Supplemental Note 1: Petrology and Mineralogy of the Progreso and Río Grande Plutons

The Xolapa metamorphic complex consists of igneous basement rocks that were metamorphosed between the Early Cretaceous and Eocene (145–36 million years ago) and later intruded by undeformed plutons during the Eocene-Oligocene (36–23 million years ago; Elías-Herrera et al. 2007; Morán-Zenteno et al. 1999; Tolson 2007). Of central concern here is the Río Verde Batholith, a massive intrusion of igneous rock that consists of three plutons: the Progreso pluton, the Río Verde pluton, and the Jamiltepec pluton, located along the western section of the coast of Oaxaca but extending to Guerrero and to the central coast of Oaxaca (Figure 6). The Progeso pluton and the Río Grande pluton are located underneath and adjacent to Tututepec. As such, these two plutons were the geological source of all local materials used in pottery making. Their descriptions are summarized from Hernández-Bernal and Morán-Zenteno (1996).

The Progreso pluton, located above the lower Río Verde Valley, is composed of primarily hornblende-biotite granodiorite (granodiorite is slightly richer in plagioclase than granite; see Blatt and Tracy [1996]), but some portions are biotite-hornblende-bearing granite and tonalite. This pluton contains relatively large mineral grains with sizes ranging from medium to coarse (5–10 mm). Biotite and felsic enclaves are also common.

To the east, the Río Grande pluton, located above the Río San Francisco Valley, consists primarily of “biotite granite with subordinate granodioritic-tonalitic facies” (Hernández-Bernal and Morán-Zenteno 1996:366). Granite is richer in potassium feldspar and poorer in plagioclase than granodiorite. Although present, biotite enclaves are less abundant and mineral grains are fine (< 1 mm) to medium (1–5 mm) in size. Both plutons are enriched in light rare-earth

elements (REE) relative to heavy rare-earth elements. Finally, the REE concentrations are negatively correlated with silica content. Thus, in this heterogeneous intrusive geological environment, variations in concentrations of biotite, hornblende, quartz, plagioclase, and REE as well as the size of minerals mark different source locations within the batholith for eroded materials that were used to make pottery at Tututepec during the Postclassic.

These geological data indicate that as we travel west from the Río San Francisco Valley (Río Grande pluton) to the Río Verde Valley (Progreso pluton), deposits of clay and aplastics eroding from these plutons generally decrease in silica (SiO_2) content, but increase in heavier elements, mafic mineral content (e.g., biotite and hornblende), and mineral grain size (see Hernández-Bernal and Morán-Zenteno 1996:Figure 2). Clays and aplastics from the Río Verde Valley (Progreso pluton) will have relatively larger and more frequent biotite inclusions and be richer in Fe, Cr, Zn, for instance, as compared with clays and aplastics from the Río San Francisco Valley (Río Grande pluton; see Figure 6).