# A P P E N D I X  B

Seismic Shear Wave Velocity Test

Seismic shear wave velocity profiling of the subsurface materials at the project site was performed using Seismic Cone Penetration Testing (SCPT) equipment. The purpose of the seismic shear wave velocity profiling of the subsurface materials was to analyze the seismic design considerations more closely for the project. Shear wave velocity testing using seismic cone penetration test equipment was performed at a selected boring location, designated as Boring No. B-2, as shown on the Site Plan (Plate 2). The seismic shear wave velocity profiling was performed at various depths, extending to a depth of about 101.7 feet below the existing ground surface.

In order to conduct the seismic shear wave velocity test in the boring, the test boring was advanced, utilizing rotary coring methods to the maximum depth of the boring. Logs of materials encountered in the boring are presented on the Logs of Borings in Appendix A. After the boring was advanced to the maximum depth of the borehole, the bored hole was backfilled with 0.25-inch diameter coated bentonite pellets. The temporary casing from the coring operations was used as a tremie pipe to place the bentonite pellets, starting from the bottom and advancing upward. When the bentonite pellets are in contact with the groundwater in the borehole, the pellets start to hydrate slowly. As the bentonite pellets hydrate, they swell and soften. The probe was then pushed through the softened bentonite, extending to a depth of about 101.7 feet below the existing ground surface using seismic cone testing equipment (SCPT).

The seismic shear wave velocity test consists of hydraulically pushing a 10-ton steel electronic subtraction cone with an apex angle of 60 degrees and a projected surface area of 1.55 square inches (10 square centimeters) into the bored hole. The cone carries a uniaxial horizontal accelerator geophone to detect the arrival of a shear wave generated and propagated from the ground surface. The seismic measurements were made when the SCPT had stopped and a shear wave was sent into the subsurface. A shear wave was generated at the surface by striking a loaded plank with a switched hammer. The propagation time of the wave from the hammer blow to the cone was measured at each discrete depth interval. The vector difference of these depths divided by the time difference for the shear wave to arrive at the various depths provided the average shear wave velocity over the depth interval.

The seismic shear wave velocities measured and the weighted average seismic shear wave velocity calculated for the top 100 feet of the soil and rock profile at the selected boring location are presented on Plate B-1.1 through B-1.4 in Appendix B. The weighted average shear wave velocity was calculated based on the average shear wave velocity method described in Section 20.4.1 of ASCE 7-16.