

THE CITY OF KEY WEST

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EXECUTIVE SUMMARY

To: Greg Veliz, City Manager

Through: Pati McLauchin, Assistant City Manager

From: Scott Fraser, Floodplain Administrator & Fair Insurance Rates for Monroe's Flood Map Task Force

Meeting Date: June 2, 2020

RE: Grant – Flood Mapping Analysis

Action Statement

Approval of a grant to Fair Insurance Rates for Monroe (FIRM) to fund a successive series of task orders to analyze the science and data used by FEMA to develop its proposed new Flood Insurance Rate Maps, for the purpose of achieving changes to these maps and/or the filing of appeals.

While approval is sought for three task orders, their needs are interlaced; with the needs of the third task dependent upon results from the first two. For this reason, overall approval is sought from the City Commission, with additional staged approvals from the City Manager as the analysis proceeds.

Task 1.1: Review of Statistical Analysis	\$44,400
Task 1.2: Review of Storm Surge Model	\$55,000
Task 2: Review and Reanalysis of FEMA Overland Wave Analysis and Mapping	\$18,600

Total City Commission approval is sought for \$118,000 of the \$150,000 budgeted for this purpose. The members of FIRM's Flood Map Task Force have concluded these engineering costs are very reasonable, given the scope of work involved.

Background

Beginning May 2018, something seemed very amiss with the new flood maps FEMA was developing. Many buildings seemingly "least vulnerable" to flooding were being subjected to major flood level increases (upwards of +3' to +4') while "most vulnerable" buildings were showing little or no increases. In several instances, major decreases were intended for large coastline buildings. Immediately, this seemed backwards from all that was expected and from what should seem logical.

Executive Summary

Activating a Flood Map Task Force, FIRM (Fair Insurance Rates for Monroe) engaged hydrological engineers – who worked in consultation with a like company hired by the County – to develop a much clearer picture of why FEMA’s proposed new flood maps would have an unexpectedly harsh impact upon the Florida Keys communities.

The overriding reason for FEMA’s adverse mapping has been traced back to the early days of project development with a flood remapping effort for the mainland counties of: Palm Beach, Broward and Dade. Then – unfortunately for the Florida Keys – a subsequent FEMA decision to “implicitly” include within this study, Monroe County.

The most obvious explanation for FEMA’s collateral inclusion of the Keys within a study of the mainland would be a one-time major cost reduction for FEMA’s study. While FEMA saves money, annual premium increases citywide eventually total upwards of an additional \$5.4m annually.

Beyond this major problem with the project’s overall philosophy, the Consultants have identified a series of other problematic assumptions, analytical errors and evaluations that compound these impacts and result in the FEMA maps not accurately representing a “100-year flood” – which is their task at hand. More on these later in the “Details” section of this report.

Now comes the time to utilize the \$150k budgeted for the independent flood mapping analysis required to challenge FEMA’s proposed flood maps. This proposal is to fund FIRM’s Flood Map Task Force to further engage these experts to produce the scientific results to achieve one or more of the following goals:

- Convince FEMA that alternative data would be more applicable to the Florida Keys and to revisit their study, correct analytical and assumption errors, and propose less impactful flood map changes.
- Convince FEMA – via new and more detailed data – to abandon the inclusion of Monroe County from their mainland study and perform a new study specifically for the Florida Keys.
- Proceed with traditional internal FEMA appeals via the standard remapping procedure.
- Mount a judicial appeal.

Based upon recent conversations with FEMA, it’s the consensus of the Flood Map Task Force that a judicial appeal may not only be necessary, but likely most beneficial to the City.

Funding:

This Resolution seeks approval of a grant to fund Fair Insurance Rates for Monroe (FIRM) – a non-profit organization – to engage hydrologic engineering consultants for up to three task orders to further analyze science and data alternatives to FEMA’s proposed new flood maps. FIRM offers this service at its raw costs, absent any upcharges nor fees.

Under this authorization, Task Orders No. 1.1, 1.2 & 2 will be funded via this approval, yet phased for implementation/payment as the consecutive results warrant, as determined by the City Manager.

Task #3 Can’t be determined until results from task number 1.1, 1.2 & 2 have been determined and the focal points of an appeal have been identified. Thus, Task #3 wouldn’t be funded by this approval.

Task #4 prepares for the likely eventual necessity of a judicial appeal. The Consultants would compose and file the appeal and present as expert witnesses. Additional attorney fees would be likely. Cost associated with Task #4 isn't part of this funding approval.

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Task 3: Appeal Preliminary Coastal Study and FIRMs	TBD
Task 4: Judicial Appeal Filing Testimony HOURLY RATE:	\$185/hr

Additional details in attached memo from Woods Hole Group dated April 06, 2020.

Timeline:

On or about March 30, our Mayor signed an emergency request asking FEMA to delay the flood remapping effort for at least 18 months given the crisis surrounding the pandemic. *(copy attached)*

To date, FEMA has only said it has suspended all remapping efforts but hasn't said for how long. It appears FEMA is re-evaluating this stance every 30 days. As of this writing, FEMA hasn't acknowledged nor responded to the City's 18-month request. Absent the requested delay, the FEMA 90-day appeal period could begin as early as late July 2020.

Preliminary Findings – Details

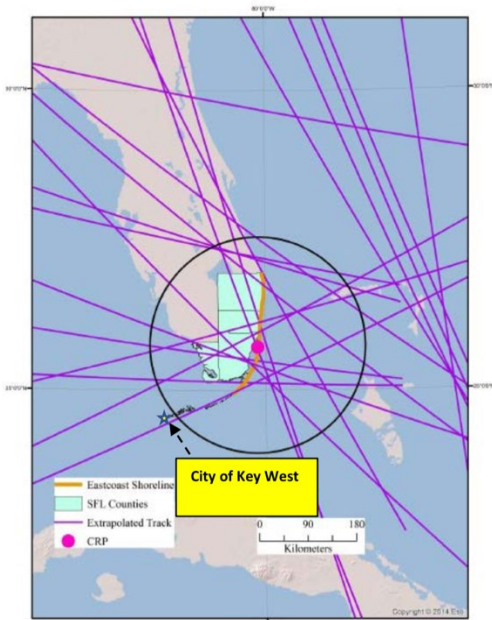
Incidental Inclusion of the Keys in a Mainland Study:

“For the purposes of the problematic model, the Keys are not treated explicitly. The storm population impacting the Keys is a combination of the storms impacting both the west and east coast of south Florida; therefore, the storm population impact on the Keys is implicitly treated with in the development of the other two problematic storm sets IDS2-Section2 will deal with the development of the optimized storm set, and the treatment of the Florida Keys will be handled through replication of storm tracks across the Florida keys.” [FEMA IDS 1, Section 5, Heading 3 – South Florida Coastline, June 2015]

For FEMA's analysis, the major singular reference point (fig. 2) used was located in Miami. In one example, a storm track made landfall in Miami after passing over the mostly open waters of the Bahamas. That storm track was then replicated downward until it intersected Key West.

It's projected impact upon Key West was based upon the actual impact upon Miami. However, this replicated storm track (fig. 1) no longer approached from over open ocean, but instead traversed the full length of Hispaniola and Cuba, apparently without consideration for how those land masses often degrade the the strength of hurricanes.

The projected impact upon Key West was if Hispaniola and Cuba didn't exist, the storm intensified over the open waters and hit full force; a highly unlikely scenario.



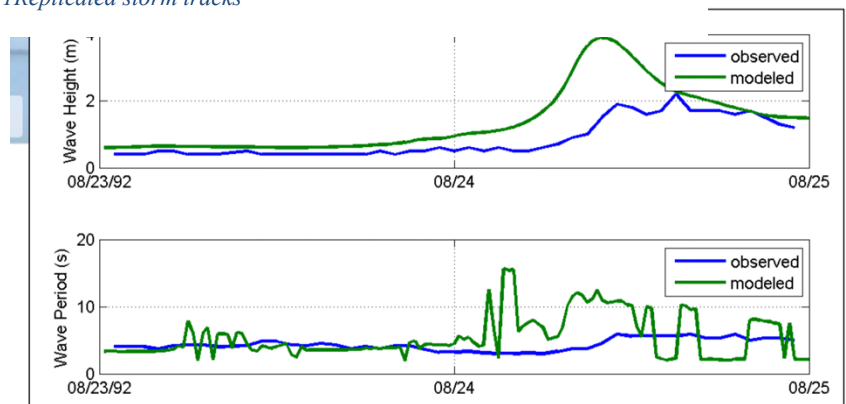
2FEMA study's Singular Reference Point



1Replicated storm tracks

Wave Modeling – Missing Validation:

A typical FEMA study involves running storm models over known and simulated storm tracks. To validate these hypothetical results, they're compared to known historical data from recorded wave buoys; the comparative wave models should be somewhat similar, hence the validation.



No such validation occurred with the Florida Keys models, because FEMA couldn't locate any comparative validation data. The Consultants found buoy data sets off the Florida Keys for three storms, which FEMA had advised weren't available.

Upon comparison, the Consultants found the simulated wave heights were double those shown in the validation. Where FEMA's study predicted four-foot waves heights, only two-foot heights could be validated.

No other such FEMA study has been performed absent wave model validation.

Friction Coefficient:

Surge waters passing through tidal channels, within Florida Bay and between the islands encounter friction along the bottom, banks and obstructions. The greater the friction, the slower the water moves, the higher it rises, the more it spreads inland and causes flooding.

FIRM's early independent analysis disclosed the use of unreasonably high friction values that likely impacted FEMA's flooding levels resulting in surge piling up an additional one – two feet.

An extended analysis will determine in phases whether the unusually high friction coefficient values resulted in significant impacts on a couple of storm models. If so, model validations would be rerun with a larger sub-set to re-calculate the statistics and remap the flood zones for an appeal.

Mangroves Identification/Density:

Mangrove stands have been proven to reduce inland flooding from storm surges and are an important part of flooding predictions. FEMA’s preliminary flood maps used an outdated NOAA 2010 mangroves database. A more current South Florida Water Management District 2016 database shows a greater breadth and density of mangroves.

Would using the more recent database result in significant changes to the proposed flood maps? Selecting a few sample-sets of mangrove stands, the Consultants will analyze whether the difference between using the old vs new datasets would have a significant impact on the flood maps. If so, FEMA would be urged to reevaluate their maps using the new dataset, or this would further the City’s case for an appeal.



This is of particular concern for the numerous residential areas adjacent to the Salt Ponds and Indigenous Park.

During the January 27th FEMA open house conducted at City Hall, homeowners identified the Atlantic Drive neighborhood – behind Indigenous Park – where a new flood zone incursion doesn’t seem to account for the vegetation’s disruption of breaking waves.

Mesh Node Calculations:

Surge water conveyance measurements for the Cow Key Channel need modifications showing greater surge water passage and then be recalculated.

This was a result of FEMA’s model not following their modeling guidelines and therefore overestimated the surge height.

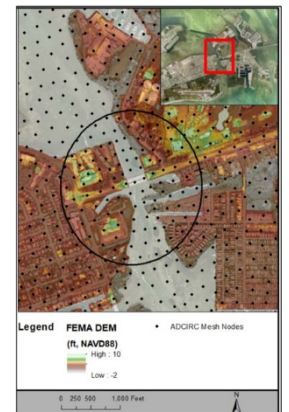
Previous City Actions

The current approved budget included \$150k for this anticipated expense.

Financial

Funds for this project will be used from account #001-1910519310 with a current balance of \$150k.

Upon approval, \$99,400 would be paid to FIRM to initiate Task No. 1.1 & 1.2. Upon subsequent City Manager approval, up to an additional \$18,600 would be made to FIRM for Task #2.



Cow Key Channel

Recommendation

Staff recommends City Commission approval to fund tasks 1.1, 1.2 & 3 for FIRM to engage hydrologic engineering consultants for these purposes.

END