Update on Stabilization of the Brine Well in Carlsbad

CARLSBAD BRINE WELL REMEDIATION AUTHORITY

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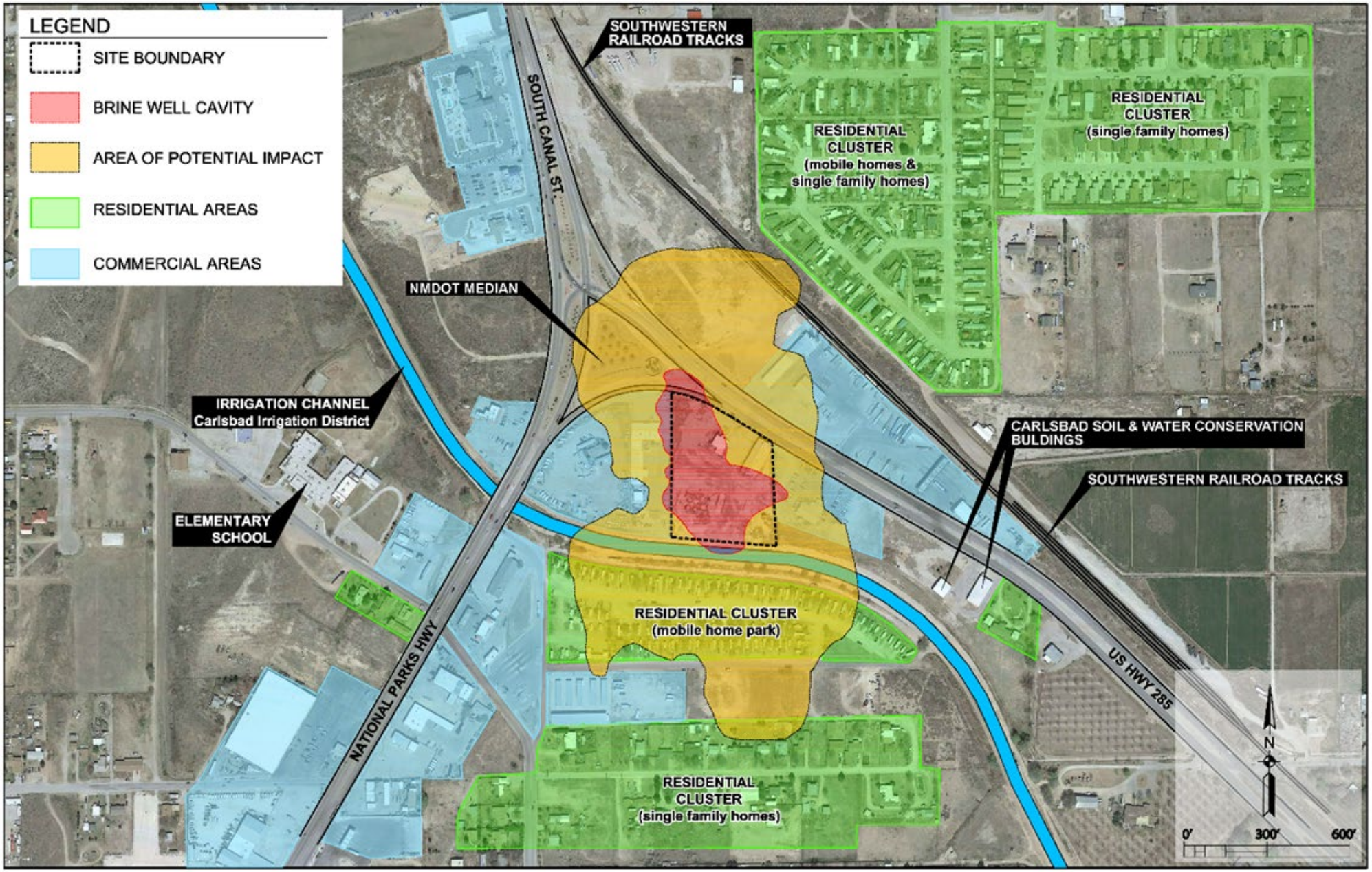
NEW MEXICO emnrd Energy, Minerals and Natural Resources Department

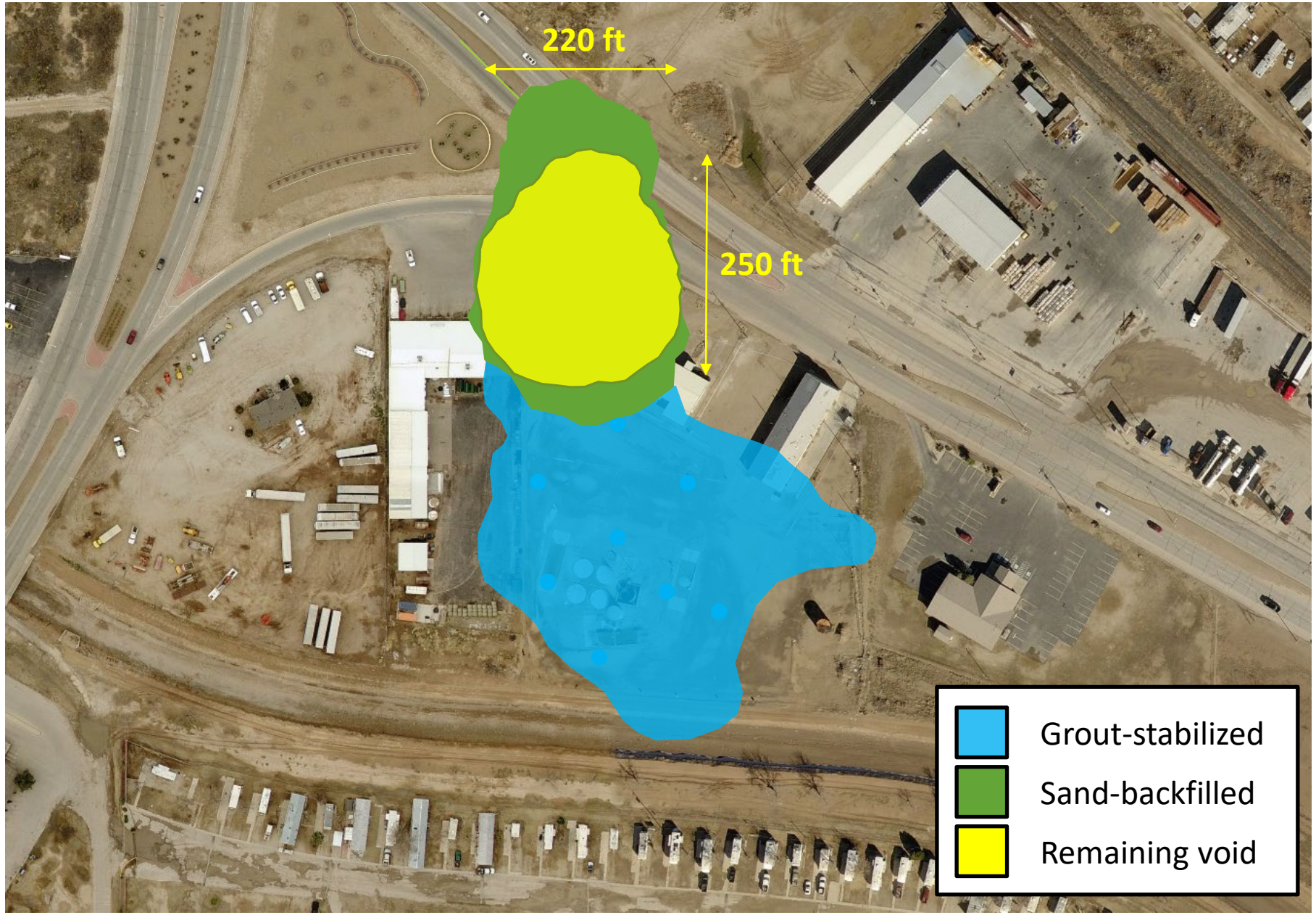

LEGEND
SITE BOUNDARY
BRINE WELL CAVITY
AREA OF POTENTIAL IMPACT
RESIDENTIAL AREAS
COMMERCIAL AREAS
SOUTHWESTERN RAILROAD TRACKS
SOUTH CANAL ST.
RESIDENTIAL CLUSTER (mobile homes & single family homes)
RESIDENTIAL CLUSTER (single family homes)
NMDOT MEDIAN
IRRIGATION CHANNEL Carlsbad Irrigation District
CARLSBAD SOIL & WATER CONSERVATION BULDINGS
SOUTHWESTERN RAILROAD TRACKS
ELEMENTARY SCHOOL
RESIDENTIAL CLUSTER (mobile home park)
NATIONAL PARKS HWY
US HWY 285
RESIDENTIAL CLUSTER (single family homes)
N
0'
300'
600'

History of Work at the Site

- Drilling and grouting operations began in September of 2019.
- The southern portions of the cavern have been successfully stabilized such that the Carlsbad Irrigation District canal, the trailer park south of the canal, and the Jehovah's Witness Church to the east are no longer threatened by significant subsidence.
- In December of 2019, a very large void was discovered in the northern portion of the cavern that is the result of significant roof failures occurring over the past 20+ years.
- It was determined that the backfilling material should be changed to sand which provides equal stability at a lower unit cost.
  - Injection of grout into a large open void is cost-ineffective.

History of Work at the Site

- Operations transitioned to sand deployment in January of 2020 and work schedules were modified in response to the COVID-19 pandemic.
- By July of last year, 100,563 cubic yards of sand had been injected.
- A significant fraction of sand infiltrated into cracks within a rubble pile residing at the bottom of the void and nearly 60,000 cubic yards of void remain to be filled.
- Sand injection was paused at the end of July 2020 as it was projected the available funding would be insufficient to complete the project.


220 ft
250 ft
Grout-stabilized
Sand-backfilled
Remaining void

Additional Sand Needed to Complete Stabilization

Remaining void volume as measured by sonar	59,900 yds^3
Accuracy of the sonar survey (*+9%)*	+ 5,400 yds^3
Air gap at the top of the void	+ 2,400 yds^3
Future infiltration into the rubble (*50% of unaccounted volume)*	+ 13,500 yds^3
Sand settlement	+ 1,800 yds^3
Contingency (*20%)*	+ 16,600 yds^3
Void which cannot be cost-effectively filled	- 23,100 yds^3
Estimate of sand needed	**76,500 yds^3**

Moving Forward

- The contractor was directed to develop a cost estimate for injecting 76,500 cubic yards of sand at a rate of 800 cubic yards per day.
- The estimate, including 2 years of post-backfill monitoring and a 10% contingency, was just under $25,000,000 including NMGRT.
- Several items in the estimate were identified for exclusion including the post-backfill monitoring and contingency providing a cost reduction of nearly $3,600,000.
- A balance of $4,000,000 remains within the Brine Well Remediation Fund from prior contributions.

Moving Forward

- $18,000,000 in additional funding was directed to the project:
  - $5,000,000 appropriated during the 2021 legislative session
  - $10,000,000 additional funding committed by NMDOT
  - The City of Carlsbad and Eddy County have agreed to provide an additional $3,000,000, $1,500,000 each.
- The BLM will be providing sand free of any materials charge, project is still responsible for transportation costs. We continue to explore the possibility of transporting the displaced brine to a company in the area for use rather than pay for disposal.
- Goal is to resume sand injection in August of this year and complete the project in the Spring of 2022.

Questions?