

Development of Liquefaction-Induced Ground Damage Maps for the Wairau Plains, New Zealand

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Abstract : The Wairau Plains are located in the north-east of the South Island of New Zealand in the region of Marlborough. The region is cut by many active crustal faults such as the Wairau, Awatere, and Clarence faults, which give rise to frequent seismic events. This paper presents the preliminary results of the overall project in which liquefaction-induced ground damage maps are developed in the Wairau Plains based on the Ministry of Business, Innovation and Employment NZ guidance. A suite of maps has been developed in relation to the level of details that was available to inform the liquefaction hazard mapping. Maps at the coarsest level of detail make use of regional geologic information, applying semi-quantitative criteria based on geological age, design peak ground accelerations and depth to the water table. The next level of detail incorporates higher resolution surface geomorphologic characteristics to better delineate potentially liquefiable and non-liquefiable deposits across the region. The most detailed assessment utilised CPT sounding data to develop ground damage response curves for areas across the region and provide a finer level of categorisation of liquefaction vulnerability. Linking these with design level earthquakes defined through NZGS guidelines will enable detailed classification to be carried out at CPT investigation locations, from very low through to high liquefaction vulnerability. To update classifications to these detailed levels, CPT investigations in geomorphic regions are grouped together to provide an indication of the representative performance of the soils in these areas making use of the geomorphic mapping outlined above.

Keywords : hazard, liquefaction, mapping, seismicity

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