



TOWN OF CUTLER BAY

Attachment "B"

Revised Flood Mitigation Plan Excerpt
Highlighted FDEM Approved Changes

FLOODPLAIN MITIGATION PLAN

APPROVED PENDING ADOPTION



3.2.2 Coastal/Canal Bank Erosion

Hazard/Problem Description

Coastal Erosion

Coastal erosion is a process whereby large storms, flooding, strong wave action, sea level rise, and human activities, such as inappropriate land use, alterations, and shore protection structures, wears away the beaches and bluffs along the coast. Erosion undermines and often destroys homes, businesses, and public infrastructure and can have long-term economic and social consequences. According to NOAA, coastal erosion is responsible for approximately \$500 million per year in coastal property loss in the United States, including damage to structures and loss of land. To mitigate coastal erosion, the federal government spends an average of \$150 million every year on beach nourishment and other shoreline erosion control measures.

Coastal erosion has both natural causes and causes related to human construction activities. Gradual coastal erosion results naturally from the very slow rise of sea-level. Severe coastal erosion can occur over a very short period of time when the state is impacted by hurricanes, tropical storms and other weather systems. In Florida, sand is moved parallel to most beaches by longshore drift and currents. Sand is continually removed by longshore currents in some areas but it is also continually replaced by sand carried in by the same type of currents. Structures such as piers or sea walls, jetties, and navigational inlets may interrupt the movement of sand, and sand can become “trapped” in one place by these types of structures. The currents will continue to flow, though depleted of sand trapped elsewhere which leads to erosion.

Erosion rates and potential impacts are highly localized. Average coastline recession rates of 25 feet per year are not uncommon on some barrier islands in the Southeast. Severe storms can remove even wider beaches, along with substantial dunes, in a single event. In undeveloped areas, these high recession rates are not likely to cause significant concern, but in some heavily populated locations, one or two feet of erosion may be considered catastrophic (NOAA, 2014).

Canal Bank Erosion

Streams/canals erode by a combination of direct stream processes, like down cutting and lateral erosion, and indirect processes, like mass-wasting accompanied by transportation. When the channel bends, water on the outside of the bend (the cut-bank) flows faster and water on the inside of the bend (the point) flows slower as shown in Figure 3.5. This distribution of velocity results in erosion occurring on the outside of the bend and deposition occurring on the inside of the bend.

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. Stream bank erosion processes, although complex, are driven by two major components: stream bank characteristics (erodibility) and hydraulic/gravitational forces. Many land use activities can affect both of these components and lead to accelerated bank erosion. The vegetation rooting characteristics can protect banks from fluvial entrainment and collapse, and also provide internal bank strength. When riparian vegetation is changed from woody species to annual grasses and/or forbs, the internal strength is weakened, causing acceleration of mass wasting processes. When land use changes occur in a watershed, such as clearing land for agriculture or development, runoff increases. With this increase in runoff the stream channel will adjust to accommodate the additional flow, increasing streambank erosion. Stream bank aggradation or degradation is often a response to stream channel instability. Since bank erosion is often a symptom of a larger, more complex problem, the long-term solutions often involve much more than just bank stabilization. **As a result canal bank erosion can occur throughout the Town of Cutler Bay as shown on Figure 3.13 (Cutler Bay Canal System) in Section 3.2.5.**

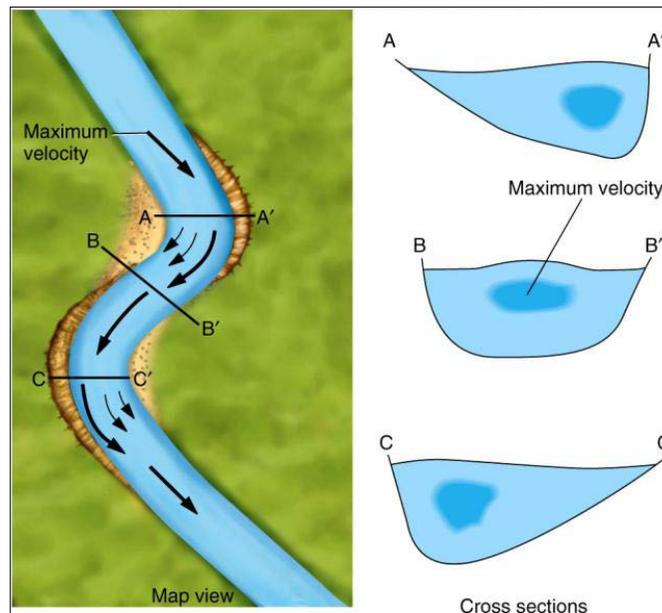


Figure 3.5- Stream Meanders

Past Occurrences

Miami-Dade County has been addressing coastal erosion since 1975 and invests approximately \$6 million annually in beach restoration. However, unlike other communities within Miami-Dade County affected by coastal erosion, the shoreline of Biscayne Bay (the eastern boundary of the Cutler Bay planning area) is protected by mangroves within Biscayne National Park which assist in shoreline protection and stabilization. The tangled root systems of the mangroves trap sediments which prevents coastal erosion. Mangroves also assist in buffering the coastal zone from tropical storms and hurricanes as their branches and root systems create friction that reduces the force of winds and waves. Therefore, the mangroves play a large role in protecting Cutler Bay from coastal erosion. **As a result, coastal erosion does not pose an imminent threat to insurable buildings in Cutler Bay.**

Cutler Bay has reported one localized instance of limited canal erosion. A search of the NCDC database and SHELDUS database resulted in no past occurrences of coastal erosion or canal bank erosion. Furthermore, a report completed in June 2012 by the Florida Department of Environmental Protection (DEP), Division of Water Resource Management, titled “Critically Eroded Beaches in Florida” which inventoried critically eroded areas along the Atlantic and Gulf coasts did not identify any areas of erosion within the Cutler Bay planning area.

Frequency/Likelihood of Future Occurrence

Likely – Several known localized instances of canal erosion prove that this hazard should be considered as a likely concern. **However, no structural damage of insurable structures has occurred and is not likely to impact any buildings.**

Coastal erosion is an unlikely concern for Cutler Bay.

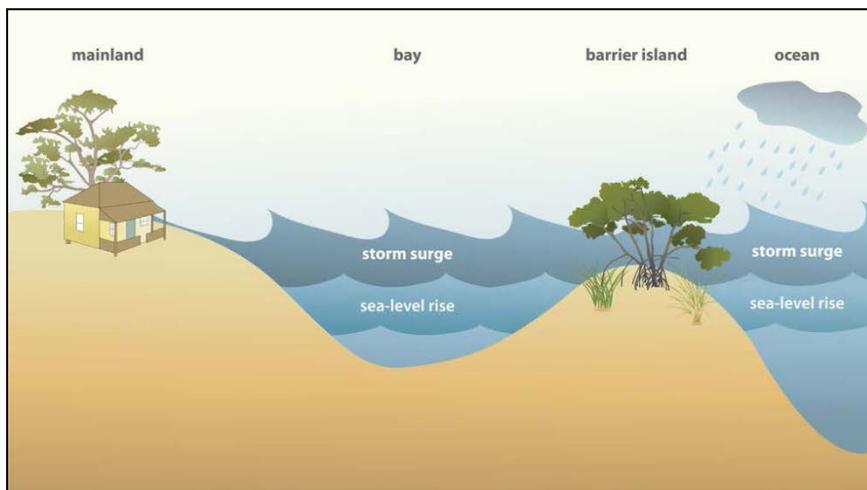


Canal Erosion on SW 194th Street

However, it is paramount that Cutler Bay continues to maintain the natural flood protection benefits and floodplain functions provided by Biscayne National Park. This coastal flood zone should remain preserved and undeveloped in order to continue to protect the Cutler Bay planning area from coastal erosion. **In areas along the canal system throughout the Cutler Bay Planning area, the extent of canal bank erosion is an average of 1 to 2 feet of erosion along the top and/or sides of canal banks.** The maintenance of the canal system is the responsibility of Miami-Dade County and the South Florida Water Management District.

Climate Change and Coastal/Canal Bank Erosion

Sea-level rise will raise all tide levels, from low tide to storm surge. Wave action at higher tide levels may cause erosion of sandy beaches. Higher storm surges, which may be accompanied by stronger storm winds, could wash over the tops of sand dunes, flooding the burrows of dune-nesting animals. The combined effects of wind and waves could damage dunes, leaving the beachfront more vulnerable. (UF/IFAS Extension, 2013).



Credits: Jane Hawkey, IAN Image Library (ian.umces.edu/imagelibrary/)

Figure 3.6 - Seal Level Rise and Coastal Erosion of Dunes

According to the Center of Ocean Solutions, there has been a dramatic increase in coastal erosion over the last two decades and this is expected to continue as sea level rises and storm frequency and severity increase. Rather than occurring over the same time scale with sea level rise, erosion of beaches and coastal cliffs is expected to occur in large bursts during storm events as a result of increased wave height and storm intensity. Because of these large events, scientific models predict that shoreline erosion may outpace sea level rise by 50 to 200 fold. Erosion will have significant effects on coastal habitats, which can lead to social and economic impacts on coastal communities. With the reduction of coastal habitats and the ecological services they provide, coastal communities will experience more frequent and destructive flooding, compromised water supplies and smaller or fewer beaches.

3.2.3 Dam/Levee Failure

Hazard/Problem Description

Dam Failure

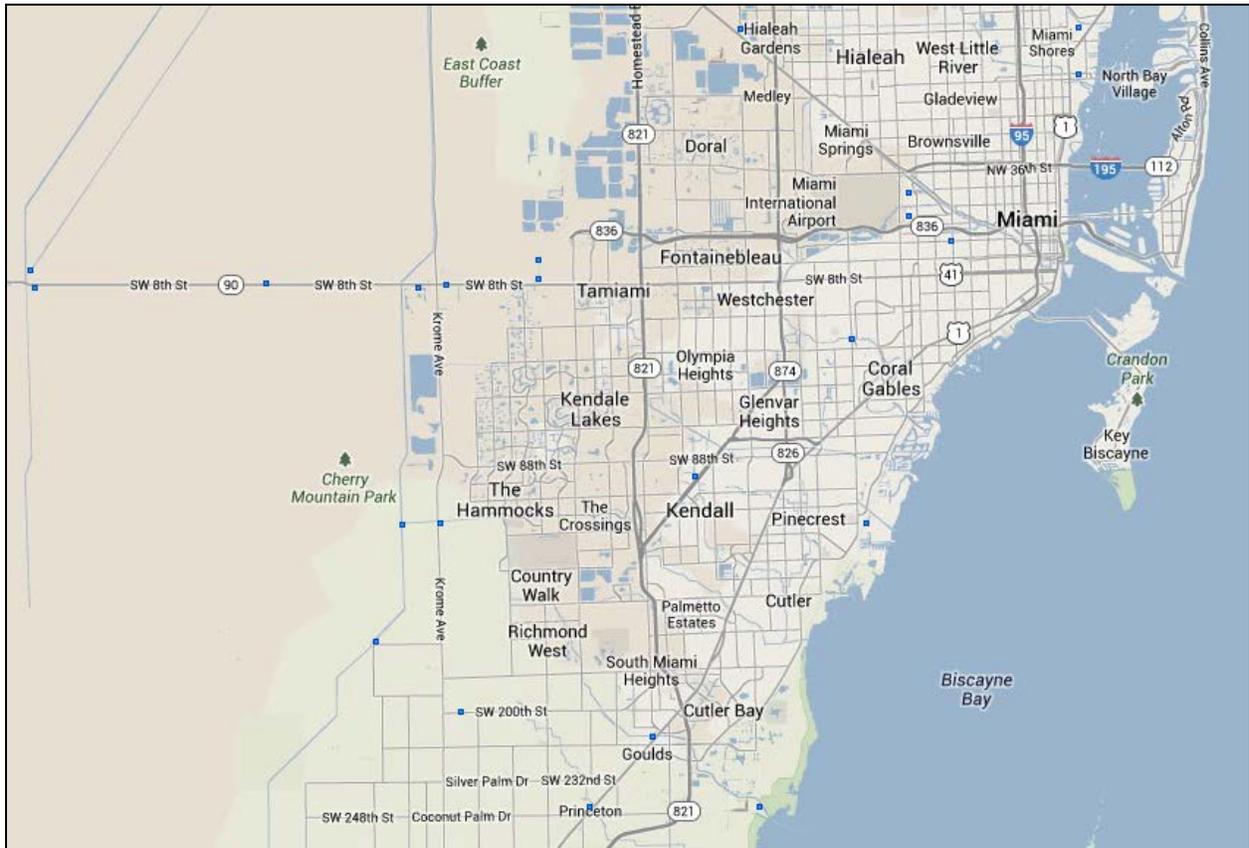
A dam is a barrier constructed across a watercourse that stores, controls, or diverts water. Dams are usually constructed of earth, rock, or concrete. The water impounded behind a dam is referred to as the



3. Equal or exceed 25 feet in height and exceed 15 acre-feet in storage
4. Equal or exceed 50 acre-feet storage and exceed 6 feet in height

Low hazard dams which do not meet the criteria specified in number 3 or 4 are not included in the NID even if they are regulated according to state criteria. In some states, the number of these dams is several times the number of dams included in the NID.

Figure 3.7 reflects all dams included in the NID that are located around the Cutler Bay planning area. There are no dams located within the jurisdictional boundaries of Cutler Bay and no areas within Cutler Bay that could be affected by a dam failure. Table 3.7 details all dams located within Miami-Dade County as included in the NID.



Source: U.S. Army Corps of Engineers National Inventory of Dams

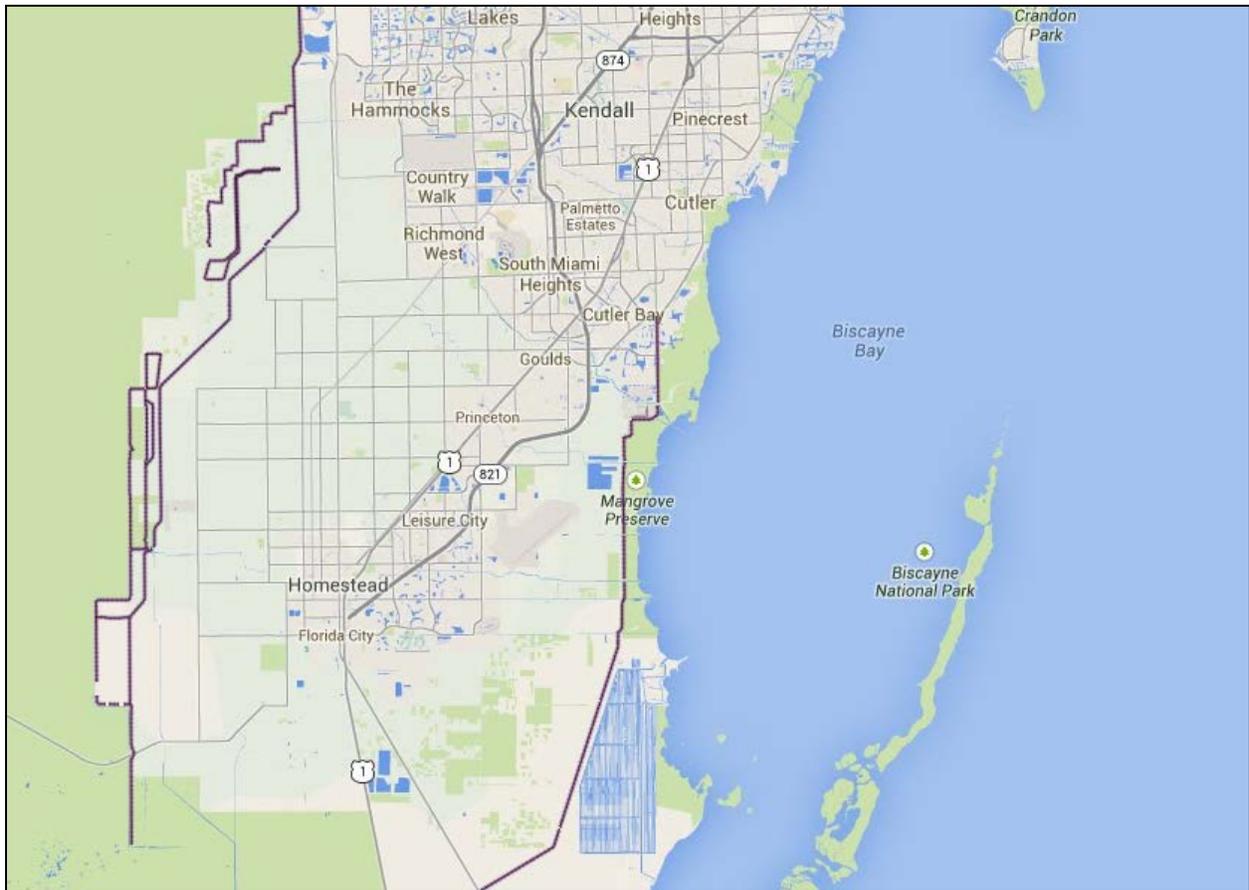
Figure 3.7- National Inventory of Dams for Cutler Bay

Table 3.7 - National Inventory of Dams, Miami-Dade County

Dam Name	NIDID	Owner	Height (Ft.)	NID Storage (acre-feet)	Primary Purpose	River
Structure 338	FL00690	SFWMD	26	242	Other	CANAL 1
Structure No. 148	FL00390	SFWMD	20	2977	Flood Control	BLACK CREEK (C-1)
Structure No. 21	FL00399	SFWMD	20	853	Flood Control	BLACK CREEK (C-1)
Structure No. 20A	FL00402	SFWMD	32	495	Flood Control	CANAL 106
Structure No. 333	FL00681	SFWMD	23	2726900	Other	LEVEE 29 BORROW CANAL

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events. Levees reduce, not eliminate, the risk to individuals and structures behind them. A levee system failure or overtopping can create severe flooding and high water velocities. It is important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Figure 3.9 below reflects all levees included in the U.S. Army Corps of Engineers National Levee Database (NLD). Levee centerlines are indicated in purple. Table 3.8 details all levees within a 25 mile radius of the Town of Cutler Bay as included in the NLD. **No areas with Cutler Bay could potentially be affected by a levee failure.**



Source: U.S. Army Corps of Engineers National Levee Database

Figure 3.9 - National Levee Database for Cutler Bay

Table 3.8 - National Levee Database, Cutler Bay Planning Area

County(ies)	System Name	Sponsor	Length (mi)	Inspection Rating	Leveed Area Type
Broward, Hendry, Miami-Dade, Palm Beach	L-38 Section 2	SFWMD	3.74	Minimally Acceptable	Agricultural
Miami-Dade	East Coast, L-30	SFWMD	13.88	Minimally Acceptable	Urban
Miami-Dade	L-31 East	SFWMD	18.91	Minimally Acceptable	Rural
Miami-Dade	8.5 Square Mile Area	SFWMD	13.38	Minimally	Urban



County(ies)	System Name	Sponsor	Length (mi)	Inspection Rating	Leveed Area Type
				Acceptable	
Miami-Dade	L-31W Segment 3	SFWMD	5.15	Minimally Acceptable	Agricultural
Miami-Dade	L-31 West	SFWMD	16.5	Minimally Acceptable	Urban
Miami-Dade	C-111 SD South	SFWMD	6.76	Minimally Acceptable	Agricultural
Broward, Collier, Miami-Dade, Monroe	L-29	SFWMD	45.38	Unacceptable	Agricultural
Broward, Miami-Dade	East Coast, L-33	SFWMD	8.17	Minimally Acceptable	Urban
Miami-Dade	C-111 SD North	SFWMD	5.86	Minimally Acceptable	Agricultural
Broward, Miami-Dade	WCA-3B	SFWMD	51.89	Minimally Acceptable	Agricultural
Miami-Dade	L-31 North	SFWMD	21.11	Minimally Acceptable	Urban

Source: U.S. Army Corps of Engineers National Levee Database

Past Occurrences

There are no past reported dam breaches or levee failures within Cutler Bay.

Frequency/Likelihood of Future Occurrence

Unlikely –There are no high or significant hazard dams located within Cutler Bay, and there are no documented occurrences of past levee failure. Therefore, the extent of dam and levee failure on the Cutler Bay planning area would be negligible and have no effect (0 feet) in rising flood levels.

It should be noted that there are no levees within Cutler Bay that have been certified by FEMA to protect against the 100-year flood. Therefore, Cutler Bay residents should not be lulled into a false sense of security by the surrounding levees as no level of protection is guaranteed. In fact, areas behind levees that cannot be certified are typically considered high-risk areas.

Climate Change and Dam/Levee Failure

While average annual rainfall may increase or decrease slightly as a result of climate change, the intensity of individual rainfall events is likely to increase which could overwhelm fragile flood control systems. Climate change is unlikely to change the risk of the Town to dam failure. However, future levees and sea walls may need to be built to combat the effects of sea level rise and storm surge which would affect future risk.

3.2.4 Flood: 100-/500-year

Hazard/Problem Description

Flooding is defined by the rising and overflowing of a body of water onto normally dry land. Flooding can result from an overflow of inland or tidal waters or an unusual accumulation or runoff of surface waters from any source. Flooding within Cutler Bay can be attributed to tidal flooding resulting from hurricanes and tropical storms and heavy rainfall that overburdens the drainage system within the community.

The primary source of flooding in Cutler Bay is due to stormwater runoff where catch basins and the underground drainage system are not able to handle heavy rainfall events. This type of flooding causes

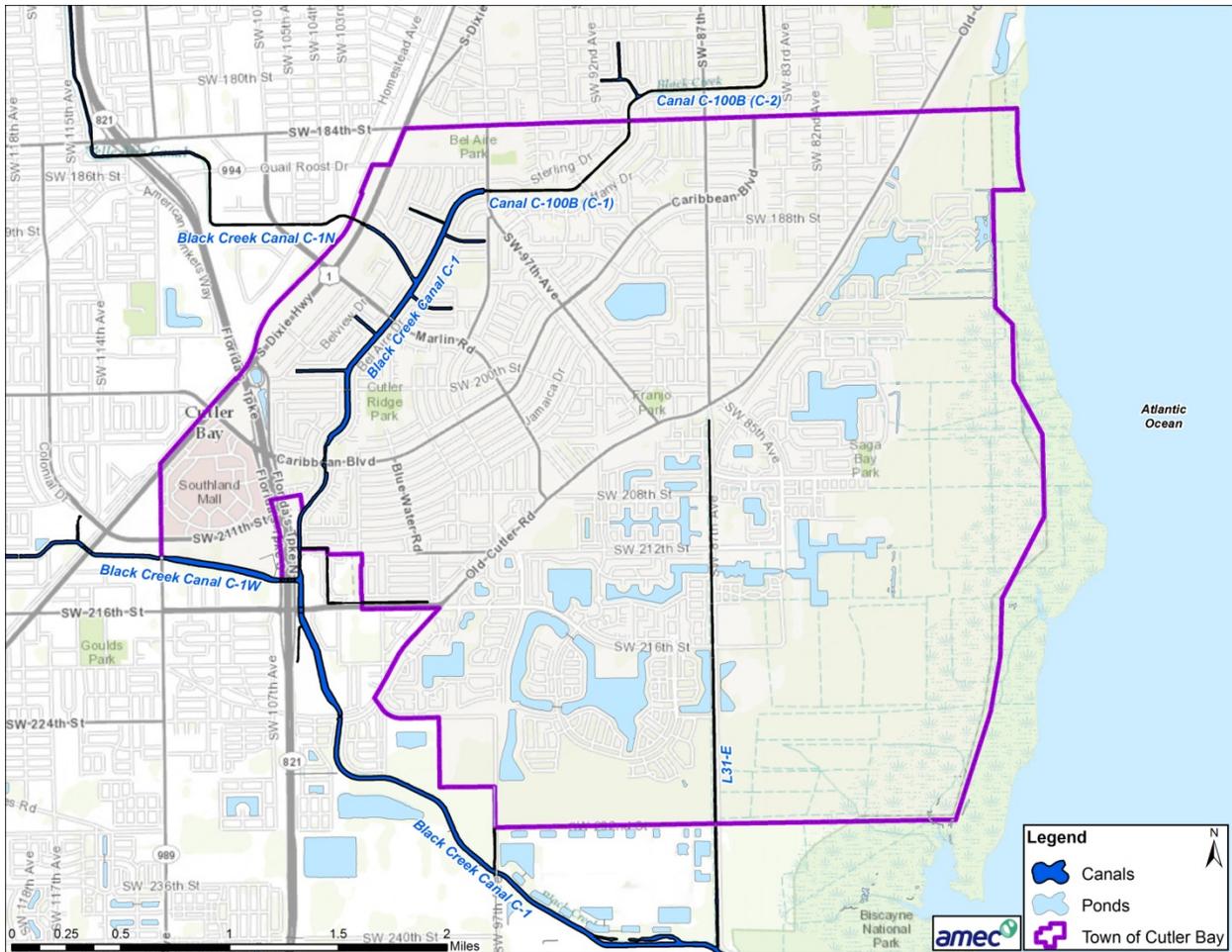


Figure 3.13 - Cutler Bay Canal System

Past Occurrences

Localized stormwater flooding can be associated with a 100-year (1% annual chance flood) and the depth of flooding is often 3 feet which is consistent with AH Zones shown in much of Cutler Bay. Details of past occurrences for localized stormwater flooding are detailed in Section 3.2.4. This is shown in Figure 3.26 in Section 3.3.4. Areas of local stormwater flooding were identified by the FMPC. Figure 3.14 depicts the areas of localized flooding identified by the FMPC. The areas of localized flooding include:

- Sterling Dr and SW 93 St
- Parcels between SW 195 St and SW 196 St
- The parcels bordered by Caribbean Blvd, Anchor Rd, Pan American Dr and Blue Water Rd
- Manta Drive at Old Cutler Rd
- Old Cutler Rd southwest of the intersection of Franjo Rd
- The intersection of SW 89 Ct, Franjo Rd and SW 200 St
- SW 186 St at SW 97th Avenue
- SW 77 Ave and SW 188 St through the intersection of SW 78 Ave
- SW 79 Ave at SW 79 Ct
- SW 197 Terrace at SW 196 Terrace
- SW 84 Ave at SW 199 Terrace
- SW 212 St between SW 85 Ave and SW 87 Ave



climate change and sea level rise include increased flooding frequency, potential damage to critical infrastructure, and increasing public costs associated with flood insurance claims, infrastructure repair and maintenance, environmental impacts and increased costs associated with emergency management efforts.

Sea Level Rise

The potential impacts to buildings, assets, and infrastructure from climate change and sea level rise will be negligible based on the buffer from the Atlantic Ocean by the Key Biscayne National Park and the Cutler wetlands; however, limited increases in the water level of canals may be an issue in the future. Sea level rise can have the following impacts on property and infrastructure in Cutler Bay:

- Coastal infrastructure: bridges, docks, piers
- Jettys/erosion control structures
- Roads and bridges
- Utility infrastructure
- Erosion hazard zones
- Built environment including residential development
- Natural resources
- Recreational facilities and amenities such as beaches, public access points, and parks
- Salt water intrusion into water supply
- Loss of property and property tax revenue due to inundation

As discussed in Section 3.2.1, the USACE projection for sea level rise in southeast Florida is 3-7 inches by 2030 and 9-24 inches by 2060. NOAA Coastal Services Center provides a sea level rise and coastal flooding impacts viewer in order to assess how sea level rise will impact coastal communities. Figure 3.25 reflects the impact of a one-foot sea level rise on Cutler Bay using the coastal flooding impacts viewer provided by NOAA. The sea levels represent inundation at high tide, and areas that are hydrologically connected are shown in shades of blue (darker blue = greater depth). The low-lying areas, displayed in green, are hydrologically "unconnected" areas that may flood. Table 3.24 provides an exposure analysis based on the elevation of land that structures are located on relative to local high tide. The results do not factor in structure elevation.



3.3.3 Coastal/Canal Bank Erosion Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—Low

Coastal Erosion

The severity of coastal erosion is typically measured through a quantitative assessment of annual shoreline change for a given beach cross-section profile (feet or meters per year) over a long period of time. Erosion rates vary as a function of shoreline type and are influenced primarily by episodic events, but can be used in land use and hazard management to define areas of critical concern. A report completed in June 2012 by the Florida Department of Environmental Protection (DEP), Division of Water Resource Management, titled “Critically Eroded Beaches in Florida” which inventoried critically eroded areas along the Atlantic and Gulf coasts did not identify any areas of erosion within the Cutler Bay planning area. Fortunately, Biscayne National Park forms the eastern boundary of the Cutler Bay planning area along Biscayne Bay. The shoreline in this area is protected from coastal erosion by the absence of development and the tangled root systems of the mangroves that are preserved in this area. **Because of this buffer (including the Cutler wetlands), no damage to insurable buildings, infrastructure, or assets within Cutler Bay is expected.**

Canal Bank Erosion

Cutler Bay has experienced limited canal bank erosion in the past. Canal bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. Erosion has occurred and will occur as a matter of course on an occasional basis in all canal bank areas. **As a result, no damage to insurable buildings, infrastructure, or assets have been identified within Cutler Bay and none is expected.**

3.3.4 Flood: 100-/500-year Vulnerability Assessment

Likelihood of Future Occurrence—Likely
Vulnerability—High

Flood damage is directly related to the depth of flooding by the application of a depth damage curve. In applying the curve, a specific depth of water translates to a specific percent damage to the structure which translates to the same percentage of the structure’s replacement value. As previously shown in Figure 3.11, a large portion of the Town is located in areas vulnerable to 100-year flooding under normal flood circumstances.

Methodology

Parcel counts by FEMA flood zone were determined using a spatial intersection of the tax parcels, provided by the Town of Cutler Bay, and the effective FEMA flood zones provided in the Miami-Dade County FEMA DFIRM Database, effective 9/11/2009. This methodology was used to determine whether a parcel is affected by multiple flood zones. In the case of parcels affected by multiple zones, the entire parcel assessment value was applied to the flood zone covering the majority of the parcel in order to provide exposure estimates for each FEMA flood zone. In order to determine the correct occupancy class for each parcel, the County Land Use Codes (CLUC) provided in the Cutler Bay tax parcel data were translated into FEMA Hazus specific occupancy classes (i.e. RES1, COM4, EDU2, etc.). These were translated to ensure the correct depth damage factor was applied to the parcel based on its occupancy class to ensure a more accurate damage assessment of the parcel.

Table 3.25 shows the correlation between BFEs and average flood depth. Figure 3.26 depicts the depth of flooding that can be expected within the Town of Cutler Bay during the 100-year flood event.



Flood Zone	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
Standard	5	\$5,990	\$1,223,300	1	\$46,367
Preferred	303	\$119,419	\$86,823,000	1	\$37,327
Total	3,325	\$1,754,782	\$733,266,900	4	\$127,940

Source: FEMA Community Information System, April 2014

Table 3.37 compares the number of policies in force with the number of buildings located within each flood zone in order to examine the percentage of buildings that are insured within each zone.

Table 3.37 - Percentage of Buildings Insured

Flood Zone	Number of Policies in Force	Number of Buildings	% Insured
AE Zone	2,482	7,402	33.5%
AH Zone	535	1,761	30.4%
VE Zone	0	0	0%
X Zone	308	3,535	8.7%
Total	3,325	12,698	26.2%

Source: FEMA Community Information System, April 2014

The notable statistic in Table 3.37 is that while there are 9,163 buildings located within the 100-yr flood zone (AE, AH and VE Zones), only 33% of these buildings carry an active flood insurance policy. Furthermore, only 9% of buildings within the X Zone are insured, and as the repetitive loss figures show below, flooding is not limited to the 100-yr flood zones.

Table 3.38 compares number of buildings present, number of policies in force, total coverage and a calculation of loss estimate values for the 100-yr flood.

Table 3.38 - Flood Loss Estimates by Flood Zone

Flood Zone	Number of Buildings	Number of Policies in Force	Total Value ¹	Total Coverage	Loss Estimate
AE Zone	7,402	2,482	\$1,281,223,491	\$517,974,300	\$274,693,655
AH Zone	1,761	535	\$342,026,222	\$127,246,300	\$23,582,217
VE Zone	0	0	\$0	\$0	\$0
Total	9,163	3,017	\$1,623,249,713	\$645,220,600	\$298,275,872

Source: Miami-Dade County 2013 Tax Assessor's Data, FEMA 2009 DFIRM

¹Total value does not include land value.

The above analysis of existing flood insurance coverage shows that existing building coverage does exceed the loss estimate for the 100-yr flood zone; however, this statistic does not take into account the large number of uninsured properties (67%) that would have no coverage in the event of a flood loss. Total building content value within the 100-yr flood zone is estimated at \$603,428,166. An analysis of NFIP data through December 2011 showed active policies with building contents coverage totaling \$56,094,000.

Repetitive Loss Analysis

An analysis of repetitive loss was completed to examine repetitive loss properties against FEMA flood zones. **All 16 unmitigated repetitive loss properties located within the Town of Cutler Bay are residential.**

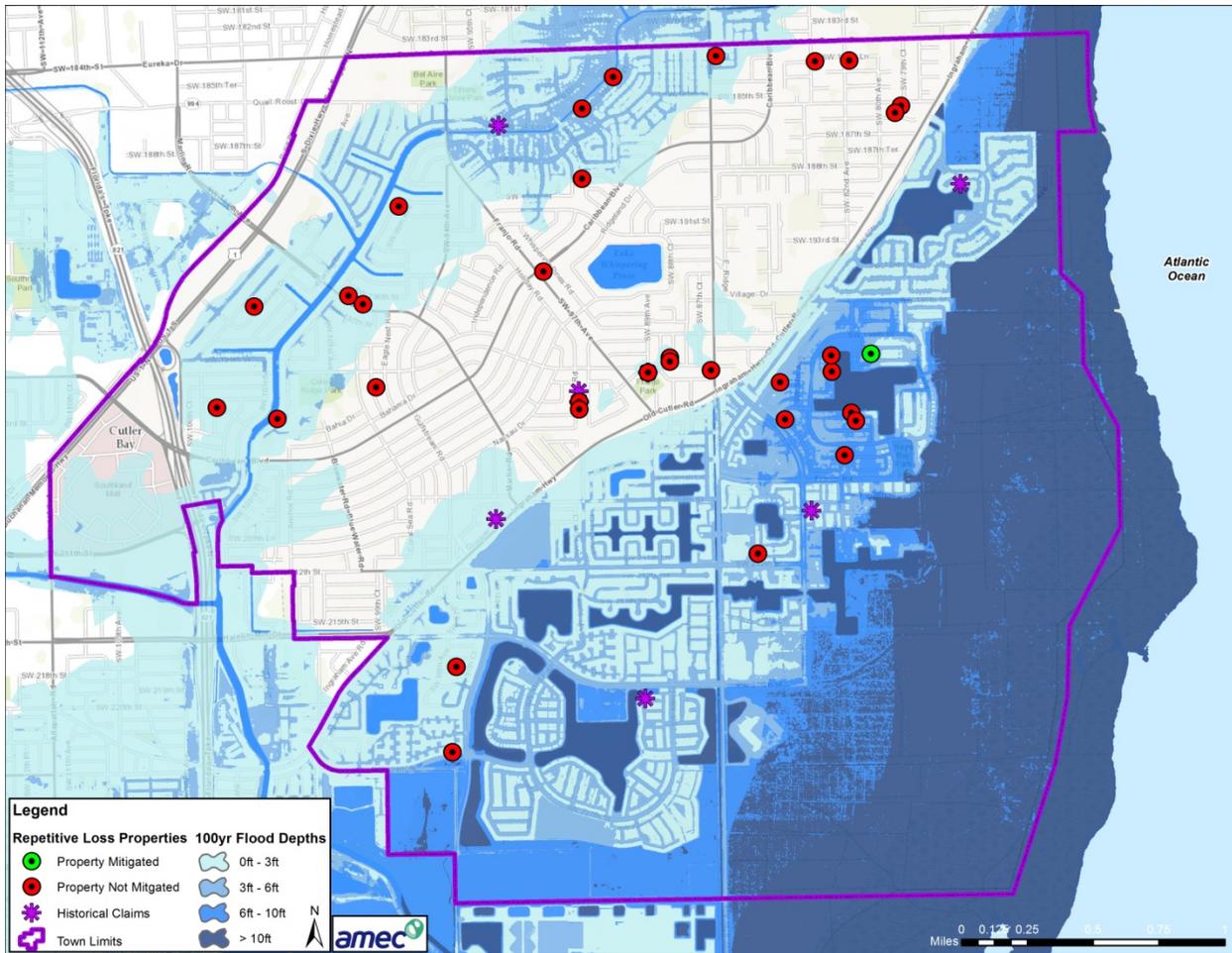


Figure 3.31 - Repetitive Loss Properties and 100-yr Flood Depth

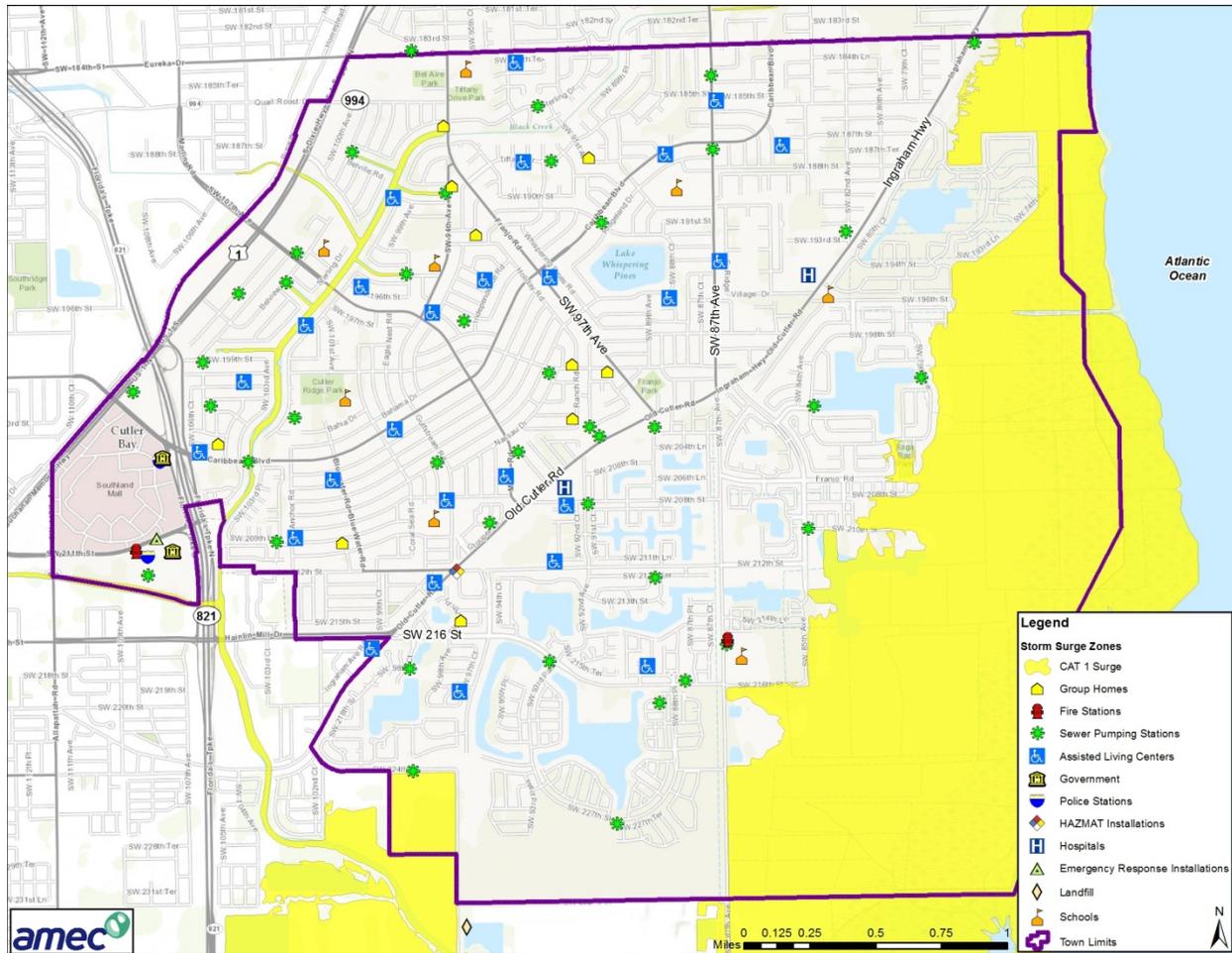
3.3.5 Flood: Stormwater/Localized Flooding Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Localized flooding also occurs at various times throughout the year with several areas of primary concern to the Town. Localized flooding and ponding affect streets and property. Based on figure 3.32, there appears to be a correlation between areas of localized stormwater flooding and repetitive loss properties. Stormwater and localized flooding can often be attributed to the 100-year (1% annual chance flood) and some of the assets identified in Section 3.3.4 can be impacted from localized stormwater flooding. No direct damage of insurable buildings (other than potentially repetitive loss single-family structures) have been identified as being damaged by localized stormwater flooding. Areas of localized flooding identified by the FMPC are summarized below:

- Sterling Dr and SW 93 St
- Parcels between SW 195 St and SW 196 St
- The parcels bordered by Caribbean Blvd, Anchor Rd, Pan American Dr and Blue Water Rd
- Manta Drive at Old Cutler Rd
- Old Cutler Rd southwest of the intersection of Franjo Rd
- The intersection of SW 89 Ct, Franjo Rd and SW 200 St

vulnerability of predicted flood level models (SLOSH) resulting from hurricane storm surge, almost the entire Town becomes vulnerable to property damaging flooding from a Category 3 or stronger hurricane. Based on NOAA's Storm Surge Inundation (SLOSH Maximum of Maximums – worst case including high tide) Mapping concludes that in a category 1 hurricane, Cutler Bay can expect up to 3 feet of surge.



Source: Florida Division of Emergency Management (<http://www.floridadisaster.org>)

Figure 3.36 - Category 1 Storm Surge Impact in Cutler Bay

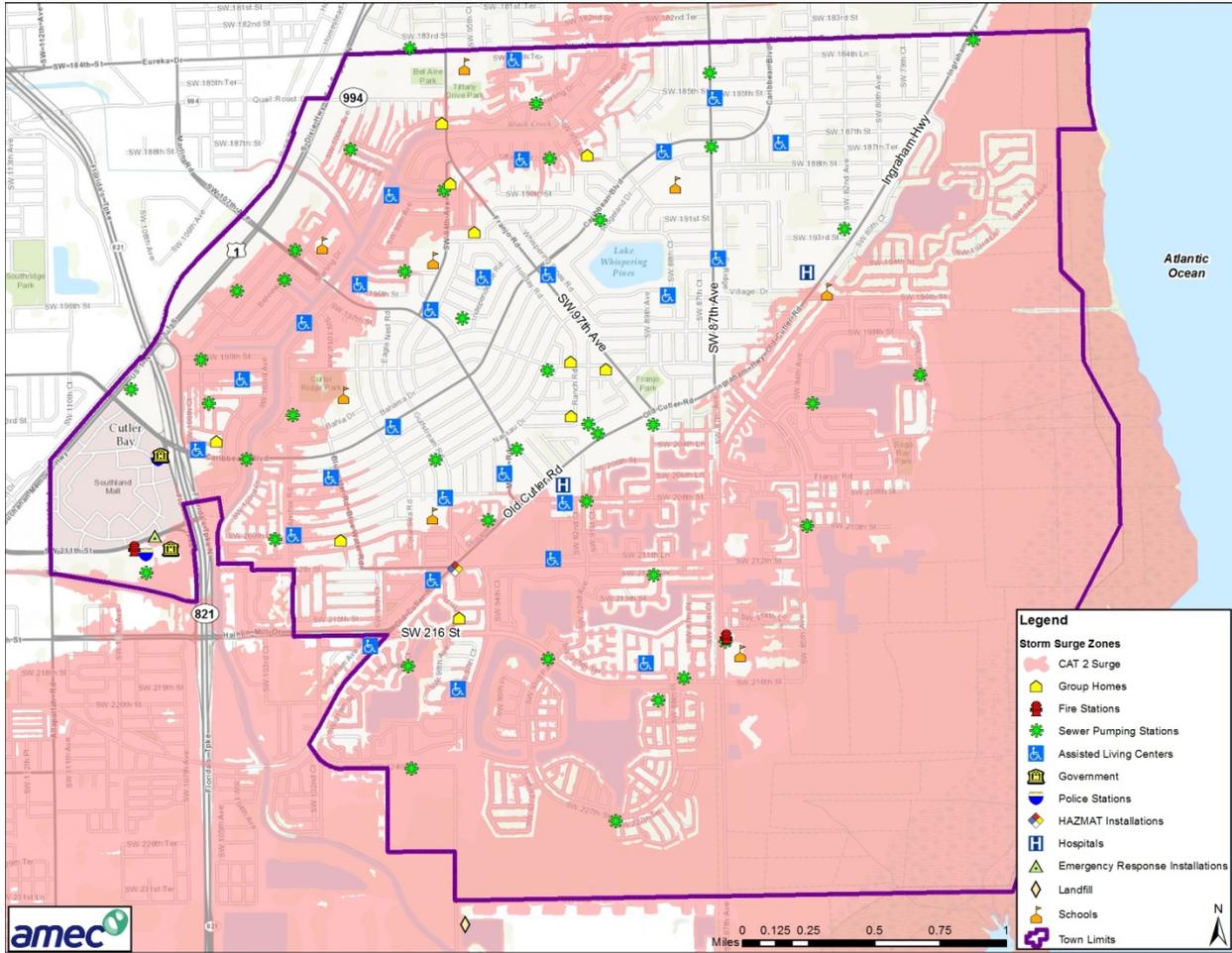
Table 3.40 – Cutler Bay Assets at Risk to Category 1 Storm Surge

Land Use	Total Parcel Count	Improved Parcel Count	Land Value	Improved Value	Estimated Content Value	Total Value ¹
Residential	131	131	\$10,088,847	\$36,473,796	\$18,236,898	\$54,710,694
Commercial	0	0	\$0	\$0	\$0	\$0
Education	0	0	\$0	\$0	\$0	\$0
Government	50	2	\$32,322,041	\$8,043,297	\$8,043,297	\$16,086,594
Religious	0	0	\$0	\$0	\$0	\$0
Other	113	0	\$10,552,203	\$28,264	\$28,264	\$56,528
Total	294	133	\$52,963,091	\$44,545,357	\$26,308,459	\$70,853,816

Source: Miami-Dade County 2013 Tax Assessor's Data, NOAA, FDEM

¹Total value does not include land value.

In a category 2 hurricane, Cutler Bay can expect greater than 3 feet (but less than 6 feet) of storm surge based on NOAA's Storm Surge Inundation Mapping.



Source: Florida Division of Emergency Management (<http://www.floridadisaster.org>)

Figure 3.37 - Category 2 Storm Surge Impact in Cutler Bay

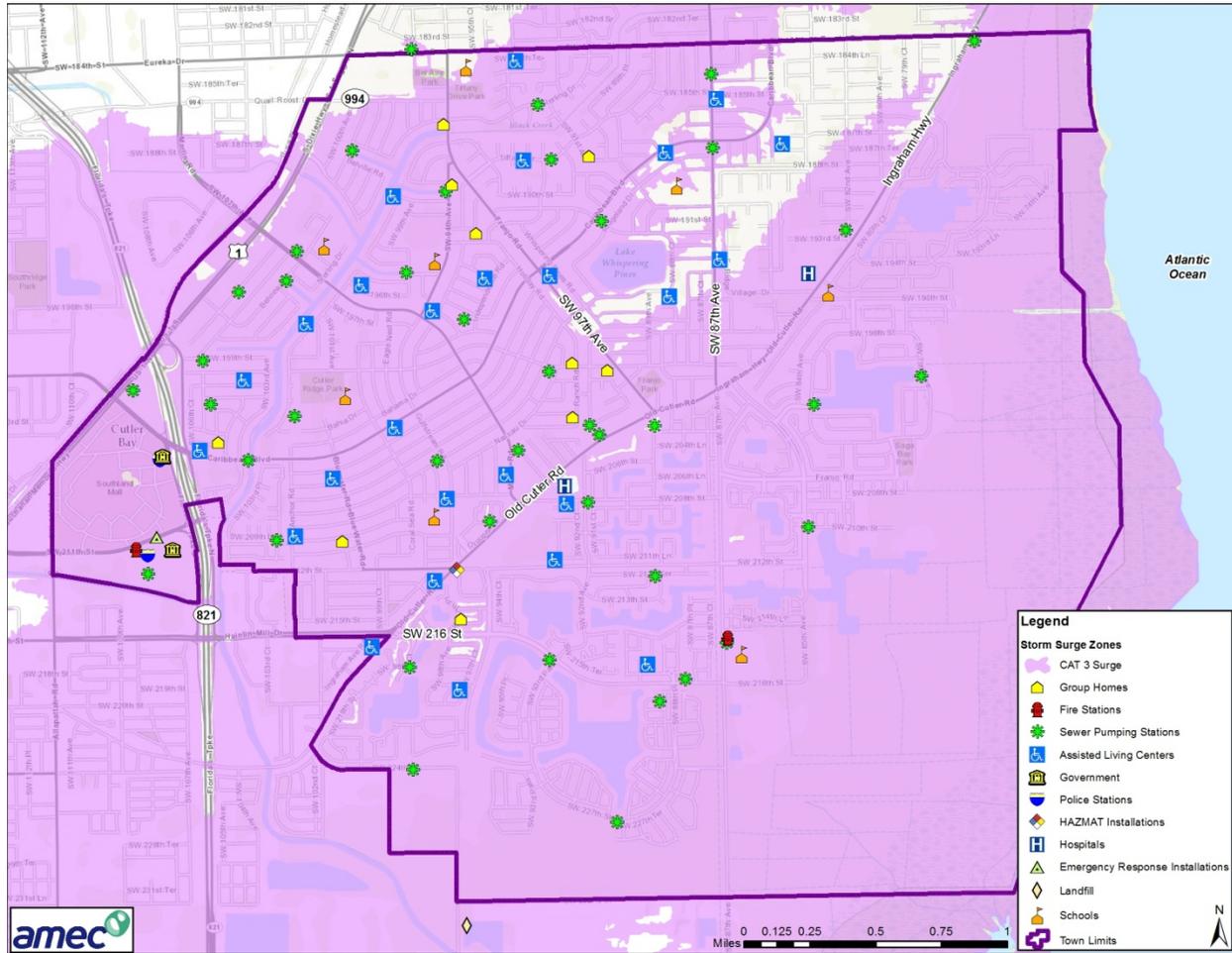
Table 3.41 - Cutler Bay Assets at Risk to Category 2 Storm Surge

Land Use	Total Parcel Count	Improved Parcel Count	Land Value	Improved Value	Estimated Content Value	Total Value ¹
Residential	8,394	8,371	\$225,410,153	\$775,162,872	\$387,581,436	\$1,162,744,308
Commercial	13	12	\$27,537,135	\$14,216,393	\$14,216,393	\$28,432,786
Education	9	9	\$12,322,287	\$42,153,052	\$42,153,052	\$84,306,104
Government	77	10	\$46,475,637	\$35,654,656	\$35,654,656	\$71,309,312
Religious	6	6	\$6,511,468	\$11,265,018	\$11,265,018	\$22,530,036
Other	461	6	\$51,115,775	\$14,339,906	\$21,153,079	\$35,492,985
Total	8,960	8,414	\$369,372,455	\$892,791,897	\$512,023,634	\$1,404,815,531

Source: Miami-Dade County 2013 Tax Assessor's Data, NOAA, FDEM

¹Total value does not include land value.

In a category 3 hurricane, Cutler Bay can expect greater than 6 feet of storm surge based on NOAA's Storm Surge Inundation Mapping.



Source: Florida Division of Emergency Management (<http://www.floridadisaster.org>)

Figure 3.38 - Category 3 Storm Surge Impact in Cutler Bay

Table 3.42 - Cutler Bay Assets at Risk to Category 3 Storm Surge

Land Use	Total Parcel Count	Improved Parcel Count	Land Value	Improved Value	Estimated Content Value	Total Value ¹
Residential	12,307	12,284	\$380,025,456	\$1,147,291,683	\$573,645,842	\$1,720,937,525
Commercial	80	78	\$129,608,965	\$79,413,481	\$79,413,481	\$158,826,962
Education	10	10	\$15,522,287	\$47,013,077	\$47,013,077	\$94,026,154
Government	86	13	\$49,411,117	\$36,347,156	\$36,347,156	\$72,694,312
Religious	8	8	\$7,175,576	\$12,534,413	\$12,534,413	\$25,068,826
Other	579	28	\$82,701,470	\$29,774,601	\$41,723,388	\$71,497,989
Total	13,070	12,421	\$664,444,871	\$1,352,374,411	\$790,677,357	\$2,143,051,768

Source: Miami-Dade County 2013 Tax Assessor's Data, NOAA, FDEM

¹Total value does not include land value.

In a category 4 hurricane, Cutler Bay can expect up to 9 feet of storm surge based on NOAA's Storm Surge Inundation Mapping

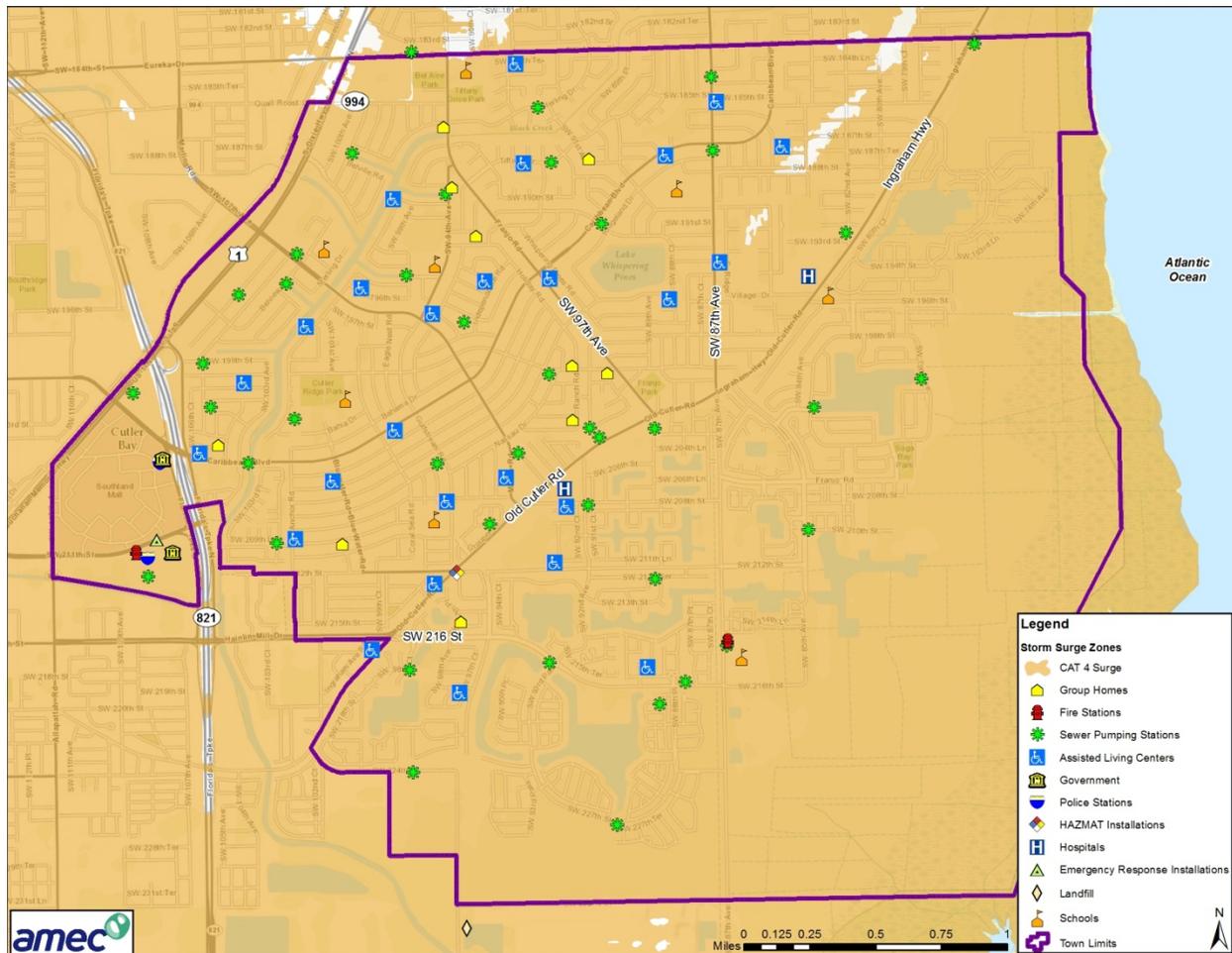


Figure 3.39 - Category 4 Storm Surge Impact in Cutler Bay

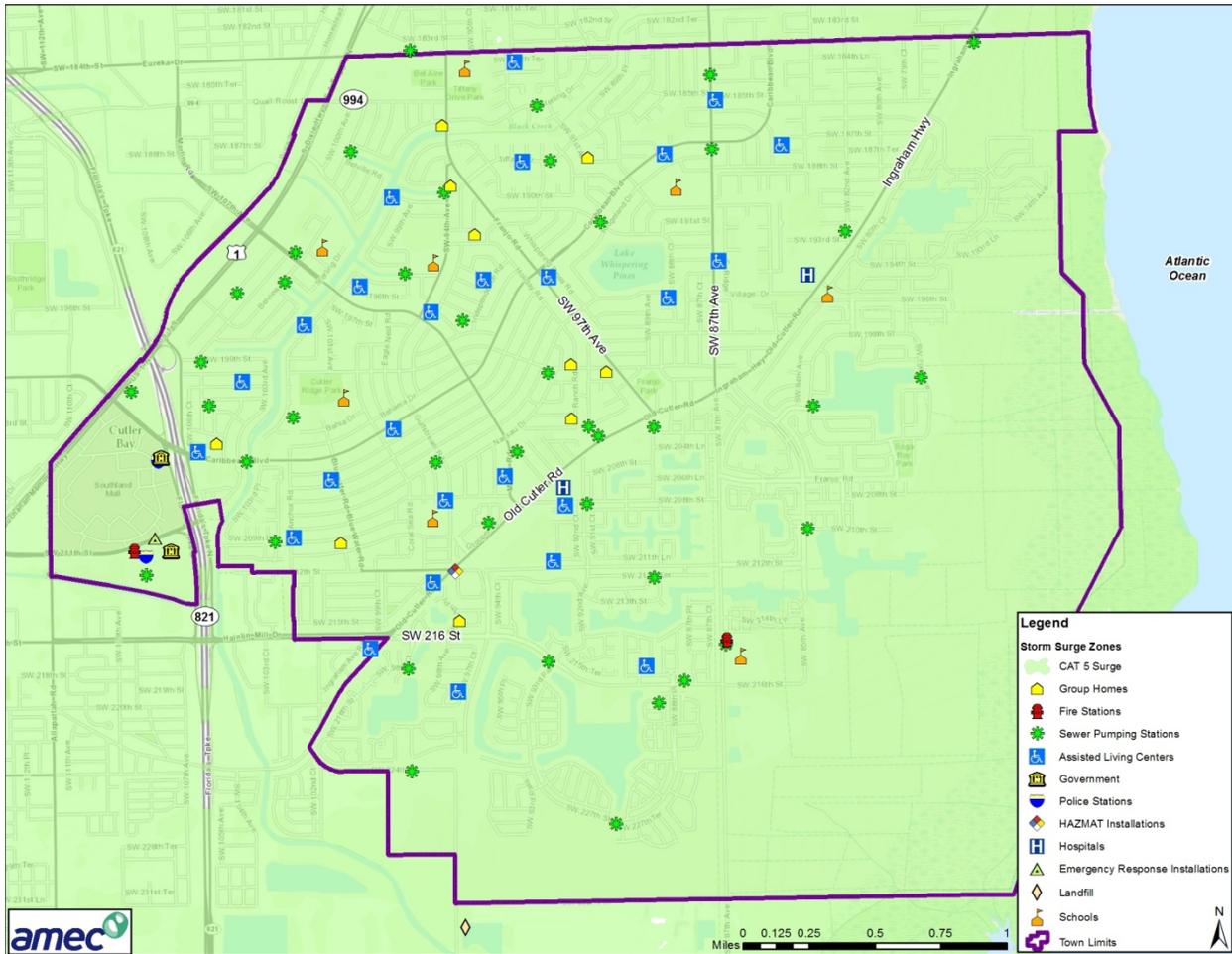
Table 3.43 - Cutler Bay Assets at Risk to Category 4 Storm Surge

Land Use	Total Parcel Count	Improved Parcel Count	Land Value	Improved Value	Estimated Content Value	Total Value ¹
Residential	12,570	12,547	\$396,851,782	\$1,197,267,361	\$598,633,681	\$1,795,901,042
Commercial	86	84	\$133,843,386	\$83,764,330	\$83,764,330	\$167,528,660
Education	10	10	\$15,522,287	\$47,013,077	\$47,013,077	\$94,026,154
Government	87	13	\$49,412,594	\$36,347,156	\$36,347,156	\$72,694,312
Religious	8	8	\$7,175,576	\$12,534,413	\$12,534,413	\$25,068,826
Other	590	31	\$85,073,136	\$30,292,386	\$42,500,066	\$72,792,452
Total	13,351	12,693	\$687,878,761	\$1,407,218,723	\$820,792,722	\$2,228,011,445

Source: Miami-Dade County 2013 Tax Assessor's Data, NOAA, FDEM

¹Total value does not include land value.

In a Category 5 hurricane, Cutler Bay can expect over 9 feet of storm surge based on NOAA's Storm Surge Inundation Mapping.



Source: Florida Division of Emergency Management (<http://www.floridadisaster.org>)

Figure 3.40 - Category 5 Storm Surge Impact in Cutler Bay

Table 3.44 - Cutler Bay Assets at Risk to Category 5 Storm Surge

Land Use	Total Parcel Count	Improved Parcel Count	Land Value	Improved Value	Estimated Content Value	Total Value ¹
Residential	12,575	12,552	\$397,212,144	\$1,198,688,315	\$599,344,158	\$1,798,032,473
Commercial	86	84	\$133,843,386	\$83,764,330	\$83,764,330	\$167,528,660
Education	10	10	\$15,522,287	\$47,013,077	\$47,013,077	\$94,026,154
Government	87	13	\$49,412,594	\$36,347,156	\$36,347,156	\$72,694,312
Religious	8	8	\$7,175,576	\$12,534,413	\$12,534,413	\$25,068,826
Other	590	31	\$85,073,136	\$30,292,386	\$42,500,066	\$72,792,452
Total	13,356	12,698	\$688,239,123	\$1,408,639,677	\$821,503,199	\$2,230,142,876

Source: Miami-Dade County 2013 Tax Assessor's Data, NOAA, FDEM

¹Total value does not include land value.