Memorandum

MIAMI-DADE COUNTY

Date: November 19, 2015

December 15, 2015
Agenda Item No. 2B1

To: Honorable Chairman Jean Monestime
and Members, Board of County Commissioners

From: Carlos A. Gimenez
Mayor

Subject: Third Quarter Status Report In Response to Multiple Resolutions Pertaining to Recommendations by the Sea Level Rise Task Force (July 31, 2015 – October 31, 2015)

The following report is pursuant to multiple resolutions adopted by the Board of County Commissioners (Board) on January 21, 2015, which support the implementation of the recommendations presented by Miami-Dade Sea Level Rise Task Force (Task Force).

For ease of review, the individual status reports have been incorporated into one (1) Comprehensive Report, which is attached. The final report pursuant to Resolution No. R-44-15 was provided as part of the Second Quarter Status Report. A resolution authorizing an extension of six (6) months for the final report requested under Resolution No. R-46-15 was approved by the Board on November 3, 2015.

Background

In July 2013, the Board created the Task Force for the purpose of reviewing current and relevant data, science and reports, and to assess the likely and potential impacts of sea level rise and storm surge on Miami-Dade County over time. On July 1, 2014, the Task Force presented a report to the Board entitled, "Miami-Dade Sea Level Rise Task Force Report and Recommendations," providing the requested assessment along with recommendations on how Miami-Dade County can begin preparing for projected sea level rise impacts. Subsequently, Resolution No. R-451-14 and Ordinance No. 14-79 were approved by the Board in 2014, requiring that planning, design, and construction of County infrastructure consider potential sea level rise impacts. In January 2015, the Board adopted seven (7) resolutions supporting the recommendations of the Task Force, of which one (1) was an urging and six (6) require quarterly reports and a final report to the Board. Additional background details for each of these resolutions can be found in previous quarterly progress reports transmitted to the Board.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda.

If you have questions concerning the above, please contact James F. Murley, Chief Resilience Officer, Department of Regulatory and Economic Resources, at (305) 375-5593 or MURLEYJ@miamidade.gov.

Attachment

c: Honorable Harvey Ruvin, Clerk of Courts, Eleventh Judicial Circuit
Abigail Price-Williams, County Attorney
Office of the Mayor Senior Staff
Department Directors
Lourdes M. Gomez, Deputy Director, Department of Regulatory and Economic Resources
James F. Murley, Chief Resilience Officer, Department of Regulatory and Economic Resources
Charles Anderson, Commission Auditor
Eugene Love, Agenda Coordinator

Comprehensive Report

Sea Level Rise Resolutions

Third Quarter Update (July 31, 2015- October 31, 2015)

R-44-15: Study the Feasibility of Designating Climate Adaptation Action Areas

This resolution directed the Mayor or the Mayor's Designee to study the feasibility of designating climate change Adaptation Action Areas, as recommended in the Comprehensive Development Master Plan. This resolution requires a status report within 90 days, and a final report within 180 days of the effective date.

The final report for this resolution was transmitted to the Board as part of the Second Quarter Status Report.

R-45-15: Prepare an Action Plan and Report to Implement the Miami-Dade County Climate Change Advisory Task Force Recommendations

This resolution directed the Mayor or the Mayor's designee to prepare an action plan and report to implement the Miami-Dade County Climate Change Advisory Task Force Recommendations of (I) establishing departmental oversight for the implementation of the task force recommendations and (II) dedicating sufficient resources and staffing to review, update, and implement the Miami-Dade County Climate Change Advisory Task Force recommendations. This resolution requires quarterly status reports and a final report within one (1) year of the effective date.

The following steps were taken during the third quarter in order to prepare the report referenced in this resolution:

- As of this quarter, Department of Regulatory and Economic Resources (RER) staff have completed the analysis comparing the Climate Change Advisory Task Force (CCATF) recommendations to the Regional Climate Action Plan and GreenPrint and have identified where CCATF recommendations were integrated into these subsequent plans. The staff will consider the incorporation of the other recommendations into the next iteration of GreenPrint where the recommendations are still relevant and appropriate.

- The staff have also completed the research on the implementation status of each recommendation and have prepared a first draft of that component of the final report which will be submitted to the Board in January of 2016.

- During the final quarter, staff will work with other departments and divisions to finalize the determination of resources and staffing that will be necessary to implement the remaining relevant recommendations

R-46-15: Prepare Action Plan and Report to Accelerate the Climate Change Adaptation Planning Process by Evaluating the Engineering and Other Relevant Expertise Needed to Develop an Enhanced Capital Plan

This resolution directs the Mayor or the Mayor's designee to prepare an action plan and report to accelerate the climate change adaptation planning process by evaluating the engineering and other relevant expertise needed to develop an enhanced capital plan that includes but is not limited to flood protection, salinity structures, pump stations, and road and bridge designs, and to determine the costs of retaining the experts needed. This resolution requires a status report within 90 days and a final report within 180 days of the effective date. Resolution No. R-1009-15, approved by the Board on November 3, 2015, authorized an extension to provide the final report.

Staff conducted the following research and interviews during the third quarter to address the preparation of the action plan required by this resolution:

- RER staff continued many tasks initiated in previous quarters including working with the Water and Sewer Department (WASD), the Stormwater Utility Planning Division (formerly in the PWWM department) at RER, and the City of Miami Beach, to evaluate the applicability of their existing contracts with various firms to plan for adaptation to rising sea levels.

Each of these existing contracts provide very useful information which can serve as a springboard for the County's own efforts. The technical products from these projects are also being collected by RER staff to inform the final reports for this resolution and Resolution R-48-15.

- On August 31, 2015, RER had a conference call with the city of Seattle staff to discuss how the city has incorporated sea level rise into its capital project planning process. The City staff explained how consideration of sea level rise implications were integrated into their Public Works department's "stage gates" process, which is designed to rationalize investments and ensure that capital improvement projects make sense from a triple bottom line perspective. Before creating this review process Seattle had two rounds of studies developing localized sea level rise projections which were then mapped in GIS and used for a vulnerability analysis. Project managers and have adopted the sea level rise projection and have experienced a relatively low marginal cost to elevate projects to be resilient to sea level rise. City staff are beginning conversations with other agencies to ensure that these resilient projects do not become islands, but are instead supported by the surrounding infrastructure. The City has yet to encounter significant pushback against these new requirements and has generally found good buy-in. Seattle is considering strengthening their floodplain regulations in the future to better incorporate sea level rise, but have not determined the timing for this yet.

- On September 2, 2015, RER staff spoke with New York City to discuss how the City developed the comprehensive coastal protection strategy outlined in *A Stronger More Resilient New York.* This comprehensive strategy drew heavily upon the *Urban Waterfront Adaptive Strategies* guide (discussed later in this report) and previous supporting research such as that done by the New York City Panel on Climate Change. Building on this foundational research and working with an urgency provided by Hurricane Sandy, the New York City team developed a comprehensive strategy for coastal protection in a period of five months. Typically, an effort of this scale would take one to two years, at a minimum. With an internal team of over 40 people pulled from various departments, and with the support of external consultants and academics, the plan was published in June 2013. Even though the plan was prepared over a short time period the team garnered significant community engagement and feedback that was incorporated into the final plan. This comprehensive plan serves as an excellent model that Miami-Dade County should consider drawing from as the County prepares its own strategy.

- On September 3, 2015, RER staff spoke with staff at the City of San Francisco about how the city has incorporated sea level rise into its capital planning process and to discuss the city's process to develop the sea level rise checklist summarized in the Second Quarter report. To support the development of the checklist and the accompanying comprehensive guidance document framing vulnerability and adaptive capacity, City staff worked with liaisons from key government departments for over a year. Through frequent meetings they were able to develop a process that had wide buy-in from other departments. Through that process they were also able to integrate additional training on climate change and sea level rise to bolster their internal capacity to respond to these changes. During this process the city was able to draw upon existing contracts with consulting firms with the relevant technical expertise. For example, the city was able to draw upon the engineering firm that was under contract to develop a comprehensive capital improvement plan for the city's sewer system. One of the many strengths of the approach adopted by San Francisco is that it provides considerable flexibility to account for the type of project, the project lifespan, and the marginal cost of future adaptations, as well as other considerations. This allows project managers to select the appropriate adaption scenario based on their project. For example, a fire station that is intended to function in place for 75 years, will be built to a much higher elevation than a new park gazebo with a lifespan of only 20 years. San Francisco has shared the materials they used to develop the guidance, their sea level rise project checklist, and their training materials. This process is also an excellent example of how Miami-Dade County can begin to systematically integrate considerations of sea level rise into its own capital planning process.

- During the week of September 21, 2015, RER staff interviewed eight major planning and engineering firms to ascertain the approximate cost, timeline, and scope of work that would be required to develop an enhanced capital plan involving all levels of government to reinvent Miami-Dade County's urban infrastructure. The intention of these interviews was not to evaluate any of the firms, but rather to conduct market research and gather order of magnitude estimates of the approximate costs to fulfil this resolution and better understand how this work could be structured. During these interviews, the firms were asked to discuss precedent projects where their firms had developed a comprehensive capital plan, flood protection plan, or resiliency plan that would be relevant to Miami-Dade County. For each example, the approximate time and resources required to develop it were discussed. Firms were also asked how this work could be phased and subdivided to provide more flexibility based on future funding availability. Specifically they were asked to detail which subcomponents (i.e. economic assessments of adaptation strategies) they would recommend including in phase one of the process. All firms were asked how they could build upon the extensive data and analysis the County has previously developed (i.e. localized sea level rise projections, surge, groundwater, and stormwater modeling etc.) to maximize project outcomes. All firms were asked how they would adapt their work to reflect the unique hydrology and geology in Southeast Florida, which precludes a number of typical flood defenses such as levees. All firms were asked if they have experience evaluating existing codes/regulations/procedures to understand how they could better encourage resilient investments in other capital projects. Finally, all firms were asked how they integrated community engagement into prior planning projects.

- On September 23, 2015, RER staff spoke with a senior climate scientist and coastal engineer from the Army Corps of Engineer's (USACE) Institute for Water Resources in Portland, Oregon. Both individuals are experts in how to incorporate sea level rise into capital project planning. During the conference call, the discussion focused on how Miami-Dade County could potentially implement the USACE's Engineering Technical Letter on sea level rise, which is already partially incorporated through the SE Florida Regional Climate Change Compact's (Compact) Unified Sea Level Rise projection.

R-47-15: Continue Strategic Implementation of Miami-Dade County's Environmentally Endangered Lands (EEL) Program and Identify Potential Additional Long-Term Funding Sources

This resolution directs the Mayor or the Mayor's designee to continue strategic implementation of Miami-Dade County's Environmentally Endangered Lands (EEL) program, consistent with program objectives as approved by the voters, and to identify potential additional long-term funding sources for the continued acquisition and management of EEL lands. This resolution requires quarterly status reports and a final report within 364 days of the effective date.

The following actions have been taken to implement this resolution in the Third Quarter:

- Strategic implementation through acquisition: Between July 30, 2015 and October 15, 2015, the EEL Program has acquired 3.47 acres within the Goulds Pineland EEL Preserve at a total cost of $180,000 (all Building Better Communities General Obligation Bond Program funding). This acreage includes the purchase of two (2) folios, one of which is 2.3 acres and the other is 1.17 acres.

- Identify potential long term funding for acquisition and land management: The balance of the EEL Trust Fund as of July 31, 2015 was $41,886,142. Approximately $12.9 million dollars of additional funds for land acquisition remains available under the Building Better Communities General Obligation Bond Program. County staff continue to evaluate additional potential funding opportunities.

R-48-15: Conduct a Comprehensive Study and Develop Adaptation Strategies to Address Potential Flood Damage Reduction and Saltwater Intrusion

This resolution requests that the South Florida Water Management District, the United States Geological Survey, and the Southeast Florida Regional Climate Change Compact Partners work with Miami-Dade County on issues of climate change and sea level rise, and directs the Mayor or the Mayor's designee in conjunction with the Office of Intergovernmental Affairs to work jointly with these entities to conduct a comprehensive study and develop adaptation strategies to address potential flood damage reduction and saltwater intrusion associated with sea level rise and put forth a time frame for implementation and potential funding mechanisms. This resolution requires quarterly status reports and a final report within 364 days of the effective date.

The following steps have been taken during the third quarter to address the comprehensive study referenced in this resolution:

- WASD continues to monitor changing environmental conditions and evaluate the potential impact of saltwater intrusion. The resources needed to continue to protect freshwater resources are currently being re-evaluated and a final report will be available by January 2016, indicating where additional resources may be needed. This report will also assess the potential to slow or limit saltwater intrusion.

- The Stormwater Utility Planning Division continues to advance their flooding studies within the C-8 and C-9 basins. The division had previously developed inundation limits and new floodplain maps and an estimate for the end-of-wet season groundwater table. The division is in the process of converting the C-9 model to the appropriate vertical datum (NAVD88), in order to create a new floodplain map which will use the Compact's new unified sea level projections (2015), considering future groundwater table and future land use. The completion schedule for this first modeling work is approximately six (6) weeks after receipt of the future groundwater table from WASD, based on the new US Geological Survey (USGS) groundwater/surface water interface model. After this modelling phase is complete and the floodplain maps are produced, the Planning Division of RER will analyze potential land use impacts.

- In addition, the model runs for Arch Creek basin have been completed using the current Compact sea level rise projections (2015). Maps of inundation depths and new floodplain maps are being prepared using the 2015 Compact projections. Since this is a coastal basin, only the tide projections are necessary for the first round of modeling. The Planning Division of RER, will review the results for potential land use impacts.

- The model runs for Oleta River basin are being prepared, using the current Compact sea level rise projections (2015). Inundation depths maps and new floodplain maps are being prepared using the 2015 Compact projections. Since this is a coastal basin, only the tide projections are necessary for the first round of modeling. The Planning Division of RER, will review the results for potential land use impacts.

- The Florida Climate Institute (FCI) is a consortium of Florida universities with programs focused on climate change and sea level rise related research, and currently includes the University of Miami, Florida International University, Florida Atlantic University, and University of Florida, amongst other Florida universities. RER staff are working with several of the South Florida FCI universities to assemble and summarize the best available science relevant to Miami-Dade County's vulnerability to sea level rise and saltwater intrusion, as well as research on potential adaptation options. A first draft of the submissions from the Florida Climate Institute has been drafted and will be incorporated into the final report which will be submitted to the board in January 2016. The scientific research spans the breadth of disciplines from studying social adaptation to sea level rise, to changing precipitation patterns, to modeling of the interdependencies of various infrastructural systems, to modeling the resilience of wetland ecosystems to changing sea levels.

- Work also continues on the RAND Corporation study "Adaptation Planning for Sea Level Rise and Climate Change in Southeast Florida: Understanding the Interactions of New Infrastructure, Land Use Changes, and Water Management". The technical experts working on this project are world-renowned experts in complex decision-making and are bringing a wealth of expertise to our regional adaptation challenges. While the final scope is not finalized and may still change, the intended outcome is to develop an integrated system of simulation models for the region that will provide a transparent, interactive tool, and a level analytical playing field to assess potential interactions among water management, transportation, and land use decisions under a range of scenarios. The project's ultimate goal is to provide tools to help decision-makers and stakeholders in the region gain a better understanding of the costs of both action, and inaction, across a wide range of scenarios. In collaboration with RER staff and with technical experts and partners within the region, RAND's engagement will help to support: rigorous evaluation of vulnerabilities of land-based assets, application of models to support economic loss and benefit-cost evaluations, assessment of alternative funding and financing strategies, and identification of preferred and phased risk-reduction strategies. RAND will also seek to test several hypotheses including one which proposes that more compact development will reduce the costs of providing selected public services.

- Work is also beginning on a Pre-disaster Mitigation project in the C-7, C-8, and C-9 basins. This project, funded by the Federal Emergency Management Agency (FEMA) and awarded to the South Florida Water Management District and State of Florida's Office of Emergency Management, will identify the most vulnerable coastal flood control structures within the pilot basins. The project will use storm surge modeling to analyze surge predictions at the downstream locations of the flood control structures, which will then be used to drive watershed simulation models for the selected basins. The project will also collect higher-resolution elevation data, canal cross sections, and land use, to develop realistic flood simulation models for two watersheds. These simulations will also incorporate a range of sea level rise projections to identify changes in the level of service over the next 25 to 50 years. This project will also include the development of various communication tools which will help local, regional, state, and federal agencies visualize the potential impacts of flooding events. This project is expected to be completed before September, 2017.

- On August 11 and 12, 2015, RER and the Stormwater Utility Planning Division staff members participated in a two day GIS-based training provided by the National Oceanographic and Atmospheric Administration (NOAA). This training taught staff several techniques including: (1) how to map coastal inundation, including how to map water levels using GIS techniques; (2) how to determine the differences among various inundation products; and (3) how to access and manipulate water level, topography, bathymetry and base layer data. This includes mapping storm surge, inland flooding, shallow coastal flooding, and sea level rise. This training was integral to broadening the technical expertise and the number of full-time staff with the technical capability to support future vulnerability analyses for the County. Additionally this training is now available to all staff interested in taking advantage of it.

- On August 17, 2015, RER staff met with the director and several staff members of the University of Miami's School of Architecture's Center for Urban and Community Design. This Center, directed by Professor Sonia Chao, has extensive experience with sustainable and environmental design, and with assisting local governments to develop innovative solutions to community design challenges. This meeting focused on the precedent projects that could be useful models for Miami-Dade County to consider when framing potential adaptation options for Miami Dade County. Professor Chao also reviewed

how design guidelines could be useful tools for the County as it moves forward and encourages more resilient forms of development. The discussion also focused on how to effectively integrate community participation into future adaptation planning.

- On August 20, 2015, Planning staff and Environmental Resources Management staff of RER met with The Nature Conservancy to discuss how future adaptation options can enhance ecological restoration and further The Nature Conservancy's goals to increase equity and access to safe, attractive, and healthy public spaces.

- On September 1, 2015, RER staff held a conference call with New York City Department of City Planning staff who developed NYC's "Urban Waterfront Adaptive Strategies". This guidance document identifies resilience strategies and a framework for analysis specific to different urban coastal communities. The guide also outlines the type and approximate costs and benefits associated with each different adaptation approach. It also outlines a clear framework wherein each coastal community can evaluate the appropriateness of different adaptation approaches to their particular coastal geomorphology and urban condition. This reference serves as an excellent model which could be readily replicated in Miami-Dade County to provide a similar framework for approaching adaptation.

R-49-15: Initiating Discussions with the Insurance and Reinsurance Organizations to Develop Long-Term Risk Management Solutions

This resolution directs the Mayor or designee, in conjunction with the Office of Intergovernmental Affairs, to initiate discussions related to climate change with private insurance and reinsurance professional organizations, member local governments in the Southeast Florida Climate Change Compact, the Florida Office of Insurance Regulation's Department of Financial Services, and other key stakeholders to develop long-term risk management solutions. This resolution requires quarterly status reports and a final report within one (1) year of the effective date.

The following discussions have been taken during the third quarter in order to prepare the report referenced in this resolution:

- During this quarter, RER staff continued several initiatives including conversations with The Nature Conservancy regarding their collaborative work with Swiss Re to demonstrate the cost effectiveness of coastal ecosystems in risk reduction. Staff also continued to contact the list of key stakeholders drawn from commercial and residential real estate, insurance, reinsurance, and finance. In addition RER has continued to work closely with the Risk Management Division within the Internal Services Department (ISD) to identify additional contacts.

- On July 29, 2015, staff spoke with regional Compact partners and the Chambers of Commerce from Miami-Dade and Broward counties to determine how the Compact could more directly engage the business community. Through this discussion a number of opportunities were identified to present to different business groups. For example, in January 2016, the Miami-Dade Chamber of Commerce will be hosting a panel discussion on climate change. RER staff are working directly with the Chamber to identify potential speakers and will continue to help with shaping the content of the event.

- On August 21, 2015 RER staff also met with the Beacon Council to discuss how best to approach and engage the business community regarding the issues of sea level rise and climate change. At this meeting the staff outlined a work plan to hold a series of small focus group meetings with key business leaders which represent several key industries within Miami-Dade County. These initial conversations are intended to serve as the foundation for a broader engagement strategy once the appropriate messaging has been developed.

- On August 31, 2015, Miami-Dade County hosted a delegation of 35 representatives from Lloyd's of London, one of the largest reinsurance agencies in the world. The Lloyd's delegation came to Miami to learn of our challenges associated with sea level rise and climate change, and what the County is doing at a local and regional level to plan and prepare for impacts. The meeting was also an opportunity to learn more about how Lloyd's is approaching these challenges from their perspective. During the discussion Lloyds raised a number of questions about the County's current floodplain regulations and how the County was going to integrate sea level rise considerations into future land use planning. They discussed how, in the United Kingdom, the insurance industry has effectively negotiated with the government to increase overall insurability. In the United Kingdom, it is the responsibility of the government to put adequate regulations in place which reduce the riskiest forms of development, and in exchange, the insurance industry agrees to continue to offer insurance. Recently, as flood risks and losses have increased, the insurance industry has renegotiated that agreement and has pushed the government to do more in terms of flood defenses. This meeting with the Lloyd's representatives also provided new insights into the potential for the County to use catastrophe models (which are already utilized) to better inform our risk

mitigation investments, reduce the County's exposure to extreme events, and reduce insurance premiums. The Lloyd's delegation also raised important considerations about how climate change and the associated increase in risk moving forward will impact insurance premiums and the ability to purchase insurance.

- On September 25, 2015, the British Consulate of Miami facilitated a meeting at their office between RER staff and representatives from CBRE Real Estate Services and Royal Institution of Chartered Surveyors (RICS). RICS promotes and enforces the highest professional qualifications and standards in the development and management of land, real estate, construction and infrastructure. CBRE provides a broad range of professional services with a particular emphasis on the real estate market. This meeting focused on professional standards relating to construction, insurance, and climate change. The discussion also revolved around the future effect of sea-level rise, exacerbated by natural catastrophe, on the economic and environmental resilience in Florida.

- On September 25, 2015, staff drawn from ISD, Planning, Sustainability, and Emergency Management, sat down with representatives from AJG and AIR Worldwide to discuss how the County could make better use of the outputs of the annual catastrophe models that are conducted for the Risk Management Division of ISD. The secondary goals of the meeting were to discuss how the use and scope of the catastrophe models could be expanded in the future to better guide the County's mitigation efforts. Given Miami-Dade County currently uses its annual catastrophe analysis primarily to determine the Average Annual Loss (AAL), the discussion focused on how these tools could also be used to help the County reduce the exposure of its own assets. The discussion centered on how these risk mitigation tools, used primarily for insurance purposes, could be fed more directly to Emergency Management to prioritize mitigation strategies, which will in turn increase the County's resilience to sea level rise and potentially reduce insurance premiums. The potential to broaden the current scope of this work to incorporate sea level rise was also discussed.

- On September 25, 2015, staff drawn from the ISD, RER Planning, the Office of Sustainability, and the Office of Emergency Management, held a separate discussion with Swiss Re, a global reinsurance company, regarding work they completed for New York City as part of the city's *Stronger, More Resilient New York* initiative. Swiss Re supported the development of the coastal protection plan for New York using an iterative process examining the cost effectiveness of different adaptation measures. This process also utilized catastrophe models. This meeting focused on the potential to draw upon the reinsurance industry's risk management expertise to help expedite the development of a comprehensive plan to increase Miami-Dade County's resilience to sea level rise.