MEMORANDUM OF AGREEMENT
BETWEEN
THE STATE OF CONNECTICUT DEPARTMENT OF HOUSING
AND
THE UNIVERSITY OF CONNECTICUT

RE: The Development of the Connecticut Connections Coastal Resilience Plan

I. Purpose

This Memorandum of Agreement (hereinafter "**Agreement**") is made and concluded in Hartford, Connecticut by and between the University of Connecticut, acting through the Connecticut Institute for Resilience and Climate Adaptation (hereinafter "**UCONN**"), acting herein by Laura Kozma, and the State of Connecticut, Department of Housing (hereinafter, the "**DOH**"), acting herein by its Commissioner, Evonne M. Klein. The purpose of Agreement is to document the understanding between the two parties regarding the administration of a grant made to the DOH by the United States Department of Housing and Urban Development ("**HUD**") through its Community Development Block Grant Disaster Recovery ("**CDBG-NDR**") program pursuant to The Disaster Relief Appropriations Act, 2013 (P.L. 113-2) as amended, and administered by the DOH.

UCONN has submitted a proposal to the DOH for a grant to implement and carry out an eligible activity under the CDBG-NDR referred to as "The Development of the Connecticut Connections Coastal Resilience Plan" (hereinafter, the "**Project**"). With this planning grant award, UCONN will develop a resilience planning framework, conduct resilience planning, develop implementation plans, assess flood risk, evaluate adaptation options, undertake capacity-building, and engage stakeholders in New Haven and Fairfield counties of the State of Connecticut to address vulnerabilities to future climate change and sea level rise.

II. Term of Agreement

This Agreement will begin on June 1, 2018 and will terminate on May 31, 2022.

The Project will be carried out in accordance with all applicable state and federal law including, but not limited to, the requirements of the Community Development Block Grant Program, Federal Register Notice 81 FR 36557-01 dated June 7, 2016, and Federal Register Notice 82 FR 36812-02 dated August 7, 2017.

III. Cancellation

Either party may cancel this Agreement without cause by providing written notice of such intention to the other party with thirty (30) days advance notice.

IV. Statutory Authority

The statutory authority for agencies to enter into this Agreement is as follows:

A. For the DOH, Connecticut General Statutes §§ 4-8 and 8-206 and

B. For UCONN, Connecticut General Statutes §§ 10a-104 and 10a-108.

V. Maximum Payments and Payment Schedule

A. Maximum Payment: The total aggregate payment made under this Agreement shall not exceed Eight Million Two Hundred Three Thousand Three Hundred Twenty Three and 00/100 Dollars ($8,203,323.00).

B. Payment Schedule:

The Project is subject to a maximum reimbursement of expenses up to a total of $8,203,323.00. UCONN will be responsible for any and all expenses which exceed the Maximum Payment. Payments under this Agreement shall be made by the DOH based on actual expenses incurred according to quarterly billings submitted to the DOH by UCONN. The DOH reserves the right to reduce payments and withhold funding for any Program or site in a consolidated contract for which UCONN:

i. has not submitted required quarterly reports or audits, or has submitted reports that have not received the DOH's approval, or

ii. has submitted reports that do not support the need for full payment.

The DOH shall provide written notice to UCONN if payment is reduced or withheld under this Section.

VI. Funding Availability

The DOH assumes no liability for payment under the terms of this Agreement until and unless any federal/state funds for this Agreement are authorized and available.

VII. Budget

This Agreement is subject to the budget approved by the DOH in Paragraph XV of this Agreement (hereinafter, the "**Budget**"). Expenditures made under this Agreement must be in accordance with this Budget. Any increase in a budget line item in excess of 20% must be approved in writing by the DOH.

VIII. Services to Be Performed By UCONN

UCONN hereby agrees to:

A. Maintain full, accurate, and current minutes and records of the Project in a form satisfactory to the DOH. UCONN will furnish, at such times as DOH shall determine and request, and upon the expiration or sooner termination of this Agreement, copies of any and all documents, data, and information relating to the Project;

B. Maintain records and backup materials regarding all expenses incurred related to the Project;

C. Submit quarterly invoices to the DOH based on actual expenses incurred by the end of each quarter (March 31, June 30, September 30, and December 31). Provide backup materials as requested;

D. Submit the Project Timeline, a copy of which will be attached hereto as Exhibit C;

E. Submit to DOH, progress and status reports, including the number of meetings held and the number of people attending each meeting, relating to the Project within fourteen (14) days following the end of each quarter (March 31, June 30, September 30, and December 31);

F. Participate in regular conference calls with DOH staff in order to share progress, consult in unforeseen challenges, and coordinate the Project;

G. Expend funds by May 31, 2022. Submit all invoices to the DOH prior to July 15, 2022. A formal request for an extension must be made in writing to DOH no later than two (2) months in advance of the May 31, 2022 deadline. In requesting an extension, UCONN is advised that at the time this Agreement was executed all CDBG-NDR funds must be expended by September 30, 2022 according to P.L. 113-2.; and

H. Perform the Project scope of work (hereinafter, the "**Scope of Work**"), as set forth on Exhibit A attached hereto and made a part hereof.

IX. Proposal

All references to the proposal in this Agreement, including in the Project's Scope of Work, shall be deemed to refer to that certain proposal entitled "The Development of the Connecticut Connections Coastal Resilience Plan" submitted by UCONN to the DOH dated June 6, 2017 (hereinafter, the "**Proposal**"), a copy of which is attached hereto as Exhibit B and made a part hereof. To the extent there is conflict between the terms of the Proposal and this Agreement, this Agreement shall govern.

X. Subcontractors

A. The DOH approves the Connecticut Department of Energy and Environmental Protection ("**CT DEEP**") and Associate Professor Alexander Felson of the Yale University Urban Ecology and Design Lab ("**Yale UED Lab**") as subcontractors of UCONN in performance of noted project tasks in Exhibit B.

B. Written approval must be obtained from the DOH prior to entering into any additional subcontracts under this Agreement.

C. Each such subcontractor's identity, services to be rendered and costs shall be detailed in the Approved Budget. No subcontractor may be used or expense under this Agreement incurred prior to identification of the subcontractor or inclusion of a detailed budget statement as to subcontractor expense, unless expressly provided in this Agreement.

D. No subcontractor shall acquire any direct right of payment from the DOH by virtue of the provisions of this Section or any other Section of this Agreement. The use of subcontractors as defined in this Section, shall not relieve UCONN of any responsibility or liability under this Agreement.

E. UCONN shall make available copies of all subcontracts to the DOH upon request. All subcontracts issued using funds from this Agreement shall include provisions requiring such subcontractors to comply fully with all applicable terms and conditions of this Agreement.

F. UCONN shall be responsible for monitoring the fiscal and programmatic activities of any subcontractor.

G. Reports of subcontractor activities and expenditures must be submitted in the format and at the times required by the DOH.

XI. Revisions and Amendments

A. A formal amendment, in writing, shall not be effective until executed by both parties to this Agreement.

B. No amendments may be made to a lapsed Agreement.

XII. Delinquent Reports

A. UCONN shall submit quarterly reports as required by the DOH by the designated due dates identified in Section VIII. E. of this Agreement.

B. After notice to UCONN and an opportunity for a meeting with a DOH representative, the DOH reserves the right to withhold payments for services performed under this Agreement if the DOH has not received acceptable quarterly progress reports, expenditure reports, refunds, and/or audits as required by this Agreement or previous agreements for similar or equivalent services UCONN has entered into with the DOH.

XIII. Intellectual Property, Data and Other Work Products

A. **Data.** For the purposes of this Agreement, "**Data**" shall mean all results, technical information, products and materials developed and/or obtained in the performance of the services hereunder, including but not limited to all reports, surveys, evaluation tools, plans, charts, recordings (video and/or sound), pictures, curricula, public awareness or prevention campaign materials, promotional materials, drawings, analyses, graphic representations, computer programs and printouts, notes and memoranda, pilot tests, teaching modules, PowerPoint, digital and electronic materials, and documents, which result from or are prepared in connection with the services performed hereunder.

B. Ownership and other rights in and to pre-existing intellectual property of the parties shall not be affected by this Agreement or its performance, except that UCONN shall have a limited right to utilize the DOH's pre-existing intellectual property as may be reasonably necessary and mutually agreed or as may be authorized by the DOH, for performing work sponsored under this Agreement.

C. **License.** As to the use of the data or information obtained under this Agreement, or materials or products authored or jointly developed under this Agreement, the parties hereby grant a non-exclusive, non-transferable, royalty-free license to each other, for the purposes of research and education.

D. **Acknowledgment.**

i) Unless expressly waived in writing by the DOH, all documents, reports, and other publications for public distribution during or resulting from the performance of this Agreement shall include a statement acknowledging the financial support of the DOH, and, where applicable, the federal government, using the text in the next Subsection.

ii) Publication or release of any of the data, information, materials or products resulting from performance of this Agreement shall each and all contain the following acknowledgment: "This publication does not express the views of the Department of Housing or the State of Connecticut. The views and opinions expressed are those of the authors. Funding for this project was provided by the United States Department of Housing and Urban Development through the Community Development Block Grant National Disaster Recovery Program, as administered by the State of Connecticut, Department of Housing."

iii) All such publications shall be released in conformance with applicable federal and state law and all regulations regarding confidentiality. The DOH shall include in applicable Amendment(s) hereto any specific confidentiality criteria or restrictions that apply to program-specific services described in such Amendment.

iv) Any liability arising from such a release by UCONN shall be the sole responsibility of UCONN, unless:

a. the DOH or its agents jointly authored said publication, or said release is done with the prior written approval of the Commissioner of the DOH.

XIV. Service-Specific Funding Provisions

For projects and services which are the subject of any Amendment under this Agreement, UCONN shall comply with any provisions or policy of the specific funding source, including but not limited to the sharing and dissemination of data and the protection of confidentiality of persons sharing personal information who may participate in the funded project. The DOH shall notify UCONN in writing of any such provisions or policy as they affect specific

services UCONN provides under Amendment to this Agreement.

XV. Approved Budget

University of Connecticut
Sponsored Program Services

Project Title: The Development of the Connecticut Connections Coastal Resilience Plan		
Category	**Amount**	
Personnel Salary & Fringe		3,822,439
Equipment		15,000
Travel		67,220
Materials & Supplies		91,156
Publication Costs		8,000
Subcontracts: Yale UED Lab		350,000
Subcontracts: CT DEEP		250,000
Subcontracts: Contractors		1,000,000
Other: SSF: RV Weiker Ship Use		20,000
Other: SSF: Buoy Support Shop		35,352
Indirect Costs (F&A)		2,544,156
Total Costs	**$**	**8,203,323**

ACCEPTANCES AND APPROVALS:

For the University of Connecticut:

Laura Kozma, Executive Director — Date: 5/8/18

For the Department of Housing:

Evonne M. Klein, Commissioner — Date: 5/11/18

EXHIBIT A

UCONN SCOPE OF WORK

Task 1: UCONN shall conduct program delivery.

Task 1.1: UCONN shall provide quarterly written reports to the DOH within fourteen (14) days following the end of each quarter (March 31, June 30, September 30, and December 31) and provide at least quarterly updates to the State Agencies Fostering Resilience Council (hereinafter, the "**SAFR Council**") at their meetings.

Task 1.2: UCONN shall procure and manage subcontractors as indicated in the Proposal.

Task 1.3: UCONN shall form a State Agency Workgroup and conduct not less than four (4) quarterly meetings per year and not less than eight (8) monthly calls per year with the State Agency Workgroup.

Task 2: UCONN shall develop a Resilience Planning Framework (Proposal Section 3.1 Phase 1).

Task 2.1: UCONN shall form and coordinate a State Agency Workgroup and Citizen Advisory Committee structure and communication strategies (Proposal Section 3.1.1.) by August 2018.

Task 2.2: UCONN shall review existing local, state, and relevant national and international resilience and adaptation planning efforts and conduct a session on their findings at a workshop by November 2018, prepare a written report on case studies from their findings by January 2019 and prepare a report on the workshop findings by January 2019 (Proposal Section 3.1.2.).

Task 2.3: UCONN shall develop a Draft Resilience Framework by May 2019 and prepare a Final Resilience Framework by September 2019 (Proposal Section 3.1.3.).

Task 2.4: UCONN shall review the Resilience Framework in a session at the first annual summit by May 2019 (Proposal Section 3.1.4.).

Task 3: UCONN shall conduct resilience planning in New Haven and Fairfield counties (Proposal Section 3.2 Phase 2).

Task 3.1: UCONN shall prepare regional resilience plans for New Haven and Fairfield counties, incorporating the Resilience Framework by May 2021 (Proposal Section 3.2.1.).

Task 3.2: UCONN shall prepare municipal resilience plans incorporating the Resilience Framework by May 2021 (Proposal Section 3.2.2.).

Task 3.3: UCONN shall conduct regional engagement and coordination through two (2) regional workshops with the Citizens Advisory Committee workgroups and other invited participants by November 2019 and November 2020 and four (4) annual summits held by May 2019, May 2020, May 2021 and March 2022. UCONN shall deliver the first synthesis report on the Resilience Framework, including lessons learned for the first two years of the Project to inform the SAFR Council Resilience Roadmap with a Draft First Synthesis Report available for comment by DOH by May 2020 and a Final First Synthesis report by September 2020. (Proposal Section 3.2.3.).

Task 4: UCONN shall synthesize, prioritize and develop implementation plans (Proposal Section 3.3 Phase 3).

Task 4.1: UCONN shall select areas for site plans and review the selected areas in a session at the third annual summit by May 2021 (Proposal Section 3.3.1.).

Task 4.2: UCONN shall conduct a review and consultation on the site plans at the fourth annual summit by March 2022 (Proposal Section 3.3.2.).

Task 4.3: UCONN shall prepare a Second Synthesis Report that compiles and integrates the Resilience Framework from Task 2, the regional and municipal plans from Task 3, the site plans in Task 4, and the findings of the Supporting Activities in Task 5. The Second Synthesis Report shall include an evaluation of the planning and regional study process, including lessons learned for the State to inform the statewide Resilience Roadmap. The Draft Second Synthesis Report shall be delivered to the DOH for comment by November 2021 and the Final Second Synthesis Report shall be completed by March 2022. The Draft Second Synthesis Report shall be presented to invited stakeholders at a workshop conducted by November 2021 and the Final Second Synthesis Report will be presented at the fourth annual summit conducted by March 2022. (Proposal Section 3.3.3.)

Task 4.4: UCONN shall obtain input from stakeholders on proposed recommendations for the statewide Resilience Roadmap at a session at a workshop conducted by November 2021. UCONN shall provide a Draft Resilience Roadmap recommendations report to the DOH for comment by March 2022 and prepare a Final Resilience Roadmap recommendations report by May 2022. (Proposal Section 3.3.4.)

Task 4.5: UCONN shall conduct a session with potential funders for the site plans in Task 4 at the fourth annual summit conducted by March 2022. (Proposal Section 3.3.5.)

Task 5: UCONN shall conduct supporting activities (Proposal Section 4).

Task 5.1: UCONN shall conduct a flood risk assessment and provide information on their findings through an online data portal launched by May 2019; presentations at the annual summits conducted by May 2019, May 2020, May 2021 and March 2022 respectively; and by delivering a draft report by November 2021 to DOH for comment and a final report by March 2022 on collated existing data and risk information, the coordination with related programs, data sharing and mapping capability, mapping product evaluation, model domain development, high resolution model development, model evaluation, risk map preparation and the 2050 risk maps. (Proposal Section 4.1).

Task 5.2: UCONN shall conduct adaptation option evaluation (Proposal Section 4.2.).

Task 5.2.1: UCONN shall engage with its design team through participation in the annual summits conducted by May 2019, May 2020, May 2021 and March 2022 respectively, the stakeholder workshops conducted by November 2018 and November 2021, and the regional workshops conducted by November 2019 and November 2020 and through other meetings as needed (Proposal Section 4.2.1.).

Task 5.2.2: UCONN shall conduct a risk reduction assessment and deliver a Draft report to DOH for comment by November 2021 and Final report by March 2022 (Proposal Section 4.2.2.).

Task 5.2.3: UCONN shall disseminate the results of the adaptation option evaluation through the delivery of a final report, online portal and provide references to any resulting publications to the DOH by May 2022.

Task 5.3: UCONN shall conduct capacity-building activities (Proposal Section 4.3.).

Task 5.3.1: UCONN shall work with the State Agency Workshop to set priorities from the

capacity-building activities at a workshop conducted by November 2018 with a report on those priorities by May 2019 and presentation of that report of priorities at the first annual summit conducted by May 2019 (Proposal Section 4.3.1.).

Task 5.3.2: UCONN shall conduct research projects using the priorities identified in Task 5.3.1. UCONN shall present on the progress of the research projects at the second and third annual summits conducted by May 2020 and May 2021. A final report shall be delivered to the DOH by May 2021. (Proposal Section 4.3.2.)

Task 6: UCONN shall conduct engagement activities (Proposal Section 5).

Task 6.1: UCONN shall conduct a climate science consensus for Connecticut and translate it for stakeholders. UCONN shall deliver a report to the DOH on their findings by November 2019.

Task 6.2: UCONN shall create a resilience toolkit and public engagement program. UConn shall launch a website for these products by August 2018; form a resilience toolkit workgroup to advise them by November 2018; regularly update the website with best practices and case studies at least biannually; present on the website updates, toolkit and engagement program at the annual summits conducted by May 2019, May 2020, May 2021 and March 2022 respectively and complete the website by May 2022; provide trainings at the four annual summits conducted by May 2019, May 2020, May 2021 and March 2022 respectively, two regional workshops conducted by November 2019 and November 2020, and through webinars conducted four to twelve times per year; provide trainings targeted at planning and zoning and wetlands commissions at least two times per year and these trainings may include presentations at relevant state conferences. (Proposal Section 5.2.)

Task 6.3: UCONN shall conduct and publish on its website at least one white paper or case study per year for the term of this Agreement on climate resilience and adaptation with a presentation at the annual summit conducted by May 2019, May 2020, May 2021 and March 2022. (Proposal Section 5.3.).

Task 6.4: UCONN shall conduct innovative design training with multi-stakeholder listening sessions by May 2019; a presentation at the annual summit conducted by May 2019; a design workshop by May 2020; and a state agency, academic and municipal workshop with site specific strategies by May 2021 (Proposal Section 5.4.).

Task 6.5: UCONN shall conduct training on engineering for coastal resilience with engineering consultants listening sessions by May 2019; presentations at the first and second annual summits conducted by May 2019 and May 2020; an education workshop conducted by May 2020; delivering a report on science translation for engineering practices by May 2021; and a training session on lessons learned from the resilience planning in Task 3 and Task 4 by May 2022. (Proposal Section 5.5)

EXHIBIT B
UCONN PROPOSAL

The remainder of this page intentionally left blank

UCONN
UNIVERSITY OF CONNECTICUT

PROPOSAL COVER PAGE

PRINCIPAL INVESTIGATOR	Dr. James O'Donnell
SPONSOR	Connecticut Department of Housing
ORIGINATING SPONSOR ***(if applicable)***	Federal Department of Housing and Urban Development
PROJECT TITLE	The Development of the Connecticut Connections Coastal Resilience Plan
PROPOSED PROJECT PERIOD	6/1/2017 - 5/31/2021
TOTAL AMOUNT REQUESTED	$8,203,323
DIRECT COSTS	$5,659,167
F&A COSTS	$2,544,156

The appropriate programmatic and administrative personnel involved in this application are aware of the sponsoring agency policies and are prepared to establish the necessary agreements consistent with those policies. The University of Connecticut makes all applicable assurances/certifications and has implemented an active and enforced conflict of interest policy compliant with Federal requirements.

Please direct questions to the Office of the Vice President for Research, Sponsored Program Services at 860-486-3622 or preaward@uconn.edu

Thank you for your consideration. The University of Connecticut looks forward to working with you.

Authorized Representative Signature:

Name: Laura Kozma
Title: Director of Research Administration and Faculty Services

1/26/18
Date

Office of the Vice President for Research
Sponsored Programs
438 WHITNEY ROAD EXTENSION, UNIT 1133
STORRS, CT 06269-1133
PHONE 860.486.3622
FAX 860.486.3726
www.osp.uconn.edu

The Development of the Connecticut Connections Coastal Resilience Plan

James O'Donnell[1], Rebecca French[1], Alex Felson[2] and Brian Thompson[3]

[1]Connecticut Institute for Resilience and Climate Adaptation
University of Connecticut
1080 Shennecossett Road
Groton, CT 06340

[2]Urban Ecology and Design Lab
Yale School of Architecture
180 York Street
New Haven, CT 06511

[3]Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106

June 6th, 2017

1. Introduction

1.1. *History*

In response to the adoption of Special Act 13-9, "An Act Concerning Climate Change Adaptation and Data Collection," the University of Connecticut (UConn) and the Connecticut Department of Energy and Environmental Protection (CT DEEP) formed the Connecticut Institute for Resilience and Climate Adaptation (CIRCA). Governor Malloy formally announced the formation of the Institute at a ceremony at the Avery Point Campus of the University of Connecticut in January 2014.

The mission of CIRCA is to increase the resilience and sustainability of vulnerable communities along Connecticut's coast and inland waterways to the growing impacts of climate change on the natural, built, and human environment. Several projects and grant programs are currently underway that advance this mission. With funding from the CT DEEP and the support of the participants in the State Agencies Fostering Resilience (SAFR) working group, CIRCA, with the Yale Urban Ecology Design (UED) Laboratory leading the CIRCA design team, prepared the initial phase of Connecticut's application to the National Disaster Resilience Competition (NDRC), a competitive grant program of the U.S. Department of Housing and Urban Development (HUD).

The Phase 1 NDRC proposal included a regional vulnerability assessment, using existing information of past storm damage, flood risk, social vulnerability, critical infrastructure, and future climate change and sea level rise. The approach adopted by SAFR to address those vulnerabilities was "to establish resilient coastal communities where structures and critical infrastructure in the flood zone are adapted to withstand occasional flooding and protected by healthy buffering ecosystems, where critical services, infrastructure and transport hubs are located on safer, higher ground, and where strong connections exist between the two." The resilience concept exploited transit oriented development investments by the State to simultaneously reconnect and protect economically isolated coastal neighborhoods to existing transportation nodes.

The Phase 1 proposal was developed with extensive engagement with citizens, towns and state agencies, and was well received by HUD. Connecticut was invited to submit a Phase 2 proposal. After further consultation and review of potential options, the proposal submitted had two central themes, pilot projects in Bridgeport and New Haven, and the development of the Connecticut Connections Coastal Resilience Plan (C3RP). The Pilot Projects will demonstrate the Phase 1 proposal's resilience concept, and the C3RP will extend the process that led to these plans to develop the Statewide Resilience Roadmap based on best climate impact research called for by Governor Dannel P. Malloy in Executive Order 50. This plan will inform the work of the State Agencies Fostering Resilience Council, chaired by the Secretary of the Office of Policy and Management (OPM), which is charged with the development of the Statewide Resilience Roadmap.

In January 2016 HUD announced that Connecticut would be awarded $54,277,359. Of this, $8,203,323 was allocated to the University of Connecticut for advancement of the

Connecticut Connections Coastal Resilience Plan; $42,574,036 was assigned to the pilot projects in Bridgeport, and $3,500,000 was awarded for administrative costs.

In their announcement of the award, HUD highlighted the priority to "extend the existing planning effort to more communities in New Haven and Fairfield Counties with the goal of providing accessible downscaled inland and coastal flooding information at the watershed scale for inland and coastal municipalities." When referring to the C3RP specifically, HUD said the award would "support the State's efforts to bring these approaches to other at-risk communities along the I-95 corridor by contributing to planning efforts, including economic and climate modeling."

1.2 *Project Overview*

CIRCA, with the support of the Urban Ecology and Design Laboratory (UEDLAB) of Yale University and Connecticut Department of Energy and Environmental Protection (CT DEEP) proposes to develop the C3RP with extensive input from the public and coordination with representatives of State agencies. The planning process will also feature partnerships across state agencies, regional COGs and municipalities; extensive stakeholder and community engagement; science-based, forward-looking regional risk assessments; resilient transit-oriented development; and community capacity-building initiatives.

In order to meet the needs of the Statewide Resilience Roadmap, the C3RP development process should also meet the following goals:

- Establish a framework for creating the Statewide Resilience Roadmap that includes regional resilience and adaptation planning, policy consideration, and actionable priorities
- Make recommendations on how to incorporate resilience to climate change into the State Plan of Conservation and Development, State Natural Hazard Mitigation Plan, the Comprehensive Energy Strategy, and local plans of Conservation and Development and Natural Hazard Mitigation
- Serve as a framework for coordinating resilience and adaptation planning, policy, and actions with the US DHS Security National Incident Management System ("NIMS")
- Provide capacity building for resilience planning and projects in Connecticut
- Provide engagement activities on the impacts of climate change and innovative adaptation solutions for the public and stakeholders in resilience across local and state government, non-profits and the private sector

An overview of the C3RP approach and goals is outlined in Section 2. The critical elements of the C3RP development are explained in Section 3 and the supporting activities are described in Section 4. Section 5 includes the engagement activities planned throughout the project period. The program management and schedule are summarized in Section 6 and the program budget is summarized in Section 7.

2. Connecticut Connections Coastal Resilience Plan Overview

We propose to extend the planning activities initiated in the development of Connecticut's NDRC proposal to communities within New Haven and Fairfield counties as highlighted by HUD in their award announcement. The development of the Connecticut Connections Coastal Resilience Plan (C3RP) will have three main ***Phases***:

1. Develop Resilience Planning Framework,
2. Conduct Resilience Planning in New Haven and Fairfield counties, and
3. Synthesize, prioritize and develop implementation plans.

The information gathering and planning activities in (2) will be guided by the Framework developed in (1). We anticipate the Framework will involve work at neighborhood, town and regional scales and that it will consider the vulnerability of all infrastructure systems with the goal of the development of multi-scale strategies for resilience in (3).

These planning project elements will be facilitated and augmented by a set of ***Supporting Activities*** and a comprehensive ***Engagement*** program.

Supporting Activities

A. *Flood risk assessment*: applied research efforts to develop flooding vulnerability assessments that are informed by climate change science
B. *Adaptation option evaluation*: The use of simulation for the evaluation of the effectiveness of adaptation strategies in the plans identified as high priority;
C. *Capacity-building activities:* Applied research projects led by UConn faculty in the areas of economic risk modeling, legal analysis and characterization of vulnerable populations.

Engagement

In addition to engagement activities targeted at establishing local resilience needs and priorities, broader engagement activities will be conducted throughout the project period. The audience will include a wide range of stakeholders including: staff of state agencies, regional councils of government, and municipalities; elected officials; planning and zoning and wetlands commissions; and engineers and environmental consultants.

3. Project Plan

3.1 ***Phase 1:*** *Develop Resilience Planning Framework*

The first step in the C3RP will bring together the stakeholders, assess the current planning efforts in the state and build a resilience framework for planning efforts going forward. Since this first objective will form the basis for the work plans for all of the other objectives,

the details for each objective going forward are intentionally general to allow for stakeholder buy-in from the state and other stakeholders from the beginning.

3.1.1. *Coordinate State Agency workgroup and Citizen Advisory Committee structure and communication strategies.*
CIRCA staff will establish the C3RP State Agency Workgroup in coordination with the SAFR Council to advise CIRCA on the C3RP. CIRCA will also establish a Citizens Advisory Committee. Members will be drawn from SAFR Advisory Committee Partners[1]. Addition, members will be appointed from such groups as: municipal and councils of government staff; design and engineering consultants; the business community; and citizen interest groups (e.g. non-profits). CIRCA will organize initial meetings with the State Agency workgroup and the Citizens Advisory Committee to review and refine the process of communication, education, and deliverables for the C3RP. Workgroups of the Citizens Advisory Committee will be formed to advise on individual projects, including regional, municipal and site plans.

3.1.2. *Review existing local, state, and relevant national and international resilience and adaptation planning efforts.*
CIRCA staff will research existing local and state resilience planning efforts with input from the State Agency Workgroup and the Citizens Advisory Committee and invited presentations from municipalities and consultants. DEEP staff will assist with research efforts, leveraging long-standing relationships with municipalities and on the ground knowledge of resilience efforts. CIRCA staff will include case studies from selected efforts from across the country and internationally, including the Rebuild by Design and National Disaster Resilience Competition efforts. The CIRCA Team will organize a program with invited presenters, partners, and selected participants to review materials, and case studies and broad contributions in targeted areas of expertise. This program will occur at the 6-month C3RP workshop and is intended as a culmination of CIRCA's research. CIRCA staff, with assistance from DEEP, will prepare a summary report from the program on identified resilience plan components from past experience in Connecticut and elsewhere.

3.1.3. *Draft Resilience Framework Development.*
At the first 6-month C3RP workshop, the CIRCA Team will lead a facilitated discussion on proposed elements of a Resilience Framework, incorporating the resilience concept of the Phase 1 NDRC application and the NDRC NOFA process along with lessons learned from the assessment of projects. Based on this discussion and subsequent feedback, the CIRCA Team will develop a draft Framework to inform future resilience planning.

3.1.4. *First annual summit: Review of Resilience Framework and Supporting Activities*
The CIRCA Team will review the draft Framework at quarterly meetings with the State Agency Workgroup and present the final Framework at the 12-month summit. The summit will also include breakout sessions to solicit input on the Supporting Activities and a

[1] SAFR Advisory Committee Partners are the organizations that signed Partner Agreements as part of the NDRC proposal.

discussion of capacity development needs. After the summit, workgroups will be formed for each regional study to provide advice on priorities and results.

3.2 ***Phase 2:*** *Conduct Resilience Planning in New Haven and Fairfield counties*

The CIRCA Team will utilize the results of the review and consultation process conducted in Phase 1 to create Requests for Proposals (RFPs) for contractors to update existing and develop new municipal and regional resilience plans.[2] These planning steps will lead to the selection of areas for site plans in Phase 3. An important goal of the NDRC application was extension of the planning process to the 13 remaining Sandy impacted coastal municipalities in Fairfield and New Haven counties, but many of these coastal towns have since undertaken additional planning efforts funded by CDBG-DR and other sources. Using appropriate guidance from the SAFR Council, the planning effort will include a combination of new plan generation and updates to these existing and concurrent planning efforts.

3.2.1. *Regional resilience planning incorporating the Resilience Framework.*
Using the Resilience Framework developed in Phase 1, and in consultation with the State Agency workgroup, the CIRCA Team will create RFP's soliciting contractors to create and update two regional resilience plans in New Haven and Fairfield counties. The regional resilience plans will use the Resilience Framework and incorporate the concept of resilient corridors, resilient TOD and forward-looking risk analysis, which includes the impacts of climate change. Contractors will also be directed to align the resilience plans with existing NHMPs and POCDs so that the regional resilience plans may be used to update those planning efforts. The regional plans will be informed by the forward-looking risk assessment activities described in Section 4.1. CIRCA Project Managers, DEEP staff and the Yale UED lab will participate in the contractors' engagement activities to ensure the plans include consideration of proposal's themes of resilient corridors, resilient TOD, and forward-looking risk analysis.

3.2.2. *Municipal resilience planning activities incorporating the Resilience Framework.*
Using the Resilience Framework developed in Phase 1, the CIRCA Team will establish targeted RFP's to solicit contractors to update and develop new municipal resilience plans using the Resilience Framework. The municipal plans will be informed by the forward-looking risk assessment activities described in Section 4.1. CIRCA Project Managers and the Yale UED Lab will participate in the contractors' engagement activities to ensure the programs include consideration of proposal's themes of resilient corridors, resilient TOD, and forward-looking risk analysis. Contractors will also be directed to align the resilience

[2]In this project the spatial scales of *regional resilience plans* will be defined by the patterns imposed by Connecticut's geology and the transportation network geography, which formed the basis of the NDRC application. These plans will cross municipal and COG borders, therefore, resilience and adaptation options may also cross these political boundaries. Recognizing, however, that governance and funding do operate within political boundaries, the CIRCA Team's planning efforts will closely coordinate with the on-going programs in New Haven and Fairfield counties and in State agencies.

plans with existing NHMPs and POCDs so that the resilience plans may be used to update those planning efforts.

3.2.3. *Regional engagement, coordination across plans and initial synthesis.*

The CIRCA Team will conduct 2 regional workshops in partnership with the workgroups under the Citizens Advisory Committee and 3 regional breakout sessions at the C3RP summits and provide coordination across the planning efforts through attendance at meetings and phone calls for all of the regional and municipal planning efforts. An initial synthesis report will be developed after 24 months to report on the lessons learned in the first two years of the planning process.

3.3 ***Phase 3:*** Synthesize, prioritize and develop implementation plans

The overall goal of the C3RP is to initiate the development of the Statewide Resilience Roadmap required by Executive Order 50. The synthesis report will review and integrate the Resilience Framework of Phase 1 and the regional, municipal and individual project plans of Phase 2. The report will provide recommendations for the Roadmap as well as the integration of these plans into the institutional planning activities of the State including, the Natural Hazard Mitigation Plan and the Plan of Conservation and Development. However, planning alone will not make Connecticut more resilient. Projects must move from planning to design and construction. In this final phase, areas will be selected for the development of site plans.[3] Based on the priorities of the regional plans (Section 3.2.1), site plans will include up to the 30% site design to incorporate cost estimates in order to advance the plans towards implementation. The criteria for choosing the areas for site plan development will be developed by the State Agency workgroup and may also be based on available funding opportunities within the local, state, or federal government or through the SAFR Advisory Committee Partners and the Citizen Advisory Committee. DEEP will assist with screening projects with particular emphasis on consistency with environmental permitting requirements and statutory policies.

3.3.1. *Site plan development.*

In consultation with the SAFR Council and stakeholder groups, and based on the priorities of the regional plans (Section 3.2.1), the CIRCA Team will select areas for site plan development at the 36-month summit based on criteria developed by the State Agency Workgroup and opportunities for funding. Contractors will prepare site plans (up to 30% site design) with cost estimates that incorporate the resilient corridors and resilient TOD concept. DEEP staff will work directly with contractors during the design process to ensure

[3] Site planning builds on a broad analysis of environmental, social, economic and logistical issues. The process includes a review and assessment of potential sites, incorporating land use patterns, historic influences and trends, and considers design opportunities. The analysis includes construction sequencing, scheduling, cost, and risk management. The site plan is commonly an early stage schematic design. In this proposal the site plan will advance to include initial cost estimates to inform funding option in section 3.3.5.

regulatory and statutory consistency. The design and assessment of the site plans will incorporate the findings of the Supporting Activities (4).

3.3.2. *Review and consultation on site plans.*
The CIRCA Team will incorporate feedback from the State Agency Workgroup during the monthly calls on the design of pilot projects with support from contractors and meetings with the Citizens Advisory Committee workgroups. DEEP staff will leverage extensive experience with review of site plans and permit applications for coastal and inland infrastructure projects, knowledge of local geography and resources, and municipal relationships to assist with plan development.

3.3.3. *Synthesis report.*
The CIRCA Team, with assistance from DEEP and in consultation with the State Agency workgroup will prepare a synthesis report that compiles and integrates the Resilience Framework in Phase 1, the plans in Phase 2, the findings of the Supporting Activities (4) and the site plans described in Section 3.3.1. The synthesis will include an evaluation of the planning and regional study process, including lessons learned for the State to inform the Statewide Resilience Roadmap. The report will be presented at the 42-month workshop.

3.3.4. *Resilience Roadmap Recommendations*
At the 42-month workshop the CIRCA Team will facilitate meetings with the State Agency Workgroup and Citizens Advisory Committee on the Synthesis Report. Based on the report and workshop meetings the CIRCA Team will prepare draft policy recommendations. As directed by Executive Order 50, the recommendations will include how to incorporate the Synthesis Report's findings into the state Plan of Conservation and Development and the Natural Hazard Mitigation Plan, and provide coordination with the DHS National Incident Management System.

During regular calls with the State Agency workgroup, the CIRCA Team will solicit and incorporate feedback on the draft Synthesis Report and finalize the report and the Resilience Roadmap recommendations. The recommendations will be presented at the final annual summit (month 46). Opportunities will be provided after the summit for additional feedback before the final report is completed.

3.3.5. *Funding site plan projects.*
CIRCA staff will convene a "Funders Summit" at the final annual summit (month 46) to review the site plans and facilitate the process to find funding from state agencies and partners to move projects from the site plans forward. Months 47 and 48 will allow for reporting from the Funder's Summit.

4. Support Activities

The project will incorporate three support activities: *flood risk assessment, adaptation option evaluation*, and *capacity-building*. The development of forward-looking risk assessment for the identification of residential areas and critical infrastructure that is vulnerable requires the high resolution hydrodynamic modeling of the extent of flooding to

be expected from precipitation, the coastal ocean, and rivers during extreme events. The models must resolve the many small-scale (tens of meters) structures that act to restrict flow if they are to be useful. For example, tide gates in salt marshes can, when operational, reduce flooding of coastal roads. Narrow highway and railway bridges can act as conduits for water from Long Island Sound and lead to flooding. Useful models must include these possibilities. They must also be locally verified, and able to account for the expected effects of climate change. This information is not currently available in Connecticut. In addition, the comparison of the various benefits and costs of options to reduce the vulnerability often requires the construction of berms, the raising of roads and the modification of culverts. The quantitative assessment of the reduction in vulnerability that alternative designs provide also requires simulation. To support planning we propose to develop tests and employ and advanced modeling capacity for these purposes. Observations will be conducted to validate and assess the performance of the predictions.

Planning also requires the development of a capability to quantitatively estimate the benefits accrued from flood risk reduction activities, to assess legal and political framework for decision-making, and to identify and map characteristics of vulnerable populations. These capacities will be developed through projects led by UConn faculty in the areas of economic risk modeling, and legal and geospatial analysis.

4.1 *Flood Risk Assessment*

The development of the risk assessment support will exploit as much existing and on-going work in Connecticut as possible. CIRCA and HUD have been funding the development and evaluation of modeling tools to describe the risk of flooding in Connecticut and these will be applied in this project. These include models of the weather, sea level and river flow. However, high-resolution digital elevation maps are required as inputs to these models, information about the location, size and operational effectiveness of tide gates, culverts and dams, dikes, levees, bridges and other flow obstructions must be assembled in areas where the models are to be implemented. The results also have to be tested to ensure all the essential details are included and so new data must be acquired in some areas. Once the extent of flooding can be predicted, the vulnerability of housing, roads and other critical infrastructure can be assessed if the location and elevation relative to a recognized datum is known.

This information will be assembled for New Haven and Fairfield counties. In the following sections we outline the critical elements of our approach.

4.1.1 *Collate Existing Data and Risk Information*

Towns, regions and Agencies are already using elevation databases, risk maps (e.g. FEMA Flood Insurance Rate Maps), critical infrastructure location and elevation databases. We will assemble, collate and compare digital elevation models, existing flood risk maps and critical infrastructure inventories for the study areas. We will make this information available to others through an on-line data portal.

4.1.2 *Coordinate with Related Programs*

There are several recent and on-going studies of flooding vulnerability in Connecticut. The US Army Corp of Engineers (USACE) also recently completed the North Atlantic Regional Study to generate storm surge and wave statistics in the North Atlantic and is beginning a new study in the western area of the State in 2016. The Bridgeport *Rebuild by Design* engineering team is currently developing an assessment of adaptation options in their project area. NOAA is currently sponsoring the development of a prototype real-time storm surge forecasting system in the northeastern states and UConn is leading the Long Island Sound element. This expands on a recently completed program to estimate extreme wave conditions in Long Island Sound using simulations and observations. UConn is now testing the simulation system for the combined effects of waves, river flooding, and storm surge flooding in Milford, Connecticut, and has completed a related program in the Branford-Guilford area.

To ensure that the results of these programs can be compared in a consistent manner to planners and stakeholders, we will review these studies and coordinate meetings with the developers to ensure that the best science practices are employed. The results of our review will be documented in a report. We will also continue to collaborate with federal agencies (NOAA, USACE, HUD) working on resilience issues, and related projects in the regions.

4.1.3 *Data Sharing and Mapping Capability*

To ensure that the results of the project have sustained and broad impact, we will develop and maintain a website that distributes technical information about the program and results. In concert, we will also develop a system to view and distribute maps that will provide planners and other stakeholders access to our results. These products will be developed to meet modern Geographic Information System standards so that they can be shared with towns and COGs for future use. We have been in contact with the NOAA Office for Coastal Management and are exploring the implementation of their Digital Coast viewer.

4.1.4 *Mapping Product Evaluation*

At the beginning of the project we will use the results of the study conducted at Milford to develop, demonstrate and evaluate the effectiveness of the tools using focus groups. This evaluation of tools will occur in parallel with consultation on the identification of areas known to be at high-risk of flooding and other locations of concern to municipalities.

4.1.5 *Model Domain Development*

The modeling system employed in the project has been developed at UConn through programs funded by NOAA, CIRCA and HUD. The system is based on the FVCOM (Chen et al., 2007) and predicts sea level variations due to tides and storms throughout Long Island

Sound. It has been coupled with a model of the flow of rivers in Connecticut developed at UConn by Anagnostou and Shen (2017) and so predicts areas likely to be flooded by the combined effects of surge and river flow. The model achieves a horizontal resolution of 10m by nesting high resolution calculations in areas close to shore, where flooding is likely, within a course resolution model of the entire Long Island Sound. This fine and medium resolution calculations are also embedded in a model of the entire northwest Atlantic. This capability has been demonstrated in a recent study of flooding in Milford, CT.

Even with this sophisticated multi-scale simulation system, the effects of tide gates and small bridges are not adequately resolved. Since these are important in some areas of the Fairfield and New Haven Counties, we have developed an approach that represents the effects of such structures using a linked-box model approach and demonstrated it at Jarvis Creek, Branford, CT, to understand the frequency of flooding at RT 146. In this project we must replicate what we have done in Milford across both counties and then integrate the linked box approach where necessary to resolve the effects of small scale flow control structures.

The first step will be the definition of the boundaries of the high-resolution subdomains. Figure 1 shows in the complexity of the boundaries of the towns (white lines) in Fairfield and New Haven Counties (bounded by red lines) that are the subject of study. The blue lines show the boundaries of the three major hydrologic basins that intersect the coast of Connecticut. In Figure 1(b) the same area is shown but with the location of the many secondary rivers that flow into Long Island Sound. Defining the boundaries of the high resolution subdomains will require extensive discussion with the municipalities to identify areas of major concern, and then detailed examination of the regions' hydrology, hydrography and bathymetry. We anticipate that as many as five separate subdomains will be required to resolve the flood risk patterns.

4.1.5 *High Resolution Model Development*

Once the models domains have been identified, simulations and evaluations (described in the next section) will be undertaken in each area. It is likely that detailed topography will be required, and processing of LIDAR surveys, and field surveys of tide gates and culverts will be conducted in areas with marshes and complex coastlines. We have the capacity to do two or three areas at a time and the schedules will be aligned with the planning activities. We have already created an archive of meteorological forcing fields (simulations of major storms) with which to drive the sea level variability and the river flow simulations. The predicted sea levels will be used to create return interval statistics for sea level and flooding extent.

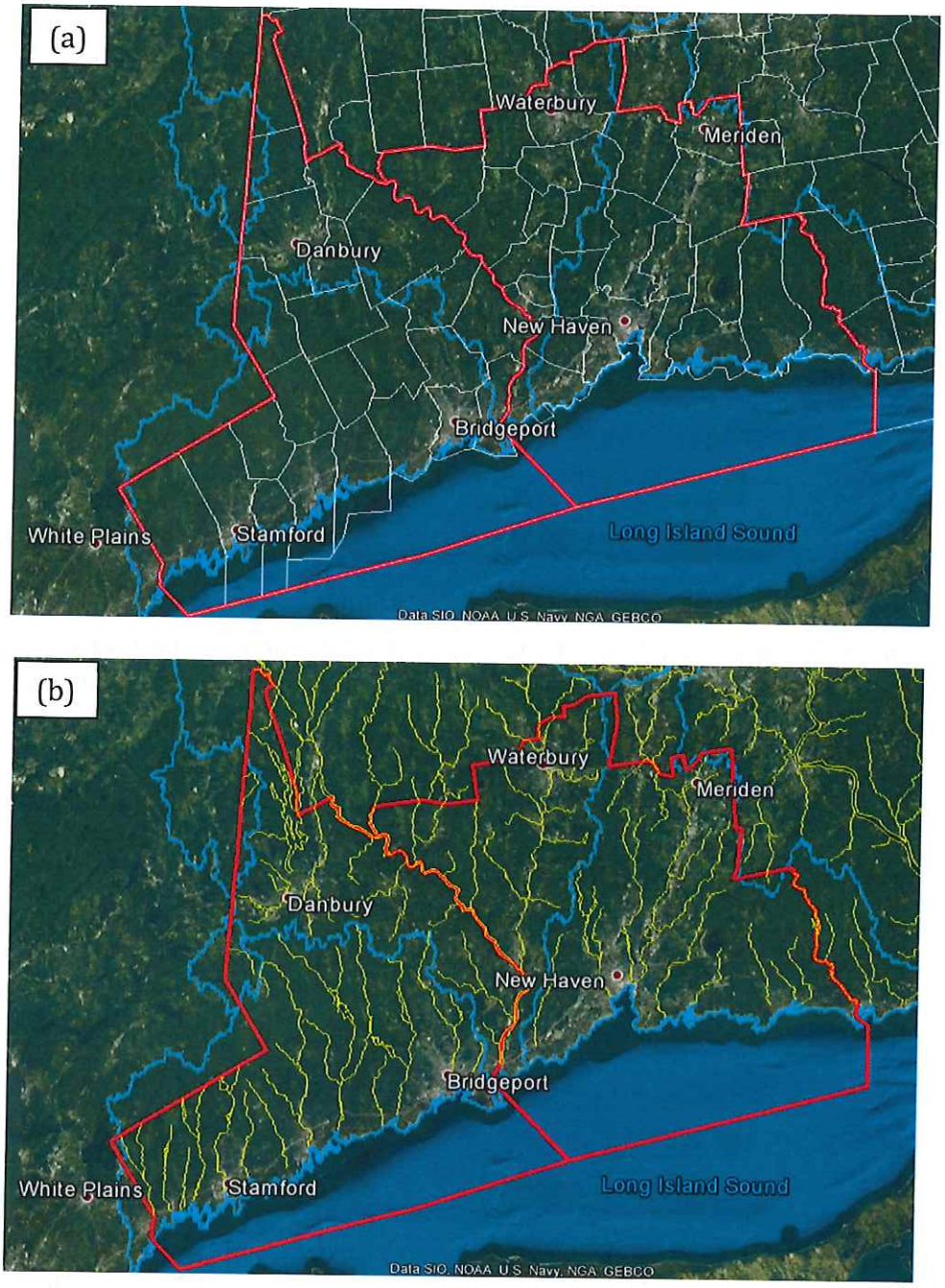


Figure 1. Maps of Connecticut with the boundaries of Fairfield and New Haven Counties identified by the red lines. In (a) the boundaries of the municipalities are shown by the white lines and the major hydrologic basins are shown by the white lines. In (b) Connecticut's many secondary rivers are shown by the yellow lines.

4.1.6 *Model Evaluation*

The model evaluation process will require the deployment of water level sensors and current meters in some areas of each high-resolution domain. Between three and five locations will be necessary depending upon the local geometry. We have extensive experience with this type of work and an existing inventory of equipment. However, some

additional water level sensors will be purchased to allow the collection of data in multiple areas simultaneously. Fall, winter and early spring are the best times for the fieldwork since that is when storms are more frequent and intense. The sea level fluctuations are, therefore, the largest and all these intervals will allow the model results to be assessed in the most appropriate conditions.

4.1.7 *Risk Map Preparation*

After the high-resolution models have been demonstrated to provide accurate simulations during the evaluation periods, the models will be used to predict the sea level and flooding extent that would have occurred in the 20 storms with the highest winds speeds on record at Bridgeport, CT. The wind allows the estimation of the return interval and simulated water levels provides the flooding extent estimate. The return interval is equivalent to the inverse of the risk of exceedance. FEMA and the USACE have used alternative strategies to generate synthetic return intervals. We will assess the consequences of the differences between our approach and their approaches.

4.1.8 *Develop 2050 Risk maps*

The simulations proposed in the previous sections will describe risk at current sea levels and precipitations conditions. However, it is regarded as highly likely that sea levels will rise in the next century and there is evidence that patterns of rainfall will also change. CIRCA is currently providing estimates of the likely sea level rise in Long Island Sound and in Section 4.3.1 we propose a review process to assess what other predictions of climate science are precise enough to be included in management actions. We will use these results to provide Risk maps for 2050, and 2100 if the accuracy is considered useful by the regional study advisory workgroup.

4.2 *Adaptation Option Evaluation*

4.2.1 *Engagement with Design Team*

The design of adaption strategies will be led by the CIRCA Team and its contractors. The modeling group will participate in the C3RP summits, regional workshops, C3RP workshop and selected meetings to provide education on the risk calculations, and advise on the effectiveness of adaptation options for risk management.

4.2.2 *Risk Reduction Assessment*

It is likely that the options developed in the adaptation planning process will include modification of tide gates, the construction of breakwaters, and other engineered structures to change water flow pathways. Changes to operations of flow control structures may also be considered. We propose to conduct modeling activities to support the evaluation of the feasibility and effectiveness on risk reduction options. It is impossible to be precise in the effort level necessary at the moment, but we estimate that we should be able to contribute simulations in five areas selected by designers and planners.

4.2.3 *Dissemination of Results*
The model results and the risk maps will have value after the planning activities have been completed, both locally, and as approaches that can support future activities in other counties. To disseminate the approach and the results we will publish reports and journal articles and develop on-line materials that are accessible to the public.

4.3 *Capacity-building activities*

4.3.1. *Setting priorities.* In order to prioritize state policy and funding program evaluation needs we will convene the State Agency Workgroup in the first month of the project to set an initial list of priorities for review by the SAFR Council at the first quarterly meeting. The SAFR Advisory Council Partners and the Citizens Advisory Committee will be engaged on their list of priorities at the C3RP workshop with follow up calls leading to a final presentation of priorities at the annual summit.

4.3.2. Research Projects. The policy and funding program priorities will inform the basis of CIRCA affiliated faculty and staff research projects on economic risk modeling, legal analysis, and impacts on vulnerable populations. Lead project investigators will be selected in the first 6 months of the project and will present their project plans to the SAFR Advisory Council Partners and Citizens Advisory Committee at the 6-month workshop and first annual summit. Potential topics identified in the NDRC applications include private property tax impacts from inaction vs. action; economic activity loss related to adaptation action or inaction for critical infrastructure and businesses; the legal analysis of codes, ordinances and regulations; and the disproportionate impacts of climate change on vulnerable populations in the state.

5. Engagement

Throughout the NDRC process, HUD and the Rockefeller Foundation provided trainings and workshops for applicants. These programs included presentations by experts, case studies, access to data, and training. We propose to replicate this approach for stakeholders in Connecticut. These engagement activities will fall into the following areas: *science translation: climate science consensus; CIRCA resilience toolkit and public engagement program; policy analysis and case studies; innovative design training; and engineering for coastal resilience training.* These materials and programs will be developed and implemented for a wide range of stakeholders, including state agencies, municipal and councils of government staff, elected officials, planning and zoning and wetlands commissions and committees, design and engineering firms, and environmental consultants. The outcomes of the engagement activities will be an informed constituency to support the institutionalization of resilience and climate adaptation policies and programs in Connecticut.

5.1. Science translation: climate science consensus. We propose to translate the technical report on the climate science consensus, to be developed by CIRCA affiliated faculty and other experts, for the general public. The climate science consensus will include an evaluation of the best available climate science data and impacts for Connecticut communities. The consensus report will determine whether the current climate impact data is at a resolution, which can be used for planning and decision-making at the state, regional and municipal scale. This report will build on the work currently underway at CIRCA on sea level rise projections for the state. Science translation products will include a website or report written for a general audience and presentations through the CIRCA Resilience Toolkit and Public Engagement Program (5.2).

5.2. CIRCA Resilience Toolkit and Public Engagement Program. CIRCA staff will develop a CIRCA Resilience Toolkit and Public Engagement Program with the guidance of a workgroup of the Citizen Advisory Committee. The toolkit will utilize findings from NDR-funded activities, but will also leverage findings and lessons learned from previous and ongoing CIRCA research and municipal projects. The toolkit will include a website to share climate impact infographics, data and maps, best practices and case studies on addressing climate impacts from around the world; funding resources and guidance; and mapping tools and data. CIRCA staff will undertake the development of presentations for the general public on climate change and its likely impact on Connecticut based on the report developed in section 4.3.1. Demonstrations of, and stakeholder training on, the toolkit will take place at four C3RP summits, the two C3RP workshops, and two regional workshops. Frequent emails through the CIRCA Resilience Roundup will also disseminate new products on the toolkit. Additionally, CIRCA staff will lead trainings for specifically for planning and zoning and wetlands commissions and committees about climate impacts on Connecticut (5.2).

5.3. Policy analysis and case studies. We will develop policy white papers, case studies, workshops, and webinars developed by CIRCA staff in partnership with the SAFR Council, the SAFR Advisory Council Partners and the Citizens Advisory Committee. Up to two white papers or case study reports per year will be developed with accompanying workshops and webinars throughout the project timeline. The case studies will include monitoring and reporting on the multiple regional resilience studies, which are already underway in Connecticut funded by CDBG-DR and other sources. Many of those studies are led by UConn CIRCA-affiliated faculty and state agencies as well. CIRCA staff will report out on findings from those studies at the annual C3RP summits, coordinate across projects at UConn, and facilitate interaction between projects across state agencies with input from the State Agency Workgroup and the Citizens Advisory Council workgroups. The white papers and case studies report will be included in the online toolkit and in the trainings and educational materials for commissions and committees (5.2).

5.4. Innovative design training

Opportunities for innovative design training occur regularly in the Project Plan (Section 3). The Yale UED lab will extend the lessons learned in that process through innovative design training that includes:

- Regional multi-stakeholder listening sessions in year one with professional design firms and land use professionals;
- Presenting at the annual C3RP summit on existing CIRCA Yale, and UEDLAB projects relevant to Fairfield and New Haven project areas and on the outcomes from the stakeholder meetings;
- One design workshop in year two connecting workgroups and academic experts to state agencies (including SAFR) and the COGS to explore regional to municipal opportunities and constraints;
- Presenting at the annual summit of the findings in a collaborative design-engineering workshop;
- In year three, working with state agencies, academic experts and municipal managers in a workshop focusing on site-specific implementation strategies and other methods to inform design practice.

Presentations at the annual summits on this topic will also take place in coordination with CIRCA staff. DEEP will participate to provide real-time feedback on regulatory and statutory policy consistency.

5.5. Engineering for coastal resilience training

Sharing expertise in engineering for coastal resilience is an important component of this project. The Yale UED lab will extend lessons learned from the project planning (Section 3) to engineering through:

- Coordinated listening and learning session in year one with engineering consultants to learn about hazard mitigation and risk assessments and regional, municipal and site scale planning, policy, and engineering projects;
- Synthesis presentations at the annual summit and dissemination to working groups and professional firms;
- Education / training workshop in year two focusing on planning tools for adaptation (e.g. phasing, leveraging, economic development) and best management practices;
- Science and research sessions in year three focused on translating science and uncertainty to practice, linking storm and SLR mapping to risk modeling and engineering practices;
- Training session in year four for younger generation engineers based on lessons learned and outcomes of project.

Presentations at the annual summits on this topic will also take place in coordination with CIRCA staff. DEEP will participate to provide real-time feedback on regulatory and statutory policy consistency.

6. Project Management and Schedule

To sustain the momentum of inter-agency cooperation established by the NDRC competition, and to advance the charge to the SAFR Council to develop a Statewide Resilience Roadmap, it is important to have the guidance of the SAFR Council. It is also

critical that planning learns from, and supports the Bridgeport Pilot Projects (both RBD and NDR) to broaden the legacy of these initiatives. We will propose to the SAFR Council that they establish a State Agency workgroup, described below, to interact with CIRCA on the development of the C3RP. Similarly, we will propose that the CT Department of Housing (CT DOH) form a working group to coordinate the current CDBG-DR planning projects and that it includes the Program Leadership and relevant designers and engineers. Finally, we propose to assemble a Citizens Advisory Committee, with members drawn from the SAFR Advisory Committee Partners (identified in the NDRC proposal) and other constituencies engaged in the project. Workgroups of this committee may be formed to provide advice on particular components of the project.

6.1 *The CIRCA Team*

The project team will be led by Dr. O'Donnell. Other important participants will be Dr. Alex Felson, Yale University, and Mr. Brian Thompson of t the Connecticut Department of Energy and Environmental Protection.

Dr. James O'Donnell, Professor of Marine Sciences and Executive Director of CIRCA, will serve as Principal Investigator and be responsible for all aspects of the program. He is an expert on coastal oceanography and environmental modeling, and has experience managing large interdisciplinary applied science projects sponsored by federal and state agencies. He will oversee the program, chair the C3RP State Agency Workgroup, and coordinate with other adaptation and resilience programs in Connecticut and the surrounding region. He will also supervise CIRCA staff engaged in planning activities, coordinate sub-contractors, and oversee the development of capacity building activities.

Dr. Alexander Felson, Director, Urban Ecology and Design Laboratory, Yale University, will serve as a Co-PI and CIRCA's Lead Designer. He will participate in the review of existing resilience plans and the development of the Resilience Framework. He will also work with contractors to ensure the consideration of program design themes and priorities in the consultation process.

Mr. Brian Thompson, Director, Land and Water Resource Division, Connecticut Department of Energy and Environmental Protection, will serve as a Co-PI to manage and facilitate the interaction of the project team with the critical elements of CT DEEP.

The key members of the CIRCA team will be supported by additional staff research teams, and contractors. The project will be informed and reviewed by the SAFR workgroups.

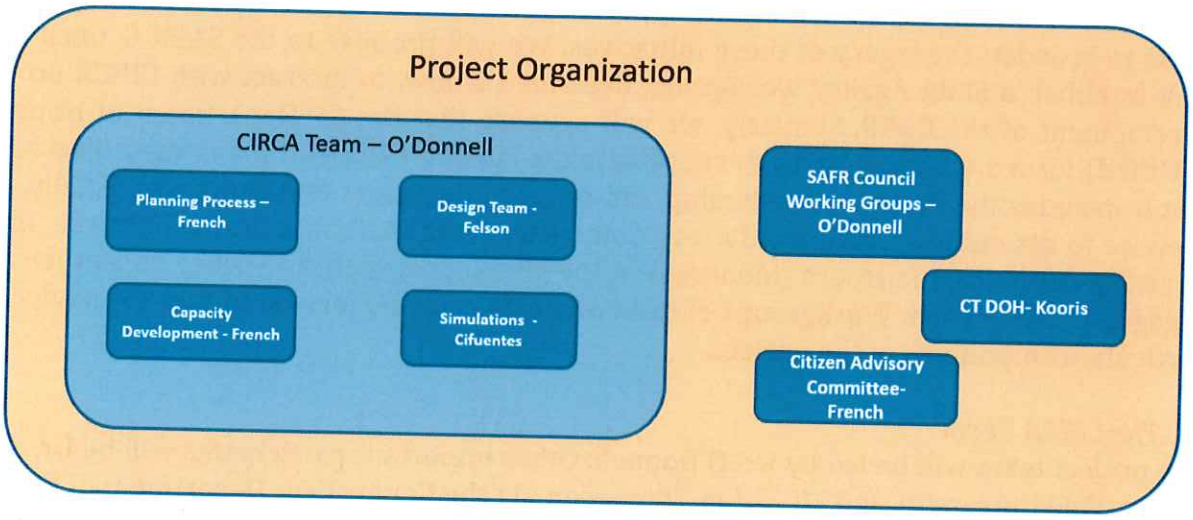


Figure 2. Schematic outline of the structure of the CIRCA project Team and its relationship to contractors and advisory groups.

6.2. *State Agency Workgroup.*
The formation of a working group to provide guidance to CIRCA on the development of the C3RP and provide coordination with existing state agency resilience planning. Members of the workgroup need not all be appointed members of the SAFR Council. Representation from the Coastal Zone Management Program and Flood Management Program through DEEP will be essential. Since State planning is coordinated by the Office of Policy and Management (OPM) they will also be key contributors. The Department of Transportation is critical since the theme of the project is to build on the TOD initiative to enhance resilience. Finally the CT DOH is an essential partner for coordination with existing CDBG-DR and RBD planning efforts and sustainable, smart growth community initiatives. We hope that the SAFR Council will appoint representatives from other agencies as appropriate.

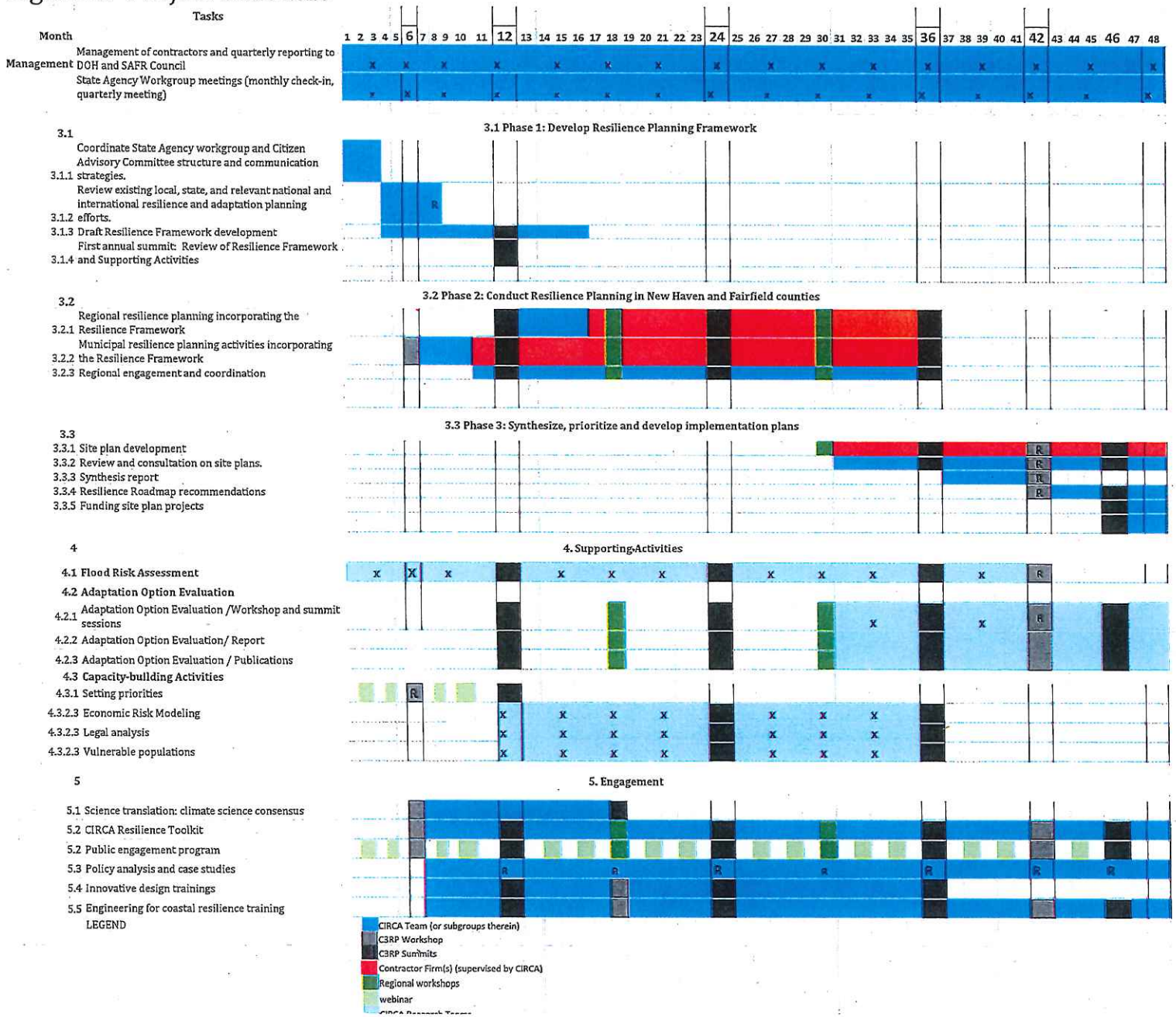
6.3 *SAFR Advisory Committee Partners, Citizens Advisory Committee and Workgroups.*
The SAFR Advisory Committee Partners identified in the NDRC proposal committed to attending one annual meeting per year to provide advice to SAFR. CIRCA will invite them to attend the annual summits to fulfill this commitment. Additionally CIRCA will establish a Citizens Advisory Committee. This committee will include some members of the SAFR Advisory Committee Partners, and others with knowledge and experience particularly relevant to critical project elements. Likely participants will include municipal and councils of government staff, design and engineering consultants, and business and community groups. The Citizens Advisory Committee will be invited to attend the summits and regional workshops. Workgroups of the Citizens Advisory Committee will be formed to advise the CIRCA Team and contractors on individual components of the project.

6.4 *Schedule.*

We propose a 48 month contract period. Phase 1 of the plan development (Section 3.1) will take 13 months. Since there are many communities in the study area we plan to begin Phase 2 (Section 3.2) with information collection after 6 months and complete it by month 36. The last 18 months would be devoted to Phase 3 (Section 3.3). The risk simulation (Section 4.1) will span the first 42 months of the program to provide capacity for planning and the opportunity to develop reports and products that will be an important legacy of the project. The adaptation evaluation (Section 4.2) supports the Phase 3 activities and will begin in month 30 and continue to the end of the project. The capacity building activities (Section 4.3) will span the entire project period though most effort will be expended in months 12 to 36. These details are summarized in Figure 3.

We propose to provide brief reports to the CT DOH at 3 month intervals and to host conference calls with the project management if required. These times are illustrated in Figure 3 by the X symbols. The C3RP Summits will occur at 12 month intervals and these are shown by the black squares in Figure 3.

Figure 3. Project Schedule



University of Connecticut
Sponsored Program Services

Table 1. Budget Summary

Project Title: The Development of the CT Connections Coastal Resilience Plan					Year I	Year 2	Year 3	Year 4	Total
A. Senior Personnel	Salary	Appt	Months Effort	% Effort	*2/1/2018 - 1/31/2019*	*2/1/2019 - 1/31/2020*	*2/1/2020 - 1/31/2021*	*2/1/2021 - 1/31/2022*	
James, O'Donnell, PI, AY (Base minus Admin Supplemt)	$148,426	10	0.10	1.00%	1,484	1,558	1,636	1,718	6,396
James, O'Donnell, PI, Summer	$29,685	2	1.30	65.00%	19,295	20,260	21,273	22,337	83,165
Assistant Director, Co-PI, Yr 1	$75,545	12	9.00	75.00%	56,659				56,659
Assistant Director, Co-PI, Yrs 2-3	$79,322	12	11.00	91.666%		72,711	76,347		149,058
Assistant Director, Co-PI, Yr 4	$87,453	12	11.00	91.666%				80,165	80,165
B. Other Personnel									
Mary Howard-Strobel, Research Assoc. I	$84,760	12	2.18	18.18%	15,409	16,179			31,588
Todd Fake, Computer Tech	$87,515	12	1.00	8.33%	7,290	7,655	8,038	8,440	31,423
Research Associate 1, TBN	$55,000	12	12.00	100.00%	55,000	57,750	60,638	63,670	237,058
Research Associate 2, TBN, Yr 1	$55,000	12	6.00	50.00%	27,500				27,500
Research Associate 2, TBN, Yrs 2-3	$57,750	12	12.00	100.00%		57,750	60,638		118,388
Research Associate 2, TBN, Yr 4	$63,669	12	6.00	50.00%				31,835	31,835
Assistant Director of Research, TBN, Yr 1	$70,000	12	12.00	100.00%	70,000				70,000
Assistant Director of Research, TBN, Yrs 2-4	$73,500	12	9.82	81.82%		60,138	63,145	66,302	189,585
Post Doc Fellow 1	$54,228	12	12.00	100.00%	54,228	56,400	58,560	60,902	230,090
Post Doc Fellow 2	$54,228	12	12.00	100.00%	54,228	56,400	58,560		169,188
Post Doc Fellow 3	$54,228	12	12.00	100.00%		54,228			54,228
Post Doc Fellow 4	$54,228	12	12.00	100.00%		54,228	56,400		110,628
Post Doc Fellow 5	$54,228	12	12.00	100.00%		54,228	56,400		110,628
Graduate Assistant 1, AY	$24,830	9	9.00	100.00%	24,830				24,830
Graduate Assistant 1, Summer	$8,404	3	3.00	100.00%	8,404				8,404
Graduate Assistant 2, AY	$24,830	9	9.00	100.00%	24,830	26,072	27,376		78,278
Graduate Assistant 2, Summer	$8,404	3	3.00	100.00%	8,404	8,824	9,265		26,493
Program Coordiantor	$64,000	12	6.00	50.00%	32,000	33,600	35,280	37,044	137,924
Planner, Yrs 1-3	$64,000	12	12.00	100.00%	64,000	67,200	70,560		201,760
Planner, Yr 4	$74,088	12	6.00	50.00%				37,044	37,044
Program Assistant, Yr 1	$43,000	12	4.00	33.33%	14,332				14,332
Program Assistant, Yr 2-3	$45,150	12	12.00	100.00%		45,150	47,408		92,558
Program Assistant, Yr 4	$49,778	12	9.90	82.50%				41,067	41,067
Kara Bonsack, Graphic Designer	$70,301	12	1.00	8.33%	5,856	6,149	6,456	6,779	25,240
Undergrad Student, 20hrs/wk @30 wks @ 14/hr	$8,400		-	100.00%	8,400	8,400	8,400	8,400	33,600
				Total Salaries	552,149	764,880	726,380	465,703	2,509,112
Enter Fringe Rates									
C. Fringe Benefits□	Yr I	Yr 2	Yr 3	Yr 4					
James, O'Donnell, PI, AY (Base minus Admin Supplemt)	57.0%	58.0%	59.0%	60.0%	846	904	965	1,031	3,746
James, O'Donnell, PI, Summer	26.0%	27.0%	27.0%	28.0%	5,017	5,470	5,744	6,254	22,485
Assistant Director, Co-PI, Yr 1	69.0%				39,095				39,095
Assistant Director, Co-PI, Yrs 2-3		70.0%	72.0%			50,898	54,970		105,868
Assistant Director, Co-PI, Yr 4				73.0%				58,520	58,520
Mary Howard-Strobel, Research Assoc. I	69.0%	70.0%			10,632	11,325			21,957
Todd Fake, Computer Tech	69.0%	70.0%	72.0%	73.0%	5,030	5,359	5,787	6,161	22,337
Research Associate 1, TBN	69.0%	70.0%	72.0%	73.0%	37,950	40,425	43,659	46,479	168,513
Research Associate 2, TBN, Yr 1	69.0%				18,975				18,975
Research Associate 2, TBN, Yrs 2-3		70.0%	72.0%			40,425	43,659		84,084
Research Associate 2, TBN, Yr 4				73.0%				23,240	23,240
Assistant Director of Research, TBN, Yr 1	69.0%				48,300				48,300
Assistant Director of Research, TBN, Yrs 2-4		70.0%	72.0%	73.0%		42,097	45,464	48,400	135,961
Post Doc Fellow 1	20.0%	20.0%	21.0%	21.0%	10,846	11,280	12,298	12,789	47,213
Post Doc Fellow 2	20.0%	20.0%	21.0%		10,846	11,280	12,298		34,424
Post Doc Fellow 3		20.0%			-	10,846	-		10,846
Post Doc Fellow 4		20.0%	21.0%		-	10,846	11,844		22,690
Post Doc Fellow 5		20.0%	21.0%		-	10,846	11,844		22,690
Graduate Assistant 1, AY	20.0%				4,966				4,966
Graduate Assistant 1, Summer	26.0%				2,185				2,185
Graduate Assistant 2, AY	20.0%	20.0%	21.0%		4,966	5,214	5,749		15,929
Graduate Assistant 2, Summer	26.0%	27.0%	27.0%		2,185	2,382	2,502		7,069
Program Coordiantor	69.0%	70.0%	72.0%	73.0%	22,080	23,520	25,402	27,042	98,044
Planner, Yrs 1-3	69.0%	70.0%	72.0%		44,160	47,040	50,803	-	142,003
Planner, Yr 4				73.0%				27,042	27,042
Program Assistant, Yr 1	69.0%				9,889	-	-	-	9,889
Program Assistant, Yr 2-3		70.0%	72.0%		-	31,605	34,134	-	65,739
Program Assistant, Yr 4				73.0%	-	-	-	29,979	29,979
Kara Bonsack, Graphic Designer	69.0%	70.0%	72.0%	73.0%	4,041	4,304	4,648	4,949	17,942
Undergrad Student, 20hrs/wk @30 wks @ 14/hr	4.0%	5.0%	5.0%	5.0%	336	420	420	420	1,596
				Total Fringe Benefits	282,345	366,486	372,190	292,306	1,313,327
				Total Salaries & Fringes	834,494	1,131,366	1,098,570	758,009	3,822,439
D. Equipment	*				15,000				15,000
E. Travel	*Domestic*				11,604	18,604	18,604	18,408	67,220
	Foreign								-
F. Participant Support Costs	*# of Participants: _____*								
Stipends									-
Travel									-
Subsistence									-
Other									-
				Total Participant Costs	-	-	-	-	-
G. Other Direct Cost									
Materials & Supplies					43,137	17,500	21,000	9,519	91,156
Publication Costs							4,000	4,000	8,000
Consultant Services									-
Subawards: Yale $350,000; CT DEEP $250,000; Blds $1,000,000	**				600,000	1,000,000			1,600,000
Other: SSF: RV Weiker Ship Use	$ 1,000 PER DAY		5 DAYS/YR		5,000	5,000	5,000	5,000	20,000
Other: SSF: Buoy Support Shop	$ 51.26 PER HR Y1		160 HOURS/YR		8,202	8,612	9,043	9,495	35,352
				Total Other Direct Costs	656,339	1,031,112	39,043	28,014	1,754,508
H. Total Direct Costs					1,517,437	2,181,082	1,156,217	804,431	5,659,167
I. Indirect Costs (F&A) @	*YR 1*	*YR 2*	*YR 3*	*YR 4*	566,700	781,460	705,292	490,704	2,544,156
Enter Indirect Cost Rates	*59.5%*	*61.0%*	*61.0%*	*61.0%*					
	** no F & A applied, ** F & A on 1st $25,000*								
J. Total Costs				DIFF $ -	$ 2,084,137	$ 2,962,542	$ 1,861,509	$ 1,295,135	$ 8,203,323
Indirect Cost Base (MTDC)					$ 952,437	$ 1,281,082	$ 1,156,217	$ 804,431	$ 4,194,167

Budget Justification – CT DOH

Senior/Key Personnel:
Dr. James O'Donnell, PI, (Effort = 0.10 AY months and 1.30 summer months for Years 1-4) will be responsible for all aspects of the program "*The Development of the Connecticut Coastal Resilience Plan*", including management of the staff and sub-awards required to effectively conduct the proposed tasks, and for the preparation of reports. The PI will also lead the interaction of the CIRCA effort with the SAFR Council and the Connecticut Department of Housing.

Assistant Director, Co-PI, (Effort = 9.0 calendar months for Year 1 and 11.0 calendar months in each Years 2-4) will serve as Program Director and conduct, with staff and contractors, the activities in Task 3.1. She will also manage the contractors engaged for Task 3.2, coordinate the synthesis activities in Task 3.3 and the engagement programs in Task 5. She will also manage the capacity building activities in task 4.3.

Other Personnel:
Mary Howard-Strobel, Research Associate I, (Effort = 2.18 calendar months for Years 1-2) as an experienced with the instruments and analyses involved in Task 4.1.6, she will work to train and assist the new Research Associate (Item B3) to accelerate the initiation of the project.

Todd Fake, Computer Technician, (Effort = 1.0 calendar month for Years 1-4) will provide support to the implantation of the computer simulations and data management and train the new Research Associate (Item B.4).

Research Associate #1, TBN, (Effort = 12.0 calendar months for Years 1-4) will conduct the topological and hydrologic measurements required to develop and test the flooding simulations in Tasks 4.1 and 4.2.

Research Associate #2, TBN, (Effort = 6.0 calendar months in Year 1, 11.0 calendar months in Years 2-3, and 5.50 calendar months for Year 4) will assist with project coordination, computing, mapping and graphics required by the program in Tasks 4.1 and 4.2.

Assistant Director of Research, TBN, (Effort = 12.0 calendar months for Year 1 and 9.82 calendar months for Years 2-4) will supervise the simulation and observation programs, and the development of maps, products and reports, and coordinate the staff engaged in the work.

Post Doc Fellow #1, TBN, (Effort = 12.0 calendar months for Years 1-4) will support Tasks 4.1 and 4.2, data analysis and coastal model evaluation.

Post Doc Fellow #2, TBN, (Effort = 12.0 calendar months for Years 1-3) will support Tasks 4.1 and 4.2, hydrologic model development and application.

Post Doc Fellow #3, TBN, (Effort = 12.0 calendar months for Year 3) will support Task 5.3, social science research.

Post Doc #4, TBN, (Effort = 12.0 calendar months for Years 2-3) will support Task 4.3, legal research.

Post Doc Fellow #5, TBN, (Effort = 12.0 calendar months for Years 2-3) will support 5.3, economics research.

Graduate Assistant #1, TBN, (Effort = 12.0 calendar months for Year 1) will support Tasks 4.1 and 4.2, data analysis and coastal model evaluation.

Graduate Assistant #2, TBN, (Effort = 12.0 months for Years 1-3) will support Tasks 4.1 and 4.2, Coastal model development and data analysis and coastal model evaluation.

Project Coordinator, TBN, (Effort = 6.0 calendar months for Years 1-4) will assist Dr. French coordinate and conduct the activities in Task 3.1, 3.2, 3.3, 4.3 and 5.

Planner, TBN, (Effort = 12.0 calendar months in Years 1-3 and 6.0 calendar months for Year 4) will assist Dr. French coordinate and conduct the activities in Task 3.1, 3.2, 3.3, 4.3 and 5.

Program Assistant, TBN, (Effort = 4.0 calendar months for Year 1, 12.0 calendar months in Years 2-3, and 9.9 calendar months in Year 4) will assist Dr. French coordinate and conduct the activities in Task 3.1, 3.2, 3.3, 4.3 and 5.

Kara Bonsack, Website Designer, (Effort = 1.0 calendar months for Years 1-4) will provide technical support in creating and updating the Project web pages.

Undergraduate Students, TBN. We are requesting $34,800 ($8,700 in each Years 1-4, 30hr/week for 20 weeks at $14/hr. in each year of the project) which will provide support for engagement activities for undergraduate interns to assist in CIRCA activities.

Fringe benefits:
Fringe benefits are negotiated with the Department of Health and Human Services as part of the University's Cost Rate Agreement and are calculated as a percentage of salaries. The fringe rates for the PI will be 57% in Year 1, 58% in Year 2, 59% in Year 3 and 60% in Year 4 for AY time and 26% in Year 1, 27% in Years 2-3 and 28% in Year 4 for summer. The fringe rates for the Post Doc Fellows #1 – 5, the Graduate Assistants #1 and #2 will be 20% in Years 1-2 and 21% for Years 3-4 for AY and 26% in Year 1, and 27% in Years 2-3 for summer. The fringe rates for the Co-PI, 3 Research Associates, Computer Technician, Assistant Director of Research, Program Coordinator, Planner, Program assistant and the Graphic Designer will be 69% in Year 1, 70% in Year 2, 72% in Year 3 and 73% in Year 4. The fringe rates for the Undergraduate Students will be 4% In Year 1, 5% in Years 2-4.

Equipment:
We request a total of $15,000 to acquire a new set of computing nodes to augment the simulation cluster to accelerate calculations.

Travel:
We are requesting $67,220 ($11,604 in Year 1, 18,604 in each Years 2 – 3 and $18,408 in Year 4) for travel. The breakdown of travel costs is as follows:

- **Local Travel** - To support engagement with towns and contractors we request $4212/year for Years 1 to 4. This estimate assumes 1 trip per week with an average roundtrip mileage of 150 miles at $0.54/mile.
- **Regional Coordination** - We request $4392/year for travel to coordinate with colleagues in the northeast and NY metropolitan regional area in each Years 1-3 and $2196 in Year 4. These estimates assume one trip per month by a project team

member to a meeting 200 miles from Groton, CT, at $0.54/mile and a 1 night hotel at $150/day in each Years 1-3, and 1 trip every 2 months in Year 4.

- **National coordination** - We are request $3000 in Year 1 and $6000 in each Years 2 to 4 to support the expense for two of the senior project team (PI/Co-PI/Asst. Dir.) to travel to one national conference per year to learn from other professionals working on related projects. In addition, we request $14,000 in Years 2-4 for the expenses for the 5 Post-Docs and 2 graduate students working on the project to attend one national meeting.

Costs will comply with the applicable Federal regulations and per diem rates in effect for the destination cities when the costs are incurred. Travel costs may include airfare, hotel, per diem, registration fees and ground transportation.

Other Direct Costs:
Materials and Supplies: We request $91,156 ($43,137 in Year 1, $17,500 in Year 2, $21,000 in Year 3, and $9,519 in Year 4) for materials and supplies necessary to conduct the project. (Note that computer workstations are classified as supplies). An itemization of the cost follows:

- We request $3,000 in each Years 1-4 for computer software and backup media for the computers used in the CIRCA offices and for instrument preparation, data analysis, model development and evaluation, and the preparation of documentation.

- We request $5,637 in Year 1 to purchase 7 personal computers for the new staff working on the project and $4000 in Year 2 for the postdoctoral research assistants.

- We request $3,000 for two workshops in Year 1; $4,000 for two regional workshops and one summit each Years 2-3; and $2,519 for one workshop and one summit in Year 4. The funds will be used for food, room rentals and supplies.

- We request $4,000 in Years 1 and 2 and $1,500 in Years 3 and 4 for the purchase of batteries and mooring hardware to support the deployment of instruments.

- We request $2,500 in each Years 1-4 for the calibration and refurbishment of instruments required in the field program.

- We request $35,000 to purchase 10 water level sensors at $2500 each to complement existing equipment ($25,000 total in Year 1and $10,000 in Year 3) to purchase 4 replacements sensors in anticipation that the hazards associated with field will result in some losses.

Specialized Service Facilities:
We request $20,000 ($5,000 in each Years 1-4) for the use of the Research Vessel Lowell Wiecker for deployment and recovery of instruments and bathymetric surveys which requires use of ships. We estimate 5 days per year will be required at cost of $1000/day.

We request $35,352 ($8,202 in Year 1, $8,612 in Year 2, 9,043 in Year 3 and $9,495 in Year 4) for the preparation of instruments, and the recovery and repair will be supported by the Marine Sciences Support facility with the Buoy Support Shop. We estimate 160 hour per year will be required at $51.26/hr. in Year 1, with 5% inflation projected for Years 2-4.Subawards:
We are requesting $1,600,000 ($600,000 in Year 1 and $1,000,000 in Year 2) to fund sub awards on the project. In Year 1, the Project will require 2 identified subcontractors that were

integral to the preparation of the project proposal. The Connecticut Department of Energy and Environmental Protection will require $250,000 to assist in the plan development. Yale will require $350,000 to serve as the Design Lead and participate in the planning process. In Year 2, we propose to engage additional subcontractors to undertake the municipal, regional and site plans. Contractors will be selected during the grant through a competitive process and estimate up to 4 contracts for a total of $1,000,000.

Publications:
We request $8,000 ($4,000 in each Years 3 and 4) to disseminate the results of the project in academic literature with 4 journal articles.

Indirect Costs:
Indirect costs of 59.5% (Year 1) and 61% (Years 2-4) are assumed on the modified total direct costs (MTDC). Excluded from the MTDC base are equipment items with unit costs of $5,000 or more, and subaward costs after the first $25,000 of each subaward. The rates and exclusions are based on the University's federally negotiated cost rate agreement with the Department of Health and Human Services dated June 2, 2017.

UCONN
UNIVERSITY OF CONNECTICUT

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Commissioner Evonne Klein,
Connecticut Department of Housing
505 Hudson Street,
Hartford CT 06106

May 1st, 2018

Dear Commissioner Klein,

I submitted a proposal to your Department entitled "The Development of the Connecticut Connections Coastal Resilience Plan" that is currently being considered for funding. As I am sure you are aware, Dr. R. French, a key member of the Institute's staff and a co-author of the proposal, recently transferred from the University of Connecticut to your Department. Consequently, the work that we proposed she conduct at CIRCA must now be undertaken by a new hire. I assure you that this change will not impact the project budget or schedule, however, as Dr. French was identified in the proposed budget and budget justification documents, I attached revised versions and request that they be used to replace the sections I submitted.

Please let me know if you have any questions or concerns.

Best rega

James O'Donnell,
Professor of Marine Sciences, and Executive Director,
Connecticut Institute for Resilience and Climate Adaptation

1080 SHENNECOSSETT ROAD
GROTON, CT 06340-6048
PHONE 860.405.9087
FAX 860.405.9153
JamesODonnell@uconn.edu
circa.uconn.edu

CIRCA
Connecticut Institute for Resilience and Climate Adaptation

Dannel P. Malloy
Governor

STATE OF CONNECTICUT
DEPARTMENT OF HOUSING

Evonne M. Klein
Commissioner

May 2, 2018

James O'Donnell
Executive Director, Connecticut Institute for Resilience and Climate Adaptation
University of Connecticut
Avery Point Campus
1080 Shennecossett Road
Groton, CT 06340

RE: Staff Changes to Connecticut Connections Coastal Resilience Plan

Dear Professor O'Donnell,

Thank you for your letter and attached budget revisions dated May 1, 2018 for your proposal submitted to the Department of Housing entitled, "The Development of the Connecticut Connections Coastal Resilience Plan." The Department acknowledges receipt of the budget changes reflecting Dr. Rebecca French's transfer of employment from the University of Connecticut, Connecticut Institute for Resilience and Climate Adaptation to the Connecticut Department of Housing as of April 13, 2018.

The Department accepts that due to this change of employment, her name was removed from UConn's budget and the vacated position will be filled by a new hire. The revised budget will be included with your original proposal in our files to inform the drafting of a Memorandum of Agreement between UConn and the Department of Housing to undertake the scope of work described in the proposal for the Community Development Block Grant National Disaster Resilience planning funds overseen by the Department.

Under a separate cover, you will receive the Memorandum of Agreement for your review and execution. Please make every effort to execute the document and return them to the Department within 30 days of receipt.

Thank you for your participation in the National Disaster Resiliency Program. If you have any questions or require further information, please contact Dr. Rebecca French, Director of Resilience at 860-270-8231 or Rebecca.French@ct.gov.

Sincerely,

Evonne M. Klein
Commissioner

EXHIBIT C
Project Timeline

1. Applicant Name: University of Connecticut
2. Project Name: The Development of the Connecticut Connections Coastal Resilience Plan
3. Program Years: 4 years, 1 month (49 months)
4. Grant Number: B-13-DS-09-0002

Total Grant: $8,203,323	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	5th Qtr.	6th Qtr.	7th Qtr.	8th Qtr.
Dates: 06/01/2018 – 06/30/2022	9/30/18	12/31/18	3/31/19	6/30/19	9/30/19	12/31/19	3/31/20	6/30/20
Total Grant Amount Available:	$8,203,323	$7,779,876	$ 7,396,642	$ 6,993,408	$6,590,174	$5,950,934	$5,311,694	$4,672,454
Projected Expenditure:	$403,447	$403,234	$403,234	$403,234	$639,240	$639,240	$639,240	$639,240
Grant Amount Remaining:	$ 7,779,876	$7,396,642	$6,993,408	$6,590,174	$5,950,934	$5,311,694	$4,672,454	$4,033,214

Total Grant: $8,203,323	9th Qtr.	10th Qtr.	11th Qtr.	12th Qtr.	13th Qtr.	14th Qtr.	15th Qtr.	16th Qtr.
Dates: 06/01/2018 – 06/30/2022	9/30/20	12/31/20	3/31/21	6/30/21	9/30/21	12/31/22	3/31/22	6/30/22
Total Grant Amount Available:	$4,033,214	$3,277,929	$ 2,522,644	$ 1,767,359	$1,012,074	$ 759,055	$506,036	$ 253,018
Projected Expenditure:	$755,285	$755,285	$755,285	$755,285	$253,019	$253,019	$253,018	$253,018
Grant Amount Remaining:	$ 3,277,929	$2,522,644	$1,767,359	$1,012,074	$759,055	$506,036	$253,018	$0

Major Tasks (Expand as Needed)	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	5th Qtr.	6th Qtr.	7th Qtr.	8th Qtr.
Dates: 06/01/2018 – 06/30/2022	9/30/18	12/31/18	3/31/19	6/30/19	9/30/19	12/31/19	3/31/20	6/30/20
Task 1	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update
Task 2			Workshop Report	Draft Report	Framework Report			
Task 3				Regional Summit Report		CAC Workshop Report 1		Regional Summit Report; Draft Framework Synthesis Report
Task 5				Regional Summit Report ; Flood Risk Assessment Portal; Capacity Building Report-1				Regional Summit Report
Task 6	Launch Website			Website Training Report 1 Design training Report 1; Engineering training Report 1		Climate Science Report		Website Training Report 2; Design training Report 2
Quarterly Report	QR1	QR2	QR3	QR4	QR5	QR6	QR7	QR8

Major Tasks (Expand as Needed)	9th Qtr.	10th Qtr.	11th Qtr.	12th Qtr.	13th Qtr.	14th Qtr.	15th Qtr.	16th Qtr.
Dates: 06/01/2018 – 06/30/2022	9/30/20	12/31/20	3/31/21	6/30/21	9/30/21	12/31/22	3/31/22	6/30/22
Task 1	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update	SAFR Update
Task 3	Final Framework Synthesis Report	CAC Workshop Report 2		2 Resilience Plans; Regional Summit Report			Regional Summit Report	
Task 4						Draft Second Synthesis Report Draft Resilience Roadmap Report	Draft Resilience Roadmap Final Second Synthesis Report	Final Resilience Roadmap
Task 5				Regional Summit Report; Capacity Building Report-2		Draft Risk Reduction Report	Regional Summit Report ; Draft Risk Reduction Report	
Task 6				Website Training Report 3; Design Strategies Workshop Report Science for Engr. Report			White Paper 2	Website Training Report 4 Resilience Planning Training Report
Quarterly Report	QR9	QR10	QR11	QR12	QR13	QR14	QR15	QR16

Budget Summary

Project Title: The Development of the Connecticut Connections Coastal Resilience Plan		
Category		**Amount**
Personnel Salary & Fringe	$	4,201,906.00
Equipment	$	50,000.00
Travel	$	78,712.00
Materials & Supplies	$	70,100.00
Publication Costs	$	5,342.00
Subcontracts: Contractors	$	1,000,000.00
Consultant Services: RV Weiker Ship Use	$	20,000.00
Consultant Services: Buoy Support Shop	$	35,352.00
Indirect Costs (F&A)	$	2,741,911.00
Total Costs	**$**	**8,203,323.00**

University of Connecticut
Sponsored Program Services

	Salary	Appt	Months Effort	% Effort	Year 1 6/1/2018 - 5/31/2019	Year 2 6/1/2019 - 5/31/2020	Year 3 6/1/2020 - 5/31/2021	Year 4 6/1/2021 - 5/31/2022	Total
A. Senior Personnel									
O'Donnell, James, PI, AY	$174,426	10	0.10	1.00%	1,744	1,831	1,923	2,019	7,517
O'Donnell, James, PI, Sum	$34,685	2	1.30	65.00%	22,675	23,809	24,999	26,249	97,732
Felson, Alex - annual	$125,000	11	-						-
Felson, Alex Year 1 Partial start 1/4/19	$56,818	5	4.10	82.00%	46,591				46,591
Felson, Alex, Yr 2	$125,000	11	9.02	82.00%		107,625			107,625
Felson, Alex, Yrs 3-4	$125,000	11	6.05	55.00%			75,797	79,587	155,384
Trunscinski - annual	$75,000	11	11.00	100.00%					-
Truscinski, Dir Resl Plan, Yr 1 start 10/26/18	$47,727	7	7.00	100.00%	47,727				47,727
Truscinski, Dir Resl Plan, Yr 2-4	$75,000	11	11.00	100.00%		78,750	82,688	86,822	248,260
									-
B. Other Personnel									-
Howard-Strobel, annual	$80,724	11	2.20	20.00%					-
Howard-Strobel, Yr 1	$44,031	6	1.20	20.00%	8,806				8,806
Howard-Strobel, Yr 2	$80,724	11	2.20	20.00%		16,952			16,952
Fake - annual	$83,348	12	1.08	9.00%					-
Fake , Yr1	$41,674	6	0.54	9.00%	3,751				3,751
Fake, Yr 2-4	$83,348	12	1.08	9.00%		7,876	8,034	8,195	24,105
Onat - annual	$75,000	11							-
Onat, Yr 1 start 11/23/18	$42,955	6.3	6.30	100.00%	42,955				42,955
Onat, Yr 2-4	$75,000	11	11.00	100.00%		78,750	80,325	81,932	241,007
Massidda - annual	$51,000	11	-						-
Massidda, start 10/26/18	$32,455	7	6.44	92.00%	29,859				29,859
Massidda, year 2-4	$51,000	11	11.00	100.00%		53,550	54,621	55,713	163,884
Lund, annual	$64,000	12	3.00	25.00%					-
Lund, Yr 1	$32,000	6	1.50	25.00%	8,000				8,000
Lund, Yr 2-4	$64,000	12	12.00	100.00%		67,200	68,544	69,915	205,659
Yaworsky	$54,600	12	6.00	50.00%	27,300	27,846	28,403	28,971	112,520
Resilience Specialist, Yr1 Special Pay	$64,000	12	6.00	50.00%	32,000				32,000
Resilience Specialist, Yr2-3	$64,000	12	12.00	100.00%		67,200	70,560		137,760
Bonsack	$66,953	12	1.00	8.33%	5,577	5,689	5,803	5,919	22,988
Research Associate 2, Yr1	$55,000	11	5.50	50.00%	27,500				27,500
Research Associate 2, Yr 2-4	$55,000	11	11.00	100.00%		57,750	60,638	63,670	182,058
Post Doc Yrs 2-4	$54,000	11	11.00	100.00%		55,620	57,289	59,008	171,917
Post Doc Yrs 2-3	$54,000	11	11.00	100.00%		55,620	57,289		112,909
Post Doc, Yr 2	$54,000	11	11.00	100.00%		55,620			55,620
Post Doc, Yr 2, 3	$54,000	11	11.00	100.00%		55,620	57,289		112,909
Post Doc, Yr 2, 3	$54,000	11	11.00	100.00%		55,620	57,289		112,909
GA, AY	$24,590	9	9.00	100.00%	24,590	25,820			50,410
GA Summer	$8,322	3	3.00	100.00%	8,322	8,738	9,175		26,235
GA AY	$23,369	9	9.00	100.00%	23,369	24,537	25,764		73,670
GA Summer	$7,910	3	3.00	100.00%	7,910	8,306	8,721		24,937
Undergraduate Student, 20hrs@30 wks@					8,400	8,400	8,400	8,400	33,600
					-	-	-	-	-
					-				-
				Total Salaries	377,076	948,729	843,551	576,400	2,745,756

Enter Fringe Rates

C. Fringe Benefits	Yr 1	Yr 2	Yr 3	Yr 4					
O'Donnell, James, PI, AY	54.8%	56.0%	57.0%	58.0%	956	1,025	1,096	1,171	4,248
O'Donnell, James, PI, Sum	25.1%	28.7%	30.0%	31.0%	5,691	6,833	7,500	8,137	28,161
Felson, Alex - annual					-	-	-	-	-
Felson, Alex Year 1 Partial start 1/4/19	54.8%				25,532	-	-	-	25,532
Felson, Alex, Yr 2		56.0%			-	60,270	-	-	60,270
Felson, Alex, Yrs 3-4			57.0%	58.0%	-	-	43,204	46,160	89,364
Trunscinski - annual					-	-	-	-	-
Truscinski, Dir Resl Plan, Yr 1 start 10/26/	72.0%				34,363	-	-	-	34,363
Truscinski, Dir Resl Plan, Yr 2-4		73.8%	75.0%	76.0%	-	58,118	62,016	65,985	186,119
									-
Howard-Strobel, annual					-	-	-	-	-
Howard-Strobel, Yr 1	72.0%	73.8%	75.0%	76.0%	6,340	-	-	-	
Howard-Strobel, Yr 2	72.0%	73.8%	75.0%	76.0%	-	12,511	-	-	
Fake - annual					-	-	-	-	-
Fake , Yr1	72.0%	73.8%	75.0%	76.0%	2,701	-	-	-	
Fake, Yr 2-4	72.0%	73.8%	75.0%	76.0%	-	5,812	6,026	6,228	
Onat - annual	72.0%	73.8%	75.0%	76.0%	-	-	-	-	-
Onat, Yr 1 start 11/23/18	72.0%				30,928	-	-	-	30,928
Onat, Yr 2-4		73.8%	75.0%	76.0%	-	58,118	60,244	62,268	180,630
Massidda - annual					-	-	-	-	-
Massidda, start 10/26/18	72.0%				21,498	-	-	-	21,498
Massidda, year 2-4		73.8%	75.0%	76.0%	-	39,520	40,966	42,342	
Lund, annual					-	-	-	-	-
Lund, Yr 1	72.0%	73.8%	75.0%	76.0%	5,760	-	-	-	
Lund, Yr 2-4		73.8%	75.0%	76.0%	-	49,594	51,408	53,135	154,137
Yaworsky	25.1%	28.7%	30.0%	31.0%	6,852	7,992	8,521	8,981	32,346
Resilience Specialist, Yr1 Special Pay	25.1%	28.7%	30.0%	31.0%	8,032	-	-	-	8,032
Resilience Specialist, Yr2-3	72.0%	73.8%	75.0%	76.0%	-	49,594	52,920	-	102,514
Bonsack	72.0%	73.8%	75.0%	76.0%	4,015	4,198	4,352	4,498	17,063
Research Associate 2, Yr1	72.0%				19,800	-	-	-	19,800
Research Associate 2, Yr 2-4		73.8%	75.0%	76.0%	-	42,620	45,479	48,389	136,488
Post Doc Yrs 2-4	19.0%	19.8%	21.0%	22.0%	-	11,013	12,031	12,982	36,026
Post Doc Yrs 2-3	19.0%	19.8%	21.0%		-	11,013	12,031	-	23,044
Post Doc, Yr 2		19.8%	-		-	11,013	-	-	11,013
Post Doc, Yr 2, 3		19.8%	21.0%		-	11,013	12,031	-	23,044
Post Doc, Yr 2-3		19.8%	21.0%		-	11,013	12,031	-	23,044
GA, AY	19.0%	19.8%			4,672	5,112	-	-	9,784
GA Summer	25.1%	28.7%	30.0%		2,089	2,508	2,753	-	7,350
GA AY	19.0%	19.8%	21.0%		4,440	4,858	5,410	-	14,708
GA Summer	25.1%	28.7%	30.0%		1,985	2,304	2,616	-	6,905
Undergraduate Student, 20hrs@30 wks@	4.1%	4.3%	4.4%	4.5%	344	361	370	378	1,453
					-	-	-	-	-
				Total Fringe Benefits	185,998	466,493	443,005	360,654	1,456,150
				Total Salaries & Fringes	563,074	1,415,222	1,286,556	937,054	4,201,906
D. Equipment	*				40,000		10,000		50,000
E. Travel	*Domestic*				12,504	22,604	21,604	22,000	78,712
	Foreign								-
F. Participant Support Costs	*# of Participants: ____*								
Stipends									-
Travel									-
Subsistence									-
Other									-
				Total Participant Costs	-	-	-	-	-
G. Other Direct Cost									
Supplies & Materials					30,100	18,000	11,500	10,500	70,100
Publication Costs					1,200	1,091	1,000	2,051	5,342
Consultant Services					5,000	5,000	5,000	5,000	20,000
Bouoy Support					8,202	8,612	9,043	9,495	35,352
Subawards	**				500,000	500,000			1,000,000
Other									-
				Total Other Direct Costs	544,502	532,703	26,543	27,046	1,130,794

	YR 1	YR 2	YR 3	YR 4					
H. Total Direct Costs					1,160,080	1,970,529	1,344,703	986,100	5,461,412
I. Indirect Costs (F&A) @	59.5%	61.0%	61.0%	61.0%	398,698	927,523	814,169	601,521	2,741,911
Enter Indirect Cost Rates	* no F & A applied, ** F & A on 1st $25,000								
J. Total Costs					$ 1,558,778	$ 2,898,052	$ 2,158,872	$ 1,587,621	$ 8,203,323
Indirect Cost Base (MTDC)					$ 670,000	$ 1,620,529	$ 1,334,703	$ 986,100	$ 4,511,412

Laura B. Kozma
Executive Director

2/7/19
Date

DCH Commissioner

2/15/19
Date

Copy of O'Donnell Revised final.xls

The Development of the Connecticut Connections Coastal Resilience Plan: Revised Budget Plan (November 2018)

James O'Donnell

Connecticut Institute for Resilience and Climate Adaptation
University of Connecticut
1080 Shennecossett Road
Groton, CT 06340

There will be no foreseeable impact on the outcomes and products of the project after the approved budget plan is revised to accommodate changes in personnel available at the University of Connecticut and its subcontractors. The following sections describe the main changes and we then provide a revised Budget Explanation to replace Section 7 in the original proposal.

1. Dr. A. Felson plans to leave his position at Yale University to and therefore we propose to do the work proposed with a UConn employee. We propose to use the $350,000 allocated in the **SubAwards** section of the approved budget to the salaries for the Director of Design.

2. The Mr. Brian Thompson of CT DEEP will not be able to conduct the work proposed due to lack of available staff. We propose to move the $200,000 allocated in the **SubAwards** section of the approved budget to the salaries for the new Director of Design position and expand the roles of the Planner, and enhance the participation of Katie Lund in the Public Engagement activities.

3. Since R. French has left UConn, we replaced her role in Project Management with J. Truscinski, and her role in Community Engagement with K. Lund.

4. We have increased the effort of the Planner to assist in the activities proposed for the Director of Design. The role of Planner was updated to Resilience Specialist to support the Director of Design.

5. We have added relocation expenses for Yaprak Onat, Assistant Director of Research to assist with the relocation expenses from Hawaii to Connecticut.

6. We have reduced travel in Year 1

7. We have increased the funds for publication for the science results in years 3 and 4.

7. Revised Budget Justification

Senior/Key Personnel:
Dr. James O'Donnell, PI, (Effort = 0.1 AY months and 1.30 summer months for Years 1-4) will be responsible for all aspects of the program "*The Development of the Connecticut Coastal Resilience Plan*", including management of the staff and sub-awards required to effectively conduct the proposed tasks, and for the preparation of reports. The PI will also lead the interaction of the CIRCA effort with the SAFR Council and the Connecticut Department of Housing.

Director of Resilience Planning. John Truscinski,(Effort = 7 calendar months for Years 1 and 11 months in years 2-4). He will act as project manager, lead and coordinate planning activities. He will also manage the contractors engaged for Task 3.2, coordinate the synthesis activities in Task 3.3 and the engagement programs in Task 5. He will also conduct components of the capacity building activities in task 4.3.

Director of Design Alex Felson (Effort = 4.10 calendar months for Year 1 and 9.02 calendar months in Years 2, and 6.05 months in years 3-4) He will participate in the planning activities to ensure innovative design ideas are considered in all planning activities, and will participate, with staff and contractors in Tasks 3.1 and 3.2. He will also review relevant coastal planning guidelines for manager and contractors. the synthesis activities in Task 3.3 and the engagement programs in Task 5. He will also manage the capacity building activities in task 4.3.

Other Personnel:
Mary Howard-Strobel, Research Associate I, (Effort = 1.20 calendar months for Year 1 and 2.20 calendar months for Year 2) as an experienced with the instruments and analyses involved in Task 4.1.6, she will work to train and assist the new Research Associate (Item B3) to accelerate the initiation of the project.

Todd Fake, Computer Technician, (Effort = .54 calendar month for Year 1 and 1.08 calendar months for Years 2-4) will provide support to the implantation of the computer simulations and data management and train the new Research Associate (Item B.4).

Research Associate #1, Caterina Massidda, (Effort = 6.44 calendar months for Years 1 and11 months in years 2-4) will conduct the topological and hydrologic measurements required to develop and test the flooding simulations in Tasks 4.1 and 4.2.

Research Associate #2, TBN, (Effort = 5.50 calendar months in Year 1, 11.0 calendar months in Years 2-4) will assist with project coordination, computing, mapping and graphics required by the program in Tasks 4.1 and 4.2.

Assistant Director of Research, Yaprak Onat, (Effort = 6.30 calendar months for Year 1 and 11 calendar months for Years 2-4) will supervise the simulation and observation programs, and the development of maps, products and reports, and coordinate the staff engaged in the work.

Post Doc Fellow #1, TBN, (Effort = 11.0 calendar months for Years 2-4) will support Tasks 4.1 and 4.2, data analysis and coastal model evaluation.

Post Doc Fellow #2, TBN, (Effort = 11.0 calendar months for Years 2-3) will support Tasks 4.1 and 4.2, hydrologic model development and application.

Post Doc Fellow #3, TBN, (Effort = 11.0 calendar months for Year 2) will support Task 5.3, social science research.

Post Doc #4, TBN, (Effort = 11.0 calendar months for Years 2-3) will support Task 4.3, legal research.

Post Doc Fellow #5, TBN, (Effort = 11.0 calendar months for Years 2-3) will support 5.3, economics research.

Graduate Assistant #1, TBN, (Effort = 9 calendar months for Years 1-2, 3 Summer months for years 1-3) will support Tasks 4.1 and 4.2, data analysis and coastal model evaluation.

Graduate Assistant #2, TBN, (Effort = 9 calendar months and 3 Summer months for Years 1-3) will support Tasks 4.1 and 4.2, Coastal model development and data analysis and coastal model evaluation.

Katie Lund, (6 calendar months in Year 1, and 12 months in Years 2-4) will lead project team efforts on Task 6 Engagement Activities, including 6.2 creating a resilience tool-kit and public engagement program, as well as, the coordination of webinars and workshops for the project.

Lauren Yaworsky, (6 calendar months in Years 1-4) will act as program coordinator for the project assisting with invoicing, contracting, and other administrative duties as needed.

Resilience Specialist TBN, (6 calendar months in Year 1, and 12 calendar months Years 2-4) will ...assist in various assigned tasks to support planning and research activities for the project.

Kara Bonsack, Website Designer, (Effort = 1.0 calendar months for Years 1-4) will provide technical support in creating and updating the Project web pages.

Undergraduate Students, TBN. We are requesting $33,600 ($8,400 in each Years 1-4, 20hr/week for 30 weeks at $14/hr in each year of the project) which will provide support for engagement activities for undergraduate interns to assist in CIRCA activities.

Fringe benefits:

Fringe benefits are negotiated with the Department of Health and Human Services as part of the University's Cost Rate Agreement and are calculated as a percentage of salaries. The fringe rates for the PI and the Director of Design will be 54.8% in Year 1, 56.0% in Year 2, 57% in Year 3 and 58% in Year 4 for AY time and 25.1% in Year 1, 28.7% in Year 2, 30% in Year 3 and 31% in Year 4 for summer. The fringe rates for the Post Doc Fellows #1 – 5, will be 19.8% in Year 2, 21% in Year 3 and 22% in Year 4.The fringe rates for the Graduate Assistants in Year 1 will be 19.0%, Year 2 will be 19.8%, and 21.0% AY. Summer fringe rates for the Graduate Assistants are 25.1% in Year 1, 28.7% in year 2, and 30.0% in Year 3. The fringe rates for the Director of Resilience Planning, Mary Howard-Strobel, the Computer Technician, the Associate Director of Research, Research Associate #1-2, *Lund, the Website Designer, and the Research Associate 2 are 72.0% in Year one, 73.8% in Year 2, 75% in Year 3, and 76% in Year 4. The fringe rates for *Yaworsky will be 25.1% in Year 1, 28.7% in Year 2, 30% in Year 3 and 31% in Year 4. The fringe rate for the Resilience Specialist will be 25.1% in Year 1 (special payroll), 73.8% in Year 2, 75.0% in Year 3 and 76.0% in Year 4. The fringe rate for the Undergraduate student will be 4.1% in Year 1, 4.3% in Year 2, 4.4% in Year 3, and 4.5% in Year 4.

Equipment:
We request a total of $50,000 for new equipment. We are requesting $15,000 to acquire a new set of computing nodes to augment the simulation cluster to accelerate calculations and $25,000 to purchase 10 water level sensors at $2500 each to complement existing equipment ($40,000 total) in Year 1. We are requesting $10,000 in Year 3 to purchase 4 replacements sensors in anticipation that the hazards associated with field will result in some losses.

Travel:
We are requesting $78,712 ($12,504 in Year 1, $22,604 in each Year 2, $21,604 in Year 3 and $22,000 in Year 4) for travel. *The breakdown of travel costs is as follows:

- **Local Travel** - To support engagement with towns and contractors we request $4212/year for Years 1 to 4. This estimate assumes approximately 1 trip per week with an average roundtrip mileage of 150 miles at $0.545/mile.
- **Regional Coordination** - We request $4392/year for travel to coordinate with colleagues in the northeast and NY metropolitan regional area in each Years 1-3 and $2196 in Year 4. These estimates assume approximately one trip per month by a project team member to a meeting 200 miles from Groton, CT, at $0.54/mile and a 1 night hotel at $150/day in each Years 1-3, and 1 trip every 2 months in Year 4.
- **National coordination** - We are request $3000 in Year 1 and $6000 in each Years 2 to 4 to support the expense for two of the senior project team (PI/Co-PI/Asst. Dir.) to travel to one national conference per year to learn from other professionals working on related projects. In addition, we request $14,000 in Years 2-4 for the expenses for the 5 Post-Docs and 2 graduate students working on the project to attend one national meeting.

Costs will comply with the applicable Federal regulations and per diem rates in effect for the destination cities when the costs are incurred. Travel costs may include airfare, hotel, per diem, registration fees and ground transportation.

Other Direct Costs:
Materials and Supplies: We request $70,100 ($30,100 in Year 1, $18,000 in Year 2, $11,500 in Year 3, and $10,500 in Year 4) for materials and supplies necessary to conduct the project. (Note that computer workstations are classified as supplies). An itemization of the cost follows:

- We request $3000 in each Years 1-4 for computer software and backup media for the computers used in the CIRCA offices and for instrument preparation, data analysis, model development and evaluation, and the preparation of documentation.

- We request $14,000 in Year 1 to purchase 7 personal computers for the new staff working on the project and $4000 in Year 2 for the postdoctoral research assistants.

- We request $3,000 for food, room rental and supplies for two workshops in Year 1; $4,000 each Years 1-4 for food, room rental and supplies for two regional workshops and one summit each year in Years 2 and 3; and $3,000 for food, room rental and supplies for one workshop and one summit in Year 4.

- We request $4,000 in Years 1 and 2 and $1,500 in Years 3 and 4 for the purchase of batteries and mooring hardware to support the deployment of instruments.

- We request $3,000 in each Years 1-4 for the calibration and refurbishment of instruments required in the field program.

Publications Costs (Journals)
We request a total of $5,342 ($1,200 in Year 1, $1,091 in Year 2, $1,000 in Year 3, and $2,051 in Year 4) to pay for the costs of publication of results in scientific journals.

Consultant Services:
We request $20,000 ($5,000 in each Years 1-4) for the use of the Research Vessel Lowell Wiecker for deployment and recovery of instruments and bathymetric surveys which requires use of ships. We estimate 5 days per year will be required at cost of $1000/day.

We request $35,352 ($8,202 in Year 1, $8,612 in Year 2, 9,043 in Year 3 and $9,495 in Year 4) for the preparation of instruments, and the recovery and repair will be supported by the Marine Sciences Support facility with the Buoy Support Shop We estimate 160 hour per year will be required at $51.26/hr.

Subawards:
We are requesting $1,000,000 ($500,000 in Year 1 and $500,000 in Year 2) to fund subawards on the project. We propose to engage subcontractors to undertake the municipal, regional and site plans. Contractors will be selected during the grant through a competitive process and estimate up to 4 contracts for a total of $1,000,000.

Indirect Costs:
Indirect costs of 59.5% (Year 1) and 61% (Years 2-4) are assumed on the modified total direct costs (MTDC). Excluded from the MTDC base are costs after the first $25,000 of the requested subaward. The rates and exclusions are based on the University's federally negotiated cost rate agreement with the Department of Health and Human Services dated June 14, 2018.