Board of Trustees
Academics and Campus Environment Committee

Tuesday, February 23, 2021
Microsoft Teams

Trustees: Charles Tokarz, Chair; Tim Boaz, Claire Mitchell, Oscar Horton, Les Muma, Melissa Seixas
USF Foundation Board Liaison: Debbie Sembler

A G E N D A

I.	Call to Order and Comments	Chair Charles Tokarz
II.	Public Comments Subject to USF Procedure	Chair Tokarz
III.	New Business – Action Items	
	a. Approval of November 10, 2020 Meeting Minutes	Chair Tokarz
	b. Approval of Tenure as a Condition of Employment	Sr. Vice Provost Dwayne Smith
	c. Approval of the B.S. in Environmental Engineering	Dean Robert Bishop
	d. Approval of 2015-2025 Master Plan Updates	CFO Nick Trivunovich Interim VP Chris Duffy
IV.	New Business – Information Items	
	a. Black Undergraduate Student Enrollment Initiative	Dr. Paul Dosal Mr. Anddrikk Frazier Dr. Lincoln Chandler
	b. USF Health & Wellness Support Services Overview	Dr. Patricia Helton
V.	Adjournment	Chair Tokarz

APPEARANCES BEFORE THE BOARD

Individuals or group representatives, who desire to appear before the Board to address a subject within the Board's jurisdiction may submit their requests in writing at least three (3) days in advance to the Corporate Secretary, c/o Office of Board of Trustees Operations, 4202 E. Fowler Avenue, CGS401, Tampa, FL 33620, specifying the agenda item on which the requestor(s) wishes to comment.

Comments shall generally be heard at Board Committees. However, the President in consultation with the Chair will determine whether the item will be heard and when the item will be heard. There will be a three minute time limit on any presentation. The total time allotted for all comments shall not exceed fifteen minutes, unless approved by the Board Chair.

As permitted by section 286.0114, F.S., the Board Chair may decline to hear any matter that: does not relate to a particular agenda item; is not practicable for a particular meeting; is outside the Board's jurisdiction; or was made available for public comment at a prior committee meeting before the Board takes action.

The Chair may recognize any individual or representative of groups to address the Board.

In order to proceed with the essential business of the Board in an orderly manner, any individual or group representative who attempts to disrupt a Board meeting will be subject to appropriate action pursuant to law.

BOT e-mail address is board@usf.edu.

Per BOT Operating Procedures, Article VI, 03.06.2018

Board of Trustees Academics and Campus Environment Committee

NOTES

Tuesday, November 10, 2020
Microsoft Teams Virtual Meeting

I. Call to Order and Comments

Chair Charles Tokarz welcomed and thank those in attendance, and called the meeting to order with a quorum confirmed by Vice President and Assistant Corporate Secretary Cindy Visot with the following committee members present:

Trustee Tim Boaz
Trustee Stephanie Goforth
Trustee Michael Griffin
Trustee Oscar Horton
Trustee Claire Mitchell
Trustee Byron Shinn
Trustee Charles Tokarz

Chair Tokarz reminded the trustees that the agenda is full of critical action items and information items to support the university's strategic aspirations, so he asked that trustees hold questions until the end of every presentation.

II. Public Comments Subject to USF Procedure

Chair Tokarz confirmed with Dr. Visot there were no requests for public comment.

III. New Business – Action Items

a. Approval of Previous Minutes
   i. August 25, 2020

   Chair Tokarz asked the committee if any edits needed to be made to the minutes and the committee confirmed there were none. A motion for approval was made by Trustee Horton with a second from Trustee Griffin and was approved unanimously by the committee.

b. Tenure as a Condition of Employment

   Provost Wilcox presented the item on behalf of Senior Vice Provost Dwayne Smith. Provost Wilcox presented the three candidates and their qualifications and brief biographies: Drs. Dana Thompson Dorsey and Willis A. Jones for the

College of Education and Dr. James Michael Grichnik for the Morsani College of Medicine.

A motion for approval was made by Trustee Goforth with a second from Trustee Horton and was approved unanimously by the committee.

c. Amendment to USF Regulation 6.0021: Student Code of Conduct

Dean of Students Danielle McDonald presented the item, which was introduced by Chair Tokarz as one necessitated by directive of the US Department of Education and the Florida Board of Governors. Dean McDonald took the trustees through a slide deck and the broadened due process that would be provided to students in the case of violations of the student code of conduct.

A motion for approval was made by Trustee Griffin with a second from Trustee Goforth and was approved unanimously by the committee.

d. 2019-2020 FIO Annual Report

Vice Provost and Acting Director of the Florida Institute of Oceanography James Garey presented the item. Dr. Garey provided an overview of FIO's mission and its status as an Academic Infrastructure Support Organization that USF hosts on behalf of and in support of the entire State University System.

Dr. Garey's presentation included the announcement of the hiring of a permanent director, Dr. William Montrose ("Monty") Graham, as well as data from the previous year and improvements for the coming year, including changes to organization structure and best practices.

A motion for approval was made by Trustee Goforth with a second from Trustee Horton and was approved unanimously by the committee.

Before moving on to the information items BOT Chair Zimmerman wanted to discuss the recent announcements regarding the university's plans for the College of Education and a strategic vision for its future, faculty and students. The trustees had a robust discussion with President Currall and Provost Wilcox including the timing of decisions to be made, budget implications and how to best include stakeholders in the discussions.

IV. New Business – Information Items

a. Academic Continuity: Fall 2020 and Spring 2021

Provost Wilcox and Associate Vice President for Innovative Education Cindy DeLuca presented the item, which included an overview of the unprecedented steps the university has taken to innovate and support its students, faculty and

staff during the COVID-19 pandemic. The presentation also included a breakdown of class modality types, lessons learned from the summer and fall and how to improve upon these for the upcoming spring 2021 semester.

b. Progress Update on SACSCOC Accreditation Site Visit

Vice Provost for Strategic Planning, Performance & Accountability Terry Chisolm presented the item. Dr. Chisolm informed the trustees that the decision had been made by SACSCOC that the site visit will be entirely virtual and that the Provost's Office will be working with IT and participants to ensure everyone has the appropriate technology and support for a seamless visit. Dr. Chisolm also discussed the audit of the university's websites to ensure compliance (e.g. removing USF System, etc.) with the university's consolidated accreditation. Dr. Chisolm informed the committee that one of the upcoming key next steps is the completion of the site visit documentation which needs to be FedExed to SACSCOC by December 11.

c. Strengthening Commitment to Diversity, Equity, and Inclusion at USF: A Performance Dashboard

Before beginning the presentation, Chair Tokarz asked recently appointed Senior Advisor to the President and Provost for Diversity and Inclusion Dr. Elizabeth Hordge-Freeman to introduce herself as this is her first meeting presenting to the BOT. Dr. Freeman briefly discussed her background, including her faculty appointment as associate professor of sociology in the College of Arts and Sciences.

Dr. Freeman presented her item, which will eventually launch at USF as the DARE Dashboard to help the university set goals and track progress to become an anti-racism institution of higher learning. The dashboard looks at various metrics from across the university and applies not only to students, but faculty as well, in four elements of equity and experience: access, achievement, inclusion and engagement. The goal of the dashboard is to help set more effective strategies for promoting student, faculty and staff success and leverage USF's momentum and data-driven approach to become a national model of institutional transformation.

d. Student Access and Success in the Context of COVID-19

Vice President for Student Success Paul Dosal and Dean of Admissions Glen Besterfield presented the item which focused on retention and graduation rates, FTIC enrollment history, as well as goals for 2021 and targets for the FTIC class of 2021. In addition to the metrics, Dean Besterfield also provided an overview of headwinds admissions has faced in light of the COVID-19 pandemic; he also discussed some of the strategies the university has been using to continue to recruit the best and brightest, particularly for Black students. Both Dr. Dosal and

Dean Besterfield were enthusiastic and optimistic about the university's performance and future outlook.

e. Enhancing Faculty Success at USF

Vice Provost Dr. Pritish Mukherjee presented the last item, an update on what the university is doing to support its faculty and help meet its strategic aspirations. Dr. Mukherjee provided an overview of the extensive work the university had done already, following recommendations from its Faculty Success Strategic Initiative Workgroup. Dr. Mukherjee also discussed what he calls a "strategic ecosystem" for faculty success and how it fits within the larger structure and objectives of the university, particularly as President Currall takes the institution through the strategic renewal process.

V. Adjournment

Chair Tokarz asked if any committee member had final comments and thanked all the presenters for their presentations before adjourning the meeting.

Agenda Item: III b

USF Board of Trustees
February 23, 2021

Issue: Tenure Nomination as a Condition of Employment

Proposed action: Approve Tenure as a Condition of Employment

Executive Summary:

Administrators such as the President, Provost, Deans, Chairs, and senior faculty who are recruited to USF are normally awarded tenure as a condition of employment. These highly qualified individuals usually have earned tenure at their previous institutions, which makes them attractive candidates to USF. In order to attract them, USF must provide a package that is competitive with other nationally and internationally ranked institutions. Tenure upon appointment for qualified candidates, among other things, is a term and condition of the employment package that makes USF an institution of choice.

Financial Impact: NA

Strategic Goal(s) Item Supports:
USF Strategic Plan 2013-2018, Goal II

Committee Review Date:
Academic and Campus Environment Committee **–** February 23, 2021

Supporting Documentation Online (*please circle*): **Yes** **No**

- Memorandum to Jordan B. Zimmerman, Chair, USF Board of Trustees
- Tenure Nominations as a Condition of Employment
- Faculty Profiles

Prepared by: Dwayne Smith, Senior Vice Provost & Dean, Graduate Studies, 813-974-2267

UNIVERSITY of SOUTH FLORIDA

MEMORANDUM

DATE: February 23, 2021

TO: Jordan B. Zimmerman, Chair

FROM: Steven C. Currall, President

SUBJECT: Tenure as a Condition of Employment Nominations

I am requesting approval by the USF Board of Trustees of the enclosed Tenure as a Condition of Employment Nominations at USF. In nominating these faculty members for tenure, I certify that the requirements and conditions contained in USF Regulations, Policies, and Procedures for the granting of tenure have been met. I am satisfied that the nominee will make a significant professional contribution to USF and the academic community.

Enclosures

Faculty Nominations for Tenure as a Condition of Employment
USF Board of Trustees Meeting – February 23, 2021

College	Name	Rank	Department/ School	Degree of Effort*	Previous Institution	Tenure at Previous Institution
Arts & Sciences	William (Monty) Graham, PhD	Professor	Integrative Biology	1.0	University of Southern Mississippi	Yes
College of Public Health	George Boustrus, PhD, MSc, BEng	Professor	Occupational Health, Safety and Wellness	1.0	European University Cyprus	Yes

*If less than 1.0 FTE

University of South Florida **1**
Tenure Nominations as a Condition of Employment

Arts & Sciences

William (Monty) Graham, PhD

Dr. Monty Graham joined the faculty of the University of South Florida in January 2021 as Director of the Florida Institution of Oceanography (FIO). There, he will lead the state's only ocean-sciences Academic Institution Support Organization serving the Florida State University System as well as several private institutions, state agencies, and private industry affiliates. In order to establish a home department for him, the faculty of the Department of Integrative Biology in the College of Arts & Sciences have voted unanimously to grant him tenure as a Professor in that academic unit. Dr. Graham comes to USF from the University of Southern Mississippi where was a tenured Professor of Marine Science. He previously served as Chair of the Department of Marine Science at USM and was the founding Director of the School of Ocean Science and Engineering at that institution. Dr. Graham has authored or co-authored over 85 peer-reviewed scientific articles, mostly in the discipline of biological oceanography with an emphasis on gelatinous plankton evolution, systems ecology, and physical-biological interactions. He has an h-index of 42 and 6,310 citations (Google Scholar). His directly awarded grant-funded programs exceed $20M, and he has mobilized more than $200M to support ocean research and educational infrastructure including several large ships, marine laboratories, and modern research facilities in support of ocean technology development. Dr. Eric Eisenberg, Dean of the College of Arts & Sciences, along with Provost Ralph Wilcox and President Steven C. Currall, strongly concur with the faculty vote of the Department of Integrative Biology to grant him tenure at the rank of Professor.

University of South Florida **2**
Tenure Nominations as a Condition of Employment

Public Health

Dr. Georgios Boustras, PhD, Msc, BEng

Dr. Boustras will join USF Health's College of Public Health on July 1, 2021 as Professor and Director of the newly envisioned Center for Occupational Health, Safety and Wellness which will serve as the umbrella for three existing programs with over $5 million in state and federal funding annually. Dr. Boustras comes to USF from the European University Cyprus where he is a tenured Professor in Risk Assessment and founding Director of the research Center for Risk and Decision Sciences (CERIDE). He joined the European University Cypress (EUC) as an Assistant Professor in 2009; he was promoted to Associate Professor with tenure in 2012 and to Full Professor in 2017. From September 2014 through September 2020, Dr. Boustras served as Dean of the School of Business Administration at EUC. Prior to joining EUC, Dr. Boustras was a Lecturer at Kingston University College of Engineering in London, England and an Honorary Research Fellow at Imperial College Department of Chemical Engineering and Chemical Technology in London. Dr. Boustras earned a PhD in Probabilistic Fire Risk Assessment from Kingston University London in 2003. He earned a MSc in Energy Resources Management and a BEng in Chemical Engineering from London South Bank University in 1997 and 1995 respectively. Dr. Boustras's research focus is on the development, use, and evaluation of risk models for safety systems. He has obtained over four million Euros ($4.4 million) in competitive funding from the European Commission. He has 50 publications in Scopus indexed journals, has published four books and two book chapters, and made over 20 presentations at international conferences, workshops, or seminars. He currently serves as Editor-in-Chief of *Safety Science*, the leading safety management journal. Also, he has served on the editorial board of eight additional major scientific journals in his field. He developed the MSc and PhD in Occupational Safety and Health at EUC which is fully accredited by IOSH. In addition, he has taught undergraduate and graduate students and has served as the major professor for a number of master's and doctoral students. The COPH APT Committee; Dr. Charles Lockwood, SVP for USF Health; Provost Ralph Wilcox; and President Steven C. Currall all concur to recommend Dr. Boustras for tenure at the rank of Professor.

Agenda Item: III c

USF Board of Trustees
February 23, 2021

Issue: Bachelor of Science in Environmental Engineering – CIP Code 14.1401

Proposed action: Approval

Executive Summary:

Environmental Engineers design systems and solutions at the intersection of human communities and the environment. The proposed 120-credit B.S. in Environmental Engineering program is an undergraduate STEM degree, designed to prepare graduates for high-demand, well-paying jobs in Florida and beyond. The job outlook is strong and graduates will have employment opportunities with industry, engineering design firms, local/state/federal governments, and nongovernmental organizations, along with numerous opportunities to advance their education at the Master's or Ph.D. levels.

The proposed B.S. in Environmental Engineering will meet national ABET accreditation requirements and emphasize the themes of infrastructure, sustainability, health, data science, and global citizenship. The program is expected to improve gender diversity in the College of Engineering and faculty quality is demonstrated by a national ranking of the existing graduate program and several teaching awards made to faculty members by national professional societies.

Financial Impact:

There will be no financial impact because existing faculty and resources will be reallocated for this new degree program.

Strategic Goal(s) Item Supports: Goal 1: To promote the lifelong success of well-educated, highly skilled, and adaptable alumnae/alumni who lead enriched lives, are engaged citizens and thrive in a dynamic global market.
BOT Committee Review Date: February 23, 2021
Supporting Documentation Online (*please circle*): **Yes** **No**
Prepared by: James Mihelcic, Ph.D., Professor

Form updated September 2020

STATE UNIVERSITY SYSTEM OF FLORIDA

Board of Governors, State University System of Florida

REQUEST TO OFFER A NEW DEGREE PROGRAM

In Accordance with BOG Regulation 8.011

(Please do not revise this proposal format without prior approval from Board staff)

University of South Florida (USF)	**Fall 2021**
Institution Submitting Proposal	**Proposed Implementation Term**
College of Engineering	**Civil and Environmental Engineering**
Name of College(s) or School(s)	**Name of Department(s)/Division(s)**
Environmental Engineering	**Bachelor of Science in Environmental Engineering**
Academic Specialty or Field	**Complete Name of Degree**
14.1401	
Proposed CIP Code (2020 CIP)	

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees	**President's Signature Date**
Board of Trustees Chair's Signature Date	**Provost's Signature Date**

PROJECTED ENROLLMENTS AND PROGRAM COSTS

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 3 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary/ Philanthropy Funds	Total Cost
Year 1	55	45	$7,763	$349,339	0	0	$349,339
Year 2	107	88					
Year 3	160	132					
Year 4	213	175					
Year 5	265	218	$2,452	$534,637	0	0	$534,637

*Note: This outline and the questions pertaining to each section **must be reproduced** within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.*

Form updated September 2020

Introduction

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including majors, concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

Environmental engineers design systems and solutions at the intersection of human communities and the environment. The proposed 120-credit undergraduate B.S. in Environmental Engineering program (BSENV) is an undergraduate STEM degree, designed to prepare graduates for high-demand, well-paying jobs in Florida and beyond. Graduates will have employment opportunities with industry, engineering design firms, local/state/federal governments, and nongovernmental organizations, along with numerous opportunities to advance their education at the Master's or Ph.D. levels. The U.S. Bureau of Labor Statistics reports that employment of environmental engineers and environmental health/safety engineers are projected to grow 3-4% from 2019 to 2029[1].

The proposed B.S. in Environmental Engineering is aligned with SUS goals, namely to increase degree productivity and program efficiency while increasing student access and success in STEM fields, and increase business and community engagement. USF's mission supports delivery of a world-class educational experience promoting the success of talented and diverse undergraduate, graduate, and professional students. Furthermore, USF's Goal #1 is "to promote the lifelong success of well-educated, highly skilled, and adaptable alumnae/alumni who lead enriched lives, are engaged citizens and thrive in a dynamic global market."

The proposed B.S. in Environmental Engineering will meet national ABET accreditation requirements and emphasize the themes of *infrastructure*, *sustainability*, *health*, *data science*, and *global citizenship*. The 120-credit proposed curriculum has been carefully tailored to weave these themes throughout, while simultaneously meeting ABET accreditation requirements. No tracks, concentrations, or specializations are being proposed.

The ABET/EAC Environmental Engineering Program Criteria[2] state that the Environmental Engineering curriculum "must include a) Mathematics through differential equations, probability and statistics, calculus-based physics, chemistry (including stoichiometry, equilibrium, 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, 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." These program criteria are explained in greater detail elsewhere.[3]

---

1 U.S. Bureau of Labor Statistics, Occupational Outlook Handbook, https://www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm and https://www.bls.gov/ooh/architecture-and-engineering/health-and-safety-engineers.htm <accessed September 9, 2020>

2 Criteria for Accrediting Engineering Programs, 2020 – 2021, ABET, https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2020-2021/#3 <accessed July 18, 2020>

3 Commentary on the ABET Program Criteria for Environmental Engineering Programs, American Academy

The existing USF graduate programs in Environmental Engineering will support the proposed undergraduate program. USF's graduate program in Environmental Engineering is currently ranked #35 among all universities nationally and #21 nationally among public universities, according to the 2021 US News and World Report rankings (second-highest ranking in FL).[4] As a recognized leader in Environmental Engineering, it will serve our undergraduate population and the State of Florida to offer an undergraduate program of similar caliber to our nationally-recognized graduate program.

B. Please provide the date when the pre-proposal was presented to CAVP (Council of Academic Vice Presidents) Academic Program Coordination review group. Identify any concerns that the CAVP review group raised with the pre-proposed program and provide a brief narrative explaining how each of these concerns has been or is being addressed.

The pre-proposal was presented at the April 11, 2020, CAVP Academic Program Coordination Review Group, and no concerns were expressed.

C. If this is a doctoral level program please include the external consultant's report at the end of the proposal as Appendix D. Please provide a few highlights from the report and describe ways in which the report affected the approval process at the university.

N/A

D. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support (see link to the SUS Strategic Plan on the resource page for new program proposal).

The proposed B.S. in Environmental Engineering program is aligned with strategic plans of the State University System, the University of South Florida, and the State of Florida.

The proposed program directly meets three goals of the SUS Board of Governors 2025 Strategic Plan (indicated by double checks in the table below) and indirectly meets five other goals (indicated by single checks), as described below.

State University System Goals	Excellence	Productivity	Strategic Priorities for a Knowledge Economy
Teaching & Learning (Undergraduate)	✓✓Strengthen Quality & Reputation of Academic Programs and Universities	✓✓Increase Degree Productivity and Program Efficiency	✓✓Increase the Number of Degrees Awarded in Programs of Strategic Emphasis

of Environmental Engineers & Scientists, May 2020 https://www.aaees.org/education/abetprogramcriteria.php <accessed July 18, 2020>

4 U.S. News & World Report, Best Graduate Schools, https://www.usnews.com/best-graduate-schools <accessed September 9, 2020>

Scholarship, Research, and Innovation	✓Strengthen Quality & Reputation of Scholarship, Research, and Innovation	✓Increase Research Activity and Attract More External Funding	Increase Commercialization Activity
Community & Business Engagement	✓Strengthen Quality & Recognition of Commitment to Community & Business Engagement	✓Increase Community and Business Engagement	✓Increase Community and Business Workforce

Teaching and Learning. The proposed program contributes directly to the SUS goals in this area.

- Under the Excellence emphasis, the program will strengthen the quality and reputation of the SUS academic programs and universities by offering an undergraduate degree from the faculty of a highly-ranked graduate Environmental Engineering program. USF's graduate program in Environmental Engineering is currently ranked #35 among all universities nationally and #21 nationally among public universities, according to the 2021 US News and World Report rankings (second highest ranking in FL).[5] As a recognized leader in Environmental Engineering, it will serve our undergraduate population and the State of Florida to offer an undergraduate program of similar caliber to our nationally-recognized graduate program.
- Under the Productivity emphasis, the proposed B.S. in Environmental Engineering is expected to increase degree productivity and program efficiency while increasing student access and success in STEM fields. Currently, students in the Tampa Bay area lack facile access to an Environmental Engineering degree program; which has likely resulted in fewer students in the area able to pursue their interest in this field by completing degrees, or to more switching of degree programs or institutes by students attempting to align their interests with available degree programs. With the availability of an undergraduate degree program in Environmental Engineering at USF, we expect to increase both degree productivity and increase efficiency by alleviating these negative pressures.
- Finally, under the Strategic Priorities for a Knowledge Economy emphasis of the Strategic Plan, this proposed degree program will increase the number of degrees awarded and degree access in a STEM Program of Strategic Emphasis. Specifically, the proposed B.S. in Environmental Engineering will be offered under a federally and state designated STEM CIP Code. – STEM category (14.1401: Environmental/Environmental Health Engineering). Further, data reported by The American Society for Engineering Education show that the availability of B.S. in Environmental Engineering program will make a STEM degree more accessible to several underrepresented groups, especially women, because Environmental Engineering programs typically attract a much higher percentage of women students (50.6%) than the average for bachelor's degrees in engineering (21.9%).[6] Furthermore, underrepresented minority students have been found to be motivated by degree programs that integrate human connections and sustainability, which underpin the emphasis areas of this proposed program.

Community and Business Engagement. The proposed B.S. in Environmental Engineering will also indirectly contribute to the SUS Strategic Plan goals under Community and Business Engagement. By its nature, Environmental Engineering engages in civic and community

5 U.S. News & World Report, Best Graduate Schools, https://www.usnews.com/best-graduate-schools <accessed September 9, 2020>

6 Roy, J., Engineering by the Numbers, American Society for Engineering Education, Updated July 2019

problems that require engineering expertise. Many faculty members who contribute to USF's graduate Environmental Engineering degree programs are actively engaged with local community, government, and industry partners through research, consulting, and class projects focused on the Environmental Engineering needs of these partners. The proposed B.S. in Environmental Engineering program will expand the cohort of students for research and course project time for these types of interactions, as well as improve the relevant training of these students. Overall, this will increase faculty and student interactions with the community and businesses and should strengthen the quality and recognition of those interactions. Furthermore, by providing highly relevant, real-world experience, it will increase the quality and success of the community and business workforce.

Scholarship, Research, and Innovation. Although the proposed B.S. in Environmental Engineering does not contribute directly to the SUS Strategic Plan goals in the area of Scholarship, Research, and Innovation, we expect the program to indirectly contribute to the Excellence emphasis goal for research. Specifically, it will increase undergraduate participation in research because the USF Environmental Engineering faculty already actively engage undergraduates in research. The degree program will thus provide a larger cohort of undergraduate students who can be engaged in Environmental Engineering research. Furthermore, related to the Productivity emphasis, engagement of undergraduates in research and enhanced community/business-engaged projects should stimulate increased research funding from external (both federal and private) sources, particularly from the National Science Foundation, which actively encourage both types of work in funding calls.

In addition to contributing to the SUS Strategic Plan goals, the proposed B.S. in Environmental Engineering program is also aligned with USF's Mission. Specifically, it will primarily contribute to Goal #1: To promote the lifelong success of well educated, highly skilled, and adaptable alumnae/alumni who lead enriched lives, are engaged citizens and thrive in a dynamic global market. A central theme of the program is global citizenship with concepts of global citizenship and engagement woven throughout the curriculum, including classes that are certified as USF Global Citizens' courses. Furthermore, many USF Environmental Engineering faculty are actively involved in research projects around the globe that provide case studies for courses and undergraduate student research opportunities with an international context.

In addition, the proposed program will indirectly contribute to USF's Goal #2: To conduct high-impact research and innovation to advance frontiers of knowledge, solve global problems and improve lives. Additional themes of the proposed B.S. in Environmental Engineering are sustainability, health, infrastructure, and data science. By developing undergraduates with related perspectives and skills, the program will be developing students who can effectively contribute to cutting edge research for the betterment of society.

The program will contribute to USF's Goal #3: To be a major social and economic engine creating robust global, national and regional partnerships to build a prosperous and sustainable future for our regional communities and the State of Florida, through both the enhanced community and business interactions on environmental engineering problems and through training students with the knowledge, skills, and perspectives needed by Florida and the world from improving sustainability and economic competitiveness.

Finally, the proposed B.S. in Environmental Engineering program contributes to the goals of Florida Strategic Plan for Economic Development, 2018-2023. This includes contributing to Pillar 1 of the plan (Talent Supply and Education) by supporting Goal 1.1: Aligning Educational and Workforce Development Programs to Foster Employment Opportunities and Developing Workers with Skills to Meet Employer Needs, Goal 1.3: Increasing and Retaining Graduates in High Demand STEM Fields, and Goal 1.4: Expanding Access to Education/Training for Underserved Populations. The proposed program also contributes to Pillar 3 of the plan (Infrastructure and Growth Leadership) by supporting Goals 3.3 and 3.4, which address developing and managing safe and modern civic infrastructure, including transportation systems and future supply of quality

water to meet Florida's economic and quality of life goals. Lastly, the proposed program contributes to Pillar 6 (Civic and Governance Systems) by producing graduates who can contribute to efficiency and effectiveness of government agencies that employ environmental engineers, such as the Department of Environmental Protection (DEP) and Water Management Districts.

E. If the program is to be included in a category within the Programs of Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion. The Programs of Strategic Emphasis Categories are:

- **Critical Workforce:**
  - ☐ Education
  - ☐ Health
  - ☐ Gap Analysis
- **Economic Development:**
  - ☐ Global Competitiveness
  - ☒ Science, Technology, Engineering, and Math (STEM)

Please see the Programs of Strategic Emphasis (PSE) methodology for additional explanations on program inclusion criteria at the resource page for new program proposal.

The B.S. in Environmental Engineering currently falls under the Programs of Strategic Emphasis in the State University System of Florida, Board of Governors 2012 – 2025 Strategic Plan in the Economic Development – Science, Technology, and Math - STEM category. It recognizes an increasing need for professional engineers who design systems and solutions at the intersection of human communities and the environment.

F. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

This new degree program will be offered on the USF Tampa campus. Some electives can be taken on the St. Petersburg campus.

Institutional and State Level Accountability

II. Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

Florida requires environmental engineers to provide economic and social opportunities for an increasing population, reliable water and wastewater systems, management of nutrient pollution that has adversely impacted both Florida coasts, improved urban air quality, protection of public health, Everglades and Brownfield restoration, and other infrastructure improvements.

The U.S. Bureau of Labor Statistics (BLS) reports environmental engineering employment will

grow 3% between 2019 and 2029.[7] BLS counts 55,800 environmental engineers employed in the U.S. as of September 2020 and an additional 26,400 health and safety engineers (with an expected 4% change in employment over the 2019 to 2029 time period), many trained as environmental engineers.[7] The proposed B.S. in Environmental Engineering program will provide graduates with a route to work as a health and safety engineer, not only because of ABET accreditation program requirements, but also because we built in a planned re-emphasis on managing health and risk in our program.

Complementing this positive employment outlook, the 2019-2020 Burning Glass Data (Appendix C) reported 25,671 environmental engineering job postings in the last 12 months nationwide, and 1,174 Florida postings (Florida ranked 4th in postings). Nationwide job growth is projected at +8.43% while Florida growth is projected at +17.32% (+17.0% in Tampa Bay region). Ninety-six percent of job postings were advertised with the bachelor's degree requirement. The median annual wage for environmental engineers is reported by BLS to be $88,860 per year as of September, 2020.[7] The median annual wage for health and safety engineers is reported by BLS to be $91,410 per year as of September, 2020.[7]

Engineering News Record reports there is continued strength in environmental markets and top companies in that sector are expanding their global reach. In fact, the Top 200 environmental services revenue, based on what firms reported in 2018, totaled $57.24 billion -- up 7.3% from the previous year's amount.[8] In 2018, Bankrate.com rated environmental engineering in the top 25% of 162 college degrees based on earning potential and employment.[9] Indeed.com lists over 1,000 available environmental engineering jobs in Florida. U.S. News & World Report Money currently ranks environmental engineering as their #3 Best Engineering Job and has stated that "top companies in the environmental sector are expanding their global reach."[10]

"In a changing U.S. labor market, new and emerging occupations – including those that are linked to a green economy or the adoption of newer technologies – are raising the importance of analytical skills, such as science, mathematics and programming, according to a new Pew Research Center analysis of federal government job-skills data."[11]

Our curriculum also addresses several critical infrastructures identified by the White House, so vital that their breakdown would have a debilitating effect on security, economic development, public health, and safety (Presidential Policy Directive PPD-21). Unfortunately, the American Society of Civil Engineers (ASCE) Report Card for Florida's Infrastructure provides the following grades: Stormwater - D; Coastal Areas - D+; Drinking Water - C+; Wastewater - C. ASCE writes that "Infrastructure is the backbone of Florida's economy and a necessary part of every

7 U.S. Bureau of Labor Statistics, Occupational Outlook Handbook, https://www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm and https://www.bls.gov/ooh/architecture-and-engineering/health-and-safety-engineers.htm <accessed September 9, 2020>

8 Engineering News Record, ENR 2019 Top 200 Environmental Firms: Building Up to Meet Demand https://www.enr.com/articles/47303-enr-2019-top-200-environmental-firms-building-up-to-meet-demand <accessed July 18, 2020>

9 Garcia, A.D., The most valuable college majors, ranked August 26, 2019, https://www.bankrate.com/career/most-valuable-college-majors/ <accessed July 18, 2020>

10 U.S. News & World Report, Best Engineering Jobs, https://money.usnews.com/careers/best-jobs/environmental-engineer, https://money.usnews.com/careers/best-jobs/rankings/best-engineering-jobs <accessed July 18, 2020>

11 Kochhar, R., New, emerging jobs and the green economy are boosting demand for analytical skills, Pew Research, March 23, 2020 https://www.pewresearch.org/fact-tank/2020/03/23/new-emerging-jobs-and-the-green-economy-are-boosting-demand-for-analytical-skills/ <accessed July 18, ,2020>

Floridian's day" and ASCE provides an overall grade of America's infrastructure of a D+.[12] For just water alone, recent surveys estimate that $322−$600 billion is needed over the next 20 years in the United States alone for projects and activities to address water quality or related public health problems.[13]

Environmental engineering is also recognized as a distinct specialty for professional licensure. Accordingly, our program will providing enhanced student training so they meet ABET Accreditation "program criteria" and better prepare them to pass the very important Fundamental and Professional engineering examinations.

The proposed B.S. in Environmental Engineering program will have a positive impact on USF's growing research grant and contract opportunities. The environmental industry represents 2.83% of the U.S. GDP[14], and interested students should become active participants in undergraduate research opportunities, with some students electing to pursue graduate research upon undergraduate degree completion.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

Majorities of Americans say the federal government is doing too little to protect key aspects of the environment, including water (69%) and air quality (64%).[15] Supported by public sentiment for protecting natural resources and human health and by-laws aimed at curtailing environmental damage, there is renewed awareness amongst American and global youth that attracts them to careers where they can have a positive impact on the environment.

The types of knowledge and skills gained through a B.S. in Environmental Engineering make this a high-demand career field, and one of the fastest growing. Integrated expertise in problem solving in the integrated media of soil, air, and water will make graduates attractive to industry, engineering design firms, governments, and nongovernmental organizations.

A 2019 report from the U.S. National Academy of Engineering (NAE)[16] (inspired by a previous 2008 "NAE Grand Challenges for Engineering" project[17]) had a purpose to inspire young engineers across the globe to address the biggest challenges facing humanity in the 21st Century. The NAE Grand Challenges identified in 2008 that our B.S. in Environmental

[12] American Society of Civil Engineers (ASCE), 2017 Infrastructure Report Card, State Infrastructure (most recent Florida data is from 2016), https://www.infrastructurereportcard.org/state-by-state-infrastructure/ <accessed July 18, 2020>

[13] Copeland, C.; Tiemann, M. Water Infrastructure Needs and Investment: Review and Analysis of Key Issues, CRS Publication Number 7-5700; United States Government Publishing Office: Washington, D.C., 2010. (2)U.S. Environmental Protection Agency. Water Infrastructure and Resiliency Finance Center. http://water.epa.gov/infrastructure/waterfinancecenter.cfm. <accessed July 18, 2020>

[14] Mihelcic, J. R., Ren, Z. J., Cornejo, P. K., Fisher, A., Simon, A. J., Snyder, S. W., ... & Moeller, J. Accelerating innovation that enhances resource recovery in the wastewater sector: advancing a national testbed network, Environmental Science & Technology, 51, 7749−7758, 2017.

[15] Majorities See Government Efforts to Protect the Environment as Insufficient, PEW Research, May 14, 2018, https://www.pewresearch.org/science/2018/05/14/majorities-see-government-efforts-to-protect-the-environment-as-insufficient/ <accessed July 18, 2020>

[16] National Academies of Sciences, Engineering, and Medicine. 2019. Environmental Engineering for the 21st Century: Addressing Grand Challenges. Washington, DC: The National Academies Press. doi: https://doi.org/10.17226/25121 <accessed July 18, 2020>

[17] National Academy of Engineering, NAE Grand Challenges for Engineering. http://www.engineeringchallenges.org/challenges.aspx <accessed August 5, 2020>

Engineering program will address are: 1) Restore and Improve Urban Infrastructure, 2) Provide Access to Clean Water, 3) Manage the Nitrogen Cycle, 4) Develop Carbon Sequestration Methods, and 5) Engineer the Tools of Scientific Discovery.

The 2019 report identified five pressing challenges for the 21st Century that environmental engineers are uniquely poised to address: 1) Sustainably Supply Food, Water, and Energy, 2) Curb Climate Change and Adapt to its Impacts, 3) Design a Future without Pollution and Waste, 4) Create Efficient, Healthy, Resilient Cities, and 5) Foster Informed Decisions and Actions.

Also, the sustained health and success of environmental engineering programs at other universities in Florida and nationwide suggests that student demand for this major remains high and that the market is not yet saturated. Nationwide, there are now over 80 ABET-accredited programs in Environmental Engineering (or closely related programs such as Environmental Resources Engineering, Environmental Systems Engineering, etc.),[18] but the student demand for this major continues to grow. Data provided to us by a colleague show that, since the early 1990s, new B.S. programs in Environmental Engineering have been added across the country at a sustained average rate of between 2 and 3 new programs per year, with little sign of slowing (M.D. Annable, University of Florida, personal communication, 3 August 2020; provided in Appendix E). Burning Glass data (Appendix C) shows that from 2014-2018, the number of Environmental Engineering degrees conferred by four Florida state universities (University of Central Florida, University of Florida, Florida International University, and Florida Gulf Coast University) increased from 115 per year to 127 per year, an increase of over 10%.

Professional engineering licensure by the National Council of Examiners for Engineering and Surveying (NCEES) requires passing two examinations, the Fundamentals of Engineering (FE) exam and the Principles and Practice of Engineering (PE) exam. The FE exam is offered in six specific branches of engineering: Chemical, Civil, Electrical & Computer, Environmental, Industrial & Systems, and Mechanical. (The exam is also offered in a seventh area, “Other Disciplines”.) The recognition of Environmental Engineering as a specific branch of engineering by NCEES indicates the maturity of Environmental Engineering as a discipline and gives confidence that students demand training in this area.

We have not performed a survey to specifically gage interest of enrolled USF students in the proposed program. However, the B.S. in Civil Engineering program currently requires a capstone design course in the senior year and approximately 20% of the Civil Engineering seniors elect to specialize in environmental/water engineering for their capstone experience.

Anecdotally, Engineering students are taking the first Environmental Engineering course (i.e., ENV4001 Environmental Systems Engineering Progress) during their junior and senior years and some have conveyed to the instructor that they wish they could have more specialized courses or a separate degree in Environmental Engineering.

In addition, there are several student professional organizations at USF that are Environmental Engineering-focused and affiliated with local environmental engineering practitioners. These student organizations are currently well populated by undergraduates interested in environmental engineering as a profession. These include the Florida Water Environment Association (FWEA), American Water Works Association (AWWA), and Tampa Bay Association of Environmental Engineering Professionals Student Chapter at USF (TBEEP). Environmental Engineering faculty serve as advisors to these organizations.

Finally, the national projections for substantial job growth in environmental engineering, as described above in Section II.A., provide evidence for current and future student demand for our

[18] ABET, Accredited Programs. https://amspub.abet.org/aps/name-search?searchType=program&keyword=environmental%20engineering <accessed August 5, 2020>

B.S. in Environmental Engineering degree program.

C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix C, provide data that support the need for an additional program.

We have identified seven universities in Florida that offer a B.S. degree in Environmental Engineering with the CIP code 14.0401. The seven universities include six public universities (Florida Atlantic University, Florida Gulf Coast University, Florida International University, Florida Polytechnic University, University of Central Florida, and University of Florida) and one private university (University of Miami). Enrollment and degree awarded Information about these seven programs is tabulated below.

Name of Institution (abbreviated)	Public/ Private	CIP Code	Fall 2017 Enrollment	Fall 2018 Enrollment	Degrees Awarded (2017-2018)
FAU	Public	14.0401	24	37	0
FGCU	Public	14.0401	124	128	19
FIU	Public	14.0401	101	91	23
FL Poly	Public	14.0401	0	0	0
UCF	Public	14.0401	238	207	43
UF	Public	14.0401	201	200	42
U Miami	Private	14.0401	34	32	7

Table updated on July 18, 2020 with public university data. U Miami provided their data on August 27 in an email to Dr. Mihelcic. Note: All institutions have Environmental Engineering as the name of their programs.

Representatives from all seven universities were contacted by electronic mail in early August, 2020, and notified of USF's development of a new B.S. program in Environmental Engineering. Response from the other universities has been overwhelmingly positive and supportive (all correspondence is available in Appendix E). Comments received from our colleagues include the following.

- "Congratulations for developing the new degree proposal for the B.S. Degree in Environmental Engineering. I am sure you will have a successful and strong program with the strong faculty you have at USF. I hope we will have opportunities to develop a strong partnership and collaboration in the near future." (Dr. Berrin Tansel, FIU)
- "This is a great initiative…. Please let me know if I could be of any help." (Ajeet Kaushik, FL Poly)
- "Thanks for the exciting news on the new B.S. Environmental Engineering at USF. The growth in BSEE degrees has been steady since the early 90's…. I think this shows that interest in the BSEE degree is very strong." (Dr. Michael Annable, UF)
- "Best wishes for a successful rollout of your new B.S. Environmental Engineering Program." (Dr. Paul Chadik, UF)
- "We have a lot of experience teaching at the [undergraduate] level to your typical Fl high school grad and are happy to help in any way we can." (Dr. Simeon Komisar, FGCU)
- "Best wishes for this effort. We would be delighted to see a stronger relationship among our institutions." (Dr. Antonio Nanni, University of Miami)

All of the above referenced interactions provide evidence that USF's proposed B.S. in Environmental Engineering program will not have a negative impact on other programs in the state. Possible collaboration can take place in terms of exchanging best practices for our undergraduate teaching programs, exchanging information regarding improving program assessment required for ABET accreditation, and building research interactions.

Memoranda of support from USF's deans, faculty and administrators are included in Appendix E.

D. Use Table 1 in Appendix A (1-A for undergraduate and 1-B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 30 credit hours per year and graduate FTE will be calculated as 24 credit hours per year. Describe the rationale underlying enrollment projections. If students within the institution are expected to change majors to enroll in the proposed program at its inception, describe the shifts from disciplines that will likely occur.

Table 1-A is included in Appendix A. The rationale for our projections is that we plan to accept 40 FTIC applicants the first year plus we estimated an additional 15 already-enrolled USF students will join the program via transfer from other majors. We expect our enrollment to reach 265 total students by Year 5, accepting about 40–50 students per year. This is consistent with enrollments observed at Florida institutions of comparable size, such as the University of Florida and the University of Central Florida (see Section II.C., above). As projected in Table 1-A, we do anticipate some internal transfers from the existing B.S. program in Civil Engineering and perhaps some other Engineering majors (e.g., Chemical Engineering, Mechanical Engineering) and to a lesser extent students who might transfer from environmental science-related majors (e.g., Geology, Biology, Environmental Science and Policy).

E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date Appendix B to indicate that the analysis required by this subsection has been completed.

There are currently 8 tenured/tenure-track faculty on the USF Tampa campus who specialize in Environmental Engineering (Alfredo, Cunningham, Ergas, Trotz, Mihelcic, Stuart, Yeh, & Q. Zhang) and one lecturer (Albergo). Of these nine individuals, five are female and one is African American. There are four additional tenured/tenure-track faculty in the Department of Civil and Environmental Engineering who specialize in water resources engineering and who will support this program, of whom two are Latino/Hispanic. We have included one of these water resources engineering faculty (Arias) in Table 2-A because he will teach some required water resource courses and also a technical elective. He is Latino/Hispanic.

USF's College of Engineering is committed to engaging underrepresented and minority high school students into Engineering programs. The College engages routinely with teachers, students and parents in Title I schools to attract students from diverse racial, ethnic and socio-economic backgrounds. Furthermore, the proposed B.S. in Environmental Engineering program will benefit from nationwide trends that show some under-represented groups are selecting environmental engineering as a career. For example, the American Society for Engineering Education reports the highest percentage of B.S. Engineering degrees awarded to women is in Environmental Engineering (50.6%) (2018 data). In comparison, women only earn 21.9% of bachelor's degrees in Engineering. In addition, nationally 10% of B.S. Environmental Engineering degree recipients are reported as Hispanic/Latino (they earn 11.4% of bachelor's Engineering degrees), Black/African American students earned 4.2% of bachelor's degrees in 2018 and

Native American and Hawaiian/Pacific Islander bachelor's earned 0.3% and 0.2%, respectively, of bachelor's engineering degrees. [19]

Furthermore, the USF Tampa campus provides a positive climate for underrepresented students because it has a student enrollment that includes 31% of student enrollment is African American or Hispanic and 54% are female. The American Society for Engineering Education (ASEE) reports that USF is also ranked 13th in U.S. for bachelor's engineering degrees awarded to Black or African Americans.[19]

The proposed program thus has strong potential to make a STEM degree more accessible to several underrepresented groups. Specifically to achieve a diverse student population, the proposed B.S. in Environmental Engineering program will leverage the College's recruitment and outreach programs such as "Bulls I Mentoring", ESTEAM events, Selmon S3 program and course offerings for high school students with a goal to secure a robust pipeline of diverse student population.

The specific steps USF will take to ensure a diverse student body include the following:

- Work closely with the coordinator of minority student recruitment in the College. As previously stated, USF is ranked 13th in the U.S. for bachelor's engineering degrees awarded to African Americans, and USF's College of Engineering has previously been ranked in the top 10 of universities nationwide in conferring doctoral degrees to African American and Hispanic/Latino students, according to an annual survey in Diverse *Issues in Higher Education*.
- Actively recruit applicants from top high schools nationally with excellent underrepresented minority students;
- Work with local community colleges to discuss the program and make arrangements for community college students to transfer to this program.
- Continue our on-going community engagement around local environmental issues with local K-12 school math and science teachers that have a high percentage of underrepresented students.
- Attendance at state and national conferences; and,
- Conduct visitations to local high schools and community colleges.

The operation of this program at USF should not impact the FIU student population. FIU was supportive of our proposed program when we contacted them (Section II.C.). FAMU does not offer an undergraduate Environmental Engineering degree program. Also, the sustained health and success of environmental engineering programs at other universities in Florida and nationwide suggests that student demand for this major remains high and that the market is not yet saturated. Employment demand (discussed previously) is strong in Florida and nationwide and Burning Glass data (Appendix C) shows that from 2014-2018, the number of Environmental Engineering degrees conferred by four Florida state universities (University of Central Florida, University of Florida, Florida International University, and Florida Gulf Coast University) increased from 115 per year to 127 per year, an increase of over 10%, indicating growing interest from students.

III. Budget

A. Use Table 3 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 4 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year

[19] Roy, J., Engineering by the Numbers, American Society for Engineering Education, Updated July 2019

1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

Since this proposal is to create a new undergraduate degree program in Environmental Engineering that compliments an existing B.S. in Civil Engineering program and specialized Master's and Ph.D. programs in Environmental Engineering, many resources are already currently housed within the Department of Civil and Environmental Engineering to support the program.

Appendix A, Table 2, lists the 10 faculty supporting the program, along with the percentage of their effort given to the B.S. in Environmental Engineering program. Appendix A, Table 3 shows the costs of the faculty and other associated budgetary costs of the program. Faculty account for 1.57 person-years in year 1 and 2.42 in year 5 as the program expands. Many of the courses taught by the faculty supporting the program are required by students in both the B.S. in Civil Engineering program and the proposed B.S. in Environmental Engineering program. It was assumed for these "shared" courses that 25% of the class enrollment would be Environmental Engineering and 75% would be Civil Engineering students. This assumption is based on projected enrollment for both programs. Other costs besides faculty salary/benefits include sharing of department staff that focus on undergraduate advising and teaching support, stipend, benefit, and tuition for graduate assistants assigned to supporting two required laboratories, and some office expenses to support instruction and advising.

The A&P Salaries and Benefits cost include some expenses to support academic advising that are managed directly the Department of Civil and Environmental Engineering. However, a large student advising budget is not required as this is coordinated and budgeted centrally in the College of Engineering. Environmental Engineering faculty and staff within the Department of Civil and Environmental Engineering will provide support for those advising efforts.

The cost totals $349,339 in for Year 1 and $534,637 by Year 5. The increase in costs from Year 1 to Year 5 is due to an increase in the cost of health insurance and tuition for the graduate teaching assistants.

B. **Please explain whether the university intends to operate the program through continuing education, seek approval for market tuition rate, or establish a differentiated graduate-level tuition. Provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate.** ***Please include the expected rate of tuition that the university plans to charge for this program and use this amount when calculating cost entries in Table 3.***

There is no plan to operate this undergraduate program through continuing education or to seek approval for market tuition rate. The expected rate of tuition for this program is equal to that of other programs on the USF Tampa Campus. For the 2020-2021 academic year, the undergraduate tuition rate is $211.19 per credit hour for Florida residents and $575.01 for non-residents (https://www.usf.edu/business-finance/controller/documents/one_usf_undergraduate_tuition_rates_2020-2021.pdf) <accessed July 27, 2020>.

C. If other programs will be impacted by a reallocation of resources for the proposed program, identify the impacted programs and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate

research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).

We do not anticipate any significant impacts on other programs, nor any significant reallocation of resources.

- Faculty affiliated with the proposed program are already members of the USF faculty and teach classes in existing degree programs (e.g., B.S. in Civil Engineering; Master's and Ph.D. in Environmental Engineering).
- No new support staff (e.g., office support) are required because the program will be offered from the Department of Civil and Environmental Engineering, which already maintains a support staff employee.
- Most of the courses to be offered under the proposed degree program are already offered as required courses or as electives in existing degree programs, and already have permanent course numbers in USF's course inventory.
- The library resources required for the program are already in place as USF has established master's and doctoral programs in Environmental Engineering.
- Laboratory facilities are already in place because the B.S. in Civil Engineering already requires environmental engineering and hydraulics laboratory courses as part of the curriculum.

It is possible that existing degree programs at USF may see slightly decreased enrollments as some students shift to the new B.S. in Environmental Engineering program. Degree programs possibly affected include Civil Engineering, Chemical Engineering, Environmental Science and Policy, and/or Geology. However, the impact on these degree programs is expected to be small; if the proposed new program in Environmental Engineering draws a handful of students from each of these existing majors, the impact on any individual existing degree program will be negligible.

Potential positive impacts of establishing the new program are that a new group of highly talented, well-qualified engineering students will enter USF, allowing the College an opportunity to raise academic metrics, and have new students who can work in a number of environmental engineering-related faculty labs.

D. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).

There is no anticipated impact of this kind on other programs or departments.

E. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.

As previously described, the proposed B.S. in Environmental Engineering is supported fully with existing operational funds. Our existing undergraduate capstone design course in environmental/water resources engineering partners with local units of government and their staff on local water and environmental engineering design projects. Faculty have also been successful in securing competitive external funding from the federal government (Department of Education Graduate Assistance in Areas of National Need, and National Science Foundation NRT program) that allowed us to develop courses in complex systems modeling and food-water-energy systems. These courses address some of the identified "Grand Challenges for the 21st Century" as identified by the National Academies of Science, Engineering, and Medicine [National Academies of Sciences, Engineering, and Medicine, 2019. Environmental Engineering for the 21st Century: Addressing Grand Challenges. Washington, DC: The National Academies Press.

doi: https://doi.org/10.17226/25121] <accessed July 27, 2020>. Environmental engineers are uniquely poised to address these challenges.

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Tables 1 and 3 in Appendix A, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

Critical Workforce Development. The B.S. in Environmental Engineering, offered under a federally and state designated STEM CIP Code, recognizes an increasing need for professional engineers who design systems and solutions at the intersection of human communities and the environment. The National Academy of Sciences wrote in 2019 that "Over the decades the field (*environmental engineering*) has improved countless lives through innovative systems for delivering water, treating waste, and preventing and remediating pollution in air, water, and soil. These achievements are a testament to the multidisciplinary, pragmatic, systems-oriented approach that characterizes environmental engineering."[20] However, "the future holds daunting challenges for human society and our environment. Populations are expanding, demand for resources is increasing, the climate is changing, and humanity's impacts on the planet continue to mount." The discipline of Environmental Engineering can thus help achieve a better quality of life for our growing population without compromising the ability of future generations to achieve the same.

The proposed B.S. in Environmental Engineering will help Florida and the nation achieve economic, social, and environmental well-being by meeting national ABET accreditation requirements and emphasizing the themes of infrastructure, sustainability, health, data science, and global citizenship. These new professionals will be ready for well-paying jobs in a variety of sectors across Tampa Bay, the I-4 Technology Corridor, across Florida, and nationally.

Critical Infrastructures. Because the proposed B.S. in Environmental Engineering will meet national ABET accreditation requirements and emphasize the themes of *infrastructure*, *sustainability*, *health*, *data science*, and *global citizenship*, graduates will support several critical infrastructures (e.g., water/wastewater) identified by the White House, so vital that their breakdown would have a debilitating effect on security, economic development, public health, and safety (Presidential Policy Directive PPD-21). Unfortunately, the American Society of Civil Engineers (ASCE) Report Card for Florida's Infrastructure provides the following grades: Stormwater - D; Coastal Areas - D+; Drinking Water - C+; Wastewater - C.

Pathways for Professional Licensure & Graduate Education. Graduates from the B.S. in Environmental Engineering program will be better prepared for obtaining professional licensure and to enter into the increasing array of relevant graduate programs in science, engineering, business, law, and policy. Environmental engineering is recognized as a distinct specialty for professional licensure. Accordingly, our program will provide better student training so they meet ABET Accreditation "program criteria" and will prepare them to pass the very important Fundamental and Professional engineering examinations. There are several excellent Environmental Engineering graduate degrees in Florida that are particularly well-suited for graduates of the proposed B.S. in Environmental Engineering program. These are but a few examples of the kinds of professional licensure and interdisciplinary graduate programs well

[20] National Academies of Sciences, Engineering, and Medicine. 2019. Environmental Engineering for the 21st Century: Addressing Grand Challenges. Washington, DC: The National Academies Press. doi: https://doi.org/10.17226/25121 <accessed July 18, 2020>

within reach of our students.

Increased Diversity in STEM. Data reported by The American Society for Engineering Education shows the proposed B.S. in Environmental Engineering program will make a STEM degree more accessible to several underrepresented groups, especially women. This is because the highest percentage of B.S. Engineering degrees awarded to women is in Environmental Engineering (50.6%).[21] In comparison, women only earn 21.9% of bachelor's degrees in Engineering fields overall. The 2.8 million Floridians residing in the Tampa Bay area lack easy access to this important STEM field.

V. Access and Articulation – Bachelor's Degrees Only

A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program's approval. (See criteria in Board of Governors Regulation 6C-8.014)

The total number of credit hours to earn a B.S. in the proposed Environmental Engineering degree program is 120.

B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see link to the Common Prerequisite Manual on the resource page for new program proposal). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access.

If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

The common prerequisites for the program will be the same as those that currently exist for all Environmental Engineering programs in the Florida State University System, as listed in the *2019/2020 Common Prerequisite Manual* (https://dlss.flvc.org/admin-tools/common-prerequisites-manuals) <accessed August 3, 2020>. They are as follows:

USF Course	Common Prerequisite
MAC 2281 Engineering Calculus I or MAC 2311 Calculus I	MAC X311 or MAC X281

21 Roy, J., Engineering by the Numbers, American Society for Engineering Education, Updated July 2019

MAC 2282 Engineering Calculus II or MAC 2312 Calculus II	MAC X312 or MAC X282
MAC 2283 Engineering Calculus III or MAC 2313 Calculus IIII	MAC X313 or MAC X283
MAP 2302 Differential Equations	MAP X302 or MAP X305
CHM 2045/2045L General Chemistry I/Laboratory or CHS 2440/2440L General Chemistry of Engineering/Laboratory	CHM X045/X045L or CHM X045C or CHS X440/X440L
CHM 2046/2046L General Chemistry II/Laboratory	CHM X046/X046L or CHM X046C
PHY 2048/2048L General Physics I - Calculus Based/Laboratory	PHY X048/X048L or PHY X2048C
PHY 2049/2049L General Physics II - Calculus Based/Laboratory	PHY X049/X049L or PHY X049C or PHY X044/049L

A grade of C is the minimum acceptable grade in each of the prerequisite courses.

C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that Florida College System transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

The University does not intend to seek formal Limited Access status for the proposed program.

D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see link to the Statewide Articulation Manual on the resource page for new program proposal). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

The proposed program is not an AS-to-BS capstone program.

Institutional Readiness

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan (see link to the SUS Strategic Plan on the resource page for new program proposal).

This degree program falls under the Programs of Strategic Emphasis in the State University System of Florida, Board of Governors 2012 – 2025 Strategic Plan in the Economic Development. It will increase the number of STEM graduates and the proposed B.S. in Environmental Engineering will be offered under a federally and state designated STEM CIP Code. Specifically, the B.S. in Environmental Engineering program directly supports the following SUS strategic planning goals and USF' goals:

The proposed B.S. in Environmental Engineering is aligned with SUS goals, namely to increase degree productivity and program efficiency while increasing student access and success in STEM fields, and increase business and community engagement. USF's Mission focuses on creating new partnerships to build a sustainable future for Florida in the global economy. Furthermore, USF's Goal #1: To promote the lifelong success of well-educated, highly skilled, and adaptable

alumnae/alumni who lead enriched lives, are engaged citizens and thrive in a dynamic global market." The degree program will also develop the knowledge, skills, abilities, and aptitudes of USF students to compete and succeed in our global society and marketplace.

Furthermore, the Florida Governor's 2018-2023 Florida Strategic Plan for Economic Development has six Pillars. Pillar 3 is related to Infrastructure; Pillar 3.3 specifically addresses ensuring availability of future supply of quality water to meet Florida's economic growth and quality of life goals; Pillar 6 recognizes achievements made by government entities that employ environmental engineers such as the Department of Environmental Protection (DEP) and Water Management Districts.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The B.S. in Environmental Engineering is aligned with SUS goals, namely to increase degree productivity and program efficiency while increasing student access and success in STEM fields, and increase business and community engagement. USF's Mission focuses on creating new partnerships to build a sustainable future for Florida in the global economy. Furthermore, USF's Goal #1: To promote the lifelong success of well-educated, highly skilled, and adaptable alumnae/alumni who lead enriched lives, are engaged citizens and thrive in a dynamic global market." The B.S. in Environmental Engineering program has also been aligned with the USF Global Citizens Project, which is a University-wide initiative aimed at enhancing undergraduate students' global competencies through the development of new and improved curricular and co-curricular experiences.

C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology in table format of the activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

The following table describes key events and decision-making points in the planning of the new degree program. The date, stakeholders participating, and activities are briefly outlined below:

Planning and Implementation Process for the B.S. in Environmental Engineering (BSENV) Program.

Date	Participants	Activity
January, 2017	Environmental Engineering Faculty and USF Academic Planning	Planning meeting to discuss creating BSENV degree program.
Spring 2017	Environmental Engineering Faculty	Begin Planning to develop ABET-accredited B.S. Environmental Engineering curriculum (BSEV) (CIP Code 14.1401). Draft curriculum developed.
February 27, 2017	Environmental Engineering Faculty and Chemical Engineering	Faculty reach out to two Chemical Engineering colleagues about potential electives.
May 1, 2017	Environmental Engineering Faculty and Hillsborough County Community College	Meeting to discuss how to integrate the BSENV program with Biotechnology Alliance at HCCC.
Fall 2017	Civil and Environmental Engineering Department	Creation of BSENV degree officially added as tactic to department strategic plan.

September 18, 2017	Civil and Environmental Engineering Department	Faculty discuss removing Dynamics as pre-req for Fluid Mechanics. One reason is proposed BSENV curriculum.
November 16, 2017	Civil and Environmental Engineering Department	Faculty vote to remove Dynamics as pre-req for Fluid Mechanics. One reason is proposed BSENV curriculum.
January 2018	College of Engineering	Department Chairs discuss and approve proposed program at COE Chair's Retreat.
May, 2018	Environmental and Water Resources Faculty	Discuss and provide input to draft curriculum.
September 13, 2018	Civil and Environmental Engineering Department and College of Engineering	Pre-proposal submitted to COE Dean for Approval.
November 9, 2018	Civil and Environmental Engineering Department and USF Health	Civil and Environmental Engineering department reaches out to USF Health about plan to create BSENV degree program.
Summer to Fall, 2019	Civil and Environmental Engineering Department	Submit ABET Self-Study and have site visit for ABET assessment of undergraduate Civil Engineering program.
Fall 2019	Environmental Engineering Faculty	Submit pre-proposal for BSENV program to University councils and committees.
January 16, 2020	Environmental Engineering Faculty and Chemical Engineering	Environmental Engineering faculty reach out to Chemical Engineering about co-sharing teaching a course on fate and transport.
February 3, 2020	Environmental Engineering Faculty and GeoSciences	Agreement reached to allow BSENV students to take GIS courses as electives.
February 4, 2020	Environmental Engineering Faculty and Global Pathways program	Environmental Engineering faculty discusses how to make BSENV program part of Global Citizens Pathway Program.
February 11, 2020 and February 19, 2020	Environmental Engineering Faculty and Integrative Biology	Environmental Engineering Faculty reach out to Integrative Biology about appropriate Biological Science course for BSENV majors to take.
February 13, 2020	Environmental Engineering Faculty and Health Sciences	Agreement reached to allow BSENV students to take Health Sciences courses as electives.
February 14, 2020	Environmental Engineering Faculty and USF St. Pete Campus College of Arts and Sciences	Agreement reached to allow BSENV students to take elective courses taught on St. Petersburg campus.
January 30 , 2020	Civil and Environmental Engineering Faculty	Receive input on current draft of curriculum and revise.
March 5, 2020	Civil and Environmental Engineering Faculty	Receive second round of input on proposed curriculum and revise.
February - March 2020	Environmental Engineering Faculty	Developed and submitted all university proposals for prerequisite changes and new constituent courses necessary to implement the newly structured BSENV. Approval received.

The following table describes key dates and activities associated with the implementation of the

new degree program.

Events Leading to Implementation of Preproposal and New Degree Proposal

Date	Implementation Activity
February 14, 2020	College Council approval of pre-proposal
March 11, 2020	Undergraduate Council approves pre-proposal
March 18, 2020	Academic Program Advisory Council (APAC) approves preproposal
April 11, 2020	SUS CAVP Academic Program Coordination Review Group expressed no concern
April 16, 2020	BOT's Academic Campus Environment (ACE) Committee approves USF's Accountability Plan, where the B.S. in Environmental Engineering was listed
June 2, 2020	BOT approves USF"s Accountability Plan
June 23, 2020	BOG approves USF's Accountability Plan
September 11, 2020	New degree proposal approved by the Department of Civil and Environmental Engineering and Department Chair
September 11, 2020	New degree proposal approved by the College of Engineering's Undergraduate Program Directors Committee and Dean
November 9, 2020	New degree proposal approved by the Undergraduate Council
February 9, 2021	New degree proposal approved by USF's Academic Campus Environment Advisory Council (ACEAC)
February 23, 2021	BOT's ACE Committee approves the new degree proposal
March 9, 2021	BOT approves the new degree proposal
March 12, 2021	New degree proposal submitted to the Academic and Student Affairs unit in the Board of Governors Office
	Once notification has been received by the BOG's Academic and Student Affairs staff, we will add it to the USF undergraduate catalog and USF's electronic systems, market the program, and recruit students.

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations. Please include evidence that teacher preparation programs meet the requirements outlined in Section. 1004.04, Florida Statutes, if applicable.

The College of Engineering will seek ABET accreditation for the new undergraduate Environmental Engineering degree program, which is a hallmark, gold standard of all top engineering undergraduate programs, based upon rigorous independent assessment of many quantitative outcomes and metrics.

USF's graduate program in Environmental Engineering is currently ranked #35 among all universities nationally and #21 nationally among public universities, according to the 2021 US News and World Report rankings (second highest ranking in FL).[22]

22 U.S. News & World Report, Best Graduate Schools, https://www.usnews.com/best-graduate-schools <accessed September 9, 2020>

USF's College of Engineering went through the ABET 2019-2020 Accreditation Cycle in 2019. The ABET Site Visit Dates were October 13-15, 2019. The Environmental Engineering faculty participated in the collection of assessment data, development of the Self-Study document, and the site visit in support of the B.S. in Civil Engineering program that was under review. The 2020 Final Program Accreditation Actions and Statement of Accreditation received from ABET in August, 2020 included two institutional strengths which are both related to establishing and maintaining an undergraduate program: (1) University focus on overall student success that has led to implementation of a number of programs and initiatives that include advising struggling students, redesign of gateway courses, expanded library access, and creating Engineering Living and Learning Communities. (2) University is designated as a preeminent research institution with the State of Florida and this has provided research opportunities for graduate and undergraduate students. Specifically for the B.S. in Civil Engineering program, the Department was acknowledged to have a strength of a diverse faculty (in terms of gender and race) that will better prepare students to be inclusive in their approach to engineering problem solving.

An outside peer (Environmental Engineering professor from the University of Colorado-Boulder) prepared an Evaluation Report for master's and PhD programs in Environmental Engineering at the University of South Florida (April 2, 2018). Relevant to this proposal, the evaluator reported that: (1) with respect to the general strength of the program, "the number of faculty appears adequate to cover the courses in the graduate curriculum" and "it appears that more than a single faculty member possesses the expertise to teach the courses." (2) Regarding the quality of the faculty, the evaluator reported that (a) "the research directions of the environmental faculty are diverse and strong," (b) "they contribute to the strategic plan goal to establish preeminence in sustainable infrastructure," and (c) "First and foremost, the program has excellent faculty. These individuals are well known in the field by other Environmental Engineering faculty nationally and some internationally." (3) Connections outside academia to real-world, practical issues is a strength. Students considered the integration of practical issues into their courses a particular strength, and a number of the research projects include partnerships with communities and municipalities.

The following items relate to recommendations made by the outside evaluator to improve the Environmental Engineering *graduate* programs and our progress in implementing the recommendations. These items were selected for this proposal because they are valuable for implementing an undergraduate program: (1) The evaluator suggested we conduct an exit survey of graduating master's and Ph.D. students. This was addressed by developing a focused LinkedIn group to help with networking of graduates. (2) The evaluator suggested we develop advising guides for graduate students with "sample courses" that lead to strengths in different specialty areas of environmental engineering. We have now developed materials to better advise new and continuing graduate students on courses that are required or elective for the Environmental Engineering graduate degrees and to support different concentrations within the discipline. These materials are now posted on the Department's web site. (3) It was suggested the program increase discussion of non-academic career paths for doctoral students. A new externally funded NSF NRT grant is developing on-line materials to help facilitate advising doctoral students on non-academic career paths. (4) The evaluator suggested we hire additional Environmental Engineering faculty. In the year after the outside evaluation, the Department completed a successful search for a new faculty member, Dr. Katherine Alfredo, who started at USF as an Assistant Professor in Fall 2019. Dr. Alfredo has expertise in drinking water treatment and policy which will support the undergraduate program. (5) The evaluation also led our programs to update a comprehensive exam for non-thesis Master's students to allow them to demonstrate competency in oral communication and solution of a complex problem. (6) The evaluator asked that we consider whether it is desirable for all Environmental Engineering graduate students to have some familiarity and competence across environmental media (e.g. air, water, and soil) and whether these competencies are already encompassed within the required courses or if some modification is needed either within the required courses or changing the required courses. To address this observation we addressed the required core courses where

these different environmental media are covered and increased emphasis on less emphasized media in these core classes. We have taken this advice into consideration when developing the undergraduate curriculum to ensure familiarity and competence across environmental media.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

The Academic Learning Compact is provided in Appendix F.

Educational goals of the proposed program in environmental engineering are consistent with the mission of the College of Engineering and of the Department of Civil and Environmental Engineering. The mission of the College of Engineering at the University of South Florida is to improve the quality of life in our community by providing a high quality education for our students and practicing professionals, creating new knowledge and solving real world problems via innovative research, and engaging in effective community service and outreach. The mission of the Department of Civil and Environmental Engineering is to provide undergraduate students with a strong, broad-based, engineering education that gives them the basic intellectual and organization skills to allow them to work with complex systems with technological, social and environmental components.

The proposed program will seek ABET accreditation. For ABET accreditation, the proposed B.S. Environmental Engineering program will have the same three Program Educational Objectives as the existing BS in Civil Engineering program:

1. Graduates can obtain positions in both public and private organizations.
2. Graduates are continuing their professional development by extending their professional knowledge through independent learning, continuing education courses, conferences, workshops, short courses, graduate study and involvement in professional societies.
3. Graduates who are working in public or private organizations which encourage professional registration will have made appropriate progress towards achieving that registration.

In addition, students graduating from the proposed program must achieve the seven learning outcomes required for all ABET-accredited engineering programs. Specifically, students graduating from the program will have:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics *(critical thinking skill)*
2. an ability to 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 *(critical thinking skill)*
3. an ability to communicate effectively with a range of audiences *(communication skill)*
4. an ability to 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 *(critical thinking skill)*
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives *(communication skill)*
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions *(critical thinking skill)*
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies *(critical thinking skill)*

Finally, the ABET/EAC Environmental Engineering Program Criteria[23] state the Environmental Engineering curriculum "must include a) Mathematics through differential equations, probability and statistics, calculus-based physics, chemistry (including stoichiometry, equilibrium, 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, 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." These program criteria are explained in greater detail elsewhere.[24]

Assessment of student learning outcomes will be performed through a variety of mechanisms that include core task assessments, examinations, assignments, and capstone experiences. Also, students' achievement of the identified core learning outcomes will be measured. The results of the assessments will be used to improve student achievement and program effectiveness.

B. Describe the admission standards and graduation requirements for the program.

Students applying to the University of South Florida are expected to meet the University's admissions standards, as listed on USF's Office of Admissions' website:

- First time in college (FTIC) Requirements: https://www.usf.edu/admissions/freshmen/admission-information/requirements-deadlines.aspx <accessed 06/19/2020>
- Transfer Requirements: https://www.usf.edu/admissions/transfer/admission-information/requirements-deadlines.aspx <accessed 06/19/2020>

In addition to meeting USF's admissions standards, the proposed program in Environmental Engineering will adhere to the same standards as the existing B.S. program in Civil Engineering.

For graduation, students must satisfy the requirements from their catalog year while maintaining GPA and grading requirements, and satisfactory completion of the following requirements:

- General Education Program (36 credit hours), including State Core General Education, State Computation and Communication;
- Minimum of 120 unduplicated credit hours;
- A minimum adjusted grade point average (GPA) of 2.0 on all coursework taken at USF and an overall 2.0 GPA average on all college-level coursework;
- Major and college requirements for the degree program;
- Nine credit hours of coursework taken during the summer term(s) (if entered USF with less than 60 credit hours);
- Registration and successful completion of at least thirty (30) of the last sixty (60) credit hours;
- 42 credit hours of upper-level (3000–4999) coursework;
- Civics Literacy;

[23] Criteria for Accrediting Engineering Programs, 2020 – 2021, ABET, https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2020-2021/#3 <accessed July 18, 2020>

[24] Commentary on the ABET Program Criteria for Environmental Engineering Programs, American Academy of Environmental Engineers & Scientists, May 2020 https://www.aaees.org/education/abetprogramcriteria.php <accessed July 18, 2020>

- Foreign language admissions coursework.

C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

The Environmental Engineering degree program requires a total of 120 credit hours of coursework. The lower-level portion of the degree program includes common course prerequisites and general education courses, which may be completed as part of an AA from a FCS institution. The major portion of the degree program includes 58 hours in the major coursework and 10 credit hours of supporting coursework.

Required Supporting Courses (10 credit hours)
The following courses are supporting courses for this major. They are required for the major, but are not counted in the total major hours but are counted toward the total program hours of 120 credit hours. The degree will not be awarded if these courses have not been taken by the end of the student's final semester.

- BSC 2010 Biology I Cellular Processes (3 credit hours)
- BSC 2010 Biology I Cellular Processes Laboratory (1 credit hour)
- EGN 1113 Introduction to Design Graphics (3 credit hours) [ETD 1320 Introduction to Computer Aided Drafting (3 credit hours) is an acceptable substitute]
- GLY 3850 Geology for Engineers (3 credit hours) [ESC 2000 Introduction to Earth Science (3 credit hours) or GLY 2010 Dynamic Earth: Introduction to Physical Geology (3 credit hours) are acceptable substitutes]

Required Major Courses (58 credit hours):

- CGN 4122 Professional and Ethical Issues (3 credit hours)
- CWR 4202 Hydraulics (3 credit hours)
- CWR 4202L Civil Engineering Hydraulics Laboratory (1 credit hour)
- CWR 4540 Water Resources Engineering I (3 credit hours)
- CWR 4812 Capstone Water Resources/Environmental Design (3 credit hours)
- ENV 2061 Engineering Sustainable and Healthy Environments (2 credit hours)
- EGN 3000 Foundations of Engineering (0 credit hours)
- EGN 3000L Foundations of Engineering Lab (3 credit hours)
  Note: Any General Education Creative Thinking course will count for students transferring to USF with a Florida Public A.A.
- EGN 3311 Statics (3 credit hours)
- EGN 3343 Thermodynamics I (3 credit hours)
- EGN 3353 Fluid Mechanics (3 credit hours)
- EGN 3443 Probability and Statistics for Engineers (3 credit hours) or STA 2023 Introductory Statistics I (3 credit hours)
  Note: Students are strongly encouraged to take EGN 3443, if they have not transferred STA 2023 to USF.
- EGN 3615 Engineering Economics with Social and Global Implications (3 credit hours) or ECO 2023 Economic Principles (Microeconomics) (3 credit hours)
  Note: Students are strongly encouraged to take EGN 3615, if they have not transferred ECO 2023 to USF.
- EGN 4453 Numerical and Computational Tools I in Civil and Environmental Engineering
- (3 credit hours)
- ENV 4001 Environmental Systems Engineering (3 credit hours)
- ENV 4004L Environmental Engineering Laboratory (1 credit hour)
- ENV 4053C Chemical Fate and Transport in the Environment (3 credit hours)
- ENV 4071 Environmental Site Assessment (3 credit hours)

- ENV 4105 Air Pollution Fundamentals (3 credit hours)
- ENV 4417 Water Quality and Treatment (3 credit hours)
- ENV 4612 Green Engineering for Sustainability (3 credit hours)
- ENV 4618 ENVISION Sustainable Communities (3 credit hours)

Unrestrictive/General Electives:
The Department suggests the following list of electives student make take to supplement their Environmental Engineering knowledge and meet the credit hour requirements of the degree program. The courses may be utilized to fulfill unrestricted/general electives.

Basic and Environmental Sciences Technical Elective Options:
- CHM 2210 Organic Chemistry (3 credit hours)
- EVR 4027 Wetland Environments (3 credit hours)
- ENV 4082 Environmental Field Sampling (3 credit hours)
- GLY 4734 Beaches and Coastal Environments (3 credit hours)

Critical Infrastructure Technical Elective Options:
- CCE 4031 Construction Management (3 credit hours)
- CWR 4541 Water Resources Engineering II (3 credit hours)
- CWR 4625 Ecological Engineering (3 credit hours)
- ENV 4351 Solid Waste Engineering (3 credit hours)
- SUR 2101C Engineering Land Surveying (3 credit hours)
- TTE 4003 Transportation and Society (3 credit hours)

Data Science Technical Elective Options:
- EGN 4454 Numerical and Computational Tools II in Civil and Environmental Engineering (3 credit hours)
- GEO 3164C Research Methods in Geography (3 credit hours)
- GIS 3006 Mapping and Geovisualization (3 credit hours)
- GIS 4035C Remote Sensing of the Environment (3 credit hours)
- GIS 4043C Geographic Information Systems (3 credit hours)

Health and Safety Technical Elective Options:
- HSC 3503 Principles of Toxicology (3 credit hours)
- HSC 4213 Environmental and Occupational Risk Analysis (3 credit hours)
- HSC 4430 Occupational Health and Safety (3 credit hours)

Energy Technical Elective Options:
- EEL 4283 Sustainable Energy (3 credit hours)
- ENV 2073 Global Warming: Science and Politics of a Contemporary Issue (3 credit hours)
- EVR 2217 Energy, Environment and Sustainability (3 credit hours)

Global Citizens Technical Elective Options:
- ECH 4783 Sustaining the Earth: An Engineering Approach (3 credit hours)
- GEO 4340 Natural Hazards (3 credit hours)
- HSC 4211 Health, Behavior and Society (3 credit hours)
- HSC 4624 Foundations of Global Health (3 credit hours)
- PHC 4250 Crisis Leadership in Disasters (3 credit hours)

Education Abroad Elective Options:
Students are able to take 3-6 credit hours of their electives through education abroad programs. The specific education abroad course(s) must be approved in advance by the Department.

D. Provide a sequenced course of study for all majors, concentrations, or areas of

emphasis within the proposed program.

Please see Appendix G for the eight-semester and four-semester course sequenced plans of study.

E. Provide a one- or two-sentence description of each required or elective course. For degree programs in medicine, nursing, and/or allied health, please identify the courses that meet the requirements in Section 1004.08, Florida Statutes for required patient safety instruction.

BSC 2010 Biology I Cellular Processes (3 credit hours)
This course deals with biological systems at the cellular and subcellular levels. Topics include an introduction to biochemistry, cell structure and function, enzymes, respiration, mitosis and meiosis, genetics and gene expression.

BSC 2010 Biology I Cellular Processes Laboratory (1 credit hour)
Laboratory portion of Biology I Cellular Processes relating to cellular and subcellular structure and function. Mitosis, meiosis, and Mendelian genetics will be stressed.

CGN 4122 Professional and Ethical Issues (3 credit hours)
Ethical, legal and other professional responsibilities of engineers to society, their clients, and the profession. Prepares a student for public lives as a citizen, community member, and practitioner. Includes preparation of contracts and specifications.

CWR 4202 Hydraulics (3 credit hours)
Fundamental and applied aspects of pipe flow, free surface flow, and unsteady flow for hydraulic systems.

CWR 4202L Civil Engineering Hydraulics Laboratory (1 credit hour)
Performance of experiments to reinforce principles of hydraulics engineering.

CWR 4540 Water Resources Engineering I (3 credit hours)
A study of the engineering principles involved in sustaining and managing the quantity and quality of water available for human activities with particular emphasis on surface water and ground water hydrology.

CWR 4812 Capstone Water Resources/Environmental Design (3 credit hours)
A capstone water resources design experience for seniors in Civil and Environmental Engineering. A design-oriented course to design both industrial and domestic water treatment and water transport systems and hydraulic systems.

ECO 2023 Economic Principles (Microeconomics) (3 credit hours)
Introduction to the theory of price determination. How an economy decides what to produce, how to produce, and how to distribute goods and services.

EGN 1113 Introduction to Design Graphics (3 credit hours)
An introductory course covering the principles of technical drawing by employing traditional and Computer-Aided-Drafting (CAD) techniques using AutoCAD. Students will also learn to apply these concepts to civil design and engineering plans preparation.

ENV 2061 Engineering Sustainable and Healthy Environments (2 credit hours)
Case studies are used to explore the technical and non-technical perspectives involved with designing and managing equitable and enduring infrastructure that reduces environmental contamination and health risks from exposure to environmental hazards.

EGN 3000 Foundations of Engineering (0-3 credit hours)

Introduction to the USF College of Engineering disciplines and the engineering profession. Course will provide you with knowledge of resources to help you succeed. Course topics include academic policies and procedures, study skills, and career planning.

EGN 3000L Foundations of Engineering Lab (3 credit hours)
Introduction to Engineering and its disciplines incorporating examples of tools and techniques used in design and presentation. Laboratory exercises will include computer tools, engineering design, team projects, and oral and written communication skills.

EGN 3311 Statics (3 credit hours)
Principles of statics, mechanical equilibrium, forces, moments, plane trusses.

EGN 3343 Thermodynamics I (3 credit hours)
Axiomatic introduction to thermodynamic concepts of energy, entropy, work and heat. Properties of ideal and real substances. Applications: power production and refrigeration, phase equilibria.

EGN 3353 Fluid Mechanics (3 credit hours)
Fundamental and experimental concepts in ideal and viscous fluid theory; momentum and energy consideration, introduction to hydraulics, pipe flow. Lecture.

EGN 3443 Probability and Statistics for Engineers (3 credit hours)
An introduction to concepts of probability and statistical analysis with special emphasis on critical interpretation of data, comparing and contrasting claims, critical thinking, problem solving, and writing.

EGN 3615 Engineering Economics with Social and Global Implications (3 credit hours)
Presents basic economic models used to evaluate engineering project investments with an understanding of the implications of human and cultural diversity on financial decisions through lectures, problem solving, and critical writing.

EGN 4453 Numerical and Computational Tools I in Civil and Environmental Engineering (3 credit hours)
Computer basics, computer programming operations, flow charts, developing simple computer programs, vector and matrix algebra, equation solving techniques.

ENV 4001 Environmental Systems Engineering (3 credit hours)
Introduction to environmental engineering. Protection of human health, air, water, and land resources. Sustainable design, water quality, solid and hazardous waste management, air quality control, contaminated environments. Application of mass balances.

ENV 4004L Environmental Engineering Laboratory (1 credit hour)
Laboratory experience in the measuring of environmental engineering parameters.

ENV 4053C Chemical Fate and Transport in the Environment (3 credit hours)
Investigates how chemical properties, physical processes, and environmental characteristics all influence the fate and transport of chemicals in natural and engineered systems. Includes theory, practical examples, and laboratory experiment.

ENV 4071 Environmental Site Assessment (3 credit hours)
All of the fundamental elements of environmental site assessments, including a review of pertinent laws and regulations, the process of interviews, file reviews, and the site reconnaissance, through the use of procedures based on the Scientific Method.

ENV 4105 Air Pollution Fundamentals (3 credit hours)
An introduction to ambient air pollution control. Emphasis is given to principles underlying our understanding of air pollution, its sources, its effects, along with approaches for its management.

ENV 4417 Water Quality and Treatment (3 credit hours)
An introduction to municipal water supply and waste water treatment. Topics include water requirements and waste volumes, water quality, physical and chemical treatment processes, and advanced wastewater treatment processes.

ENV 4612 Green Engineering for Sustainability (3 credit hours)
Offers an overview of principles of green engineering including innovation, inherency, interdisciplinary, integration, and international, with an emphasis on applications of green engineering principles in different design stages.

ENV 4618 ENVISION Sustainable Communities (3 credit hours)
Explores how infrastructure projects can be conceived and designed with relevant partners to make our societies more sustainable and equitable. Criteria used by the Envision™ rating system are reviewed, and applied to build infrastructure projects.

ESC 2000 Introduction to Earth Science (3 credit hours)
An introductory course in the Earth Sciences. Topics covered include geology, weather, climate change, ocean dynamics, and the history of the Earth, the solar system and beyond.

GLY 2010 Dynamic Earth: Introduction to Physical Geology (3 credit hours)
A first course in geology emphasizing the Earth's composition, structure, and dynamics. Lectures/activities include but are not limited to plate tectonics, earthquakes, volcanism, glaciation, global warming, shorelines, and natural resources.

ETD 1320 Computer Aided Drafting (3 credit hours)
This course provides an introduction to the use of Computer-Aided Drafting. It includes a review of computer hardware and software used in an automated drafting environment; concepts of how a drawing is stored and manipulated by the computer; commands necessary to do a simple drawing; and the actual drawing of a part. This course provides for the development of beginning skills in the use of a microcomputer, operating peripheral devices for CAD, and using AutoCAD software.

GLY 3850 Geology for Engineers (3 credit hours)
An examination of geologic materials and processes designed for engineering students; classification and properties of earth materials, surface processes, site investigation techniques, applications of geology to the solution of engineering problems.

STA 2023 Introductory Statistics (3 credit hours)
Descriptive and Inferential Statistics; Principles of Probability Theory, Discrete and Continuous Probability Distributions: Binomial Probability Distribution, Poisson Probability Distribution, Uniform Probability Distribution, Normal Distribution and more.

Basic and Environmental Sciences Technical Elective Options:
CHM 2210 Organic Chemistry (3 credit hours)
Fundamental principles of organic chemistry.

EVR 4027 Wetland Environments (3 credit hours)
Study of the general properties and ecology of wetlands, examination of the distribution and functions of wetlands, and consideration of wetland conservation and policies.

ENV 4082 Environmental Field Sampling (3 credit hours)
This course is designed to provide students with an interest in the field of environmental science/engineering, with the highest level of practical, hands-on environmental field training to help them advance their careers.

GLY 4734 Beaches and Coastal Environments (3 credit hours)
A comprehensive introduction to the nature of all coastal environments including beaches, dunes, tidal inlets, estuaries, reefs, and river deltas. Emphasis will be on the natural state of these environments and how human activities have and will impact them. Consideration of coastal management policies involving economics, ethics, policy, and environmental law.

Critical Infrastructure Technical Elective Options:
CCE 4031 Construction Management (3 credit hours)
Fundamentals of construction management. Topics include: general definitions, organizational roles, types of contracts, analysis of labor and equipment, cost estimating, contractor cash flow analysis, planning and scheduling, project control, construction administration, quality and safety management, and use of computer software in construction management.

CWR 4541 Water Resources Engineering II (3 credit hours)
The course is intended to be a technical elective for students specializing in water resources or environmental engineering. Material in the course covers subsurface hydrology including both soil vadose zone processes and the ground water flow.

CWR 4625 Ecological Engineering (3 credit hours)
This course explores ecological principles and engineering design techniques to enable the creation and rehabilitation of ecosystems for the benefit of nature and society. Particular applications to be covered include water pollution control (wastewater and stormwater), and ecosystem restoration (freshwater/coastal wetlands, and rivers).

ENV 4351 Solid Waste Engineering (2 credit hours)
Introduction to the principles of integrated municipal solid waste management; waste minimization, recycle and disposal options. Design of landfill disposal systems. Course restricted to Civil and Environmental Engineering majors.

SUR 2101C Engineering Land Surveying (3 credit hours)
Principles of land surveying for engineering practice. Traverses, levels, boundary surveys, route surveys, coordinate geometry, and mapping.

TTE 4003 Transportation and Society (3 credit hours)
This course provides a multidisciplinary introduction to transportation and its impacts on society. It explores how transportation interacts with the economy, the environment and the social and political nature of society.

Data Science Technical Elective Options:
EGN 4454 Numerical and Computational Tools II in Civil and Environmental Engineering (3 credit hours)
Numerical Methods including numerical integration, root finding, numerical differentiation and integration, eigen-values, and eigen-vectors, data modeling. Development of computer programs to perform these operations.

GEO 3164C Research Methods in Geography (3 credit hours)
Statistical analysis in geographic research.

GIS 3006 Mapping and Geovisualization (3 credit hours)
An introduction to the concepts underlying modern, computer-based mapping and to the collection, storage, and geovisualization of digital spatial data.

GIS 4035C Remote Sensing of the Environment (3 credit hours)
Analysis of satellite images and aerial photographs for studies of the environment.

GIS 4043C Geographic Information Systems (3 credit hours)

An introduction to the concepts underlying Geographical Information Systems, with an emphasis on analytical capabilities of such systems in both raster and vector domains.

Health and Safety Technical Elective Options:

HSC 3503 Principles of Toxicology (3 credit hours)
Covers basic principles of toxicology, incl. molecular/cellular sites of action of toxicants, physiological effects of toxicants on individual organ systems. Environmental toxicology is also covered.

HSC 4213 Environmental and Occupational Risk Analysis (3 credit hours)
This course provides an introduction of risk analysis for environmental and occupational health. Students will gain knowledge of the various regulations and scientific methods for the evaluation of health risk in environmental and occupational settings.

HSC 4430 Occupational Health and Safety (3 credit hours)
This course provides a review of occupational health and safety. Regulatory guidance and compliance, and the underlying science that drives occupational safety regulations are covered. The roles of various health and safety professionals are explored.

Energy Technical Elective Options:

EEL 4283 Sustainable Energy (3 credit hours)
This course aims to introduce students to concepts of sustainable energy conversion. Solar, wind, hydroelectricity, hydrogen, biomass and geothermal energy conversion methods as well as main storage technologies will be discussed.

ENV 2073 Global Warming: Science and Politics of a Contemporary Issue (3 credit hours)
Nontechnical introduction to the greenhouse effect and how human activities purportedly affect the global climate. Investigation of the relationship between science and the political process. Proposed policies to address global warming.

EVR 2217 Energy, Environment and Sustainability (3 credit hours)
A critical analysis of energy sources, distribution and consumption using scientific methodology. Attributes of commonly used energy sources including environmental impact. Social, political and economic implications from a global perspective.

Global Citizens Technical Elective Options:

ECH 4783 Sustaining the Earth: An Engineering Approach (3 credit hours)
An approach of the global perspective on ecological principles revealing how all the world's life is connected and sustained within the biosphere and how engineering provides the tools to design solutions engaging the environment, societies, and economic.

GEO 4340 Natural Hazards (3 credit hours)
Examination of the physical, social, economic, political and cultural forces that create the phenomena of natural hazards. Case studies from around the world will include floods, droughts, tornadoes, hurricanes, freezes, heat waves, wild fires, earthquakes, tsunami, and volcanoes.

HSC 4211 Health, Behavior and Society (3 credit hours)
This course focuses on an ecological perspective of the determinants of health including biology, individual behavior, social relationships, social stratification, institutions, neighborhoods and communities, environment, policies and globalization.

HSC 4624 Foundations of Global Health (3 credit hours)
This course introduces students to the principles of public health from a global perspective. Emphasis will be placed on the impact of social, economic, political and environmental factors that influence health and access to health care across the globe.

PHC 4250 Crisis Leadership in Disasters (3 credit hours)
Explore analytical and intuitive aspects of leadership during disasters including the root cause of domestic and international disaster prevention, preparedness, and response, recovery, and mitigation challenges while identifying solutions to complex problems.

Education Abroad Technical Elective Options:
Students are able to take 3-6 credit hours of their Technical electives through education aboard programs. The specific education aboard course(s) must be approved in advance by the Department.

F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.

The proposed B.S. Environmental Engineering program will pursue ABET accreditation. Specific ABET program criteria for an Environmental Engineering program state that "the curriculum must prepare graduates to apply knowledge of mathematics through differential equations, probability and statistics, calculus-based physics, chemistry (including stoichiometry, equilibrium, and kinetics), an earth science, a biological science, and fluid mechanics. The curriculum must prepare graduates to formulate material and energy balances, and analyze the fate and transport of substances in and between air, water, and soil phases; conduct laboratory experiments, and analyze and interpret the resulting data in more than one major environmental engineering focus area, e.g., air, water, land, environmental health; design environmental engineering systems that include considerations of risk, uncertainty, sustainability, life-cycle principles, and environmental impacts; and apply advanced principles and practice relevant to the program objectives. The curriculum must prepare graduates to understand concepts of professional practice, project management, and the roles and responsibilities of public institutions and private organizations pertaining to environmental policy and regulations."

Industrial-driven competencies for environmental engineering are provided at the national level through the very specific ABET Environmental Engineering program criteria that our curriculum must meet. That program criteria is developed through the leadership of the American Academy of Environmental Engineers & Scientists (AAEES). The AAEES Committee that develops this program criteria is comprised of some academics but mostly practitioners from private and public organizations (AAEES overall membership is approximately 15% academic).

The Department of Civil and Environmental Engineering currently has an Advisory Board that is composed of approximately 15 civil and environmental engineers that includes (1) CEOs of engineering companies, (2) experienced design engineers from the private and public sectors, and (3) engineering academics. We plan to use this Advisory Board to solicit industry/community feedback.

G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate. For degree programs in medicine, nursing, and/or allied health, please identify the courses that meet the requirements in Section 1004.08, Florida Statutes for required patient safety instruction.

The College of Engineering will seek the Accreditation Board for Engineering and Technology (ABET) accreditation for the new Environmental Engineering degree program. ABET accreditation is granted after the first group of students graduate from the program. Specifically, once we have a completed transcript of a graduate to submit (estimated May 2024), we will ask ABET for a new program review. This will determine the timeline going forward, which will likely involve submission of the Self-Study in July 2024, and then the evaluation visit would occur in fall

2024, with accreditation results provided the next spring. Prior to the evaluation visit, we will have a Mock Visit consultant review the program. The B.S. in Environmental Engineering program would then join the programs from our existing College of Engineering degree programs that currently have ABET accreditation.

H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?

N/A

I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 3 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.

This new degree program will be offered on the USF Tampa campus with some electives offered on the St. Petersburg campus.

IX. Faculty Participation

A. Use Table 2 in Appendix A to identify existing and anticipated full-time (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

As shown in Table 2 of Appendix A, ten faculty members who contribute to the existing graduate degree programs in Environmental Engineering and teach Environmental Engineering-related coursework required for the B.S. in Civil Engineering program will participate in the proposed B.S. in Environmental Engineering.

Faculty will participate in the proposed program by teaching required or specialization classes in the major, as well as through service for curriculum planning, review and accreditation. Nine of the participating faculty members have primary appointments in the Department of Civil and Environmental Engineering (CEE), where the proposed B.S. in Environmental Engineering will be administered. One faculty member (Dr. Stuart) has a primary appointment in the College of Public Health, but receives some assignment and funding from the Department of Civil and Environmental Engineering through a long-standing joint appointment; the CEE Department plans to fund 50% FTE of her effort to participate in this proposed degree program (and other existing activities with the Department). No additional faculty hires are required to meet program requirements.

B. Use Table 3 in Appendix A to display the costs and associated funding resources for existing and anticipated full-time faculty (as identified in Table 2 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel

Services (OPS). Provide a narrative summarizing projected costs and funding sources.

As noted above, this proposal is for a B.S. in Environmental Engineering degree program that will be housed in an existing department (Civil and Environmental Engineering). All faculty and staff resources for this program are currently allotted as part of the Department of Civil and Environmental Engineering's annual operating budget. Table 3 and 4 in Appendix A show the budget and their reallocation for the faculty and other associated costs of the program. Existing faculty will account for 1.57 person-years in Year 1 to deliver the B.S. in Environmental Engineering program and 2.42 person-years in Year 5. This totals--$299,368 in salary and benefits for faculty in Year 1 and $479,727 by Year 5—represent the percent of effort of each of the faculty members from Year 1 to Year 5; the increase in Year 5 is due to increase in effort. No funds are required to support visiting and adjunct faculty.

C. Provide in the appendices the abbreviated curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

Abbreviated faculty CVs are included as Appendix H.

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

USF's graduate program in Environmental Engineering is currently ranked #35 among all universities nationally and #21 nationally among public universities, according to the 2021 US News and World Report rankings (second highest ranking in FL).[25] The productivity of the academic unit for teaching, research, and service are summarized below in terms of state and national exposure.

Teaching
Environmental Engineering program faculty are actively involved in innovative education and have received awards for their contributions. Notable examples include:

- 3 faculty (Mihelcic, Stuart, Q. Zhang) have contributed material for one undergraduate environmental engineering textbook (*Environmental Engineering: Fundamentals, Sustainability, Design*, 2nd Edition, John Wiley & Sons, 656 pages, 2014) (a 3rd Edition will be released in early 2021) that is adopted by environmental engineering programs throughout the U.S. and a second more specialized book (Field Guide in Environmental Engineering for Development Workers: Water, Sanitation, Indoor Air, American Society of Civil Engineers (ASCE) Press, Reston, VA, 2009) (Mihelcic, Trotz, Q. Zhang).
- 4 faculty have been awarded a best paper award (for 2 separate papers) from authoring education research papers for the Environmental Engineering Division of the American Society for Engineering Education (Cunningham, Ergas, Mihelcic, Q. Zhang).
- 1 faculty received an ASEE SE Regional Education Award (Q. Zhang).
- 5 faculty are professionally registered and/or achieved Board Certified environmental engineering status with the American Academy of Environmental Engineers & Scientists (Albergo, Alfredo, Ergas, Mihelcic, Yeh).
- 2 faculty have obtained Fellow status with the Association of Environmental Engineering & Science Professors (AEESP) and the Water Environment Federation (WEF) (Ergas, Mihelcic).
- 3 faculty have been awarded Outstanding Educator Awards from the Association of Environmental Engineers & Scientists (AEESP) (Cunningham, Mihelcic, Trotz).

25 U.S. News & World Report, Best Graduate Schools, https://www.usnews.com/best-graduate-schools <accessed September 9, 2020>

- 2 faculty (Ergas, Mihelcic) have received the Excellence in Environmental Engineering and Science Education (E4) Award from American Academy of Environmental Engineers & Scientists (AAEES) for significant contribution to the environmental engineering profession in the area of educating practitioners, American Academy of Environmental Engineers & Scientists
- 3 faculty have received the William R. Jones Outstanding Mentor Award from the Florida Education Fund for mentoring minority graduate students (Ergas, Mihelcic, Trotz).
- 1 faculty received the Outstanding Mentor Award from the Society for Advancement of Chicanos / Hispanics and Native Americans in Science (SACNAS) (Ergas).
- Several of our faculty (Ergas, Cunningham, Q. Zhang) have had received 2 NSF Grants to improve environmental engineering undergraduate education (totaling over 300K). These include 1) Development of a Concept Inventory for Fundamentals of Environmental Engineering, 2) Civil and Environmental Engineering Education (CEEE) Transformation Change: Tools and Strategies for Sustainability Integration and Assessment in Engineering Education.
- 6 learning materials on sustainability for the general engineering audience have been created by unit faculty (Q. Zhang) with Dr. Vanasupa (Cal Poly) funded by NSF, available at http://works.bepress.com/lvanasup/.
- 24 video tutorials have been created by unit faculty (Q. Zhang) with Dr. Vanasupa (Cal Poly) and published at Open Education Resource (OER) Commons under “The Sustainability Learning Suites” funded by NSF, available at http://www.oercommons.org/authoring/1660-the-sustainability-learning-suites/view.

Research

Environmental Engineering faculty members are PIs/co-PIs on many competitive external research grants in recent years. Several recent examples over the past few years that total over $15 million are:

- NSF CRISP Type 2: Integrative Decision Making Framework to Enhance the Resiliency of Interdependent Critical Infrastructures; $1,963,542.
- NSF CAREER: Envisioning Integrated Wastewater Management through the Lens of Reverse Logistics; $501,886.
- NSF NRT-INFEWS: Systems Training for Research on Geography-based Coastal Food Energy Water Systems (STRONG-CFEWS); $2,500,000.
- NSF S_STEM Graduate Student Scholarship to Advance Community Engaged Solutions to Manage Nitrogen.” $1 million.
- NSF PIRE: Context Sensitive Implementation of Synergistic Water-Energy Systems;$3,900,000
- US EPA Center for Reinventing Aging Infrastructure for Nutrient Management (RAINmgt); $2,499,074.
- US EPA Approaches to Reduce Nutrient Loadings for Harmful Lagal Blooms Management (Lake Ockeechobee Watershed focus) $1,000,000.
- Department of Education Doctoral Fellowships in Civil Engineering for Redesigning Resilient Transportation and Water Critical Infrastructures, $784,000.
- Gates Foundation Reinventing the Toilet Research; $1.2 million.

Research excellence was recently acknowledged by the following national awards:

- 2020 First Place Award in University Research Category made by the American Academy of Environmental Engineers & Scientists in their Excellence in Environmental Engineering & Science program for research project titled “Hybrid Adsorption Biological Treatment System (HABiTS) for Nitrogen Removal in Onsite Wastewater Treatment” (USF environmental engineering faculty partnering with local consultants and Hillsborough County Wastewater Utility).
- 2 faculty received Best Paper Award in 2019 by research journal *Water Environment Research*.

Service

- 1 faculty served on American Academy of Environmental Engineers & Scientists. Environmental Engineering Body of Knowledge (BOK) Task Force (Q. Zhang).

- 3 faculty have been elected nationally to serve on the Board of Directors of Association of Environmental Engineers & Scientists (Ergas, Mihelcic, Trotz), 2 have served as AEESP President (Mihelcic, Trotz), and 1 as AEESP Treasurer (Ergas).
- 4 faculty currently serve as Associate Editors for the following professional journals (*ASCE J. Environmental Engineering, ASCE Journal of Sustainable Water in the Built Environment, ACS Environmental Science & Technology, ACS Environmental Science & Technology Letters*) (Cunningham, Ergas, Mihelcic, Q. Zhang).
- 1 faculty member served two terms on the U.S. EPA Chartered Science Advisory Board (Mhelcic) (appointed by the EPA Administrator).
- Related to nitrogen and phosphorus pollution in FL, faculty serve as members of Southwest Florida Water Management District Springs Management committee, Florida Department of Agriculture and Consumer Services (FDACS) Office of Agriculture Water Policy BMP Research Coordinating Committee, and several have served as members of organizing committee for Water Environment Federation (WEF) Nutrients Conference (Arias, Ergas, Mihelcic).

Undergraduate Student Team Awards mentored by Environmental Engineering Faculty
Teams of undergraduate students who are members of our capstone Design course have entered and regularly been awarded first and second places at state (Florida Water Environment Federation, FWEA) and national (Water Environment Federation, WEF) competitions. https://www.fwea.org/student_design_competition.php & https://www.wef.org/membership/students-and-young-professionals2/student-design/ <accessed September 10, 2020>

Graduate Student Award for Top Master's Student
Seven recent USF Master's students have been awarded the William Brewster Snow Award from the American Academy of Environmental Engineers & Scientists (AAEES). This award recognizes an environmental engineering graduate student who has made significant accomplishments in an employment or academic engineering project (Years 2012, 2013, 2015, 2016, 2018, and 2020)

X. Non-Faculty Resources

A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.

Part I – Overview of USF Libraries, Mission, and Program/Discipline Strengths
The University of South Florida (USF) is accredited by the Southern Association of Colleges and Schools' Commission on Colleges to award associate, baccalaureate, master's, specialist and doctorate degrees. The institution was initially accredited in 1965 and was last reviewed and reaffirmed in 2015.

The University of South Florida Libraries consist of USF's main research library and the Hinks and Elaine Shimberg Health Sciences Library, both located on the Tampa Campus; the Nelson Poynter Memorial Library, USF St. Petersburg campus; and an Information Commons at the USF Sarasota-Manatee campus. Access to print resources at the USF Tampa Library is available 24/5, and access to electronic resources is available remotely 24/7.

The USF Libraries inspire research, creativity, and learning by connecting the USF community to relevant and high-quality information. Our vision is to become the center of a highly engaged university community, driven to produce high-impact research and to nourish creativity. Together, the USF Libraries provide access to more than 2 million volumes and an extensive collection of electronic resources including approximately 95,785 journal subscriptions and open access titles

and over 939 databases, 865,385 e-books, and 17,975,111 digital images. In addition, students have access to over 89,775 audio/visual materials including electronic media, music scores, audiobooks, CDs, and DVDs and 11,053 streaming videos.

The USF Libraries endeavor to develop and maintain a research collection that satisfies the resource needs of the undergraduate and graduate curriculums in the USF College of Engineering and also meets the specialized needs of the students and faculty for a B.S. program in Environmental Engineering.

Part II - USF Libraries' Collections
MONOGRAPHS (Print and Ebooks)
The USF Libraries contain extensive holdings of books in both print and e-book format that support student and faculty instructional and research needs in the new program. To identify the scope of relevant books, titles were derived from searching the library's catalog by Library of Congress Subject Headings relevant to Environmental Engineering studies.

MONOGRAPHIC COUNTS Library of Congress Subject Headings for Environmental Engineering			
Library of Congress (LC) Call Number	**Subject Heading**	**Print Books**	**Ebooks**
G70.212	GIS, Environmental Modelling. Engineering	128	210
GB 651-2998	Hydrology. Water	397	391
GE 1-350	Environmental Sciences	326	3,098
QH33-500	Environmental Monitoring	558	1,732
QR-41.2-R856	Health & Engineering	78	374
RA 565-600	Environmental Health	447	652
TA 170-171	Environmental Engineering. Sustainability, Green.	348	1,788
TC 1-978	Hydraulic Engineering	117	705
TC 1501-1800	Ocean Engineering	64	144
TD159-168	Municipal Engineering	75	211
TD169-171.8	Environmental Protection	837	1,491
TD172-193.5	Environmental Pollution	1,003	1,542
TD419-428	Water Pollution	481	830
TD429.5-480.7	Water Purification. Water Treatment & Conditioning.	81	248
TD481-493	Water Distribution Systems	293	901
TD511-780	Sewage Collection and Disposal Systems	98	324
TD783-812.5	Solid Wastes	264	449
TD813-870	Street Cleaning. Litter and its removal	44	75
TD878-894	Environment and Pollution	1,003	1,542
TD895-899	Industrial Wastes	571	1,078
TD1020-1066	Hazardous Substances and their disposal	16	49
TH 6014-6081	Environmental engineering of buildings	145	602

TH 7005-7699	Heating and ventilation	94	224

Total Monographs All Subject Headings (Non-Unique)
- Print = 7,468
- Electronic = 18,660

Ebooks and Ebook Collections
- Cambridge Core eBooks
- EBSCO eBook Collection
- Oxford Scholarship Online and University Press Scholarship Online
- ProQuest eBook Central
- ScienceDirect
- Springer eBook Collection in Engineering
- Springer eBook Collection in Earth & Environmental Science
- Taylor & Francis eBooks
- Wiley Online Library

MAJOR SERIAL TITLES (JOURNALS)
The USF Libraries subscribe to several scholarly and professional journals that have an editorial scope and content which support curricular activities at the Bachelor of Science level. A majority of the titles are in electronic format thereby enhancing accessibility. Journal titles were derived by searching Scopus SciMago and Web of Science JCR ranked journals for curriculum topics in Environmental Engineering.

Serial Title Subscriptions and Open Access
- 75 Core Journal Titles (electronic format)

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 3 in Appendix A. Please include the signature of the Library Director in Appendix B.

No additional library resources are required. A large portion of the USF Libraries' budget supports the continuation of electronic resources. Environmental Engineering is well represented throughout the USF Libraries' electronic journal subscriptions.

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

Offices:
All faculty have offices that are distributed in ENC, ENG, IRDB and ENL buildings, mostly based on their choices and proximity to their colleagues, department offices, and respective laboratories. All graduate teaching assistants are provided space in the respective laboratories or special rooms that are traditionally occupied by research groups of different concentrations of study.

The graduate teaching assistants who are not accommodated in the above areas have been assigned offices in partitioned spaces in ENC 2006.

Classrooms:
The classroom for a given course is assigned by the University based on the number of students in the course and the professor's special requirements. There are very few classrooms in the Engineering complex. Very often, classes are held in buildings adjacent to the Engineering buildings, but they are also held in buildings across campus occasionally. The standard classroom has either a white board or a blackboard and many have computers projectors

installed. The University's Department of Classroom Support will provide, upon request, any other equipment as needed for a classroom. The most recent (Fall 2011) addition of a fully-equipped auditorium in one Engineering building (ENB 118) to the classroom inventory has helped to address some of the above issues to a large extent.

Laboratory Facilities and Equipment:
Undergraduate laboratories that support the B.S. in Environmental Engineering program are listed in the table below. Descriptions are provided subsequent to the table. More detail on the laboratory facilities is provided in Section X.F.

Laboratory	Associated Course	Location	Condition	Adequacy for Instruction	Area Sq. Ft.
Environmental Engineering	ENV 4004L	ENG 227A	Very Good	Very Good	711
Hydraulics	ENV 4004L	ENG 120F	Very Good	Very Good	475
Environmental Engineering Research Laboratories		Suite 107, IDR	Very Good	Can be used for undergraduate research and specialized educational activitie	5,000

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 3 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (E) below.

No additional space or labs are required to carry out the requested new degree program in Environmental Engineering.

E. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 3 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

Not applicable.

F. Describe specialized equipment that is currently available to implement the proposed

Laboratory Facilities and Equipment:
Undergraduate laboratories that support the B.S. Environmental Engineering program are listed in the table below. Descriptions are provided subsequent to the table.

Laboratory	Associated Course	Location	Condition	Adequacy for Instruction	Area Sq. Ft.
Environmental Engineering	ENV 4004L	ENG 227A	Very Good	Very Good	711
Hydraulics	ENV 4004L	ENG 120F	Very Good	Very Good	475

Environmental Engineering Research Laboratories		Suite 107, IDR	Very Good	Can be used for undergraduate research and specialized educational activities	5,000

The Environmental Engineering laboratory is used to provide students with hands-on experience in conducting environmental measurements; interpreting data; quality control and quality assurance; running bench-scale physical, chemical, and biological reactor systems; and use of analytical instruments. The laboratory is also used to provide a staging area for field sampling and analysis and pilot studies. Demonstrations of environmental processes are conducted to complement classroom activities in some of the undergraduate classes. All students using the lab are educated in safety protocols, quality control, and proper techniques for experimental design, record keeping, and reporting of results. The laboratory has been designed to accommodate up to 15 students working in teams. Students gain experience in safety, sampling, analysis, and conduct of bench-scale and pilot-scale testing. Bench-scale equipment is available for water quality analyses such as pH, alkalinity, hardness, and spectrophotometry. Experimental stations also contain apparatus for photocatalytic oxidation experiments. Analytical balances are available for gravimetric analyses and weighing of chemicals. Furthermore, refrigerators are available for temperature controlled testing and storage of samples.

The Hydraulics laboratory is devoted entirely to undergraduate instruction and includes four weigh tank platform stations (hydraulic benches) mounting individual experiments and a 4-meter flume used to conduct various flow experiments (e.g. Impact of a Jet, Demonstration of a Pelton Turbine, Flow Over Weirs). Some of the laboratory exercises are aimed at giving students rudimentary exposure to this equipment to familiarize them with practical field data collection. In addition, the laboratory has a centrifugal pump, series and parallel pumps, a flow meter unit, a demonstration Pelton Turbine, a series of weirs and an impact of jet accessory**.** Funds were made available in 2018 to purchase a state-of-the-art hydraulic flume for this laboratory.

The Environmental Engineering research laboratories provide state-of-the- art analytical and experimental equipment for chemical and biological work. The laboratories are equipped with two constant temperature rooms, fume hoods, biosafety cabinets, and bench space to accommodate approximately 30 research students. Separate laboratories are dedicated for teaching, and computation and simulation purposes. Specific equipment related to this proposal includes: Timberline ammonia/NOx analyzer, a Respirometer Systems and Applications PF8000 Aerobic/Anaerobic respirometer system; a Thermo Scientific TN-3000 Total Nitrogen analyzer; a Metrohm professional an/cat IC system; a Gow-Mac 400 GC system; Perkin-Elmer Clarus 500 gas chromatograph with autosampler, electron capture detector (ECD), and flame ionization detector (FID); Genysis UV/visible spectrophotometers; a number of probes and meters for measuring pH, DO, temperature, conductivity, and turbidity; a Malvern Zetasizer particle size analyzer with dynamic and static light scattering; ovens, incubators, and furnaces; a Shimadzu Total Organic Carbon/Nitrogen analyzer; automatic titrators; and an Amerex AT-HV-85 autoclave. Engineering Technical Support Services includes a fully equipped and staffed machine shop.

At the college-level, the Mini-Circuits Design for X Laboratory[26] provides a collaborative environment for undergraduate students at the University of South Florida to safely pursue meaningful multidisciplinary engineering projects that expand their creative design and project management skills. The project teams are made up of engineering students, with opportunity to collaborate with non-engineering students, under the guidance of supportive faculty. Through

26 http://www.eng.usf.edu/dfx/index.htm <accessed August 27, 2020>

these projects, students gain experience with teamwork and industry design and safety procedures. The lab space is used for undergraduate coursework, projects, and organizations such as MECH, SOAR and X-Lab. Within the lab are centers such as the computer lab, the collaborative space and the fabrication space. The Laboratory Manager, Michael Celestine, along with 5 to 7 undergraduate student assistants who have been trained in all aspects of the lab including equipment and safety, provide the support to the undergraduates and faculty who use the lab space. A training schedule is posted online and anyone planning to use the lab must sign up and complete the required training session. The restructured 3-credit hour Engineering Foundations course will make use of the DfX lab and some 15 additional undergraduates will be trained to support the large number of students who will have the opportunity to use the lab space for design/build projects. USF Engineering undergraduates make take the Make Course, EEL 4935, a full semester course of advanced engineering design/ build methods. Equipment available to the students includes fabrication devices (PCB Mill, CNC Mill, Laser Cutter, Makerbot Replicator, Makerbot Replicator Z18, Makerbot Replicator 2X, Vinyl Cutter, Makerbot 3D Scanner, Copy Machine, Stratasys U-Print), electronic equipment (Electronics Workbench, Function Generators, Network Analyzers, Oscilloscopes, Arbitrary Waveform Generators, Bench Power Supplies, Hot Air Rework Tools), and computer and collaborative project equipment (Computer Drafting and Design workstations, Short Throw Projectors with Smart Board Capability) for the "Brainstorm Lounge" and the integrated classroom spaces

We believe that we are providing our students with computing and laboratory facilities (equipment, software, and services) that more than adequately support their educational needs. This is true at the University, College, and Departmental levels. We assess the adequacy of our laboratory support in part by our end-of-semester exit interviews where we ask graduating seniors to rate the laboratory facilities. Input is also solicited directly from faculty members on a yearly basis as part of the mission of the Departmental Infrastructure Committee. The student comments and faculty input help us determine the adequacy of our laboratory support.

G. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 3 in Appendix A.

These types of additional resources are not needed.

H. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 3 in Appendix A.

These types of additional resources are not needed.

I. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 3 in Appendix A.

There are no fellowships or scholarships for undergraduate students in this B.S. in Environmental Engineering program. B.S. in Environmental Engineering program students will be of high quality, so they will be quite competitive for university, regional and national scholarships, based upon both merit and financial need.

We have accounted for costs to support four graduate assistants who will assist with the required Environmental Engineering and hydraulics laboratories. We estimated this cost based on student stipend, health care costs, and tuition. The four graduate assistants would be supported during fall and spring semesters and we assumed their effort was 25% because these two laboratories are also taken by students enrolled in the B.S. in Civil Engineering program. This resulted in a program cost of $24,950 in Year 1 and #29,889 in Year 5.

J. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

Internships and practicum experiences are not a requirement of the program. Internships are commonly available for Engineering students (including B.S. in Environmental Engineering students) at local, regional and national environmental/civil engineering-related companies, local government, and state/federal government. When an employment opportunity is conveyed to the Department or individual faculty members, students are notified about the opportunity through an email list serve. Current College of Engineering departments all have active industrial departmental advisory boards, and the Department of Civil and Environmental Engineering will work to ensure appropriate representation on their existing advisory board to support the new B.S. in Environmental Engineering program.

APPENDIX A

TABLE 1-A
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Baccalaureate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1 HC	Year 1 FTE	Year 2 HC	Year 2 FTE	Year 3 HC	Year 3 FTE	Year 4 HC	Year 4 FTE	Year 5 HC	Year 5 FTE
Upper-level students who are transferring from other majors within the university**	15	12	12	10	10	8	8	6	5	4
Students who initially entered the university as FTIC students and who are progressing from the lower to the upper level***	40	33	80	66	120	100	160	133	200	166
Florida College System transfers to the upper level***	0	0	5	4	10	8	15	12	20	16
Transfers to the upper level from other Florida colleges and universities***	0	0	5	4	10	8	15	12	20	16
Transfers from out of state colleges and universities***	0	0	5	4	10	8	15	12	20	16
Other (Explain)***	0	0	0	0	0	0	0	0	0	0
Totals	**55**	**45**	**107**	**88**	**160**	**132**	**213**	**175**	**265**	**218**

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.
** If numbers appear in this category, they should go DOWN in later years.
*** Do not include individuals counted in any PRIOR CATEGORY in a given COLUMN.

APPENDIX A

Table 2

Anticipated Faculty Participation

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Specialty	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	Nicholas Albergo, M.S. Environmental Engineering	Lecturer	Non-Tenure	Fall 2021	9	0.25	1.00	0.25	9	0.25	1.00	0.25
A	Katherine Alfredo, Ph.D. Environmental Engineering	Assistant Professor	Tenure-Earning	Fall 2021	9	0.75	0.13	0.09	9	0.75	0.25	0.19
A	Mauricio Arias, Ph.D. Water Resources Engineering	Assistant Professor	Tenure-Earning	Fall 2021	9	0.75	0.13	0.09	9	0.75	0.12	0.09
A	Jeffrey Cunningham, Ph.D. Environmental Engineering	Associate Professor	Tenured	Fall 2021	9	0.75	0.13	0.10	9	0.75	0.50	0.38
A	Sarina Ergas, Ph.D. Environmental Engineering	Professor	Tenured	Fall 2021	9	0.75	0.13	0.10	9	0.75	0.25	0.19
A	James Mihelcic, Ph.D. Environmental Engineering	Professor	Tenured	Fall 2021	9	0.75	0.40	0.30	9	0.75	0.50	0.38
A	Amy Stuart, Ph.D. Environmental Health Engineering	Professor	Tenured	Fall 2021	12	1.00	0.25	0.25	12	1.00	0.33	0.33
A	Maya Trotz, Ph.D. Environmental Engineering	Professor	Tenured	Fall 2021	9	0.75	0.25	0.19	9	0.75	0.33	0.25
A	Daniel Yeh, Ph.D. Environmental Engineering	Professor	Tenured	Fall 2021	9	0.75	0.13	0.10	9	0.75	0.25	0.19
A	Qiong Zhang, Ph.D. Environmental Engineering	Associate Professor	Tenured	Fall 2021	9	0.75	0.13	0.10	9	0.75	0.25	0.19
	Total Person-Years (PY)							**1.57**				**2.42**

Faculty Code	Code Description	Source of Funding	PY Workload by Budget Classification Year 1		Year 5
A	Existing faculty on a regular line	Current Education & General Revenue	1.57		2.42
B	New faculty to be hired on a vacant line	Current Education & General Revenue	0.00		0.00
C	New faculty to be hired on a new line	New Education & General Revenue	0.00		0.00
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00		0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00		0.00
F	Existing faculty on endowed lines	Philanthropy & Endowments	0.00		0.00
G	New faculty on endowed lines	Philanthropy & Endowments	0.00		0.00
H	Existing or New Faculty teaching outside of regular/tenure-track line course load	Enterprise Auxiliary Funds	0.00		0.00
		Overall Totals for	**1.57**		**2.42**

Worksheet Table 2 Faculty Participation

APPENDIX A
TABLE 3
PROJECTED COSTS AND FUNDING SOURCES

Budget Line Item	Reallocated Base* (E&G) Year 1	Enrollment Growth (E&G) Year 1	New Recurring (E&G) Year 1	New Non-Recurring (E&G) Year 1	Contracts & Grants (C&G) Year 1	Philanthropy/ Endowments Year 1	Enterprise Auxiliary Funds Year 1	**Subtotal Year 1**	Continuing Base** (E&G) Year 5	New Enrollment Growth (E&G) Year 5	Other*** (E&G) Year 5	Contracts & Grants (C&G) Year 5	Philanthropy/ Endowments Year 5	Enterprise Auxiliary Funds Year 5	**Subtotal Year 5**
Faculty Salaries and Benefits	299,368	0	0	0	0	0	0	**$299,368**	479,727	0	0	0	0	0	**$479,727**
A & P Salaries and Benefits	5,692	0	0	0	0	0	0	**$5,692**	5,692	0	0	0	0	0	**$5,692**
USPS Salaries and Benefits	11,329	0	0	0	0	0	0	**$11,329**	11,329	0	0	0	0	0	**$11,329**
Other Personal Services	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Assistantships & Fellowships	24,950	0	0	0	0	0	0	**$24,950**	29,889	0	0	0	0	0	**$29,889**
Library	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Expenses	8,000	0	0	0	0	0	0	**$8,000**	8,000	0	0	0	0	0	**$8,000**
Operating Capital Outlay	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Special Categories	0	0	0	0	0	0	0	**$0**	0	0	0	0	0	0	**$0**
Total Costs	**$349,339**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$349,339**	**$534,637**	**$0**	**$0**	**$0**	**$0**	**$0**	**$534,637**

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions	Year 1	Year 5
Faculty (person-years)	1.57	2.42
A & P (FTE)	0.05	0.05
USPS (FTE)	0.25	0.25

Calculated Cost per Student FTE

	Year 1	Year 5
Total E&G Funding	$349,339	$534,637
Annual Student FTE	45	218
E&G Cost per FTE	$7,763	$2,452

APPENDIX A

TABLE 4

ANTICIPATED REALLOCATION OF EDUCATION GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
214100 Civil and Environmental Engineering	3,650,000	349,339	**$3,300,661**
	0	0	**$0**
	0	0	**$0**
	0	0	**$0**
	0	0	**$0**
	0	0	**$0**
	0	0	**$0**
	0	0	**$0**
Totals	$3,650,000	$349,339	**$3,300,661**

*** If not reallocating E&G funds, please submit a zeroed Table 4**

Worksheet Table 4 Reallocation

APPENDIX B

Please include the signature of the Equal Opportunity Officer and the Library Director.

DocuSigned by:
Cecil Howard
29C88DD9A350415...

1/7/2021

Signature of Equal Opportunity Officer **Date**

DocuSigned by:
Todd Chavez
55E3D5D1A2B34A1...

12/13/2020

Signature of Library Director **Date**

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II.E of the proposal and the Library Director has reviewed sections X.A and X.B.

APPENDIX C

EMPLOYMENT POTENTIAL

PROJECT CRITERIA

Location	**Nationwide, Florida, Region (Tampa-St. Petersburg-Clearwater, FL)**
Degree Level	Bachelor's degree
Time Period	7/1/2019 - 6/30/2020
Selected Programs	Environmental/Environmental Health Engineering (14.1401)
Career Outcomes mapped to Selected Programs of Study	Environmental Engineer, Health and Safety Engineer

HOW MANY JOBS ARE THERE FOR YOUR GRADUATES?

For your project criteria, there were 25,671 job postings nationwide in the last 12 months.
Compared to:

- 36,598,856 total job postings in your selected location
- 12,419,247 total job postings requesting a Bachelor's degree in your selected location

For your project criteria, there were 1,174 job postings in Florida in the last 12 months.
Compared to:

- 2,113,462 total job postings in your selected location
- 643,104 total job postings requesting a Bachelor's degree in your selected location

For your project criteria, there were 250 job postings regionally in the last 12 months.
Compared to:

- 425,717 total job postings in your selected location
- 141,449 total job postings requesting a Bachelor's degree in your selected location

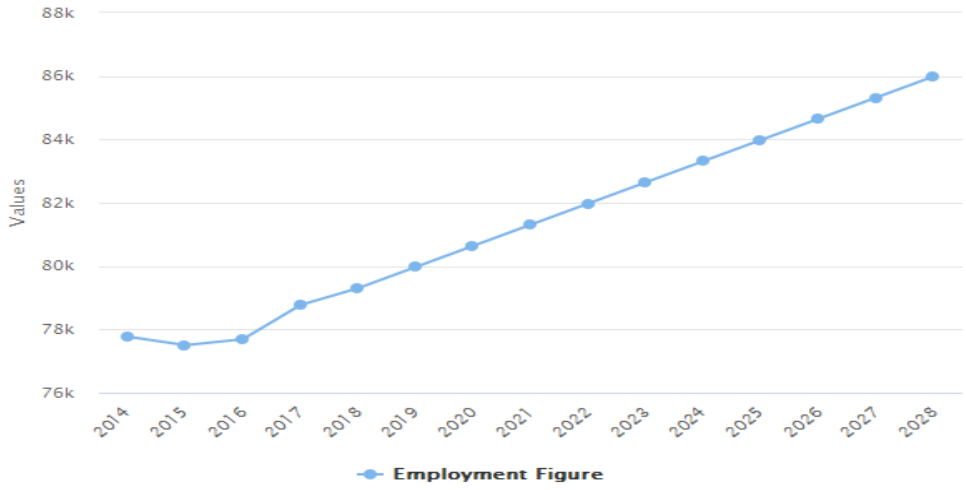
The number of jobs is expected to grow over the next 10 years.

GROWTH BY GEOGRAPHY

Geography	Selected Occupations	Total Labor Market	Relative Growth
Region	17.00 %	12.83 %	Average
Florida	17.32 %	13.15 %	Average
Nationwide	8.43 %	5.78 %	Average

HOW HAS EMPLOYMENT CHANGED FOR CAREER OUTCOMES OF YOUR PROGRAM?

Nationwide	2014	2015	2016	2017	2018	2028
Employment (BLS)	77,770	77,500	77,690	78,770	79,300	85,988
Florida	**2014**	**2015**	**2016**	**2017**	**2018**	**2028**
Employment (BLS)	4,040	3,880	3,440	2,160	2,310	2,710
Region	**2014**	**2015**	**2016**	**2017**	**2018**	**2028**
Employment (BLS)	800	650	460	320	400	468



Employment data between years 2019 and 2028 are projected figures.

DETAILS BY OCCUPATION

Occupation Group Nation	Postings	LQ	Employment (2018)	Employment Growth (2017 - 2018)	Projected Employment Growth (2019-2028)
Civil and Safety Engineering	25,671	NA	79,300	0.7%	8.4%

Occupation Group Florida	Postings	LQ	Employment (2018)	Employment Growth (2017 - 2018)	Projected Employment Growth (2019-2028)

Civil and Safety Engineering	1,174	0.8	2,310	6.9%	17.3%
Occupation Group Region	Postings	LQ	Employment (2018)	Employment Growth (2017 - 2018)	Projected Employment Growth (2019-2028)
Civil and Safety Engineering	250	1.1	400	25.0%	17.0%

HOW VERSATILE IS MY PROGRAM?

Graduates of this program usually transition into any of the 1 different occupation groups:

Occupations Group Nation	Market Size (postings)	Percentage of Career Outcome demand
Civil and Safety Engineering	25,671	100.0%
Occupations Group Florida	Market Size (postings)	Percentage of Career Outcome demand
Civil and Safety Engineering	1,174	100.0%
Occupations Group Region	Market Size (postings)	Percentage of Career Outcome demand
Civil and Safety Engineering	250	100.0%

WHAT SALARY WILL MY GRADUATES MAKE?

The average salary in the nation for graduates of your program is $76,826

This average salary is Above the average living wage for your region of $31,450

The average salary in Florida for graduates of your program is $72,876

This average salary is Above the average living wage for Florida of $29,619

The average salary in Tampa-St. Petersburg-Clearwater, FL for graduates of your program is $72,366

This average salary is Above the average living wage for Tampa-St. Petersburg-Clearwater, FL of $29,141

Salary numbers are based on Burning Glass models that consider advertised job posting salary, BLS data, and other proprietary and public sources of information.

Occupation Group Nation	0-2 Years	3-5 Years	6+ Years
Civil and Safety Engineering	$70334	$77020	$85440
Occupation Group Florida	0-2 Years	3-5 Years	6+ Years
Civil and Safety Engineering	$67642	$73433	$78553
Occupation Group Region	0-2 Years	3-5 Years	6+ Years
Civil and Safety Engineering	$65007	$70125	$81942

WHERE IS THE DEMAND FOR MY GRADUATES?

TOP LOCATIONS BY POSTING DEMAND

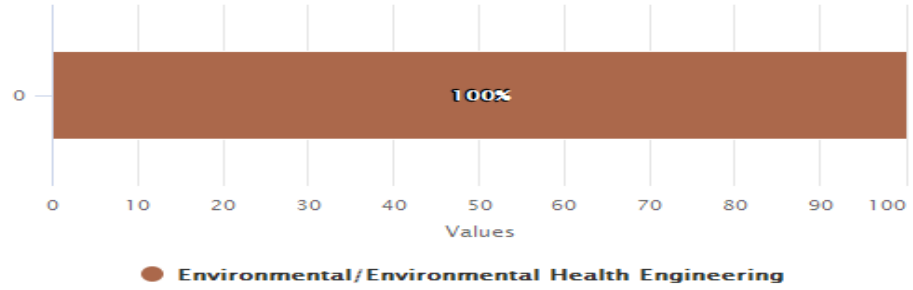
Location	Postings
California	4,027
Texas	2,241
New York	1,373
Florida	1,174
Pennsylvania	1,059
Michigan	1,051
Virginia	933
Illinois	856
Ohio	843
Colorado	783

COMPETITIVE LANDSCAPE

OVERVIEW

Nation	#	% Change (2014-2018)
Degrees Conferred	1,611	23%
Number of Institutions	98	12%
Average Conferrals by Institution	16	6.70%
Median Conferrals by Institution	15	15.40%
Florida	#	**% Change (2014-2018)**
Degrees Conferred	134	10%
Number of Institutions	5	0%
Average Conferrals by Institution	27	12.50%
Median Conferrals by Institution	23	35.30%
Region	#	**% Change (2014-2018)**
Number of Institutions	0	0%
Average Conferrals by Institution	0	0.00%
Median Conferrals by Institution	0	0.00%

MARKET SHARE BY PROGRAM

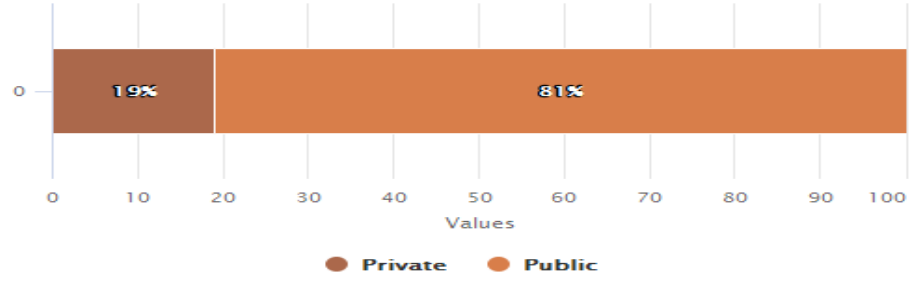


Program	*Conferrals Nationwide (2018)*	*Market Share (%)*
Environmental/Environmental Health Engineering	1,611	100.00%

Program	Conferrals Statewide (2018)	Market Share (%)
Environmental/Environmental Health Engineering	134	100.00%

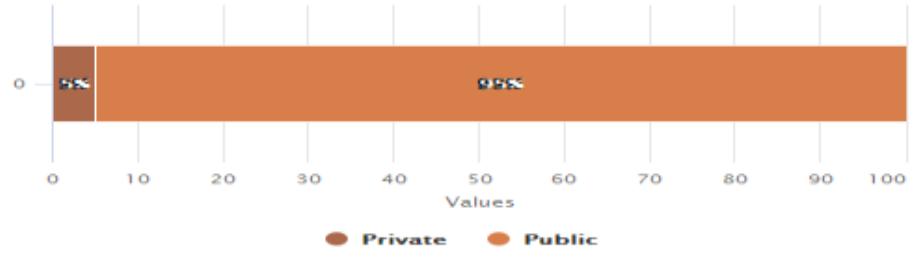
MARKET SHARE BY INSTITUTION TYPE

Nation



Institution Type	Conferrals (2018)	Market Share (%)
Private	308	19.12%
Public	1,303	80.88%

Florida



Institution Type	Conferrals (2018)	Market Share (%)
Private	7	5.22%
Public	127	94.78%

TOP INSTITUTIONS

Nationwide

Institution	School Type	Market Share (2018)	Market Share Change	Conferrals (2018)	Conferrals Change (2014-2018)
University of California-San Diego	Public	3.91%	0.00%	63	23.50%
Pennsylvania State University-Main Campus	Public	3.04%	1.13%	49	96.00%
University of Colorado Boulder	Public	2.98%	-0.77%	48	-2.00%

University of Central Florida	Public	2.67%	-0.47%	43	4.90%
University of Florida	Public	2.61%	-0.53%	42	2.40%
Humboldt State University	Public	2.61%	-1.52%	42	-22.20%
Michigan Technological University	Public	2.55%	0.56%	41	57.70%
Georgia Institute of Technology-Main Campus	Public	2.42%	-1.10%	39	-15.20%
SUNY College of Environmental Science and Forestry	Public	2.30%	0.62%	37	68.20%
Louisiana State University and Agricultural & Mechanical College	Public	2.30%	0.92%	37	105.60%

Florida

Institution	*School Type*	*Market Share (2018)*	*Market Share Change*	*Conferrals (2018)*	*Conferrals Change (2014-2018)*
University of Central Florida	Public	32.09%	-1.79%	43	4.90%
University of Florida	Public	31.34%	-2.54%	42	2.40%
Florida International University	Public	17.16%	3.94%	23	43.80%
Florida Gulf Coast University	Public	14.18%	0.13%	19	11.80%
University of Miami	Private	5.22%	0.26%	7	16.70%

TOP PROGRAMS

Nation

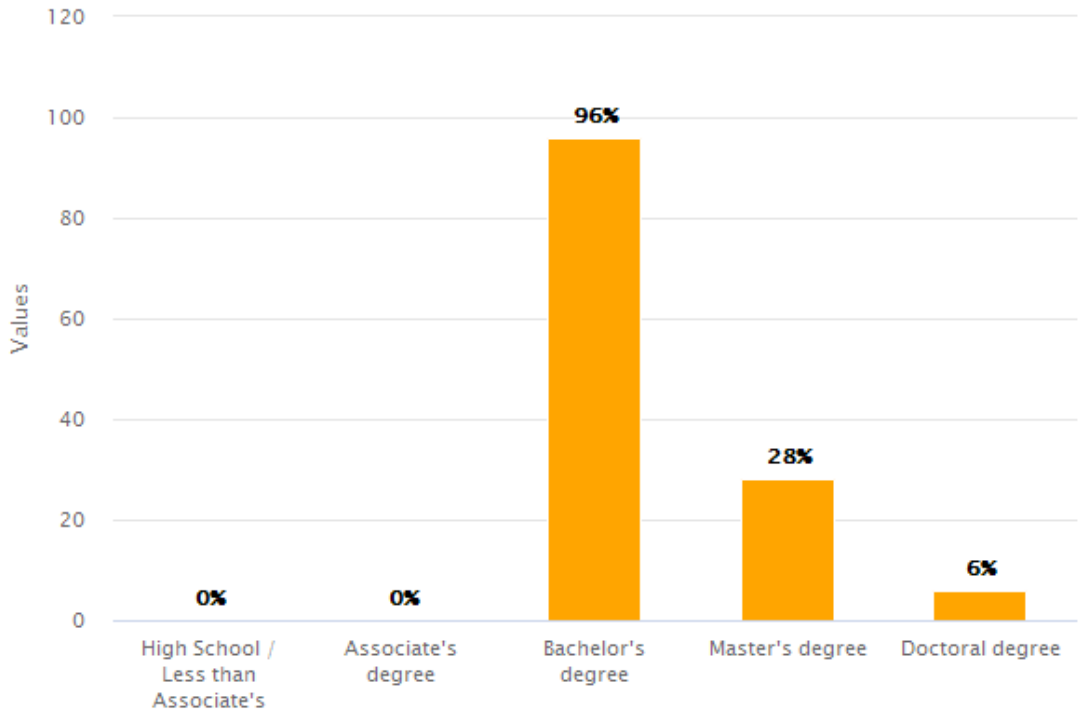
Program	Market Share (2018)	Market Share Change	Conferrals (2018)	Conferrals Change (2014-2018)
Environmental/Environmental Health Engineering	100.00%	0.00%	1,611	23.40%

Florida

Program	Market Share (2018)	Market Share Change	Conferrals (2018)	Conferrals Change (2014-2018)
Environmental/Environmental Health Engineering	100.00%	0.00%	134	10.70%

MARKET ALIGNMENT

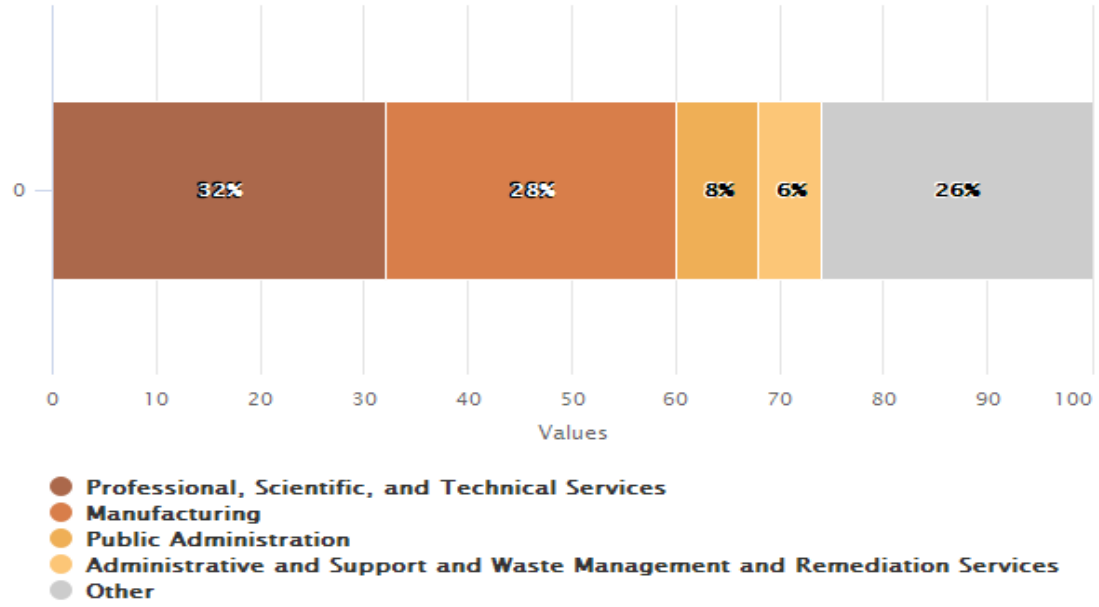
JOB POSTINGS BY ADVERTISED EDUCATION (%)



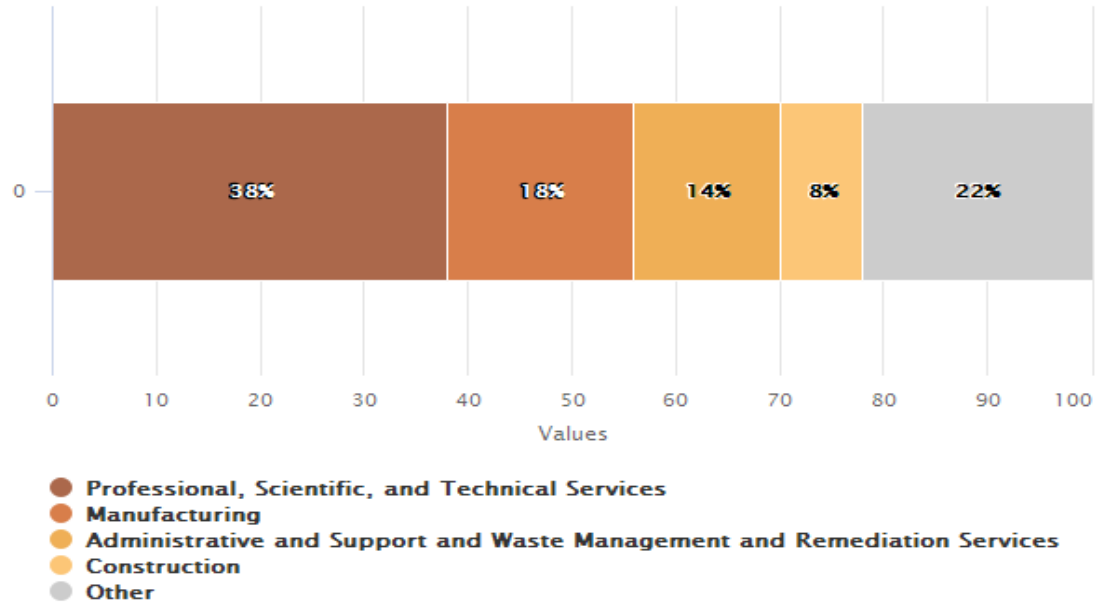
Data is similar across all demographics and nationwide is shown.

JOB POSTINGS BY INDUSTRY (%)

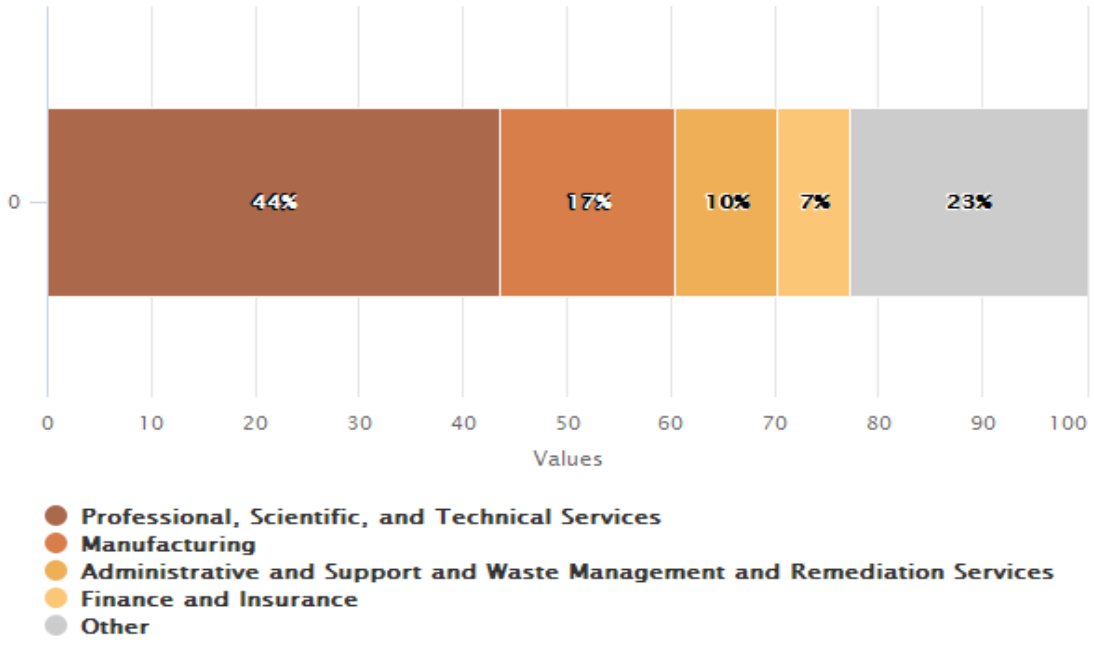
Nation



Florida

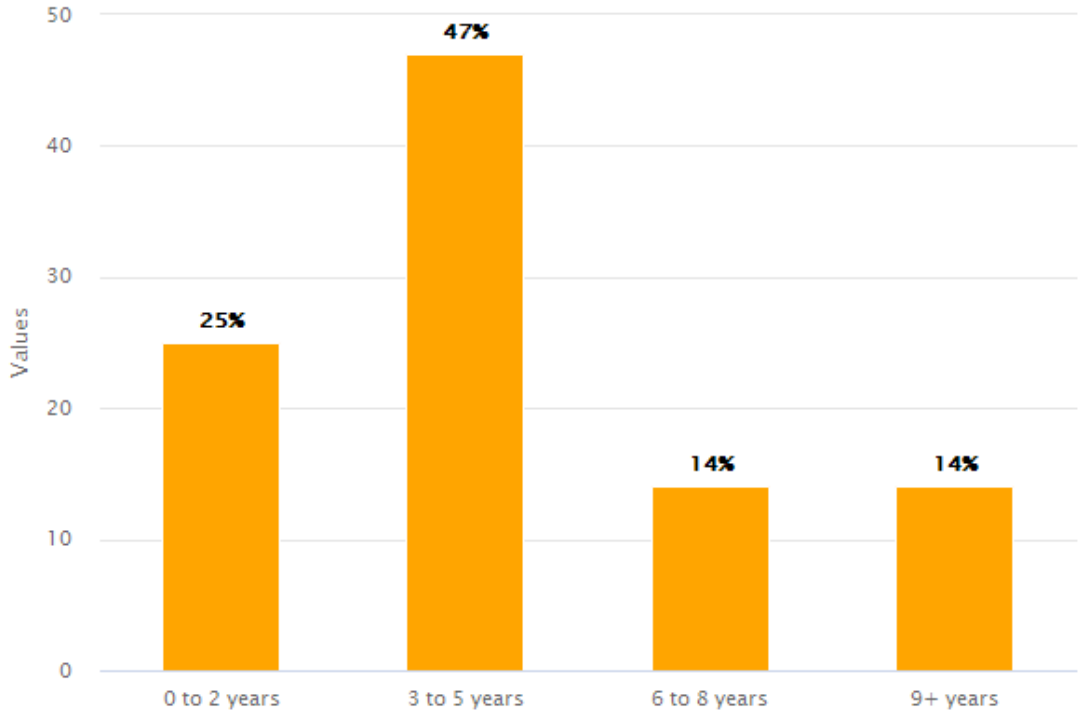


Region

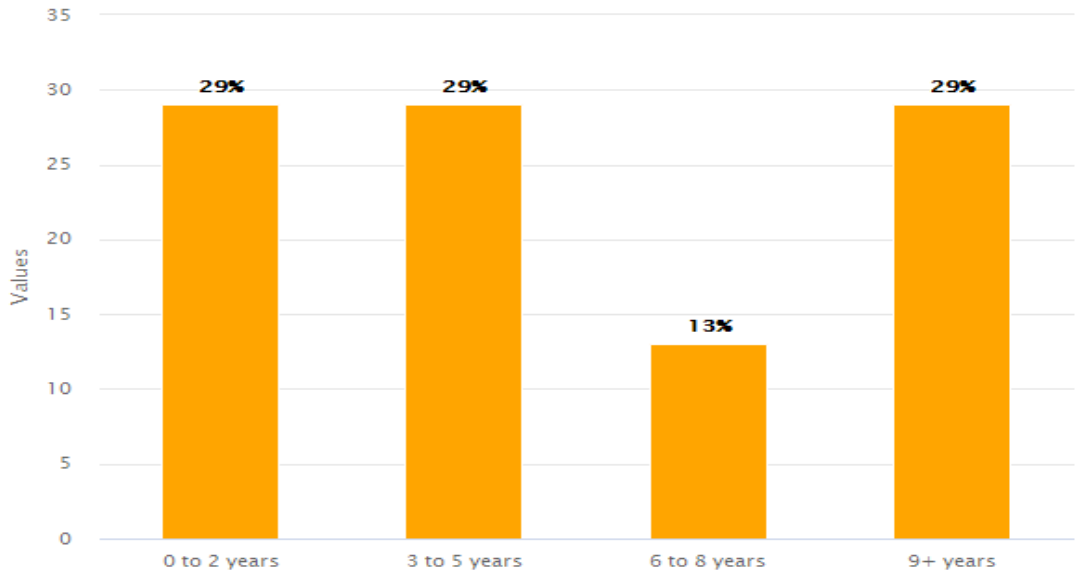

0
44%
17%
10%
7%
23%
0
10
20
30
40
50
60
70
80
90
100
Values
Professional, Scientific, and Technical Services
Manufacturing
Administrative and Support and Waste Management and Remediation Services
Finance and Insurance
Other

JOB POSTINGS BY EXPERIENCE REQUESTED (%)

National and Florida data is similar and nationwide is shown.



Region



TOP TITLES

Experience Level:

Nationwide

Title	Postings	Market Share (%)
Environmental Engineer	3,743	19.48%
Safety Engineer	2,442	12.71%
Manager	1,258	6.55%
Ehs Specialist	860	4.48%
Environmental Project Manager	576	3.00%
Engineer	476	2.48%
Fire Protection Engineer	420	2.19%
Environmental Scientist	343	1.79%
Project Environmental Engineer	242	1.26%
Ehs Coordinator	231	1.20%
Specialist	219	1.14%
Senior Engineer	165	0.86%
Wastewater Engineer	152	0.79%
Staff Environmental Engineer	143	0.74%
Safety Professional	137	0.71%

Florida

Title	Postings	Market Share (%)
Environmental Engineer	214	24.54%
Safety Engineer	62	7.11%
Engineer	40	4.59%
Ehs Specialist	29	3.33%
Environmental Project Manager	29	3.33%
Project Environmental Engineer	27	3.10%
Wastewater Engineer	24	2.75%
Environmental Scientist	23	2.64%
Manager	18	2.06%
Fire Protection Engineer	17	1.95%
Stormwater Engineer	13	1.49%
Professional Engineer	11	1.26%
Ehs Coordinator	9	1.03%
Hse Specialist	9	1.03%
Senior Wastewater Engineer	9	1.03%

Region

Title	Postings	Market Share (%)
Environmental Engineer	40	20.41%
Environmental Project Manager	14	7.14%
Stormwater Engineer	13	6.63%
Engineer	10	5.10%
Project Environmental Engineer	7	3.57%
Ehs Specialist	6	3.06%
Safety Representative	6	3.06%
Environmental Scientist	5	2.55%
Fire Protection Engineer	5	2.55%
Isr Hard Targets Mid	4	2.04%
Senior Business Controls Advisor, Risk Management	4	2.04%
Assistant Engineer	3	1.53%

Field Engineer	3	1.53%
Isr Assessments, Mid	3	1.53%
Safety Engineer	3	1.53%

TOP EMPLOYERS HIRING

Experience Level: All Experience

Nationwide

Employer	*Postings*	*Market Share (%)*
Amazon	442	2.30%
AECOM Technology Corporation	340	1.77%
Tetra Tech	262	1.36%
US Government	222	1.16%
CDM Smith	183	0.95%
SAIC	180	0.94%
Northrop Grumman	140	0.73%
Jacobs Engineering Group Incorporated	139	0.72%
Leidos	126	0.66%
The Boeing Company	124	0.65%
Ghd Incorporated	123	0.64%
Hire Resolve	118	0.61%
Burns & McDonnell	113	0.59%
Stantec, Inc.	108	0.56%
Lockheed Martin Corporation	104	0.54%

Florida

Employer	*Postings*	*Market Share (%)*
CDM Smith	36	4.13%
Amazon	22	2.52%
Reiss Engineering	22	2.52%
Jacobs Engineering Group Incorporated	17	1.95%
Tetra Tech	17	1.95%
Lockheed Martin Corporation	16	1.83%
Geosyntec Consultants	15	1.72%
Northrop Grumman	13	1.49%
SAIC	12	1.38%
Carollo Engineers	11	1.26%
Golder Associates	11	1.26%
AECOM Technology Corporation	10	1.15%
Leidos	8	0.92%
Stantec, Inc.	8	0.92%
Humana	7	0.80%

Region

Employer	*Postings*	*Market Share (%)*
Reiss Engineering	11	5.61%
Raytheon	5	2.55%
CDM Smith	4	2.04%
Geosyntec Consultants	4	2.04%
USAA	4	2.04%
AECOM Technology Corporation	3	1.53%
Amec	3	1.53%
Buffalo Technology	3	1.53%

Carollo Engineers	3	1.53%
Hazen Sawyer	3	1.53%
Honeywell	3	1.53%
Lockheed Martin Corporation	3	1.53%
Mosaic Company	3	1.53%
Perspecta	3	1.53%
Southwest Florida Water Management District	3	1.53%

APPENDIX D

The external consultant's report is not applicable to this proposals because the proposal is for an undergraduate program, not a doctoral-level program.

Appendix E

EMAIL SENT ON JULY 18, 2020 TO NOTIFY DEPARTMENT CHAIR/HEAD OR UNDERGRADUATE PROGRAM DIRECTORS ABOUT PROPOSED NEW PROGRAM

"The environmental engineering faculty at the University of South Florida's wanted to inform you that the Department of Civil & Environmental Engineering is submitting a full proposal to create a B.S. Environmental Engineering Program. We currently offer Master's and PhD degrees in that area.

The proposed 120-credit B.S. in Environmental Engineering will meet national ABET accreditation requirements and emphasize themes that include infrastructure, sustainability, health, and global citizenship. Please reach out to us with any questions or concerns you may have. We are always interested in opportunities for future collaboration between our institutions regarding instruction and research."

Sincerely, Jim

James R. Mihelcic, PhD, BCEEM, Fellow AEESP, Fellow WEF
Samuel L. and Julia M. Flom Endowed Professor
Director, International Development Engineering Program
Director, National Research Center for Reinventing Aging Infrastructure for Nutrient Management
Civil & Environmental Engineering
University of South Florida
4202 E Fowler Ave, ENB 118
Tampa, FL 33620
813-974-9896

Name of Institution	**Dept chair AND/or env engrg program director if listed on web**
FAU	Dr. Yan Yong, Department Chair and Professor
FGCU	Dr. Tanya Kunberger, Chair & Professor Dr. Simeon Komisar, Director of Environmental Engineering Program Director
FIU	Dr. Ton-Lo Wang, Interim Chair Dr. Berrin Tansel, Undergraduate Program Director
FLPOLY	Dr. Ajeet Kaushik, Assistant Professor Dr. Antonio Ruotolo, Associate Professor
UCF	Dr. Mohamed Abdel-Aty, Trustee Chair Pegasus Professor and Chair D Dr. Andrew Randall, Associate Professor
UF	Dr. Michael Annable, Professor and Environmental Engineering Science Department Head Paul Chadick, Former Environmental Engineering Science Department Head
UMiami	Dr. Antonio Nanni, Professor and Chair Dr. James Englehardt

Table updated on July 18, 2020.

RESPONSE FROM FLORIDA GULF COAST UNIVERSITY

From: Komisar, Dr Simeon
To: Mihelcic, James; Kumberger, Dr. Tanya
Cc: Cunningham, Jeff; Stuart, Amy; Fopp, Sarina
Subject: RE: Proposed B.S. Environmental Engineering
Date: Monday, August 03, 2020 12:02:48 PM

Jim,

Our BS EnvE has been accredited since 2009, so we have a lot of experience teaching at the UG level to your typical Fl high school grad and are happy to help in any way we can.

Best of luck!

Simeon J. Komisar, Ph.D.
Program Director of Environmental Engineering
Associate Professor of Environmental and Civil Engineering
Backe Chair of Renewable Energy
U.A. Whitaker College of Engineering
Florida Gucif Coast University
10501 FGCU Blvd. S.
Ft. Myers, FL 33965
239-590-1315

RESPONSE FROM FLORIDA INTERNATIONAL UNIVERSITY

From:	Berrin Tansel
To:	Mihelcic, James; Ton-Lo Wang
Cc:	Cunningham, Jeff; Stuart, Amy; Ergas, Sarina
Subject:	Re: Proposed B.S. Environmental Engineering
Date:	Monday, August 03, 2020 12:51:20 PM

Hi, Jim.

Congratulations for developing the new degree proposal for the BS Degree in Environmental Engineering. I am sure you will have a successful and strong program with the strong faculty you have at USF. I hope we will have opportunities to develop a strong partnership and collaboration in the near future.

Good luck and best regards,

Berrin

Berrin Tansel, PhD, PE, BCEE, DWRE, F. ASCE, F. EWRI, F. WEF
Professor, Civil and Environmental Engineering Department
Florida International University
Department of Civil & Environmental Eng.
10555 West Flagler Street, Engineering Center
Miami, FL 33174
Ph (305) 348 2928
Fax (305) 348 2802
e-mail tanselb@fiu.edu

RESPONSE FROM UNIVERSITY OF MIAMI

From: Nanni, Antonio
To: Mihelcic, James; Englehardt, James Douglas
Cc: Cunningham, Jeff; Stuart, Amy; Ergas, Sarina; Solo-Gabriele, Helena M; Chin, David A.; Berg, Daniel; Biswas, Pratim
Subject: RE: Proposed B.S. Environmental Engineering
Date: Monday, August 03, 2020 12:20:01 PM
Attachments: image003.png

Jim: thanks for letting us know and best wishes for this effort.
We would be delighted to see a stronger relationship among our institutions.
I am copying others at UM including CoE current and future Deans.
Regards, Tony

Antonio Nanni, PhD, PE
Inaugural Senior Scholar
Professor and Chair
Dept. of Civil, Arch. & Environ. Engineering
University of Miami
1251 Memorial Drive, McArthur Engineering Building, Rm. 325
Coral Gables, FL 33146-0630
Phone: 305-284-3461, Fax: 305-284-3492, e-mail: nanni@miami.edu

RESPONSE FROM UNIVERSIY OF FLORIDA

From: Chadik,Paul A
To: Mihelcic, James
Cc: Cunningham, Jeff; Stuart, Amy; Ergas, Sarina
Subject: New B.S. in environmental engineering
Date: Monday, August 03, 2020 3:36:39 PM

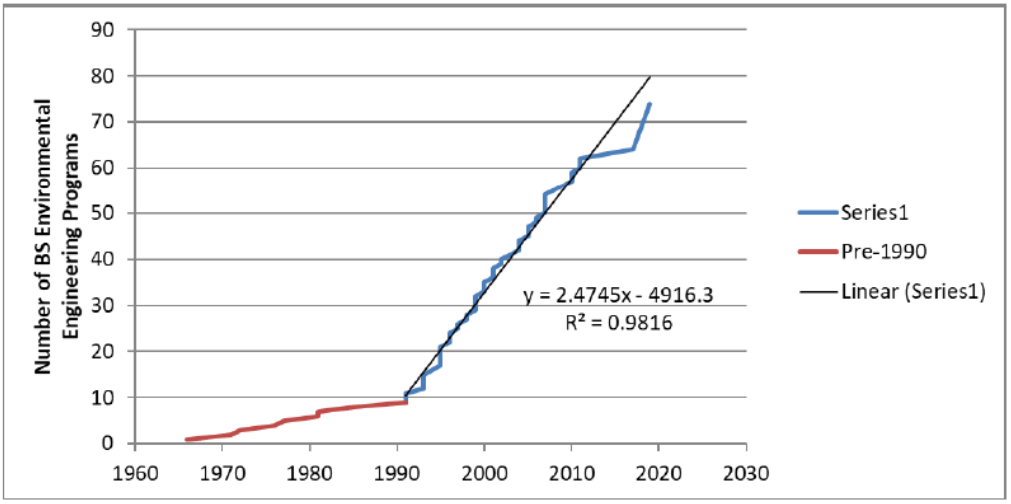
Congratulations!
Best wishes for a successful rollout of your new B.S. Environmental Engineering Program.

Kindest regards,
Paul

Paul A. Chadik, Ph.D., P.E.
Associate Professor Emeritus
210 Black Hall
University of Florida
Box 116450
Gainesville, FL 32611-6450
pchadik@ufl.edu

From: Annable,Michael D
To: Mihelcic, James
Cc: Cunningham, Jeff; Stuart, Amy; Ergas, Sarina
Subject: RE: Proposed B.S. Environmental Engineering
Date: Monday, August 03, 2020 3:12:36 PM
Attachments: image001.png

Jim,
Thanks for the exciting news on the new B.S. Environmental Engineering at USF.
The growth in BSEE degrees has been pretty steady since the early 90's (see the graph I recently updated).
I looked through the list and UCF and UF were in the mid-70's.
Later came FIU, Miami and FGCU and soon USF.
I think this shows that interest in the BSEE degree is very strong and new programs continue to be added.
Cheers,
Mike



RESPONSE FROM FLORIDA POLYTECHNIC

From: Ajeet Kaushik
To: Mihelcic, James; Antonio Ruotolo
Cc: Cunningham, Jeff; Stuart, Amy; Ergas, Sarina
Subject: Re: Proposed B.S. Environmental Engineering
Date: Monday, August 03, 2020 1:29:52 PM

Dear James,

Thank you so much for sharing about B.S. Environmental Engineering program, appreciated.
This is a great initiative and I would love to be the part of this.
Please let me know if I could be of any help.

best regards
Ajeet

Ajeet Kaushik, Ph.D.
Assistant Professor of Chemistry
Department of Natural Sciences
Division of Sciences, Arts & Mathematics (SAM)
Florida Polytechnic University, Lakeland, FL 33805-8531 USA
Website: www.floridapoly.edu
Email: - ajeet.npl@gmail.com, akaushik@floridapoly.edu,
Ph. +1754-230-3737, Office: +1-8638748745
http://akaushik3.wix.com/nanocare
https://scholar.google.com/citations?user=RYH8Z_4AAAAJ&hl=en

USF's Support of B.S. Environmental Engineering Program

Dr. Tom Frazer, Dean, College of Marine Sciences:

From: Bishop, Robert
Sent: Thursday, December 03, 2020 8:18 AM
To: Frazer, Thomas <tfrazer@usf.edu>
Cc: Bhanja, Sanjukta <bhanja@usf.edu>; Mihelcic, James <jm41@usf.edu>
Subject: Re: BS Environmental Engineering

Thanks, Tom. Jim and I will be happy to meet to discuss both BS Environmental and possible new department in coastal and ocean engineering.

Note that we already have a well established Environmental Engineering program at the graduate level, so the BS degree is additional to an existing program.

Best, B

On Dec 3, 2020, at 8:12 AM, Frazer, Thomas <tfrazer@usf.edu> wrote:

Hi Bob,

I had a good discussion yesterday afternoon with the CMS faculty regarding the BS in Environmental Engineering. They were, in general, very supportive of the new degree program and, of course, hoped that it would complement and not deter any enthusiasm for the development of a Department of Coastal/Ocean Engineering. I do think that it would a good idea, if you and Dr. Mihelcic are willing, to schedule some time to chat briefly about the degree program and also talk about COE's thoughts on the proposed Department of Coastal/Ocean Engineering and the partnership with CMS.

Cheers, Tom

Thomas K. Frazer
Professor and Dean
University of South Florida - College of Marine Science
140 Seventh Avenue South, KRC 3109, St. Petersburg, FL 33701-5016
tfrazer@usf.edu | Tel: (727) 553-3369| Fax: (727) 553-3968 | Cell: (352) 258-2406
www.usf.edu/marine-science/ | Facebook: /USFMarineScience | Twitter: @USFCMS

From: "Bishop, Robert" <robertbishop@usf.edu>
Date: Monday, November 23, 2020 at 2:31 PM
To: "Frazer, Thomas" <tfrazer@usf.edu>
Cc: "Bhanja, Sanjukta" <bhanja@usf.edu>
Subject: BS Environmental Engineering

Dear Tom,
I am requesting your support (via an email or written letter) for the proposal to establish a B.S. in Environmental Engineering program at USF. I have attached the full proposal that is currently under review by Undergraduate Council. I and Dr. James Mihelcic are free to further discuss the proposal with you and your faculty. Note this is not an ocean or marine engineering program that have their own distinct ABET engineering accreditation requirements.

Background. Environmental engineers design systems and solutions at the intersection of human communities and the environment. The 120-credit undergraduate B.S. in Environmental Engineering program will meet national ABET engineering accreditation requirements. The 8-semester curriculum is presented on pages 71-72 of the attached pdf proposal document.

Nationwide, there are now over 80 ABET-accredited programs in Environmental Engineering and the degree is also recognized as a distinct specialty for professional licensure. You are probably aware that USF's environmental engineering graduate program is ranked #35 among all universities nationally and #21 nationally among public universities according to the 2021 USNWR rankings.

Best, B

Dr. Robert H. Bishop, P.E.
Dean of Engineering
President & CEO, Institute of Applied Engineering
Professor, Department of Electrical Engineering

The University of South Florida
4202 E. Fowler Ave., ENB 118
Tampa, FL 33620-5350

St. Petersburg campus Regional Chancellor:

From: "Tadlock, Martin" <mtadlock@usf.edu>
Date: Monday, November 30, 2020 at 7:45 AM
To: Robert Bishop <robertbishop@usf.edu>, "Tadlock, Martin [mtadlock@mail.usf.edu]" <mtadlock@mail.usf.edu>
Cc: Sanjukta Bhanja <bhanja@usf.edu>, "Cardwell, Catherine" <ccardwell@usf.edu>, "Michael, Magali" <mcmichael2@usf.edu>
Subject: Re: BS Environmental Engineering

Thanks, Bob. After a careful review of the proposal among the academic leadership on the USF St. Petersburg campus, we strongly support the proposal to establish a B.S. in Environmental Engineering at the University of South Florida. The program aligns with the goals of the SUS, addresses the demand for graduates with this background in the Tampa Bay region and throughout the state of Florida, and can be delivered in a cost-effective manner within the USF.

We are very interested in providing a pathway for students on the USF St. Petersburg campus to participate in several of the supporting courses and general electives needed to acquire the major. Our relationship with you and your college is highly valued by myself and other colleagues in the sciences on this campus, and we look forward to working closely with you as this program moves forward.

Thank you for the visionary leadership you provide.

Martin Tadlock
Regional Chancellor
USF St. Petersburg campus
727-313-6717 ©
140 7th Ave South, BAY 214
St. Petersburg, FL 33701

UNIVERSITY of SOUTH FLORIDA ST. PETERSBURG CAMPUS | #ONEUSF

From: Bishop, Robert <robertbishop@usf.edu>
Sent: Monday, November 23, 2020 2:29 PM
To: Tadlock, Martin [mtadlock@mail.usf.edu] <mtadlock@mail.usf.edu>
Cc: Bhanja, Sanjukta <bhanja@usf.edu>
Subject: BS Environmental Engineering

Dear Martin, I am requesting your support (via an email or written letter) for the proposal to establish a B.S. in Environmental Engineering program at USF. I have attached the full proposal that is currently under review by Undergraduate Council. I and Dr. James Mihelcic are free to further discuss the proposal with you and your faculty.

Background. Environmental engineers design systems and solutions at the intersection of human communities and the environment. The 120-credit B.S. in Environmental Engineering program will meet national ABET engineering accreditation requirements that requires the program lead to the professional practice of engineering. The 8-semester curriculum is presented on pages 71-72 of the attached pdf proposal document.

Nationwide, there are now over 80 ABET-accredited programs in Environmental Engineering and the degree is also recognized as a distinct specialty for professional licensure. You are probably aware that USF's environmental engineering graduate program is ranked #35 among all universities nationally and #21 nationally among public universities according to the 2021 USNWR rankings.

Previous Communications. Dr. Mihelcic (COE) communicated in February 2020 with CAS Dean Magali Cornier Michael and CAS Associate Dean Susan Toler. They expressed their support for the program and interest in interacting with our college. Accordingly, we structured the program to ensure that several of the required supporting courses and recommended general electives that support the program are offered on the St. Pete campus.

Best, Bob

Dr. Robert H. Bishop, P.E.
Dean of Engineering
President & CEO, Institute of Applied Engineering
Professor, Department of Electrical Engineering
The University of South Florida
4202 E. Fowler Ave., ENB 118
Tampa, FL 33620-5350

UNIVERSITY of SOUTH FLORIDA
College of Engineering

Dr. Magali Cornier Michael, campus Dean, and Dr. Susan Toler, Associate Dean
St. Petersburg campus College of Arts and Sciences:

From: Susan Toler [mailto:smtoler@usfsp.edu]
Sent: Friday, February 14, 2020 10:41 AM
To: Michael, Magali <mcmichael2@mail.usf.edu>

Cc: Mihelcic, James <jm41@usf.edu>
Subject: Re: Proposed B.S. Environmental Engineering Degree

Hi Jim,
This looks like a great proposal, are you in the pre-proposal phase of this degree program? I would be very interested in partnering with you on this degree plan. Also remember that the College of Marine Science has a number of courses that complement engineering in a marine environment. I would love to see this degree offered here in St. Petersburg.
Warm regards,
Susan

On Thu, Feb 13, 2020 at 5:20 PM Magali Michael <mcmichael2@mail.usf.edu> wrote:
Dear Jim,

Yes, students from the new Environmental Engineering program would be allowed to take electives on the St. Pete campus. You may be interested to know that we will be launching a BS in Environmental Chemistry on the St. Pete campus in Fall 2021. Two new courses, which have been approved, are Environmental Chemistry 1 and 2 so you might think about whether those courses would fit into the program you are proposing.

By the way, have you given any thought to the possibility of offering the new BS in Environmental Engineering on the St. Pete campus given the focus on the environment on our campus and in the surrounding area? I would be happy to have a conversation with you.

I am copying Susan Toler, CAS Associate Dean on the St. Pete campus, so that she is aware of the program you are developing—she led the process of applying for the Environmental Chemistry degree program.

Magali

Magali Cornier Michael
Dean, College of Arts and Sciences
Professor of English
University of South Florida St. Petersburg
Davis 100
mcmichael2@mail.usf.edu
727-873-4258

Dr. Joni Downs Associate Professor & Associate Chair, School of Geosciences, College of Arts and Sciences:

From: Firat, Joni
Sent: Monday, February 03, 2020 2:18 PM
To: Mihelcic, James <jm41@usf.edu>
Subject: RE: BS Env Engrg and Geosciences

Hi Jim,

Of course, we'd be happy to have more students taking GIS. Any of these would be good and are consistently offered:

- GIS 3006 (It fulfils the info/data literacy for gen ed)
- GIS 4043C (our intro GIS course)
- GIS 4035C (our intro remote sensing course)
- GEO 3164C (Research Methods in Geography—our intro to geospatial data science course)

Most of the others are courses only offered on St Pete campus, although that might change. GIS 4043C is probably the best choice, if you have to limit it.

Joni

From: Mihelcic, James
Sent: Monday, 03 February, 2020 2:07 PM
To: Firat, Joni <downs@usf.edu>
Subject: BS Env Engrg and Geosciences

Hi Joni, I am leading efforts to create a BS Env Engrg degree. I am expecting 40 grads per year and hopefully official approval by fall of 2021.

I would like to recommend some data science electives students could select from a larger list in the areas of remote sensing or GIS. Do you think your School would allow this, and if so, would there be any recommendations? I have this list but would not like to list so many. Students could take 2 courses if there is a pre-req issue:

- GIS 4035 Remote Sensing of the
- GIS 4300 Environmental Modeling with GIS
- GIS 3006 Mapping and Geovisualization
- PHC 4140 Introduction to Public Health Geographic Information Systems
- GIS 4035C Remote Sensing of the Environment
- GIS 4043C Geographic Information Systems
- GIS 4300 Environmental Modeling with GIS
- GIS 4300L Environmental Modeling with GIS Laboratory
- GIS 4302C GIS for Sustainability

Dr. Claudia Cooperman Associate Professor & Assistant Dean of Undergraduate Studies, College of Public Health:

From: "Cooperman, Claudia" <coopermanc@usf.edu>
Date: Thursday, February 13, 2020 at 3:49 PM
To: "Stuart, Amy" <als@usf.edu>
Subject: Re: Proposed B.S. Environmental Engineering Degree electives

Hello,
I apologize Amy, I am out of the office the next two days. I meant to catch you after the meeting the other day. I wanted to ask if you need a formal letter for UGS ? Some programs ask for one on letterhead to submit with their proposal to substantiate the collaboration. We have no issue with the

collaboration and just ask that we coordinate in scheduling when the time comes to be sure we can meet the students needs and progression requirements.
Best Wishes,
Claudia

From: "Stuart, Amy" <als@usf.edu>
Date: Tuesday, February 11, 2020 at 3:42 PM
To: "Cooperman, Claudia" <coopermanc@usf.edu>
Cc: "Mihelcic, James" <jm41@usf.edu>
Subject: Proposed B.S. Environmental Engineering Degree electives

Asst. Dean Cooperman,
I am writing about the new BS Environmental Engineering degree that is being created by the Department of Civil and Environmental Engineering. (The degree program development is on track to hopefully receive official approval by fall 2021, with the expectation of 40 graduates per year.) I have been working with Prof. Jim Mihelcic in CEE (cc'd here) to develop the program. As a part the curriculum, students will be selecting 2 electives from a list of approximately 24 electives; we would like to list a few environmental health, public health, and global citizens approved electives that are taught by COPH.

The following are the COPH undergraduate courses we would like to list as potential recommended electives in the program:

- **HSC 3503 Principles of Toxicology**
- **HSC 4213 Environmental and Occupational Risk Analysis**
- **HSC 4430 Occupational Health and Safety**
- **HSC 4211: Health, Behavior and Society**
- **HSC 4624: Foundations of Global Health**
- **PHC 4250 Crisis Leadership in Disasters**

I am writing to get your approval for listing these courses as electives in the BS Env Engrg curriculum. Please let me know if there is any issue you see with the BS Env Engrg students taking these courses, or if you would like to discuss this further.

Thank you,
Amy

Amy L. Stuart
Professor, University of South Florida
President, Faculty Assembly, College of Public Health
Lead, Concentrations in Environmental and Occupational Health (MPH, MSPH, PhD), College of Public Health
Dept. of Civil and Environmental Engineering, College of Engineering
Faculty website, Home page
813-974-6632
als@usf.edu

Dr. James Riordan, Director of Undergraduate Studies, Department of Cell Biology, Microbiology, and Molecular Biology, College of Arts and Sciences:

From: Riordan, James
Sent: Monday, December 07, 2020 8:30 AM
To: Mihelcic, James <jm41@usf.edu>
Subject: RE: Bio Class Question for a new Degree

Hi Jim,
In a meeting with Charles late Friday, he told me just to go ahead with our agreement to approve Bio I and lab BSC 2010/L for your Environ Engineering program with the expectation that over the next year or so there may to be some exceptions/workarounds for lab offerings.

Best and sorry for the wait.
James

From: Mihelcic, James <jm41@usf.edu>
Sent: Thursday, November 19, 2020 9:58 AM
To: Riordan, James <jtriordan@usf.edu>
Subject: Bio Class Question for a new Degree

James, good to talk to you this morning and sorry for late follow up.

The Undergraduate Council recently approved the proposal to create a B.S. Environmental Engineering program (attached). We estimate that enrollment will be similar to programs at UF and UCF (about 40 students per year). We included in our curriculum BSC 2010 Biology I Cellular Processes (3 credits) & BSC 2010L Biology I Cellular Processes Laboratory (1 credit). I expect some students will take these courses at St. Pete or at a Community College.

I am looking for your approval of these requirements before we go to our next internal approval stage. Our ABET engineering accreditation requires biology content beyond what we teach in our courses, and our faculty want students to have strong foundational / laboratory content in biology to balance other course/laboratory requirements in physics and chemistry. As I told you on the phone, I understand the dynamic budget situation we are in, and would appreciate your department's approval at this time, but understand we may need to revisit this arrangement over the next year or so as our departments deal will budget issues from the pandemic.

Jim

James R. Mihelcic, PhD, BCEEM, Fellow AEESP, Fellow WEF
Samuel L. and Julia M. Flom Endowed Professor
Director, International Development Engineering Program
Director, National Research Center for Reinventing Aging Infrastructure for Nutrient Management
Civil & Environmental Engineering
University of South Florida
4202 E Fowler Ave, ENB 118
Tampa, FL 33620
813-974-9896

From: Mihelcic, James <jm41@usf.edu>
Sent: Monday, February 17, 2020 4:25 PM
To: Chalfant, Charles <cechalfant@usf.edu>; Riordan, James <jtriordan@usf.edu>
Subject: Bio Class Question for a new Degree

Charles & James,
We will have a pre-proposal in review at univ level soon to create a BS Env Engrg program. I had proposed our students be required to take a biology class in the first two years (estimated to reach 40 graduates per year). Can I ask you if your department would approve either

1. BSENVs take
   BSC 2010 Biology I Cellular Processes (3)
   BSC 2010L Biology I Cellular Processes Laboratory (1)

or

2. BSENVs take only the lecture BSC 2010 Biology I Cellular Processes (3)

I can meet with you to discuss in person. Thanks, Jim

James R. Mihelcic, PhD, BCEEM, Fellow AEESP, Fellow WEF
Samuel L. and Julia M. Flom Endowed Professor
Director, International Development Engineering Program
Director, National Research Center for Reinventing Aging Infrastructure for Nutrient Management
Civil & Environmental Engineering
University of South Florida
4202 E Fowler Ave, ENB 118
Tampa, FL 33620
813-974-9896

Appendix F

Department/Program: Civil & Environmental Engineering

Major: Environmental Engineering

Degree Designation: Bachelor of Science

The B.S. in Environmental Engineering is an interdisciplinary engineering degree program designed to provide students with a strong foundation in both theoretical and applied aspects of environmental engineering. The B.S. Environmental Engineering program will prepare its graduates to solve complex problems, supporting human and environmental needs while mitigating adverse environmental, health, and economic impacts associated with human activities. The degree emphasizes traditional areas of transport, fate, and treatment of chemical, physical, and microbial pollutants in water, air, and soil along with important 21st-century themes of infrastructure, sustainability, health, data science, and global citizenship. Courses cover fundamental science and engineering concepts applied to environmental processes, natural and built environments, and engineering design as well as applied learning experiences including community-engaged laboratory projects and a capstone design course.

Content/Discipline Knowledge & Skills

The curriculum includes: mathematics through differential equations, probability and statistics, calculus-based physics, chemistry (including stoichiometry, equilibrium, and kinetics), earth science, biological science, and fluid mechanics. Upper level courses allow students to apply basic and engineering science fundamentals in solving complex environmental and health problems that may occur in air, water, subsurface, and engineered environments. Graduates of the program will be able to apply material and energy balances, quantify the fate and transport of substances in and between air, water, and soil phases, and utilize advanced principles and practices to solve problems related to the protection of human health and the environment. They will also be able to design environmental engineering systems that include considerations of risk, uncertainty, sustainability, life-cycle principles, and environmental impacts, to apply concepts of professional practice and project management, and to understand the roles and responsibilities of public institutions and private organizations pertaining to environmental policy and regulations.

Critical Thinking Skills

Students graduating from the program will have an ability to:

- identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- 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
- 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
- develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- acquire and apply new knowledge as needed, using appropriate learning strategies

Communication Skills

Students graduating from the program will have an ability to:

- communicate effectively with a range of audiences
- function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

Assessment of Student Learning Outcome

Through a variety of mechanisms that include core task assessments, examinations, assignments, and capstone experiences, students' achievement of the identified core learning outcomes will be measured. The results of the assessments will be used to improve student achievement and program effectiveness.

Appendix G: Semester Plans

Undergraduate Eight-Semester Plan CIP Code: 14.1401 CIP Title: Environmental/Environmental Health Engineering Degree Level: Bachelor's
Credential (Degree Type): B.S.
USF Title (Major Name): Environmental Engineering

For any course and/or placeholder that must be taken in sequence and/or in the semester listed, please indicate such by inserting a (!) in the appropriate cell.

Fall 1								
!	**Current Course Prefix and Number**	**Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**
	ENC 1101		✓					3
	MAC 2281 or MAC 2311	✓	✓					4
	CHM 2045	✓						3
	CHM 2045L	✓						1
	EGN 3000				✓			0
	EGN 3000L		✓		✓			3
Take the Civics Literacy Exam (Graduation Requirement)								
Total Semester Credit Hours:								14

Spring 1								
!	**Current Course Prefix and Number**	**Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**
	ENC 1102		✓					3
	MAC 2282 or MAC 2312	✓	✓					4
	PHY 2048	✓	✓					3
	PHY2048L	✓						1
	CHM 2046	✓						3
	CHM 2046L	✓						1
Total Semester Credit Hours:								15

Fall 2								
!	**Current Course Prefix and Number**	**State Mandated Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**
	MAC 2283 or MAC 2313	✓						4
	PHY 2049	✓						3
	PHY 2049L	✓						1
	EGN 3311				✓			3
	ENV 2061				✓			2
Total Semester Credit Hours:								13

Appendix G: Semester Plans

Spring 2								
!	Current Course Prefix and Number	State Mandated Common Prerequisite	General Education Requirement	Supporting Course	Major Core	Major Elective	Unrestricted/ General Elective	Total
	EGN 3433	✓						3
	EGN 3353				✓			3
	ENV4001				✓			3
	ENV 4004L				✓			1
	EGN 1113			✓				3
	EGN 4453				✓			3
							Total Semester Credit Hours:	16

Summer 2								
!	Current Course Prefix and Number	State Mandated Common Prerequisite	General Education Requirement	Supporting Course	Major Core	Major Elective	Unrestricted/ General Elective	Total
	BSC 2010			✓				3
	BSC 2010L			✓				1
	EGN 3615		✓		✓			3
	Social Science		✓					3
							Total Semester Credit Hours:	10

Fall 3								
!	Current Course Prefix and Number	State Mandated Common Prerequisite	General Education Requirement	Supporting Course	Major Core	Major Elective	Unrestricted/ General Elective	Total
	EGN 3343				✓			3
	*XXX XXXX						✓	3
	EGN 3443		✓		✓			3
	ENV 4053C				✓			3
							Total Semester Credit Hours:	12

Spring 3								
!	Current Course Prefix and Number	State Mandated Common Prerequisite	General Education Requirement	Supporting Course	Major Core	Major Elective	Unrestricted/ General Elective	Total
	CWR 4202				✓			3
	CWR 4202L				✓			1
	ENV 4612				✓			3
	Humanities		✓					3
	GLY 3850			✓				3
							Total Semester Credit Hours:	13

Appendix G: Semester Plans

Fall 4								
!	Current Course Prefix and Number	State Mandated Common Prerequisite	General Education Requirement	Supporting Course	Major Core	Major Elective	Unrestricted/ General Elective	Total
	ENV 4417				✓			3
	ENV 4105				✓			3
	ENV 4618				✓			3
	CWR 4540				✓			3
	*XXX XXXX						✓	3
							Total Semester Credit Hours:	15

Spring 4								
!	Current Course Prefix and Number	State Mandated Common Prerequisite	General Education Requirement	Supporting Course	Major Core	Major Elective	Unrestricted/ General Elective	Total
	CWR 4812		✓		✓			3
	CGN 4122		✓		✓			3
	ENV 4071				✓			3
	*XXX XXXX						✓	3
							Total Semester Credit Hours:	12

Total Program Hours:	**120**

* The Department suggests the following list of electives student make take to supplement their Environmental Engineering knowledge and meet the credit hour requirements of the degree program. The courses may be utilized to fulfill unrestricted/general electives.

Basic and Environmental Sciences Technical Elective Options:

- CHM 2210 Organic Chemistry
- EVR 4027 Wetland Environments
- ENV 4082 Environmental Field Sampling
- GLY 4734 Beaches and Coastal Environments

Critical Infrastructure Technical Elective Options:

- CCE 4031 Construction Management
- CWR 4541 Water Resources Engineering II
- CWR 4625 Ecological Engineering
- ENV 4351 Solid Waste Engineering
- SUR 2101C Engineering Land Surveying
- TTE 4003 Transportation and Society

Data Science Technical Elective Options:

- EGN 4454 Numerical and Computational Tools II in Civil and Environmental Engineering
- GEO 3164C Research Methods in Geography
- GIS 3006 Mapping and Geovisualization
- GIS 4035C Remote Sensing of the Environment
- GIS 4043C Geographic Information Systems

Health and Safety Technical Elective Options:

- HSC 3503 Principles of Toxicology
- HSC 4213 Environmental and Occupational Risk Analysis
- HSC 4430 Occupational Health and Safety

Energy Technical Elective Options:

- EEL 4283 Sustainable Energy
- ENV 2073 Global Warming: Science and Politics of a Contemporary Issue
- EVR 2217 Energy, Environment and Sustainability

Global Citizens Technical Elective Options:

- ECH 4783 Sustaining the Earth: An Engineering Approach
- GEO 4340 Natural Hazards
- HSC 4211 Health, Behavior and Society
- HSC 4624 Foundations of Global Health
- PHC 4250 Crisis Leadership in Disasters

Education Abroad Elective Options:
Students are able to take 3-6 credit hours of their electives through education abroad programs. The specific education abroad course(s) must be approved in advance by the Department.

Appendix G: Semester Plans

Undergraduate Four-Semester Plan CIP Code: 14.1401 CIP Title: Environmental/Environmental Health Engineering Degree Level: Bachelor's
Credential (Degree Type): B.S.
USF Title (Major Name): Environmental Engineering

For any course and/or placeholder that must be taken in sequence and/or in the semester listed, please indicate such by inserting a (!) in the appropriate cell.

Fall 1								
!	**Current Course Prefix and Number**	**State Mandated Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**
	EGN 3000				✓			0
	EGN 3311				✓			3
	ENV4001				✓			3
	ENV4004L				✓			1
	EGN 4453				✓			3
	ENV 2061				✓			2
							Total Semester Credit Hours:	12

Spring 1								
!	**Current Course Prefix and Number**	**State Mandated Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**
	EGN 3353				✓			3
	GLY 3850 or ESC 2000 or GLY 2010			✓				3
	EGN 3343				✓			3
	ENV 4053C				✓			3
	EGN 1113 or ETD 1320			✓				2
							Total Semester Credit Hours:	14

Summer 1								
	Current Course Prefix and Number	**State Mandated Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**
	BSC 2020			✓				3
	BSC 2010L			✓				1
	XXX XXXX						✓	2
							Total Semester Credit Hours:	6

Fall 2								
!	**Current Course Prefix and Number**	**State Mandated Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**

Appendix G: Semester Plans

	ENV 4618				✓			3
	ENV 4417				✓			3
	ENV 4105				✓			3
	CWR 4202				✓			3
	CWR 4202L				✓			1
							Total Semester Credit Hours:	13

Spring 2								
!	**Current Course Prefix and Number**	**State Mandated Common Prerequisite**	**General Education Requirement**	**Supporting Course**	**Major Core**	**Major Elective**	**Unrestricted/ General Elective**	**Total**
	CWR 4812				✓			3
	CGN 4122				✓			3
	ENV 4612				✓			3
	ENV 4071				✓			3
	CWR 4540				✓			3
							Total Semester Credit Hours:	15

Total Program Hours:	**60**

APPENDIX H

NICHOLAS ALBERGO

2. Education
University of South Florida; Ph.D. Candidate - Chemical Engineering (Admitted 08/05), Master of Science – Civil Engineering 08/86, Bachelor of Science - Engineering Science 08/86,

3. Academic Experience
Professor of the Practice, Part-Time, Department of Civil & Environmental Engineering - University of South Florida, 2014 – Current

4. Non-Academic Experience
Nick Albergo was the founder and CEO of HSA Engineers & Scientists, a Florida-based engineering consulting firm that he successfully grew to more than 400 professionals spread throughout fifteen offices. The firm was sold to GHD in 2013. He has had a distinguished career as an inventor, as the author of over 185 professional publications, and as the founder and Keynote Speaker for the Florida Remediation Conference on Innovative Remedial Technologies, which, for the past 23 years, attracts greater than 600 professionals annually. Nick has been working within the field of environmental and water resources for over 30 years including water use and disposal associated with agricultural, industrial, household, recreational and environmental activities. He has shaped the rules and regulations that are now in common use throughout the United States. Beyond his domestic accomplishments, he is also a sought after lecturer abroad, working as a technical trainer for Governments, the World Bank, the European Union and UN.

5. Certifications or Professional Registration
Professional Engineer (Florida)

6. Current Memberships in Professional Organizations
ASTM E50.02 Vice Chair on Environmental Assessment, Risk Management and Corrective Action, ASTM E50.01 Subcommittee Chair on Performing underground Storage Tank Monitoring Well Site Assessments, Certified Florida Circuit Civil Mediator, Arbitrator – American Arbitration Association Roster of Neutrals, Certified Florida DFS Neutral Evaluator, American Academy of Environmental Engineers – Diplomate, American Academy of Water Resources Engineers – Founding Diplomate, American College of Forensic Engineers – Fellow, American Society of Civil Engineers – Fellow

7. Honors & Awards
1995 Small Business of the Year - Tampa Bay

2009 **EBJ Gold Metal** - Business Achievement ($20M - $100M) C&E Firms

2007, 2009-12' **Inc. Magazine** (Fastest growing private firms in America)

2009 & 2011 **Florida Trend** Best Midsized Companies to Work For

2008 **EBJ/CE News** Best Environmental Service Firms to Work For

2007, 2010-12' **ZweigWhite Hot Firm** (200 Fastest-Growing A/E/P & Environmental Consulting Firms (98% Revenue Growth in Past 3 years)

Suncoast Fast 50 (Fastest Growing Publicly and Privately Held Technology-Related Companies #50 -11', #35 – 98', #25 – 97', #24 – 96', #13 – 95

#285 - 1995 **National 500 Technology** List

Member of the University of South Florida President's Council

2014 Alumni Fast 50

8. Service Activities (last 5 years only)

9. Publications/Presentations (Examples in Past 5 Years)

The State of Water Resources Around the World, N. Albergo, Florida Engineering Society Journal, March 2018

Do the Waste Disposal Practices of "Vape" Shops Constitute an ASTM E1527-13 Recognized Environmental Condition?, N. Albergo, The Florida Specifier, Volume 37, No. 12, December 2015

Keynote Address – April, 2016 - **EnviroTech Summit 2016,** Raleigh, North Carolina

Speaker – April 2016 - **NAEP Annual Conference,** Chicago, Illinois

Conference Chair (1995 – current) - **Florida Remediation Conference**: Orlando, Florida

Primary Author & Trainer - **ASTM** Environmental Assessment Standard E 1527 & E 1528 – 1993 – current

Technical Task Group Leader & Trainer - **ASTM** Environmental Assessments: Phase II E 1903-02 – 2002 – current

Webinar Presenter - Tools to Ensure Effective Preparation and Testimony as an Engineering Professional, Florida Engineering Society, February 24, 2016

Conference Moderator – **Annual Southeast Brownfields Association Conference**, CRECs, Orlando, Florida, October 30, 2014

Guest Lecturer – **NGWA,** *International Water Challenges*, Denver, May 4-7, 2014

Guest Lecturer – **Florida Water Law & Policy,** *Global Water Challenges*, Orlando, February 6-7, 2014

10. Professional Development Activities (Examples in Past 5 Years)

- Nation-wide Technical Trainer – **United States Bureau of Land Management,** *Environmental Assessment/Due Diligence*, Albuquerque, NM, April 2019
- Pesticide Expert **– European Union** and **Committee for Environmental Conservation at the Government of the Republic of Tajikistan,** Dushanbe, Tajikistan, July/October 2018
- Pesticide Expert – **European Union**, Soviet Union Era Pesticide Manufacturing and Waste Burial Site, Salyan, Azerbaijan, November 2017
- Technical Trainer – **United Nations Environment Programme** (11 African Nations) Disposal Strategies for Persistent Organic Pesticides, October 2017

Katherine Alfredo

2. Education

Ph.D., Civil Engineering (Environmental Engineering), University of Texas at Austin, 2012
M.Eng., Environmental and Water Resources Eng, University of Texas at Austin, 2008
B.Eng., Civil Engineering, The Cooper Union, 2005

3. Academic Experience

Assistant Professor, University of South Florida, 2019-present, full-time
Post-doc, Fulbright-Nehru Postdoctoral Scholarship, Nagpur, India, 2016-2017, full-time
Researcher/Lecturer, Columbia University, 2015-2016, full time
Post-doc, Columbia Water Center, Columbia University, 2013-2015, full-time

4. Non-academic experience

DC Water, Research Program Manager Water Quality and Tech, 2017-2019, full-time
American Water Works Association, Researcher, 2013, full-time

5. Certifications or professional registration

Professional Engineer, Certified in VA (license # 0402060194)

6. Current membership in professional organizations

American Water Works Association (AWWA)
American Chemical Society (ACS)
Association of Environmental Engineering and Science Professors (AEESP)

7. Honors and awards – *last five years only*

Second Place Poster Presentation Award, AWWA Water Quality Technology Conference, Toronto, Ontario, Canada (11-15 November 2018)
Best Research Poster Presentation Award, Columbia University Postdoctoral Research and Career Symposium (17-18 September 2015)

8. Service activities – *last five years only*

Contributing Author, AWWA M56 Nitrification Manual, 2019-present
Project Advisory Committee, Water Research Foundation, 2018-present
Joint Expert Panel Member, U.S.-India Science and Technology Endowment Fund, 2018-present
Member of the Premise Plumbing Committee, AWWA, 2018- present
Member of the Inorganic Contaminant Research Committee Member, AWWA 2014-present
Primary convener, AGU Session GH027 I (Oral), II (Oral), III (Poster). AGU Annual Conference, Dec 2019
Expert Panelist, CA OEHHA Human Right to Water, 2019
NSF GRFP Panel Reviewer (Civil and Environmental Engineering), 2016
Contributing Editor, AWWA M4 Fluoride Manual, 2013-2015
Proposal Reviewer for National Science Foundation (NSF) Environmental Engineering CBET & Graduate Research Fellowship Award
Manuscript reviewer for approximately 10 journals

H3

9. Principal Publications – *last three years only*

Alfredo, K.A., Lin, J., Islam, A., Wang, Z. (2020). Impact of activated carbon-block point-of-use (POU) filters on chloraminated water quality. AWWA Water Science

Vasilaky, K.N., Harou, A., Alfredo, K.A. (submitted). Groundwater depletion in Northern India: Me, Myself and Others. World Development.

Alfredo, K.A., O'Garra, T. (2020). Preference for water treatment provision in rural India: comparing communal, pay-per-use, and labor-for-water schemes. Water International. https://doi.org/10.1080/02508060.2020.1720137

O'Garra, T., Alfredo, K. (2019). Communication, Observability and Collective Action: a Field Experiment on Water Management in India. 27: 1-18. Water Resources and Economics

Alfredo, K.A. and Russo, T.A. (2017). Sustainable water quality in the United States: Urban, Agriculture, and Environmental Protection Management. WIREs Water. DOI: 10.1002/wat2.1229

Alfredo, K.A., Seidel, C., Ghosh, A., Roberson, J.A. (2017). Using a Relative Health Indicator (RHI) metric to estimate health risk reduction in drinking water. Environmental Monitoring and Assessment. 189:124. DOI 10.1007/s10661-017-5815-8

10. Professional development activities – *last five years only*

Participated in peer observation program at USF (spring 2020) for improvement of teaching in STEM fields.

Participated in ASCE ExCEEd Community Exchange Teaching Workshops, Summer-fall 2020 (STEM in the online teaching environment)

MAURICIO E. ARIAS

2. **Education**
   Ph.D., Civil Engineering, University of Canterbury (New Zealand), 2014
   Master of Engineering, Environmental Engineering, University of Florida, 2007
   Bachelor of Science, Environmental Engineering, University of Florida, 2006

3. **Academic Experience**
   University of South Florida, Department of Civil and Environmental Engineering, Assistant Professor, 2016-Present
   Harvard University, Department of Evolutionary and Organismic Biology/Kennedy School of Government, Sustainability Science Postdoctoral Fellow, 2014-2016

4. **Non-Academic Experience**
   Mekong River Commission, International Consultant in fisheries climate change adaptation, 2015-2016, part-time.
   Jones Edmunds and Associates, Water Resources Engineer, 2007-2009

5. **Certifications or Professional Registration**
   State of Florida Engineering Intern, 2006
   University of Florida Graduate certificate in Ecological Engineering, 2007
   Water Diplomacy Certificate, Tufts/MIT, 2016

6. **Current Memberships in Professional Organizations**
   American Geophysical Union
   American Ecological Engineering Society

7. **Honors and Awards**
   Giorgio Ruffolo Post-doctoral Research Fellowship, Harvard University, 2014-2016
   University of Canterbury International Doctoral Student Scholarship, 2009-2012

8. **Service Activities (last 5 years only)**
   Southwest Florida Water Management District Springs Management Committee, academic representative since 2018.
   Consortium of Universities for the Advancement of Hydrologic Science, USF representative since 2017.
   Proposal panelist: NSF (Environmental Engineering 2017), EPA (P3 2017), USAID (PEER 2017).
   Proposal adhoc reviewer: NSF (Hydrological Sciences 2016 and PIRE 2017).
   International scientific committee member, International Symposium on Floodplain Ecosystems, Siem Reap, Cambodia, July 24-27, 2017.
   Journal reviewer: Ecological Engineering, Ecological Modelling, Science of the Total Environment, Environmental Modelling and Software, Hydrological and Earth System Sciences, Journal of Hydrology, Water Resources Research, Frontiers in Ecology and the Environment, Global Environmental Change, Journal of Environmental Management, ASCE Journal of Water Resources Planning and Management, ASCE Journal of

Hydrologic Engineering, Wetlands Ecology and Management, Environmental Monitoring and Assessment, Environmental Earth Sciences, International Journal of Water Sciences, Journal of Asian Earth Sciences, Urban Water, Biotropica, Journal of Hydrology: Regional Studies, Water, Hydrobiologia, Ecohydrology and Hydrobiology, River Research and Applications, Lakes and Reservoirs, Cambodian Journal of Natural History.

9. **Most important publications in the past 5 years**

Arias, ME, Holtgrieve, GW, Ngor, BP, Dang, TD, Piman, T. Maintaining Perspective of Ongoing Environmental Change in the Mekong Floodplains. *Current Opinion in Environmental Sustainability*, 1–7. https://doi.org/10.1016/j.cosust.2019.01.002. (Featured in issue front cover)

Hecht, J. S., Lacombe, G., Arias, M. E., Dang, T. D., Piman, T. Hydropower dams of the Mekong River basin: a review of their hydrological impacts. *J of Hydrology*, 568 285-300.

Arias, M.E., E. Lee, F. Farinosi, F. F. Pereira, and P. R. Moorcroft. 2018. Decoupling the Effects of Deforestation and Climate Variability in the Tapajós River Basin in the Brazilian Amazon. *Hydrological Processes* (April). https://doi.org/10.1002/hyp.11517.

Kondolf, M., Schmitt, R.J.P., Carling, P., Darby, S., Arias, M.E., Bizzi, S., Castelletti, A., Cochrane, T.A., Gibson, S., Kummu, M., Oeurng, C., Rubin, Z., Wild, T., Changing sediment budget of the Mekong: Cumulative threats and management strategies for a large river basin. *Science of the Total Environment* 625, 114-134.

Sabo, J.L., Ruhi, A., Holtgrieve, G. H., Elliott, V., Arias, M.E., Ngor, P.B., Räsänen, T., Nam, S., Designing river flows to improve food security futures in the Lower Mekong Basin. *Science* Dec 8 2017. doi:10.1126/science.aao1053.

Arias, M.E., Cochrane, T.A., Kummu, M., Lauri, H., Koponen, J., Holtgrieve, G.W., Piman, T. (2014) Impacts of hydropower and climate change on drivers of ecological productivity of Southeast Asia's most important wetland. *Ecological Modelling* 272C 252-263.

Arias, M.E., Piman, T., Lauri, H., Cochrane, T.A., Kummu, M., 2014. Dams on Mekong tributaries as significant contributors of hydrological alterations to the Tonle Sap Floodplain in Cambodia. *Hydrology and Earth System Sciences* 18, 5303–5315.

10. **Professional Development Activities**

Participation in forums related to climate changes and water management

Jeffrey Cunningham

2. Education

Ph.D., Civil and Environmental Engineering, Stanford University, 1999
M.S., Civil Engineering (Environmental Eng. & Sci.), Stanford University, 1993
B.S., Chemical Engineering, Rice University, 1991

3. Academic Experience

University of South Florida, Associate Professor, 2011–present, full-time
CSIRO Land and Water (Australia), Visiting Scientist, 2013–2014, visiting position
University of South Florida, Assistant Professor, 2005–2011, full-time
Texas A&M University, Assistant Professor, 2003–2004, full-time
Stanford University, Engineering Research Associate, 2001–2003, 75% time

4. Non-academic experience

Radian Corporation, Associate Engineer, 1991–1992, full-time

5. Certifications or professional registration

Passed Engineer-in-Training (EIT) licensure examination, 1993 (California license XE089121).

6. Current membership in professional organizations

American Society of Civil Engineers (ASCE)
Association of Environmental Engineering and Science Professors (AEESP)

7. Honors and awards – *last five years only*

2020 Association of Environmental Engineering and Science Professors (AEESP) Award for Outstanding Contribution to Environmental Engineering & Science Education.
Distinguished Service Award, AEESP, 2016.

8. Service activities – *last five years only*

Associate Editor of *ASCE Journal of Environmental Engineering*, 2017–present.
Member of the Advisory Board for the Environmental Engineering program (offered by the Department of Geography and Environmental Engineering), United States Military Academy (USMA), West Point, NY, 2016–present.
Member and Chairperson of the AEESP Doctoral Dissertation Award sub-committee, 2014–2016.
Member of the AEESP Conference site selection committee: 2017, 2019, 2021 conferences.
Proposal reviewer for National Science Foundation (NSF), U.S. Environmental Protection Agency (US EPA), and Research Competitiveness Program (RCP) at the American Association for the Advancement of Science (AAAS).
Manuscript reviewer for approximately 50 journal manuscripts.
Member of USF's Quality Enhancement Plan (QEP) Assessment Development Team.

9. Principal Publications – *last three years only*

Akers DB, Buerck A, MacCarthy MF, Cunningham JA, Mihelcic JR. In press. Estimates of blood lead levels (BLLs) for children in coastal Madagascar: Accounting for dietary uptake of lead (Pb). *Exposure and Health*, published on-line 06 July 2019 (https://rdcu.be/bI2hZ). DOI: 10.1007/s12403-019-00316-w

Orner K, Camacho-Céspedes F, Cunningham JA, Mihelcic JR. 2020. Assessment of nutrient fluxes and recovery for a small-scale agricultural waste management system. *Journal of Environmental Management*, 267, 110626. DOI: 10.1016/j.jenvman.2020. 110626

Kumar R, Campbell S, Cunningham JA. 2020. Effect of temperature on the geological sequestration of CO2 in a layered carbonate formation. *Journal of Energy Resources Technology (ASME)*, 142(7), 070907. DOI: 10.1115/1.4046137

Kumar R, Campbell S, Sonnenthal E, Cunningham J. 2020. Effect of brine salinity on the geological sequestration of CO_2 in a deep saline carbonate formation. *Greenhouse Gases: Science and Technology*, 10(2), 296–312. DOI: 10.1002/ghg.1960

Kassouf H, García Parra A, Mulford L, Iranipour G, Ergas SJ, Cunningham JA. 2020. Mass fluxes of nitrogen and phosphorus through water reclamation facilities: Case study of biological nutrient removal, aerobic sludge digestion, and sidestream recycle. *Water Environment Research*, 92(3), 478–489. DOI: 10.1002/wer.1239

Tang J, Zhang C, Shi X, Sun J, Cunningham JA. 2019. Municipal wastewater treatment plants coupled with electrochemical, biological, and bio-electrochemical technologies: Opportunities and challenges toward energy self-sufficiency. *Journal of Environmental Management*, 234, 396–403. DOI: 10.1016/ j.jenvman.2018.12.097

Orner K, Cools C, Balaguer-Barbosa M, Zalivina N, Mihelcic JR, Chen G, Cunningham JA. 2019. Energy recovery and nitrogen management from struvite precipitation effluent via microbial fuel cells. *Journal of Environmental Engineering (ASCE)*, 145(3), 04018145. DOI: 10.1061/(ASCE)EE.1943-7870.0001500

Kassouf H, Cunningham JA, Mulford L, Iranipour G. 2018. Chlorine demand and trihalomethane formation during chlorination of wastewater in Hillsborough County, Florida, USA: Effects of temperature and chlorine dose. *Journal of Environmental Engineering (ASCE)*, 144(8), 04018067. DOI: 10.1061/ (ASCE)EE.1943-7870.0001413

Aponte-Morales V, Payne K, Cunningham J, Ergas S. 2018. Bioregeneration of chabazite during nitrification of centrate from anaerobically digested livestock waste: Experimental and modeling studies. *Environmental Science & Technology*, 52(7), 4090–4098. DOI: 10.1021/acs.est.7b06248

Mendoza-Sanchez I, Autenrieth R, MacDonald TJ, Cunningham J. 2018. Biological limitations of dechlorination of cis-dichloroethene during transport in porous media. *Environmental Science & Technology*, 52(2), 684–691. DOI: 10.1021/acs.est.7b04426

10. Professional development activities – *last five years only*

Participated in peer observation program at USF (spring 2020) for improvement of teaching in STEM fields.

Participated in pre-Conference workshops and training sessions at 2017 and 2019 AEESP Conferences.

SARINA J. ERGAS

2. Education

Humboldt State Univ., Arcata, CA	Environmental Engineering	B.S.	1988
University of California, Davis, CA	Civil Engineering,	M.S.	1990
University of California, Davis, CA	Civil & Environmental Engineering	Ph.D.	1993

3. Academic Experience

2011-pres.	Professor	Civil & Environmental Engrg. Univ. South Florida
2015	Visiting Prof.	Environ. Engr. & Water Technol. UNESCO-IHE, Netherlands
2016	Visiting Prof.	Civil & Environmental Engrg. Technion Israel Inst. of Technol.
2016	Visiting Prof.	Zuckerberg Inst. for Water Research, Ben Gurion Univ. Israel
2009-2011	Assoc. Prof.	Civil & Environmental Engrg. Univ. South Florida
2009-2010	Professor	Civil & Environmental Engrg. Univ. Massachusetts, Amherst
2000-2009	Assoc. Prof.	Civil & Environmental Engrg. Univ. Massachusetts, Amherst
2007-2008	Fulbright Fellow	Civil & Environmental Engrg. Technion Israel Inst. of Technol.
1994-2000	Asst. Professor	Civil & Environmental Engrg. Univ. Massachusetts, Amherst

4. Non-Academic Experience

5. Certifications or Professional Registrations

Professional Engineer, Commonwealth of Massachusetts, Civil Engineering
AAEES Board Certified Environmental Engineer, Specialization: Water Supply/Wastewater Engineering

6. Current Memberships in Professional Organizations

American Academy of Environmental Engineering and Science
Association of Environmental Engineering & Science Professors
American Society of Civil Engineers
Water Environment Federation
Florida Water Environment Association

7. Honors and Awards

American Academy of Environmental Engineers and Scientists (AAEES) Excellence in Environmental Engineering and Science Education (E4S) Award, 2019
Association of Environmental Engineering and Science Professors (AEESP) Fellow, 2017
Water Environment Federation Fellow, 2015
Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) Outstanding Mentor Award, 2016
AEESP Service Awards: 2011 Chair Lectures Committee, 2011 Co-chair Biannual Conference, 2014 Board Member
McKnight Doctoral Fellowship Program Outstanding Mentor Award, 2015
Fulbright Fellow, Technion University, Haifa Israel, 2007/2008
ASCE ExCEEd (Excellence in Civil Engineering Education) Fellow, 2005

8. Service

American Society of Civil Engineers: Associate Editor, Journal of Sustainable Water in the Built Environment, 2016-present.

Association of Environmental Engineering & Science Professors (AEESP):

- Lectures committee (member 2006-2011, chair 2008-2010), organizing committee and technical program committee for 2011 AEESP Bi-Annual Conference, Board of Directors (2011-2014), Secretary (2012-2014), Foundation Board Secretary (2014-2016).

Water Environment Federation (WEF):

- Academic committee (2011-present), algae task group (2010-present), Stockholm Jr. Water Prize task group (2014-2015).
- *Conference & Symposia Organizing Committees*: Nutrients Conferences and Symposia (2011, 2013, 2015, 2017, 2018).
- *Session & Workshop Chair*: International Research Collaborations (2014 Water & Energy Conference), Onsite Wastewater (2017 Nutrient Management Symposium.
- *Faculty Advisor USF FWEA Student Chapter*: 2011-present.
- *Faculty Advisor FWEA/WEF Student Design Competition* (2010-present): winners FWEA competition: 2012, 2013, 2014, 2015, 2017, 2018, 2019; winners national competition: 2012, 2013, 2014 [2nd place 2018]).

Work with Secondary School Science Teachers and Students: 1995 - present:

- Guest lectures on water treatment in USF Science Education courses.
- Workshops for College of Engineering HS student visiting days and Engineering Expo.
- Host for RETs and HS student interns on environmental engineering research.
- Work with students in Corporation for Development of Community's Youth Leadership Movement on stormwater projects.
- Work with Leto HS, Pierce MS and Middleton Magnet HS on collaborative authentic science research algae biofuel production and biosand filter research.

9. Principal Publications (examples over last 5 years)

Boxman, S., Nystrom, M., Ergas, S.J., Main, K.L., Trotz, M.A. (2018) Evaluation of water treatment capacity, nutrient cycling, and biomass production in a marine aquaponic system, *Ecological Engineering*, 120(2018): 299-310.

Wang, M., Payne, K.A., Tong, S., Ergas, S.J. (2018) Hybrid Algal Photosynthesis and Ion-Exchange (HAPIX) Process for High Ammonium Strength Wastewater Treatment, *Water Research*, 142 (2018) 65-74.

He, Q., Zhang, D., Main, K., Feng, C., Ergas, S.J. (2018) Heterotrophic, autotrophic and mixotrophic denitrification for nitrate removal from marine recirculating aquaculture systems: A microcosm study, *Bioresource Technology*, 263(2018): 340-349.

Aponte-Morales, V.E., Payne, K.A., Cunningham, J.A, Ergas, S.J. (2018) Bioregeneration of Chabazite During Nitrification of Centrate from Anaerobically Digested Livestock Waste: Experimental and Modeling Studies, *Environmental Science & Technol.*, 52(7): 4090-4098.

Wang, M., Keeley, R., Zalivina, N., Halfhide, T., Scott, K., Zhang, Q., van der Steen, P., Ergas, S.J. (2018) Advances in algal-prokaryotic wastewater treatment: a review of nitrogen transformations, reactor configurations and molecular tools, *J. Environ. Mgmt.*, 217: 845-857.

Tong, S., Rodriguez-Gonzalez, L.C., Payne, K.A., Stocks, J.L, Feng, C., Ergas, S.J. (2018) Effect of pyrite pretreatment, particle size, dose and biomass concentration on particulate pyrite autotrophic denitrification (PPAD) of nitrified domestic wastewater, *Environmental Engineering Science*, https://doi.org/10.1089/ees.2017.0295.

James R. Mihelcic

2. Degrees:

1988 PhD Civil Engineering, Carnegie Mellon University
1985 MS Civil Engineering, Carnegie Mellon University
1981 BS Environmental Engineering, Pennsylvania State University

3. Academic Experience at USF

2008-present Professor of Civil and Environmental Engineering
Samuel L. and Julia M. Flom Professor, University of South Florida (2015 – present)
Director (8/08-present) Engineering for International Development Program
..

Other Academic Experience

2000-2008 Professor, Civil and Environmental Engineering, Michigan Tech
1997-2009 Director, Master's International (U.S. Peace Corps) Program, Michigan Tech
2003-2007 Co-Director, Sustainable Futures Institute, Michigan Tech
2004-2009 Adjunct Doctoral Faculty, Southern University and A&M College
1995-2000 Associate Professor, Civil and Environmental Engrg., Michigan Tech
1989-2005 Assistant Professor, Civil and Environmental Engrg., Michigan Tec

Non-Academic Experience

1988-1989 Environmental Engineer, ABB Environmental, Inc., Portland, ME
1988 AAAS/EPA Engineering Fellow, Office of Underground Storage Tanks, US EPA,
1983-1988 Research Assistant, Department of Civil Engineering, Carnegie Mellon
1981-1983 Supervising Engineering, Water, Wastewater, & Utilities, LTV Steel

5. Certifications or Professional Registrations

Board Certified Environmental Engineer Member (BCEEM), American Academy of Environmental Engineers & Scientists (AAEES), EIT Pennsylvania

6. Current Memberships in Professional Organizations

American Society for Engineering Education (AAEE), Association of Environmental Engineering and Science Professors (AEESP), Water Environment Federation, Florida Water Environment Association (FWEA)

7. Honors and Awards (past 5 years)

2019 William R. Jones Outstanding Mentor Award from the Florida Education Fund
2018 Charles R. O'Melia AEESP Distinguished Educator Award, AEESP
2017 Excellence in Environmental Engineering and Science Education (E4) Award (AAEES)
2016 Fellow with Water Environment Federation (WEF)
2016 Fellow with Association of Environmental Engineering & Science Professors (AEESP)
2015 Distinguished Service Award, AAEES
2015 University of South Florida Global Achievement Award - Faculty Global Visionary

8. Service Activities (past five years) (within and outside of the institution)

2020-present Associate Editor, Environmental Science & Technology
2020-present Associated Editor, Environmental Science & Technology Letters

2019 Guest Associate Editor, J. of Environmental Quality, special issue of nutrient management
2010-2016 U.S. EPA Chartered Science Advisory Board (SAB) (member)
2016-2018 Water Environment Federation (member) Steering Committee, Nutrient Symposium
2013-2018 American Academy of Environmental Scientists Certification Board (chair)
2017-2018 AAEES Foundation Board (member)
2013-2016, 2018-present AEESP Foundation Board (member)
2014-present Energy-Positive Water Resource Recovery Committee (NSF, DOE, EPA, WERF)
2015-present Co-Editor of UNESCO Project writing Sanitation Technology Chapters for Global Water Pathogen Project (http://www.waterpathogens.org/toc).
2015-present Editorial Advisory Board *Global Challenges* (Wiley)
2018-2019 Associate Editor, *Journal of Environmental Quality* special issue on nutrients
2016-2017 USF System Research Strategic Planning Committee
2008-present CEE Department Environmental and Water Resources Committee (member)
2008-present CEE Department Promotion & Tenure committee
2018 CEE BS Environmental Engineering Development (leader)
2018-2019 CEE Department General Education Course Changes (leader)
2010-present CEE Department Alumni Survey (chair)
2018-present CEE Department ABET Committee (co-chair)

9. Important Publications (past five years)

1. Mihelcic, J.R., J.B. Zimmerman, *Environmental Engineering: Fundamentals, Sustainability, Design*, John Wiley & Sons, 2010, 2014. (2nd Edition published in 2014, 3rd Edition planned for 2020)
2. Mihelcic, J.R., Ren, Z.J., Cornejo, P.K., Fisher, A., Simon, A.J., Snyder, S.W., Zhang, Q., Rosso, D., Huggins, T.M., Cooper, W., Moeller, J., Rose, B., Schottel, B.L., Turgeon, J. (2017). Accelerating Innovation that Enhances Resource Recovery in the Wastewater Sector: Advancing a National Testbed Network, *Environmental Science & Technology*, 51:7749-7758.
3. Mihelcic, J.R., Naughton, C.C., Verbyla, M.E., Zhang, Q., Schweitzer, R.W., Oakley, S.M., Wells, C., Whiteford, L.M. (2017). The Grandest Challenge of all: The Role of Environmental Engineering to Achieve Sustainability in the World's Developing Regions," *Environmental Engineering Science*, 34(1):16-41, 2017.
4. Cornejo, P.K., Zhang, Q., Mihelcic, J.R. (2016). How Does Scale of Implementation Impact the Environmental Sustainability of Wastewater Treatment Integrated with Resource Recovery? *Environmental Science & Technology*, 50(13):6680-6689.
5. Lopez-Ponnada, E.V., Lynn, T.J., Ergas, S.J., Mihelcic, J.R. (2020). Long-Term Performance of a Conventional and Modified Bioretention System for Removing Dissolved Nitrogen Species in Stormwater Runoff, *Water Research*, 170:115336.

10. Most Recent Professional Development Activities

Organized session at 2019 ASEE National Conference on integration of Sustainable Development Goals into Classroom, Attend WEFTEC, FWEA, and AEESP meetings on regular basis.

AMY L. STUART

2. Education

Postdoct.	Geol. & Environ. Sci. / CISAC	Stanford University	2002 to 2003
Ph.D.	Civil and Environmental Engineering	Stanford University	2002
M.S.	Civil Eng. (Env. Eng. & Sci. Program)	Stanford University	1997
B.S.	Chemical Engineering	Stanford University	1994

3. Academic Experience

University of South Florida (USF)

Professor (full time), Public Health (tenured), Civil & Environ. Eng. (courtesy)	2017 to present
Associated Faculty, Patel College of Global Sustainability	2010 to present
Joint Courtesy Faculty, Center for Urban Transportation Research	2009 to present
Associate Professor, Environmental & Occupational Health (full-time)	2011 to 2017
Assistant Professor, Environmental & Occupational Health (full-time)	2005 to 2011
Univ. of Western Australia, Visiting Research Fellow, Population Health	2013 to 2014
Univ. of North Carolina, Visiting Scientist, Comm. Model. Anal. Sys. Center	July 2010
Texas A&M Univ., Asst. Research Sci. and Graduate Faculty, Atm. Sci. (full time)	2003 to 2004
Stanford Univ., Science Fellow, Ctr. for Int'l Security and Cooperation (full time)	2002 to 2003
National Center for Atmospheric Research, Visiting Graduate Researcher	June to Aug. 1998

4.Non-Academic Experience

Environ Corporation, Associate Environmental Consultant (full time)	1994 to 1996
Stockholm Environment Institute, Visiting Scholar (full time)	June to July 1994

5. Certifications and Professional Registrations

Fundamentals of Eng. Engin. Intern No. 1100011799. Florida Board of Prof. Engineers

6.Current Memberships in Professional Organizations

Association of Environmental Engineering and Science Professors
Air & Waste Management Association
International Society of Exposure Sciences

7. Honors and Awards

National Science Foundation CAREER Grant Award (2008); Induction in Delta Omega, Honorary Society in Public Health (2008); Research Contributions Award, College of Public Health USF (2006, 2007)

Service Activities

University: Director, Graduate certificate in environmental health (2008 to 2019); Council on Technology for Instruction and Research (2014 to 2017); Sustainability Initiatives Steering Committee (2015 to 2016); Research Computing Advisory Committee (2007 to 2015)
College: President, Faculty Assembly, College of Public Health (2018 to present); Lead, Master's concentrations in environ. and occup. health (2018 to present); Faculty mentor; Review committee for Outstanding Woman in Public Health; Judge for Research Day
Department: Student admissions reviews; Environ. curriculum committee; Comp. committee

Outside: Lectures committee, Assoc. of Environ. Engineering and Science Professors (2013 to present); FL Air and Waste Management Association scholarship review committee (2010 to present); Air and Waste Management Association student liaison; Journal manuscript reviews; Funding proposal reviews

9. Principal Publications (last 5 years only)

S Gurram, AL Stuart, and AR Pinjari. Agent-based modeling to estimate exposures to urban air pollution from transportation: exposure disparities and impacts of high-resolution data. *Computers, Environment and Urban Systems*. 75: 22 –34, 2019.

R Ramakrishnan, JL Salemi, AL Stuart, H Chen, K O'Rourke, RS Kirby. Trends, correlates, and survival of infants with congenital diaphragmatic hernia and its subtypes. *Birth Defects Research*. 110: 1107–1117, 2018.

H Yu and AL Stuart. Impacts of compact growth and electric vehicles on future air quality and urban exposures may be mixed. *Science of the Total Environment*. 576: 148-158, 2017.

JP Tanner, JL Salemi, AL Stuart, H Yu, MM Jordan, C DuClos, P Cavicchia, JA Correia, SM Watkins, and RS Kirby. Uncertainty in maternal exposures to ambient $PM_{2.5}$ and benzene during pregnancy: Sensitivity to exposure estimation decisions. *Spatial and Spatio-temporal Epidemiology* 17: 117 -129, 2016.

H Yu and AL Stuart. Exposure and inequality for select urban air pollutants in the Tampa Bay Area. *Science of the Total Environment* 551-552: 474–83, 2016.

R Michael, AL Stuart, MA Trotz, and F Akiwumi. Source apportionment of wet-deposited atmospheric mercury in Tampa, Florida. *Atmospheric Research* 170: 168–75, 2016.

N Good, A Mölter, C Ackerson, A Bachand, T Carpenter, ML Clark, KM Fedak, A Kayne, K Koehler, B Moore, C L'Orange, C Quinn, V Ugave, AL Stuart, JL Peel and J Volckens. The Fort Collins Commuter Study: Impact of Route Type and Transport Mode on Personal Exposure to Multiple Air Pollutants. *Journal of Exp. Sci. and Environ. Epidemiology*, 2015.

S Gurram, AL Stuart, AJ Pinjari. Impacts of travel activity and urbanicity on exposures to ambient oxides of nitrogen and on exposure disparities. *Air Quality, Atmosphere & Health* 8: 97–114, 2015.

M Dirgawati, R Barnes, AJ Wheeler, A Arnold, KA McCaul, AL Stuart, D Blake, A Hinwood, BB Yeap, and JS Heyworth. Development of Land Use Regression Models for Predicting Exposure to NO_2 and NO_x in Metropolitan Perth, Western Australia. *Environmental Modelling & Software* 74 (December): 258–67, 2015.

JP Tanner, JL Salemi, AL Stuart, H Yu, MM Jordan, C DuClos, P Cavicchia, JA Correia, SM Watkins, and RS Kirby. Associations Between Exposure to Ambient Benzene and $PM_{2.5}$ During Pregnancy and the Risk of Selected Birth Defects in Offspring. *Environmental Research* 142 (October): 345–53, 2015.

JR Mihelcic and AL Stuart. Air Quality Engineering, in *Environmental Engineering: Fundamentals, Sustainability, Design.* 2nd Ed. Wiley, 2014.

10.Principal Development Activities

Health in All Policies Workshop: The Case of Air Pollution, Urban Health, and Sustainability. World Health Organization (WHO). Washington, D.C., June 18–20, 2018;

Defining the Role of AEESP in Outreach and Communication. AEESP Research and Education Conference, Ann Arbor, Michigan, June 2017.

Maya A. Trotz

2. Education
Ph.D. in Environmental Engineering, Stanford University, Stanford, CA, 2002
MS in Environmental Engineering, Stanford University, Stanford, CA, 1996
BS in Chemical Engineering with a minor in Theater Art, Massachusetts Institute of Technology, Cambridge, MA, 1994

3. Academic Positions

Professor	**April 2018 – Present**
Associate Professor	**June 2010 – April 2018**
Assistant Professor	**August 2004 – June 2010**
Director, National Research Traineeship Systems – Training for Research ON Geography-based Coastal Food Energy Water Systems (STRONG-CFEWS)	**August 2017 – Present**
Director, Research Experience for Teachers – Water Awareness Research and Education	**June 2012 – June 2017**
Director, Research Experience for Undergraduates – Tampa Interdisciplinary Environmental Research	**June 2010 – June 2017**
Director, U.S. Multi-disciplinary doctoral graduate fellowship program at the water-energy-materials-human-nexus	**June 2009 – May 2014**
University of South Florida (USF), Tampa, FL Dept. of Civil and Environmental Engineering	
Visiting Research Scientist	**August 2012 – July 2013**
Caribbean Science Foundation, Barbados Host: Cardinal Warde, Ph.D..	
Lecturer	**August 2003 – Dec. 2003**
Nanyang Technological University, Singapore Dept. of Civil and Environmental Engineering	
Post Doctoral Scholar	**June 2002 – July 2004**
Stanford University, Stanford, CA Dept. of Civil and Environmental Engineering Department	

4. Non-Academic Experience

Mobil Oil, Torrance, CA	**May 1991 – August 1991**
Mobil Oil, Torrance, CA	**May 1992 – August 1992**
Polaroid Corporation, Cambridge, MA	**May 1993 – May 1993**

5. Certifications & Professional Registrations ENV SP

6. Current Membership in Professional Organizations
Association of Environmental Engineering & Science Professors, Fragments of Hope Corp, American Society of Engineering Education (ASEE), Caribbean Water and Wastewater

Association (CWWA), American Society of Civil Engineers (ASCE), Association for the Study of the Worldwide African Diaspora (ASWAD), Water Environment Federation (WEF).

7. Honors/awards

USF Global Achievement Faculty Award for Outstanding Global Research (2019), Association of Environmental Engineering & Science Professors (AEESP) Award for Outstanding Contribution to Environmental Engineering Science Education (2014), Caribbean Science Foundation Distinguished Service Award, 2013, Association of Environmental Engineering & Science Professors (AEESP) Service Award (2015 & 2011), USF ASCE student chapter Outstanding Faculty Award (2009); ExCEED Teaching Fellow (2007).

8. Service Activities

- Member, Working group Exploring the Future of Sustainable Production and Consumption, and Work, Council on Competitiveness National Commission on Innovation and Competitiveness Frontiers
- President, AEESP (2018-2019), President Elect (2017 – 2018), Vice President (2016-2017), elected board member (2015-present), Conference Selection Chair (2013 – 2015), Co-Chair 2011 National Conference (2010 – 2011)

9. Principal Publications (Last 5 years only)

1. Mihelcic J, Trotz M (2019) Environmental Education that Enhances the Global Competency of Early-Career Engineers and Scientists. EM Magazine, February 2019:17-20. http://pubs.awma.org/flip/EM-Feb-2019/emfeb19.pdf
2. Wells EC, Webb WA, Prouty C, Zarger R, Trotz M, Whiteford L, Mihelcic J (2019) Wastewater Technopolitics on the Southern Coast of Belize. Economic Anthropology, 6(2):277-290. Available from: http://doi.wiley.com/10.1002/sea2.12145 DOI: 10.1002/sea2.12145
3. Isaacs WN, Cadogan E, Trotz, MA (2019). Utility-Service User Partnership for domestic potable water system adoption in Barbados. *Proceedings of the American Society of Civil Engineers Environmental & Water Resources Institute (ASCE EWRI) 2019 World Environmental & Water Resources Congress, Pittsburgh, Pennsylvania, May 19 – 23, 2019.* https://ascelibrary.org/doi/pdf/10.1061/9780784482322.017
4. Locicero R, Trotz M (2018) Green Space Based Learning Model for Repurposing Underutilized Green Spaces within School Campuses. *Advances in Engineering Education,6(3).* http://advances.asee.org/wp-content/uploads/vol06/issue03/Papers/AEE-22-Ryan.pdf
5. Boxman S, Nystrom M, Ergas S, Main K, Trotz MA (2018) Evaluation of water treatment capacity, nutrient cycling, and biomass production in a marine aquaponic system. *Ecological Engineering*, 120: 299-310. https://doi.org/10.1016/j.ecoleng.2018.06.003
6. Ries M, Trotz M, Vairavamoorthy K (2016) Fit-for-purpose" sustainability index: A simplified approach for U.S. water utility sustainability assessment. Water Practice and Technology. 11(1):35-47. DOI: 10.2166/wpt.2016.009

10. Professional Development Activities

- Executive Leadership in Academic Technology, Engineering and Science (ELATES) Program at Drexel. Accepted, 2019-2020 cohort.

DANIEL H. YEH

2. Education

BSE, Civil Engineering, The University of Michigan – Ann Arbor, MI, 1991
BS, Natural Resources, The University of Michigan – Ann Arbor, MI, 1991
Grad. Coursework, Environmental Engineering, Manhattan College – Riverdale, NY, 1991-92
MSE, Environmental Engineering, The University of Michigan – Ann Arbor, MI, 1993
PhD, Environmental Engineering, Georgia Institute of Technology – Atlanta, GA, 2000

3. Academic Experience

Univ. of South Florida, Tampa, FL, Associate Professor, Civil & Environ. Eng., 2011-present
UNESCO-IHE Institute for Water Education, Delft, Netherlands, Visiting Scholar, 2014 (May-Jul)Univ. of South Florida, Tampa, FL, Faculty (courtesy appt.), Global Health, 2009-14
Univ. of South Florida, Tampa, FL, Res. Fellow, Patel Ctr Global Solutions, 2008-2011
Univ. of South Florida, Tampa, FL, Assistant Professor, Civil & Environ. Eng., 2005-11
Stanford University, Stanford, CA, and NSF STC WaterCAMPWS, Postdoctoral Research Fellow, Civil & Environmental Engineering, 2002-04
Georgia Institute of Technology, Atlanta, GA, Graduate Research Assistant, Civil & Environmental Engineering, 1994-99

4. Non-Academic Experience

Wei Ming Pharma., Taipei, Taiwan, Manager, Product & Technology Devel., 2000-02
Ford Motor Company, Dearborn, MI, Research Engineer, Sci. Research Lab, 1993-94
HydroQual, Inc., Mahwah, NJ, Environmental Engineer, 1991-92

5. Certification or Professional Registrations

Professional Engineer (Georgia, PE025162; EnvE)
Board Certified Environmental Engineer (Water supply/wastewater engineering; Oct 2016), American Academy of Environmental Engineers and Scientists (AAEES)
Leadership in Energy and Environmental Design Accredited Professional, Building Design and Construction (LEED AP BD+C)

6. Current Memberships in Professional Organizations

American Academy of Environmental Engineers and Scientists (AAEES)
Association of Environmental Engineering and Science Professors (AEESP)
Water Environment Federation (WEF)
International Water Association (IWA)
American Planning Association (APA)
National Academy of Inventors (NAI, USF Chapter)

7. Honors and Awards

2016, Cade Museum Prize for Innovation, Sweet 16 semi-finalist (for ICARUS algae cultivation platform).

61, 2015.

8. Professional Development Activities:

Invited talk at Texas A&M Kingsville Environmental Engineering seminar series (2019)

Invited talk at Purdue University Environmental and Ecological Engineering seminar series (2019)

Invited panel at the NSF-sponsored workshop "Grand Challenges in Resilience" at Purdue University and presentation (2019)

Attendance to the NSF Resilience of Interdependent Infrastructure System workshop at George Mason University and presentation (2018)

Attendance to National Research Center for Resource Recovery and Nutrient Management Capstone Summit in Washington DC and presentation (2018)

Attendance to Cross-INFEWS NRT workshop in Missoula, Montana (2018)

Qiong (Jane) Zhang

2. Education:

B.S., Water Supply and Sanitation Engineering	The North-West Institute of Architecture Engineering, China, 1992
M.S., Environmental Engineering	TsingHua University, China, 1995
Ph.D., Environmental Engineering	Michigan Technological University, 2001

3. Academic Experience:

University of South Florida, Associate Professor, 2015 – present, full-time
University of South Florida, Assistant Professor, 2009 – 2015, full-time
Michigan Technological University, Senior Research Engineer, 2005 – 2009, part-time
Michigan Technological University, Adjunct Assistant Professor, 2005 – 2009, part-time
Michigan Technological University, Postdoctoral Researcher, 2002 – 2005, full-time
Michigan Technological University, Lecturer, 2001 – 2002, full-time
Hangzhou University, Assistant Professor, 1995 – 1997, full-time

4. Non-academic Experience:

Sustainable Futures Institute (SFI), Michigan Technological University, Operations Manager, Manages the day-to-day options of the SFI including the research initiatives, proposal development and funded projects, 2005 – 2009, part-time

5. Certifications & Professional Registrations:

EIT, 1999

6. Current Memberships in Professional Organizations:

Association of Environmental Engineering and Science Professors
American Water Works Association

7. Honors and Awards:

Best Paper Award by Water Environment Research (2019)
USF Faculty Outstanding Research Achievement Award (2017)
Vasant Surti Faculty Fellow in CEE (2017-2019)
College of Engineering (COE) Outstanding Research Award (2016)
USF Outstanding Faculty Award (2015, 2016)
CAREER award by the National Science Foundation (2015)
Best Paper Award by the Florida Section of the American Water Works Association (2014)
ASEE-SE New Faculty Research Award (2011)
Best Paper Award by the Environmental Engineering Division of the ASEE (2009)
Dedicated Service Award by the Sustainable Futures Institute at Michigan Tech (2009)

8. Service Activities Within and Outside of Institution:

Institutional service activities include:

- University: Faculty advisor of USF American Water Works Association Student Chapter (2013-present); USF Society of Women Engineers (2012-2015); USF Chinese Student Christian Fellowship (2009-present), Society of Asian Scientists and Engineers (2015-present); Faculty search committee (2015-2016, 2016-2017, 2018-2019); Academic grievance committee (2019)
- Department: Committee member of the ABET Industrial Liaison Committee, Area Committee member of Environmental/Water Resources (EWRE)

Outside service activities include:

- Associate editor, Journal of Environmental Engineering (2020-present)
- Committee member of the American Academy of Environmental Engineers & Scientists Environmental Engineering PhD Dissertation Awards Committee (2019-present)
- Committee member of the American Academy of Environmental Engineers & Scientists Environmental Engineering Body of Knowledge (BOK) Task Force (2018)
- Committee member of the ASCE Task Committee: Manual of Practice for CFD Applications in Environmental Engineering (2015-present)
- Served on organizing committee and technical committee for 2011 AEESP Education & Research Conference
- Co-organized 4 workshops to disseminate learning materials developed to incorporate sustainability into the engineering education in 2009 AEESP, 2010 ASEE, 2010 SACNAS, and 2011 AEESP.

9. Important Publications from Past Five Years:

- Rezaei, N., A. Sierra-Altamiranda, N. Diaz-Elsayed, H. Charkhgard, Q. Zhang, A multi-objective optimization model for decision support in water reclamation system planning, *J. of Cleaner Production*, 240: 118227; doi: 10.1016/j.jclepro.2019.118227, 2019.
- Diaz-Elsayed, N., N. Rezaei, T. Guo, S. Mohebbi, Q. Zhang, Wastewater-based resource recovery technologies across scale: A review, *Resources, Conservation & Recycling*, 145:94-112. doi: 10.1016/j.resconrec.2018.12.035, 2019
- Wang, M., R. Keeley, N. Zalivina, T. Halfhide, K. Scott, Q. Zhang, P. van der Steen, S.J. Ergas, Advances in algal-prokaryotic wastewater treatment: a review of nitrogen transformations, reactor configurations and molecular tools, *Journal of Environmental Management*, 217:845-857. doi: 10.1016/j.jenvman.2018.04.021, 2018.
- Prouty, C., S. Mohebbi, Q. Zhang, Socio-technical Strategies and Behavior Change to Increase the Adoption and Sustainability of Resource Recovery Systems: A System Dynamics Approach, *Water Research*, 137:107-119. doi: 10.1016/j.watres.2018.03.009, 2018.
- Diaz-Elsayed, N., X. Xu, M. Balaguer-Barbosa, Q. Zhang, An evaluation of the sustainability of onsite wastewater treatment systems for nutrient management, *Water Research*, 121: 186-196, 2017.
- Santana, M.V., Q. Zhang, M.H. Nachabe, X. Xie, J.R. Mihelcic, Could smart growth lower the operational energy of water supply? A scenario analysis in Tampa, Florida, USA, *Landscape and Urban Planning*, 164: 99-108, 2017.
- Cornejo, P. K., Q. Zhang, J.R. Mihelcic, How Does Scale of Implementation Impact the Environmental Sustainability of Wastewater Treatment Integrated with Resource Recovery? *Environmental Science and Technology*, 50(13): 6680-6689, 2016.

10. Recent Professional Development Activities:

- Invited talk at Texas A&M Kingsville Environmental Engineering seminar series (2019)
- Invited talk at Purdue University Environmental and Ecological Engrg. seminar series (2019)
- Invited panel at the NSF-sponsored workshop “Grand Challenges in Resilience” at Purdue University and presentation (2019)
- Attendance to the NSF Resilience of Interdependent Infrastructure System workshop at George Mason University and presentation (2018)
- Attendance to Cross-INFEWS NRT workshop in Missoula, Montana (2018)

Agenda Item: III d

USF Board of Trustees
February 23, 2021

Issue: USF 2015-2025 Campus Master Plan Updates

Proposed action: Approval of the 2015-2025 Campus Master Plans Updates

---

Executive Summary: Requesting UBOT approval for changes to the USF Campus Master Plans, Pursuant to Section 1013.30(3), Florida Statutes, and Florida Board of Governors Regulations, Chapter 21, which addresses Master Plan Updates.

The USF 2015-2025 Tampa Campus Master Plan update includes site location changes for both the Wellness Center Complex and Indoor Performance Facility projects. The revisions are reflected in the attached presentation, Updates to Master Plan, slide #8.

The USF 2015-2025 St. Petersburg Campus Master Plan update includes the inclusion of the Environmental & Oceanographic Sciences Research & Teaching Facility and the removal of Facility Purchase. The revisions are reflected in the attached presentation, Updates to Master Plan, slide #9.

The USF 2015-2025 Sarasota-Manatee Campus Master Plan provides informational update on land acquisition from Manatee County. The update is reflected in the attached presentation, Sarasota-Manatee Current Campus Master Plan, slide #10.

Financial Impact: None

Strategic Goal(s) Item Supports: Goal 1; Goal 2; Goal 3; Goal 4
BOT Committee Review Date: Feb 23, 2021
Supporting Documentation Online (*please circle*): (Yes) No
Prepared by: Christopher G. Duffy, Interim Vice President, Administrative Services

FACILITIES UPDATE

Master Plan Changes and Related Expenditure Authorizations

February 23, 2021

UNIVERSITY of SOUTH FLORIDA

UNIVERSITY of SOUTH FLORIDA

Objectives

- Apprise the Board of Trustees of Master Plan changes/amendments:
  - Tampa: location for Indoor Performance Facility
  - Tampa: location for the Student Wellness Center
  - St. Petersburg: location of Environmental & Oceanographic Sciences Research & Teaching Facility
  - Sarasota-Manatee: informational update on potential land acquisition
- Review expenditure authorizations and funding updates:
  - Indoor Performance Facility
  - Lee Roy Selmon Athletics Center Enhancements
  - Innovative Education renovation at TVB building
- Approval of master plan amendments (ACE committee)
- Approval of expenditure authorizations (Finance committee)

Master Plan
Informational Review

UNIVERSITY of SOUTH FLORIDA

Master Plan Overview

- **Campus Master Plan Governance**
- **Current USF Campus Master Plans**
- **Updates to Master Plan**
  - **USF Tampa campus** (Amendment #2)
  - **USF St. Petersburg campus** (Amendment #2)
  - **USF Sarasota campus** (Informational only)
- **Process and Milestones**

UNIVERSITY of SOUTH FLORIDA

Campus Master Plan Governance

USF Campus Master Plan

	F.S. 1013.30	FL BOG Ch. 21	
Manatee County	Sarasota	Goals, Objectives, & Policies (GOP)	Elements 1-11
City of St. Petersburg	St. Petersburg	Data Collection & Analysis Report (DCA)	Elements 4-11
City of Tampa	Tampa	Evaluation & Appraisal Report (EAR)	Elements 4-11
• Each campus has a Campus Development Agreement with the jurisdiction within which it is located.	• Provisions for campus planning and concurrency management. • Requires Campus Development Agreement (CDA) with local jurisdiction based on the impacts of campus growth on off-campus facilities and services.	• GOP describe the intended development criteria for the next 10 years. • DCA is an update to data upon which the Campus Development Agreement with the local jurisdiction is based. • EAR is a self-assessment.	

Minimum Requirements

- University Campus Master Plans is updated every five years
- Minimum requirements of Campus Master Plans for Florida Universities are contained in two documents:
  - **Florida Statute (FS) 1013.30**
  - **Florida Board of Governors Regulations Chapter 21, *Campus Master Plans***

UNIVERSITY of SOUTH FLORIDA

2020-2030 Campus Master Plan updates

Single Document

Includes sub-leases:
Moffitt Cancer Center
Shiners Children's Hospital
Religious Centers
USF Credit Union
Pizzo Elementary
Publix

2020-2030 USF Campus Master Plan Updates

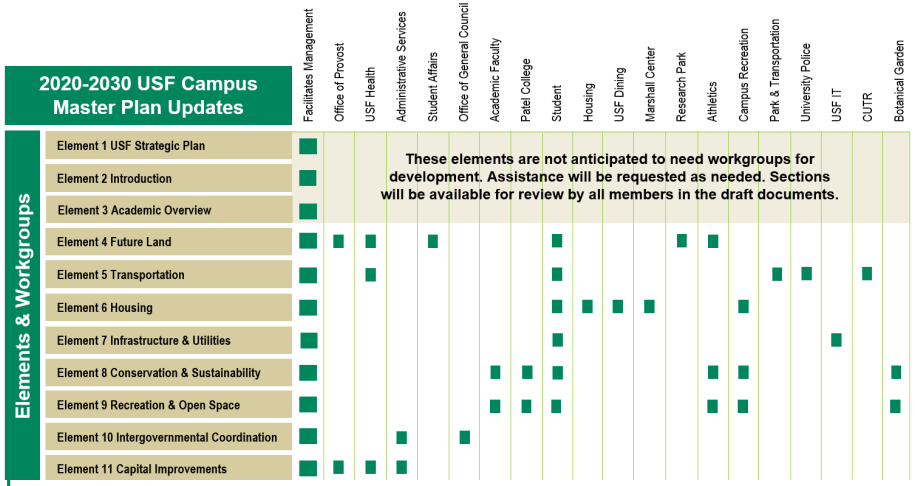
USF Tampa
CDA with City of Tampa

USF St. Petersburg
CDA with City of St. Pete

USF Sarasota
CDA with Manatee County

- **Single consolidated document** will contain all three campuses
- Overarching USF Strategic Plan and Academic Overview
- Campus Development Agreement with host jurisdiction for each campus

Elements/Workgroups

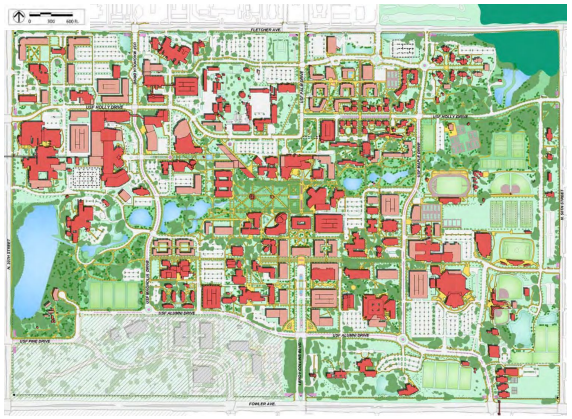


- Each Element has Workgroup with vested interest groups represented
- Workgroups reflect all campuses
- Elements 1, 2, and 3 will be changed due to consolidation

6

UNIVERSITY of SOUTH FLORIDA

Current USF Campus Master Plans



Tampa

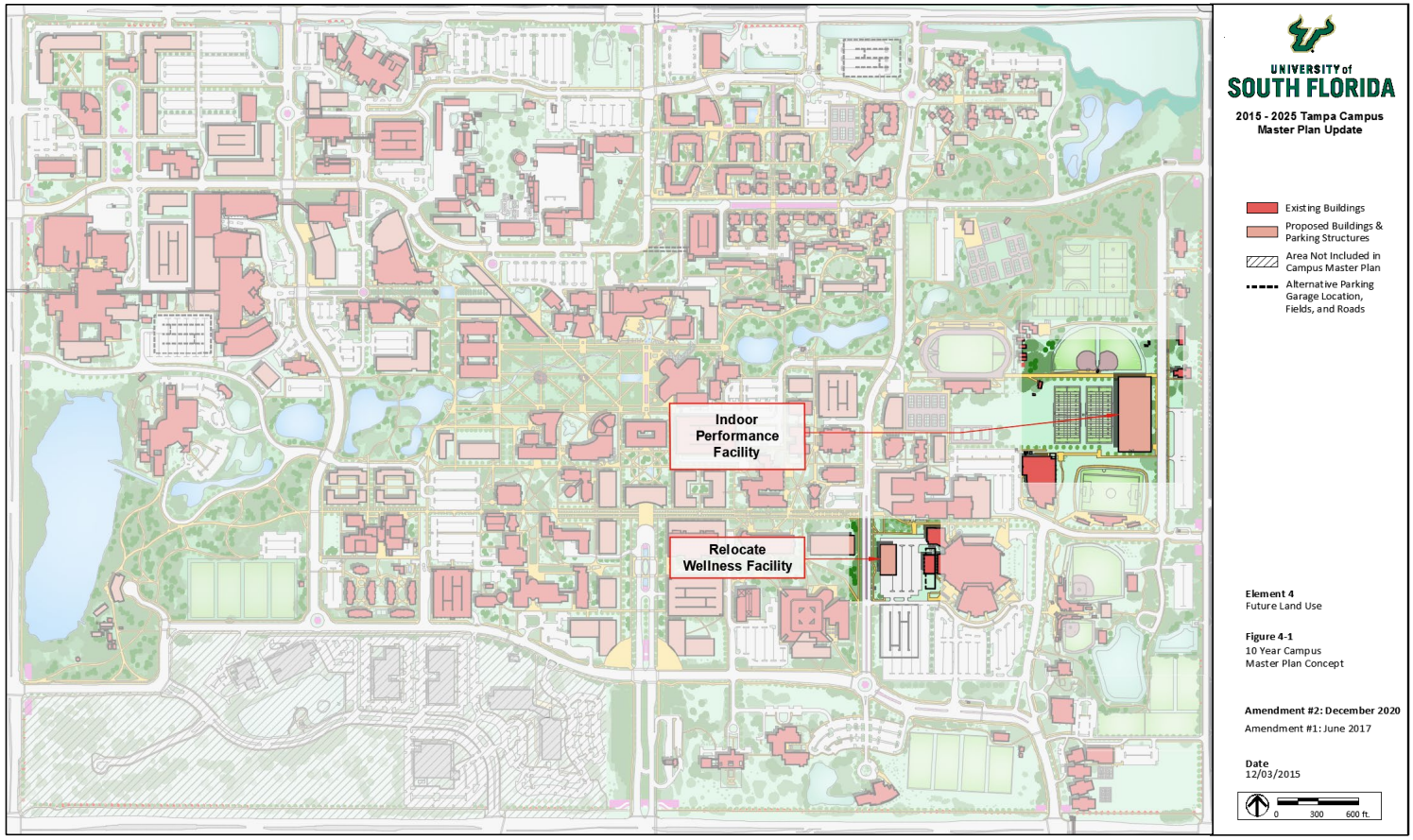
St. Petersburg

Sarasota-Manatee

- Current Master Plan for all three campuses.
- Moving forward there will be one cohesive Master Plan document to be used by individual campuses.
- All 11 Elements will be addressed within the Master Plan.

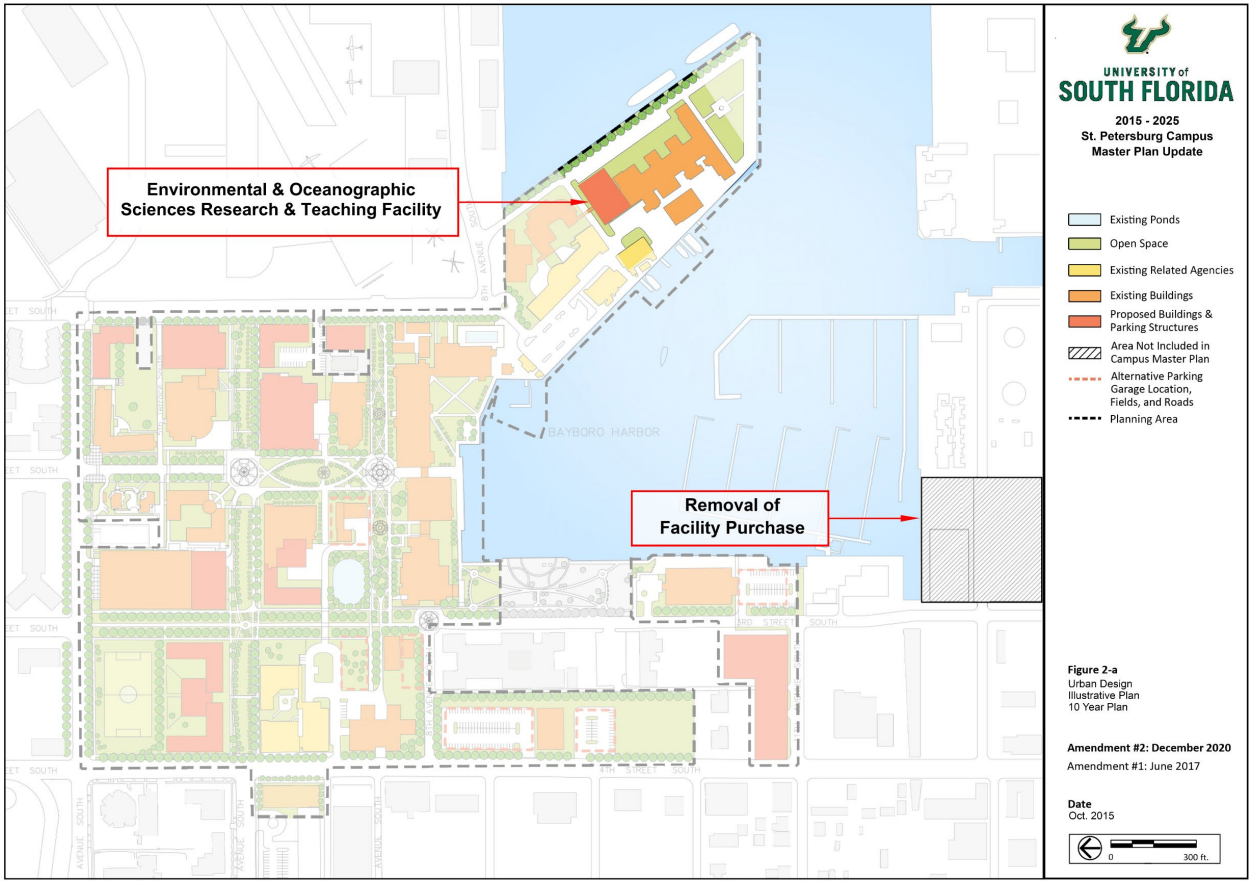
UNIVERSITY of SOUTH FLORIDA

Updates to Master Plan, **Amendment #2 Tampa**



UNIVERSITY of SOUTH FLORIDA

Updates to Master Plan, **Amendment #2 St. Petersburg**

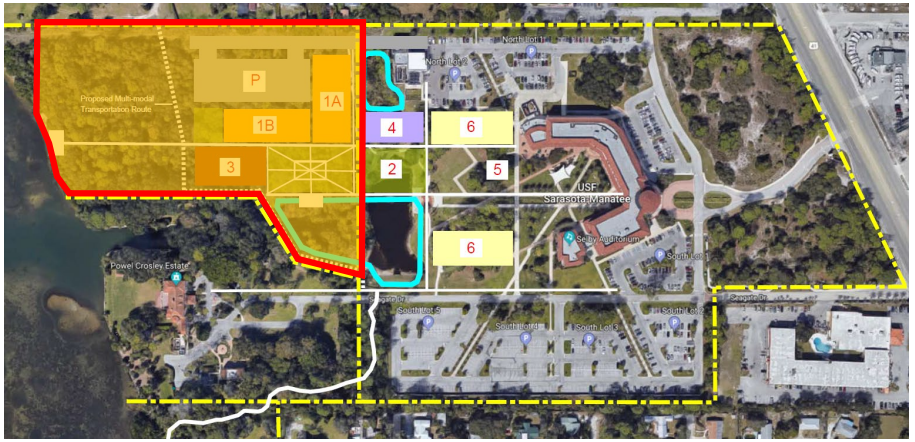


UNIVERSITY of SOUTH FLORIDA

Sarasota-Manatee - Informational Update

Current Master Plan

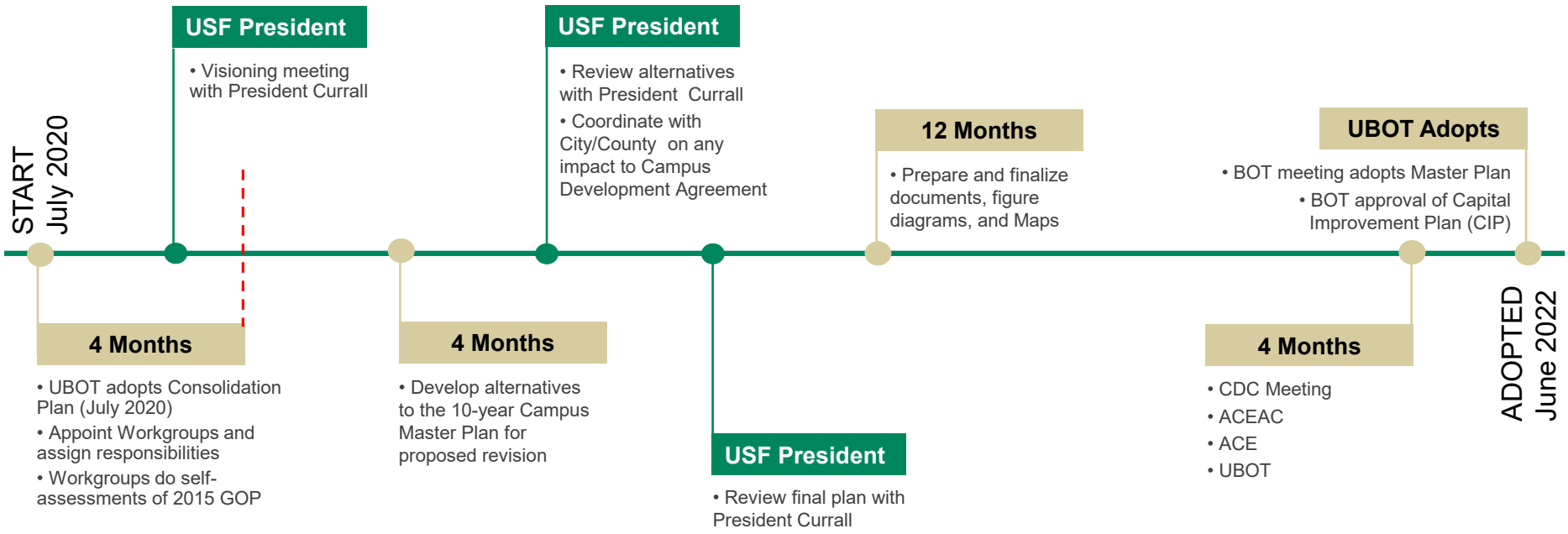
Potential Addition



10

UNIVERSITY of SOUTH FLORIDA

Campus Master Plan **Process & Milestones**

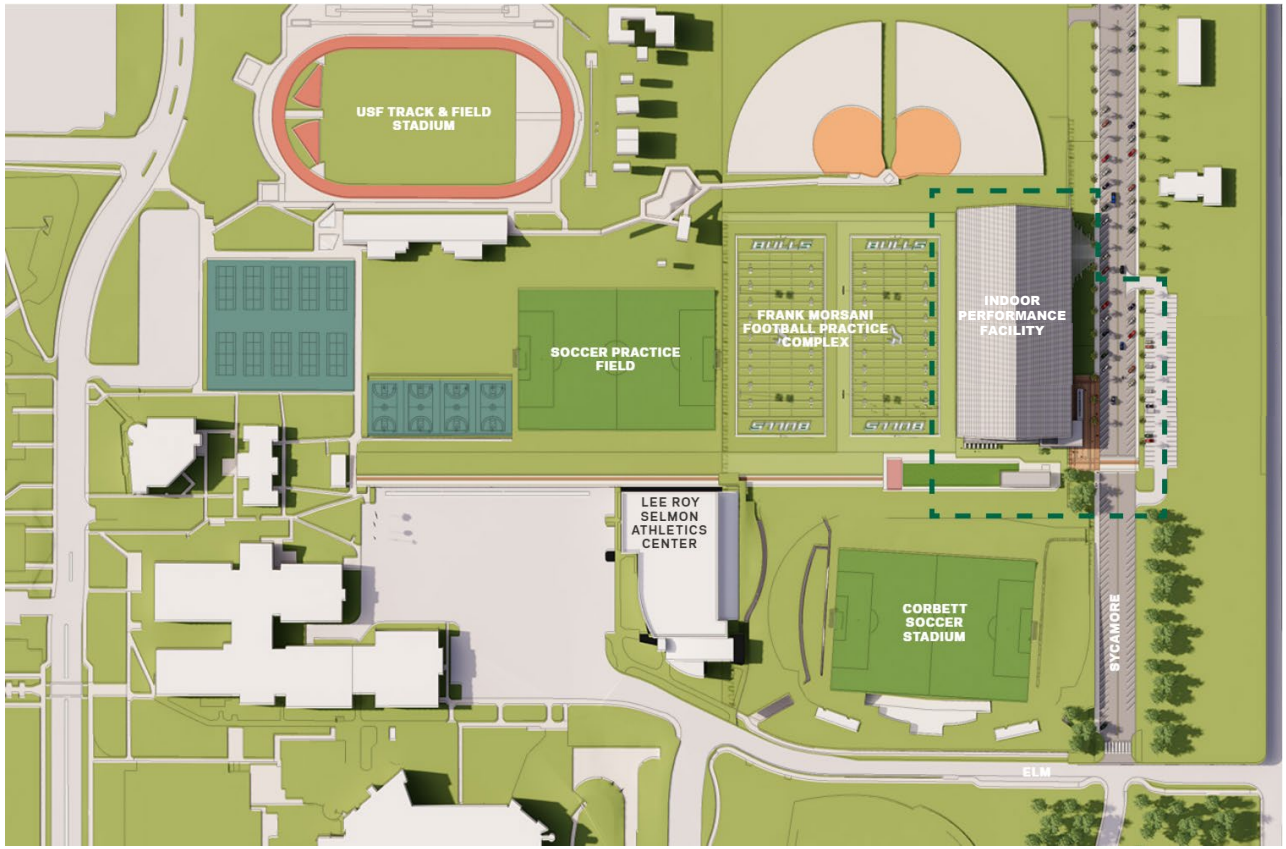


11

Indoor Performance Facility
and
Lee Roy Selmon Athletics Center Enhancements

UNIVERSITY of SOUTH FLORIDA

Indoor Performance Facility



Site Plan

UNIVERSITY of SOUTH FLORIDA

Indoor Performance Facility

Night View from USF Sycamore

UNIVERSITY of SOUTH FLORIDA

Indoor Performance Facility

Lobby

UNIVERSITY of SOUTH FLORIDA

Indoor Performance Facility

Indoor conceptual from Viewing Deck

UNIVERSITY of SOUTH FLORIDA

Indoor Performance Facility

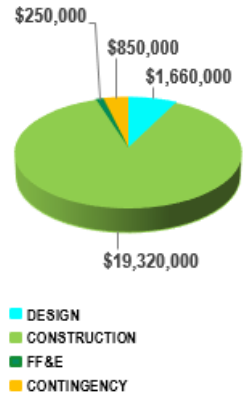
Scope:
Total Programmed Spaces: 88,600 GSF
The project will be located west of USF Sycamore Drive.

Status:
Advanced Schematic Design / Cost Estimation

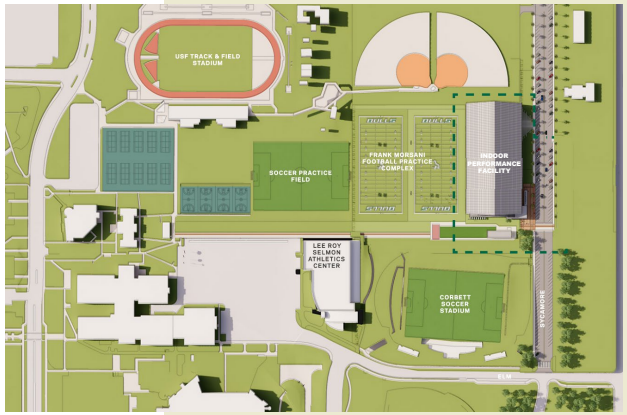
Project Delivery Method:
CM @ Risk

Project Team:
A/E: HOK Kansas City
CM: RR Simmons

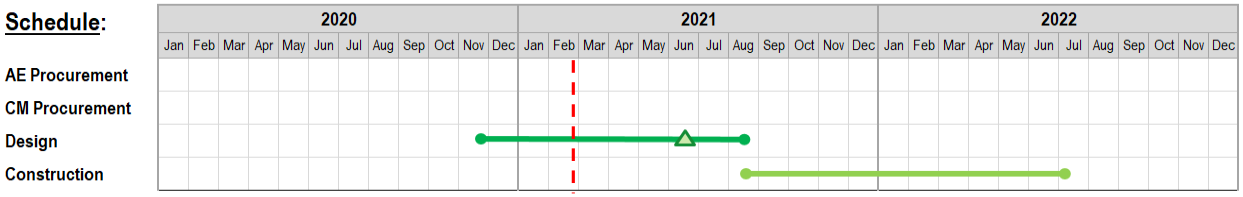
Budget: $22,080,000



Funding Source: Philanthropy



Schedule:



17

UNIVERSITY of SOUTH FLORIDA

Lee Roy Selmon Athletics Center Enhancements

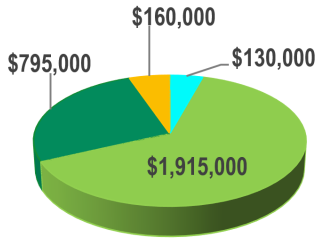
Scope:
Renovate the Lee Roy Selmon Athletics Center building to provide a comprehensive, cohesive experiential branding for the USF football operations. The scope of work includes the football operations entry area on the second floor, team meeting room, and a total renovation of locker room with a new nutrition area for athletes.

Status:
Planning/Unfunded

Project Delivery Method:
CM @ Risk

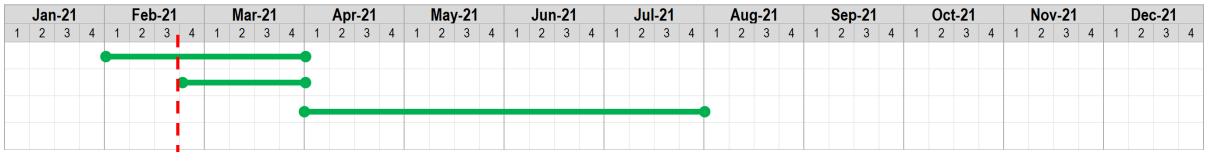
Project Team:
A/E: Rowe Architect/Engineering Matrix
CM: TBD
Graphics: Jack Porter

Budget: $3,000,000



Funding Source: Philanthropy

Schedule:



18

UNIVERSITY of SOUTH FLORIDA

Phase I Athletics Fundraising Update

- **Indoor Performance Facility**
- **Lee Roy Selmon Center Enhancements**

Phase I Goal	**$25,080,000**
Cash Received	$ 4,627,000
Pledges	12,300,000
Total Pledges & Cash Received	16,927,000
Funds To Be Raised	**$ 8,153,000**

19

Student Wellness Center

UNIVERSITY of SOUTH FLORIDA

Student Wellness Center Complex

Northwest Aerial

UNIVERSITY of SOUTH FLORIDA

Student Wellness Center Complex

Southwest View

Northwest View

UNIVERSITY of SOUTH FLORIDA

Student Wellness Center Complex

1 LEVEL 01 - WORKING

Department Legend

- ADMINISTRATION
- CENTRAL SUPPLY
- EMPLOYEE HEALTH
- EMPLOYEE HEALTH, CIRCULATION
- EMPLOYEE HEALTH, STAFF
- EMS
- EVS
- IMMUNIZATION
- IMMUNIZATION, CIRCULATION
- IMMUNIZATION, SUPPORT
- LAB
- LAB, CIRCULATION
- MECHANICAL
- MULTIPURPOSE
- NON-CLINICAL ADMIN
- OBSERVATION / URGENT CARE
- OBSERVATION / URGENT CARE, CIRCULATION
- OBSERVATION / URGENT CARE, STAFF
- PHARMACY
- PHARMACY, CIRCULATION
- PUBLIC
- PUBLIC SPACES
- STAFF CIRCULATION
- VERTICAL CIRCULATION

23

UNIVERSITY of SOUTH FLORIDA

Student Wellness Center Complex

Department Legend

- ADMINISTRATION
- ADMINISTRATION, CIRCULATION
- EVS
- MECHANICAL
- NON-CLINICAL ADMIN
- NUTRITION
- PHYSICAL THERAPY / NUTRITION
- PHYSICAL THERAPY / NUTRITION, STAFF
- PSYCHIATRY
- PSYCHIATRY, CIRCULATION
- PSYCHIATRY, STAFF
- PUBLIC
- PUBLIC SPACES
- SEXUAL HEALTH
- SEXUAL HEALTH, CIRCULATION
- SEXUAL HEALTH, STAFF
- VERTICAL CIRCULATION

Level 02 - working

Department Legend

- ADMINISTRATION
- ADMINISTRATION, CIRCULATION
- EVS
- GENERAL MEDICINE
- GENERAL MEDICINE, CIRCULATION
- GENERAL MEDICINE, STAFF
- MECHANICAL
- PHARMACY
- PUBLIC
- PUBLIC SPACES
- VERTICAL CIRCULATION

Level 03 - working

UNIVERSITY of SOUTH FLORIDA

Student Wellness Center Complex

Scope:

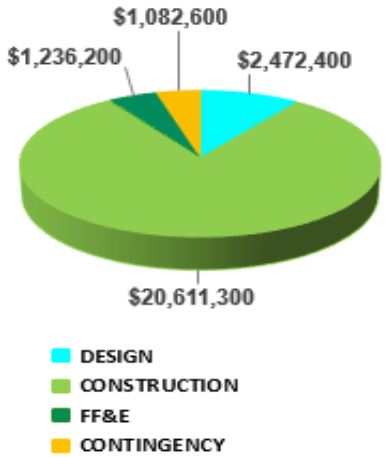
Offices	14,730 NSF
• Clinical	5,690 NSF
• Administrative	9,040 NSF
Clinical	16,648 NSF
Total Program Space	**31,378 NSF**
Total Building Gross	**47,067 GSF**

Status:
Design

Project Delivery:
Design/Build

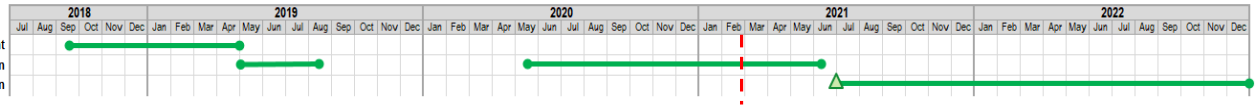
Design-Build Team:
Cannon Design / Barr&Barr-Horus

Budget: $25,402,500



Funding Source: CITF

Schedule:



△ GMP 1 : JUL 2021

Environmental & Oceanographic Sciences Research & Teaching Facility St. Petersburg campus

UNIVERSITY of SOUTH FLORIDA

Aerial View

College of Marine Science Complex

UNIVERSITY of SOUTH FLORIDA

Scope

This project is designed to be phased with activities combining new construction and renovation efforts to most efficiently meet university needs. The project will include demolition of 12,288 gross square feet (gsf) of the Northwest wing of Marine Science Lab building (MSL) and replace it with a four-story 45,200 net assignable square feet (nasf) (67,800 gsf) addition correlating to the STEM building nsf, gsf amounts. Additionally, 40,877 nasf of space will be renovated to update existing MSL mechanical, electrical, and plumbing systems including the roof. The project will accommodate the following "constellation" of academic programs projected for the St. Petersburg campus:

- **College of Marine Science (or the proposed College of Environmental and Oceanographic Sciences)**
- **College of Arts and Sciences (Environmental Chemistry, Marine Biology)**
- **College of Engineering (Coastal Engineering)**
- ***Interdisciplinary Center of Excellence in Environmental and Oceanographic Sciences***

Together, the project will provide for 86,077 (nasf):

New Addition 45,200 (nasf)

- 20,600 teaching laboratories
- 5,000 study space
- 15,600 research laboratories
- 2,000 office space
- 2,000 auditorium/exhibition space

Remodeled MSL 40,877 (nasf)

- 948 teaching laboratories
- 2,218 study space
- 28,484 research laboratories (19,561 remodeled, 8,923 recently remodeled)
- 16,650 office space
- 1,500 campus support space

28

UNIVERSITY of SOUTH FLORIDA

Environmental & Oceanographic Sciences Research & Teaching Facility

Scope:

This project is designed to be phased with activities combining new and renovation efforts to most efficiently meet university needs. The project will include demolition of 12,288 gross square feet (gsf) of the Northwest wing of Marine Science Lab building (MSL) and replace it with a four story 45,200 net assignable square feet (nasf) (67,800 gsf) addition correlating to the STEM building nsf, gsf amounts. Additionally, 40,877 nasf of space will be renovated to update existing MSL mechanical, electrical, and plumbing systems including the roof. The project will accommodate a variety of academic programs projected for the St. Petersburg campus.

Status:
Planning

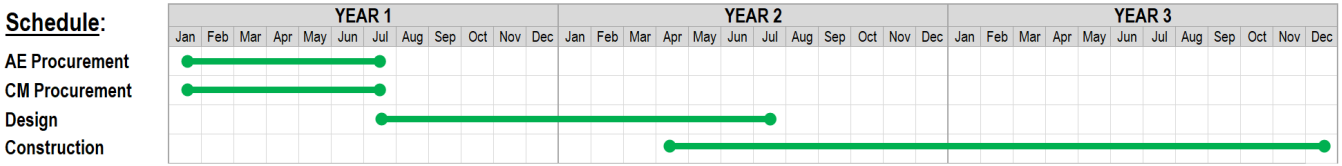
Project Delivery Method:
TBD

Project Team:
TBD

Budget:
TBD

Timing / Phasing:
TBD

Schedule:

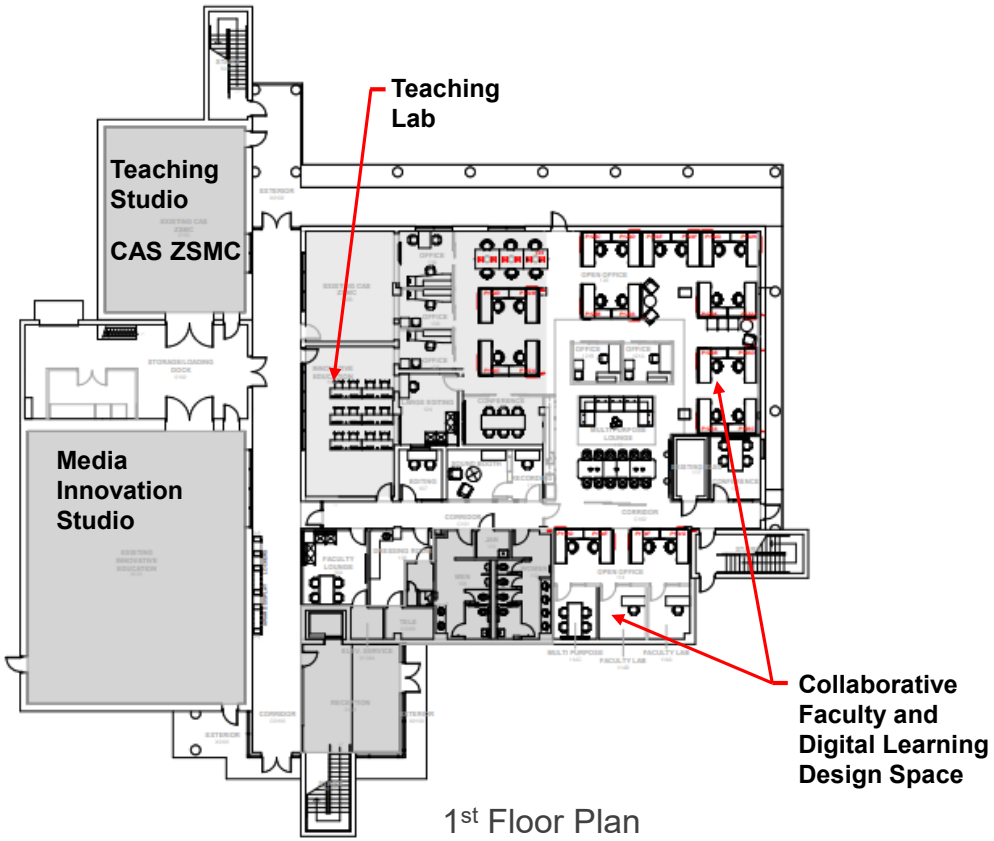


29

Innovative Education renovation at TVB building

UNIVERSITY of SOUTH FLORIDA

Innovative Education renovation at TVB building



1st Floor Plan

UNIVERSITY of SOUTH FLORIDA

Innovative Education renovation at TVB building

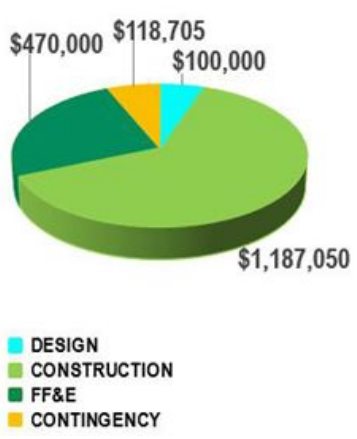
Scope:
Renovate 1st Floor of TVB Building
and Studios to Support Academic programs including:
- Innovative Education, Digital Learning
- College of Arts & Sciences
  Zimmerman School of Mass Communications
- MUMA College of Business
  Zimmerman Advertising Program (ZAP)

Status:
Design

Project Delivery Method:
GC, Competitive Bid

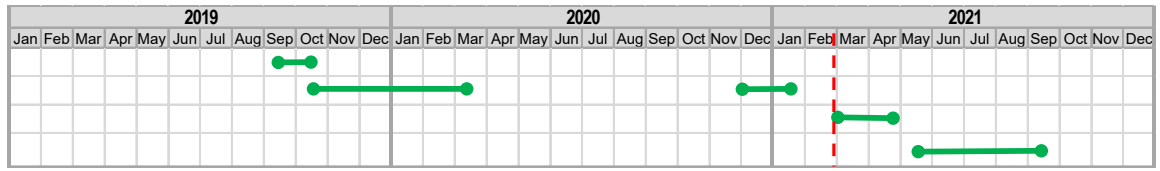
Project Team:
A/E: Gresham-Smith
GC: TBD

Budget: $1,875,755



Funding: Distance Education Fees

Schedule:



Summary and Requested Actions

UNIVERSITY of SOUTH FLORIDA

Requested Actions

- ACE Committee
  - Approve master plan changes for Indoor Performance Facility, Student Wellness Center Complex, and Environmental & Oceanographic Sciences Research & Teaching Facility on the St. Petersburg campus

- Finance Committee:
  - Approve expenditure authorizations for Lee Roy Selmon Athletics Center Enhancements and Innovative Education renovation at TVB


Thank You
UNIVERSITY of
SOUTH FLORIDA

Agenda Item: a.

USF Board of Trustees
February 23, 2021

Issue: USF/Black Leadership Network Pathways Planning Initiative

---

Proposed action: Information Item

Executive Summary:

This project is conceived as a strategic planning exercise, jointly led by USF and its partners in the USF Black Leadership Network, designed to develop innovative programs and practices to build, enhance, and expand the pipeline of Black students from high schools and community colleges in the six-county Tampa Bay area to the University of South Florida.

The steering committee, composed of representatives from USF, the BLN, Helios Education Foundation, and community partners, has engaged the services of a consultant, Dr. Lincoln Chandler, to expand the pipeline of Black students from Tampa Bay high schools to any USF campus. By June 1, 2021, the committee plans to develop a set of action steps that USF and its partners in the region can take to boost Black student enrollment.

Financial Impact: None.

Strategic Goal(s) Item Supports:
BOT Committee Review Date: February 23, 2021
Supporting Documentation Online (*please circle*): **Yes** No
Prepared by: Paul Dosal, Vice President for Student Success

Agenda Item: b.

USF Board of Trustees
February 23, 2021

Issue: Health & Wellness Support Services During COVID

Proposed action: Information Item

Executive Summary:

The COVID-19 pandemic presented extraordinary challenges to the health and well-being of all members of the USF community. Health & Wellness service providers on all campuses, ranging from doctors and nurses to counselors and coaches, were compelled to respond to increasing demand for their services using new technologies and techniques.

In this presentation, Health & Wellness representatives will brief the Board of Trustees on how the teams responded to these challenges, the lessons they've learned, and how they might adopt and sustain some of the best practices in the post-COVID-19 environment.

Financial Impact: NA

Strategic Goal(s) Item Supports:
BOT Committee Review Date: 2/23/2021
Supporting Documentation Online (*please circle*): Yes No
Prepared by: Paul Dosal, Vice President for Student Success

UNIVERSITY of SOUTH FLORIDA

Health & Wellness

Dr. Patti Helton, Associate Vice President for USF Health & Wellness

1. Campus Recreation
2. Counseling Services
3. Student Health Services
4. Student Outreach and Support
5. Student Well-Being/Health Promotion
6. Victim Advocacy & Violence Prevention
7. Wellness Success Coaching

UNIVERSITY of SOUTH FLORIDA

Student Health Services

- Covid-19 Response:
  - ONE USF Response
    - Services 7 days a week
    - Covid Positive students/Case management
    - Random Testing
    - Residential Housing Move In/Random Testing
    - Covid Vaccine
  - Challenges
    - Testing

UNIVERSITY of SOUTH FLORIDA

Student Health Services

- Challenges:
  - Preventative Health Care
  - Call Center

- Successes:
  - Psychiatric Services
  - Medical Response Unit
  - New Building

UNIVERSITY of SOUTH FLORIDA

Student Counseling Services

- Challenges faced
- Best Practices Adopted
- Lessons Learned