TO: Joe Benson, Interim Provost

THROUGH: Chuck Karr, Dean, College of Engineering

FROM: Ken Fridley, Professor and Head

DATE: August 14, 2013

SUBJ: Proposed New Baccalaureate Degree Programs in Architectural Engineering and Environmental Engineering

The faculty of the Department of Civil, Construction, and Environmental Engineering propose to establish two new baccalaureate programs, one in architectural engineering and one in environmental engineering. Both proposals are outgrowths of existing and successful minors programs in the respective areas and offered by the department. The proposed programs were developed with a recognition that the engineering profession continues to become increasingly more specialized. New graduates are expected to have more focus and a greater depth of knowledge within an area of practice. Additionally, both proposed programs take full advantage of existing faculty expertise, current course offerings, and new facilities related to both areas.

Architectural engineering is the discipline of engineering with a focused emphasis on the planning, design, construction and maintenance of buildings. The architectural engineering profession bridges the gap between architecture and the traditional engineering disciplines of civil, mechanical, electrical engineering. While architects focus on building form and function (space, feel, materials, aesthetics, and outdoor experience), architectural engineers focus on how the building works (stability, safety, serviceability, comfort, health, efficiency, visibility, mood, power, cost, implementation). There are only 17 accredited architectural engineering programs in the country, none of which are in the state. The job market for architectural engineers correlates well with the demand for architects and civil engineers, as well as new construction forecasts. Based on this and the U.S. Department of Labor, Bureau of Labor Statistics, the demand for architectural engineering graduates is strong and increasing by an estimated 22% from 2010 to 2020.

Environmental engineers use the principles of engineering, geological science, biology, physics, and chemistry to develop solutions to today’s environmental problems, considering both the built and natural environments. Environmental engineers are involved in efforts to improve methods and policies for recycling, waste disposal, public health, control of water and air pollution, and natural resource management. There are 60 accredited engineering programs in the country, none of which are in the state. The U.S. Department of Labor, Bureau of Labor Statistics estimates an average job growth rate of 22% for environmental engineers from 2010 to 2020. The Department also offers the Master of Science in Environmental Engineering, which has been growing in popularity with both students and employers.
While nationally there are 226 accredited civil engineering programs, 17 architectural engineering programs, and 60 environmental engineering programs, there are just five universities that offer all three programs. The five are Cal Poly San Luis Obispo, University of Colorado-Boulder, Missouri University of Science and Technology (formerly University of Missouri-Rolla), University of Oklahoma, and Penn State University. By adding the two proposed programs, the University of Alabama would join a select group of universities offering all three degrees and will be the only university in the country to offer civil, construction, architectural, and environmental engineering.

To project enrollments, we defined these five institutions that offer civil, architectural, and environmental engineering as a benchmark group. The fall 2012 undergraduate enrollment in our civil engineering program was 547. The average fall 2012 enrollment in civil engineering for the benchmark group was 360. The average fall 2012 enrollment in architectural engineering and environmental engineering for the benchmark group was 200 and 134, or about 55% and 37% of the civil engineering enrollment, respectively. We are projecting to have enrollments in the proposed architectural engineering and environmental engineering of approximately 35% and 25% of our civil engineering enrollment, respectively, during the first five-year start-up period of the programs.

The percent of women and under-represented minorities enrolled in our civil engineering program is also compared to those of the benchmark groups as shown in the figure below. Our civil engineering program enrolls a higher percentage of women than the benchmark group, but a lower percentage of minority students. The percent of women enrolling in the architectural engineering and environmental engineering programs exceed that of both our civil engineering program and the benchmark civil engineering group. The percentage of minority students enrolled is about the same for each of the benchmark group programs. Based on this, we are expecting to increase the number and percentage of women and under-represented students both enrolled in and earning degrees from the department and college.

It is significant to note that six years ago the department was approved to offer the Bachelor of Science in Construction Engineering, which has been very successful by all accounts. As noted, no other single university offers degrees in civil, architectural, environmental, and construction engineering. The University of Alabama would be in a unique and advantageous position by being the only institution to offer all four of these related degree programs. This would allow us to recruit, retain, and graduate a unique cadre of engineers with the knowledge, skills, and abilities to address the complex problems we face with in built and natural environments.

Two formal proposals are attached, one for each of the proposed programs. Also attached is a set of support letters potential employers and others, including one from the University of Oklahoma commenting on having civil, architectural, and environmental engineering together within a single department. Please let me know if you have any questions regarding the proposed programs or any of the supporting materials.