



Letter of Notification (LON)

Policy A1.0 New Academic Programs: Approval Process

Institution: University of Tennessee, Knoxville
Proposed Academic Program: Environmental Engineering, BS
Proposed Implementation Date: January 2024
CIP Code and Title: 14.1401 (Environmental Engineering)
CIP Code Definition:

A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of systems for controlling contained living environments and for monitoring and controlling factors in the external natural environment, including pollution control, waste and hazardous material disposal, health and safety protection, conservation, life support, and requirements for protection of special materials and related work environments.

LON Submission Date: January 24, 2023
Posted Date on THEC Website: January 24, 2023
Public Comment Period: January 25 – February 8, 2023

Letter of Notification Checklist

THEC Academic Policy 1.0 (Section 1.0.6A) Letter of Notification Requirements:

- ✓ Letter of Support from the President/Chancellor signifying institutional governing board or system office support for development;
- ✓ Program overview;
- ✓ Background information;
- ✓ Feasibility Study;
- ✓ Enrollment and graduation projections;
- ✓ Projected costs to deliver the proposed program;
- ✓ Projected revenues for the proposed program;
- ✓ Letters of support.

Letter of Notification (LON)

Bachelor of Science Environmental Engineering



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

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Section I: Overview

Program Information

Institution:	University of Tennessee Knoxville
College:	Tickle College of Engineering
Department:	Civil and Environmental Engineering
Title of Degree:	Bachelor of Science in Environmental Engineering
Degree Designation:	Bachelor of Science
Formal Degree Abbreviation:	BS ENVE
CIP/THEC Code:	09.14.1401.00
CIP Code Title:	Environmental Engineering
Proposed UT BOT Approval:	October 2023
Proposed THEC Approval:	November 2023
Proposed Implementation Date:	January 2024
Academic Program Liaisons:	<p>Karen Etzkorn, Director of Academic Affairs 505 Summer Place / 1268B UT Tower University of Tennessee System, 37902 Phone number: 865-974-2140 Email: etzkorn@tennessee.edu</p> <p>Chris Cox, Department Head 325 JD Tickle Engineering Building 851 Neyland Drive Knoxville TN 37996-2313 Phone: 865-974-7700 Email: ccox9@utk.edu</p>



The University of Tennessee
Board of Trustees

Resolution 002-2023
Letter of Notification - Bachelor of Science
in Environmental Engineering
(University of Tennessee, Knoxville)

Resolved:

The Executive Committee, on behalf of the Board of Trustees, hereby approves the attached Letter of Notification pertaining to the proposed Bachelor of Science in Environmental Engineering and authorizes the submission of such Letter of Notification to the Tennessee Higher Education Commission.

Adopted this 20th day of January, 2023.

Certificate

I hereby certify that the foregoing Resolution was adopted by the Executive Committee of the Board of Trustees of The University of Tennessee on the date set forth above.

Cynthia C. Moore
Secretary and Special Counsel

System Letter of Support



THE UNIVERSITY OF TENNESSEE SYSTEM

ACADEMIC AFFAIRS AND STUDENT SUCCESS

December 22, 2022

Dr. Julie Roberts, Chief Academic Officer
Tennessee Higher Education Commission
312 Rosa L Parks Ave. 9th Floor
Nashville, TN 37243

Dear Dr. Roberts:

On behalf of UT Knoxville's Tickle College of Engineering, please accept the attached Letter of Notification (LON) for a proposed Bachelor of Science program in Environmental Engineering (CIP 14.1401). The BS ENVE program will cover fundamental topics such as fluid mechanics, environmental chemistry, microbiology, fate and transport of environmental pollutants, environmental systems engineering, and risk assessment, as well as applied topics including hydrology, water resources engineering, water, and waste treatment, air pollution control, solid and hazardous waste management, and energy systems. The University is well-positioned to support this degree program through current faculty resources, and has existing infrastructure on campus to support the program (e.g., existing environmental engineering research labs and equipment, a fully-equipped environmental teaching lab, a designated water resources teaching lab, two full-time staff technicians, and the Water Quality Core Facility). The proposed program will provide opportunities to expand its impact in thematic areas in which the Tickle College of Engineering (TCE) offers expertise and has the full support of the UT System.

We look forward to receiving an evaluation of the LON by THEC staff.

Sincerely,

Bernie Savarese, Ed.D.
Acting Vice President of Academic Affairs and Student Success
University of Tennessee System

CC: Donde Plowman
John Zomchick
Matthew Mench
Chris Cox
Heather Hartman
Karen Etzkom

Campus Letter of Support



December 21, 2022

Dear President Boyd,

Please accept the attached application for a new BS degree program in Environmental Engineering in the Tickle College of Engineering at the University of Tennessee, Knoxville.

The proposed program will be housed in the existing Department of Civil and Environmental Engineering. The department has offered an MS Environmental Engineering degree program since 1970 and also offers environmental engineering coursework and specializations at the BS and PhD levels. Environmental Engineering is recognized as a distinct discipline by the ABET engineering accreditation board and the National Council of Examiners of Engineers and Surveyors (NCEES). There is no existing BS Environmental Engineering degree in the state of Tennessee, but similar programs in bordering states have enrollments totaling over 900 students. Likewise, many peer institutions have robust enrollments in BS Environmental Engineering programs. UTK student surveys indicate strong demand for the program and job market surveys and letters of support from specific employers show strong demand for environmental engineering graduates. The program can be successfully offered using current faculty, staff, and facility resources.

The curriculum for this new BS Environmental Engineering has been reviewed and approved by the department and college. It is currently under review by the appropriate campus-level bodies on the Knoxville campus and has the full support of campus administration. At this time, we request transmission to THEC for approval. Please contact me if you have any questions or need additional documentation.

Thank you in advance for your attention to this matter.

Sincerely,

John Zomchick
Provost & Senior Vice Chancellor

CC: Donde Plowman
Bernie Savarese
Karen Etkorn
Matthew Mench
Chris D. Cox

Office of the Provost and Senior Vice Chancellor
527 Andy Holt Tower, Knoxville, TN 37996-0152
865-974-2445 865-974-4811 fax provost@utk.edu

Flagship Campus of the University of Tennessee System

Section II: Background

Background Concerning Academic Program Development

The Department of Civil and Environmental Engineering (CEE) at The University of Tennessee offers a nationally ranked BS degree in Civil Engineering, an MS degree in Civil Engineering, and a Ph.D. degree in Civil Engineering. The BS degree in Civil Engineering (BS CE) requires that students be broadly educated in all six subdisciplines of Civil and Environmental Engineering before they choose specific specialty areas in two areas during the last academic year of their program. The six subdisciplines include (1) Structural, (2) Geotechnical, (3) Transportation, (4) Construction, (5) Environmental, and (6) Water Resource Engineering. Environmental Engineering and Water Resource Engineering are colloquially known as the “wet side” of the Civil Engineering discipline, while the other subdisciplines are referred to as the “dry side.” Under our current undergraduate curriculum, BS CE students take all six intro-level courses and then, in consultation with their advisor and faculty mentors, select second-level courses in at least two specialty areas, often in synergistic pairs (e.g., Structures/Geotechnical, Water Resources/Environmental).

As noted, the department offers MS degrees in both Civil Engineering and Environmental Engineering. The MS degree in Environmental Engineering (MS ENVE) was established in 1970, recognizing the need to educate and train engineers in specific skills related to protecting human health and the environment from the effects of pollution. Since its inception, the MS degree program has encompassed both the Environmental Engineering and Water Resources subdisciplines. Interested students can also earn a degree in Civil Engineering at the doctoral level with specializations in Environmental Engineering or Water Resources.

One of the challenges to recruiting undergraduate students who want to pursue Environmental or Water Resources Engineering (ENVE) disciplines is that the current BS CE program lacks sufficient opportunities to develop in-depth knowledge in those areas. This issue presents two concerns. First, many students interested in ENVE topics are less interested in enrolling in a degree program weighted so heavily in course requirements on the “dry side” topics, like structural engineering. As such, students interested in Environmental Engineering may choose different institutions outside of Tennessee, such as Alabama, Clemson, the University of Georgia, Georgia Tech, Missouri University of Science and Technology, or North Carolina State (See Table 1 for enrollment data). Additionally, UT students interested in Environmental Engineering may select different degree programs that do not fully align with their interests. For example, they may choose degree options in Biosystems Engineering, Chemical Engineering, or even a non-engineering degree like Environmental Science. We expect that offering a focused BS ENVE will increase enrollment and retention by better-placing students in a degree program that fits their interests and attracting students who otherwise leave the state to pursue ENVE programs at other institutions.

Overall, establishing a BS ENVE program at The University of Tennessee will significantly boost both our undergraduate and graduate programs of study by providing opportunities to grow student enrollment. We have also recently filled a new faculty position allocated to the department to support the proposed BS ENVE program. The growth in students and visibility that comes from starting a new degree program can directly lead to improved US News rankings through growth in

reputation. Second, a BS ENVE degree will produce graduates prepared to address numerous societal and environmental issues at the local, state, regional, and national levels.

The environmental challenges faced by our society have become increasingly complex during the last 50 years. For example, a recent report from the *National Academies*¹ identified the following grand challenges for environmental engineering:

- Create sustainable food, water, and energy
- Curb climate change and adapt to its impacts
- Design a future without pollution or waste
- Create efficient, healthy, resilient cities
- Foster informed decisions and actions

The *National Academies* study does not expect that environmental engineers will be able to solve these problems independently; instead, they will play a role in solving them by working in partnership with other STEM professionals, policymakers, and affected communities. The BS ENVE curriculum will provide more specialized skills to the area of study not included in the traditional BS CE curriculum, allowing graduates to contribute to these grand challenges.

Purpose and Nature of Academic Program

The BS ENVE program will expand on the existing strengths of the departmental faculty and potentially offer opportunities to expand expertise in thematic areas in which the Tickle College of Engineering (TCE) offers expertise. The departmental faculty have approved a proposed curriculum for the BS ENVE degree, which will include fundamental topics such as fluid mechanics, environmental chemistry, microbiology, fate and transport of environmental pollutants, environmental systems engineering, and risk assessment, as well as applied topics such as hydrology, water resources engineering, water, and waste treatment, air pollution control, solid and hazardous waste management, and energy systems. The development of professional skills in communication, teamwork, ethics, public policy, and project management will also be integrated throughout the curriculum. The program will culminate in a capstone design project. This project will be delivered through a two-semester course sequence patterned after the CE 399S (1 credit hour) and CE 400 (3 credit hour) sequence in our BS CE program. The first course focuses on project scoping, community outreach and engagement, professional communication, and reflection, while detailed engineering design takes place during the second semester. This curriculum will satisfy the general and program-specific criteria of ABET and the Volunteer Core general education requirements. The program will also prepare students to pass the Environmental Engineering Fundamentals of Engineering Exam administered by the National Council of Examiners for Engineering and Surveying.

We anticipate a potential program expansion to support specific regional needs and institutional strengths, including atmospheric science, watershed and river management, hydropower, and

¹ National Academies of Sciences, Engineering, and Medicine 2019. *Environmental Engineering for the 21st Century: Addressing Grand Challenges*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25121>.

nuclear decommissioning and waste management (currently a minor in partnership with Nuclear Engineering). These distinct strengths could improve recruitment considerably compared to other programs while addressing the regional needs of the state.

The primary target population for the program includes traditional first-year college students and transfer students from community colleges. In the TCE in recent years, external transfer students have numbered fewer than 10% of new students coming to the college. Nevertheless, CEE considers transfer students a vital constituency and has developed transfer pathways for its BS CE program in partnership with other TN institutions. We would develop similar pathways for the new BS ENVE program. The program will be fully delivered on the Knoxville campus. Like other BS programs within the Tickle College of Engineering, student outcomes will satisfy both general and program-specific criteria of ABET. The criteria are listed below as general and program-specific criteria.

Alignment with State Master Plan and Institutional Mission

State Master Plan²

An explicit goal of the 2020 update to THEC's State Master Plan is to "increase enrollment in majors leading to high-demand jobs." The proposed BS ENVE degree program supports this goal in several ways. There is a severe workforce shortage in civil engineering and construction. The THEC-TSAC report "Improving the Pipeline for Tennessee's Workforce: Academic Supply for Occupational Demand Report 2022"³ lists Civil Engineering as one of the most in-demand STEM majors in Tennessee, with 1,110 unique job postings and 1,741 hires of civil engineers in 2020. Still, the supply of civil engineers cannot keep up with the demand, with all our graduates having jobs months before graduation. The recent federal infrastructure bill will only increase demand for Civil Engineers for the foreseeable future. How can the BS ENVE degree help this situation? Many civil engineers work to design and provide water supply, wastewater supply, and stormwater infrastructure. Our BS ENVE grads will also possess these skills. Moreover, our research shows that most students likely to enroll in the BS ENVE program will be unlikely to enroll in a traditional BS CE program. Therefore, by offering a BS ENVE, we will increase the total number of engineers able to deliver new and improved infrastructure to Tennessee and the nation.

Another high-demand occupation listed in the THEC-TSAC report is "Environmental Scientists and Specialists, Including Health."⁴ A BS in Environmental Engineering is often among the preferred degrees for this kind of position. Finally, the 2019 Tennessee Department of Labor and Workforce Development report "The Demand for STEM Occupations in Tennessee"⁵ reports that Environmental Engineers are expected to increase by 15.64% from 1151 in 2016 to 1331 in 2026. There are no existing BS Environmental Engineering degree programs in TN to meet this need.

² <https://www.tn.gov/content/dam/tn/thec/bureau/research/other-research/master-plan/finalmp.pdf>

³ <https://www.tn.gov/content/tn/thec/research/supply-and-demand.html>

⁴ Ibid.

⁵ <https://www.jobs4tn.gov/admin/gsipub/htmlarea/uploads/LMI/Publications/STEMReport2019Updated.pdf>

In the State's Postsecondary Education Master Plan (Postsecondary Attainment in the Decade of Decision 2015-2025)⁶, "Drive to 55" aims to increase the percentage of Tennesseans who hold postsecondary degrees. The plan requires increased degree production, and part of that plan can include offering degrees in the state that do not exist, thereby increasing retention of Tennesseans in in-state degree programs. Part of this drive is preparing students to succeed in STEM-oriented fields. The Drive to 55 focuses explicitly on identifying barriers to achievement for underrepresented students or other "focus populations." Providing degree programs that align better with student interests could bridge that gap. For example, women and minorities are underrepresented in engineering, yet in environmental engineering programs at other institutions, women make up about 50% of the student body (Table 2). Environmental engineering could be a bridge to increase the success of underrepresented students at the college level. Our department's history of successfully matriculating and graduating transfer students also enhances the accessibility of the program to lower-income and less-prepared students who often begin their college careers at community colleges.

The University of Tennessee Institutional Mission and Visions

This program aligns well with the University of Tennessee's strategic plan⁷. Specifically, the BS ENVE degree will: 1) *Enhance Educational excellence* by offering a new high-demand degree program that will increase enrollment, degrees awarded, and diversity in TCE. 2) *Expand research capacities* through the new female faculty member hired to support the program who brings a new research field (carbon storage and reuse) to UT and increases faculty diversity in TCE, and 3) *Foster outreach and engagement* by addressing grand challenges facing TN through our teaching, research, and outreach to the community.

The BS ENVE degree program also contributes to all five goals in UTK's strategic vision⁸.

- Goal 1. CULTIVATING THE VOLUNTEER EXPERIENCE. The BS ENVE will provide access to a degree not currently available anywhere else in Tennessee, enhancing enrollment at UTK by offering a new degree that addresses significant challenges affecting every Tennessean and people worldwide.
- Goal 2. CONDUCTING RESEARCH THAT MAKES LIFE & LIVES BETTER. We have hired one new faculty member to support the new degree program. Her carbon storage and reuse research has global implications in sustaining our way of life, mitigating climate change, and ensuring economic prosperity in the coming decades. Our department will continue its strong track record of undergraduate research by introducing BS ENVE students to research opportunities.
- Goal 3. ENSURING A CULTURE WHERE VOL IS A VERB. As shown later in Table 2, women are often drawn to environmental engineering as a field in which they are highly motivated to make a difference. Our program will provide this opportunity, thereby increasing the diversity of the TCE enrollment. Within the CEE department, we envision

⁶ <https://www.tn.gov/content/dam/tn/thec/bureau/research/other-research/master-plan/MasterPlanSummary.pdf>

⁷ https://plan.tennessee.edu/wp-content/uploads/sites/38/2022/05/Strategic-Plan-Update-Final_5_19_22.pdf

⁸ <https://plan.tennessee.edu/wp-content/uploads/sites/38/2022/05/strategic-vision-2021-UTK.pdf>

that this greater diversity will, over time, be transformational to our overall culture, thereby increasing the respectfulness and inclusiveness of our entire community.

- Goal 4. MAKING OURSELVES NIMBLE & ADAPTABLE. Environmental engineering has been interdisciplinary and collaborative since its emergence at the intersection between civil engineering and public health in the early 1900s. This spirit of collaboration continues through our proposed curriculum, which includes required technical courses from ten different units outside of CEE, all of whom will benefit from the increased enrollment in their courses. Furthermore, our faculty researchers have a strong track record of collaborative research.
- Goal 5. EMBODYING THE MODERN R1, LAND-GRANT UNIVERSITY. Tennesseans are rightfully proud of our state's natural beauty. At the same time, Tennesseans are looking forward to increased prosperity as our state seeks to continue its track record of drawing new industries to the state. Environmental Engineering serves to protect human health and our natural environment from hazardous byproducts associated with our way of life in ways that ensure economic growth and prosperity may continue. Our faculty and students seek to continue our strong engagement with the community to educate, empower, and work alongside them to benefit Tennessee and its citizens.

College and Departmental Mission and Vision

Both the TCE and CEE are currently developing strategic plans that align with the UTK strategic vision. Therefore, demonstrating that the BS ENVE contributes to UTK's strategic vision ensures that it will also align with the college and department-level strategic plans. TCE has already demonstrated that the BS ENVE degree aligns with its strategic goals by funding a faculty line needed to develop and deliver the degree program.

Institutional Capacity to Deliver the Proposed Program

The University is well-positioned to support this degree program through current resources. Several current members of the faculty will support the BS ENVE while they continue to support the BS CE program. These include two governor's chairs, the department head, six additional tenure-line faculty, and a PhD-level staff member who teaches two labs. In addition, the department has been approved to search for a full-time lecturer and the Goodrich Chair of Excellence, which represents two vacant lines that recently opened due to the faculty members' previous departure. Once these two open positions are filled, we anticipate that the current faculty will be sufficient to deliver the program. The faculty group described above represents a net increase of one faculty position above the historical size of the Environmental/Water Resources faculty. The new faculty member has already been hired, and the funds have been committed. Based on the above, the program's costs will be calculated based on a net addition of one faculty line. The department's MS in Environmental Engineering, established in 1970, demonstrates the long-term stability of educational programs in environmental engineering within the department and establishes name recognition for the major. There is also existing infrastructure on campus to support the program, including existing environmental engineering research labs and equipment, a fully-equipped environmental teaching laboratory, a designated water resources teaching

laboratory in the John D. Tickle building, two full-time staff technicians, and the Water Quality Core Facility. Additionally, campus research centers such as the TN Water Resources Research Center, the Institute for a Secure and Sustainable Environment, the Center for Environmental Biotechnology, the Baker Center for Public Policy, and the Bredesen Center for Interdisciplinary Research and Graduate Education are available to support interdisciplinary interests of faculty members and students.

CEE has one of the strongest records of collaboration in teaching, extracurricular student activities, and research on campus. We first outline several areas of existing collaboration with other academic units and then elaborate on how these collaborations will be enhanced by a BS ENVE program.

Collaboration in Minors and Dual Degree Programs

- CEE offers a minor in Environmental Engineering. Students in CE, BSE, and CEB commonly complete it.
- BS CE students frequently select the interdisciplinary undergraduate and graduate minors in Watersheds. The program is hosted in Biosystems Engineering, and CE and BSE faculty members have chaired the faculty watershed minor committee.
- CEE has partnered with Nuclear Engineering (lead department) on the Nuclear Decommissioning and Environmental Management minor.
- CEE strongly supports the new college-level Engineering for Sustainability minor started in 2022 by teaching EF 305 Engineering Approaches to Sustainability and managing the program's administration.
- CE students frequently minor in Business.
- CEE is a participating department in the Intercollegiate Graduate Minor in Statistics and Data Science.
- CEE is a participating department in the Intercollegiate Graduate Minor in Computational Sciences.
- CEE partners with the Haslam College of Business to offer two Dual degree programs (MS CE/MBA and MS ENV/MBA)

Collaborations in Extracurricular Activities

- Hydrolunteers is an interdisciplinary student group that serves as the student chapter for the American Water Resources Association (AWRA) and the American Water Works Association/Water Environment Association. Students from CEE, BSE, LA, and EPS are among the members; a CEE faculty member serves as a faculty mentor.
- CEE students and faculty are well represented at the annual Watershed Symposium, organized by the watershed faculty associated with the watershed minors.
- The College of Architecture and Design is leading the formation of a Knoxville chapter of ACE, a mentoring program for high school students with a potential interest in Architecture, Construction, and Design. CEE and the Construction Science Program in BESS are additional partners in this effort.

Collaboration in Research

Multidisciplinary research is a distinguishing characteristic of the CEE department. It is active in various research centers and collaborates with numerous departments across campus. Research proposals led by CEE faculty with outside collaborators are shown in Figure 1, while collaborations with CEE faculty led by other units are shown in Figure 2. All told, over the six years, the number of funded collaborative research projects has remarkably averaged more than 10 per CEE tenure-line faculty member.

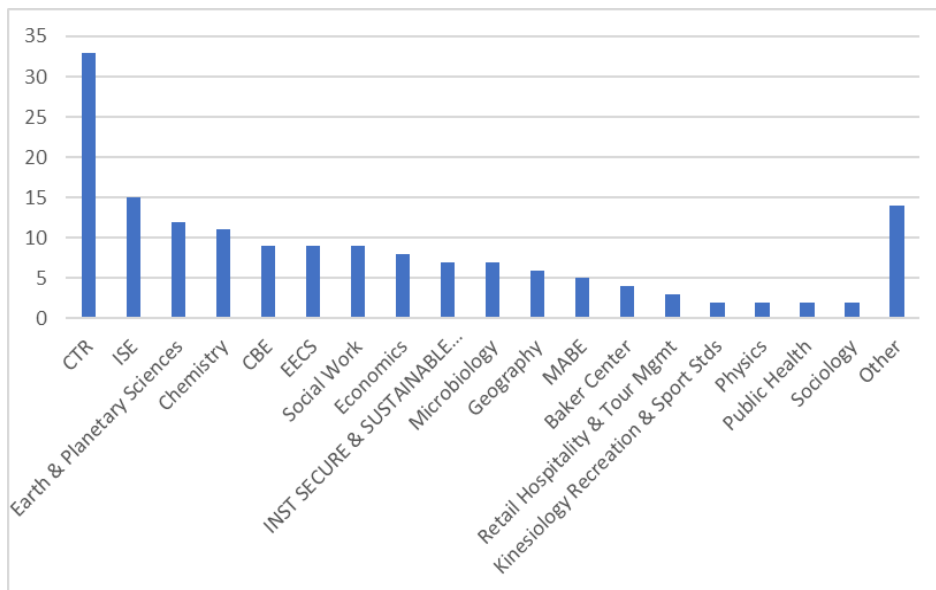


Figure 1. Number of research proposals led by CEE faculty with collaborators from researchers outside the department (2013-2018).

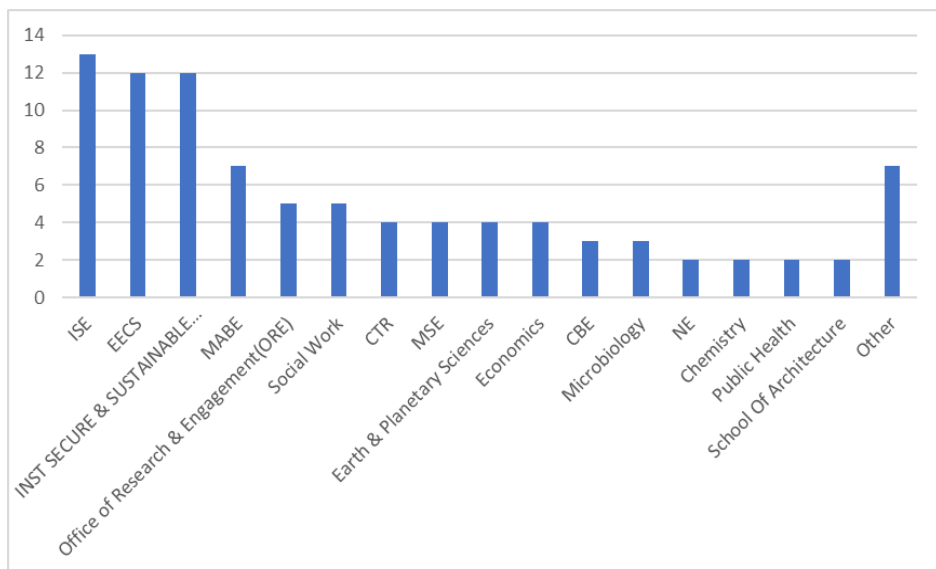


Figure 2. Research proposals led by researchers from other units with CEE collaborators.

As we formulate the curriculum for a BS ENVE program, we intend to continue our stellar record of collaboration with others on campus. Future BS ENVE students will likely increase enrollments in the Nuclear Decommissioning and Environmental Management minor, the Watershed minor, and the Engineering for Sustainability minor, as well as increase enrollment in related classes. The inherently interdisciplinary nature of the environmental engineering discipline is reflected in the proposed curriculum for the BS ENVE degree, which includes required classes from MATH, CHEM, STAT, ME, EF, BSE, GEOL, and GEOG, in addition to general education courses. Enrollment of BS ENVE students in courses offered by other units efficiently utilizes resources outside of CEE, improves the interdisciplinary training of our students, and provides tuition income to colleges outside of TCE through the new UTK budget allocation model.

Existing Programs Offered at TN Institutions

There are currently no existing BS ENVE programs in the state of Tennessee.

Accreditation

ABET General Criteria⁹

The Accreditation Board of Engineering and Technology's General Criteria include the ability to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

ABET Program Criteria

The Accreditation Board of Engineering and Technology's Program Criteria include the following:

The curriculum must include: a) Mathematics through differential equations, probability and statistics, calculus-based physics, chemistry (including stoichiometry, equilibrium,

⁹ <https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2022-2023/>

and kinetics), earth science, biological science, and fluid mechanics. b) Material and energy balances, fate and transport of substances in and between air, water, and soil phases; and advanced principles and practices relevant to the program objectives. c) Hands-on laboratory experiments, and analysis and interpretation of the resulting data in more than one major environmental engineering focus area, e.g., air, water, land, and environmental health. d) Design of environmental engineering systems that includes considerations of risk, uncertainty, sustainability, life-cycle principles, and environmental impacts. e) Concepts of professional practice and project management, and the roles and responsibilities of public institutions and private organizations pertaining to environmental policy and regulations.¹⁰

We do not expect the BS ENVE program to affect our current BS CE program significantly but will complement it. There is an expressed interest by some current BS CE students to continue in that degree program while also taking courses in Environmental and Water Resource Engineering (these students prefer a general CE degree education), and we currently intend to maintain our six specialty areas. The proposed curriculum cross-lists several courses between the two curricula. We will also continue to offer the Environmental Engineering Minor to students not enrolled in the BS ENVE program.

Administrative Structure

The BS ENVE program will be administered through the existing academic structure of the University of Tennessee, Knoxville. The Department of Civil and Environmental Engineering in the Tickle College of Engineering will offer the degree. Dr. Chris Cox, the Civil and Environmental Engineering Department Head, will direct the program. The department head reports to the Dean of the Tickle College of Engineering, Dr. Matthew Mench. The organizational structure is illustrated in Figure 3:

¹⁰ Ibid.

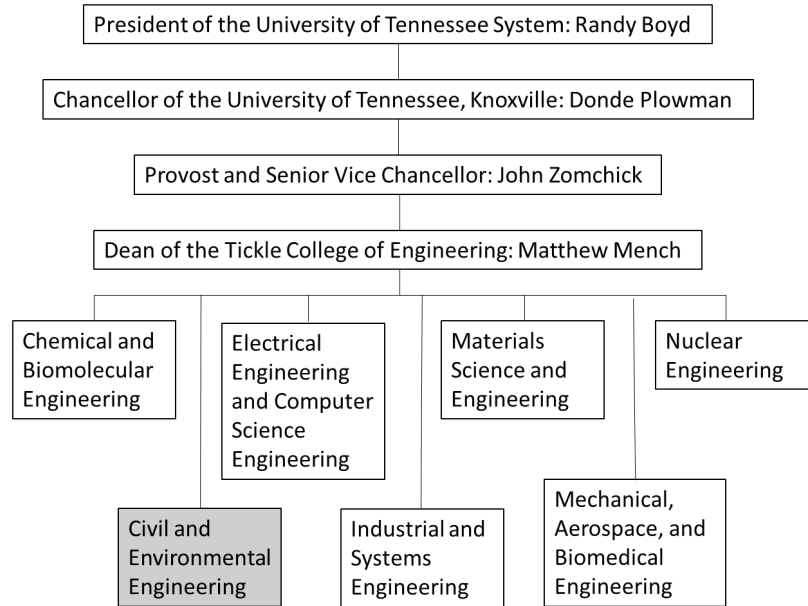


Figure 3. Simplified organizational chart. The Department of Civil and Environmental Engineering will administer the BS ENVE degree.

Section III: Feasibility Study

Student Interest

To assess student interest in a potential BS ENVE degree program, we examined BS ENVE enrollments at schools in states bordering Tennessee and at aspirational peer institutions. We also conducted separate surveys of first-year students enrolled in the Tickle College of Engineering and students currently enrolled in CEE. Enrollments in BS ENVE degree programs in surrounding states are summarized in Table 1. The data show significant regional student demand for this degree program and highlight the opportunity to recruit students from bordering states that do not have Environmental Engineering programs, including Arkansas, Kentucky, Mississippi, and Virginia.

Table 1.

Enrollment in BS ENVE programs in states bordering Tennessee.

State	Institution	BS Program Enrollment 2020*
Alabama	University of Alabama	89
Arkansas	None	0
Georgia	Georgia Tech	218
	Kennesaw State	101
	Mercer	33
	University of Georgia	163
Kentucky	None	0
Missouri	Missouri Science and Technology	115
Mississippi	None	0
North Carolina	North Carolina State	168
South Carolina	Clemson	81
Tennessee	None	0
Virginia	None	0

*Online Profiles American Society for Engineering Education <http://profiles.asee.org/>

To determine the potential enrollment and demographics of students enrolling in a BS ENVE program, we examined enrollments in BS CE and BS ENVE degree programs at peer institutions. We define peer CEE programs as those ranked 17-30 by US News among public institutions (this included 18 institutions because of ties in ranking). Among these 18 peer institutions, only the University of Maryland, the University of Virginia, Auburn, and the University of Massachusetts—Amherst do not offer BS ENVE programs. Three other institutions, Iowa, Iowa State, and Arizona State University have begun offering BS ENVE programs since 2015.

Enrollment data for BS ENVE and BS CE programs at peer institutions are summarized in Table 2.

Table 2.

Enrollments in BS CE and BS ENVE Programs At Peer Institutions.

School	CE	ENVE	ENV/CE	CE %F	ENVE %F
North Carolina State University	464	168	36%	25%	51%
University of Florida	307	151	49%	29%	68%
Arizona State University	534	159	30%	25%	63%
Ohio State University	536	157	29%	21%	48%
University of California—Irvine	376	118	31%	32%	58%
Iowa State University*	523	23	4%	24%	43%
University at Buffalo—SUNY	428	120	28%	18%	55%
Colorado School of Mines	316	174	55%	37%	65%
Colorado State University	371	181	49%	25%	51%
Michigan State University	384	207	54%	22%	51%
Oregon State University	315	78	25%	24%	47%
Missouri University of Science & Technology	405	115	28%	24%	58%
University of Arizona	221	52	24%	24%	58%
University of Iowa	180	53	29%	22%	49%

*Note: CE %F and ENVE %F represent the percentage of enrollees who are female in CE and ENVE degree programs, respectively. *New program began in 2021. Online Profiles American Society for Engineering Education <http://profiles.asee.org/>*

Across all peer institutions with BS ENVE degree programs, the enrollment in that program is about one-third of the corresponding BS CE program. Excluding the new program at Iowa State, BS ENVE enrollment ranged from 24% to 55% of BS CE enrollment. Female students (shown as F in Table 2) make up 56% of all students enrolled in BS ENVE programs (ranging from 43% to 65%) compared to an average of 25% of women in the corresponding BS CE program (ranging from 18% to 37%). Across all established peer programs, BS ENVE enrollment is sufficient for a viable degree program and is likely to attract more women than the BS CE program.

To assess interest in a BS ENVE program among students currently enrolled in the TCE, we surveyed two groups that would provide the initial cohort of students to populate the degree program.

1. Existing CEE students interested in Environmental or Water Resources Engineering

The first group surveyed was CEE students who have selected either Water Resources or Environmental Engineering as their specialty-area electives, usually chosen in their junior or senior year (Figure 3). These students have self-selected interests in those two subjects and would be likely candidates for the BS ENVE program. We excluded students who did not select specialty areas in Environmental Engineering or Water Resources since they are not likely interested in a

stand-alone BS ENVE program. The survey was distributed to 12 students enrolled in Water Resources II in the Fall of 2018 and 18 in Environmental Engineering II in the Spring of 2019. Of those, we received 25 responses, an 83% response rate. Of the respondents, 60% decided to specialize in ENV or WR engineering before or when they entered the CEE department. When asked to gauge their interest in and BS ENVE degree relative to the BS CE, more than half (14/25) said they would be Extremely Interested or Very Interested in that degree program, and an additional 9/25 reported moderate or slight interest in the proposed program (Figure 4).

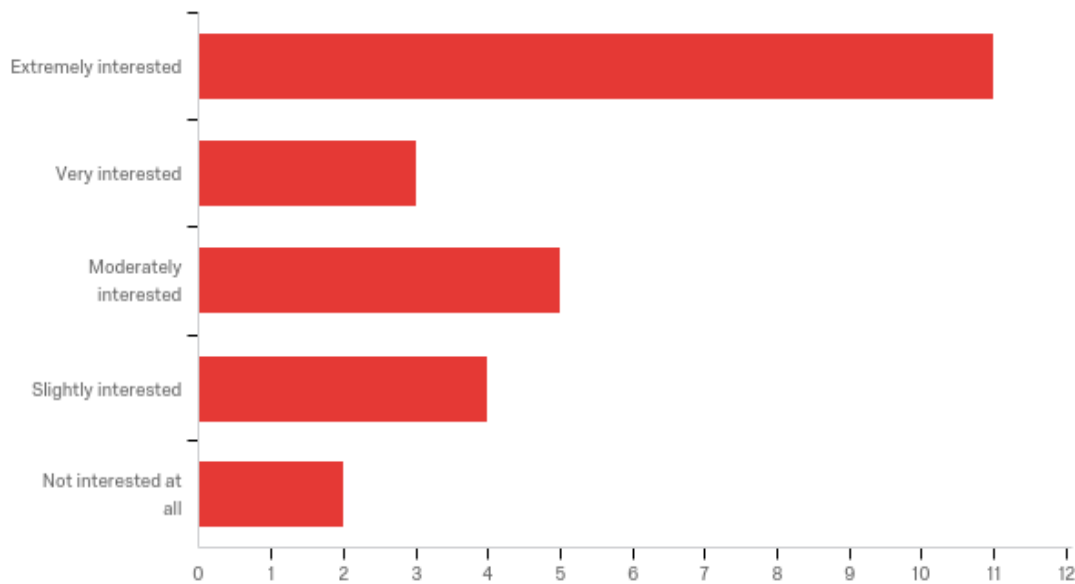


Figure 4: Q13 - Compared to a general Civil and Environmental Engineering degree, how interested would you be in a standalone Environmental Engineering BS program (not a concentration) that would allow you to focus on environmental and water resources training that would NOT include broader Civil Engineering disciplines in construction, geotechnical, structures and transportation?

From Fall 2017 to Fall 2019, 53 students selected either Environmental Engineering or Water Resources as one of their specialty areas for 165 total BS CE graduates. This figure of 53 students, or roughly one-third of the CE graduates, represents the potential market from students already in our department for a BS ENVE. Of these, 18 students selected both specialty areas, while the others selected either Environmental Engineering or Water Resources and another specialty in CE. Sometimes scheduling conflicts make it difficult for students to choose the desired secondary specialty area, and they make this selection based on convenience. We believe these data indicate clear interest among existing Junior and Senior CE students for an ENVE BS program. At the same time, there will likely continue to be students who select these specialty areas while remaining in the BS CE degree program.

2. Incoming Students (first- and second-year students)

To assess interest from students outside the department, we also surveyed first- and second-year students in the TCE Engineering Fundamentals courses. This process allowed us to identify

students when they were choosing majors and gauge their awareness and interest in Environmental Engineering degree programs. The survey was distributed to 672 students in EF 151 and EF 152, and we received 496 responses (74% response rate). The questions were worded to evaluate students' overall level of interest in the TCE for a BS ENVE program if it did not require typical CE coursework (e.g., Structural Engineering or other “dry side” courses). This large cohort included all TCE majors, so many of them (e.g., electrical engineers) did not show any interest in an ENVE BS program. Forty-five freshmen (including ten who had declared an interest in CE) stated they would be *extremely interested* in a BS program. This number would likely be higher if all students had responded to the survey. In summary, a BS ENVE program could generate enough first-year student familiarity and interest to support itself as a viable program among current TCE students. On average, students across all Engineering majors (except declared CE students) indicated that they would be more interested in a BS ENVE program than the current BS CE program.

Students outside of TCE or UT

Additionally, two sources of student populations for program enrollment are challenging to assess. However, these sources have the potential to attract additional prospective students. First, students outside TCE could be interested in a BS ENVE program. We did not conduct university-level surveys.

A more significant draw will be students recruited from across the state or region that would not have considered UT because it lacked a BS ENVE program. It is not easy to know how many students we can attract currently selecting other institutions. However, other BS ENVE programs in the region have large student enrollment (Table 1), indicating significant demand.

Local and Regional Need/Demand

National demand for Environmental Engineers is strong. The US Bureau of Labor Statistics indicates that there were 52,300 Environmental Engineering Jobs in 2020, an increase of 1,900 during the last ten years. They further estimate that environmental engineering jobs will increase by another 4% over the next decade. The estimated annual salary for an environmental engineer is \$96,820 per year, which is slightly greater than that for civil engineers (\$88,050).¹¹

As mentioned previously, environmental engineers often fill positions described as “Environmental Scientists and Specialists, Including Health,” which are identified by the state of Tennessee as high-demand occupations¹². Likewise, Tennessee has also projected that Environmental Engineers are expected to increase by 15.64% from 1151 in 2016 to 1331 in 2026.¹³ There are no existing BS Environmental Engineering degree programs in TN to meet this need.

In the sections below, we share results from our analysis of current regional job openings, a survey of local employers, and letters of support from local, regional, and national employers. These lines

¹¹ <https://www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm>

¹² Op. Cit. <https://www.tn.gov/content/tn/thec/research/supply-and-demand.html>

¹³ Op. Cit. <https://www.jobs4tn.gov>

of evidence confirm that the workforce demand for environmental engineering graduates is strong, warranting the first such program in Tennessee.

Employer Demand

To assess the regional job market for Environmental Engineers, we conducted two job searches for Environmental Engineering positions on LinkedIn with the following parameters:

- Experience Level: Entry Level
- Job Type: Full Time
- Locations:
 - Search 1: Tennessee
 - Search 2: Atlanta GA, Charlotte NC, Raleigh NC, Austin TX, Dallas TX, Houston TX
- Job Function: Analyst, Consulting, Research, Engineering, and Project Management
- Title: Environmental Engineer, Environmental Specialist, Civil Engineer
- Date: The searches were conducted on November 1, 2022

Search 1 focused on Tennessee and returned 64 jobs, while Search 2 focused on major metropolitan areas in the southeast region, returning 212 jobs. Each of these listings was screened to identify jobs for which a BS in Environmental Engineering fulfills the educational requirement, yielding more than 25 positions in Tennessee and 100 positions regionally. Screenshots from the two searches and a list of 30 example positions are listed in Appendix C. The search demonstrates a strong employment market for degree holders with a BS in Environmental Engineering in Tennessee and regionally.

Strong employment prospects for our MS ENVE graduates over many years provide additional evidence of employer demand for Environmental Engineers. Our graduates have gone to work for employers such as private consulting and industry, as well as utilities and government agencies (ORNL, TVA, NOAA, the Southeast Regional Climate Center, US Army Corp of Engineers, the USGS, and the Tennessee Department of Environment and Conservation).

One remaining question we addressed through a survey was employer preference between ENVE and CE at the undergraduate level. Some of our civil engineering graduates are hired to work in environmental engineering positions. We wanted to assess the extent to which a BS ENVE degree would expand employment opportunities for graduates compared to a BS CE degree and gain employer perspective on future needs. We sent surveys to 15 employers active in the region and known to hire environmental engineers, including a mixture of private and public-sector employers. Most employers selected for the survey hire heavily from UTK but may be less familiar with BS ENVE graduates since we do not have such a program. We received responses from 11 of the 15 employers. Results from the survey are summarized in Appendix D. Major takeaways from the employer survey include the following points:

- 1) There is a regular and steady demand for environmental engineers.
- 2) Currently, these employers hire mostly BS CEs to fill vacant positions.

- 3) Eight employers would prefer to hire a BS ENVE to fill these positions, while the other three would still prefer to hire employees with BS CEs.
- 4) Traditional CE topics, such as surveying and geotechnical engineering, are useful for much environmental engineering work and should at least be available to BS ENVE students as electives.
- 5) 6 of the 11 employer respondents foresee increased demand for environmental engineers.
- 6) 10 of the 11 employer respondents would similarly compensate employees holding a BS CE and BS ENVE.

Even considering that BS degree graduates from both Civil Engineering and Environmental Engineering programs may be viewed similarly by many employers, the BS ENVE degree represents tremendous value to employers by drawing more students to water and wastewater treatment and water resources. There is currently a tremendous shortage of graduates to fill entry-level positions in this industry. Without the availability of a BS ENVE degree, these students are likely to pursue other fields. The visibility of the BS ENVE degree will attract more students to a high-demand profession, thereby contributing a solution to workforce shortages in infrastructure engineering.

Community and Industry Partnerships

The Department of Civil and Environmental Engineering has rich and long-standing relationships with the community and industry, which we will leverage to support the new degree program. These include local- and state-based **research sponsorship relationships** with the Great Smoky Mountain National Park, the Tennessee Department of Environment and Conservation, the Tennessee Department of Transportation, and several local industries. We partner with many consulting engineering companies, local utilities, state agencies, industries, and non-profit groups each year on capstone senior design projects. We anticipate expanding these partnerships to support the environmental engineering capstone design sequence. Local parent organizations, including the Knoxville Branch of the American Society of Civil Engineers, the Tennessee-Kentucky Water Environment Association, the Tennessee Section of the American Water Resources Association, and the Tennessee Society of Professional Engineers, support the department student chapters of professional organizations. Many local, regional, and national employers provide **internships, cooperative education, and full-time post-graduate employment opportunities**.

Letters of support from a sampling of employers demonstrating the high demand for graduates and willingness to support the program are provided in Appendix A.

Section IV: Enrollment and Graduation Projections

We estimate that each entering first-year class will have 30 BS ENVE students. This estimate is conservative based on the survey of current TCE first-year students and assuming new students from outside the TCE and UTK select this program. We also assume that, during the program's first year (Fall 2023), we will recruit 20 sophomores from the previous year's first-year class.

We developed an enrollment model based on UG data from the BS CE program from 2012 to 2022. In developing the model, we tracked the enrollment behavior of each student to gain deep and high-confidence insights into factors that govern enrollment on a year-by-year basis. We assumed that the trends observed in the BS CE program would be our best estimate of enrollment patterns in the BS ENVE degree. During this period, we identified the following trends that form the basis of the model:

- Each year, 30 new students will enter the program as first-year students.
- On average, the second-year class is 69%, as large as the first-year class from the previous year. The decrease in enrollment occurs due to the common practice of TCE students to switch majors in their first year and because some first-year students take more than one academic year to earn more than 30 credit hours.
- On average, the Junior class is 118%, as large as the Sophomore class from the previous year. The net increase occurs because of a net gain from transfer students (both internal to UTK and external) and a few students who have less than 30 credit hours after their first year but more than 60 credit hours after their second year, thereby never showing up as Sophomores in university data.
- The second and third assumptions are equivalent to the attrition of five students per year.
- On average, 60% of Seniors (defined as students having over 90 credit hours at the beginning of the fall semester) graduate by the end of that academic year. The remaining students require additional time to complete graduation requirements. We also identified some students that entered the BS CE degree program with more than 90 credit hours. These are typically second-degree students or students who did not complete their degrees when enrolled in a different major earlier in their academic careers. Together, these factors make the Senior class the largest of the four categories.
- We estimate the number of Seniors in any given year by:
$$\text{Seniors (previous year)} - \text{graduates (previous year)} + \text{juniors (previous year)}$$

Based on these assumptions, the BS enrollment during the program's first five years is projected as described in Table 3.

Table 3.

Projected Enrollment in the BS ENVE Program During the First Five Years Of The Program.

Year	Academic	Freshmen	Sophomores	Juniors	Seniors	Projected Total Enrollment	Projected Attrition	Projected Graduates
1	2023-2024	30	20	10	0	50	5	0
2	2024-2025	30	21	24	10	75	5	0
3	2025-2026 ¹	30	21	25	24	100	5	14
4	2026-2027 ²	30	21	25	35	111	5	21
5	2027-2028	30	21	25	39	115	5	23

¹Prepare ABET accreditation report; ²ABET accreditation visit

By 2027, the projected BS ENVE enrollment will be approximately 1/3 the enrollment of our current BS CE program, which matches the average ratio of BS ENVE to BS CE students at peer institutions, suggesting that the enrollment projections are reasonable. We also project that 50% of the students will be women, based on the percent female enrollment at peer institutions.

Section V: Projected Costs to Deliver the Proposed Program

The Department of Civil and Environmental Engineering has offered an environmental and water resources-related curriculum for several decades. Therefore, most of the faculty and staff needed to support the program are already in place, as well as the laboratories and equipment. As a result, the projected costs to offer the degree program are modest.

Faculty and Instructional Staff

TCE approved one new faculty line to support the new BS ENVE degree program. That individual, an assistant professor, has already been hired, effective August 1, 2022, and is the basis of new operating expenses. We currently have two open positions for a lecturer and Goodrich Chair, but these are historical positions and require no new resources. After we fill the open positions, we will have sufficient faculty to offer the BS ENVE program.

The new faculty member's final two years of the start-up budget appear as one-time equipment costs in the THEC Financial Projection Form (actual expenditures are likely to be in diverse categories, including equipment, graduate student support, summer faculty salary, and travel). Salaries are calculated from the assistant professor's 2022 base salaries of \$100,000, increasing by 3% per year. Faculty fringe benefit rates are estimated at 33%.

Non-Instructional Staff

We project that an additional academic advisor will be needed to advise students within the program. The projected workload will be approximately 50%, with the other half of the position able to be assigned to other advising responsibilities either within the department or the college. The full-time salary for the position is estimated to be \$48,000, increasing by 3% per year. Staff fringe benefit rates are estimated at 33%.

Graduate Assistants

We have also included expenses related to two new GTA lines (one beginning in year two and the second beginning in year 4) that will likely be allocated to the department in the coming years through the TCE GTA allocation formula. Graduate student tuition is assumed to increase by 3% a year, and health insurance at 8% per year. We also assume that half of the graduate student tuition will be paid by research contracts.

Accreditation

We will seek ABET accreditation for the program in the 2026-2025 academic year. We have budgeted \$6700 for the initial off-cycle accreditation visit, plus \$715 per year in accreditation maintenance costs. These costs were obtained from the ABET website.

Consultants

New program approval requires a visit from an external evaluator. We have budgeted \$2500 for this purpose.

Equipment

No new equipment is required to support the new academic program.

Information Technology

No new information technology is needed to support the new academic program.

Library Resources

No new library resources are required to support the new academic program.

Marketing

We are including \$10,000 for a one-year initial marketing program to develop state-wide awareness of the new program.

Facilities

Existing facilities are sufficient to support the new program.

Travel

Any needed travel expenses to support the new program are included in the accreditation, consulting, and marketing costs described above.

Other Resources

No additional resources are required.

Section VI: Projected Revenues for the Proposed Program

Tuition

Tuition income projections were based on the enrollment shown in Table 3. However, it should be noted that of the students listed in Table 3, we project approximately ten students per class will be students who would have previously enrolled in the BS CE program. The rest will be new students to the department.

We made additional assumptions to obtain the tuition revenue estimates in the TDEC Financial Projection forms. We assumed that students would enroll in both the Fall and Spring semesters and that one-third of graduating seniors would graduate in December (thus, enrolling in only one semester), which is consistent with past trends in the BS CE program. We assume that each student will enroll in nine hours of engineering courses per semester, generating differential tuition income at \$110 per student credit hour. We assume a 3% increase in tuition each year and that about 25% of the students will be out-of-state, consistent with recent trends in TCE (TCE out-of-state enrollment in first-year cohort 2019: 22% 2020: 26% 2021: 30% 2022: 36%).

Grants

New faculty members are expected to conduct externally-funded research. By the end of year five, collectively, the new faculty member allocated to start this new degree program should be generating at least \$250K of research expenditures per year. Assuming an average effective F&A rate of 35% of direct costs on this research, this represents about \$90K per year in F&A. However, since none of these contracts are in place currently, we did not include research funds in either the revenue or expenses portion of the THEC Financial Projection Form.

Our projection indicates that the BS ENVE program will generate excess income each year that can be reallocated to other University and TCE priorities.

Other

We are not anticipating other income sources during the program's first five years.

Appendix A: Letters of Support



United Cleanup Oak Ridge LLC

P.O. Box 4699 | Oak Ridge, TN 37831

ORRCC-22-0732

December 8, 2022

Dr. Chris Cox, Department Head
Department of Civil and Environmental Engineering
John D. Tickle Engineering Building
The University of Tennessee
851 Neyland Drive, Suite 325
Knoxville, TN 37996

Dear Dr. Cox:

Support for Bachelor of Science Degree Program in Environmental Engineering

Please accept this letter in support of the University of Tennessee's plan to develop a Bachelor of Science degree in Environmental Engineering.

UCOR is the prime cleanup contractor for the Department of Energy's Oak Ridge Office of Environmental Management, and our 2,000-strong workforce is tasked with the responsibility to safely manage environmental cleanup and risk reduction across the Oak Ridge Reservation. This \$8.2 billion cleanup over the next decade will include decontaminating, deactivating, demolishing, and disposing of waste, and remediating former nuclear and industrial facilities for future science and national security investments at the Oak Ridge National Laboratory, Y-12 National Security Complex, and the Heritage Center (formerly East Tennessee Technology Park).

UCOR is an economic engine for Tennessee: beyond our 2,000-strong workforce, an analysis by UT's Howard H. Baker Jr. Center for Public Policy determined that our environmental cleanup at the Oak Ridge Reservation has a \$1.3 billion annual economic impact in Tennessee and supports 7,022 full-time jobs. And UCOR's cleanup success at the Heritage Center has also enabled approximately \$500 million in planned investment at the Heritage Center, as well as making Oak Ridge the epicenter of the renaissance of the commercial nuclear industry.

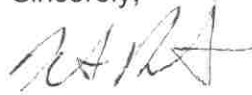
As a corporate partner to the University of Tennessee, we understand that students in the BS Environmental Engineering program will have the option of completing the Nuclear Decommissioning and Environmental Management minor. Our industry would certainly be interested in hiring students with this background, which includes understanding of project management, construction management, and the radiological and environmental risks associated with materials and wastes used in nuclear-related industries. In addition, environmental engineering skills in waste management and multi-media fate and transport and risk assessment are applicable to many of our projects. There is a tremendous unfilled need for engineers with this background, both locally and nationally.

As part of our memorandum of understanding with the university, we would seek to recruit graduates from your program to fill internship, co-op, and entry-level positions in our organization. We would also seek to support your program through promotion of the minor to your students; advice on curriculum development; generation of relevant capstone design projects; and potential research support for faculty who specialize in this area.

Dr. Chris Cox
Page 2
ORRCC-22-0732
December 8, 2022

Please let us know how we can further support the development of your Environmental Engineering degree program.

Sincerely,



Kenneth J. Rueter
President and Chief Executive Officer

KJR:SLD:JSA:vxI

c: J. S. Aylor
H. T. Conner
S. L. Dolynchuk
File—DMC—NoRC



8 December 2022

Dr. Chris Cox
University of Tennessee Knoxville - Civil & Environmental Engineering
427 John D. Tickle
Knoxville, TN 37996-2313

Re: Tennessee Higher Education Commission
BS Environmental Engineering Degree

Dear Dr. Cox:

I write this letter in support of the University of Tennessee's Tickle College of Engineering initiation of a new Environmental Engineering program.

Gresham Smith is a Nashville, TN based architecture, engineering, and planning firm with nearly a national footprint. With more than 1,100 employees, the firm is engaged with clients in aviation, healthcare, manufacturing, commercial development, transportation, and water/environment. Gresham Smith's annual revenue exceeds \$250 million.

As you are well aware, we consider the University an important industry partner as evidenced by my participation on advisory boards both for the Department of Civil and Environmental Engineering and for the Tickle College of Engineering.

Over the course of the past several years, the largest headwind to our company's growth has been the availability of talent. Given the dynamics in the AEC industry, we foresee this shortage of engineers to continue over a significant period, particularly in light of recent federal funding for infrastructure and green energy projects. In short, the need for infrastructure-related engineers in all experience ranges puts downward pressure on our ability to serve our clients at a time when their needs are increasing. In 2022, we have hired approximately 110 new engineers (including environmental professionals) and still have unmet recruitment needs.

Gresham Smith will stand to benefit from access to an increased pipeline of environmental engineering interns to help us meet the needs of our clients across the State of Tennessee, and the United States.

I would be pleased to address any questions that you may have.

Sincerely,



Randall E. Gibson, P.E.
Chief Strategy Officer

222 Second Avenue South

GreshamSmith.com

Genuine Ingenuity

Suite 1400

Nashville, TN 37201



December 5, 2022

The University of Tennessee – Knoxville
Department of Civil and Environmental Engineering
325 John D. Tickle Engineering Building
851 Neyland Drive
Knoxville, Tennessee 37996-2313

Attention: Dr. Chris Cox, PhD, PE,
Department Head and Robert M. Condra Professor

Reference: Potential BS Degree Program in Environmental Engineering

Dear Dr. Cox:

Thank you for reaching out regarding the University of Tennessee – Knoxville (UTK) Department of Civil and Environmental Engineering's (DCEE) planning for a Bachelor of Science (BS) degree program in Environmental Engineering. This BS program is an interesting development with the potential to assist consulting firms like S&ME address future staffing needs.

Over the last 30 years, S&ME has hired many UTK DCEE graduates for roles in our geotechnical, construction services, civil, environmental, and water resources practices. We appreciate their grounding in civil engineering basics and agility to adapt to our market needs. However, while the need for agility is ever present, as engineering knowledge grows, so does the need for specialization. In the environmental engineering area, S&ME will need new graduates knowledgeable in site assessment, contaminate fate and transport (hydrogeology), solid waste management, stormwater management, vapor intrusion control, air pollution management, and environmental regulations while still having a grounding in traditional civil engineering skills such as surveying, drafting, surface water hydrology and hydraulics, and construction materials properties. Knowledge of the graphical language of engineering drawings and geographic information systems is important, but the ability to communicate in writing and verbally is critical. Students should have occasions in every class to practice communicating.

A BS degree program in Environmental Engineering at UTK DCEE will supply employers with qualified graduates having the specific and general knowledge to be immediately productive but also able to evolve as society's needs change. It will also attract students who may not have considered engineering in general, or civil engineering in particular, to the profession, helping to ease the looming talent shortage. We look forward to learning more about this new program as plans progress. Please let us know how we can be of any assistance.

Sincerely,

S&ME, Inc.

Handwritten signature of Ken Barry in black ink.

Ken Barry, PE, D. WRE
Technical Principal / Vice President

Handwritten signature of Gregory B. Page in blue ink.

Gregory B. Page, PE
Principal Engineer



Dr. Chris Cox
Head and Professor
Department of Civil and Environmental Engineering
325 John D. Tickle Engineering Building
851 Neyland Drive
The University of Tennessee
Knoxville, TN 37996

Dear Dr. Cox,

I am writing in support of the University of Tennessee's plan to develop a BS degree in Environmental Engineering. I graduated from UT with a BS in Civil Engineering (2001) and an MS in Environmental Engineering (2004). As such, I am very familiar with the content of your proposed BS Environmental Engineering degree. As a practicing engineer at First Utilities District (FUD) of Knox County, I can attest to the critical role environmental engineers play in providing people access to clean and dependable drinking water and in preserving water quality in our lakes, rivers, and aquifers. The ability to continue to provide these services is dependent upon a continual supply of well-trained engineers with specialized knowledge about environmental engineering.

My awareness of the importance of engineering education has motivated me over the past several years to volunteer my time to support the Civil Engineering 481 Water Resources II class, taught by Dr. John Schwartz and the Civil Engineering capstone design course taught by Dr. Jenny Retherford. To support these classes, I work with the instructors to develop real-world design projects to give practical experiences to students, give guest lectures, and mentor student teams. My understanding is that equivalent courses will be offered to students in the Environmental Engineering degree program and it is my intention to continue to support these classes in a similar manner in future years.

I anticipate that graduates from the proposed BS in Environmental Engineering program will have the knowledge and skills to make strong contributions to the water infrastructure industry. Graduates from an environmental degree program will be in high demand with water utilities such as FUD, regulatory agencies, and consulting engineers.

Please let us know how we can further support the development of your environmental engineering degree program.

Sincerely,

A handwritten signature in black ink that reads "Mark W. McKinney, PE". The signature is stylized and includes a long horizontal flourish at the end.

Mark W. McKinney, PE
Capital Engineer Supervisor

November 29, 2022

Dr. Chris Cox
Head and Professor
Department of Civil and Environmental Engineering
325 John D. Tickle Engineering Building
851 Neyland Drive
The University of Tennessee
Knoxville, TN 37996

Dear Dr. Cox,

I am writing in support of the University of Tennessee's plan to develop a BS degree in Environmental Engineering.

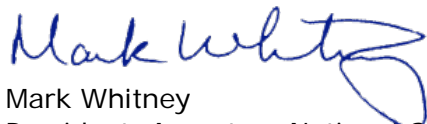
As the President of Amentum's National Security group, I oversee day-to-day operations, manage profit and loss, strategic initiatives, and business development activities for Amentum's work for clients such as the Department of Energy, National Nuclear Security Administration, and the U.S. Army Corps of Engineers across the United States and several other countries around the world. One of the primary capabilities of our organization is associated with managing environmental cleanup for these customers at sites such as the Oak Ridge Reservation (Tennessee), Savannah River Site (South Carolina), and Hanford Site (Washington) to name a few. Given the extremely large market for environmental cleanup that is estimated to range in the hundreds of billions of dollars both here domestically and across the world, having a pipeline of qualified students is imperative to support our company in the decades to come.

As a corporate partner to the University of Tennessee, we understand that students in the BS Environmental Engineering program will have the option of completing the Nuclear Decommissioning and Environmental Management minor. Our industry, and particularly our company, is interested in hiring students with this background, which includes understanding of project management, construction management, and the radiological and environmental risks associated with materials and wastes used in nuclear-related industries. In addition, environmental engineering skills in waste management and multi-media fate and transport, and risk assessment are applicable to many of our projects. There is a tremendous unfilled need for engineers with this background nationally.

As part of our memorandum of agreement with the university, we would seek to recruit graduates from your program to fill internship, co-op, and entry-level positions in our organization. We would also seek to support your program through promotion of the minor to your students, advice on curriculum development, generation of relevant capstone design projects, and potential research support for faculty who specialize in this area.

Please let us know how we can further support the development of your Environmental Engineering degree program.

Sincerely,



Mark Whitney
President, Amentum National Security

August 22nd, 2022

Dr. Chris Cox
Head and Professor
Department of Civil and Environmental Engineering
325 John D. Tickle Engineering Building
851 Neyland Drive
The University of Tennessee
Knoxville, TN 37996

Dear Dr. Cox,

I am writing on behalf of HDR Engineering, Inc. to support the University of Tennessee's plan to develop a BS degree in Environmental Engineering.

HDR is a top 5 rated engineering firm by Engineering News Record, with more than 11,000 employees in offices across the US and around the world. Engineers with strong backgrounds in environmental engineering and water resources lead projects related to water supply and distribution, wastewater collection and treatment, air quality management, site remediation, water resources management, and sustainable energy systems. These projects are distributed across the various markets sectors we serve, including Water, Waste, Energy, Transportation, and Industrial. Many of the projects serve to protect public health, manage natural resources, and protect the environment as a whole.

HDR hires over 200 entry-level engineers each year, including graduates of BS in Environmental Engineering programs. Environmental engineers are well-suited to fill many of these positions. Our demand for engineers with strong training in environmental engineering and water resources is projected to be strong for the foreseeable future.

We are excited about the prospect of a BS in Environmental Engineering degree program at the University of Tennessee. We would seek to recruit graduates from your program to fill entry-level positions in our offices in the Southeast and nationally. Moreover, we would gladly support other academic activities such as providing input on curriculum development and potentially working with you to develop capstone design projects based on real-world projects.

Please let us know how we can further support the development of your BS in Environmental Engineering degree program.

Sincerely,

Shane

Shane R. Womack, PE, Vice President, Office Principal, UT Knoxville BSCE Graduate, 1992

HDR Engineering, Inc.



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Solid Waste Management
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 14th Floor
Nashville, Tennessee 37243

October 1, 2019

Dr. Chris Cox, Department Head
Department of Civil and Environmental Engineering
525 John D. Tickle Building
University of Tennessee -- Knoxville
Knoxville, TN 37996

Subject: Establishment of Environmental Engineering Program
University of Tennessee – Knoxville

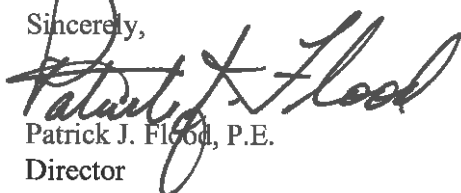
Dear Dr. Cox:

I understand that the Civil and Environmental Engineering Department at the University of Tennessee is making plans to establish a Bachelor's degree in Environmental Engineering. Environmental engineers play a vital role in protecting public health and preserving environmental resources across the state of Tennessee in areas such as safe drinking water, sanitation, solid waste management, environmental remediation, air quality, water resources management, groundwater, and numerous others.

Environmental engineers are employed in public utilities, manufacturing, consulting engineering firms, and state and federal agencies, including my own, the Tennessee Department of Environment and Conservation. This degree program will play a vital role in workforce development in Tennessee, especially since there are currently no undergraduate environmental engineering programs offered by any of Tennessee's colleges or universities. I am also pleased to learn that the degree program you are envisioning will prepare graduates to contribute solutions to some of the most important issues facing Tennessee and the nation, including sustainable energy and water systems, smart and resilient communities, and informed community-driven decision making.

I wholeheartedly support the development of an Environmental Engineering Program at the University of Tennessee – Knoxville. Please let me know how I may offer support for your plans to develop this degree program. Thank you.

Sincerely,



Patrick J. Flood, P.E.
Director



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 19, 2019

Dr. Chris Cox
Department Head, Civil and
Environmental Engineering
University of Tennessee
325 John D. Tickle Building
851 Neyland Drive
Knoxville, Tennessee 37902

Dear Dr. Cox:

Thank you for soliciting TVA's input on the proposed creation of an Environmental Engineering bachelor's degree at the University of Tennessee. As you know, TVA hires many students from UT's current civil engineering program. These students have gone on to successful careers for TVA, in roles as diverse as river management, bridge engineering, and geotechnical engineering and structures.

It is important to note that each of these career paths at TVA are fairly specialized tracks. To illustrate, let me use the group I lead as an example. Within River Management, we depend on a deep set of water resources engineering and policy skills. We depend on staff to make extremely complex decisions that affect the lives of millions of people. These decisions are typically supported by very complex statistical and modelling techniques that often cannot be performed by a new graduate with a generalist civil engineering background. For that reason, we prefer to hire M.S. level graduates into our group. Even so, it often requires a year or two of skills acquisition for that new hire to make a significant contribution.

Your effort to create an undergraduate program that would focus more heavily on the water resources, environmental, and policy aspects of engineering would allow graduates to be more immediately beneficial to TVA.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Barnett".

Tom Barnett, PE
General Manager
River Management

Appendix B: THEC Financial Projection Form

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
I. Expenditures							
A. One-time Expenditures							
New/Renovated Space	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment	150,000	150,000				-	-
Library	-		-	-	-	-	-
Consultants	2,500	-	-	-	-	-	-
Travel	-	-	-	-	-	-	-
Other (marketing, accreditation)	10,000	-	6,700	-	-	-	-
Sub-Total One-time	\$ 162,500	\$ 150,000	\$ 6,700	\$ -	\$ -	\$ -	\$ -
B. Recurring Expenditures							
Personnel							
Administration							
Salary	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits	-	-	-	-	-	-	-
Sub-Total Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Faculty							
Salary	\$ 103,000	\$ 106,090	\$ 109,273	\$ 112,551	\$ 115,927	\$ -	\$ -
Benefits	33,990	35,010	36,060	37,142	38,256	-	-
Sub-Total Faculty	\$ 136,990	\$ 141,100	\$ 145,333	\$ 149,693	\$ 154,183	\$ -	\$ -
Support Staff							
Salary	\$ 24,000	\$ 24,720	\$ 25,462	\$ 26,225	\$ 27,012	\$ -	\$ -
Benefits	7,920	8,158	8,402	8,654	8,914	-	-
Sub-Total Support Staff	\$ 31,920	\$ 32,878	\$ 33,864	\$ 34,880	\$ 35,926	\$ -	\$ -
Graduate Assistants							
Salary	\$ -	\$ 12,000	\$ 12,000	\$ 24,000	\$ 24,000	\$ -	\$ -
Benefits	-	2,688.00	2,903.04	3,135.28	3,386.11	-	-
Tuition and Fees* (See Below)	-	8,999	8,999	8,999	8,999	-	-
Sub-Total Graduate Assistants	\$ -	\$ 23,687	\$ 23,902	\$ 36,134	\$ 36,385	\$ -	\$ -
Operating							
Travel	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Printing	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-
Other (accreditation)	-	-	-	715	715	-	-
Sub-Total Operating	\$ -	\$ -	\$ -	\$ 715	\$ 715	\$ -	\$ -
Total Recurring	\$ 168,910	\$ 197,664	\$ 203,098	\$ 221,421	\$ 227,209	\$ -	\$ -
TOTAL EXPENDITURES (A + B)	\$ 331,410	\$ 347,664	\$ 209,798	\$ 221,421	\$ 227,209	\$ -	\$ -

Base Tuition and Fees Rate	\$	-	\$	17,997	\$	18,537	\$	19,093	\$	19,666	\$	-	\$	-
Number of Graduate Assistants		-		1		1		2		2		-		-

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
II. Revenue							
Tuition and Fees ¹	913,357	1,394,363	1,844,895	2,070,289	2,175,933	-	-
Institutional Reallocations ²	(581,947)	(1,046,699)	(1,635,097)	(1,848,868)	(1,948,724)	-	-
Federal Grants ³	-	-	-	-	-	-	-
Private Grants or Gifts ⁴	-	-	-	-	-	-	-
Other ⁵	-	-	-	-	-	-	-
BALANCED BUDGET LINE	\$ 331,410	\$ 347,664	\$ 209,798	\$ 221,421	\$ 227,209	\$ -	\$ -

Notes:

(1) In what year is tuition and fee revenue expected to be generated and explain any differential fees. Tuition and fees include maintenance fees, out-of-state tuition, and any applicable earmarked fees for the program.

Total program enrollment projections are 2023: 50; 2024: 75; 2025: 100; 2026: 211; 2025: 115. One third of graduates are assumed to graduate in December. In state and out-of-state tuition includes 2% increase per year. Differential tuition for engineering is estimated to be charged for 9 hours per semester, on average. We assume 25% of students are out of state

(2) Please identify the source(s) of the institutional reallocations, and grant matching requirements if applicable.

The program is in the black in each of the first five years. Funds can be used within the Tickle College of Engineering to cover expenses and support priorities.

(3) Please provide the source(s) of the Federal Grant including the granting department and CFDA(Catalog of Federal Domestic Assistance) number.

New faculty are expected to bring in new research dollars (including F&A), ramping up over time ramping up to >\$300K per year for the faculty to be hired. Since none of these contract have been awarded, they are not included in the budget.

(4) Please provide the name of the organization(s) or individual(s) providing grant(s) or gift(s).

None

(5) Please provide information regarding other sources of the funding.

None

Appendix C: Results from Online LinkedIn Job Search

Search 1: Tennessee

environmental engineering jo... Tennessee, United States

Jobs | Entry level 1 | Full-time 1 | Job Function 5 | Title 3 | Date Posted | Company | All filters | Reset

Environmental engineering jobs in Tennessee, United States

- Civil Project Engineer**
Thomas & Hutton
Smyrna, TN (On-site)
Vision, Dental
2 connections work here
3 weeks ago 2 applicants
- Civil Engineer - Structural Design**
The Pictsweet Company
Bells, TN
2 company alumni work here
1 week ago 0 applicants
- Traffic Engineer**
WSP USA
Nashville, TN (Hybrid)
Actively recruiting
1 week ago 7 applicants
- Geotechnical Engineer**
Universal Engineering Sciences
Memphis, TN (On-site)
3 connections work here
1 month ago 0 applicants
- Civil Engineer Aviation**
Kimley-Horn
Nashville, TN
7 connections work here
1 month ago 0 applicants

Search 2: Major Regional Metropolitan Areas

LinkedIn search results for "environmental engineering jobs" in the United States. The search filters are: Entry level: 1, Full-time: 1, Location: 6, Job Function: 5, Title: 3, Date Posted: [dropdown], All filters, Reset.

Environmental engineering jobs in United States

- Environmental Engineer**
CPS, Inc.
Atlanta, GA (On-site)
1 alum works here
Promoted Easy Apply
- Staff Environmental/Civil Engineer (Entry Level)**
ERM
Charlotte, NC (Hybrid)
8 company alumni work here
Promoted 1 applicant
- Graduate Water Resources Engineer**
WSP USA
Dallas, TX
148 alumni work here
Promoted 17 applicants
- Critical Environments Operating Engineer**
JLL
Austin, TX
Medical, Vision, Dental, 401(k)
1 company alumnus works here
Promoted 1 applicant
- Environmental Engineer**
North Carolina State University
Raleigh, NC (On-site)
109 alumni work here
1 month ago 1 applicant

Summary of 30 Positions Identified During Online Job Search

Employer	Job Title	Location	Education Requirement	Link
Leidos	Environmental Engineer	Oak Ridge, TN	Bachelor's degree in environmental/civil/engineering or related science degree	https://www.linkedin.com/jobs/view/3305771865/
LJA Engineering, Inc	Graduate Engineer - Water/Wastewater	Knoxville, TN	Bachelor of Science, Civil or Environmental Engineering is required.	https://www.linkedin.com/jobs/view/3313561147/
CDM Smith	Environmental Engineer 1	Nashville, TN	Bachelor's degree in Civil, Environmental, or Chemical Engineering or related discipline.	https://www.linkedin.com/jobs/view/3334619792/
Thomas & Hutton	Project Manager - Water Wastewater Engineer	Smyrna, TN	Bachelor's degree in Civil Engineering, Environmental Engineering	https://www.linkedin.com/jobs/view/3324487714/
S&ME	Civil Engineering Staff Professional	Knoxville, TN	A bachelor's degree in Civil or Environmental Engineering.	https://www.linkedin.com/jobs/view/3250373971/
S&ME	Civil Engineering Staff Professional	Nashville, TN	A bachelor's degree in Civil or Environmental Engineering.	https://www.linkedin.com/jobs/view/3153298663/
Tetrattech	Junior Environmental Scientist/Engineer	Nashville, TN	Degreed individual in the sciences (biology, ecology, geology, hydrogeology, etc.), architecture, or engineering	https://www.linkedin.com/jobs/view/3281929552/
Liberty Personnel Services	Junior Civil Engineer	Nashville, TN	BS in Civil or Environmental Engineering	https://www.linkedin.com/jobs/view/3307183299/
Actalent	Project Environmental Engineer	Brentwood, TN	Bachelor's degree in Construction Engineering, Civil Engineering, Environmental Engineering. or Geotechnical Engineering required.	https://www.linkedin.com/jobs/view/3339849761/

ERM	Staff Environmental Engineer/Geologist/Scientist	Nashville, TN	BS in environmental, civil, or chemical engineering; geology; hydrogeology; or related discipline;	https://www.linkedin.com/jobs/view/3330559539/
CPS, Inc	Environmental Engineer	Atlanta, GA	BS in Environmental Science, Engineering, Chemistry, or another science-related field	https://www.linkedin.com/jobs/view/3224222450/
ERM	Staff Environmental/Civil Engineer (Entry Level)	Charlotte, NC	Bachelor's degree in Civil, Environmental, or Chemical Engineering.	https://www.linkedin.com/jobs/view/3330561732/
WSP USA	Graduate Water Resources Engineer	Dallas, TX	Bachelor's Degree in Civil or Environmental Engineering, with a focus on Water Resources or a closely related discipline.	https://www.linkedin.com/jobs/view/3289793004/
North Carolina State University	Environmental Engineer	Raleigh, NC	Bachelor's Degree in the Engineering discipline related to the area of assignment	https://www.linkedin.com/jobs/view/3332431405/
Terracon	Staff Environmental Compliance Engineer	Charlotte, NC	Bachelor's degree in Chemical Engineering, Environmental Engineering, or other environmental related discipline (Master's degree preferred),	https://www.linkedin.com/jobs/view/3295663375/
McGill and Associates	Water / Wastewater Engineer	Raleigh, NC	Bachelor's Degree in Civil or Environmental Engineering or a related field	https://www.linkedin.com/jobs/view/3310206188/
STV	Water Resources Engineer	Charlotte, NC	Bachelor's degree in Engineering and a master's degree in Engineering is a plus (Civil, Biological, Agricultural, or another related discipline)	https://www.linkedin.com/jobs/view/3325914605/

AECOM	Environmental Engineers All Levels	Dallas, TX	BA/BS degree in environmental, engineering, or other relevant discipline	https://www.linkedin.com/jobs/view/3334609573/
Chord Energy	Environmental Engineer Advisor	Houston, TX	Bachelor's degree in environmental science, engineering, or a related degree	https://www.linkedin.com/jobs/view/3305283575/
Chord Energy	Environmental Engineer	Houston, TX	Bachelor's degree in environmental science, engineering, or a related degree	https://www.linkedin.com/jobs/view/3304959287/
Westwood Professional Services	Civil Graduate Engineer	Dallas, TX	Bachelor's Degree in Civil or Environmental Engineering	https://www.linkedin.com/jobs/view/3323712518/
CHA Consulting	Early Career Environmental Engineer	Atlanta, GA	Bachelor's degree in Environmental Engineering is required.	https://www.linkedin.com/jobs/view/3257605305/
AECOM	Environmental Engineers All Levels	Austin, TX	BA/BS degree in environmental, engineering, or other relevant discipline	https://www.linkedin.com/jobs/view/3312986883/
TRC Companies	Environmental Engineer	Austin, TX	Bachelor's Degree in engineering (environmental, civil, chemical, or agricultural) from an accredited university	https://www.linkedin.com/jobs/view/3153764888/
CyberCoders	Project Engineer - Land Development	Raleigh, NC	BS in Civil or Environmental Engineering	https://www.linkedin.com/jobs/view/3303259898/
ERM	Staff Environmental/Civil Engineer (Entry Level)	Atlanta, GA	Bachelor's degree in Civil, Environmental, or Chemical Engineering.	https://www.linkedin.com/jobs/view/3330560698/
Baxter & Woodman	Water / Wastewater Engineer	Houston, TX	Bachelor of Science Degree from an accredited university in Civil Engineering, Environmental Engineering,	https://www.linkedin.com/jobs/view/3339083598/

			Mechanical Engineering, or a related field.	
AECOM	Environmental Engineers All Levels	Houston, TX	BA/BS degree in environmental, engineering, or other relevant disciplines	https://www.linkedin.com/jobs/view/3312992110/
Aqua	Project Engineer	Houston, TX	Bachelor's degree in Mechanical, Civil, or Environmental Engineering	https://www.linkedin.com/jobs/view/3325850328/
Garver	Project Engineer	Atlanta, GA	Bachelor's degree in civil, biological, or environmental engineering from an ABET-accredited program Registered as an Engineer Intern (EI)	https://www.linkedin.com/jobs/view/3324950656/

Appendix D: Summary of Employer Survey Responses

In the last five years, how many entry-level engineering positions did your firm (or branch office) hire that included environmental engineering in the job description?

- 2 to 5: 4 respondents
- 6 to 13: 6 respondents
- About 100: 1 respondent

About what proportion of those were filled by a candidate with a civil engineering BS degree vs. environmental?

- Predominantly civil: 7 respondents
- About 50/50: 2 respondents
- Only hire Environmental Engineers with graduate degrees: 1 respondent
- Don't know: 1 respondent

Consider two job candidates for a position in your organization that carries the nominal job title of "Environmental Engineer." One candidate holds a BS in Environmental Engineering, and another holds a BS in Civil Engineering. Other than their degree, the two candidates are equally qualified. Please select the statement that most closely reflects your opinion:

- Our organization would prefer the depth of knowledge of a candidate holding the Environmental Engineering degree: 7 respondents
- Our organization would prefer the breadth and versatility of the candidate holding the Civil Engineering degree: 3 respondents
- Our organization only hires people holding an MS degree in Environmental Engineering for such positions: 1 respondent

Thinking 5-10 years into the future, do you think you will have more, less, or about the same level of interest in hiring a student with a BS ENVE degree?

- More: 6 respondents
- Less: 0 respondents
- About the same: 5 respondents

Would you compensate a BS ENVE graduate higher, lower, or about the same as a BS CEE graduate?

- More: 1 respondent
- Less: 0 respondents
- About the same: 10 respondents

Do you have any additional comments?

- River management focus area would be great
- My environmental engineering training served me well, so I favor such a B.S. Degree. Keep in mind that much "environmental work" requires a strong background in Civil Engineering. For example, landfill design is considered environmental but is mostly civil.

- While we almost exclusively hire MS and Ph.D. level engineers, we very much value the BS in ENVE, especially in Tennessee, where PE registration requires a BS in engineering.
- Not at this time
- The preference stated above for Environmental would be slight and a function of the exact position. In some cases, a generalist is preferred.
- Our Division typically hires most of its engineers into either the Solid Waste Program or the Hazardous Waste Program. Traditional Civil Engineering programs would benefit candidates in the Solid Waste Program; an Environmental Engineering program might give a slight benefit to candidates in the Hazardous Waste Program (depending on course content). I would also be VERY concerned about an Environmental Engineering graduate being able to obtain their PE; it would be an easier path for a traditional Civil Engineering graduate.
- I like the idea of a student coming into the workplace better understanding what we do in the water and wastewater industry.
- First, the question that compares the two candidates is not as black and white as asked. There are instances where an Environmental would be a preference over a Civil, but that is not delineated in the question. For example, the preference would be an environmental engineer in a technical services field that deals with environmental programs. However, in general, project management may be Civil, but the answers to the question make you go one way or the other. Also, an Environmental could step into the role of a project manager so that they would be versatile. Second, while Civil students get a well-rounded education, there is a need for what I would term a process engineer. An environmental engineer who has studied more about water and wastewater processes could benefit Plant Operations. They would be technically minded and related to process and could help us troubleshoot process upsets, go back in time, and examine why upsets occurred. They would also need soft skills to communicate and work with a more blue collared workforce in the treatment plant Operator world.
- My Environmental Department head is a relatively young engineer named Matt Bruck. Matt can provide additional information about what consultants in environmental engineering would value.
- TVA River Management would certainly be in favor of hiring graduates who have had more focus on water resources studies
- Great for employers who are big enough to hire ENV BS and CE BS and separate their duties into two categories, but not the best option for a smaller employer who is looking to have the breadth of capabilities or the employee who isn't exactly sure what they want to be when they grow up because too limited in knowledge and skills.