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MEMORANDUM

DATE: November 13, 2024

TO: Marcos Cazares
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FROM: Jeffrey C. Hodsdon, P.E. - LSC Transportation Consultants, Inc.

SUBJECT: Old Ranch Road Storage
Traffic Technical Memorandum – Access Sight Distance
LSC #S244330



LSC has prepared this traffic technical memorandum for the proposed mini-storage development proposed for the site located generally northeast of the intersection of Old Ranch Road/Rhinestone Drive in Colorado Springs, CO. The purpose of this memo is to present an evaluation of the access intersection "speed lines of sight" for the proposed access point/driveway location. The proposed access driveway would form a new east leg of the Rhinestone Drive/Kettle Ridge Drive intersection, converting it from a T-intersection to a four-leg intersection in order to provide access to the site.

ACCESS INTERSECTION SIGHT DISTANCE EVALUATION

The proposed site-access point must meet City Traffic Criteria Manual standards for "speed lines of sight, which represent the **"intersection/entering sight distance"** in each direction upstream along the major road. The analysis also includes supplemental analysis of **"stopping sight distance along the major road for vehicles approaching the access intersection."**

Entering Sight Distance ("Speed Lines of Sight")

City Requirement

With an assumed 25-mile-per-hour (mph) (citywide default speed limit - unposted in the vicinity of the site), the minimum required entering/intersection sight distances for both approaches at the proposed site-access location is 280 feet (per the City **Traffic Criteria Manual**).

Field Measurements and LSC Evaluation

There is a vertical crest of a hill approximately 50 feet north of the intersection of Old Ranch Road/Rhinestone Drive. Additionally, a utility cabinet is located on the southeast side of the Rhinestone Drive/site-access intersection that would partially obstruct the “speed line of sight” to northbound vehicles for the westbound approach (motorists exiting the site). Please refer to Figures 1-4 for the analysis/evaluation.

The following field measurements of the available lines of sight to the south were recorded during LSC’s site visit and are depicted in Figure 2:

- Line of sight is not obstructed between zero and 243' from the access, nor is it obstructed between 311 feet and 330 feet.
- Line of sight to an approaching northbound vehicle is obstructed by the utility cabinet between points 243 feet and 311 feet from the access.
- 330 feet – measured from a drivers’ eye location at a point where the utility cabinet does not obstruct line of sight to the south to the center of the northbound lane of Rhinestone Drive (note: this location is closer to the edge of the street than the standard measurement location of 13 feet back from the edge of the street)
- Line of sight past 380 feet is limited by the crest vertical curve on Rhinestone just north of Old Ranch Road.

STOPPING SIGHT DISTANCE ALONG THE MAJOR ROAD APPROACHES

Given the identified limitations to the speed lines of sight, this memo also includes the following supplemental analysis of “**stopping sight distance along the major road for vehicles approaching the access intersection.**” This has been added to demonstrate that, if necessary, northbound motorists will have sufficient stopping sight distance to slow and stop (if necessary) to avoid colliding with a vehicle entering the intersection. Please refer to Figures 1-4.

The northbound approach on Rhinestone Drive approaching the proposed site access has a 4.2-percent downgrade, while the southbound approach has a 4.2-percent upgrade slope. Per AASHTO Table 3.2, the minimum required “stopping sight distance along the major road for vehicles approaching the access intersection” with a design speed of 25 mph is as follows:

- Arriving from the south, looking north – 165 feet (adjusted for 3-6 percent downgrade)
- Arriving from the north, looking south – 143 feet (adjusted for 3-6 percent upgrade)

Stopping-sight-distance field measurements for both the northbound and southbound approaches to the proposed site-access location on Rhinestone Drive meet these distance requirements.

FINDINGS AND RECOMMENDATIONS

Given that most traffic exiting the site will turn left into the southbound travel lane, rather than to the north, the speed line-of-sight requirement is likely conservative. Only infrequently, will northbound “through” vehicles potentially need to alter their “free-flow” speed due to traffic turning to the north (into the travel lane, in the same direction). Moreover, Rhinestone south of Looking Glass Way is a relatively short section of “collector-type” roadway. North of Looking Glass Way, the street is a local residential street.

Sight distance looking to the south from the proposed site access is limited by vegetation (overgrown weeds) along the edge of the roadway on the east side of Rhinestone Drive. Removing this vegetation would likely result in entering sight distance being acceptable at the site access. Per the *Traffic Criteria Manual*, the speed lines of sight will need to be kept clear of landscaping, weeds, and other potential obstructions to sight distance.

Regarding the existing utility cabinet on the east side of Rhinestone Drive south of the proposed access, given the site-specific conditions and this analysis, LSC recommends that the applicant **not** be required to relocate the existing utility cabinet. However, LSC recommends with routine replacement/upgrade, etc. by CSU in the future, that the cabinet be installed farther back from the street such that the speed line of sight is not restricted.

Given that most traffic exiting the site will turn left into the southbound travel lane, rather than to the north, the speed line of sight requirement is likely conservative. Only infrequently, will northbound “through” vehicles potentially need to alter their “free-flow” speed due to traffic turning to the north (into the travel lane, in the same direction). Speed lines of sight also apply for motorists making a “crossing maneuver,” which also applies to left turns entering the southbound travel lane. However, the necessary sight distance is practically lower for these movements (based on detailed AASHTO criteria). Also, Rhinestone south of Looking Glass Way is a relatively short section of “collector-type” roadway. North of Looking Glass Way, the street is a local residential street.

Stopping-sight-distance field measurements for both the northbound and southbound approaches to the proposed site-access location on Rhinestone Drive meet these distance requirements.

* * * * *

Figures 1-4



1" = 50'
scale

- 280' = required speed line of sight for 25 mph
- 165' = required stopping sight distance* for 25 mph with 4.2% downgrade

Notes: Required speed line of sight values assume the grade for the access driveway is 3% or less

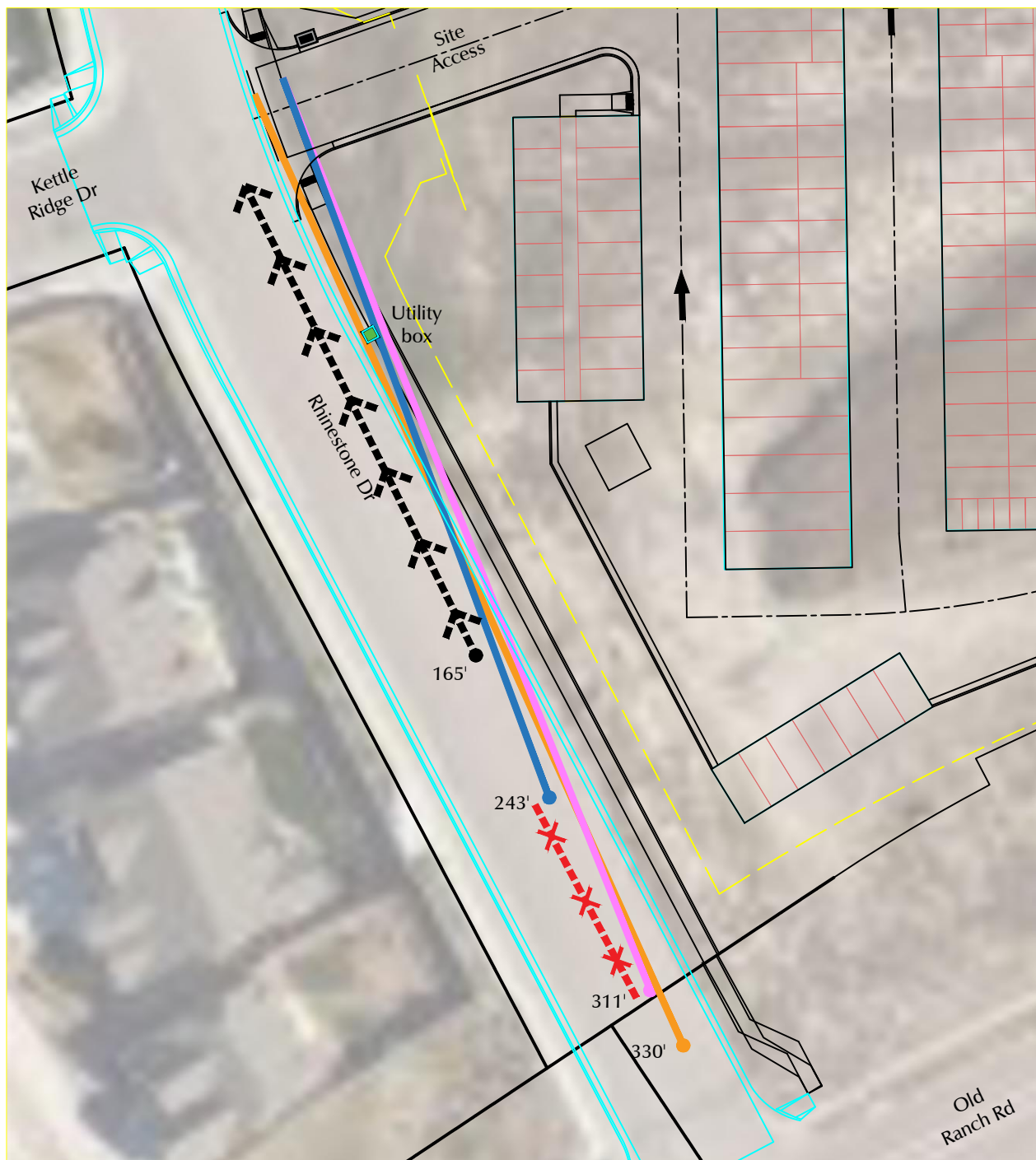
* Stopping sight distance along the major road for vehicles approaching the access



Figure 1

Sight Distance Analysis Requirements South of Site Access

Old Ranch Road Storage (LSC# S244330)



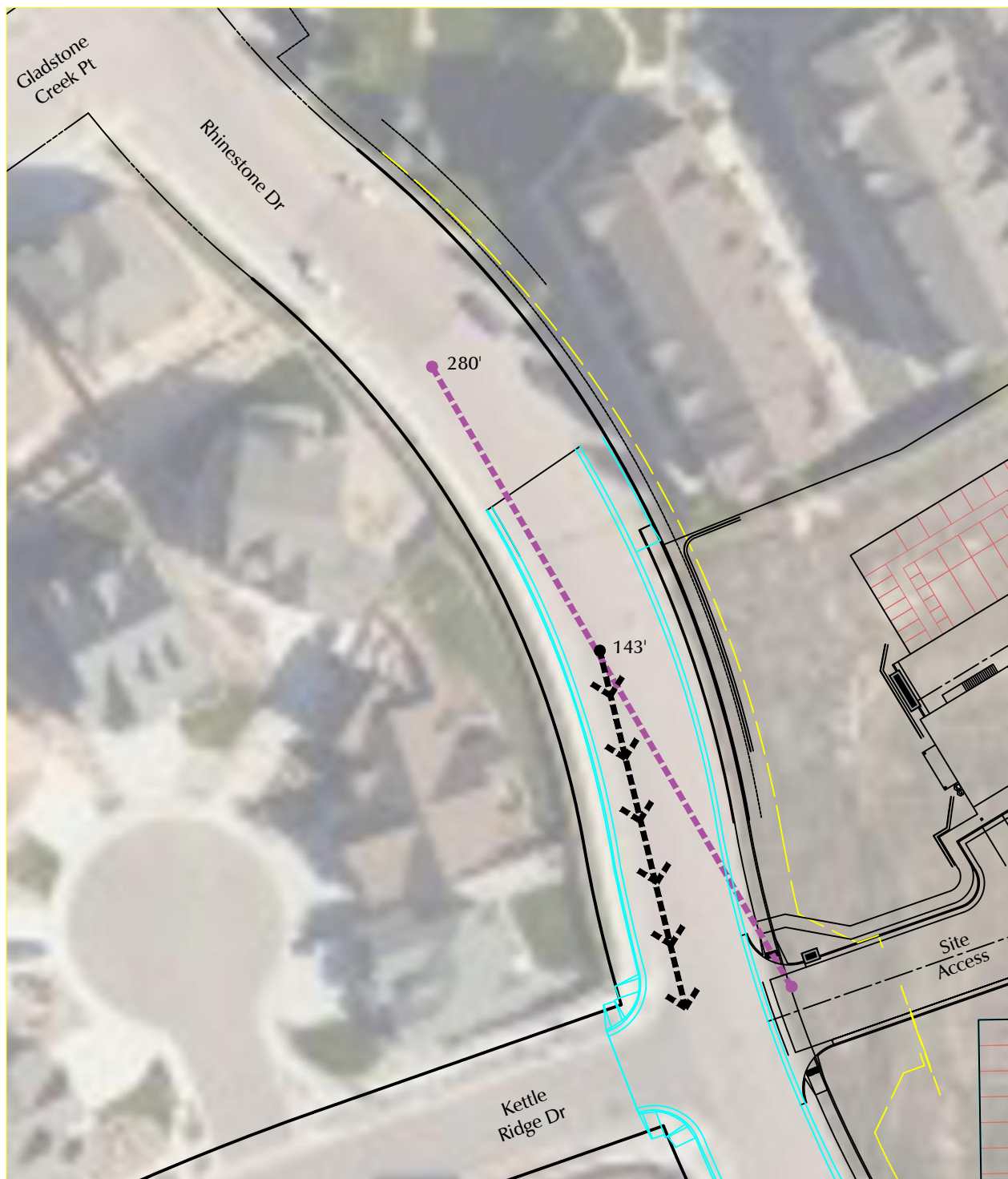
1" = 50'
scale

- 311' = field-estimated (available) speed line of sight to the northbound approaching vehicle looking past the left side of the utility box (to the east side/parcel side of the obstruction)*assuming the exiting motorist "driver's eye" at the prescribed distance back from the major roadway exiting driver stops and does not avoid being obstructed by utility box
- 243' = field-estimated (available) speed line of sight to the northbound approaching vehicle looking to the right side of the utility cabinet (to the west side/street side of the cabinet)* if driver's eye is blocked by east side of utility box (from City Standard "driver's eye" location")
- * Utility box obstructs speed line of sight to northbound approaching vehicles within this segment of Rhinstone Drive between the points 243' and 311' from the site access. Line of sight is not obstructed between 0' and 243', nor is it obstructed between 311' and 330'. Line of sight past 330' is limited by the crest vertical curve on Rhinstone Drive just north of Old Ranch Road.
- 330' = field-estimated (available) speed line of sight if driver pulls forward close to the edge of street, as shown, in order to see upstream around the west side (road side) of the utility box

Figure 2

Available Speed Lines of Sight South of Site Access

Old Ranch Road Storage (LSC# S244330)



- 280' = required speed line of sight for 25 mph
- 143' = required stopping sight distance for 25 mph with 4.2% upgrade (per AASHTO Table 3-2)

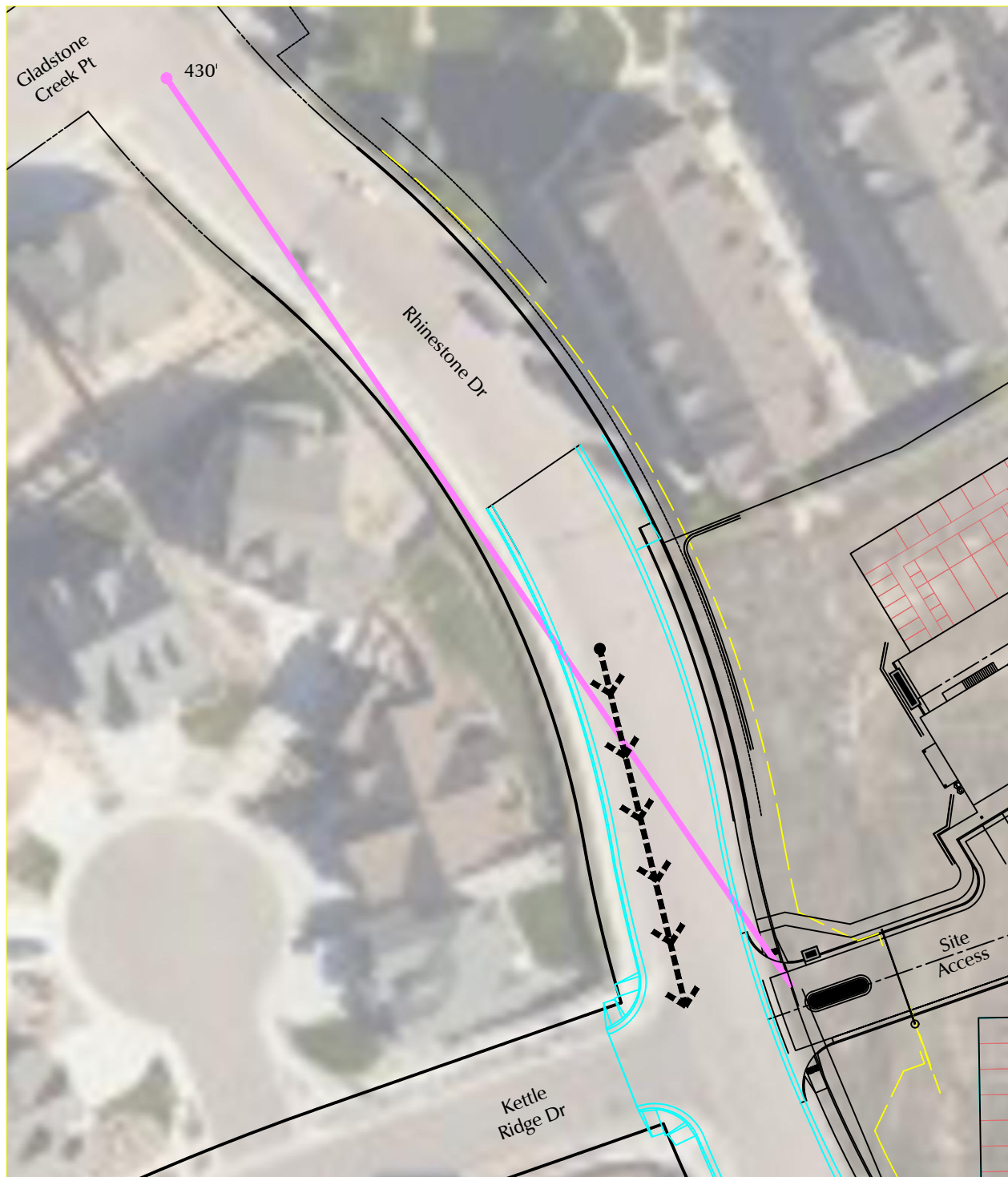
Note: required speed line of sight values assume the grade for the access driveway is 3% or less



Figure 3

Sight Distance Analysis Requirements North of Site Access

Old Ranch Road Storage (LSC# S244330)



1" = 60'
scale

— 430' = field-estimated (available) speed line of sight
 --- 143' = available stopping sight distance exceeds the required 143'

Figure 4
 Available Speed Line of Sight
 North of Site Access

Old Ranch Road Storage (LSC# S244330)