Community Resiliency in the City of Satellite Beach

Resiliency Strategies and Recommendations for Addressing Community Resiliency

Prepared by the East Central Florida Regional Planning Council for the City of Satellite Beach and the Florida Department of Environmental Protection

The project team and technical advisory committee reviewed the strategies and recommendations supported by respondents to the Satellite Beach Resilient Community Survey as well as best practices provided by NOAA and other reports and studies concerning strategy and policy practices throughout the United States. Recommendations and strategies are listed below, by vulnerability analyzed for this study, for the City of Satellite Beach to consider in its resiliency planning. Policy options should be expanded to assist the community in planning and preparing for vulnerability impacts, especially flooding, erosion, storm surge, and sea level rise, as well as protecting utility infrastructure.

The strategy and policy recommendations below have been developed through best practice research the project team, technical advisory committee input, and comments generated through the public engagement activities.

City staff should conduct case studies of various coastal jurisdictions similar in nature to the City of Satellite Beach or addressing similar strategies the City may be pursing. While every community is different and there is no "one size fits all" solution or strategy for addressing coastal resiliency, these case studies may present creative and viable tools, strategies and recommendations for the City.

Consistency between the City's various plans and procedures is vital as the City continues its efforts toward resiliency. The **City should review all plans and procedures to determine gaps and areas to incorporate resiliency strategies and policies determined to be appropriate for the City.** City plans and procedures should be updated to address areas that are most vulnerable to flooding, storm surge, coastal erosion and rising seas based on inundation modeling. A matrix of updates may be developed to ensure appropriate plans are consistent in policies, strategies and regulations.

Although the City is mainly built out, as redevelopment occurs, **the City should encourage higher densities and/or mixed use in appropriate and less vulnerable areas within the City, especially along the A1A corridor or pockets of undeveloped property.** This may require changes to the City's comprehensive plan, land development codes and other plans within the City. **The City may also consider conducting an analysis of the A1A corridor built environment and work with stakeholders to determine a vision for the area in an effort to increase the tax base away from the high hazard areas.**

While a large amount of the City's tax base is located in the vulnerable areas, it is important for plans to be made to create a larger tax base outside the high hazard areas, especially those vulnerable to coastal erosion and flooding. **An effort should be made to determine opportunities, scale, and vision of redevelopment in order to maintain a small town feel while diversifying the tax base in areas external to vulnerabilities.**

The City may wish to investigate the potential of developing special taxing districts related to the AAAs and a redevelopment/business district area around the A1A corridor or other areas determined by the City. These taxing districts could be established for improvements to infrastructure within those areas deemed most critical for adaptation measures and/or appropriate enhancements.

With only a score of 8 in the Community Rating System, the City should explore measures to increase its score in the CRS to assist with Flood Insurance Rates, especially as it relates to public education. **As the City updates its Flood Management Plan, the goals and actions should seek to balance supporting existing development and access needs of the City with development strategies that protect life and property. Additionally, a series of actions should be outlined for the City to implement in an effort to engage and educate the public and officials on the subject of resiliency, vulnerabilities and adaptation measures and tools.**

Outreach information should, at a minimum, address coastal erosion, flood insurance, mitigation activities and programs, storm surge, and sea level rise materials. **The city should continue to host tables at various events and festivals providing an outreach and educational opportunity for stakeholders. The City website should be updated and provide a page expressly dedicated to resiliency efforts, education materials, and links to resources.**

Coastal erosion not only impacts those living along the shoreline, but also the City as a whole due to the tax base associated with these properties, users of the beach, tourists, and environmental aspects and protection impacted by eroded shorelines. It will be important for the City, in order to protect the property rights and interests across the City, to work closely with all stakeholders to appropriately address this issue in an effort to protect the life, health and safety of the City as a whole. **It is recommended that the City, in conjunction with the County and other agencies, host a series of workshops, targeting specific stakeholders for each workshop, to discuss strategies, host speakers for educational purposes, and obtain buy-in and feedback, for addressing coastal erosion/beach front issues.**

The City may create a Resiliency Task Force to help drive the educational and outreach efforts for the City as well as provide input on strategies under consideration. The efforts associated with public engagement are also taken into account in the Community Rating System, in which the City is already actively engaged. This Task Force should be composed of private businesses, public/non-profit agencies, and residential stakeholders. The task force should also be comprised of a variety of age groups and outreach should also target the under 55 population as they are generally the under showing demographic.

At the time of this study, The Federal Government was in the process of developing a Federal Flood Risk Management Standard which proposed adding 2-3 feet to the base flood elevation, depending upon critical versus non-critical actions. It will be necessary for the City to follow the potential implementation of these standards for compliance issues and the potential funding and impacts that may be associated with the standards.

In an effort to reduce the impact of surge and flooding on private and public property, and protection of life and safety of residents, **the City, in conjunction with their floodplain manager, contractors and engineers, should develop higher standards and innovative designs that offer additional flood protection in the most vulnerable areas.** The implementation of these standards may be conducted on a rolling basis, as well as voluntary, as the areas of sea level rise and surge impacts increase. The City should develop a framework to help private property owners navigate the process of implementing mitigation strategies to their home using private funds. Additionally, **in areas within the Inland Flooding Adaptation Action Area, the City should strategically retrofit the existing storm water system with state of the art, innovative facilities to reduce flooding after heavy storms while addressing water quality objectives.**

In conjunction with this effort, **the City should investigate potential strategies or tools to keep residents in the City as their property becomes unusable, especially those within the highly vulnerable areas.** This may include developing a type of transfer of development rights or other housing options within less vulnerable areas of the City. Additionally, as properties become un-usable, they could be utilized by the City to create buffers, green space, and water dependent uses that may be serve as a buffer to protect property from vulnerabilities as well as provide revenue for the City for a period of time. As evident from responses in the survey, these mechanisms for property transfer should not be shouldered solely or mainly by the City but should be mainly the responsibility of the property owners and should only occur after a property has been destroyed or is unusable. The City may wish to engage property owners in highly vulnerable areas to determine their potential response if they are no longer able to sustain their property in an effort to plan for migration of these owners to other parts of the City and how to structure a potential property transfer program.

Using the information from this resiliency project, the City should review vulnerable critical facilities and assets and rank them relative to importance, level of vulnerability, and life expectancy. This information can be utilized in potential adaptation measures related to infrastructure, especially utilities as deemed a priority for the stakeholders.

The strategies below are broken into the areas of vulnerability used in the public engagement exercise and reflect the top supported strategies by vulnerability. All the strategies, their ranking and overall percentage of support and opposition can be found at the end of this document for further use by the City.

Loss of Power/Utilities

Loss of power and utilities was ranked as the number one vulnerability by respondents to the public engagement exercise conducted by the City. The strategy "**Work with Utility companies to determine the feasibility of moving pole-mounted utilities underground"** was not only the ranked #1 option within the Loss of Power/Utilities vulnerability but also #1 when normalized across all vulnerability strategy options. This should be one of the priority areas of concentration for the City as it moves forward. The feasibility and cost benefit of this option should be discussed prior to and considered in conjunction with any major roadway or other infrastructure project.

As the City reviews site specific analysis of critical facility/infrastructure in relation to hazards including storm surge and sea level rise, the **City should develop a process for determining the feasibility, benefit, and strategy for relocating infrastructure to higher ground, west of A1A.** This process may include a cost benefit analysis, determination of the life of the structure, and prioritization of the infrastructure at risk across the City.

Respondents to the public engagement activity also supported the diversification of energy sources within the City such as **rooftop-solar power, off-grid electric power, and other alternative power sources**. This strategy may be more focused on the residential and commercial stakeholders as each individual sees fit. It is also recommended that the City conduct a study to determine potential cost savings in the implementation of various alternative energy strategies such as hybrid fleets, solar panels for government buildings and other power sources as well as provide citizens with resources to assist in their implementation of alternative energy sources.

Coastal Erosion

Coastal erosion was ranked #2 for vulnerabilities of concern to respondents to the public engagement activity (note: the difference in rankings between #2,#3, and #4 was 0.40% overall, thus indicating coastal erosion, storm surge, and flooding as equal concerns by the majority of respondents).

The results of the public engagement activity indicated support for **planting native coastal vegetation such as sea oats** in an effort to control coastal erosion. The City should work with surrounding communities, Patrick Air Force Base, IFAS, Brevard County Natural Resources, the Marine Resource Council, homeowners, and other stakeholders to develop and implement strategies for a living, natural coastline.

In an effort to create a sustainable and resilient economic base, it will be important for the City to create opportunities for economic growth outside of the highly vulnerable areas such as along the A1A corridor or other inland properties. With approximately 60% of the tax base located along the beach front, it is important for economic resiliency that the **City implement policies to direct development away from high-risk areas** to protect the health and safety of individuals, decrease potential damage to public and private property and to increase tax base and revenue generating opportunities in less vulnerable areas of the City. These policies may include increasing development and economic opportunities in less vulnerable areas as well as discouraging development (new and redevelopment) in the areas most vulnerable to coastal erosion of the City. This strategy is applicable under the storm surge vulnerability as well.

Storm Surge

Storm Surge was ranked as 3rd as a vulnerability of concern (note: the difference in rankings between #2,#3, and #4 was 0.40% overall, thus indicating coastal erosion, storm surge, and flooding as equal concerns by the majority of respondents).

In an effort to protect private properties from impacts associated for storm surge, in addition to adjusting the Base Flood Elevation standards for rebuilds, redevelopment, new construction to meet, at a minimum, the potential new Federal Flood Risk Management Standards, the City should determine the feasibility of **increasing construction setbacks from the shoreline and encourage higher minimum elevations for buildings and infrastructure where feasible** in these vulnerable areas**.** This strategy may be limited on some properties due to lot sizes and the ability to set structures back a certain distance. This strategy would be applicable to rebuilds, redevelopment and new construction.

As with coastal erosion, in an effort to protect the health and safety of individuals, decrease potential damage to public and private property from storm surge and to increase tax base and revenue generating opportunities the City should begin the process to develop and **implement policies that direct development away from high-risk areas**. These policies may include, but would not be limited to increasing development and economic opportunities in less vulnerable areas, discouraging development (new and redevelopment) in the areas most vulnerable to storm surge, increasing business development opportunities in an economic district, utilizing unbuildable property for water dependent uses which can generate City revenue, and others.

As discussed earlier in this document, the City currently has a CRS rating of 8. It is recommended that the **City takes action to reduce property owners' premiums for the National Flood Insurance Program.**

Flooding

Flooding, although ranked 4th as a vulnerability of concern (note: the difference in rankings between #2,#3, and #4 was 0.40% overall, thus indicating coastal erosion, storm surge, and flooding as equal concerns by the majority of respondents) within the City of Satellite Beach, it is an issue that is currently impacting the City.

Stormwater capacity is and will continue to be an area the City will need to maintain and improve to mitigate for excessive rainfall, nuisance flooding, storm surge, annual high tides, and sea level rise impacts. Feedback from the public engagement survey indicated strong support for the **installation of larger drainage pipes and structures as the system undergoes maintenance and repair.** To ensure fiscal and environmental responsibility, the City should coordinate with the appropriate agencies, stormwater experts and others to design and install sufficient pipes and structures to support the current and future stormwater needs.

Strategies associated with roadway upgrades and stormwater reuse were extremely close in support within the flooding vulnerability that the City should work with stakeholders to determine feasibility of incorporating these strategies into stormwater projects and roadway upgrades, especially within the Inland Flooding Adaptation Action Area. This may be accomplished through a variety of techniques considered in "Green Streets", pavement, and other design or engineering techniques. **This strategy would recognize periodic flooding may block access to the roadway, but the roadway would be built to withstand the prolonged exposure to water.** Stormwater reuse may be accomplished **by installing vaults for stormwater storage and reuse for non-potable purposes such as irrigation, toilets, and construction.** As an additional strategy, **the City may investigate the benefit and feasibility of installing pumps to alleviate flooding during rain events, storm surge, high tides, etc.** These may be beneficial in key locations or during the annual high tide events. These strategies should be considered by the City as part of all roadway projects and determine fiscal and engineering feasibility as well as cost benefit and mitigation of flooding impacts.

Sea Level Rise

Sea level rise strategies were only ranked by 27% of respondents. However, to provide a full report on strategies for the City to consider, as well as identify overlap between sea level rise strategies and those of other vulnerabilities, recommendations are provided below. Many of these strategies implemented for other vulnerabilities, in turn, may also mitigate impacts of sea level rise.

Through this project, the City has **identified areas subject to hazards of rising sea levels**. The City should utilize this information in an effort to **identify those that would benefit from long term strategies**. Many of these areas may include infrastructure or other facilities and areas that are also vulnerable to other hazards such as flooding and storm surge and may be identified for strategies.

Additionally, as the City considers flooding and storm surge in policies and plans for projects, sea level rise projections should also be considered especially as it pertains to a cost benefit of project standards, improvements or other techniques. **The City should develop a policy that considers sea level rise projections regarding infrastructure, zoning and construction standards.** This would also tie into the various strategies that address **implementing policies to direct development away from high-risk areas**, as this would include sea level rise impact areas as high risk.

Vulnerability	Strategy	Number of 1 Star Rankings	Number of 2 Star Rankings	Number of 3 Star Rankings	Number of 4 Star Rankings	Number of 5 Star Rankings	% of Total Survey Respondents Who Support Strategy (rated with 4-5 Stars)	% of Total Survey Respondents Who Oppose Strategy (rated with 1-2 Stars)	% of Total Survey Respondents who were Neutral (rated with 3 stars)	Total % of Total Respondents who Ranked Strategy	Rank of Strategy within Specific Vulnerability based on #pos/#neg	Total Weighted Sum	Weighted Rank Across all Strategies
Loss of Utilities/ Power	Work with utility companies to determine the feasibility of moving pole-mounted utilities underground.	7	4	32	49	179	48%	2%	7%	57%	1	1202	1
Coastal Erosion	Plant native coastal vegetation such as sea oats	3	4	15	45	176	46%	1%	3%	51%	1	1116	2
Flooding	Install larger drainage pipes and structures as the system undergoes maintenance and repair.	4	6	31	83	123	43%	2%	6%	52%	1	1056	3
Storm Surge	Increase construction setbacks from the shoreline	13	29	42	58	111	36%	9%	9%	53%	1	984	4
Coastal Erosion	Implement policies to direct development away from high-risk areas	20	15	36	43	126	36%	7%	8%	50%	2	960	5
Storm Surge	Implement policies to direct development away from high-risk areas.	23	21	47	55	105	34%	9%	10%	52%	2	951	6
Storm Surge	City takes action to reduce property owners' premiums for the National Flood Insurance Program.	25	17	52	54	98	32%	9%	11%	51%	4	921	7

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Flooding	Install vaults for stormwater storage and reuse for non-potable purposes such as irrigation, toilets and construction	18	18	48	65	92	33%	8%	10%	50%	3	918	8
Loss of Utilities/ Power	Promote rooftop-solar power, off-grid electric power, and other alternative energy sources.	40	32	52	30	105	28%	15%	11%	54%	2	905	9
Loss of Utilities/ Power	Move critical utilities (electric trunk line and substation, sewer force main, etc.) to higher ground west of A1A.	30	27	70	65	64	27%	12%	15%	53%	3	874	10
Flooding	This strategy would recognize periodic flooding may block access to the roadway, but the roadway would be built to withstand the prolonged exposure to water.	14	15	70	79	60	29%	6%	15%	50%	4	870	11
Flooding	Install pumps to alleviate flooding during rain events, storm surge, high tides, etc.	22	27	65	62	67	27%	10%	14%	51%	2	854	12
Storm Surge	Encourage higher minimum elevations for buildings and infrastructure, where feasible.	22	32	71	67	57	26%	11%	15%	52%	3	852	13

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Coastal Erosion	Importing sand from other areas to the beach using dredges or trucks.	42	21	47	42	83	26%	13%	10%	49%	3	808	14
Coastal Erosion	Installing hard structures such as sea walls, rip-rap (large rocks), geo tubes, etc.	52	31	56	44	52	20%	17%	12%	49%	3	718	15
Sea Level Rise	Identify areas subject to hazards of sea level rise that would benefit from long term strategies.	2	1	14	36	78	24%	1%	3%	27%	1	580	16
Flooding	Acquire at-risk properties from willing sellers.	78	43	58	22	27	10%	25%	12%	48%	5	561	17
Sea Level Rise	Consider sea level rise projections in policies regarding infrastructure, zoning, and construction standards.	2	4	23	33	69	21%	1%	5%	27%	1	556	18
Sea Level Rise	Implement policies to direct development away from high-risk areas.	3	9	19	23	77	21%	3%	4%	27%	1	555	19
Storm Surge	Property owners should make these decisions on their own without depending on government assistance or policy support.	113	27	29	13	19	7%	29%	6%	42%	5	401	20

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Coastal Erosion	Property owners should make these decisions on their own without depending on government assistance or policy support.	133	29	27	8	12	4%	34%	6%	44%	5	364	21
Loss of Utilities/ Power	Continue to maintain utilities and power resources as-is.	120	33	24	11	6	4%	32%	5%	41%	4	332	22
Sea Level Rise	The City should only protect City infrastructure (buildings, roadways, utilities) from adverse impacts, not private property.	57	13	21	18	20	8%	15%	4%	27%	4	318	23
Sea Level Rise	Property owners should make these decisions on their own without depending on government assistance or policy support.	78	10	11	10	9	4%	18%	2%	25%	5	216	24
No Vulnerabilities	Plan only for storms (rainfall and hurricanes) and coastal erosion without considering climate change or sea level rise.	0	1	2	4	3	1%	0%	0%	2%	1	39	25
No Vulnerabilities	None of this is necessary and we should stop all efforts towards planning for a climate resilient community.	2	0	4	0	3	1%	0%	1%	2%	3	29	26

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No Vulnerabilities	Sponsor a series of public meetings where representatives of major environmental organizations (e.g., FDEP, NOAA, USACE) discuss what is known and unknown about coastal hazards.	5	1	2	1	1	0%	1%	0%	2%	1	22	27