This investigation was performed to evaluate the long-term performance of concrete pavements made with high volumes of Class F and Class C fly ash (FA). Six different mixtures, consisting of three mixtures with Class C fly ash having up to 70% cement replacement and three mixtures with Class F fly ash having up to 67% cement replacement, were used. Two series of tests were conducted to establish the long-term performance for all mixtures using core specimens from in-situ pavements. Long-term tests were conducted for compressive strength, resistance to chloride-ion penetration, and density. Test results revealed that both Class C and Class F fly ash contributed to high long-term compressive strength. Generally, the concrete mixtures containing Class F fly ash exhibited higher resistance to chloride ion penetration relative to mixtures containing Class C fly ash. Long-term compressive strengths of core specimens taken from in-situ pavements ranged from approximately 45 to 59 MPa (6,550 to 8,500 psi). The highest long-term compressive strength was achieved by concrete mixtures incorporating 19% Class C fly ash at the age of 12 years (59 MPa, 8,500 psi) and 67% Class F fly ash at the age of 7 years (57 MPa, 8,250 psi). Visual observations revealed that the concrete pavement sections containing high-volumes of Class F fly ash (35 to 67% FA) performed well in the field with only minor surface scaling. Concrete pavement sections containing up to 70% Class C fly ash have experienced some surface damage due to abrasion and scaling, especially in an area where truck traffic makes a 90-degree turn.