

INTERLOCAL AGREEMENT

Between

BROWARD COUNTY

and

CITY OF FORT LAUDERDALE

for

COST SHARING FOR THE
CLIMATE CHANGE ADAPTATION PLANNING AND DECISION TOOL
DEVELOPMENT FOR BROWARD COUNTY

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COST SHARING FOR THE
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DEVELOPMENT FOR BROWARD COUNTY

This is an Interlocal Agreement, made and entered into by and between: BROWARD COUNTY, a political subdivision of the state of Florida, hereinafter referred to as "COUNTY",

AND

CITY OF FORT LAUDERDALE, a municipal corporation of the state of Florida, its successors and assigns, on behalf of its water utility, hereinafter referred to as "CITY".

WHEREAS, this Interlocal Agreement is entered into pursuant to §163.01, Florida Statutes, also known as the "Florida Interlocal Cooperation Act of 1969"; and

WHEREAS, COUNTY began a planning process, known as the Broward Countywide Integrated Water Resource Plan, hereinafter known as "IWRP," in 1997 to improve coordination between all water managers in its geographical borders; and

WHEREAS, COUNTY is desirous of entering into interlocal agreements to encourage local water managers to pursue feasibility and preliminary design work for IWRP related projects which will improve the effective and efficient use of local water resources; and

WHEREAS, the Technical Advisory Committee and the Water Advisory Board for the Board of County Commissioners have recommended cost share funding for these IWRP recommended projects; and

WHEREAS, CITY has expressed a desire to cost share feasibility and preliminary design work pursuant to the terms and conditions hereafter set forth; NOW, THEREFORE,

IN CONSIDERATION of the mutual terms, conditions, promises, covenants, and payments hereinafter set forth, COUNTY and CITY agree as follows:

ARTICLE 1
DEFINITIONS AND IDENTIFICATIONS

- 1.1 Agreement - means this document, Articles 1 through 10, inclusive. Other terms and conditions are included in the exhibits and documents that are expressly incorporated by reference.
- 1.2 Board - The Broward County Board of County Commissioners.
- 1.3 Commission – The City Commission of the City of Fort Lauderdale, Florida
- 1.4 Contract Administrator - The Broward County Administrator, the Director of the Broward County Environmental Protection and Growth Management Division, or the designee of such County Administrator or Director. The primary responsibilities of the Contract Administrator are to coordinate and communicate with CITY and to manage and supervise execution and completion of the Scope of Services and the terms and conditions of this Interlocal Agreement as set forth herein. In the administration of this Interlocal Agreement, as contrasted with matters of policy, all parties may rely on the instructions or determinations made by the Contract Administrator; provided, however, that such instructions and determinations do not change the Scope of Services.
- 1.5 County Administrator – The administrative head of COUNTY pursuant to Sections 3.02 and 3.03 of the Broward County Charter.
- 1.6 County Attorney - The chief legal counsel for COUNTY who directs and supervises the Office of the County Attorney pursuant to Section 2.10 of the Broward County Charter.
- 1.7 Project - The Project consists of the services described in Article 2.
- 1.8 NEMAC – National Environmental Modeling and Analysis Center (University of North Carolina-Ashville)

ARTICLE 2
SCOPE OF SERVICES

CITY shall provide cost sharing for the development of an adaptation planning and decision tool for Broward County. COUNTY shall facilitate the development of an adaption planning and decision tool for Broward County including all work identified in this Interlocal Agreement and Exhibit "A". The parties agree that the Scope of Services is a description of all work to be performed under this Interlocal Agreement to include preliminary considerations and prerequisites, and all labor, materials, equipment, and tasks which are such an inseparable part of the work described that exclusion

would render performance by COUNTY impractical, illogical, or unconscionable.

- 2.1 It is understood and agreed that COUNTY may enter into a separate agreement with the NEMAC to perform the services required under this Interlocal Agreement; however, CITY shall not be responsible for any additional costs or expenses associated with said separate agreement with the NEMAC beyond those agreed to herein. CITY acknowledges that the Contract Administrator has no authority to make changes that would increase, decrease, or otherwise modify the Scope of Services to be provided under this Agreement.

ARTICLE 3
COMPENSATION

- 3.1 CITY agrees to pay COUNTY, in the manner specified in Section 3.2, Method of Billing and Payment, the total of Five Thousand Dollars (\$5,000), of the total project cost of Fifty Thousand Dollars (\$50,000), for work actually performed and completed pursuant to this Interlocal Agreement as set forth in Exhibit "A," which amount shall be accepted by COUNTY as full compensation for all such work. It is acknowledged and agreed by COUNTY that this amount is the maximum payable and constitutes a limitation upon CITY's obligation to compensate COUNTY for its services related to this Interlocal Agreement. This maximum amount, however, does not constitute a limitation, of any sort, upon COUNTY's obligation to perform all items of work required by the Scope of Services.

3.2 METHOD OF BILLING AND PAYMENT

- 3.2.1 One invoice for the total amount of \$5,000 will be submitted at the end of the last phase of the project (Phase 4). The invoice must be in the form of one original invoice plus one copy. Invoice shall designate the nature of the services performed and/or the expenses incurred.

- 3.2.2 CITY shall pay COUNTY within thirty (30) calendar days of receipt of COUNTY's proper invoice, as required by the "Broward County Prompt Payment Ordinance" (Broward County Ordinance No. 89-49, as may be amended from time to time). To be deemed proper, all invoices must comply with the requirements set forth in this Interlocal Agreement and must be submitted on the form and pursuant to instructions prescribed by Contract Administrator.

3.3 Payment shall be made to COUNTY at:

Board of Broward County Commissioners
Jim Steinmuller, Accounting Administrator
Government Center, Room 221
115 South Andrews Avenue
Fort Lauderdale, Florida 33301

ARTICLE 4
TERM AND TIME OF PERFORMANCE OF AGREEMENT

- 4.1 This Interlocal Agreement shall become effective upon execution by COUNTY and shall continue in full force and effect until midnight, twelve (12) months following final execution of the Agreement. In addition, the County Administrator is authorized to execute any amendments extending the term of this Interlocal Agreement with the appropriate amendment prepared with the same or similar formality.
- 4.2 All duties, obligations, and responsibilities of COUNTY and CITY required by this Interlocal Agreement shall remain in full force and effect through the termination date or any extended termination date, as set forth above, unless written notice of termination by the COUNTY or the CITY is provided pursuant to Article 9, Notices. Time shall be deemed to be of the essence in performing the duties, obligations and responsibilities required by this Interlocal Agreement.

ARTICLE 5
CHANGE IN SCOPE OF SERVICES

- 5.1 Any change to the Scope of Services must be accomplished by a written amendment, executed by the parties in accordance with Section 10.9 below.

ARTICLE 6
GOVERNMENTAL IMMUNITY

- 6.1 Nothing herein is intended to serve as a waiver of sovereign immunity by any party nor shall anything included herein be construed as consent to be sued by third parties in any matter arising out of this Interlocal Agreement or any other contract. CITY and COUNTY are a state agency or political subdivision as defined in Chapter 768.28, Florida Statutes, and agrees to be fully responsible for the acts and omissions of its agents or employees to the extent permitted by law.

ARTICLE 7
INSURANCE

- 7.1 COUNTY and the CITY are entities subject to Section 768.28, Florida Statutes, and both the COUNTY and CITY shall furnish one another with written verification of liability protection in accordance with state law prior to final execution of said Agreement.

ARTICLE 8
TERMINATION

- 8.1 This Agreement may be terminated for cause by the aggrieved party if the party

in breach has not corrected the breach within ten (10) days after receipt of written notice from the aggrieved party identifying the breach. This Agreement may also be terminated for convenience by the Board or Commission. Termination for convenience by the Board or Commission shall be effective on the termination date stated in written notice provided by COUNTY, which termination date shall be not less than thirty (30) days after the date of such written notice. This Agreement may also be terminated by the County Administrator upon such notice as the County Administrator deems appropriate under the circumstances in the event the County Administrator determines that termination is necessary to protect the public health, safety, or welfare. If COUNTY erroneously, improperly, or unjustifiably terminates for cause, such termination shall be deemed a termination for convenience, which shall be effective thirty (30) days after such notice of termination for cause is provided.

- 8.2 Termination of this Interlocal Agreement for cause by CITY or COUNTY shall include, but not be limited to, negligent, intentional, or repeated submission for payment of false or incorrect bills or invoices, failure to suitably perform the work, failure to continuously perform the work in a manner calculated to meet or accomplish the objectives as set forth in this Interlocal Agreement, or multiple breach of this Interlocal Agreement which has a material adverse effect on the efficient administration of the Project notwithstanding whether any such breach was previously waived or cured.
- 8.3 Notice of termination shall be provided in accordance with the "NOTICES" section of this Interlocal Agreement except that notice of termination by Contract Administrator which Contract Administrator deems necessary to protect the public health, safety, or welfare may be verbal notice which shall be promptly confirmed in writing in accordance with the "NOTICES" section of this Interlocal Agreement.
- 8.4 In the event this Interlocal Agreement is terminated for convenience, COUNTY shall be paid for any services properly performed to the date the Agreement is terminated; however, upon being notified of CITY's election to terminate, COUNTY shall refrain from performing further services or incurring additional expenses under the terms of this Interlocal Agreement. COUNTY acknowledges and agrees that ten dollars (\$10.00) of the compensation to be paid by CITY, the receipt and adequacy of which is hereby acknowledged by COUNTY, is given as specific consideration to COUNTY for CITY's right to terminate this Interlocal Agreement for convenience.

ARTICLE 9
NOTICES

- 9.1 Whenever either Party desires to give notice to the other, such notice must be in writing, sent by certified United States Mail, postage prepaid, return receipt requested, or sent by commercial express carrier with acknowledgement of delivery, or by hand delivery with a request for a written receipt of

acknowledgment of delivery, addressed to the party for whom it is intended at the place last specified. The place for giving notice shall remain the same as set forth herein until changed in writing in the manner provided in this section. For the present, the Parties designate the following:

FOR BROWARD COUNTY:

Director, Natural Resource Planning and Management Division
115. S. Andrews Avenue, Room 329H
Fort Lauderdale, Florida 33301

With copy to:

County Administrator
115 South Andrews Avenue, Suite 409
Fort Lauderdale, Florida 33301

TO CITY:

Director, Public Works Department
City of Fort Lauderdale
100 N. Andrews Avenue
Fort Lauderdale, FL 33301

ARTICLE 10
MISCELLANEOUS

10.1 OWNERSHIP OF DOCUMENTS

Any and all reports, photographs, surveys, and other data and documents provided or created in connection with this Interlocal Agreement are and shall remain the property of COUNTY, and, if a copyright is claimed, CITY grants to COUNTY a non-exclusive license to use the copyrighted item(s) indefinitely, to prepare derivative works, and to make and distribute copies to the public. In the event of termination of this Interlocal Agreement, any reports, photographs, surveys, and other data and documents prepared by COUNTY, whether finished or unfinished, shall be delivered by COUNTY to the City Contract Administrator within seven (7) days of termination of this Interlocal Agreement by either party.

10.2 PUBLIC RECORDS

COUNTY is a public agency subject to Chapter 119, Florida Statutes. To the extent CITY is a contractor acting on behalf of the COUNTY pursuant to Section 119.0701, Florida Statutes, CITY shall:

10.2.1 Keep and maintain public records that ordinarily and necessarily would be required to be kept and maintained by COUNTY where COUNTY

performing the services under this Agreement;

10.2.2 Provide the public with access to such public records on the same terms and conditions that COUNTY would provide the records and at a cost that does not exceed that provided in Chapter 119, Florida Statutes, or as otherwise provided by law;

10.2.3 Ensure that public records that are exempt or that are confidential and exempt from public record requirements are not disclosed except as authorized by law; and

10.2.4 Meet all requirements for retaining public records and transfer to COUNTY, at no cost, all public records in possession of CITY upon termination of this Agreement and destroy any duplicate public records that are exempt or confidential and exempt. All records stored electronically must be provided to COUNTY in a format that is compatible with the information technology systems of COUNTY.

The failure of CITY to comply with the provisions set forth in this Section shall constitute a default and breach of this Agreement and COUNTY shall enforce the default in accordance with the provisions set forth in Section 8.1.

10.3 INDEPENDENT CONTRACTOR

COUNTY is an independent contractor under this Interlocal Agreement. Services provided by COUNTY pursuant to this Interlocal Agreement shall be subject to the supervision of COUNTY. In providing such services, neither COUNTY nor its agents shall act as officers, employees, or agents of the CITY. No partnership, joint venture, or other joint relationship is created hereby. CITY does not extend to COUNTY or COUNTY's agents any authority of any kind to bind CITY in any respect whatsoever.

10.4 MATERIALITY AND WAIVER OF BREACH

COUNTY and CITY agree that each requirement, duty, and obligation set forth herein is substantial and important to the formation of this Interlocal Agreement and, therefore, is a material term hereof.

COUNTY's failure to enforce any provision of this Interlocal Agreement shall not be deemed a waiver of such provision or modification of this Interlocal Agreement. A waiver of any breach of a provision of this Interlocal Agreement shall not be deemed a waiver of any subsequent breach and shall not be construed to be a modification of the terms of this Interlocal Agreement.

10.5 COMPLIANCE WITH LAWS

COUNTY shall comply with all federal, state, and local laws, codes, ordinances,

rules, and regulations in performing its duties, responsibilities, and obligations pursuant to this Interlocal Agreement.

10.6 SEVERANCE

In the event a portion of this Agreement is found by a court of competent jurisdiction to be invalid, the remaining provisions shall continue to be effective unless COUNTY or SECOND PARTY elects to terminate this Agreement. An election to terminate this Agreement based upon this provision shall be made within seven (7) days of final court action, including all available appeals.

10.7 JOINT PREPARATION

The Parties and their counsel have participated fully in the drafting of this Agreement and acknowledge that the preparation of this Agreement has been their joint effort. The language agreed to expresses their mutual intent and the resulting document shall not, solely as a matter of judicial construction, be construed more severely against one of the Parties than the other. The language in this Agreement shall be interpreted as to its fair meaning and not strictly for or against any party.

10.8 PRIORITY OF PROVISIONS

If there is a conflict or inconsistency between any term, statement, requirement, or provision of any exhibit attached hereto, any document or events referred to herein, or any document incorporated into this Interlocal Agreement by reference and a term, statement, requirement, or provision of Articles 1 through 10 of this Interlocal Agreement, the term, statement, requirement, or provision contained in Articles 1 through 10 shall prevail and be given effect.

10.9 JURISDICTION, VENUE, WAIVER OF JURY TRIAL

This Agreement shall be interpreted and construed in accordance with and governed by the laws of the state of Florida. The Parties acknowledge that jurisdiction of any controversies or legal disputes arising out of this Agreement, and any action involving the enforcement or interpretation of any rights hereunder, shall be exclusively in the state courts of the Seventeenth Judicial Circuit in Broward County, Florida, and venue for litigation arising out of this Agreement shall be exclusively in such state courts, forsaking any other jurisdiction which either party may claim by virtue of its residency or other jurisdictional device. **BY ENTERING INTO THIS AGREEMENT, CITY AND COUNTY HEREBY EXPRESSLY WAIVE ANY RIGHTS EITHER PARTY MAY HAVE TO A TRIAL BY JURY OF ANY CIVIL LITIGATION RELATED TO, ARISING FROM, OR IN CONNECTION WITH THIS AGREEMENT.**

10.10 AMENDMENTS

The Parties may amend this Agreement to conform to changes in federal, state, or local laws, regulations, directives, and objectives. No modification, amendment, or alteration in the terms or conditions contained herein shall be effective unless contained in a written document prepared with the same or similar formality as this Agreement and executed by the COUNTY and CITY or others delegated authority to or otherwise authorized to execute same on their behalf.

10.11 PRIOR AGREEMENTS

This document represents the final and complete understanding of the parties and incorporates or supersedes all prior negotiations, correspondence, conversations, agreements, and understandings applicable to the matters contained herein. The parties agree that there is no commitment, agreement, or understanding concerning the subject matter of this Interlocal Agreement that is not contained in this written document. Accordingly, the parties agree that no deviation from the terms hereof shall be predicated upon any prior representation or agreement, whether oral or written.

10.12 INCORPORATION BY REFERENCE

The truth and accuracy of each "Whereas" clause set forth above is acknowledged by the parties. The attached Exhibit "A" is incorporated into and made a part of this Interlocal Agreement.

10.13 REPRESENTATION OF AUTHORITY

Each individual executing this Interlocal Agreement on behalf of a party hereto does hereby represent and warrant that he or she is, on the date he or she signs this Interlocal Agreement, duly authorized by all necessary and appropriate action to execute this Interlocal Agreement on behalf of such party.

10.14 MULTIPLE ORIGINALS

Multiple copies of this Interlocal Agreement may be executed by all parties, each of which, bearing original signatures, shall have the force and effect of an original document.

10.15 RECORDS

This Interlocal Agreement shall be recorded by the County in the public records of Broward County, in accordance with Section 163.01, F.S. (2008), the Florida Interlocal Cooperation Act of 1969.

IN WITNESS WHEREOF, the parties hereto have made and executed this Interlocal Agreement: BROWARD COUNTY through its BOARD OF COUNTY COMMISSIONERS, signing by and through its Mayor or Vice-Mayor, authorized to execute same by Board action on the _____ day of _____, 20____, and CITY OF FORT LAUDERDALE, signing by and through its Mayor, who is duly authorized to execute same by Board action on the _____ day of _____, 20____.

COUNTY

ATTEST:

BROWARD COUNTY, through its
BOARD OF COUNTY
COMMISSIONERS

County Administrator and Ex-Officio
Clerk of the Board of
County Commissioners of
Broward County, Florida

By _____
Mayor
____ day of _____, 20____

Insurance requirements
approved by Broward County
Risk Management Division

Approved as to form by
Joni Armstrong Coffey
Broward County Attorney
Governmental Center, Suite 423
115 South Andrews Avenue
Fort Lauderdale, Florida 33301
Telephone: (954) 357-7600
Telecopier: (954) 357-7641

By _____
Signature (Date)

By _____
Daphne E. Jones (Date)
Assistant County Attorney

Print Name and Title above

Maite Azcoitia (Date)
Deputy County Attorney

INTERLOCAL AGREEMENT BETWEEN BROWARD COUNTY AND CITY OF FORT LAUDERDALE FOR COST SHARING FOR THE CLIMATE CHANGE ADAPTATION PLANNING AND DECISION TOOL DEVELOPMENT FOR BROWARD COUNTY, FLORIDA TO BE PERFORMED IN PARTNERSHIP WITH NEMAC.

CITY

IN WITNESS OF THE FOREGOING, the parties have set their hands and seals the day and year first above written.

WITNESSES:

CITY OF FORT LAUDERDALE

Lee R. Feldman, City Manager

[Witness type or print name]

[Witness type or print name]

ATTEST:

(CORPORATE SEAL)

Jonda K. Joseph, City Clerk

APPROVED AS TO FORM:

Assistant. City Attorney

Phase 1 - Data and Values Integration and Creation of a Climate Impacts Database

3D modeling and resulting visualization requires a certain amount and level of data up front to ensure that they are both accurate and current. Therefore, a complete data acquisition phase will be undertaken for the selected pilot focus areas in order to ensure the right datasets feed into the 3D models and visualizations. Fortunately for the project, most of the required datasets already exist. Required datasets include 1) high resolution aerial ortho and oblique imagery, 2) high resolution digital elevation models (DEM), preferably bare earth DEMs generated from light detection and ranging (LIDAR) data, 3) building footprint, height, and base floor elevation data, 4) hydrologic information in the form of floodplain, stream, canals, and other feature data, and 5) ancillary data including streets, bridge locations, street-scape, utility/infrastructure, land use/land cover, and planimetric data. All of these data are currently available or can be modified from public data sources and will be brought in the database for integration with hydrologic model outputs. The information will be in GIS and spatial format and will have appropriate metadata. This effort will also confirm that hydrologic and 3D models can interact with each other so that the impacts from the hydrologic models help drive the development of the 3D models.

The data must be scalable in order to ensure they will work across a variety of project scales. We will design a pilot focus areas GIS database to handle three main scales – the county as a whole, the basin where USGS is doing a detailed hydrologic analysis, and the pilot focus areas where detailed 3D visualizations will be constructed (one square kilometer or less depending upon building density). However, only the pilot focus areas will be fully populated with the GIS datasets outlined in the previous paragraph as well as generated 3D model data including the 3D buildings and their associated attributes. The GIS database will then be used as one main building block for a Climate Impacts Database for Broward County, which can serve as the foundation for a larger study.

Finally, the issue of data storage must be addressed. Broward County will need a database that can be kept up-to-date with the addition of new impacts, expansion of the study area, etc. UNC Asheville has explored how to store these data. Most data work well in typical GIS Esri Geodatabases and Spatial Data Engine (SDE) databases, but the 3D models can prove to be more of a challenge, and we are currently experimenting with City GML and other solutions. We need to ensure delivery of data in a format that is secure yet accessible by multiple users as specified in the SARP proposal that followed the NOAA requirements.

Deliverables:

- 1.) Any value-add to any of the datasets that we collect from Broward County and other sources
 - a. Enhancements to the building footprints dataset, which may include building height, number of floors, and first floor elevations
 - b. Recommendations for improvements to the initially proposed methodologies
- 2.) GIS database suitable for desktop applications
- 3.) Prototype of 3D model database

Phase 2 – 3D Modeling and Visualization

The first step in the 3D modeling and visualization process is to build an initial 3D scene of the pilot focus areas, which will allow for data investigation and allow UNC Asheville to become more familiar with the local environment. It will also serve as the base for building more detailed 3D scenes. This initial 3D scene will incorporate elevation DEMs from the available LIDAR data and drape existing aerial ortho-imagery onto the elevation data.

Next, 2D polygon building footprints and some estimated building height data will be used to construct an initial set, or mass, of 3D building models county-wide. These initial building models are referred to as sugar-cubes due to their basic sugar-cube like appearance. The 2D polygon building footprints will be extruded to their known heights, obtained from attributes in the building footprint dataset. Building height information will either originate from county tax information or will be estimated by determining the number of floors in a building (multiplying total floors by 10 feet). The buildings will be textured based on type of building, with the building type information being derived by intersecting the buildings with the parcel land use data. Select buildings will have more detailed textures and facades applied using either Esri tools described further below or Trimble SketchUp.

To enhance the visualization experience and simulate the actual environment as realistically as possible, more detailed 3D building models are required. UNC Asheville will commission and purchase a set of highly-detailed building models of the pilot focus areas from CyberCity 3D Inc., a California-based company that specializes in the automatic extraction and generation of 3D building models utilizing high-resolution aerial oblique imagery. This technique of developing 3D building models represents the very latest in technology for this level of 3D visualization. The complete buildings dataset will be delivered without textures, though selected and key iconic buildings will have textures and facades applied. They will also include such attributes as volume, height of first floor, building height, and total roof area, all of which will potentially allow for an even greater set of spatial analyses and 3D visualization. These detailed 3D buildings, as well as the sugar-cube buildings previously mentioned, could all be color-coded based on building type, value, flood levels, zoning use, or other tabular and stakeholder-identified information.

To achieve maximum realistic 3D visualizations, we may need to incorporate other elements to create “streetscape” scenes. This means adding street furniture, trees, lamp posts and other major landmarks. Additionally, depending on the level of detail, the aerial ortho-imagery may need to be “cleaned”. This includes removing bridges over water and roadways to make room for 3D bridges. Otherwise, you will see a 3D bridge with the actual bridge pasted to the elevation in the imagery underneath. We will remove other elements if necessary, such as cars from streets or parking lots (in pre-determined locations). Adobe Photoshop will be used for this imagery cleaning process.

Once all of the data, building models, and other ancillary information have been assembled into the 3D GIS application and database, selected and available flood model and sea-level rise data from the USGS hydrologic modeling efforts and FEMA floodplain maps will be incorporated. This will include the spatial

and temporal extent of inundation responses to various sea-level rise rates, observed high tides, designed storm events, and inland and coastal groundwater and surface water levels.

Finally, the actual 3D visualizations and scenarios will be generated for the pilot focus areas. This will include visualizing selected different flood heights that can be used in developing and testing adaptation strategies, including 1) replacement of gravity drainage infrastructure with pumps, 2) movement of control structures, 3) retrofitting current control structures, and 4) increasing coastal sea wall heights. Again, due to the pilot nature of this study, not all of these may be visualized.

From a technical software standpoint, a combination of Esri's 3D products will be utilized for this work, including ArcGIS for Desktop's 3D Analyst (ArcScene and ArcGlobe) and CityEngine 2014. Much of the initial 3D work, including data assembly, building an initial scene, and incorporating 3D building and flood models, will be accomplished with ArcScene and ArcGlobe. However, an innovative approach for UNC Asheville will be the use of CityEngine 2014, which represents Esri's latest advancement in 3D visualization technology, allowing not only 3D visualization but 3D analysis as well. It allows for more dynamic city layouts, procedural-based modeling, the ability to quickly sketch and texture 3D building models, and the opportunity to test various planning and hazard scenarios. CityEngine 2014 also includes the option to export "web-scenes" directly to Esri's ArcGIS Online, a free online GIS web viewer, which will allow for the 3D visualizations to be explored in a web-based interactive environment. Broward County is already utilizing ArcGIS Online.

A variety of 3D outputs from the 3D modeling and visualization work described in the previous paragraph will be generated, including 2D and 3D graphics as well as 3D animations. These will be delivered as web and print versions to be used in simulations and/or scenarios. Animations will consist of virtual fly-overs of the pilot focus areas. These image and video outputs will then be stored on a server to enable access through a web interface.

Deliverables:

- 1.) Any value-add to the imagery used in the visualizations
- 2.) Sugar-cube 3D building models
- 3.) Detailed 3D building models from CyberCity 3D
- 4.) Any other GIS data generated for this pilot focus areas project
- 5.) Data output from the 3D analysis
- 6.) 2D and 3D graphics of the pilot areas
- 7.) Short and portable video animations of the pilot areas
- 8.) ArcGIS Online-based web-scenes
- 9.) Recommended improvements for the full project

Phase 3 – Narrative Development and Storytelling with a Supporting Online Application

While the 3D visualizations and animations will be of great value and useful decision making tools, they must be supplemented by a set of narratives more clearly defining and describing what the visualizations are actually depicting and highlighting. Additionally, these narratives must be

disseminated in such a way that they tell the complete story of moving from hydro model data and economic assessments to visualizations to decisions. We will create a set of sample narratives and a story board for the pilot focus areas.

UNC Asheville will also create a set of mock-ups and wireframes of a website/portal (or a very limited working prototype) that would house all of these visualizations and link to a collection of education and outreach materials for various audiences. The website, to be built in a later phase of work, would include an online GIS viewer for map reference, a collection of graphics and screenshots, the 3D animations and virtual fly-overs and short movies that would discuss the scenarios and provide critical way-finding.

Deliverables:

- 1.) Set of sample narratives and a sample story board
- 2.) Set of wireframe designs simulation how the final website and web visualization tool would look

Phase 4 – Workshops for Broward County Staff, Planners, and other Stakeholders

Two staff members from UNC Asheville will travel to Broward County and host up to two mini (2-4 hours) workshops. The first mini workshop would be geared towards the GIS and other technical staff of Broward County and would focus on the 3D modeling and visualization work performed. The second mini workshop would be for identified and invited stakeholders to engage them in the process and acquire their input.

Deliverables:

- 1.) Workshop content in digital form (presentations, exercises, etc.)

Statement of In-Kind Support and Justification of Sole Source

UNC Asheville has already invested over \$10,000 working with Broward County on the Research and Development of these types of tools. They will invest another \$10,000 worth of effort as a match to the additional \$40,000 that Broward County is investing. UNC Asheville has significant expertise and experience in creating the type of products proposed, and will not have to invest time or money in establishing a work process or hiring experienced staff.

In addition, UNC Asheville is the primary technology provider to the Third National Climate Assessment as well as the recently announced White House’s Climate Resilience Toolkit and will utilize these sets of skills and expertise as leverage to create this prototype project.

Finally, though the Broward County/UNC Asheville /NCAR joint SARP proposal submitted in fall 2013 was not successful, this investment by Broward County will not only get this project moving ahead, it will also serve as a good example of the proactive attitude of the county related to Climate Impacts and will position it to benefit from other future funding.

Timeline

2014 / 2015										
Timeline	J	A	S	O	N	D	J	F	M	Value
Phase 1										\$7,500
Phase 2										\$17,500**
Phase 3										\$7,500
Phase 4										\$7,500

UNC Asheville will bill Broward County at the end of each phase of work equally for the total \$30,000.

**Once the Subcontractor (CyberCity 3D, Inc.) submits invoice to UNC Asheville for the 3D building acquisition, UNC Asheville will bill Broward County for the \$10,000 that will be due.

Proposed Budget

Category	Amount
Salaries and Benefits	\$22,000
3D Building Models to Contractor	\$10,000
Materials/Supplies/Software/Administration	\$5,000
Travel	\$3,000
Total Cost to Broward County	\$40,000
UNC Asheville Salaries and Benefits (UNC Asheville Match)	\$10,000