The San Francisco International Airport (SFO) Central Terminal Building (CTB) was dedicated in 1954 as the airport’s main terminal. The upper floors of the CTB were transformed into an administrative office building in 2005. In 2010, the flight operations portion of the CTB was seismically retrofitted and remodeled into the current Terminal 2 (T2), recognized as the country’s first LEED Gold certified airport terminal.

The CTB’s 6-story concrete structure housed over 600,000 square feet, including the airport’s original Air Traffic Control Tower (ATCT). Following completion of the new ATCT in 2016, SFO hired Turner Construction, AE3 Partners/Woods Bagot Joint Venture, and Simpson Gumpertz & Heger (SGH) to execute a $45 million design-build project that included demolition of the original control tower and upper four stories of T2 and the “build back” of two stories above the existing structure.

The new two-story structure is programmed to accommodate airline lounges, office space, café, and exterior observation decks at each end of the building. TSA screening for T2 is located directly below the “build back” at the 2nd level, which presented a major design challenge as TSA could not be affected during construction. Advanced analysis techniques and innovative connection detailing were necessary to prove that the existing building and foundations could meet current engineering analysis techniques and innovative connection detailing were necessary to prove that the existing building and foundations could meet current engineering analysis techniques and innovative connection detailing were necessary to prove that the existing building and foundations could meet current engineering

Higher level analysis included a rocking evaluation that avoided foundation retrofit. We performed a nonlinear pushover analysis to demonstrate equivalent performance of the foundations supporting the new moment frame columns. We modeled the existing pile foundations with compression-only gap elements that simulate lift-off of the cap from the socketed piles. We demonstrate that at a design drift of 2% in the new addition, uplift in the foundation is less than the 3 inch pile embedment into the pile cap.