More Sites for the LWA
Sevilleta, Pie Town, Horse Springs and parts West

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ABSTRACT

In this memo we describe a visit to potential sites for the LWA. We employ the same criteria for evaluating the sites established by Taylor et al. 2006 (LWA memo 62) including the distance to power, roads and fiber, flatness of the terrain, soil composition, available terrain shielding, and indications of locally generated Radio Frequency Interference (RFI). Coordinates and photographs are provided for each site. Finally, we summarize the sites that are most suitable for further study.

1. Introduction

On July 27, 2007 we visited 8 potential sites for LWA stations, including one potential location for the LWA core. These sites were selected from the array configuration study of Cohen (2006; LWA memo No. 55), with attention to the development plan for the LWA outlined in Taylor (2006; LWA memo No. 56). Figure 1 shows the locations of the sites visited marked in yellow on a map of the Plains of San Agustin and surrounding area.

Note that we tried, but failed to find an adequate sites near Datil and Green's Gap. There is very little state land, and none of it flat at Datil. Greens Gap was also a dud site with too much structure and trees on the land.

On July 18, 2007 we visited the Sevilleta Wildlife Refuge. Two sites are reported on, the leach field, and a site on the mesa to the west.

The group consisted of Greg Taylor and John Dickel from UNM, Pat Crane and Aaron Cohen from NRL, and Willie Lucero from the New Mexico State Land Office (SLO). All sites described herein are on State Land. The LWA has a contract allowing right of entry onto State Land. At this point we do not exclude the possibility of using Federal lands, or even private land, but since UNM is a State University, we have found it convenient to begin investigating potential sites on State Land. We also note that there is a considerable amount of State Land on the Plains of San Agustin, where many of the early LWA stations will be located.

For each site we provide GPS coordinates, photographs, and descriptions of the site including the approximate distance to roads, power, and fiber. We also discuss the local flatness, ground cover, terrain shielding, and any likely sources of RFI. We then make an assessment of the suitability of the site for further study. Additional photographs, and 360 degree panoramic videos are available upon request.

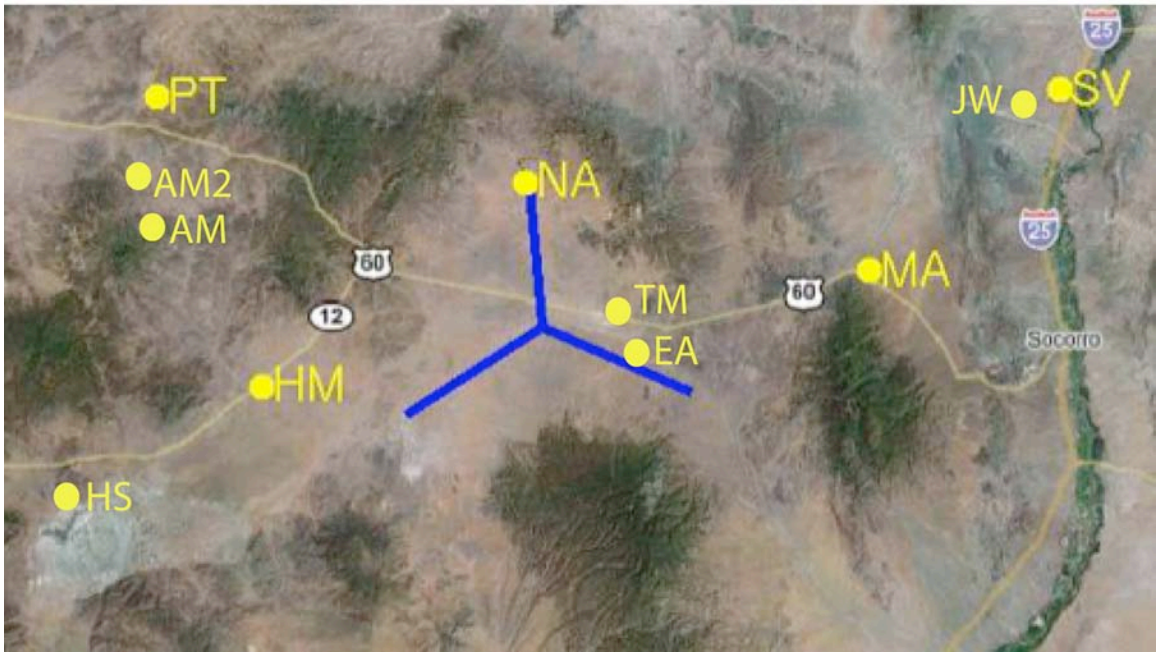

Figure 1: Locations of the 10 sites visited (marked in yellow) July 18 and 27, as well as the NA and MA sites (not visited these trips). The VLA arms are marked in blue.

2. Site Descriptions

Provided below, 1 per page.

(1) EA: East Arm, backup core location, near E56
Latitude: 34 01.538; Longitude: -107 28.769

Distance to power: < 3 miles (not counting VLA antenna)
Distance to road: < 0.25 miles
Distance to fiber: < 0.25 miles (assuming access at pad E56)
Directions: turnoff south on hwy 60 near mile marker 100.
Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Good – hills to the north and east, Sandia Peak not visible
Obvious RFI sources: 1 house about 5 miles distant

Fig. 2. View from site (1) looking to the west down the east arm of the VLA.

Other Notes: Access is excellent along a well graded road. There is an abundance of state land, most of it much like this site, enough for the core though in patches instead of continuous as it is for the NA site.

Conclusion: Excellent site, should be followed up with RFI survey work depending on configuration needs.

(2) TM: Tres Montosas, off Hwy 60 after Tres Montosas campground

Latitude: 34 04.905; Longitude: -107 29.596

Distance to power: < 1 mile to the north on hwy 60
Distance to road: <0.25 miles
Distance to fiber: <0.25 miles

Directions: On South side of Hwy 60 after Tres Montosas campground.
Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass with a few small trees
Terrain Shielding: Fair.
Obvious RFI sources: 1 house about 2 miles distant, Hwy 60 <0.25 mile distant.

Fig. 3. Looking north from TM site.

Conclusion: Fair site, may need to put in a road to get away from Hwy 60. Not easy for RFI testing. No further evaluation recommended unless configuration studies demand it.

(3) QU: Quarry off Hwy 60 east of VLA turnoff

Latitude: 34 05.427; Longitude: -107 31.521

Distance to power: < 0.5 mile to the south running perpendicular to 60
Distance to road: < 0.1 miles on quarry access road
Distance to fiber: < 0.3 miles on Hwy 60

Directions: Exit Hwy 60 on quarry road (note access from gate to the west, if there is a lock on the road to the quarry).
Terrain: flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Fair.
Obvious RFI sources: Chances of Sporadic activity at the quarry (e.g., trucks, walky-talkies).

Fig. 4: Looking north toward the quarry.

Conclusion: Risky site, do not conduct RFI surveys as yet.

(4) HM: Horse Mountain, off Hwy 12 past old windmill

Latitude: 34 00.491; Longitude: -108 00.303

Distance to power: 2 miles west on Route 12
Distance to road: <0.1 miles
Distance to fiber: <0.1 miles

Terrain: gentle slopes
Soil Composition: Dirt
Ground Cover: Grass,
Terrain Shielding: Good
Obvious RFI sources: Ranch House 3 miles distant. Very empty and even FM reception poor.

Fig. 5. Looking east from HM site.

Other Notes: Might be ok to do RFI testing on the side of the road, or look for access through a gate.

Conclusion: Excellent site, close to fiber. RFI studies needed.

(5) HS: Horse Springs

Latitude: 33 53.235; Longitude: -108 19.090

Distance to power: < 0.5 miles
Distance to road: < 0.1 miles
Distance to fiber: 1.8 miles on Hwy 12

Directions: 1.8 miles to the east off Hwy 12 just past Old Horse Springs
Terrain: Sloped (about 5 degrees) with some small depressions
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: hills to the south, somewhat exposed but in empty country.
Obvious RFI sources: ranch house 0.5 miles distant.

Fig. 6. Looking north from the center of HS site.

Other Notes: Easy access along a well graded road that comes off of Hwy 12.

Conclusion: Good site. Worth conducting an RFI survey as configuration demands.

(6) AM: off the road to Pie Town from New Horse Springs or GreensGap Road

Latitude: 34 10.229; Longitude: -108 07.459

Distance to power: 2 miles over some fairly rocky ground
Distance to road: <0.1 miles
Distance to fiber: <0.1 miles

Terrain: Flat (but note possible drainage issues)
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Great – ringed by hills, far from anything
Obvious RFI sources: none

Fig. 7. Looking south from site AM.

Other Notes: Beautiful valley, but could have drainage issues. Little tight but a station would fit.

Conclusion: Good site. Might be the best site for low RFI that we have seen.

(7) AM2: Off Hwy xxx a few miles south of Pie Town

Latitude: 34 12.407; Longitude: -108 08.368

Distance to power: <0.5 miles
Distance to road: <0.1 miles
Distance to fiber: <0.1 miles

Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass and a few small shrubs
Terrain Shielding:
Obvious RFI sources: ranch house 0.25 miles away

Fig. 8. Looking at John Dickel on site AM2.

Conclusion: Good site, possibly easier than AM or PT.

(8) PT: Off Hwy 603 a couple miles north of Pie Town

Latitude: 34 20.993; Longitude: -108 09.018

Distance to power: <0.25 miles
Distance to road: <0.1 miles
Distance to fiber: ~3 miles

Directions: North of Pie Town on 603, stay left at fork in the road.
Terrain: Slight slope
Soil Composition: Dirt
Ground Cover: Grass and a few small shrubs
Terrain Shielding: some shielding to the north.
Obvious RFI sources: ranch houses (2) about 0.5 miles away

Fig. 9. Looking north at Hwy 603 from PT site.

Conclusion: Fairly long run to fiber. There was no flat state land easily accessed from the VLBA_PT antenna.

(9) SV: Off Interstate 25

Latitude: 34 21.518; Longitude: -106 54.054

Distance to power: <0.1 miles
Distance to road: <0.1 miles
Distance to fiber: <0.1 miles (but connection back to VLA unknown)

Terrain: Flat
Soil Composition: Dirt and other
Ground Cover: Grass
Terrain Shielding: None, line of sight to Sandia and M mountain
Obvious RFI sources: I25 < 0.25 miles, ~50 people working around SV headquarters.

Fig. 10. Looking across the leach field at the currently empty new building at SV.

Other Information: Met with Renee Robichaud (FWS) and talked to Don Natvig (UNM). There is encouragement for us to have an SV site and to take space in the new building. Infrastructure would make development easy, question will be if the RFI is tolerable.

Conclusion: Preliminary RFI data taken. Wait for analysis of data before proceeding. Also need to understand fiber issues – how do we get data back to VLA?
(10) JW: Off Jack Well road at Sevilletta.

Latitude: 34 20.951; Longitude: -106 54.036

Distance to power: <0.5 miles
Distance to road: <0.1 miles
Distance to fiber: ~8 miles (and connection back to VLA unknown)

Directions: exit I25 at Bernardo, Take Popotosa rd west, then turn onto Jack Well Rd.
Permit required to get gate combination.
Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: None, line of sight to Sandia and M mountain
Obvious RFI sources: I25 ~ 4 miles, ~50 people working around SV headquarters.

Fig. 11. Looking north from the mesa off Jack Well road.

Other Information: There is a high voltage line and AT&T fiber running about 0.5 miles away. Could we get access to fiber there? Or do we set up a an IR laser link to buildings below. Also, we may be required to bury the shelter.
Conclusion: Wait for analysis of SV data before proceeding. Also need to understand fiber issues – how do we get data back to VLA

3. Summary

For the core location the NA site still looks the best, but it is good to have a backup core location and for this the EA site and surroundings look promising and should be followed up with RFI surveys. Other good locations worth testing for RFI are the SV and HM sites. Preliminary results suggest that RFI at SV is higher, whether it is too high still remains to be evaluated. HM testing should proceed since preliminary configuration studies indicate that HM would be a good early LWA station if we combine LWA1+ with the VLA.