LIQUEFACTION-POTENTIAL MAP FOR A PART OF WEBER COUNTY, UTAH

UTAH GEOLOGICAL SURVEY

Public Information Series 27

August 1994

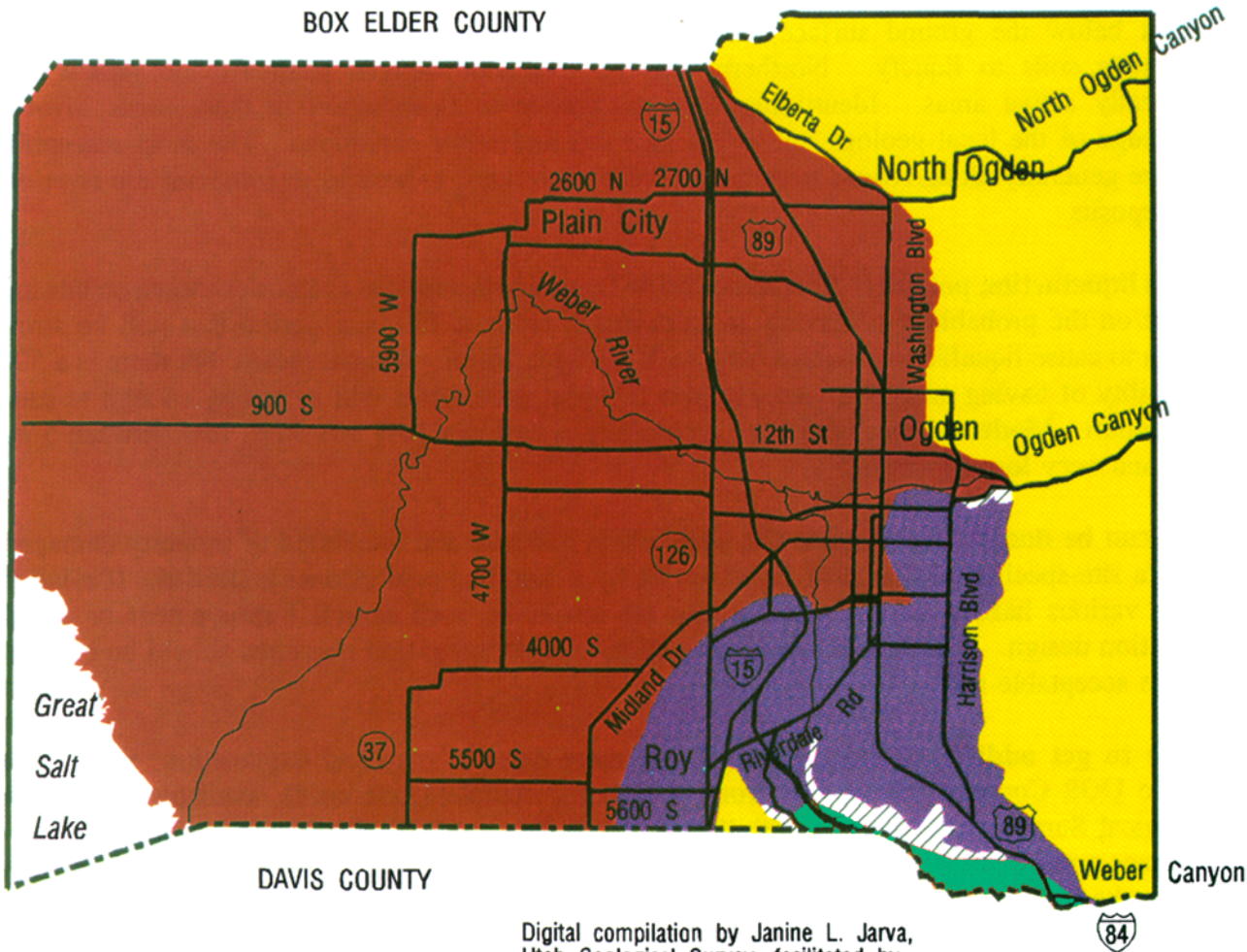
LIQUEFACTION POTENTIAL

- High
- Moderate
- Low
- Very Low
- Landslides

SCALE 1:200,000

1 0 1 2 3 4 5 6 MILES

1 0 1 2 3 4 5 6 7 8 9 KILOMETERS



Digital compilation by Janine L. Jarva, Utah Geological Survey, facilitated by Automated Geographic Reference Center

This map is for general reference only and was modified from Anderson, L.R., Keaton, J.R., and Bay, J.A., 1994, Liquefaction potential map for the northern Wasatch Front, Utah: Utah Geological Survey Contract Report 94-5, 150 p., scale 1:48,000. Copies of this report are available at the Utah Geological Survey.

LIQUEFACTION

by Loren R. Anderson', Jeffrey R. Keaton', and Sandra **N.** Eldredge'

What is liquefaction? Liquefaction may occur when water-saturated sandy soils are subjected to earthquake ground shaking. When soil liquefies, it loses strength and behaves as a viscous liquid (like quicksand) rather than as a solid. This can cause buildings to sink into the ground or tilt, empty buried tanks to rise to the ground surface, slope failures, nearly level ground to shift laterally tens of feet (lateral spreading), surface subsidence, ground cracking, and sand blows.

Why is liquefaction a concern? Liquefaction has caused significant property damage in many earthquakes around the world, and is a major hazard associated with earthquakes in Utah. The 1934 Hansel Valley and 1962 Cache Valley earthquakes caused liquefaction, and large prehistoric lateral spreads exist at many locations along the Wasatch Front. The valleys of the Wasatch Front are especially vulnerable to liquefaction because of susceptible soils, shallow ground water, and relatively high probability of moderate to large earthquakes.

Where is liquefaction likely to occur? Two conditions must exist for liquefaction to occur: (1) the soil must be susceptible to liquefaction (loose, water-saturated, sandy soil, typically between 0 and 30 feet below the ground surface) and (2) ground shaking must be strong enough to cause susceptible soils to liquefy. Northern, central, and southwestern Utah are the state's most seismically active areas. Identifying soils susceptible to liquefaction in these areas involves knowledge of the local geology and subsurface soil and water conditions. The most susceptible soils are generally along rivers, streams, and lake shorelines, as well as in some ancient river and lake deposits.

How is liquefaction potential determined? The liquefaction potential categories shown on this map depend on the probability of having an earthquake within a 100-year period that will be strong enough to cause liquefaction in those zones. **High** liquefaction potential means that there is a 50% probability of having an earthquake within a 100-year period that will be strong enough to cause liquefaction. **Moderate** means that the probability is between 10% and 50%, **low** between **5** and 1 0 %, and **very low** less than 5 %.

What can be done? To determine the liquefaction potential and likelihood of property damage at a site, a site-specific geotechnical investigation by a qualified professional is needed. If a hazard exists, various hazard-reduction techniques are available, such as soil improvement or special foundation design. The cost of site investigations and/or mitigation measures should be balanced with an acceptable risk.

Where to get additional information For a more detailed map and explanation, refer to the specific UGS Contract Report (see front of map for complete reference), available at the Utah Geological Survey, 2363 South Foothill Dr., Salt Lake City, UT, 84109-1491, (801) 467-0401. The maps and report were funded in part by the U.S. Geological Survey, as part of the National Earthquake Hazard Reduction Program.

'Utah State University , [2]SHB AGRA, [3]Utah Geological Survey