



18 March 2019

Maren Dougherty  
Executive Vice President  
Communications and Visual Experience  
Autry Museum of the American West  
4700 Western Heritage Way  
Los Angeles, CA 90027

**Re: Qualitative Structural Peer Review Comments  
Historic Southwest Museum Mount Washington Campus**

Dear Ms. Dougherty:

I met with you at the campus on January 29, 2019. Jesse Lattig and Chris Morris from the National Trust for Historic Preservation regional office joined us for a cursory walk-through of the main museum building, including the Caracol and Torrance Towers and main access tunnel. You provided me written copies of some recent reports for my review. During the walk, the three of you discussed some of the site history for my orientation and context. We did not view the Poole Wing or Braun Library. After the site visit, you sent me additional past reports for background. The reports were by Steve Dietrich 2017, Geotechnologies Inc. 2017, Gruen Associates 2013, Brenda Levin & Associates 2006, Goodwin Associates 1996, and John Martin Associates 1996. Assessment of current conditions (at the time of each report) and discussion of future re-use options and recommendations were common themes of the reports.

Overall, the existing structural systems of the buildings are in good condition for their ages. The site has been exposed to several significant earthquakes and after shock sequences that have damaged buildings throughout the Southern California region including, but not limited to: 1933 Long Beach, 1971 San Fernando, and 1994 Northridge. Past earthquake damage at this site has been limited and repairable. Occurrence of future earthquake shaking of an intensity that causes significant damage is only a probability. Future structural analysis at the site has to identify the annual probability of different levels of earthquake shaking and associated structural damage. If the annual probability of future earthquake shaking and damage is significant, and the predicted damage would threaten life safety and character-defining historic features, hazard reduction alternatives are identified and selected.

Organizations interested in revitalizing the sites and making greater use of current or new buildings will need to have highly experienced team members that can carry out additional geotechnical investigations as recommended by Geotechnologies Inc. In my opinion, a detailed investigation is required to quantify the site geology, regional seismicity, and parameters for the evaluation of existing structures or design of new structures related to foundations. The structural engineer will use the results of the detailed geotechnical report

to develop alternatives for earthquake hazard reduction for any new structures and continued use of any existing structures. Past performance of the site and site structures during earlier earthquakes is not necessarily indicative of future performance, but it does suggest to me that the existing structural systems and site still have a useful service life for many years to come. Opinions of construction cost at this stage would be premature. Those opinions would need to be developed for specific alternatives, based upon structural quantities developed from working drawings, substantiated by structural computations.

Due to hillside configuration and potential complexities of sub-surface geology, I would expect new foundation work at the site to be more complex than conventional foundation construction of spread footings and slab on grade. Past reports discuss new buildings, modifications to existing buildings and parking lots, road widening, and underpinning existing footings as possible scenarios. For example, one possible method of supplementing the Caracol foundation capacity for future seismic demands on the downslope side (without underpinning) would be construction of a new lower concrete terrace. One could drill some pile shafts into the slope out board of the tower to a proper depth. Then place rebar, cast in place concrete, and construct a new reinforced concrete terrace slab on top of the piles and tie the terrace into the side of the tower as low as possible down the hill. This method provides additional lateral support opined as deficient in earlier reports.

Structural systems that accommodate the site geology, seismicity and topography are well known to experienced design professionals and contractors. Successful long term adaptive re-use of the site and site structures would be expected.

Very truly yours,



Michael Krakower SE