Magnetite-ballasted activated sludge systems (commercially known as BioMag®) have recently started to gain regulatory and commercial acceptance in the United States for secondary treatment and nutrient removal. Because this process is relatively new, design guidance for this process is not included in the most recent published version of the WEF Manual of Practice No. 8 (2010). While there are approximately twenty publications documenting individual case studies of this technology, few of these attempt to summarize design considerations and lessons learnt from installations and pilots at multiple facilities. The information presented in this paper is supported by the authors' experience in the design of the first such facility in Virginia, as well as from analysis of other installations, pilot studies, and lab studies of Evoqua Water Technologies' BioMag® system. The paper provides an overview of design considerations including preliminary treatment, biological reactors, secondary clarifiers, solids wasting, magnetite feed, and magnetite recovery.