A First Look at Sites for the LWA

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ABSTRACT

In this memo we describe the first visit to potential sites for the LWA. We establish a set of criteria for evaluating the sites 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 November 9, 2006 we visited 7 potential sites for LWA stations, including two potential locations 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 red on a map of the Plains of San Agustin and surrounding area.

The group consisted of Greg Taylor and John Dickel from UNM, Pat Crane from NRL, Frazer Owen from NRAO, 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.

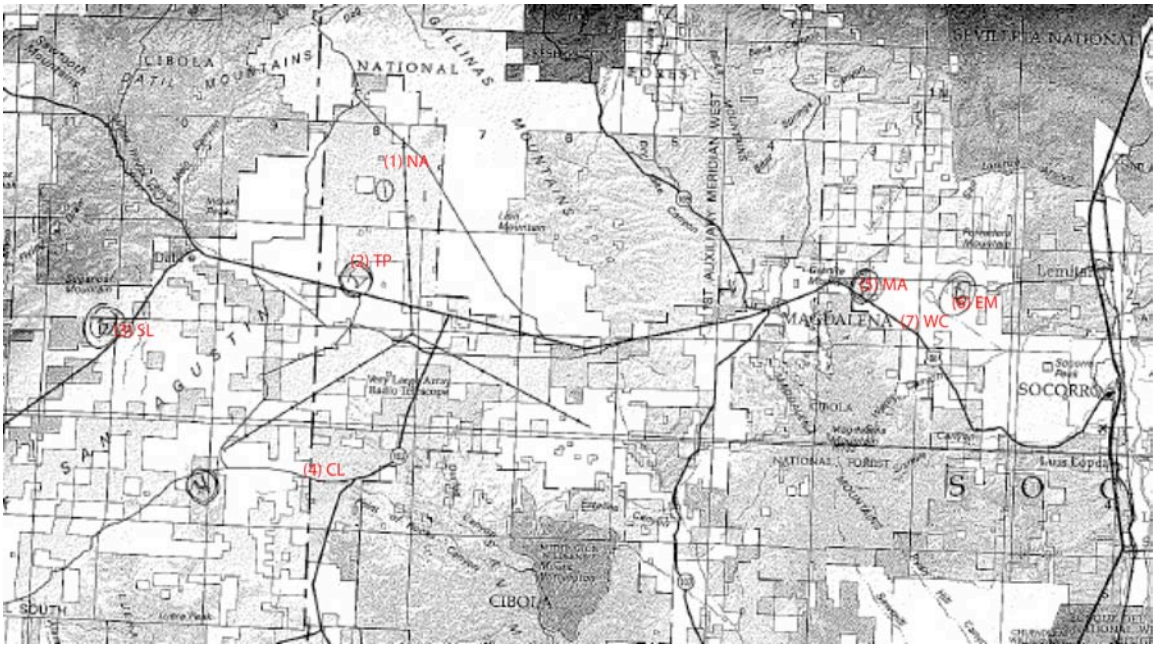

Figure 1: Locations of the 7 sites visited (marked in red). Numbers indicate the sequence except for (6) and (7) which have been interchanged to match with the planned sequence (shown as circled numbers).

2. Site Descriptions

Provied below, 1 per page.

(1) NA: North Arm, potential core location
Latitude: 34 14.919; Longitude: -107 38.421

Distance to power: < 0.25 miles
Distance to road: < 0.25 miles
Distance to fiber: < 0.25 miles

Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Excellent – hills to the north and east, Sandia Peak not visible
Obvious RFI sources: 1 house about 0.5 miles distant

Fig. 2. View from site (1) looking to the north-east.

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. There is some concern that the existing power line near this site might not be able to support the entire core, but the full core would span some 10 km, and likely come close to other power lines. There are a few low areas that could be subject to flooding, but for the most part these are on private land and not on the State Land parcels.

Conclusion: Excellent site, should be followed up with RFI survey work.

(2) TP: Twin Peaks, off Hwy 60 near the entrance to the HH ranch.

Latitude: 34 07.612; Longitude: -107 40.280

Distance to power: 1 mile
Distance to road: <0.25 miles
Distance to fiber: 1 mile

Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Fair.
Obvious RFI sources: 1 house about 1 miles distant, Hwy 60 1 mile distant.

Fig. 3. Looking east from site (2).

Other Notes: Very easy access to site. Do not need to cross Hwy 60 to get to fiber (its on this side).

Conclusion: Excellent site, should be followed up with RFI survey work.

(3) SL: Sugar Loaf, off Hwy 12 south of Datil

Latitude: 34 05.517; Longitude: -107 53.949

Distance to power: 0.25 mile
Distance to road: 0.25 miles
Distance to fiber: 0.25 mile

Terrain: rolling hills, locally flat in places
Soil Composition: Dirt
Ground Cover: Grass, with a few trees
Terrain Shielding: Fair.
Obvious RFI sources: About 6 miles from Datil, Hwy 12 0.25 miles.


Fig. 4: Looking west back toward Hwy 12.

Other Notes: The rancher who leases this property, Dick Wellborn, informed us that the area we were looking at floods regularly. There are two arroyos that drain the property separated by a bit less than 100m. He also told us of a subdivision going in nearby. Some flat areas might be found here, but may not be on State Land, and may have to be cleared of trees.

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

(4) CL: on County Line south of West Arm, (way) off Hwy 52. Potential core location.
Latitude: 34 08.615; Longitude: -107 09.873

Distance to power: 6 miles
Distance to road: 0.25 miles if you call this a road
Distance to fiber: 6 mile

Terrain: rolling hills, locally flat in places
Soil Composition: Dirt
Ground Cover: Grass,
Terrain Shielding: Good
Obvious RFI sources: None. Very empty.


Fig. 5. Looking west from site (4).

Other Notes: We didn't make it to the intended site location at the end of the west arm. Access is very challenging after turning off Hwy 52 along many miles of ungraded one-track "county road" with deep ruts, wash outs, and gates (unlocked). We saw enough of the land to conclude that it would not make for a good core location. There is insufficient state land, rolling hills, and poor access to sites. Probably a location for a single site can be found. Willie thought that access from Hwy 60 along county roads would be similarly difficult. Should try to access it by going down the west arm of the VLA (which may require keys to pass through locked gates).

Conclusion: Difficult site, do not conduct RFI surveys as yet.
(5) MA: Magdalena site off Hwy 60 5 miles east of Magdalena

Latitude: 34 08.615; Longitude: -107 09.873

Distance to power: 0.5 mile
Distance to road: <0.25 miles
Distance to fiber: 0.5 mile

Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Not much. Line-of-sight to Sandia
Obvious RFI sources: 0.5 miles from Hwy 60. Sandia peak transmitters, M mountain transmitters. Only about 5 miles from Magdalena, with some shielding to that direction.

Fig. 6. Looking east toward the EMRTC site a few seconds after an explosion there.

Other Notes: A good site except for possible strong RFI. Easy access along a well graded road that comes off of Hwy 60. There are high tension power lines running along the base of the mountains in Fig 6, and its possible that more lines could go in.

Conclusion: Good site. Worth conducting an RFI survey.

(6) EM: off the road to the EMRTC explosives testing site
Latitude: 34 05.150; Longitude: -107 03.792

Distance to power: 1 mile
Distance to road: <0.25 miles
Distance to fiber: <0.25 mile

Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Some, Sandia not line of sight.
Obvious RFI sources: 1 mile from Hwy 60. Sandia peak transmitters, M mountain transmitters. High tension power lines ~ 2miles away. Detonations from EMRTC a few miles away?

Fig. 7. Looking north from site (6).

Other Notes: Easy access along well graded road. Only a few miles from high tension power lines, and even high voltage lines could go in in the future.

Conclusion: Good site. Worth conducting an RFI survey, also to find out about the impact of the high tension lines.

(7) WC: Water Canyon off Hwy 60

Latitude: 34 05.943; Longitude: -107 06.110

Distance to power: <0.25 mile
Distance to road: <0.25 miles
Distance to fiber: <0.25 mile

Terrain: Flat
Soil Composition: Dirt
Ground Cover: Grass
Terrain Shielding: Some. Sandia not line-of-sight
Obvious RFI sources: <0.25 miles from Hwy 60. Sandia peak transmitters, M mountain transmitters. A few miles from EMRTC. A few houses some miles distant.

Fig. 8. Looking East along the fence at the boundary of site (7).

Other Notes: A good site except for possible strong RFI, and close proximity to Hwy 60. Access requires climbing over a barb wire fence.

Conclusion: Decent site. Postpone RFI survey for now.

3. Summary

For the core location the NA site looks excellent so far and should be followed up with RFI surveys as soon as possible. Other good locations worth testing for RFI are the TP, EM, and MA sites.