

## Final Project Summary — PEER Lifelines Program

<b>Project Title—ID Number</b>	NGA: Site Condition Metadata from Geology—1L05		
<b>Start/End Dates</b>	4/1/03 – 6/30/04	<b>Budget/ Funding Source</b>	\$59,359 / PG&E/CEC
<b>Project Leader (boldface) and Other Team Members</b>	Wills (CDC-CGS)		

### 1. Project goals and objectives

Provide geology-based estimates of shear-wave velocity at all California strong-motion recording sites in the PEER-NGA database.

### 2. Benefits of the results of this project to develop technologies and protocols to mitigate the vulnerability of electric systems and other lifelines to damage directly and indirectly caused by earthquakes. Also, benefits to develop assessment techniques to evaluate damage to electric systems caused by earthquakes and to assess fiscal impacts due to the loss of electric service to the community.

The PEER Next Generation Attenuation Equation project and developers of attenuation codes need to consider site conditions in seismic hazard analysis. To accommodate this need, CGS is contributing to PEER's database of site conditions information for all strong motion stations that have recorded earthquake ground motion.

### 3. Brief description of the accomplishments of the project

To expand the database of strong ground motion data and metadata, CGS has added preliminary estimates of the average shear-wave velocity to 30 m each of approximately 1200 sites based on existing GIS data. These estimates have then been refined from the preliminary statewide site conditions map based on existing data from measured shear-wave velocity profiles and newly measured profiles, principally in areas where existing profile data is sparse or lacking. Based on the available site conditions information, CGS has estimated of the average shear wave velocity to 30 m for each site, including the basis for the estimate and uncertainty.

### 4. Describe any instances where you are aware that your results have been used in industry

Velocity estimates based on this technique are the basis of the "Preliminary site conditions map of California" which is used in estimating earthquake ground shaking for emergency response through "ShakeMap"s and is used in estimating future potential ground shaking used in setting earthquake insurance rates in California through the California Earthquake Authority.

### 5. Methodology employed

For this project CGS compares the locations of measurements of shear-wave velocity with geologic maps to develop correlations between Vs and geologic units. The summary statistics can then be applied to earthquake strong-motion recording stations on those or similar geologic units.

### 6. Other related work conducted within and/or outside PEER

This project is intended to provide background data to the PEER NGA project.

### 7. Recommendations for the future work: what do you think should be done next?

Future work should focus on providing velocity estimates for specific sites where the generalized approach does not provide a sufficiently accurate estimate, mainly sites where the geologic conditions change in the upper 30 m.

### 8. Author(s), Title, and Date for the final report for this project

Not complete at this time.