

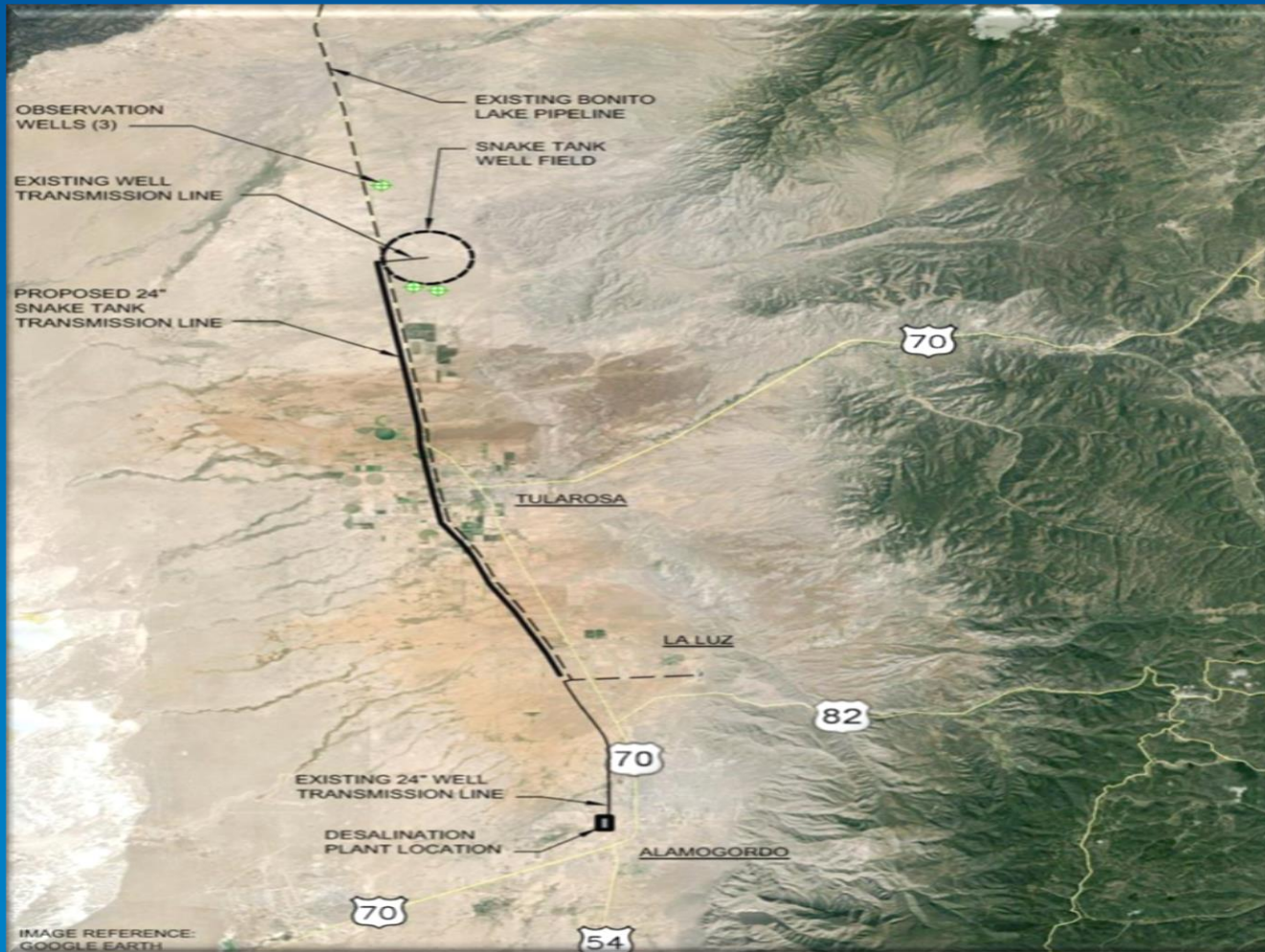
Alamogordo Regional Water Supply Project



Robert Fowlie, PE, BCEE

February 28, 2019

Alamogordo Regional Water Supply Project

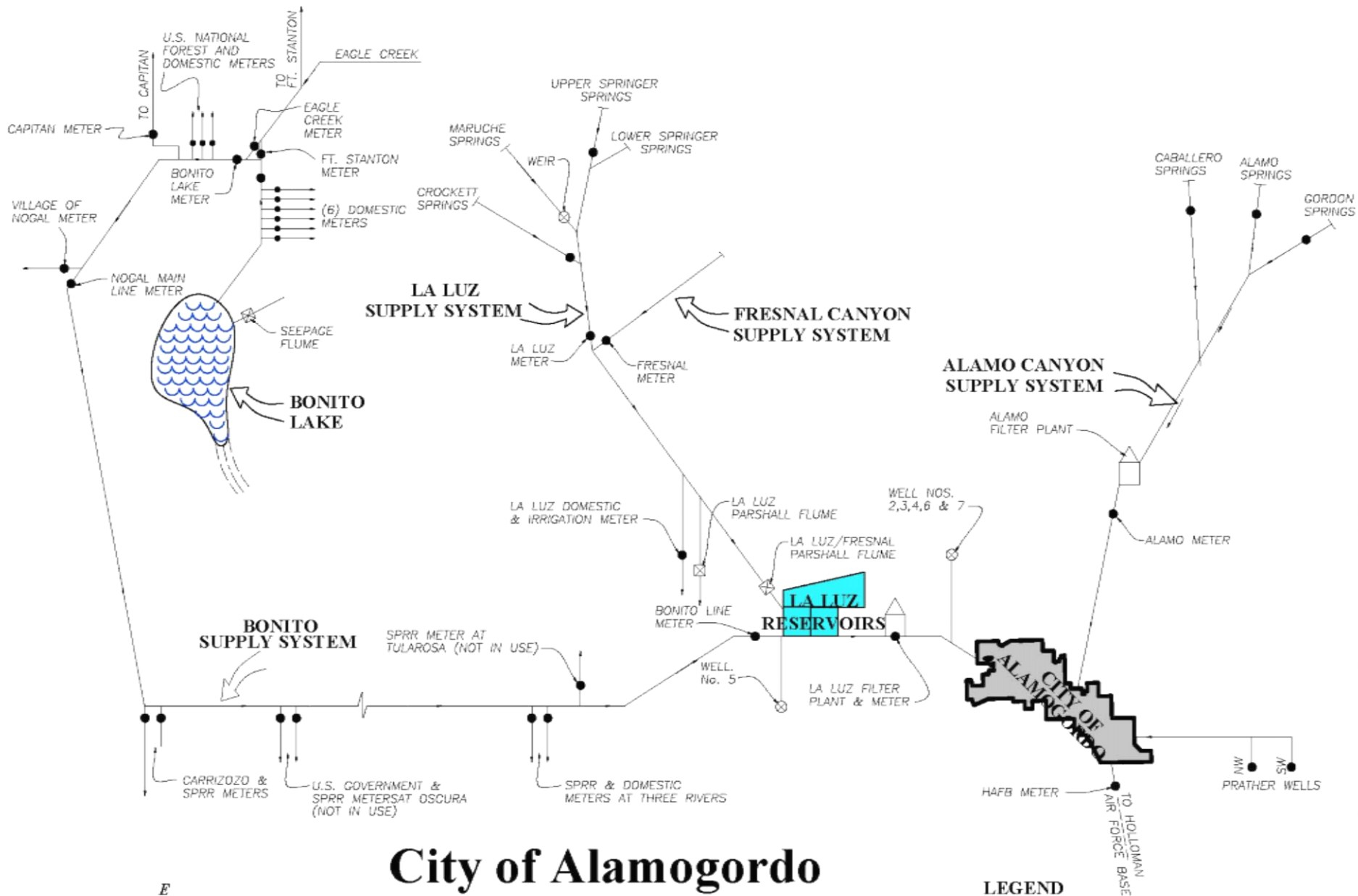


Existing Water Sources – Surface Water

- City has 5400 AFY of surface water rights.
- Approximately 70 percent of the City's water supply is provided by surface water sources.
- Surface water comes from the Sacramento Mountains east of the City and from Bonito Lake 90 miles northeast of the City.
- Bonito Lake supplies approximately 25 percent of City's water supply.
- Bonito Lake supply lost in 2012 due to Little Bear Fire.

Existing Water Sources – Ground Water

- City uses ground water to supplement surface water supply.
- 3900 AFY of ground water rights.
- Ground water supplied by 9 wells.
- Groundwater high in TDS (1500-1800 mg/L) – blended with surface water.
- Groundwater supply affected by drought (water levels dropping, production reduced).



City of Alamogordo Water Collection System



No Scale

LEGEND

- — Water Line & Meter as Noted
- ⊠ — Water Line & Parshall Flume or Weir as noted
- ⊗ — City Well as Noted
- — Domestic Meter as Noted

Bonito Lake



Need for Project –Water Supply

- **Need for future water supply** based on concept of “Firm Water Supply.”
- **Firm Water Supply** – “the reliable withdrawal rate of acceptable quality water that can be supplied by available flows and/or storage releases from reservoirs and/or groundwater reserves throughout a critical drought period”(AWWA M50).
- **Method uses past data** to estimate what can be expected in the future .
- **Same methodology** used to estimate firm supply of groundwater.

Need for Project – Demand and Supply Requirements

Projected Water Demand and Water Supply Requirements 2015 to 2050

Year	Total Demand (AFY)	Ground Water Supply ² (AFY)	Surface Water Supply (AFY)	Additional ARSWP Supply Required (AFY)	Additional ARSWP Supply Required (MGD)
2015	7,185	3,909	2,254 ³	1,022	0.91
2020	7,626	3,909	2,254 ³	1,463	1.3
2025	8,095	3,909	2,525 ⁴	1,661	1.5
2030	8,594	3,909	2,525	2160	1.9
2035	9,122	3,909	2,525	2,688	2.4
2040	9,685	3,909	2,525	3,251	2.9
2045	10,279	3,909	2,525	3,845	3.4
2050	10,914	3,909	2,525	4,480	4.0

1- Reference: Draft 40-Year Water Plan, Livingston Associates and John Shomaker and Associates 2014

2- Existing ground water sources

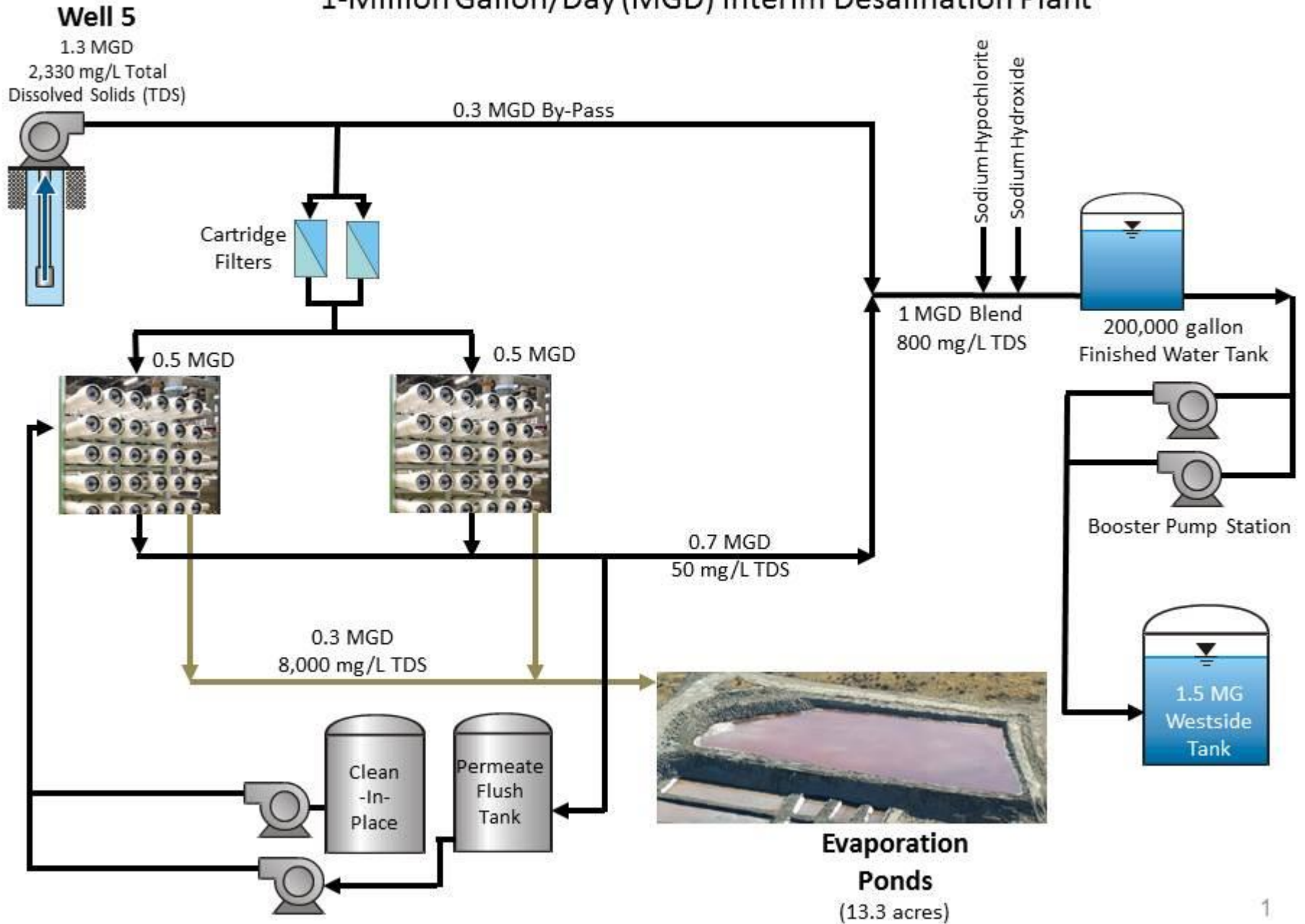
3- Assumes Bonito Lake is out of service until 2020

4- Assumes Bonito Lake is in service

Water Quality

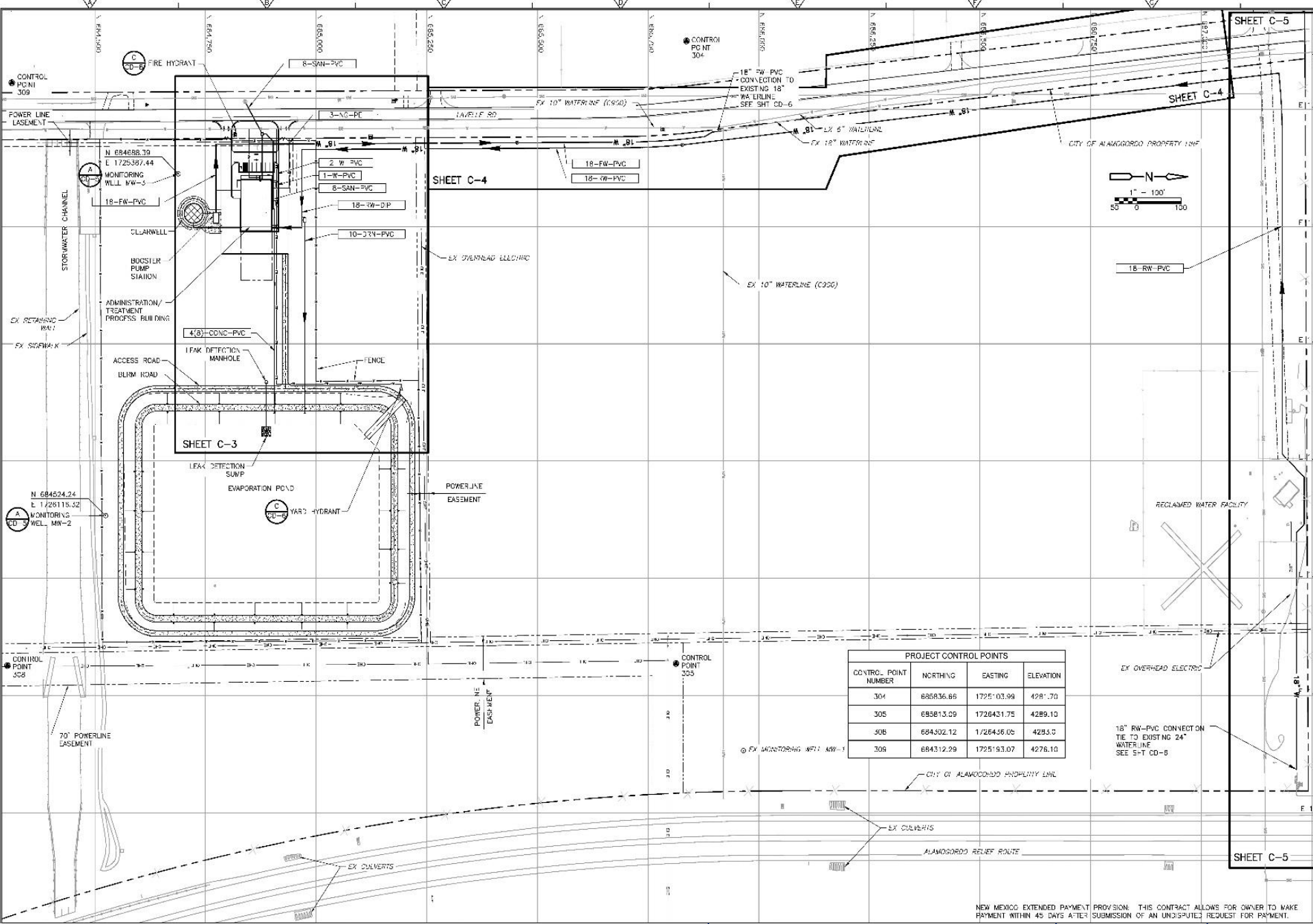
	Well No. 4	Well No. 5	Well No. 8
Calcium	390	410	440
Magnesium	66	98	99
Potassium	5.9	4.3	3.9
Sodium	320	85	88
Flouride	0.59	0.69	0.59
Chloride	68	170	160
Phosphorus	<0.50	<0.50	<0.50
Sulfate	1600	1400	1300
Nitrogen, Nitrate	<0.50	<0.50	0.33
Nitrogen, Ammonia	<0.50	<0.50	<0.50
Alkalinity, Total	64	120	140
Carbonate	<2.0	<2.0	<2.0
Bicarbonate	64	120	140
Hardness	1300	1400	1500
pH	7.56	7.43	7.74
Specific Conductance	3200	2800	2900
TDS	2700	2400	2400
Turbidity	2.1	<0.50	0.67
Metals			
Aluminum	<0.020	<0.020	<0.020
Arsenic	<0.001	<0.001	<0.001
Barium	0.02	<0.020	<0.020
Cadmium	<0.0020	<0.0020	<0.0020
Chromium	<0.0060	<0.0060	<0.0060
Copper	0.019	<0.0060	0.012
Iron	0.63	0.14	0.27
Lead	0.01	<0.0050	0.014
Manganese	0.44	0.021	0.029
Mercury	<0.00020	<0.00020	<0.00020
Molybdenum	0.048	<0.0080	<0.0080
Nickel	<0.010	<0.010	<0.010
Selenium	0.002	0.003	0.003
Silica	23	31	30
Silver	<0.0050	<0.0050	<0.0050
Strontium	<0.001	7.15	7.4
Zinc	<0.050	<0.050	0.34

City of Alamogordo 1-Million Gallon/Day (MGD) Interim Desalination Plant



Concentrate Disposal

- Concentrate disposal to sanitary sewer and 5.6 acre evaporation pond.
- Plant operator controls how much goes to pond and sanitary sewer (60-65% goes to sanitary sewer).
- Pond is double lined (2-60 mil HDPE liners separated by geonet).
- Future expansions in production capacity will require injection well for concentrate disposal.



PROJECT CONTROL POINTS			
CONTROL POINT NUMBER	NORTHING	EASTING	ELEVATION
304	685836.86	1725103.99	4281.70
305	695813.09	1726421.75	4289.10
306	684502.12	1726456.05	4285.0
308	684312.29	1725193.07	4276.10

NEW MEXICO EXTENDED PAYMENT PROVISION: THIS CONTRACT ALLOWS FOR OWNER TO MAKE PAYMENT WITHIN 45 DAYS AFTER SUBMISSION OF AN UNDISPUTED REQUEST FOR PAYMENT.

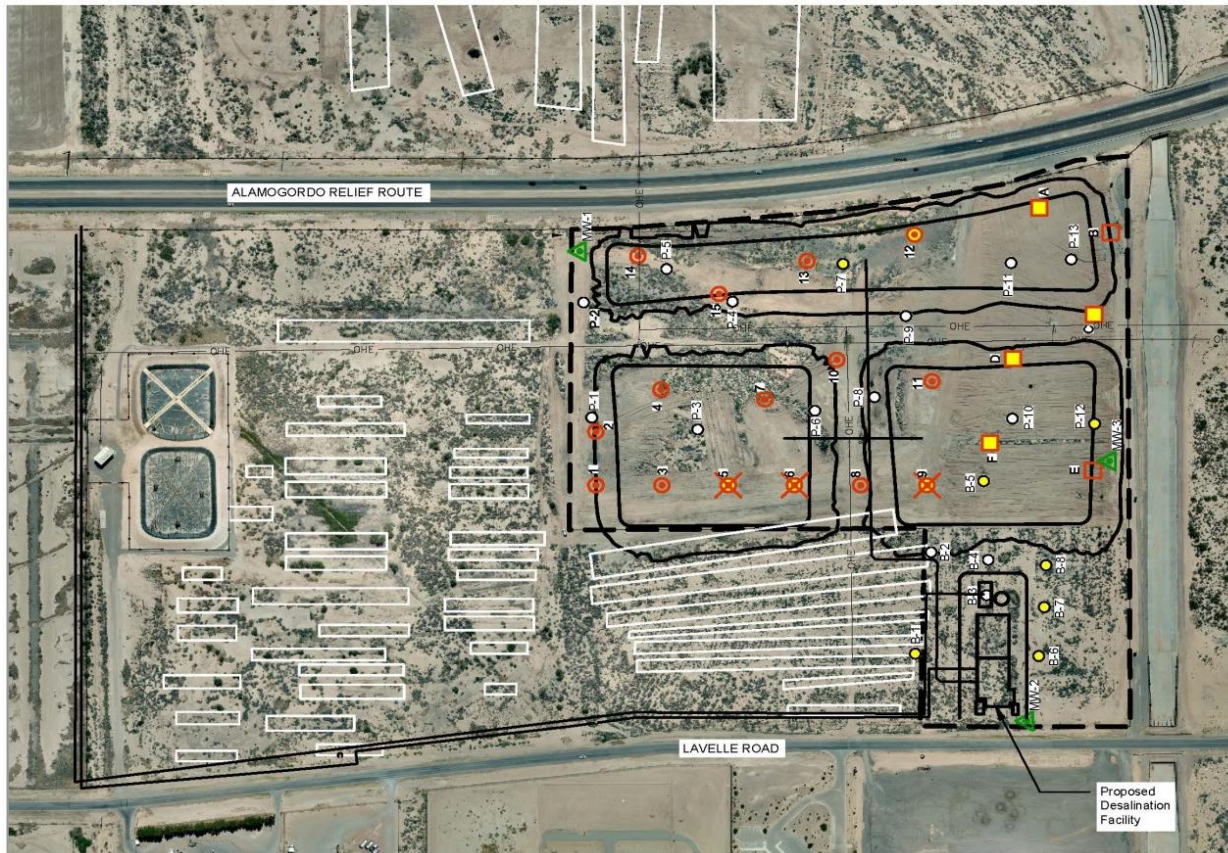
Overall Site Plan
















Solid Waste Challenges

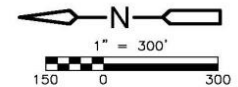
- Plant site is located adjacent to former Alamogordo Landfill.
- City conducted Focused Environmental Investigation during preliminary design.
- Landfill gas was not detected.

Plant Site in Relation to Alamogordo Landfill



LEGEND

-  SITE OF DESALINATION PLANT AND FACILITIES
-  INTERPRETED TRENCH OUTLINE
-  1 TEMPORARY LFG WELLS
-  12 TEMPORARY LFG WELLS WITH SOLID WASTE PRESENT
-  ABANDONED LFG BORING
-  B-8 SOIL BORINGS
-  B-4 SOIL BORINGS WITH SOLID WASTE PRESENT
-  C TEST PITS
-  D TEST PITS WITH SOLID WASTE PRESENT
-  MW-1 PROPOSED MONITORING WELL LOCATION
-  PROPOSED FACILITY
-  PROPOSED PIPELINE
-  OHE EXISTING OVERHEAD ELECTRIC LINES

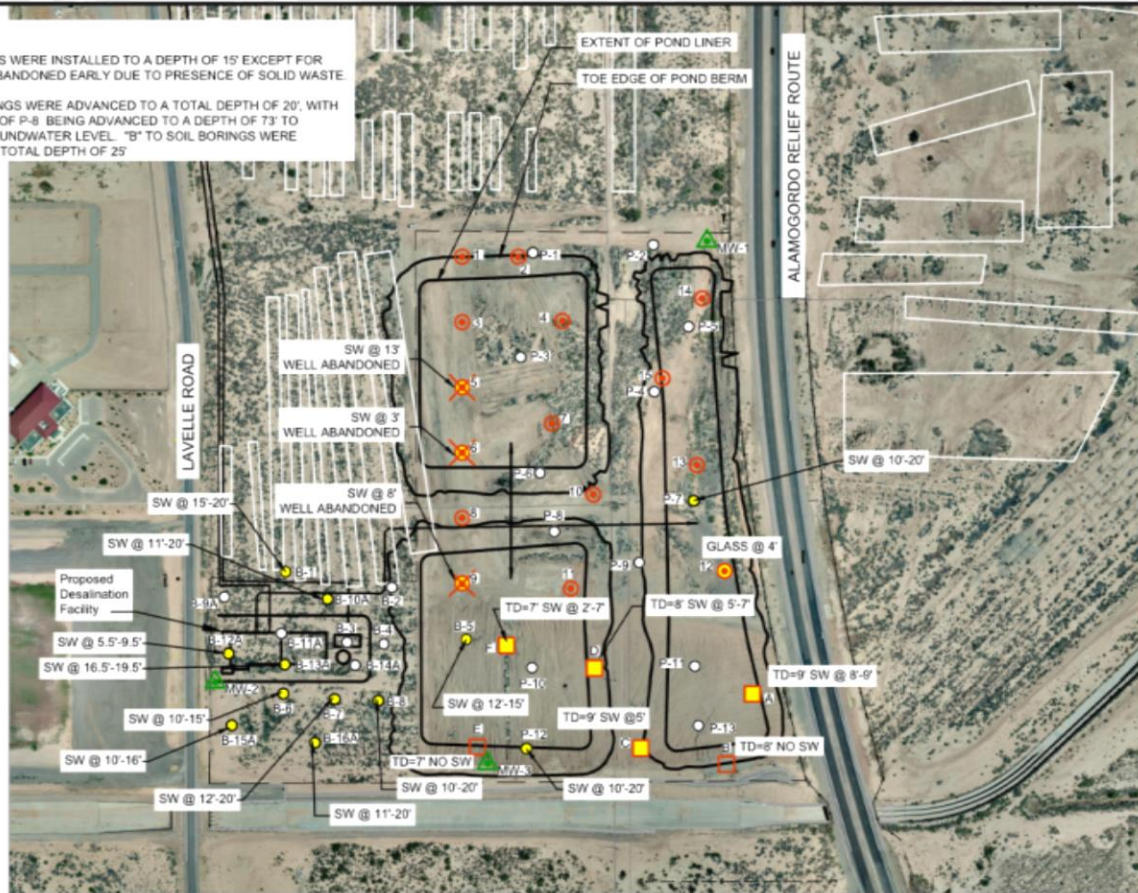


REFERENCE: EXTENT OF TRENCH OUTLINES FROM "GEOPHYSICAL INVESTIGATION AT THE ALAMOGORDO LANDFILL, ALAMOGORDO NEW MEXICO," SUNBELT GEOPHYSICS, JULY 2003
















Focused Environmental Site Investigation

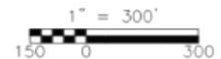
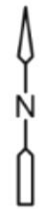
NOTES

1. ALL LFG WELLS WERE INSTALLED TO A DEPTH OF 15' EXCEPT FOR THOSE THREE ABANDONED EARLY DUE TO PRESENCE OF SOLID WASTE
2. "P" SOIL BORINGS WERE ADVANCED TO A TOTAL DEPTH OF 20', WITH THE EXCEPTION OF P-8 BEING ADVANCED TO A DEPTH OF 73' TO DETERMINE GROUNDWATER LEVEL. "B" TO SOIL BORINGS WERE ADVANCED TO A TOTAL DEPTH OF 25'



LEGEND

-  SITE OF DESALINATION PLANT AND FACILITIES
-  INTERPRETED TRENCH OUTLINE (1)
-  1 TEMPORARY LFG WELLS
-  12 TEMPORARY LFG WELLS WITH SOLID WASTE PRESENT
-  ABANDONED LFG BORING
-  B-8 SOIL BORINGS
-  B-4 SOIL BORINGS WITH SOLID WASTE PRESENT
-  C TEST PITS
-  D TEST PITS WITH SOLID WASTE PRESENT
-  MW-1 PROPOSED MONITORING WELL LOCATION
-  PROPOSED FACILITY
-  PROPOSED PIPELINE
-  EXISTING OVERHEAD ELECTRIC LINES
-  TD TOTAL DEPTH
-  SW@9 SOLID WASTE ENCOUNTERED AT APPROXIMATE DEPTH BELOW GROUND SURFACE



REFERENCE: EXTENT OF TRENCH OUTLINES FROM "GEOPHYSICAL INVESTIGATION AT THE ALAMOGORDO LANDFILL, ALAMOGORDO NEW MEXICO," SUNBELT GEOPHYSICS, JULY 2003

Regulatory Requirements – Solid Waste Bureau

- Solid Waste Bureau wanted all solid waste removed; not cost effective.
- Developed “engineered solution” acceptable to NMED.
 - Settlement Analysis of pond liner.
 - Landfill gas venting system under liner.
 - Landfill gas venting system under treatment plant.
 - Deep foundation system.
 - LFG monitors inside treatment plant building.

Project Status

- Project has been under construction since May 2017.
- Construction cost - \$8.8 million.
- Project Scheduled for Completion Spring 2019.

Solid Waste Removal



Solid Waste Removal - After



Evaporation Pond



Evaporation Pond



Treatment Plant Building



Desalination Plant under Construction



Treatment Plant Building



Desalination Plant Treatment Building



Desalination Plant Piping



Questions

