

Resilient Redesign III

Site Briefing Packet

Over the next four days, you will join a team of regional and local experts to design strategies which may serve as models of resilience for communities throughout the Southeast Florida region. The objective of the design sessions is to identify the physical and planning adaptations necessary to reduce the risk, damage and economic losses associated with climate change. The designs should help manage disruptions caused from severe storms, water supply constraints and population growth, while considering the preservation of historical, community character and the prominent integration of natural infrastructure. Although these design strategies are organized around case study sites, the goal of the workshop is to develop transferable models relevant to development and redevelopment opportunities throughout the region.

Teams have toured the three case study sites and generated site briefing documents and presentations for each. These documents and enlarged site maps, along with a site briefing presentation given on the first day, will be available for your reference.

Included in the Site Briefing Packet:

- Framing/Design Questions
- Study Area Descriptions
- Maps of the Study Areas

As you begin to contemplate the workshop framing and design questions, consider how your experiences and expertise can contribute to specific components of the design process. Teams are encouraged to work collaboratively to address all aspects of the community's needs, while utilizing strengths from all members to build a robust and transferable design concept.

The Southeast Florida Resilient Redesign III Workshop is organized as part of a series of regional convenings around priority recommendations from the Regional Climate Action Plan. This plan was developed and adopted by the Palm Beach, Broward, Miami-Dade and Monroe Counties as partners to the four-county Southeast Florida Regional Climate Change Compact. Support for this workshop was also provided by the Institute for Sustainable Communities and the Kresge Foundation. The University of Miami School of Architecture is hosting this year's event. A summary of the workshop outcomes will be featured on the Compact's website, along with other follow-up workshops and communications.

Thank you for joining us!

Implementation support to
the Compact is provided by:



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support from: THE KRESGE FOUNDATION

Framing Questions

DESIGN OBJECTIVE:

Develop designs for waterfront urban communities that are resilient and responds to the following concepts:

- Sea level rise of 2 ft. by 2060 (minimum)
- Tidal flooding
- Extreme rainfall and storms
- Increased storm surge
- Water supply constraints
- Energy disruptions
- Increased population growth and increased housing needs
- Increased traffic volumes and parking requirements
- Transitions in the age of the general population
- Localized and community-wide disaster impacts
- Heat waves
- Increase in temperature
- Changes in industry
- Economic redevelopment
- Nonpoint source water pollution

DESIGN QUESTIONS:

1. What are the limitations of the current design and landscape and how does a resilient redesign mitigate the issues identified above?
2. How can resilient designs be implemented so they are compatible with the vision and economics of the community?
3. What water management strategies should be implemented to increase the resiliency of the community?
4. How can new resilient infrastructure be interfaced with existing infrastructure to ensure compatibility?
5. How can historical properties become resilient and interface with proposed resilient infrastructure?
6. How should redesign be phased to avoid economic disruptions due to incompatibility of old and new infrastructure?
7. How can resilient features be implemented within a constrained footprint?
8. What are the implications of implementing a resilient design in a single community and not in neighboring communities?
9. What are the legal or planning obstacles up against the resilient redesign prior to implementation?
10. What are the next steps for communities to implement resilient redesign?
11. What are the economic and social implications or benefits of the redesign?
12. Which agencies should collaborate to integrate redesign concepts into upcoming projects?
13. What are the economic and social implications or benefits of the redesign?

Study Area Descriptions

LOWER MATECUMBE KEY

Lower Matecumbe Key (LMK) is the westernmost of the four large islands comprising the Village of Islamorada in the Upper Florida Keys. As of the 2010 census, the Village had a total population of 6,119, with 901 residing on LMK. The island is approximately 4.5 miles long, 0.6 miles at the widest point and as narrow as 200 feet from shore-to-shore in one location. Development on the island is predominantly residential, with most homes situated on open water or canals. There are small clusters of waterfront commercial activity (e.g., marinas and charter boats) on the eastern and western ends, as well as in the middle of the island. U.S. Highway 1, the only road in and out of the Keys, runs the length of the island.

Most of LMK is less than four feet above mean higher high water, typical for the lower and middle Keys to the west, but substantially lower than the remainder of the islands in the Village and on Key Largo to the east. This low elevation makes LMK extremely vulnerable to storm surges and sea level rise impacts. As elsewhere in the Keys, the incidence of nuisance flooding of low-lying portions of the island is increasing as the sea rises. LMK's substratum is fossilized coral limestone, which is so porous that it does not retain fresh water. This is a boon for stormwater drainage, but a challenge for adaptation, as there is nothing to impede the saltwater beneath the island from rising with the sea level.

Village officials are well aware of LMK's vulnerabilities and they are proactive about addressing them. With the help of a consulting team that was engaged in similar work for Monroe County, a vulnerability analyses was conducted and initial planning was centered on five focus areas" Habitat, Infrastructure & Built Environment, Village Buildings & Key Facilities, Adaptation Strategies, and Sustainability. Completed in 2016, this "Islamorada Matters" planning effort utilized the Compact's sea level rise projections to create low and high sea level rise scenarios for 2030 and 2060. Other than low-lying roads, one of the vulnerabilities identified is the low-lying Fire Station #19 located on LMK. A comprehensive website of the planning process, results summary, and link to download the full report may be found at:

<http://www.islamoradamatters.com/>.

There are four main components LMK wishes to explore through the Resilient Redesign process: potential new residential development, retrofitting existing residential development, waterway connectivity, and the exposure of US1 to erosion at Sea Oats Beach.

- 1. Potential New Residential Development:**

Although new development is relatively uncommon in the Village, the 36-acre Parmelee Estate on LMK is an undeveloped oceanfront/canal-front property which presents the Resilient Redesign team with a "clean slate" upon which to draw-up plans for a more sustainable future. Designers will be able to examine what new development on a low-lying Florida



island might need to cope with today's storm risk, tomorrow's sea levels, and various other challenges.

- 2. Retrofitting Existing Residential Development:** Much more typical of the challenges facing the Village is the need to create redevelopment solutions that account for storms, sea level rise, and overall sustainability. Oceanfront/canal-front properties, some of which were built on grade, others on pilings, and most of which are served by low-lying streets, present a complex design challenge. Can the design team conceive of affordable solutions to extend the useful lives of homes without dramatically changing the character of neighborhoods in subdivisions like Safety Harbor, White Marlin Beach, and Port Antigua? If the answer is no, in some instances, what does dramatic change look like?



- 3. Waterway Connectivity:** Western LMK is a complex knot of natural and created waterways, some of which have stronger water flows and better water quality than others. The design team will examine opportunities to connect or otherwise reconfigure existing waterways with multiple objectives in mind, including improved water quality, wildlife habitat, aesthetics, and waterborne transportation.



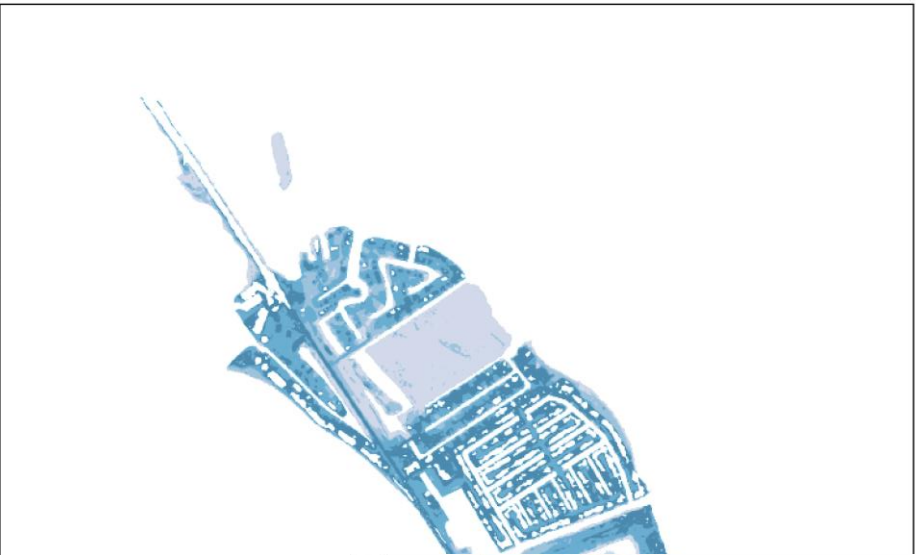
- 4. Sea Oats Beach/US1 Exposure:** The low-lying stretch of U.S. Highway 1 parallel to Sea Oats Beach on LMK is one of the most vulnerable portions of the highway in the Keys, from the standpoint of flooding and erosion. Once a wide and beautiful beach with sea turtle nesting and shorebird habitats, today the stretch of Sea Oats Beach along the highway is almost nonexistent and wildlife has disappeared with it. At high tide, the sea laps at the erosion control structure established by Florida Department of Transportation to protect the highway in 2006. Hurricanes easily overwash the highway at this point, temporarily making ingress into and egress from the Florida Keys impossible, and threatening much more serious disruption if the highway should wash out. Just east of Sea Oats Beach, the highway is even lower in elevation. Although less exposed to erosion at that

location, it is more prone to flooding. King tides approach the highway shoulder. We would like feedback on the combination of reengineering the highway and restoring natural features that could provide the optimal mix of functionality, safety, beauty and wildlife habitat.

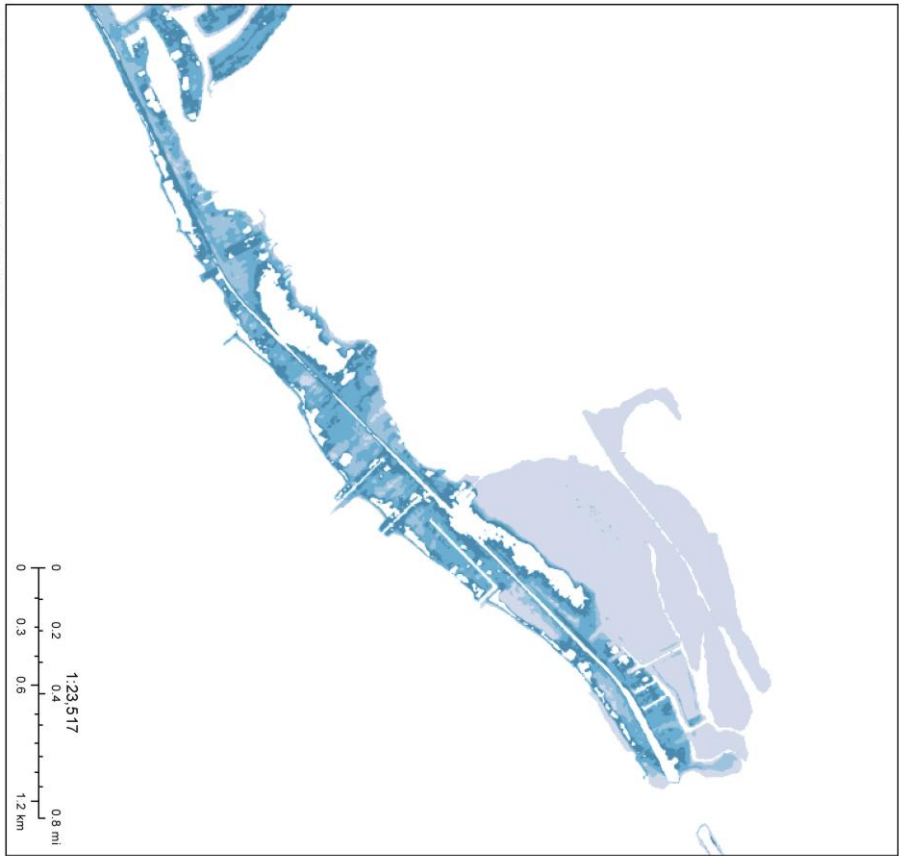


LOWER MATECUMBE KEY – CASE STUDY MAPS

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<http://maps.coastalresilience.org/>

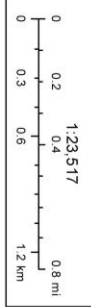
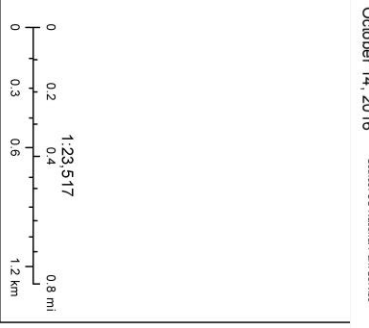


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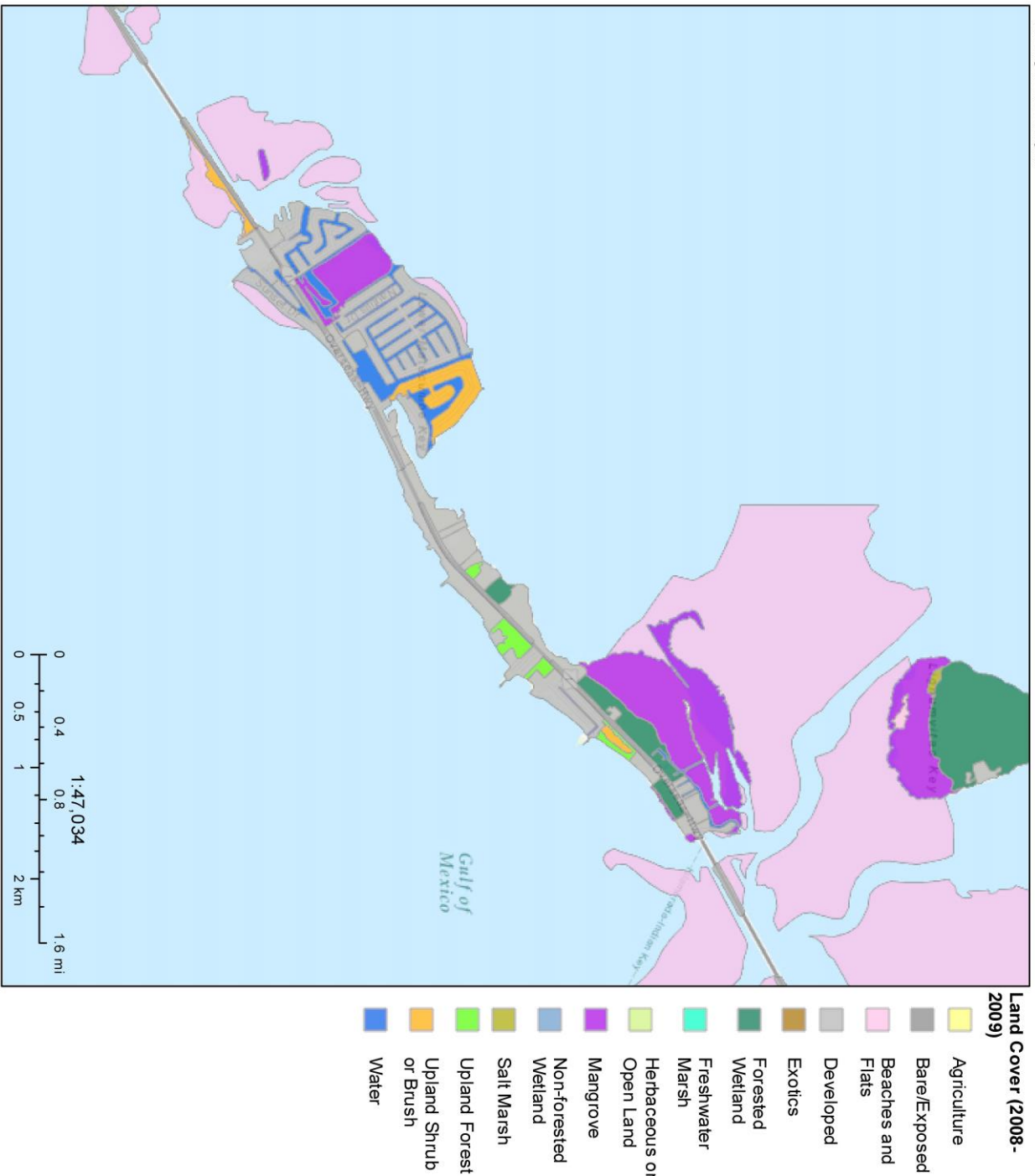


LMK East 1' Elevation Intervals

- 1 foot sea level rise
- 2 feet sea level rise
- 3 feet sea level rise
- 4 feet sea level rise



LMK Landuse 2008/2009



October 6, 2016

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors,



1. Potential Residential

2. Waterway Connectivity

3. Existing Residential

4. Sea Oats Beach/US1 Exposure

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Imagery Date: 12/16/2014

24°51'23.62" N 80°43'54.64" W elev 5

SHORECREST, CITY OF MIAMI

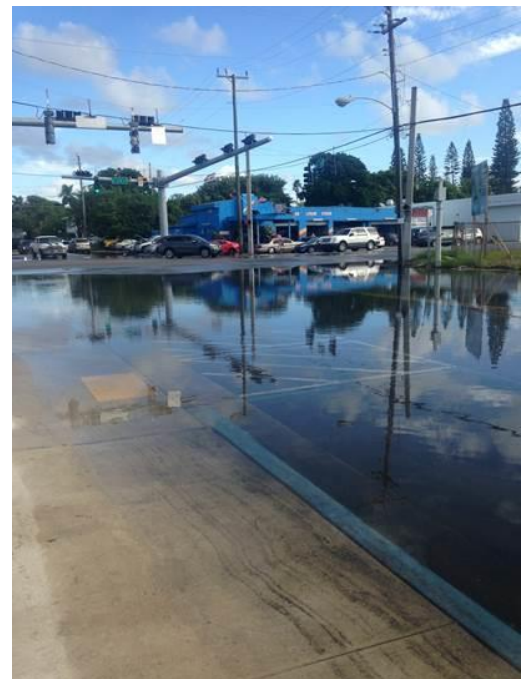
Several areas within the City of Miami are increasingly affected by tidal flooding, sea level rise and other related impacts. The City of Miami has initiated and is exploring several measures to increase its resilience to these threats, including: upgrading and hardening of infrastructure, investing in internal reorganization to address resilience, incorporating resilience into city policies and plans (where applicable), and increasing local, regional and national collaborative efforts to address resilience, such as its partnership in the 100 Resilient Cities, *Greater Miami & the Beaches* consortium.



Miami is uniquely vulnerable to these impacts as a result of its geology, susceptibility to tropical cyclones and other extreme weather events. The city has a high number of assets exposed to the threats of climate change and specifically, sea level rise. In addition, many of the city's residents face a variety of challenging socio-economic conditions. Approximately 30% of Miami's residents currently live below the poverty line compared to 16% statewide. The median household income (2009-2013) was only \$30,375 versus \$46,956 statewide. The city also has one of the highest rates of income disparity in the nation.

The northeastern Miami neighborhood of Shorecrest was chosen as the case study area for this initiative because it incorporates many of the factors discussed above. Shorecrest is a small, low-lying, demographically diverse, and a predominantly low-to-moderate income residential community that has been severely impacted by tidal flooding, particularly during recent King tide events, as the area's aging drainage infrastructure is increasingly unable to cope. During the 2015 King tide season, many areas within the community were inundated with saltwater, which did not recede for several days and even weeks in the most severely impacted locations. These events resulted in significant impacts for the community and its residents, including: increased difficulty for many residents to access roads and public transportation, further compromising of already aging infrastructure, discharging of polluted runoff into the environmentally sensitive Biscayne Bay, and damage to personal property and vehicles.

Shorecrest is bordered by Biscayne Boulevard to the west, Biscayne Bay to the east, and from NE 87th Street in the north to NE 78th Street in the south. The community's largest demographic group is Hispanics, followed by African Americans, whites and others. This case study area also includes roadways managed by both the city and Miami-Dade County, thereby affording the opportunity to model and incorporate multi-jurisdictional collaboration and solutions for resilience.



Several community-based organizations have been engaging Shorecrest's residents to document their personal impacts from these events and to ensure they are brought to the table as meaningful stakeholders on potential resilience solutions for their community. Shorecrest has not experienced the same high-level of investment, development and resultant economic boon as many of the city's higher-profile communities have in recent years. This Resilient Redesign process will incorporate and build on the good work already done by these groups, to envision a more resilient Shorecrest for its residents, and to serve as a replicable model for similar areas throughout the city, region and beyond.

Existing Landcover



FEMA Flood Zones



Elevation



ARCH CREEK, MIAMI-DADE COUNTY

Many areas of Miami-Dade County are already experiencing flooding during heavy rains and seasonal high tides, due to their low elevation and drainage constraints. Currently, the South Florida Water Management District, the county, and municipalities operate a complex water management system to balance canal and water table levels to minimize flooding in urban areas and prevent saltwater intrusion. The porous substrate presents a unique challenge for managing groundwater levels and flooding, and makes traditional flood defenses designed to keep the water out less effective here. This also presents a challenge for areas still served by septic tanks.

Arch Creek was selected as a case study area because it is highly vulnerable to flooding, it is economically diverse, and it's the possible site for a future passenger rail station that would provide an opportunity for transit-oriented redevelopment. The study area also crosses jurisdictional boundaries for five different local governments that can provide a model for multi-jurisdictional coordination on resilience. The area's vulnerabilities are characteristic of other areas, therefore, solutions developed for the Arch Creek area will likely have wide applicability. The case study area is divided into three focus areas: one inland, one along the ridge and rail line, and one along the waterfront.

The Arch Creek area has also been selected as the county's first Adaptation Action Area pilot and will serve as a model for future adaptation initiatives. In May 2016, this area was the focus of a Resilience Panel sponsored by the Urban Land Institute and supported by the Kresge Foundation. That panel provided many helpful recommendations. The Resilient Redesign process will hopefully build on that work and better inform the implementation of ideas in this area. There is also significant opportunity to explore green infrastructure solutions in the flood-prone areas of the site.

There are three main components we wish to explore through the Resilient Redesign process: a waterfront area on Biscayne Bay, a site along the ridge site that is a possible future passenger rail station, and a low-lying inland area vulnerable to flooding.

1) Waterfront: This area is an example of a single-family residential subdivision that was platted in the 1950's, which used cut and fill techniques to develop residential lots on finger canals connecting to Biscayne Bay. This development pattern is characteristic of development along Biscayne Bay within this area of the county. Over 80% of the homes on the finger canals were developed prior to 1973, the date of the first Flood Insurance Rate Map and accompanying federal flood mitigation regulations. These areas are directly exposed to storm surge and have a higher median income and a higher rate of owner-occupied units when compared with the majority of the case study area.



2) Ridge: The intersection of the Florida East Coast Railway and NE 125th Street has been identified as a potential location for a future passenger rail station. The Tri-Rail Coastal Link is an initiative to implement passenger rail service along the Florida East Coast Railway between Palm Beach County and downtown Miami. The focus area comprises of the land within a half-mile radius around the proposed transit station, which is on relatively higher ground. The half-mile radius corresponds with the radius for urban centers, as defined in the County's Comprehensive Development Master Plan.

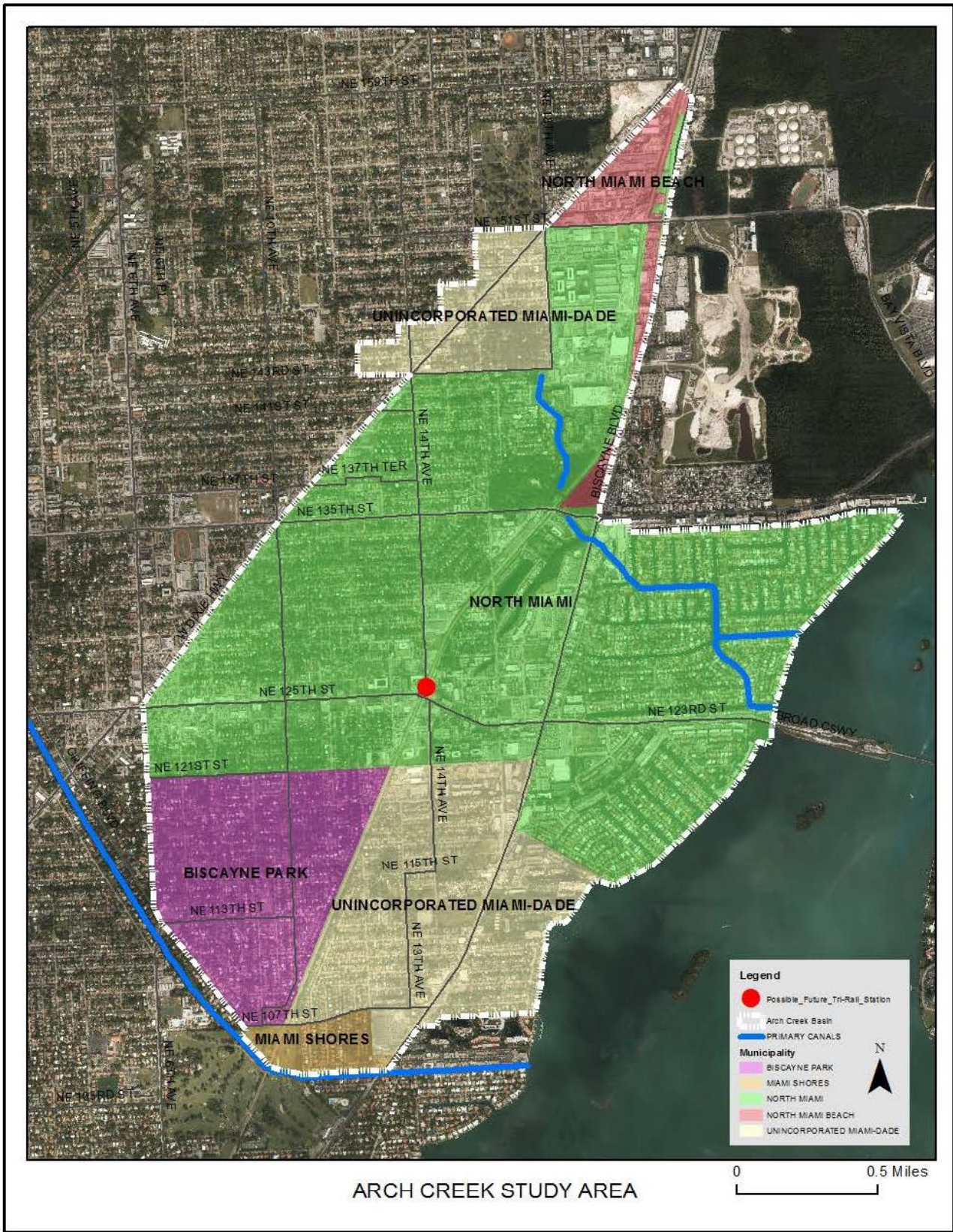


3) Inland: Arch Creek Estates consists of mostly low-lying housing units built prior to the establishment of the county's Flood Criteria and the requirements of FEMA's National Flood Insurance Program. There are 34 repetitive loss properties located within this focus area, with three properties classified as severe repetitive loss. Because of the way these communities were developed, the areas of repetitive losses snake through the grid system, likely conforming to historic waterbodies that were filled and developed over. Since the area is so low, the effectiveness of traditional drainage infrastructure may be challenged in the face of long-term sea level rise. Redevelopment and elevation will likely be required, however with any redevelopment it is important to consider the implications on housing affordability.



ARCH CREEK – CASE STUDY MAPS





Map 3: Ground Elevations in Arch Creek

