Recent discussions of the possible need for a ground screen beneath the LWA antennas has led to questions about requirements for the ground screen itself. This memo does not address the question of whether a ground screen will be necessary to meet LWA specifications, but only the question of how closely spaced a wire grid has to be to approximate a solid, perfectly conducting ground screen.

Figure 1 shows a section of a square wire grid used as a model for a simple ground screen consisting of thin wires of diameter $d << D$, where $D$ is the center-to-center distance between the wires.
Figure 2 shows a finite-integral time-domain calculation of the reflectance and transmittance of the wire grid for a plane wave at normal incidence. For this simulation the wire material was assumed to be an excellent conductor such as Cu or Al. Even a relatively poor conductor such as stainless steel, which has a resistivity 40 times that of Cu, differs significantly only above microwave frequencies, and for HF/VHF frequencies looks identical on the scale of Figure 2. This grid reflects 50% of the incident energy when the wavelength is four times the wire spacing, increasing to 90% at $\lambda = 12D$.

A specific example for the LWA, a square grid of thin ($d = 3$ mm) wires 10 cm apart would reflect 98.7% of the incident radiation at 80 MHz, and greater than this at lower frequencies. This same ground screen, if constructed from stainless steel wires, would still reflect 98.5% of incident RF power. These calculations for thin wires at normal incidence are the worst case. For thicker wires, or for angles of incidence other than 0°, as would occur at points other than directly beneath an antenna, the reflectance is even higher.