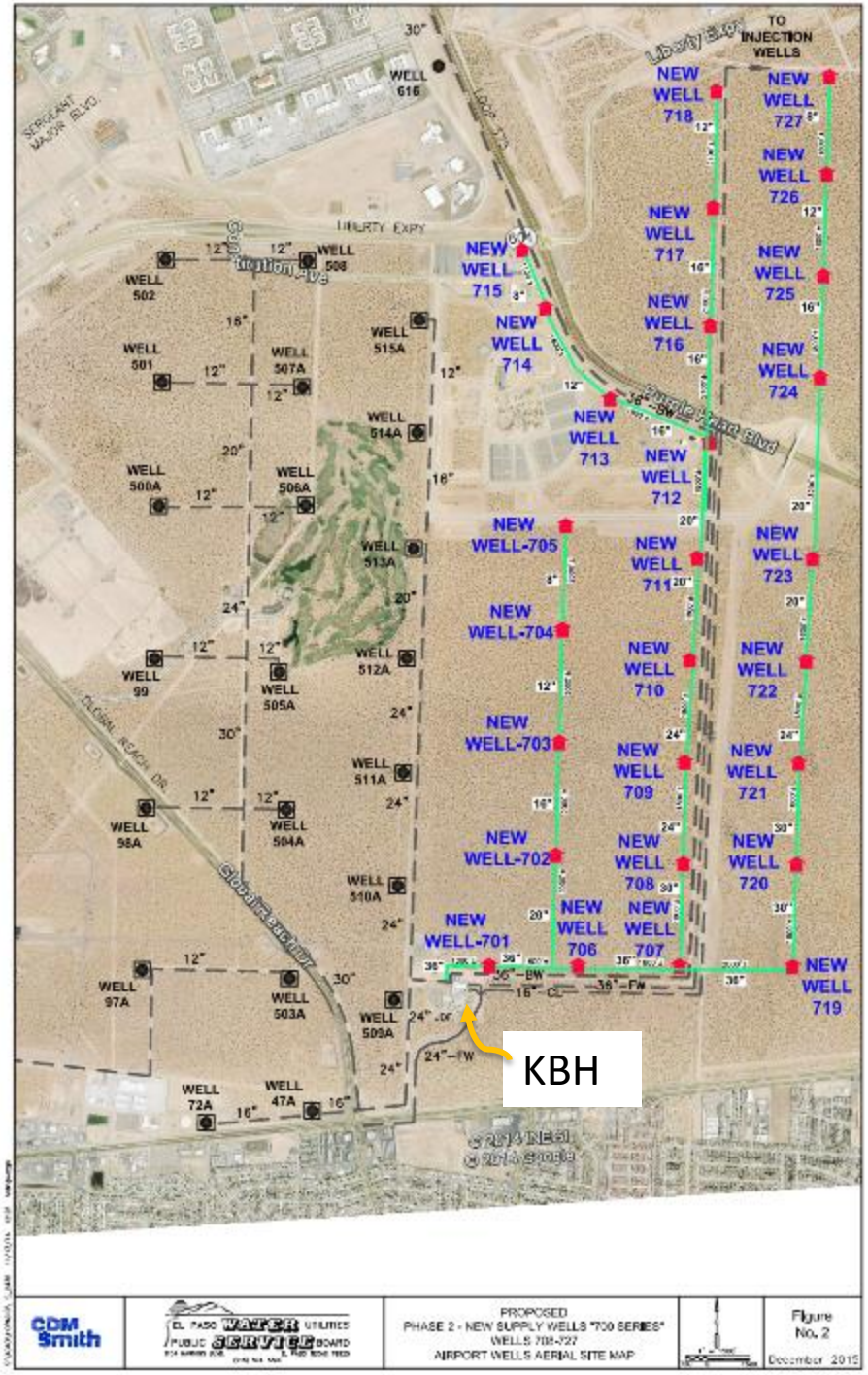
- Increase permeate production capacity by 12 mgd to a total of 30 mgd
  - New treatment building
  - Additional finished water pumping capacity
- 20+ new wells
  - Each well only ~500 gpm
- Concentrate Management:
  - Install parallel (20”) concentrate pipeline to injection wells
  - Add 1-2 new concentrate disposal wells
  - Improvements to concentrate pump station
- $90 M capital (preliminary estimate)

Phase 2- Wellfield Addition

- “700 Series” wellfield at full buildout
- 20 new wells, in addition to Phase 1
- 500-700 gpm each
- Total Supply: 20 mgd
- Additional 4 miles of collector pipeline



Ultimate Buildout

- Net finished water production: 42 mgd on peak day
- Will run at max capacity only seasonally and as “emergency” supply
- Continued blending of 12 mgd with 30 mgd permeate, due to degrading water quality
- $120 M capital investment (preliminary)

Questions?

Thank You!

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