Seawall Condition and Resiliency Assessment

Town of Bay Harbor Islands

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TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 Background

Cummins Cederberg, Inc. (Cummins Cederberg) was retained by Chen Moore & Associates to perform an engineering inspection of the seawall and revetments along the perimeter of the three (3) islands encompassing the Town of Bay Harbor Islands, Florida (Project) to understand the overall condition and overall level of resiliency provided by the shoreline stabilization.

1.2 Scope and Objective

The scope of work is characterized as a visual inspection of the above- and below-water components of the existing seawall and revetment structures. The scope of work did not include docks (e.g. piles, beams). However, for completeness, comments and ratings are provided for these as well. The engineering inspection was conducted to identify deficiencies as well as assess the condition of the structures.

The scope of work also included assessment of the perimeter elevation. This assessment is a compilation of available LIDAR survey data to obtain elevations along the perimeter of the islands to understand the level of resiliency relative to seasonal tidal flooding ("king tides") and future sea level rise.

The report presented herein was developed to document the observed conditions and overall level of resiliency provided by the shoreline stabilization.

1.3 Site Location

The Bay Harbor Islands are located just west of Bal Harbour and south of Haulover Inlet, refer to Figure A1.1 in Appendix A. Broad Causeway Island (BCI) is located in the center of northern Biscayne Bay and is subject to boat wake and storm waves from the North and South. West Island and East Island are situated East of Broad Causeway Island and are more sheltered from storm waves by a barrier island and Indian Island to the south. However, both West Island and East Island still receive considerable boat wake in many areas, particularly the western side of West Island. The inner waterways between East Island and West Island and between West Island and the barrier island are fairly protected from boat wakes and storm waves.

2.0 INSPECTION PROCEDURE

The engineering inspection was conducted during the months of April and May 2018. The engineering inspections consisted of an engineer dive team visually evaluating the above- and below-water components of the dock structures. The inspections were performed generally following methods presented within the American Society of Civil Engineers (ASCE) Manual and on Engineering Practice No 101: Underwater Investigations and were completed as Level I (visual) evaluations.

A Level I inspection of waterfront and bridge structures, commonly known as a "swim-by" inspection, is recognized by American Society of Civil Engineers (ASCE) and National Bridge Inspection Standards (NBIS) and consists of a visual inspection of the entire exposed surface of the below-water components of the structure without removal of marine growth. The main objective of the Level I inspection is to determine obvious major and conspicuous deficiencies that could compromise the integrity of the structure. Deficiencies and typical observations that are found during the Level I inspection are generally documented by means of photography and field notes. The Level I inspection allows the in-water engineer(s) to descend to where the structure enters the mudline and ascend to the water surface to visually inspect all components of the structure. Upon completion of the Level I inspection, the Engineer can review photographs and notes to determine if a greater level of inspection detail is required (i.e., Level II or III) or the appropriate remedial work for the structure.

Notes and data were collected during the inspections and were compiled into report cards for each property (Appendix B). The report cards include the general information about the property (i.e., location, existing condition observations, inspection comments, condition assessment), an aerial image depicting the property location and photographs of each property. It should be noted some buildings span two lots, thus one report card exists for each lot (i.e. two for the building).

The islands were stationed and parceled by lot to facilitate inspection. Stationing commenced at the bridges (Appendix D). In addition, a color-coded mapping system was developed as a plan view of each island with conditions and seawall type depicted by a color system (Appendix E and F). These maps show the approximate size and location of each property with a specific condition as noted in the legend for each sheet.

2.1 Inspection Outline

Broad Causeway Island was inspected by engineers from the uplands and in the water. Inspection of West Island and East Island was conducted by boat and in the water.

Broad Causeway Island

- The island's shoreline is stabilized with reinforced concrete seawall and rock revetment.
- The inspection commenced at Sta. 39+50' (refer to D-1.0, Appendix D) and continued in a counter-clockwise direction around the shoreline of the island.
- The eastern seawall extends between Sta. 39+50' and Sta. 6+60' and includes the eastern bridge abutment between Sta. 46+04' and Sta. 0+06'.
- The North shoreline is stabilized with a rock revetment commencing at Sta. 6+60' and terminating at Sta. 22+31'.
- The western abutment for the Broad Causeway bridge commences at Sta. 22+31' and terminates at Sta. 23+60'.
- The remaining shoreline consists of a rock revetment which terminates at Sta. 39+50'. The shoreline was accessed from land and Station (Sta.) markings were created with orange spray paint.

West Island

- The entire shoreline of the island is stabilized with reinforced concrete seawalls.
- The island includes 88 lots, with a total perimeter of approximately 8,600 feet (refer to D-1.1, Appendix D).
- Lot 1 and Station 0+00' start at the property located on the western shoreline immediately north of the bridge.

East Island

- The entire shoreline of the island is stabilized with reinforced concrete and steel sheet pile seawalls
- The island includes 74 lots, with a total perimeter of approximately 11,400 feet (refer to D-1.2, Appendix D).
- Lot 1 and Station 0+00 start at the property located on the western shoreline immediately north of the bridge.

2.2 Historic Development of Seawalls at Town of Bay Harbor Islands

The seawalls identified lining the shoreline of the West Island and the East Island are reinforced concrete pile-panel walls and steel sheet pile seawalls. The seawall construction appears to have followed a 3-step development from the original construction:

1. **Original Seawall:** The construction of the original seawalls lining the shorelines of the islands appeared to be reinforced concrete wall panels supported by anchored t-piles with a reinforced concrete cap.
2. **Repairs:** Deterioration of the original seawalls was typically addressed with retrofit pre-cast concrete batter piles and reinforced concrete cap to provide additional support. At some properties, toe protection was installed. The typical toe protection consists of cement bag rip-rap, rubble/rip-rap mix, or grout-filled aluminum sheet pile.
3. **Replacement:** Some properties were equipped with a new steel sheet pile seawall that replaced the older, deteriorated concrete seawall (e.g., properties 10, 73 & 74 at East Island).

2.3 Method of Investigation

A Level I inspection of the structures, including the support piles, was performed. Specifically, the inspection scope was to identify cracking, rotation, spalling and other forms of significant deterioration in the seawalls. The toe protection, if applicable to the seawall, was also inspected to investigate scour and/or undermining along the toe of the wall. The dock structures were inspected to identify splitting, pile rotation, fastener corrosion and other forms of deterioration or damage. Field notes were collected during the inspection to document specific items and were referenced to the property's respective report card. This report provides an overall assessment of the seawalls, revetments and dock structures, based on the ASCE Underwater Condition Rating System located in Appendix G. The structures were inspected relative to condition and not assessed relative to design and/or building code compliance.

2.3.1 Condition Ratings

The conditions referenced in each of the inspection cards are provided by the American Society of Civil Engineers (ASCE) Routine Underwater Condition Assessment Ratings. The ASCE ratings vary from Critical to Good condition. These ratings can be referenced in the American Society of Civil Engineers (ASCE) Manual on Engineering Practice No. 130: Waterfront Facilities Inspection and Assessment, 2001. Descriptions of each condition are provided below. Examples illustrating the conditions are provided in Appendix H and in table format in Appendix G.

Rating – Good: Structures that are categorized in Good condition are likely new construction and/or have no visible or minor damage.

Rating – Satisfactory: Structures that have limited minor to moderate defects or deterioration but do not exhibit overstressing or require repairs are classified as

Satisfactory. The typical Satisfactory deficiencies noted were impact damage at pile heads from initial construction, mild to moderate concrete erosion throughout the tidal zones of wall panels and piles, mild to moderate cracking along concrete caps and minor to moderate corrosion at dock fasteners.

Rating – Fair: Structures in which all primary elements are sound but minor to moderate defects or deterioration are observed are classified as Fair. Localized areas of moderate to advanced deterioration may be observed with Fair-condition structures but generally do not exhibit failure or require urgent repairs. Typical Fair condition items noted were moderate cracking along wall panels, exposed and moderately corroded pile anchor heads, moderate to advanced concrete erosion and deterioration to concrete members and advanced deterioration at dock fasteners. Cracking and moderate deterioration at dock framing members were also noted.

Rating – Poor: Structures displaying advanced deterioration or overstressing throughout larger areas of the structure but do not exhibit significant failure are classified as Poor. Repairs are typically recommended to be performed with moderate urgency for Poor structures. Typical items noted are advanced cracking with corrosion staining throughout concrete members, exposed reinforcement in concrete members, moderate rotation of walls and advanced cracking and deterioration of dock framing members.

Rating – Serious: Serious-condition structures typically exhibit advanced deterioration, overstressing or fractures which have affected the load-bearing capacity of the structure. Structures in which load restrictions are required due to failures in the structure are generally recommended to be repaired with high urgency. Severe fractures and cracking in concrete members, advanced to severe wall rotation or structure movement and severe cracking and splitting in dock framing members are examples of structures of Severe condition. Advanced to severe corrosion of fasteners at timber dock structures are also rated as Serious-condition structures.

Rating – Critical: Structures exhibiting very advanced deterioration, cracking and overstressing with failures to the structure are categorized in Critical condition. Localized failures in the main components of the structure, such as severe wall rotation, piles with through-fractures, wall panels with severe fractures and failing dock framing members are all typical items noted in Severe-condition structures.

Docks are generally recommended to be closed to use until repairs or rehabilitation are completed.

3.0 OBSERVATIONS

Observations from the inspection for the various components are summarized below, along with descriptions of deficiencies for further background. For each property, a report card was prepared summarizing the site-specific observations (refer to Appendix B). Photos illustrating conditions at Broad Causeway Island are included in Appendix C. The observations are organized as follows:

- Concrete Seawalls
- Steel Sheet Pile Seawalls
- Docks
- Revetment

3.1 Concrete Seawalls

The overall conditions of the concrete seawalls around the islands varied between Critical and Satisfactory (refer to Appendix G). Specific details of each property are itemized in the property report cards in Appendix B. Typical deficiencies identified during the above- and under-water concrete seawall inspections were cracking, necking, anchor corrosion and rotation of the seawalls. Further explanation of the deficiencies noted above and in the report cards for the concrete seawalls is provided below.

Cracking

Cracking was generally noted in the concrete caps and the pre-cast concrete batter piles. Cracking can occur in multiple forms and from different causes, such as shrinkage cracking, subgrade settlement and/or overloading. Cracks that develop prior to concrete hardening are referred to as plastic-shrinkage cracks or surface cracking. This occurs during the curing process of concrete in which the internal mass bleeds water to the surface and the surface water evaporates quicker than the bleed water. This differential curing produces stresses greater than the tensile strength of the concrete, causing cracking. Settlement cracking occurs when the concrete members settle or subside due to the consolidation of the supporting subgrade. Cracking can also occur when the concrete mix is over-saturated or insufficient concrete is provided over internal steel reinforcement.

Width of concrete cracking is also taken into consideration to determine severity, cause of cracking and repair options. Typically, cracks with a width up to 1/16” are not considered structural and may be sealed to prevent saltwater (chlorides) from entering the crack. Tidal and wave action on the seawall facilitates chloride intrusion into the concrete through cracks or spalls. Over time, the chlorides corrode the embedded reinforcing steel, causing further deterioration. Concrete spalling

is the delamination and loosening of concrete, typically due to corrosion of embedded reinforcing steel. The corroding steel expands and breaks the concrete bond, a process which takes place after initial surface cracking and exposure to saltwater.

Structural cracks, or cracks greater than 1/16" width, were noted at multiple properties. These cracks were generally noted in the concrete wall panels or piles. The structural cracks in piles were likely due to loading applied to the members greater than the design loads or were a result of impact damage from initial driving. The cracks in the concrete wall panels were likely caused by overload or rotation in the wall.

Wall Rotation

Wall rotation typically occurs when hydrostatic or lateral earth loads from the upland subgrade acting on the seawalls are greater than the loads the wall was designed for. An additional cause of wall rotation is insufficient penetration depth of the piles or wall panels below the seabed. A few seawalls that were noted to have experienced rotation had cracking along the seabed, or just above the seabed. In these cases, the wall penetration depth is likely sufficient and the loads acting upon the wall were greater than the loads that the panels could resist, which resulted in cracking at the point of greatest stress in the concrete.

Necking

Necking in concrete piles was generally noted in the concrete t-piles in the tidal zones. Necking is a form of deformation or decrease in cross-sectional area of the piles due to tidal or wave erosion. Concrete erosion was also noted throughout many concrete wall panels in the tidal zone. Erosion of the concrete in these wall panels is, again, likely due to continuous impact of waves and fluctuating tidal waters.

3.2 Steel Sheet Pile Seawalls

The steel sheet pile seawalls at Lots 10, 73 and 74 of the East Island are generally in Satisfactory condition. These steel sheet pile seawalls appeared to be relatively new construction. Rip-rap is installed along the seabed of the wall to serve as toe protection against scour. Minor corrosion was noted in the joints at the tidal zone of the steel sheet piles. This is likely a result of pile driving during construction, in which the protective coating of the piles is removed by friction between piles. The steel sheet pile seawalls are supported by pre-cast concrete batter piles that also appeared to be in Satisfactory condition. The seawalls were capped with reinforced concrete measuring 15"x38" at Lot 10 and 14"x42" at Lots 73 and 74.

3.3 Docks

The dock structures fronting the properties of the Broad Causeway, East Island and West Island vary between timber and concrete framing and piles. The conditions of the dock structures vary as well from Critical to Satisfactory. The wood dock framing generally consisted of wood joists supported on wood beams and a wood ledger secured to the outer (wet) face of the concrete cap. The beams were supported by either timber or concrete piles. The decking for the timber docks generally consisted either treated wood or composite lumber.

The construction for the concrete docks generally consisted of a cast-in-place concrete slab supported by monolithic concrete beams or primary pile caps on concrete piles.

The typical deficiencies that were identified throughout the timber docks were splitting, "salt-kill", pile rotation and marine borer damage. Warping, weathering and abrasion were two conditions that were noted at the timber decking at multiple docks. Some docks, however, were noted to have missing or no decking at all. Further explanation of the deficiencies noted above and in the report cards for the docks is provided below.

Splitting
Splitting of wood framing members is the result of over-stressing. If a load greater than the ultimate design load is applied on the structure, overstressing can occur. Splitting often occurs at the beam - pile bolted connections when the members are constructed with insufficient bolt edge distance. The splitting at these locations occurs when there is not enough material at the bolts to adequately resist the applied loads, or when the wood decays from prolonged environmental exposure.

Racking
Racking or twisting of joists often occurs when horizontal blocking between members and/or straps are not used to brace the joists. Omission of these bracing features allows the joists to rotate or twist under gravity and lateral load.

"Salt Kill"
The piles are the members that support the entire dock structure. "Salt-kill" was identified at multiple timber piles. The term "salt-kill" is used when a timber pile appears to have the outer grains diminished down to a soft or "fuzzy" appearance. The "salt-kill" process involves the absorption of the chloride from the saltwater into the wood and results in the softening of the fibers, similar to the pulp process used to create paper from wood. The fibers of the wood are pushed apart by the salt crystals, which creates the "fuzzy" appearance. Eventually, the wood degrades and affects the structural integrity of the pile.

Timber Decay

Timber decay is a process by which a fungus penetrates timber through split sections. The fungus creates a chemical alteration (or decay) of the timber by releasing enzymes into the wood which deteriorate the grain, creating nutrients for the fungus. While decay can occur in both freshwater and saltwater structures, saltwater structures can also experience the deterioration process known as "salt-kill", as explained above, and destruction by marine borers (e.g., shipworms). Much like termites, marine borers eat into timber members.

Warping, Weathering and Abrasion

Warping, weathering and abrasion can impact timber by wear-and-tear over time. Prolonged exposure to sunlight dries wood members and causes shrinkage, which causes warping in deck boards. Prolonged exposure to moisture causes rot in timber members, reducing their load-carrying capacity. Abrasion in timber piles usually occurs from adjacent moored vessels rubbing against the pile under tidal action. Eventually, abrasion can significantly reduce the section – and associated capacity - of the pile.

Hardware Corrosion

Fastener corrosion and rupture was a contributing factor in the dock failures around the islands. The docks noted to be in Critical condition were likely to have experienced significant bolt corrosion. Corrosion is the process by which a steel component is exposed to moisture and oxygen, producing iron-oxide, or rust. Both freshwater and saltwater dock structures constructed with steel fasteners will rust, if not covered by a protective coating. Further, saltwater structures have a much higher rate of corrosion due to the constant exposure to chlorides in sea-water or salt-laden air. The salt accelerates the corrosion process by facilitating the reaction between iron and oxygen.

Resistance to corrosion can be accomplished by using stainless-steel or galvanized hardware for dock construction. Galvanizing is the process of coating the entire steel fastener with a zinc-based material, which protects the outer steel base from moisture and oxygen exposure. However, this coating can quickly erode in the marine environment and is not recommended for saltwater applications.

3.4 Rock Revetments

The rock revetment lining the shoreline of the Broad Causeway Island generally appeared to be in Poor to Satisfactory condition. The revetments extended along the north and south shorelines, between the western bridge abutment and eastern seawall. The rock revetments totaled approximately 3133 linear feet. Rock revetments are designed in a sloping manner, with the higher

elevation on the landward side. The sloping configuration allows the rocks to rest on each other as well as provide some level of interlocking for further stability. Revetments are designed and constructed as shoreline protection to absorb the loads from incoming waves, such as from boat wakes or storms.

The rock revetment consisted of coral rip-rap material which varied in slope along the shoreline. Some areas of revetment were dominated by smaller rocks and concrete debris, which reduce storm protection. Timber dock debris was noted at spot locations at the southern shoreline.

The slope of the revetment appeared to be compromised and reduced in several locations along the shoreline. Low-sloping revetment was noted at the following areas on the island:

- Approximately 100 feet of low-slope revetment at Sta. 12+00'
- Approximately 125 feet at Sta. 24+55'.
- Approximately 575 feet of low-sloping revetment starting at Sta. 25+24'.
- Approximately 250 feet was noted starting at Sta. 37+00.

A revetment with an adequate slope towards the water allows wave loads to be absorbed by the revetment and protect the shoreline from excessive erosion and washout. Thus, the flat revetment areas as noted provide reduced protection along those sections of shoreline. Further, more extensive erosion along the shoreline was noted from Sta. 35+87' to Sta. 36+06', while many areas showed minor levels of erosion landward of the rocks.

3.5 Summary of Observations and Evaluation of Conditions

Following are a summary and recommendations relative to the shoreline stabilization for each of the islands, based on the observations described in the preceding sections.

3.5.1 East Island and West Island

Both islands are stabilized with seawall along the entire perimeter. The type of seawall varied throughout the islands. A summary of the types of seawall is provided below in Table 3.1. As described earlier, the original seawalls were anchored concrete T-pile walls. These are the oldest seawalls and generally exhibit the highest level of deterioration. 51% and 20% of the walls at East Island and West Island, respectively, are of this type. The anchors of these of seawalls are likely at the end of their useful life and the seawalls will soon require repair or replacement. Some of the original seawalls have already been repaired and stabilized with concrete batter piles. 30% and 63% of the seawalls at East Island and West Island, respectively, have been retrofitted with newer batter piles. These seawalls likely have a remaining service life of approximately 15 years. The

remaining walls are new walls of different types. Thus, 81% and 83% of the seawalls at East Island and West Island, respectively, remain of original construction (T-pile) and of considerable age.

TABLE 3.1
Seawall Type Per Property

Type of Wall	East Island	West Island
Anchored Concrete T-Pile	51%	20%
Battered Concrete T-Pile	30%	63%
Anchored Concrete King Pile	3%	2%
Battered Concrete King Pile	8%	1%
Battered King/T- Pile	4%	14%
Steel Sheet Pile	4%	0%

The overall conditions of the seawalls and docks are summarized in Table 3.2. For East Island, approximately 4% of the seawalls and 19% of the docks are either in Serious or Critical conditions. For West Island, the same numbers are 1% and 10%, respectively. It is recommended the City advises the residents of the condition of their respective seawall and dock (as applicable) to eliminate any potential safety hazards.

TABLE 3.2
Condition of Seawall and Docks Per Property

Condition	East Island		West Island		Causeway Island	
	Seawall	Dock	Seawall	Dock	Seawall	Rock Revetment
Good	0%	1%	0%	0%	0%	0%
Satisfactory	4%	11%	2%	18%	0%	70%
Fair	50%	28%	70%	47%	92%	0%
Poor	42%	22%	27%	11%	8%	30%
Serious	1%	11%	1%	1%	0%	0%
Critical	3%	8%	0%	9%	0%	0%
N/A	-	19%	-	14%	-	-

*N/A = dock demolished or not existing

3.5.2 Causeway Island

As noted previously, the condition of the revetment along the shoreline of the Causeway Island varies from Poor to Satisfactory condition. The portion of the revetment in poor condition, approximately 1,000 feet, is recommended to be rehabilitated. Minor repairs can be made in other segments of the revetments as part of a rehabilitation project.

The sections of shoreline that consist of reinforced concrete seawall measures approximately 1332 feet in length and is generally in fair condition. The exception is the seal segment south of the eastern bridge abutment. This segment, approximately 100 feet, is in Poor condition. This difference in condition is likely due to more severe environmental exposure, as the segment north of the bridge is of the same age and construction.

4.0 WATER LEVELS

4.1 Tides

Tides are the rise and fall of water levels in the ocean produced by the effects of gravitational forces, resulting in changes in water levels. In southeast Florida there is an active tidal station located at the University of Miami's Rosentiel School of Marine and Atmospheric Science in Virginia Key, Florida. This tidal station has been active since 1994 and has collected different oceanographic data including high and low water levels, wind measurements, air temperature, and barometric pressure. Based on recorded measurements by the tidal station at Virginia Key, the local tidal range is approximately 2.0 to 2.5 feet, depending on the time of the year.

4.1.1 Datums

Tides in the Project vicinity are predominately semi-diurnal with an average extreme range of approximately 2.1 feet and a period of approximately 12.4 hours. Tidal water levels were obtained from National Oceanographic Atmospheric Administration (NOAA) Station 8723073 near Haulover Inlet located approximately 3,000 feet north of the study site.

TABLE 4.1
Tidal Water Levels, Haulover Inlet NOAA Station 8723073

Datum	Elevation (Feet, NAVD)
Mean Higher High Water (MHHW)	0.27
Mean High Water (MHW)	0.20
North American Vertical Datum (NAVD)	0.00
Mean Sea Level (MSL)	-0.85
Mean Low Water (MLW)	-1.81
Mean Lower Low Water (MLLW)	-1.94

An important remark about the datums shown in Table 4.1 is the fact that they are based on the National Tidal Datum Epoch. The National Tidal Datum Epoch is based on the specific 19-year period adopted by the National Ocean Service as the official time segment over which tide overactions are taken. The current National Tidal Datum Epoch is from 1983 through 2001 and is considered for revision every 20 to 25 years, based on changing water levels.

Variations from MHW, MHHW, MLW, and MLLW levels should be anticipated due to the fact that these are average values.

4.1.2 Seasonal Tidal Variations

The tidal water levels observed over a longer period will exhibit seasonal variation, where in some periods of time the water levels may be consistently higher than what is usually seen. This is due to water levels being influenced by periodic variations in the relative position of the Earth, moon and the sun. The effects of these periodic variations can be quantified into tidal constituents, which are calculated based on the geographic location of interest. NOAA provides tidal predictions of water levels on an annual basis based on the calculated tidal constituents. NOAA predicted water levels for the year 2015 are presented in Figure A4.1, depicting a period of significantly higher tidal peaks during the months of September through November due to the periodic variations of the Earth, moon and the sun.

4.1.3 Predicted vs Observed

In addition to variations in the tidal levels, there is also variation between the predicted and the observed water level values. The water level variances can be influenced by wind, temperature, pressure or other factors other than the previously described gravitational effects that govern the tides. The difference between the observed and predicted water level values can be significant with differences of up to approximately 1.5 feet. Figure A4.2 shows the difference between predicted and observed water levels in 2015.

4.1.4 Annual Exceedance

Figure A4.2 clearly demonstrates that other factors (in addition to the tidal variations) should be considered, as higher water levels typically occur. Figure A4.3 shows the annual exceedance of different water levels during a 6-year period with data from the Key Biscayne tidal station utilizing actual site measurements. The data shows that the MHHW level is exceeded approximately 20% of the time, which corresponds to approximately 73 days annually. With rising sea levels, the exceedance percentage for a specific elevation would increase corresponding to essentially shifting the curve on Figure A4.3 to the right.

4.1.5 Extreme "King" Tides

As noted above, tidal values are average values and are exceeded on a frequent basis. The predictions of tidal water levels show a periodically seasonal high-water level during a certain time of the year, as compared to the average values. These seasonal high-water level events are popularly referred to as "king tides". The king tides can cause flooding in inland low-lying areas, or when heavy rainfall events occur, as the drainage efficiency is decreased due to the elevated water levels.

An example of an extreme king tide is the high-water level event that occurred in September 27, 2015. The extreme king tide exceeded the predicted high-water levels by more than a foot. This event caused severe flooding in different neighborhoods in the general coastal Miami area. While the mechanisms for these extreme king tide events are still being investigated, it is apparent that one cannot rely solely on tidal predictions to design against coastal flooding. The 2015 peak was subsequently surpassed in 2017, where a peak flood elevation of 2.2 feet NAVD was observed. For this study, an extreme tidal elevation of 2.3 feet, NAVD was adopted, as this was the water elevation measured during the previously mentioned extreme king tide event in 2017, being the highest tidal elevation in recent years.

4.2 Sea Level Rise Projections

The sea level rise projections used for this study were adopted from the 2015 Southeast Florida Unified Sea Level Rise Projection developed by Southeast Florida Regional Compact Climate Change Sea Level Rise Work Group. The compact is composed of Broward County, Miami-Dade County, Monroe County, and Palm Beach County and works to create a regional climate action plan to include mitigation and adaptation strategies. A work group was assembled consisting of experts and stakeholders with the objective to develop consistent adaptation policies relative to sea level rise.

The Sea Level Rise work group reviewed many of the existing sea level rise Projections and scientific literature to develop a unified regional Projection for the South Florida area. Three Projections were selected and are labeled below and illustrated on Figure A4.4:

1. The Intergovernmental Panel on Climate Change (IPCC) AR5 Median Curve
2. The US Army Corps of Engineers (USACE) High Curve
3. The National Oceanic and Atmospheric Administration (NOAA) High Curve

The compact recommends the use of the region between the IPCC AR5 Median curve and the USACE High curve to be generally applied to most Projects within a short-term planning horizon.

For high risk Projects, such as power plants, levees, airports, railroads and major highways, the NOAA High curve should be used since they are considered critical infrastructure and downtime or damages to them can be costly.

One of the uncertainties in analyzing the historic sea level rise is the annual rate of sea level rise, which appears to be increasing. This is supported by the data, but because this increase is a more recent phenomenon and is primarily associated with the latter part of the data set, it is difficult to confidently predict the trend of this acceleration. To put this effect into further perspective, it is noted the average rate of rise of sea level at the Key West tidal station from 1913 to 1999 was 0.88 inches/decade. By 2060, sea level is projected to rise by 2.0 to 6.0 inches per decade or a 200% to 700% increase in the average rate.

Another way of evaluating the projection is to define the uncertainty in time. Viewed this way, the upper and lower limit of the projection suggest that a 1.0 foot sea level rise will occur between 2040 and 2070, while a 2.0 feet sea level rise may occur between 2060 and 2100. Interestingly, and further underlining the uncertainty, is that a 3.0 feet sea level rise could occur as early as 2078 or 2150. Thus in 2070, the sea level rise could be anywhere between 1.0 to 3.0 feet.

To account for uncertainty in the projections, planners must use updated projection curves based on newly gathered information. The new information could result in projection curves that show an increase or decrease in the rate of sea level rise, or stagnation in the rate of sea level rise. The updated curves will determine if infrastructure needs to be upgraded or modified to adapt to the new projections, or if improvements can be delayed. However, for planning purposes in most cases, it will be preferable to overestimate rather than underestimate, as the latter may make future adaption more difficult or costly.

For this study, the USACE High Curve was adopted. The predicted sea level rise is presented in Table 4.2 in tabular form. Table 4.2 also list the corresponding water levels for MHHW and the 2017 extreme tide events, and their projected elevations. As additional data are collected, and uncertainty in predictions are reduced, the values in Table 4.2 should be reevaluated.

TABLE 4.2

Sea Level Rise Projections and Water Level Elevations (Relative to 1992)

Based on USACE High Projection	2018	2030	2040	2050	2060	2070	2080	2090	2100
Sea Level Rise (feet)	0.4	0.7	1.1	1.6	2.1	2.7	3.4	4.1	4.9
MHHW (feet, NAVD88)	0.7	1.0	1.4	1.9	2.4	3.0	3.7	4.4	5.2
Extreme King Tide (feet, NAVD88)	2.2	2.5	2.9	3.4	3.9	4.5	5.1	5.9	6.7

5.0 PERIMETER ELEVATION

Topographic survey data is required to assess potential impacts of sea level rise and seasonal tidal flooding. The information allows analysts to identify areas with low-lying elevations, which are prone to flooding, including areas where flooding might impede access to other locations

5.1 Topographic Mapping

5.1.1 LiDAR Data

In lieu of conducting conventional surveys for each individual property, Light Detection and Ranging (LiDAR) data covering the study area was obtained from Miami Dade County Office of Resiliency. The LiDAR data was produced as part of the 2015 Aerial LiDAR Specific Purpose Survey of Miami-Dade County, conducted by Aerial Cartographics of America, Inc. from February 2015 to April 2015. Details on the collection of the data and its accuracy can be found on the "Surveyor and Mapper Report for the 2015 Aerial LiDAR Specific Purpose Survey of Miami-Dade County" dated August 31st, 2015. The files comply with industry standard accuracy requirements.

The LiDAR dataset was provided in 5000 x 5000 feet tiles covering the entire study area. The provided data was classified using standard LiDAR classification. The LiDAR dataset coordinates were projected North American Datum of 1983, State Plane Coordinate System of Florida in feet. The vertical datum used for the points was the North American Vertical Datum of 1988 (NAVD 88), in feet.

Using the provided dataset, a point cloud file was created by filtering the data to include only values that were classified as ground (or bare earth, class = 2). The created point cloud included the coordinates of the filtered points and their elevations. The boundaries of the study area were identified and delineated for the creation of a triangular irregular network (TIN). The TIN was created using the point cloud created from the filtered dataset. From the resulting TIN, elevation maps were produced for each island, as shown in Appendix H. Comparisons of the data in other locations in Miami-Dade County to existing known survey points showed good agreement.

5.1.2 Perimeter Elevation

The approximate perimeter elevation along the shoreline was extracted for each of the three (3) islands in order to obtain the perimeter elevation. The LiDAR data provides exceptional coverage but does not necessarily capture individual components or transitions (e.g. walls). Therefore, for some properties, there is some uncertainty in the exact elevation along the perimeter due to the presence of multiple structures or not a clearly defined perimeter in the data; however, for general

planning purposes the elevations should suffice. For most properties, the elevation further landward of the shoreline is slightly higher than at the perimeter. There are a few areas with negative elevation in East Island and West Island, which is a result of ongoing excavation at the time of data collection. Some of the low elevation at the BCI appears to be associated with swales.

The elevations for each of the islands are summarized in Figure A5.1A through A5.1C (top) in Appendix A. The average perimeter elevation for each island is as follows:

East Island: 3.0 feet NAVD
West Island: 2.9 feet NAVD
BCI: 2.8 feet NAVD

The elevations of each of the island were further summarized Figure A5.1A through A5.1C (bottom) in Appendix A, which illustrates the cumulative percentage of shoreline (seawall and revetment) above various elevations. It is noted that approximately 52% of the shoreline perimeter will be below the projected 2040 King Tide elevation for East Island, while 58% and 56% for West Island and BCI, respectively. It is also noted that for all islands portions of the shoreline is already below the 2017 King Tide elevation.

For both East Island and West Island, approximately 90% of the perimeter elevation is below 4 feet NAVD. It is projected the peak king tide elevation will reach this level in approximately 2060.

5.2 New Construction

The service life of a new seawall is approximately 30-40 years depending on material and maintenance level. Thus, any new seawall constructed within the next 5 years will likely remain until approximately 2050 to 2060. It is recommended new seawalls consider this relative to top elevation. Seawalls being repaired within the next few years will likely need replacement around 2035. The projected King Tide elevation at this time is approximately 2.7 feet NAVD, which should also be considered in the design. These values should also be considered in new infrastructure projects. A detailed plan for these is recommended, as increasing the elevation of infrastructure will have significant impact on surrounding areas. If the Town considers implementing minimum elevation requirements, further studies and planning are recommended to understand impacts and required elevation level.

6.0 CONCLUSIONS AND RECOMMENDATIONS

A technical assessment of the shoreline conditions along the Town of Bay Harbor Islands was conducted relative to understanding condition and resiliency level, with regards to sea level rise. The present report is intended to summarize the existing conditions and provide initial guidance relative to sea level rise resiliency level.

A condition inspection was conducted for the entire shoreline of the Town of Bay Harbor Islands. The inspection included an above- and below-water assessment of the seawalls and revetment along the shoreline. Though not in the scope of work, docks along the shoreline were inspected as well. Significant deterioration was noted along with overall condition of the revetment, seawalls and docks. For the residential properties, a report card was prepared for each property, summarizing observations.

The types of seawalls and overall conditions were summarized to understand anticipated remaining service lives.

An evaluation of typical and extreme tidal water levels was conducted to understand peak tidal levels and exceedance probability. Published sea level rise projections were reviewed and adopted for the study.

Topographic LiDAR data was compiled and processed in order to develop a detailed topographic map of the Project area. The approximate perimeter elevation was determined for each island in order to understand level of resiliency relative to sea level rise.

The following conclusions and recommendations are made:

- The length of East Island perimeter is approximately 11,500 feet.
- The length of West Island perimeter is approximately 8,600 feet.
- The length of BCI perimeter is approximately 4,600 feet.
- The original seawalls were anchored concrete T-pile walls. These are the oldest seawalls and generally exhibit the highest level of deterioration. 52% and 21% of the walls at East Island and West Island, respectively, are of this type.
- Approximately 30% and 76% of the seawalls are of the original T-pile walls supported by newer batter piles. These seawalls likely have a remaining service life of approximately 15 years.
- Approximately 82% and 95% of the seawalls at East Island and West Island, respectively, are still of original type (T-pile) and of considerable age.

- For East Island, approximately 19% of the seawalls and 24% of the docks are either in Serious or Critical condition.
- For West Island, the same numbers are 11% and 13%.
- Residents should be notified of the condition of their seawall and dock (as applicable) to address potential safety hazards. It is recommended to remove remnants of older docks not functioning to eliminate potential safety hazards.
- The condition of the revetment along the shoreline of the Broad Causeway Island varies from Poor to Satisfactory. The portion of the revetment in Poor condition, approximately 1,000 feet, is recommended to be rehabilitated. Minor repairs can be made in other segments of the revetments as part of a rehabilitation project.
- The seawall at BCI is typically in Fair condition and may have another 10-15 years of useful life remaining. The exception is the seawall segment south of the eastern bridge abutment. This segment should be monitored given the proximity to important infrastructure and likely replaced within the next 5-10 years.
- A peak seasonal high tide elevation of 2.2 feet NAVD was recorded in 2017 and was adopted as current peak tidal water level.
- The sea level rise projections adopted for this study forecast an increase of 1.2 feet by 2050 and 4.4 feet in 2100 as compared to now.
- For both East Island and West Island, approximately 90% of the perimeter elevation is below 4 feet NAVD. It is projected the peak king tide elevation will reach this level in approximately 2060.
- Any new seawall constructed within the next 5 years will likely remain viable until approximately 2050 to 2060, depending on type and maintenance level. It is recommended new seawall construction consider this service life in determining cap elevation.
- Seawalls being repaired within the next few years will likely need replacement around 2035. The projected King Tide elevation at this time is approximately 2.7 feet NAVD, which should also be considered in the design.
- It is recommended to consider sea level rise in new infrastructure projects. A detailed plan for these is recommended, as increasing the elevation of infrastructure will have significant impact on surrounding areas. If the Town considers implementing minimum elevation requirements, further studies and planning are recommended to understand impacts and required elevation level.

The assessment and recommendations are based on the data obtained from the field observations. This report may not account for unseen variations among the existing conditions, due to the limit of underwater visibility, heavy marine growth or hidden features of the marina structures. The services performed by Cummins Cederberg are consistent with the degree of care and skill ordinarily exercised by and consistent with the standards of the engineering profession practicing

at the same time, under similar circumstances and in a similar location as the Project. No other warranty, expressed or implied, is herewith made.

7.0 REFERENCES

1. Aerial Cartographics of America, Inc. (2015), "Surveyor and Mapper Report for the 2015 Aerial LiDAR Specific Purpose Survey of Miami-Dade County".

2. Waterfront Facility Inspection Committee, Ronald E. Heffron, P.E. (2015), "ASCE Manuals and Reports on Engineering Practice No. 130 – Waterfront Facilities Inspection and Assessment".

3. William V. Sweet et al. (2017), "In Tide's Way: Southeast Florida's September 2015 Sunny-day Flood".

4. Southeast Florida Regional Climate Change Compact Sea Level Rise Work Group (2015), "Unified Sea Level Rise Projection for Southeast Florida".

Appendix A
Report Figures

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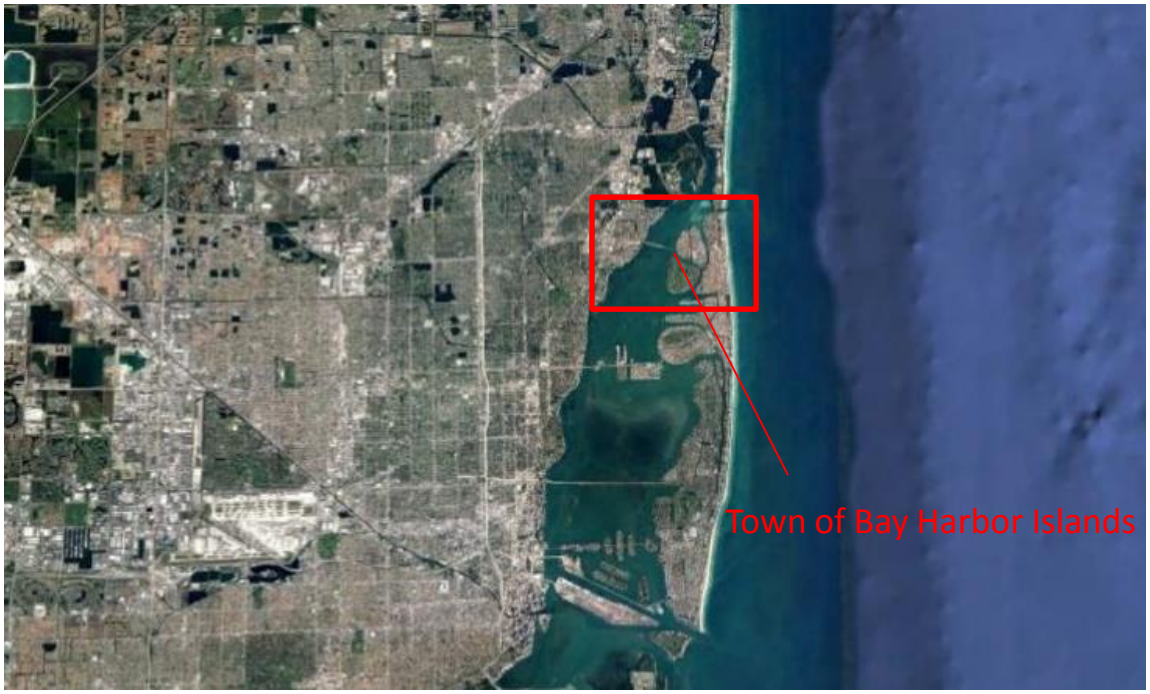

Source: Google

Figure A1.1: Location Map and Project Site
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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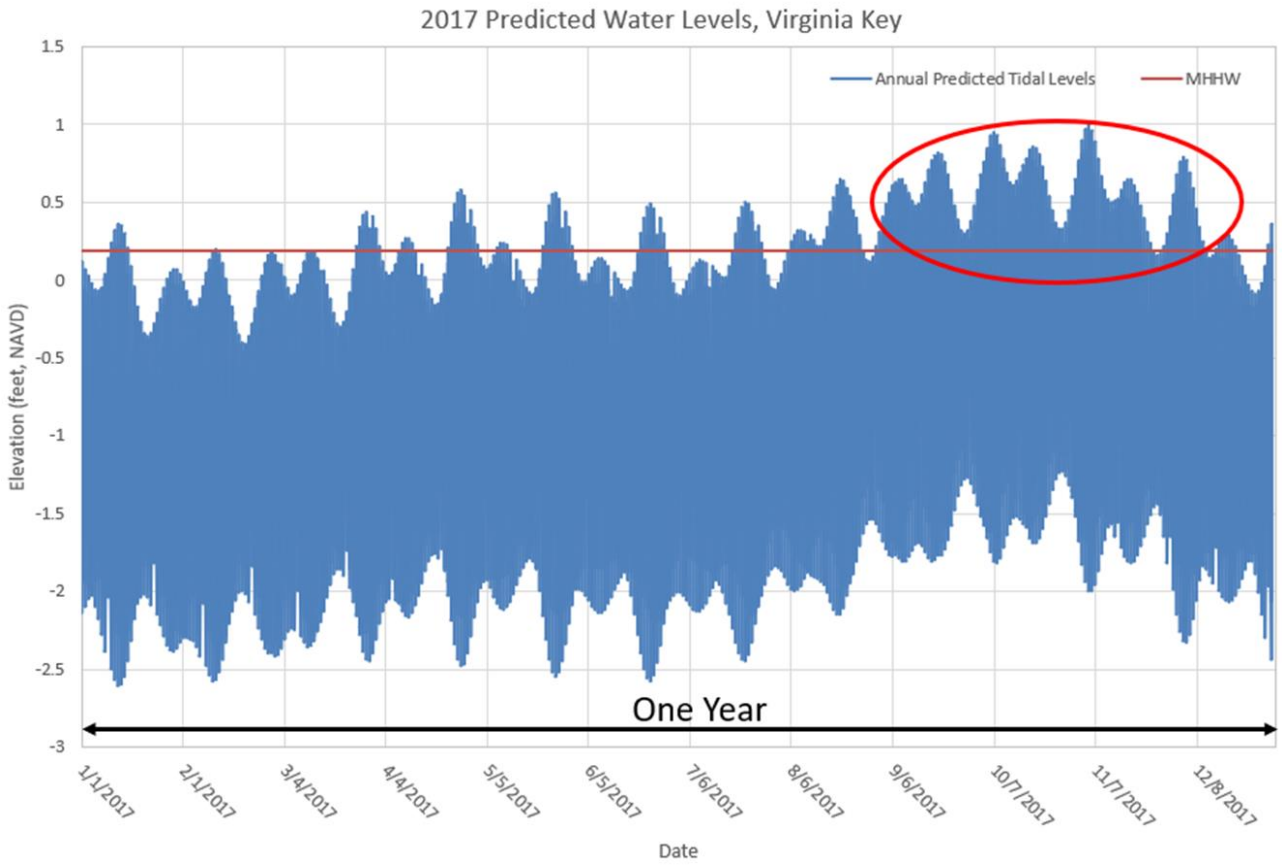

Figure A4.1: 2017 Tidal Predictions
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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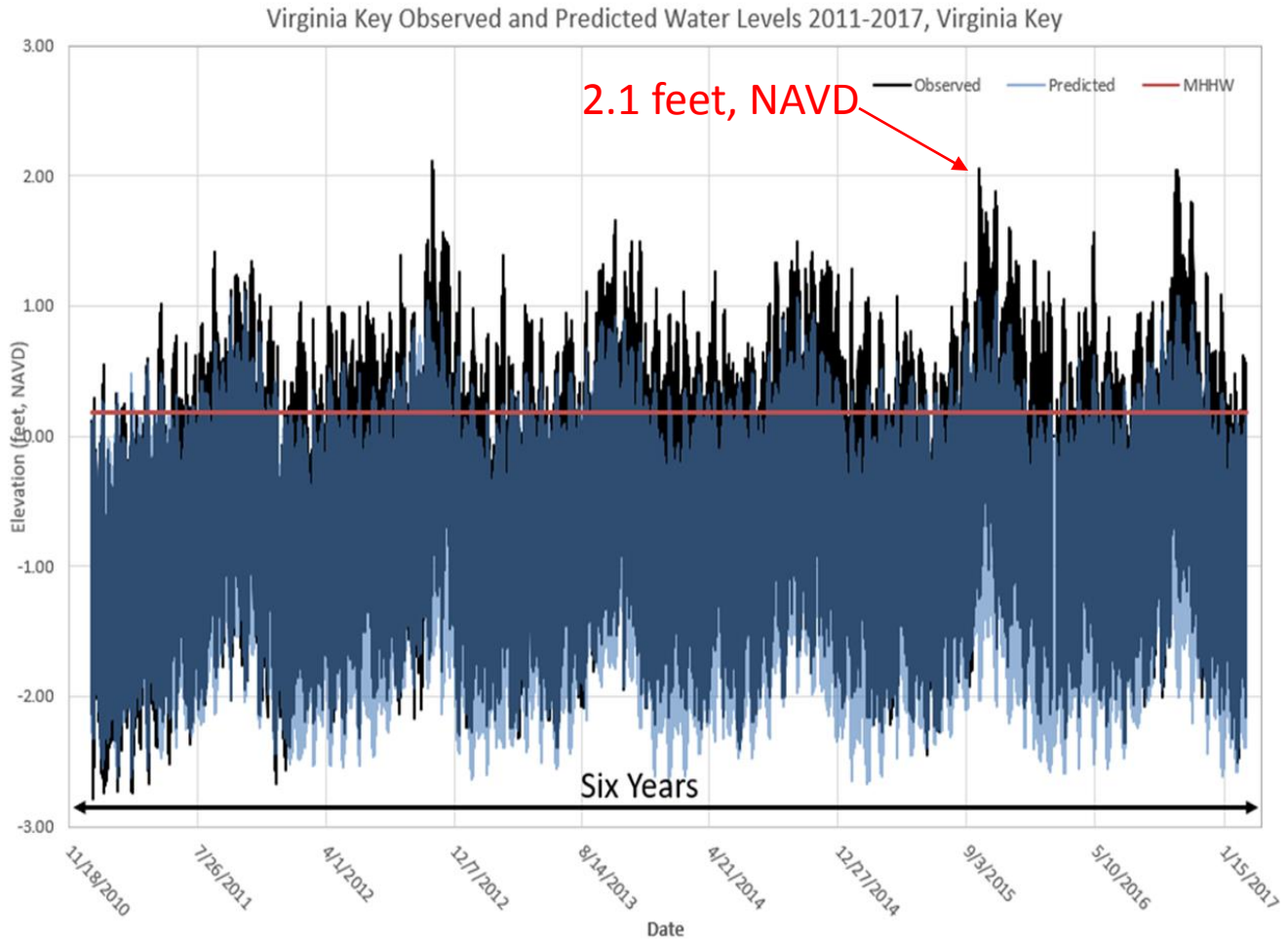

Figure A4.2: Predicted vs Observation Tidal Variations
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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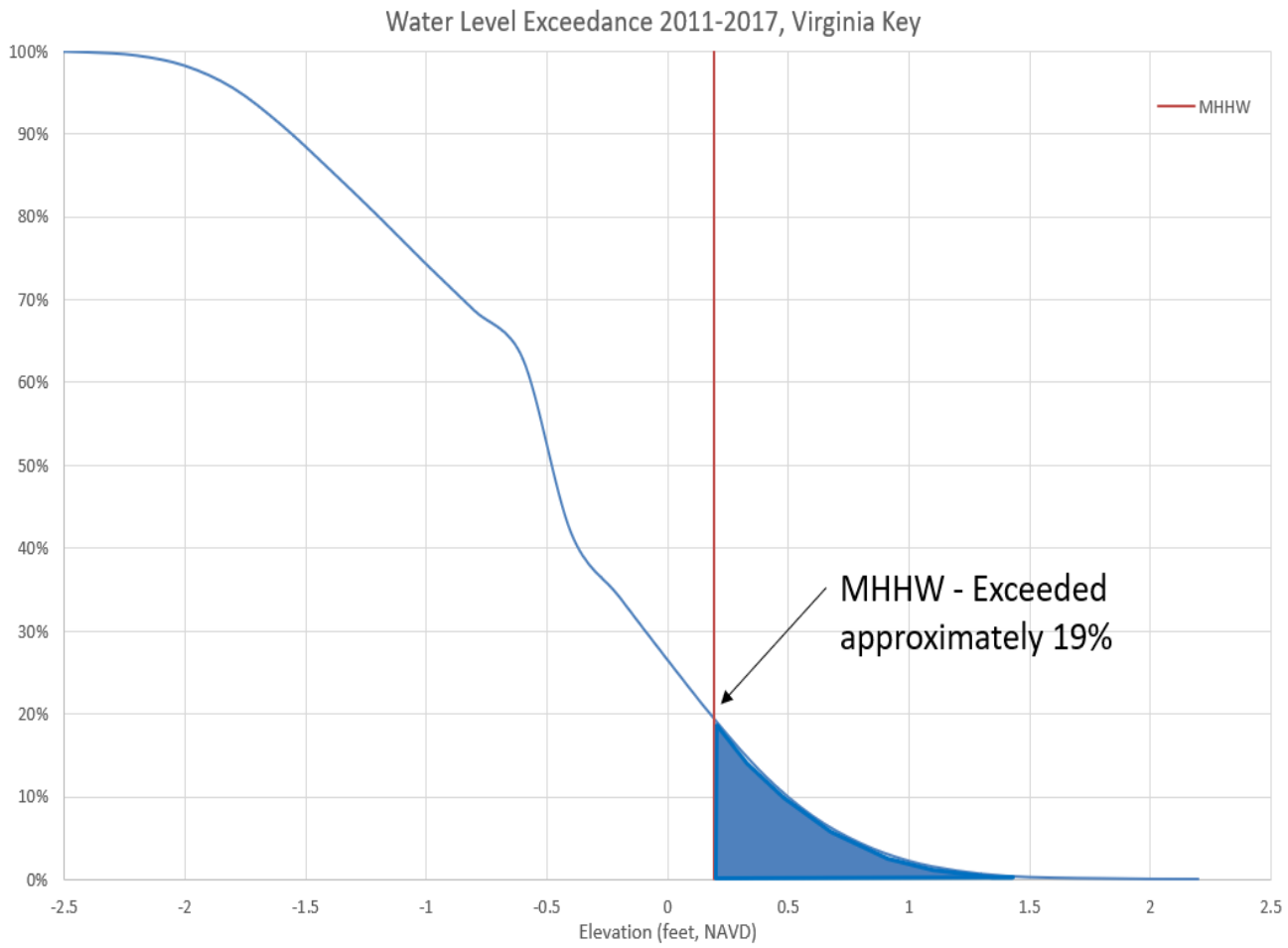

Figure A4.3: Accumulated Tidal Variations
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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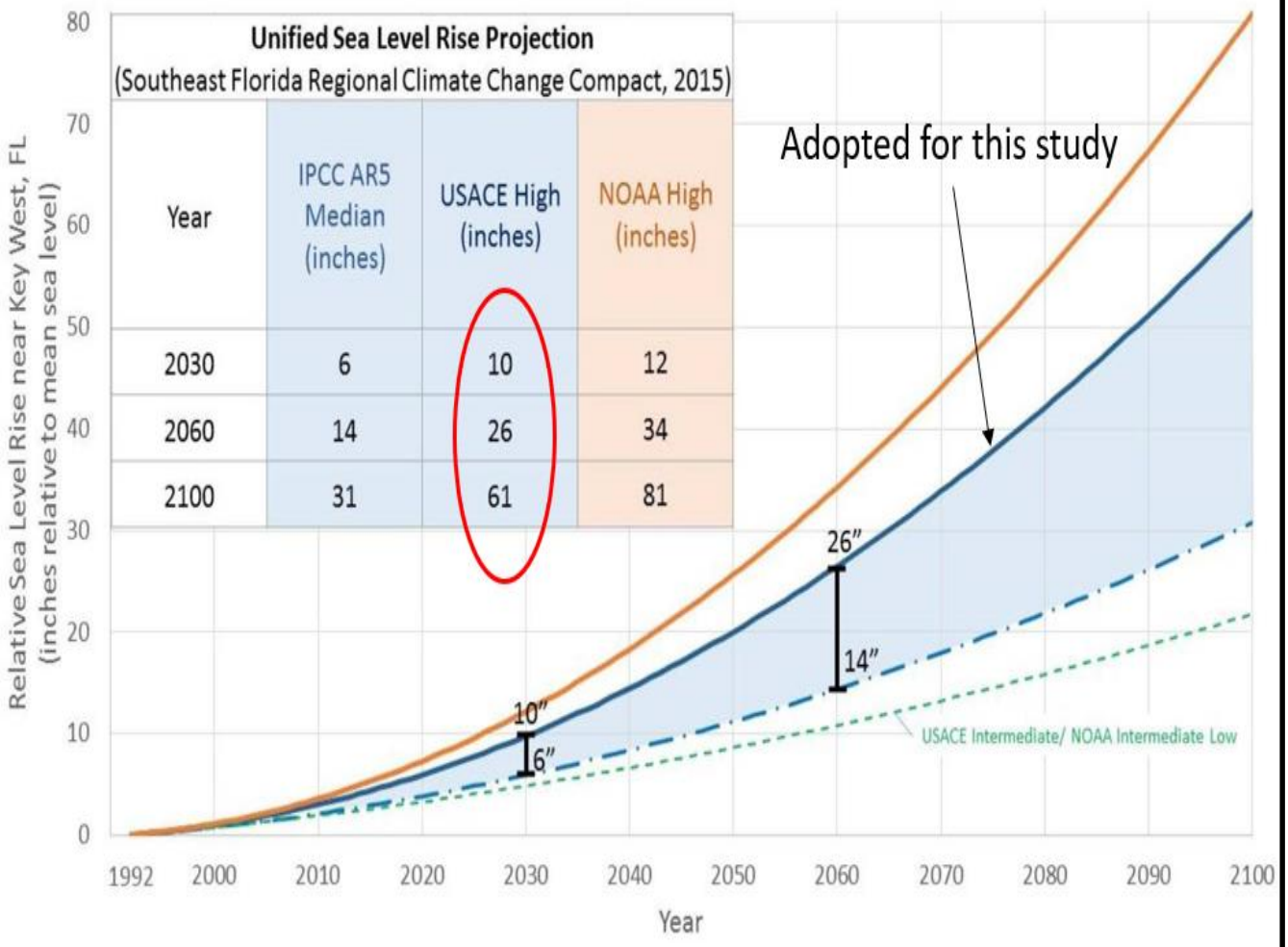

Source: USACE, IPCC AR5, NOAA

Figure A4.4: Sea Level Rise Projections
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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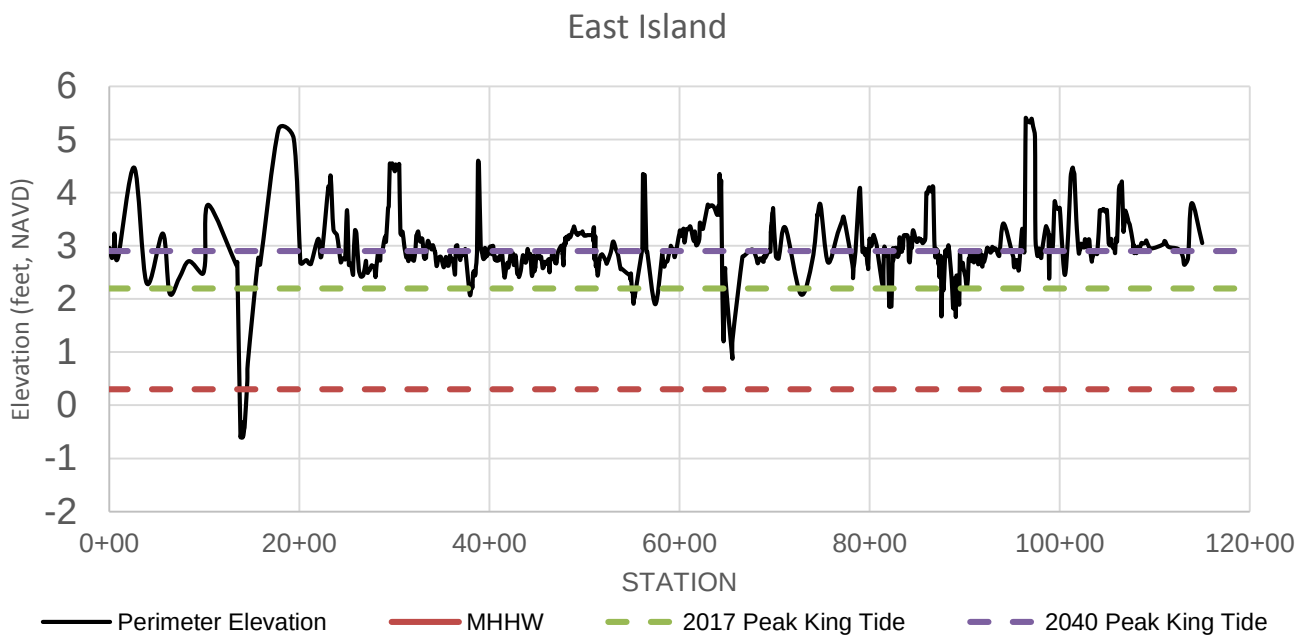

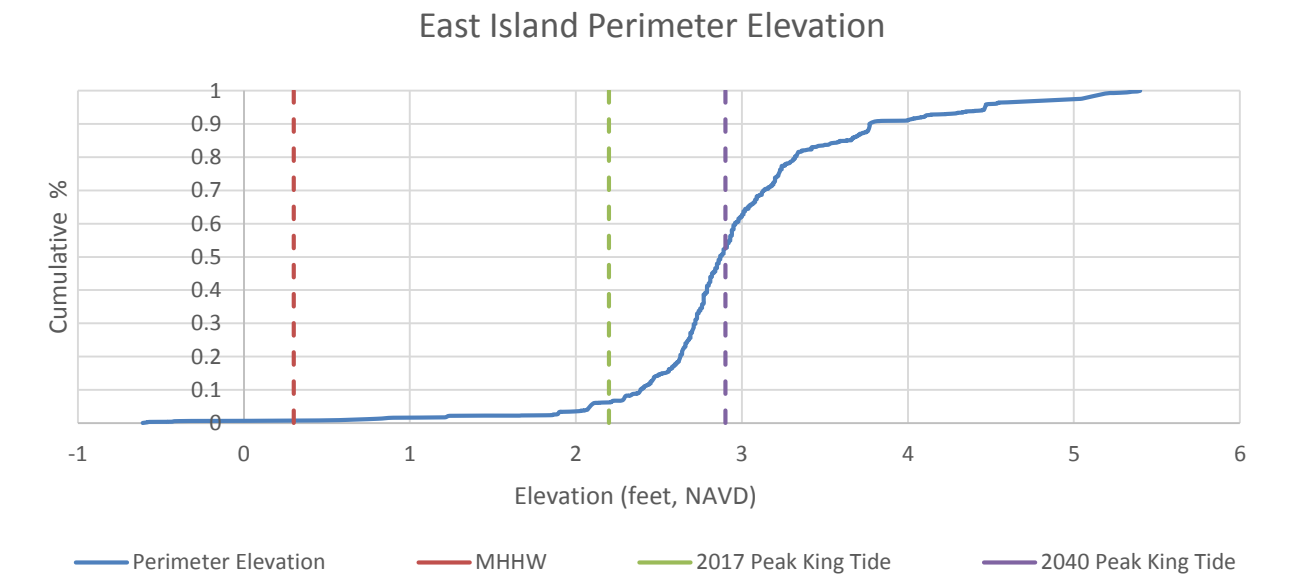

Figure A5.1A: Perimeter Elevation – East Island
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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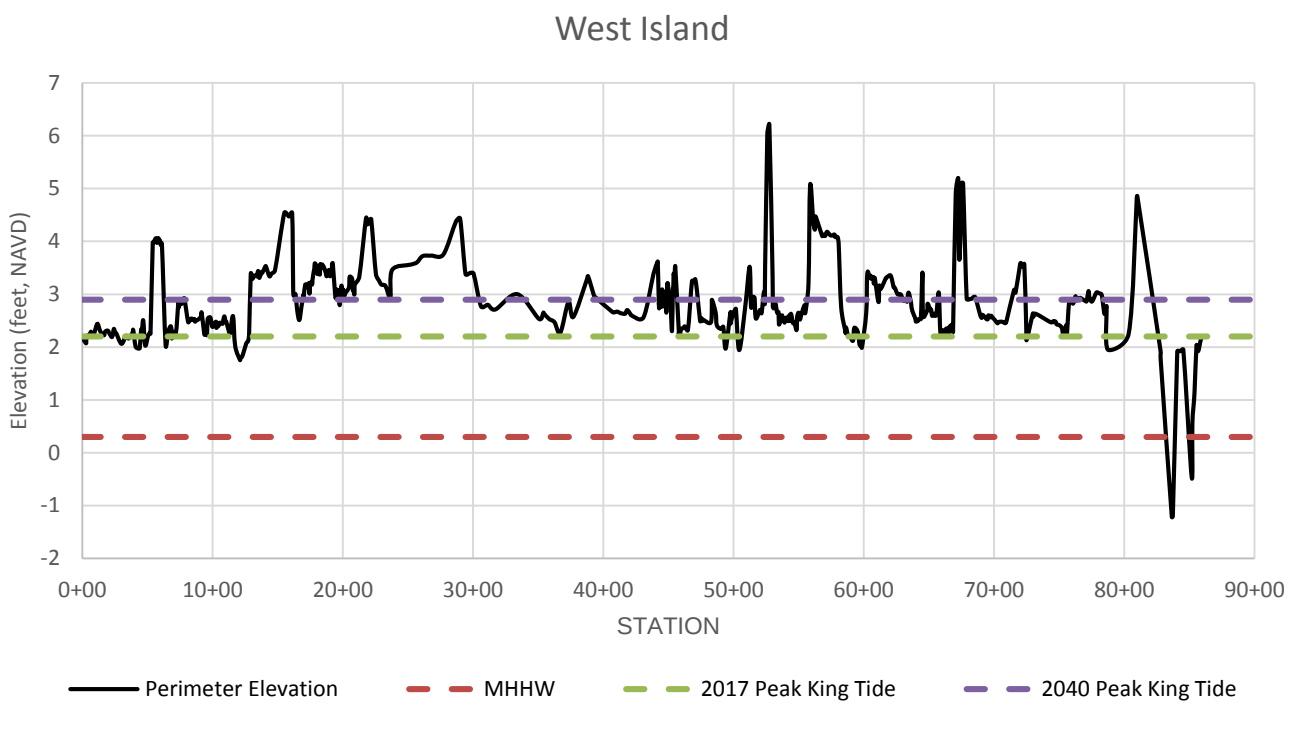

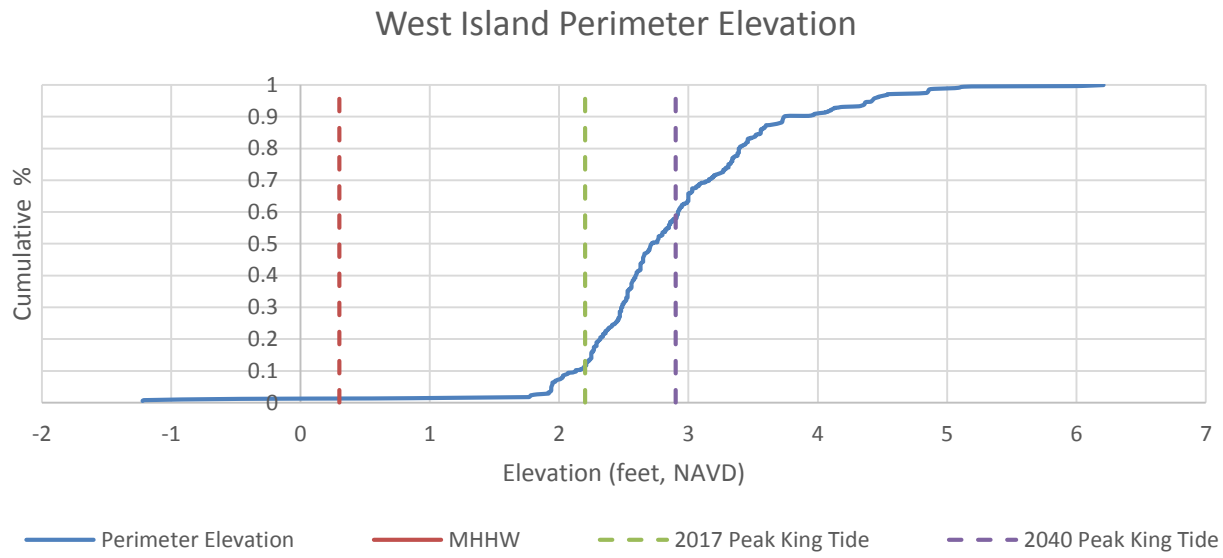

Figure A5.1B: Perimeter Elevation – West Island
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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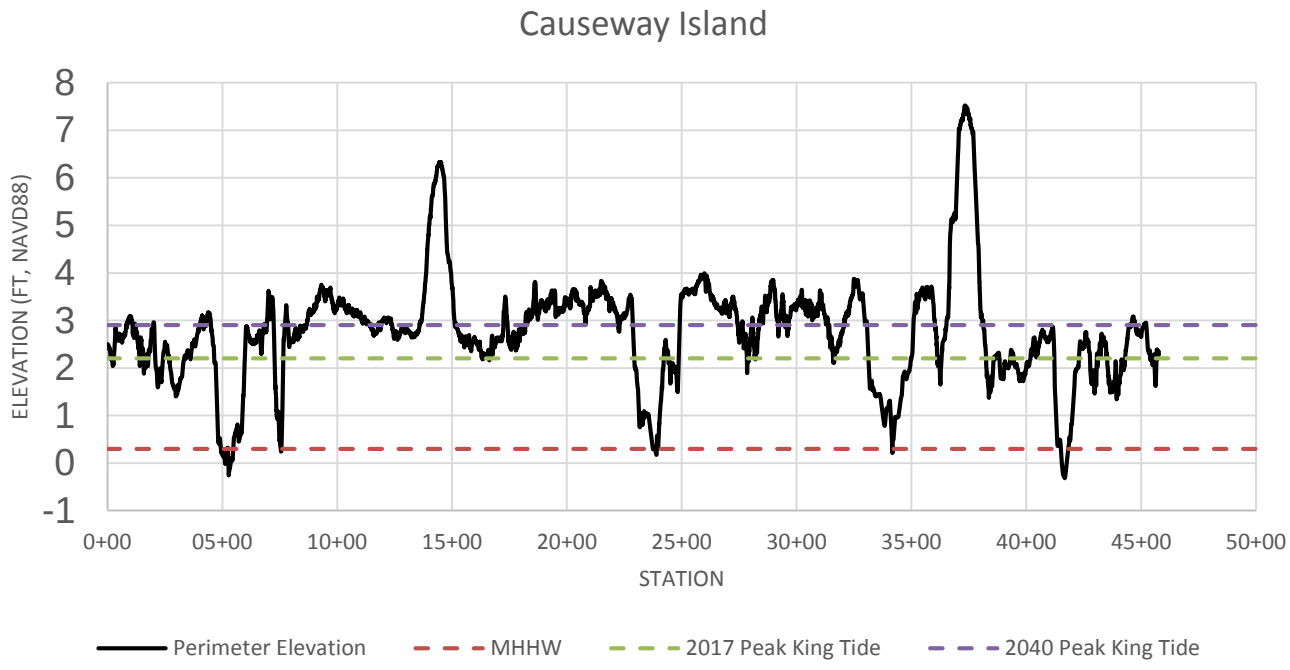

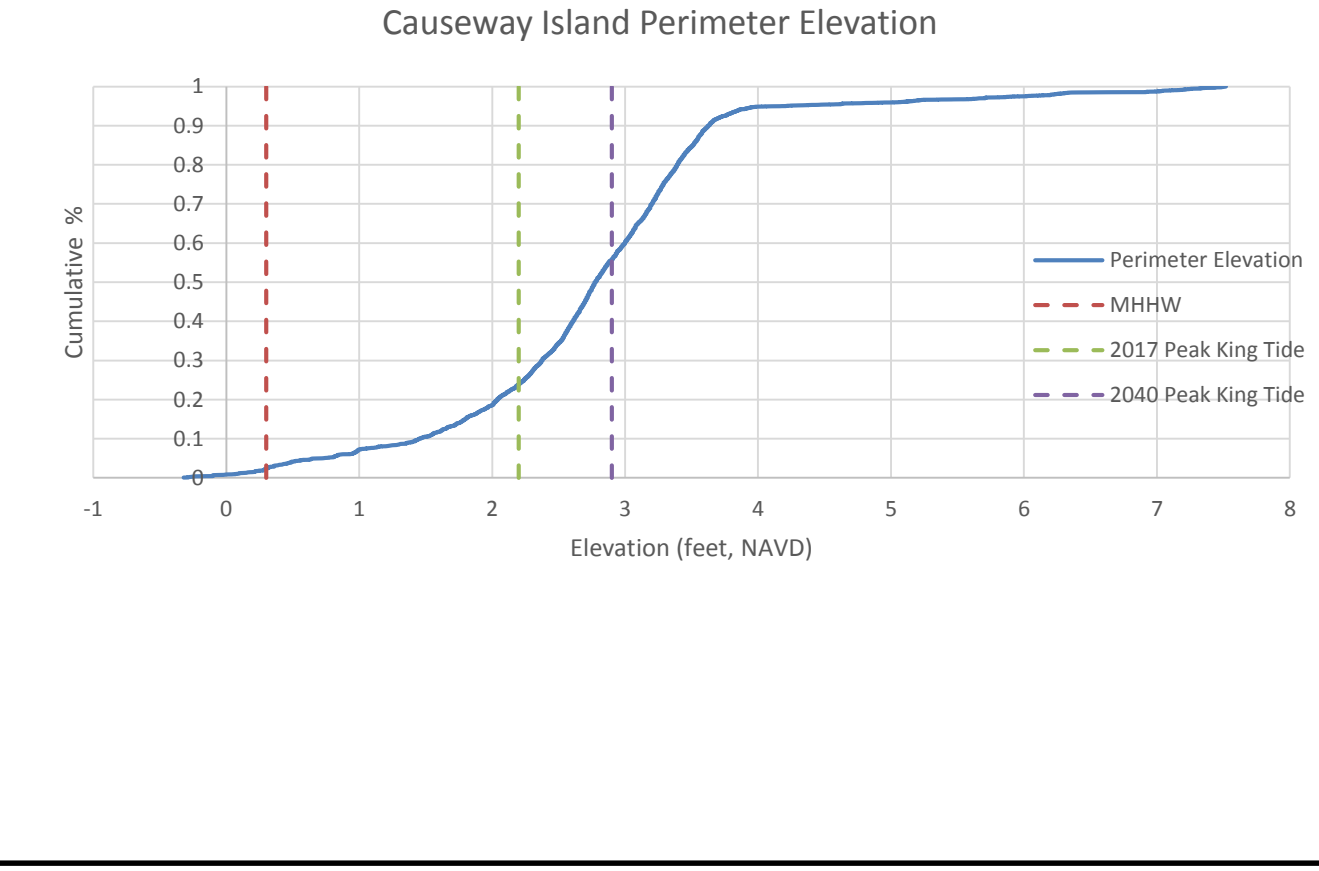

Figure A5.1C: Perimeter Elevation – Causeway Island Drive
Seawall Condition and Resiliency Assessment – Appendix A
Bay Harbor Islands

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Appendix B
Report Cards

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Appendix B-1.0 – West Island Report Cards

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9600 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#1
Date of Inspection: 4/16/2018 @ 3:40pm

Observations:

Length: 110'
Seabed Elev.: ~-5.1' NAVD Cap Elev.: ~6.8' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Not Applicable

Comments:

- Cap - Moderate cracking at wet face and soffit of cap
- T-Piles - Moderate necking at tidal zone
- Wall Panels – Moderate concrete erosion at tidal zone

- Seawall Rating: Fair
- Dock Rating: N/A

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Property Address: 9640 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#2
Date of Inspection: 4/16/2018 @ 3:45pm

Observations:

Length: 80'
Seabed Elev.: ~-7.2' NAVD Cap Elev.: ~8.10' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking at Northern wet face and soffit
- T-Piles – Minor necking at tidal zone
- Wall Panels – Minor concrete erosion at tidal zone
- Dock – Unsecured and missing timber decking, framing
- Dock – Severe corrosion at fasteners
- Dock – Splitting at timber piles

- Seawall Rating: Fair
- Dock Rating: Critical

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Property Address: 9700 W BROADVIEW DR
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Location: S-1.1 Lot#3
Date of Inspection: 4/16/2018 @ 3:50pm

Observations:

Length: 83'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~6.8' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap - Moderate cracking with exposed corrosion staining at wet face
- Cap – Spalling with exposed steel reinforcement at pile/cap
- T-Pile – Moderate concrete erosion at splash zone
- Dock – Moderate corrosion at fasteners and straps

- Seawall Rating: Fair
- Dock Rating: Fair

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Property Address: 9710 W BROADVIEW DR
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Location: S-1.1 Lot#4
Date of Inspection: 4/16/2018 @ 4:00pm

Observations:

Length: 80'
Seabed Elev.: ~-5.9' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Battered Pile, Panel
Dock: Timber framed dock, Timber Piles

Comments:

- Cap - Minor cracking at wet face
- Wall Panels - Moderate concrete erosion cracking at tidal zone
- T-Piles – Moderate necking at tidal zone
- Batter Piles – Minor cracking and spalling
- Dock – Severe corrosion at straps

- Seawall Rating: Fair
- Dock Rating: Fair

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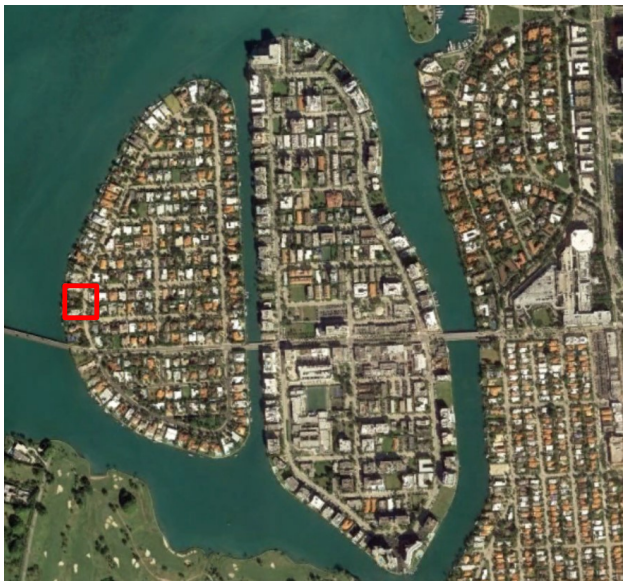
Property Address: 9720 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#5
Date of Inspection: 4/16/2018 @ 4:00pm



Observations:

Length: 77'
Seabed Elev.: ~-5.8' NAVD Cap Elev.: ~7.5' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Severe cracking and spalling at wet face with exposed steel reinforcement and corrosion staining
- Wall Panels - Moderate concrete erosion at tidal zone
- T-Piles – Separation between wall panel and t-piles
- T-Piles – Moderate necking at tidal zone
- Dock – Satisfactory Condition

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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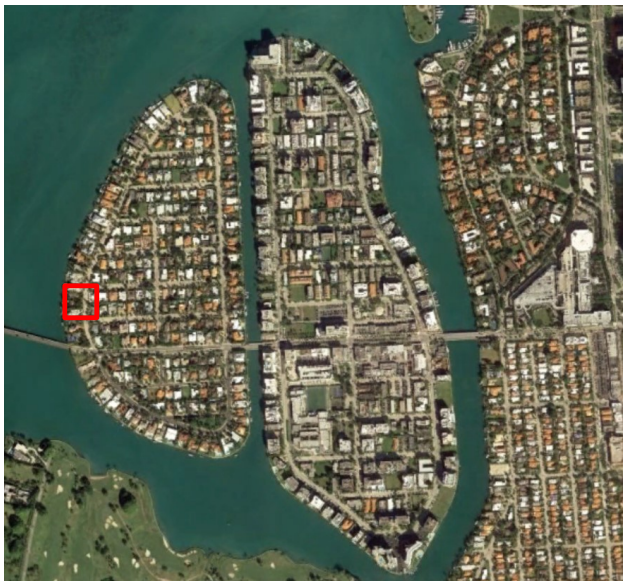
Property Address: 9730 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#6
Date of Inspection: 4/16/2018 @ 4:00pm



Observations:

Length: 82'
Seabed Elev.: ~-5.3' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber framing, Timber Piles

Comments:

- -Cap - Minor cracking along the wet face
- Mild erosion and necking at piles and concrete wall panels
- Dock – Corrosion at fasteners

- Seawall Rating: Satisfactory
- Dock Rating: Satisfactory

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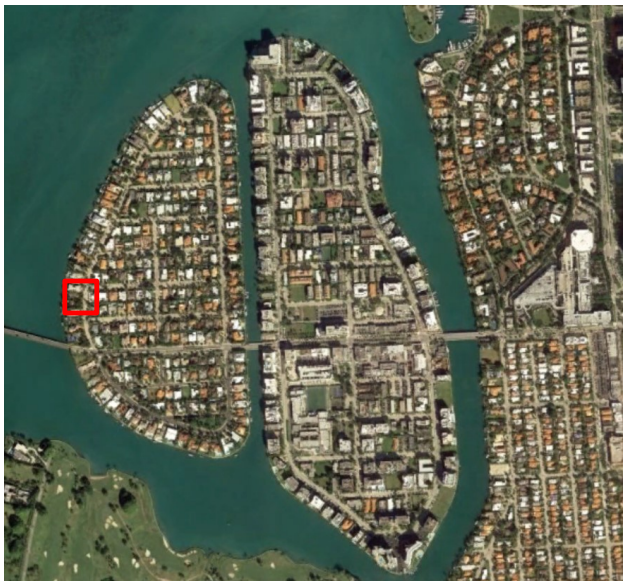
Property Address: 9740 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#7
Date of Inspection: 4/16/2018 @ 4:15pm



Observations:

Length: 89'
Seabed Elev.: ~-5.2' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate horizontal cracking along top face
- Wall Panels – Concrete overpour on existing seawall cap
- Dock – Satisfactory Condition

- Seawall Rating: Satisfactory
- Dock Rating: Satisfactory

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Property Address: 9800 W BROADVIEW DR
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Location: S-1.1 Lot#8
Date of Inspection: 4/16/2018 @ 4:15pm

Observations:

Length: 118'
Seabed Elev.: ~-5.2' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered Pile, Panel
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate concrete erosion at tidal zone
- T-Piles - Moderate cracking and necking at tidal zone
- Batter Piles – Moderate cracking
- Dock – Severe corrosion at fasteners
- Dock – Unsecured connections at beam bearing ends and unsecured/missing decking

- Seawall Rating: Fair
- Dock Rating: Critical

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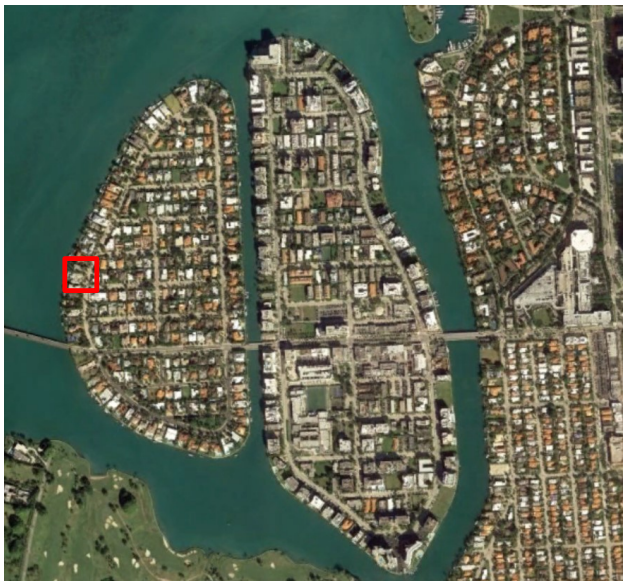
Property Address: 9814 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#9
Date of Inspection: 4/16/2018 @ 4:30pm



Observations:

Length: 82'
Seabed Elev.: ~-4.3' NAVD Cap Elev.: ~7.8' NAVD
Seawall: Battered T-Pile Panel Wall, Retrofit Batter Piles and Caps at S. end
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate concrete cracking and spalling
- Wall Panels – Scour at mudline
- T-Piles – Separation between t-pile and wall panel
- T-Piles – Concrete spalling at heads
- Batter Piles – Cracking at heads
- Dock – Severe corrosion at fasteners/straps

- Seawall Rating: Fair
- Dock Rating: Fair

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Property Address: 9826 W BROADVIEW DR
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Location: S-1.1 Lot#10
Date of Inspection: 4/16/2018 @ 4:30pm

Observations:

Length: 121'
Seabed Elev.: ~-5.9' NAVD Cap Elev.: ~7.66' NAVD
Seawall: Battered T-Pile Panel Wall, New Cap and Batter Piles
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Wall Panels – Moderate concrete erosion at splash zone
- Cap – Moderate cracking and spalling in original cap
- T-Piles – Moderate concrete erosion at splash zone
- Dock – Severe corrosion at fasteners
- Dock – Corroded straps replaced with new, bolt corrosion

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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Property Address: 9900 W BROADVIEW DR
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Location: S-1.1 Lot#11
Date of Inspection: 4/16/2018 @ 4:40pm

Observations:

Length: 151'
Seabed Elev.: ~-5.2' NAVD Cap Elev.: ~7.06' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Cracking adjacent to outfall
- Wall Panels – Moderate concrete erosion at splash zone
- Cap – Moderate longitudinal cracking
- T-Piles – Moderate concrete erosion and cracking
- Batter Piles – Minor to moderate cracking
- Dock – Corrosion at fasteners/straps, wood splitting

- Seawall Rating: Fair
- Dock Rating: (North) Satisfactory
  (South) Fair

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Property Address: 9920 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#12
Date of Inspection: 4/16/2018 @ 5:00pm

Observations:

Length: 76'
Seabed Elev.: ~-5.4' NAVD Cap Elev.: ~6.9' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- Wall Panels – Concrete erosion in splash zone
- Cap – Cracking at soffit
- T-Piles – Corrosion at t-pile anchor heads
- Dock – Moderate to severe corrosion at fasteners/straps

- Seawall Rating: Poor
- Dock Rating: Poor

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2018 Seawall Resiliency Inspection

Property Address: 9930 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#13
Date of Inspection: 4/16/2018 @ 5:00pm

Observations:

Length: 72'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~7.2' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Spalling and cracking at North property line
- Batter Piles – Moderate impact cracking
- Dock – Corrosion at fasteners/straps

- Seawall Rating: Fair
- Dock Rating: Fair

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2018 Seawall Resiliency Inspection

Property Address: 10000 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#14
Date of Inspection: 4/16/2018 @ 4:00pm

Observations:

Length: 85'
Seabed Elev.: ~-4.1' NAVD Cap Elev.: ~6.6' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor spalling and cracking at soffit
- T-Piles – Pile/panel separation with sediment accumulation
- Batter Piles – Impact cracking at pile heads
- Dock – Moderate corrosion at fasteners/straps

- Seawall Rating: Fair
- Dock Rating: Fair

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2018 Seawall Resiliency Inspection

Property Address: 10006 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#15
Date of Inspection: 4/16/2018 @ 4:10pm

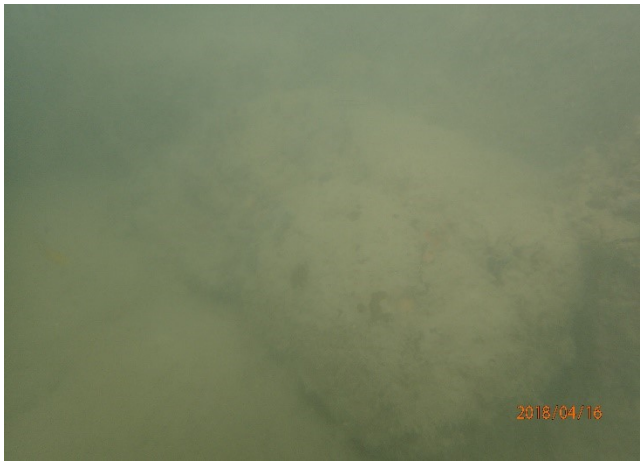
Observations:

Length: 79'
Seabed Elev.: ~-6.2' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- T-Piles – Moderate concrete erosion at splash zone
- Dock – Significant corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair



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2018 Seawall Resiliency Inspection

Property Address: 10010 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#16
Date of Inspection: 4/16/2018 @ 5:20pm

Observations:

Length: 82'
Seabed Elev.: ~-5.1' NAVD Cap Elev.: ~6.86' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- Wall Panels – Moderate cracking at tidal zone
- Cap – Moderate cracking with corrosion staining
- T-Piles – Pile/panel separation with sediment accumulation
- Batter Piles – Severe cracking and spalling below cap
- Dock – Joists toe nailed to beams, capacity should be verified with enhanced oil recovery

- Seawall Rating: Poor
- Dock Rating: Fair

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Property Address: 10020 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#17
Date of Inspection: 4/16/2018 @ 5:20pm

Observations:

Length: 82'
Seabed Elev.: ~-5.4' NAVD Cap Elev.: ~6.8' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Wall Panels – Moderate concrete erosion and spalling
- Cap – Minor to moderate cracking
- T-Piles – Moderate concrete erosion and necking
- Dock – Minor to moderate cracking at joists/beams

- Seawall Rating: Fair
- Dock Rating: Fair

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Property Address: 10050 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#18
Date of Inspection: 4/16/2018 @ 5:30pm

Observations:

Length: 75'
Seabed Elev.: ~-4.4' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Anchored King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor to moderate cracking with corrosion staining
- T-Piles – Moderate concrete erosion and necking
- Batter Piles – Cracking at pile heads
- Docks – Moderate to severe corrosion at fasteners/straps

- Seawall Rating: Fair
- Dock Rating: Fair

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Property Address: 10100 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#19
Date of Inspection: 4/16/2018 @ 5:30pm

Observations:

Length: 79'
Seabed Elev.: ~-4.6' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Anchored King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate concrete erosion and cracking
- Cap – Cracking with corrosion staining at soffit and wet face
- King Piles – Cracking and concrete erosion
- Docks – Moderate to severe corrosion at fasteners/straps

- Seawall Rating: Poor
- Dock Rating: Fair

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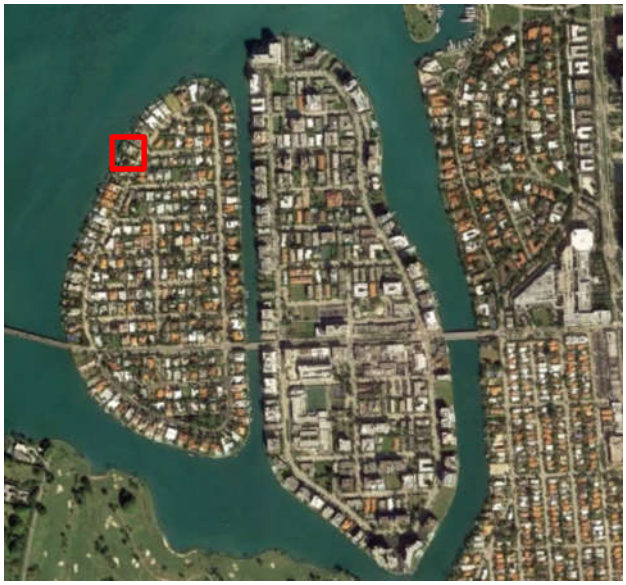
Property Address: 10120 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#20
Date of Inspection: 4/16/2018 @ 5:40pm



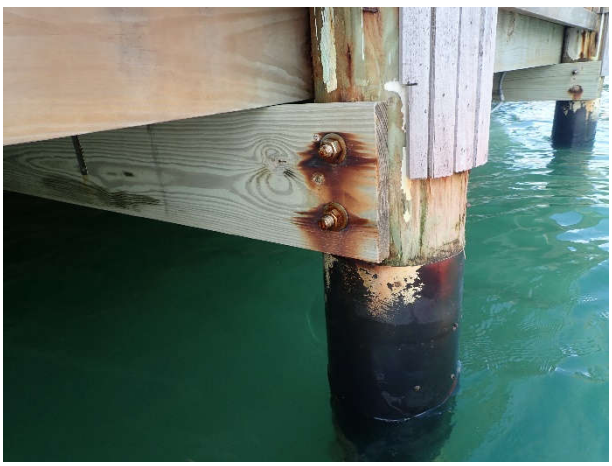
Observations:

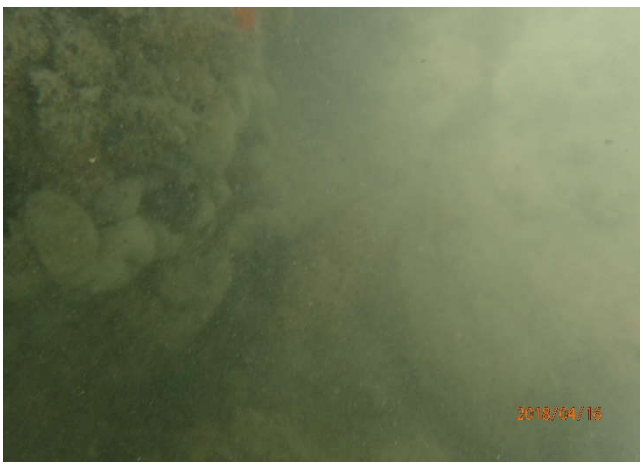
Length: 113'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Cracking with corrosion staining at soffit and wet face
- T Piles – Moderate cracking and Minor concrete erosion
- T Piles – Moderate concrete erosion and separation from wall panels
- Dock – Corrosion at beam and pile bolts
- Dock – Moderate deterioration of piles

- Seawall Rating: Fair
- Dock Rating: Fair





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Property Address: 10130 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#21
Date of Inspection: 4/16/2018 @ 4:40pm

Observations:

Length: 119'
Seabed Elev.: ~-4.4' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Anchored T-Pile King Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Moderate cracking along the wet face
- Wall Panels – Moderate concrete erosion and cracking at tidal zone
- Piles – Moderate necking and concrete erosion
- Dock – Deck demolished

- Seawall Rating: Poor
- Dock Rating: N/A

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Property Address: 10140 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#22
Date of Inspection: 4/16/2018 @ 4:40pm

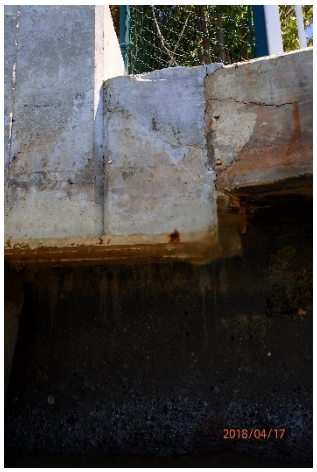
Observations:

Length: 122'
Seabed Elev.: ~-4.4' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate to severe cracking with corrosion staining along the wet face
- Wall Panels – Moderate necking and concrete erosion
- Piles – Moderate necking and concrete erosion
- Dock – Moderate corrosion at dock fasteners

- Seawall Rating: Poor
- Dock Rating: Poor



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Property Address: 10200 W BROADVIEW DR
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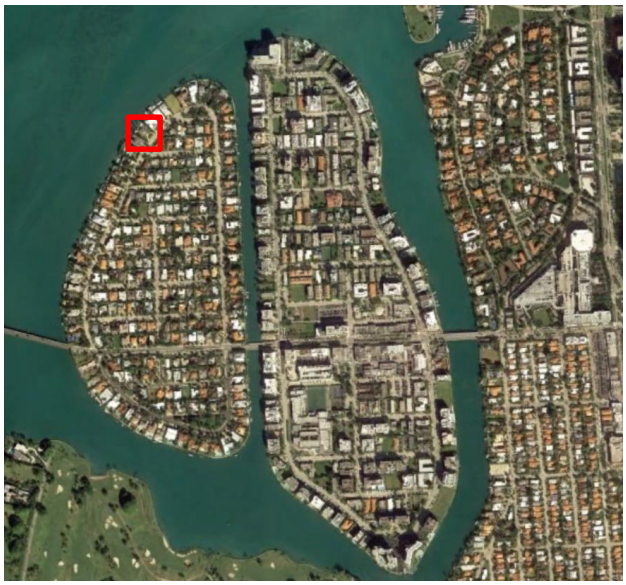
Location: S-1.1 Lot#23
Date of Inspection: 4/17/2018 @ 1:40pm



Observations:

Length: 125'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~8.8' NAVD
Seawall: Battered T-Pile Panel Wall, Two King Piles
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Aluminum Sheet Pile with Rubble

Comments:

- Wall Panels - Severe spalling at top of North panels
- King Piles – Severe spalling and deterioration with exposed steel reinforcement
- T-Piles - Moderate erosion with severe cracking and an exposed bar. Deterioration at top
- Seawall experiences heavy wake
- Seawall Rating: Poor
- Dock Rating: Satisfactory

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Property Address: 10226 W BROADVIEW DR
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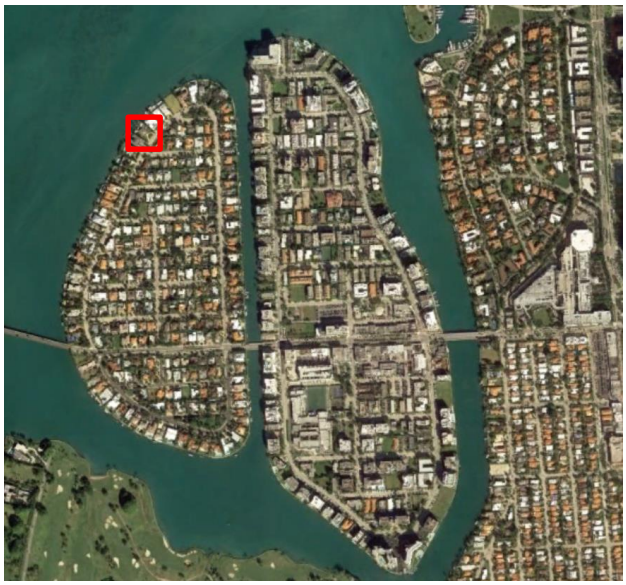
Location: S-1.1 Lot#24
Date of Inspection: 4/17/2018 @ 1:40pm



Observations:

Length: 121'
Seabed Elev.: ~-5.8' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Cracking at wet face and soffit
- Cap – Spalling and deterioration
- Batter Piles – Minor surface pitting
- Batter Piles – Moderate deterioration and cracking with corrosion staining

- Seawall Rating: Poor
- Dock Rating: Fair

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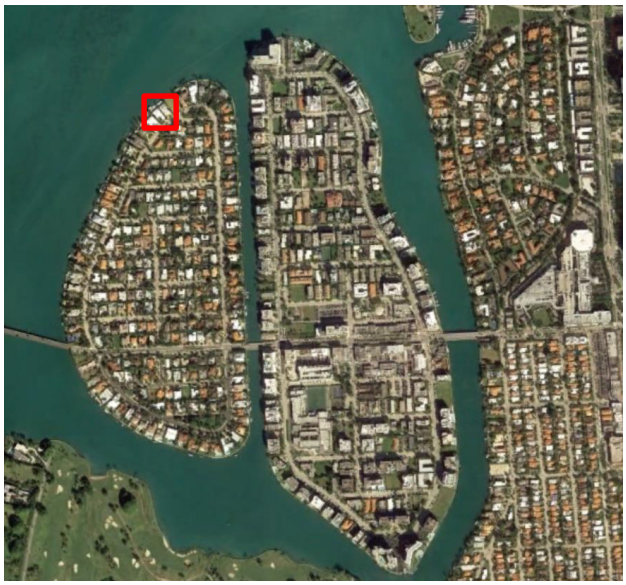
Property Address: 10236 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#25
Date of Inspection: 4/17/2018 @ 1:40pm



Observations:

Length: 123'
Seabed Elev.: ~-5.6' NAVD Cap Elev.: ~8.1' NAVD
Seawall: Battered T-Pile Panel Wall with Retrofit Batter Pile Caps
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Minor erosion at tidal zone
- Cap – Severe cracking and deterioration at original cap
- Batter Piles – Minor concrete erosion
- Dock – Fastener corrosion, missing straps

- Seawall Rating: Fair
- Dock Rating: Fair

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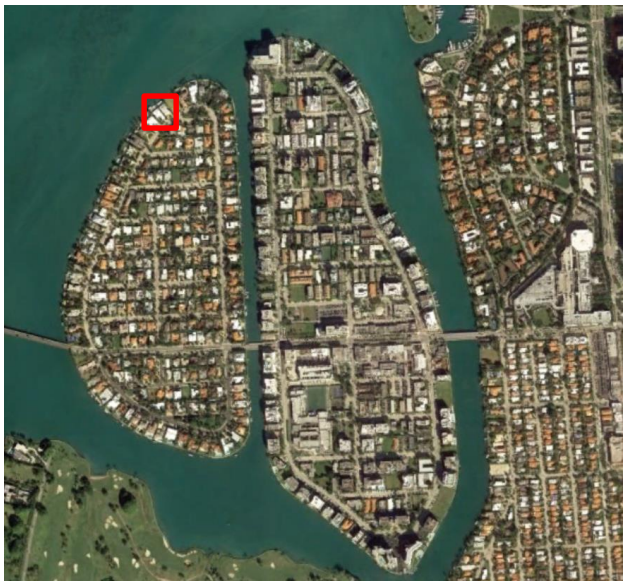
Property Address: 10250 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#26
Date of Inspection: 4/17/2018 @ 1:30pm



Observations:

Length: 85'
Seabed Elev.: ~-5.3' NAVD Cap Elev.: ~8.4' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- Wall Panels – Minor concrete erosion at tidal zone
- T-Piles – Necking at tidal zone
- Dock – Corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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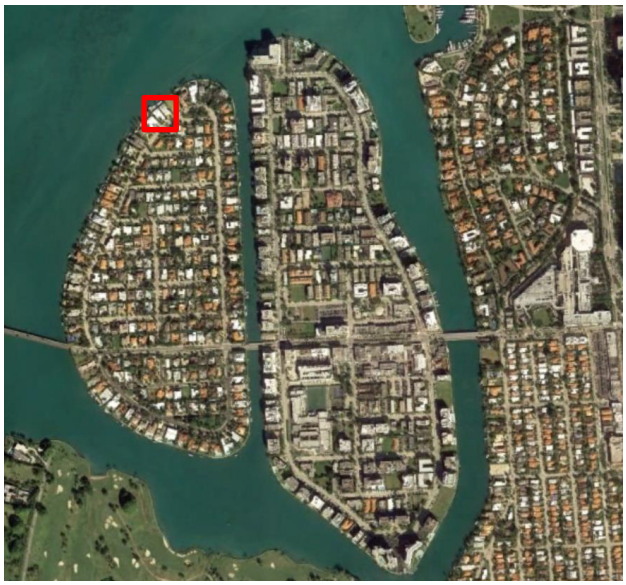
Property Address: 10300 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#27
Date of Inspection: 4/17/2018 @ 1:30pm



Observations:

Length: 82'
Seabed Elev.: ~-4' NAVD Cap Elev.: ~7.2' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Not Applicable

Comments:

- Cap – Severe cracking along bottom and wet face
- T-Piles – Minor necking at tidal zone
- Batter Piles – Minor necking and spalling

- Seawall Rating: Fair
- Dock Rating: N/A

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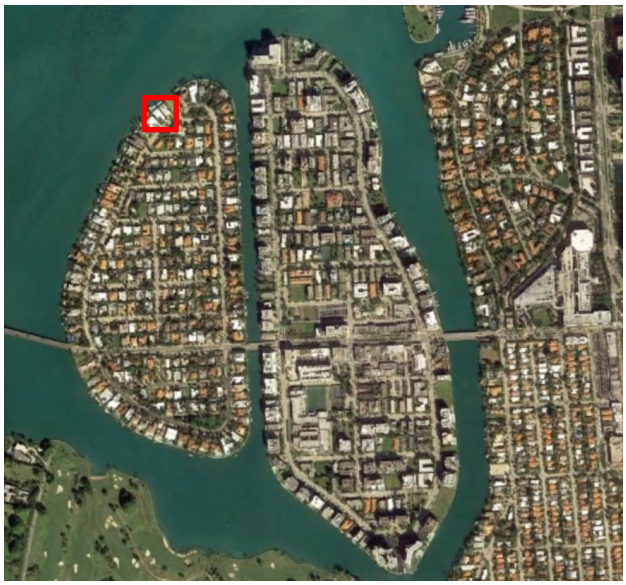
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10312 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#28
Date of Inspection: 4/17/2018 @ 1:25pm



Observations:

Length: 120'
Seabed Elev.: ~-6.1' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall (Original Construction)
Dock: Not Applicable

Comments:

- Wall Panels – Minor cracking
- Wall Panels – Moderate to severe concrete erosion
- Cap – Moderate cracking at wet face
- Cap – Significant spalling and deterioration

- Seawall Rating: Poor
- Dock Rating: N/A

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Property Address: 10330 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#29
Date of Inspection: 4/17/2018 @ 1:20pm

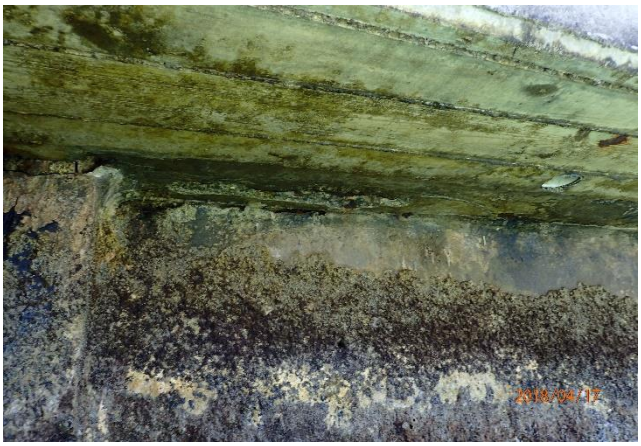
Observations:

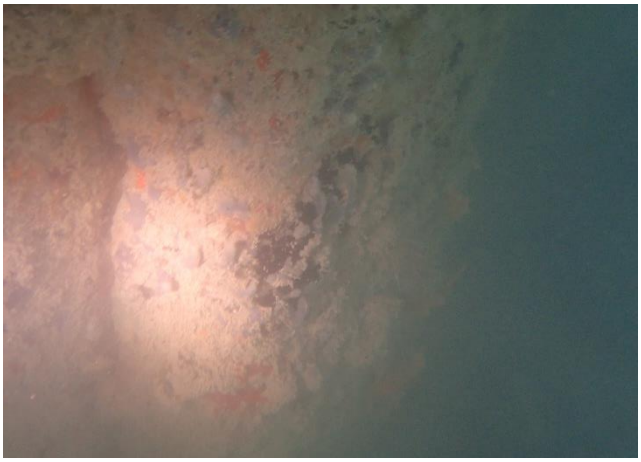
Length: 146'
Seabed Elev.: ~-6.2' NAVD Cap Elev.: ~9.1' NAVD
Seawall: Anchored & Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Cement Bag Revetment

Comments:

- Cap – Corrosion staining
- T-Piles – Northern pile head double anchor
- King Piles – Degradation of king piles
- Dock – Severe corrosion at straps

- Seawall Rating: Fair
- Dock Rating: Fair





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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10340 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#30
Date of Inspection: 4/17/2018 @ 1:10pm

Observations:

Length: 122'
Seabed Elev.: ~-5.4' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Aluminum Toe Wall

Comments:

- Wall Panels – Rotation of the wall along bottom panels
- Cap – Moderate cracking at wet face and soffit
- T-Piles – Pile/panel separation
- Toe Wall – Separation from wall panels, partial collapse

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10337 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#31
Date of Inspection: 4/17/2018 @ 1:00pm

Observations:

Length: 121'
Seabed Elev.: ~-5' NAVD Cap Elev.: ~7.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- Wall Panels – Severe undermining
- Cap – Severe cracking at wet face and soffit with corrosion staining
- Docks – Corrosion at fasteners
- Toe Wall – Voids along toe, partial collapse

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10331 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#32
Date of Inspection: 4/17/2018 @ 12:50pm

Observations:

Length: 121’
Seabed Elev.: ~-5.7’ NAVD Cap Elev.: ~7.7’ NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: Timber Dock Framing

Comments:

- Cap – Moderate cracking at wet face with corrosion stains
- King Piles – Moderate cracking at pile heads
- Dock – Corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10321 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#33
Date of Inspection: 4/17/2018 @ 12:45pm

Observations:

Length: 119'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~7.9' NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Minor concrete erosion at tidal zone
- King Piles – Moderate cracking at pile heads
- T-Piles- Moderate cracking and necking at tidal zone
- Dock – Corrosion at fasteners
- Dock Piles – Moderate "salt-kill"

- Seawall Rating: Fair
- Dock Rating: Fair

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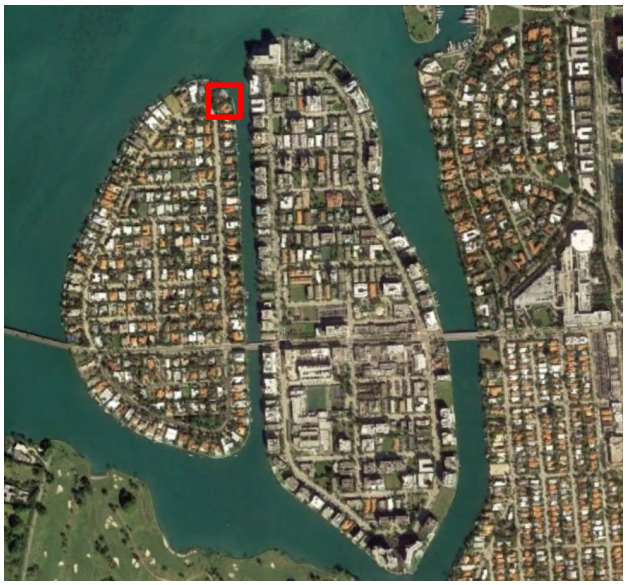
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10301 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#34
Date of Inspection: 4/17/2018 @ 12:40pm



Observations:

Length: 162'
Seabed Elev.: ~-4' NAVD Cap Elev.: ~7.8' NAVD
Seawall: Battered & Anchored T-Pile Panel Wall
Dock: Remanence of Old Dock

Comments:

- Wall Panels – Rotation of the wall with moderate to severe cracking
- Cap – Severe cracking and concrete erosion at wet face and soffit at bump-outs
- T-Piles – Pile/panel separation through unsealed fillets
- T-Piles – Corrosion at pile anchor heads
- T-Piles – Deterioration at pile heads

- Seawall Rating: Fair
- Dock Rating: N/A

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2018 Seawall Resiliency Inspection

Property Address: 10261 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#35
Date of Inspection: 4/17/2018 @ 12:35pm

Observations:

Length: 74'
Seabed Elev.: ~-5.4' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking corrosion staining at wet face
- Cap – Minor to moderate concrete erosion
- Wall Panels – Minor rotation of the wall
- T-Piles- Moderate concrete erosion and cracking
- Dock – Severe corrosion at fasteners and straps
- Dock – Loose/unsecured timber joists

- Seawall Rating: Fair
- Dock Rating: Serious

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10241 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#36
Date of Inspection: 4/17/2018 @ 12:30pm

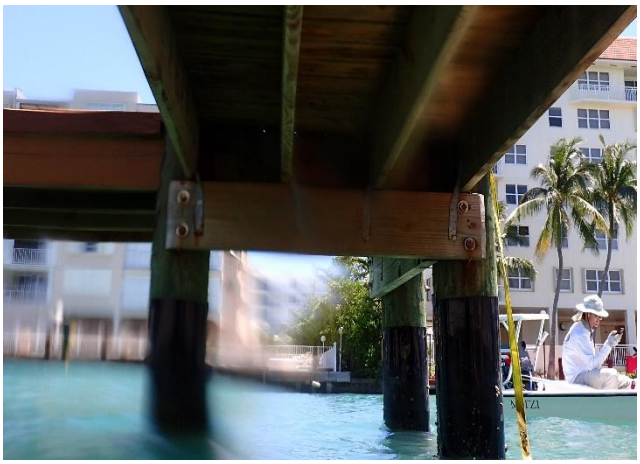
Observations:

Length: 77'
Seabed Elev.: ~-6.6' NAVD Cap Elev.: ~8.6' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking with corrosion staining at soffit
- Cap – Poured new cap topping original cap
- Wall Panels – Minor to moderate concrete erosion at tidal zone
- Dock – Minimal size at threaded rod fasteners

- Seawall Rating: Fair
- Dock Rating: Satisfactory



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10221 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#37
Date of Inspection: 4/17/2018 @ 12:20pm

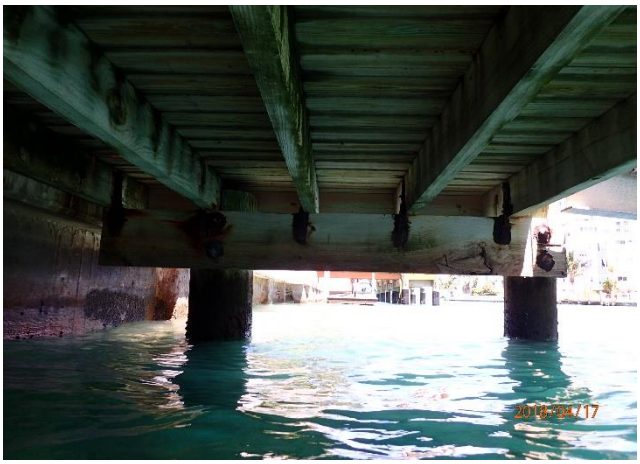
Observations:

Length: 77'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Rip-Rap Boulder Wall

Comments:

- Cap – Cracking at soffit
- Wall Panels – Moderate cracking
- T-Piles – Moderate necking, cracking, and spalling at tidal zone
- Dock – Moderate corrosion at fasteners
- Dock – Salt-kill at timber piles

- Seawall Rating: Poor
- Dock Rating: Fair



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10201 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#38
Date of Inspection: 4/17/2018 @ 12:20pm

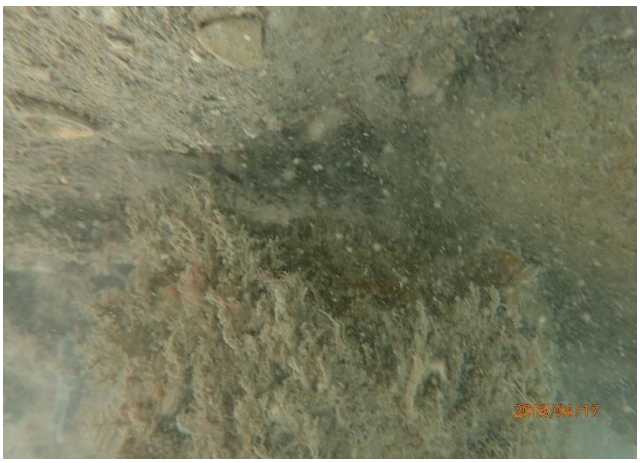
Observations:

Length: 76'
Seabed Elev.: ~-4.3' NAVD Cap Elev.: ~6.8' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Moderate cracking at soffit with corrosion staining
- Wall Panels – Moderate cracking
- T-Piles – Moderate necking and cracking at tidal zone
- Dock – Moderate to severe corrosion at fasteners
- Dock – Timber pile bearing on rock with no embedment
- Dock – Rotation at Northern pile

- Seawall Rating: Fair
- Dock Rating: Critical



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10161 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#39
Date of Inspection: 4/17/2018 @ 12:10am

Observations:

Length: 74'
Seabed Elev.: ~-6.1' NAVD Cap Elev.: ~8.5' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate cracking
- Wall Panels – Moderate concrete erosion at tidal zone
- T-Piles – Moderate cracking at tidal zone
- Dock – Corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10141 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#40
Date of Inspection: 4/17/2018 @ 11:10am

Observations:

Length: 67'
Seabed Elev.: ~-5' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Minor cracking at soffit
- Wall Panels – Minor to moderate cracking
- Wall Panels – Minor to moderate concrete erosion
- Dock – Galvanized fasteners and channels

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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2018 Seawall Resiliency Inspection

Property Address: 10121 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#41
Date of Inspection: 4/17/2018 @ 12:05pm

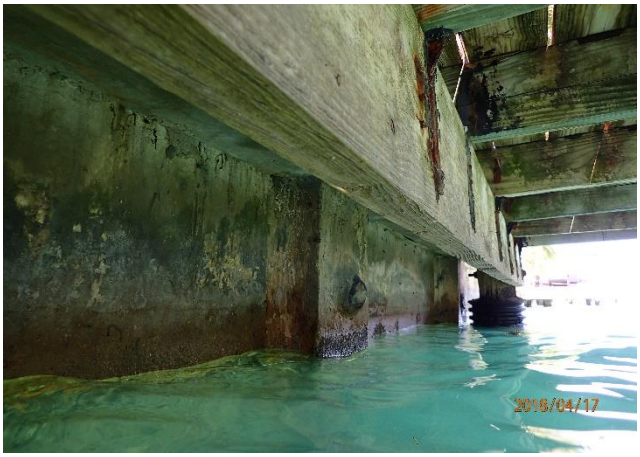
Observations:

Length: 78'
Seabed Elev.: ~-4.1' NAVD Cap Elev.: ~7.2' NAVD
Seawall: Anchored T-Pile
Dock: Timber Dock Framing, Timber Piles with Concrete Sleeves
Toe Protection: Aluminum Toe Wall

Comments:

- Cap – Minor cracking of the wet face and soffit
- Cap – Moderate spalling and honeycombing
- King Pile – Anchor head corrosion
- Dock – Mooring piles deteriorating
- Dock – Fastener corrosion

- Seawall Rating: Fair
- Dock Rating: Fair



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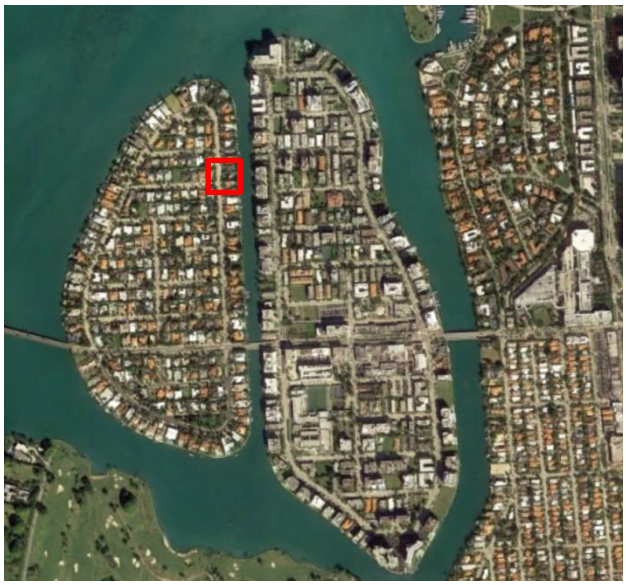
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10061 to 10101 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#42
Date of Inspection: 4/17/2018 @ 12:00pm



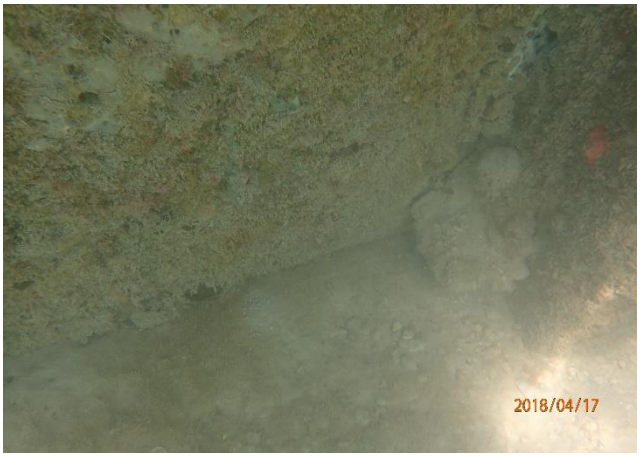
Observations:

Length: 151'
Seabed Elev.: ~-4.0' NAVD Cap Elev.: ~8.0' NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Construction of two different caps at North and South ends of the property
- Cap – Moderate cracking at wet face at Northern seawall
- Wall Panels – Minor cracking at transition to caps
- Wall Panels – Exposed bar, spalling at outfall with rotation
- T-Piles – Moderate cracking
- King-Piles – Moderate cracking
- Dock – Fastener corrosion, pile splitting

- Seawall Rating: Fair
- Dock Rating: Fair



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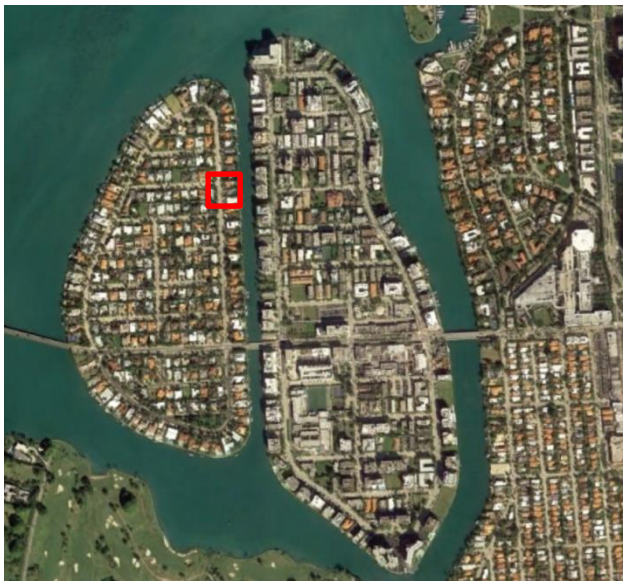
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10043 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#43
Date of Inspection: 4/17/2018 @ 11:50am



Observations:

Length: 78'
Seabed Elev.: ~-2.8' NAVD Cap Elev.: ~7.2' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor cracking with corrosion staining at wet face
- T-Piles – Exposed anchor heads with moderate corrosion
- Wall Panels – Moderate concrete erosion at tidal zone with moderate rotation
- Dock – Moderate corrosion at fasteners and straps
- Dock – Piles exhibit salt kill

- Seawall Rating: Fair
- Dock Rating: Fair

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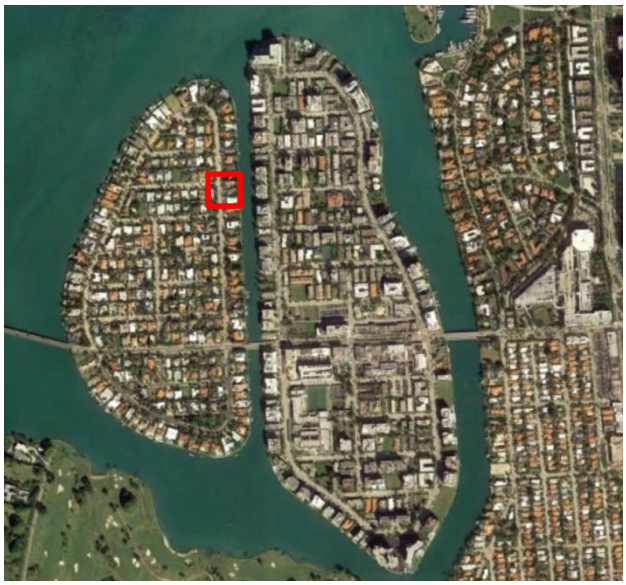
Property Address: 10021 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#44
Date of Inspection: 4/17/2018 @ 11:50am



Observations:

Length: 73'
Seabed Elev.: ~-3.0' NAVD Cap Elev.: ~7.2' NAVD
Seawall: Anchored T-Pile Panel Wall with Batter Piles and Retrofit Caps
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor to moderate cracking with corrosion staining at retrofit batter pile caps
- T-Piles – Moderate corrosion at anchors
- Batter Pile –Cracking/ spalling
- Wall Panels – Minor concrete erosion of older panels
- Dock – Moderate corrosion at fasteners
- Dock – Minor to moderate splitting of joists, pile deterioration

- Seawall Rating: Fair
- Dock Rating: Fair

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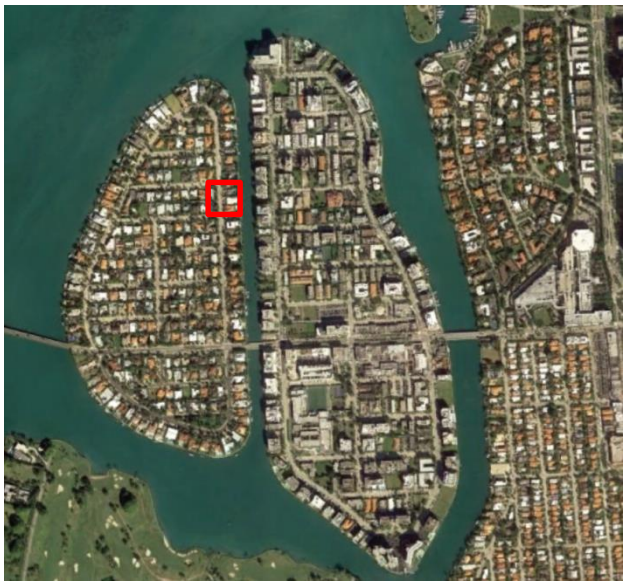
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10001 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#45
Date of Inspection: 4/17/2018 @ 11:45am



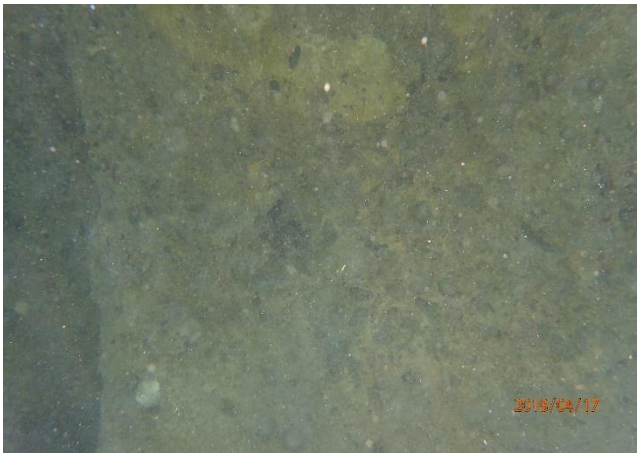
Observations:

Length: 73'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles, Timber Lift Piles

Comments:

- Cap – Minor cracking along wet face
- T-Piles – Moderate necking at tidal zone
- T-Piles – Moderate corrosion at anchor heads
- Wall Panels – Rotation of the wall
- Dock – Heavy corrosion at fasteners
- Dock – Wood splitting

- Seawall Rating: Fair
- Dock Rating: Poor



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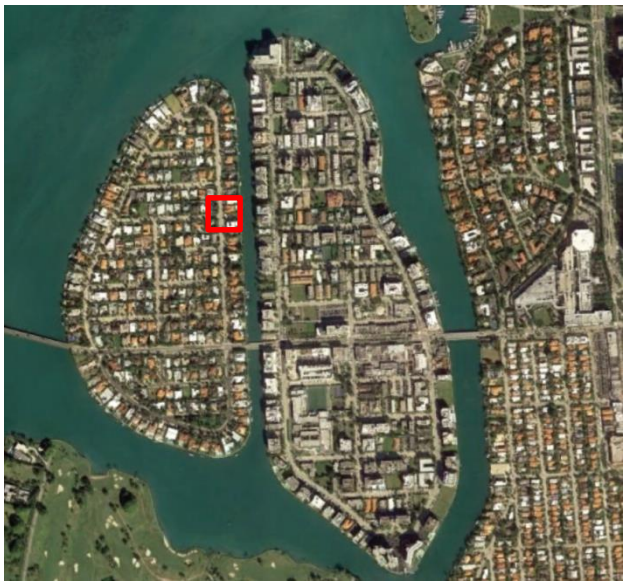
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9961 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#46
Date of Inspection: 4/17/2018 @ 11:45am



Observations:

Length: 79'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- Cap – Moderate cracking at wet face and soffit
- Wall Panels – Moderate to severe cracking along panels
- Wall Panels – Moderate concrete erosion at tidal zone
- Batter Piles – Moderate cracking
- Dock – Stringers unsecured
- Dock – Wood rotting, corroded fasteners

- Seawall Rating: Fair
- Dock Rating: Poor

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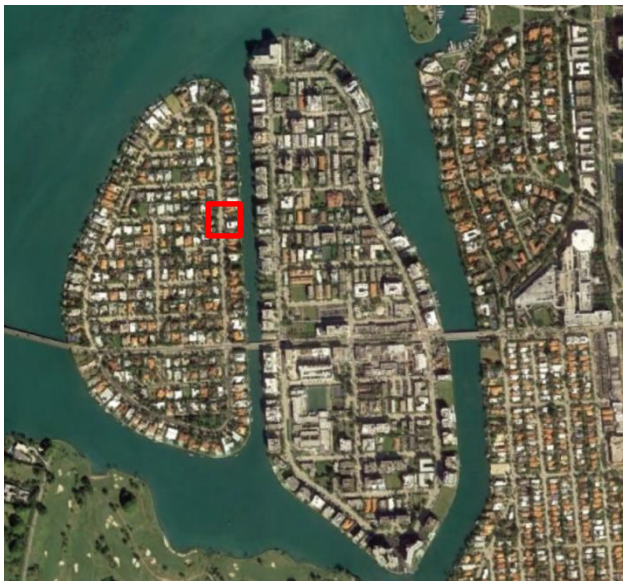
2018 Seawall Resiliency Inspection

Property Address: 9933 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#47
Date of Inspection: 4/17/2018 @ 11:30am



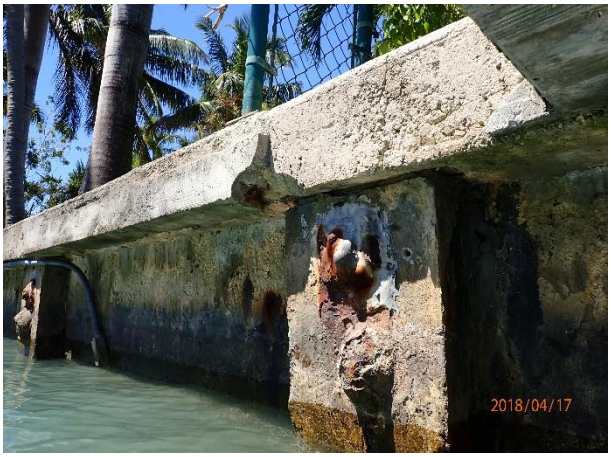
Observations:

Length: 75'
Seabed Elev.: ~-5.0' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Minor spalling at outfall
- Wall Panels – Concrete erosion at tidal zone
- Wall Panels – Minor to moderate horizontal cracking
- Cap – Spalling
- T-Piles – Moderate vertical cracking and sediment loss through fillets, anchor head corrosion

- Seawall Rating: Fair
- Dock Rating: Satisfactory



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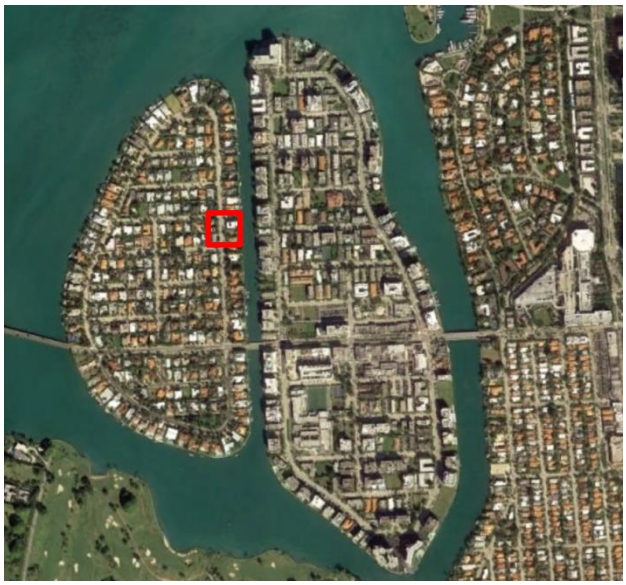
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9921 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#48
Date of Inspection: 4/17/2018 @ 11:30am



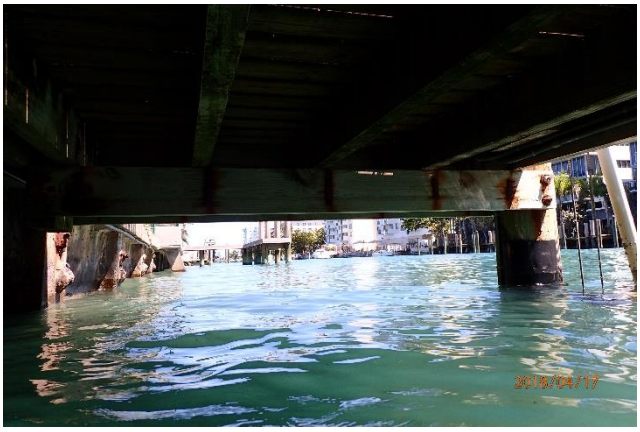
Observations:

Length: 73'
Seabed Elev.: ~-3.8' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Minor spalling with longitudinal and vertical cracking
- T-Piles – Minor to moderate erosion at anchors
- T-Piles – Double anchors with moderate corrosion at heads
- T-Piles – Pitting at piles below dock
- Wall Panels – Minor concrete erosion and cracking
- Dock – Moderate corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9901 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#49
Date of Inspection: 4/17/2018 @ 11:30am

Observations:

Length: 77'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~8.0' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Floating Dock

Comments:

- Cap – Minor cracking at soffit
- Wall Panels – Minor spalling adjacent to outfall
- Wall Panels – Minor to moderate horizontal cracking
- T-Piles – Minor concrete erosion at splash zone
- T-Piles – corrosion of the anchors

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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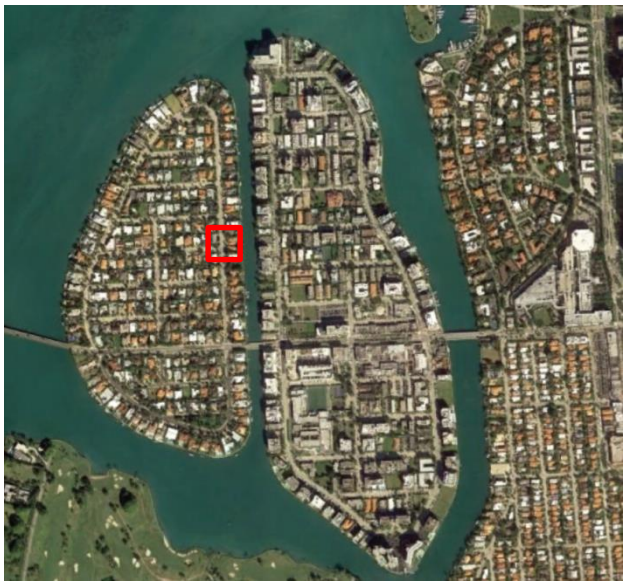
2018 Seawall Resiliency Inspection

Property Address: 9881 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#50
Date of Inspection: 4/17/2018 @ 11:25am



Observations:

Length: 75'
Seabed Elev.: ~-3.1' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor cracking at wet face
- Wall Panels – Minor spalling and cracking along panels
- T-Piles – Moderate to severe corrosion of the anchors
- Dock – Corrosion at fasteners

- Seawall Rating: Poor
- Dock Rating: Fair

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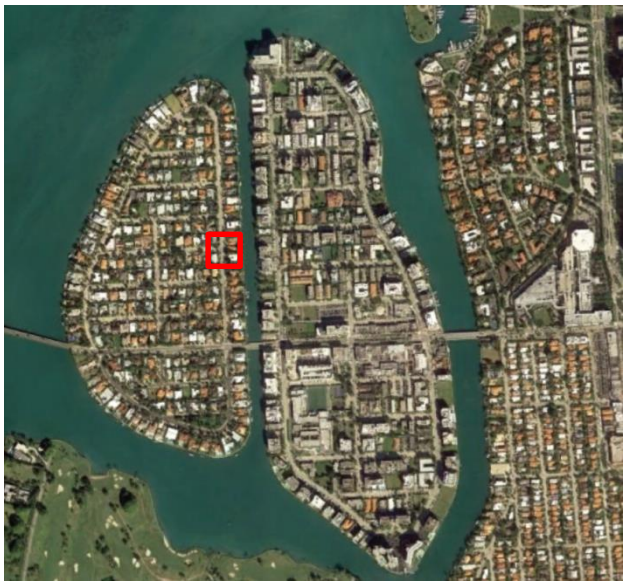
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9861 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#51
Date of Inspection: 4/17/2018 @ 11:20am



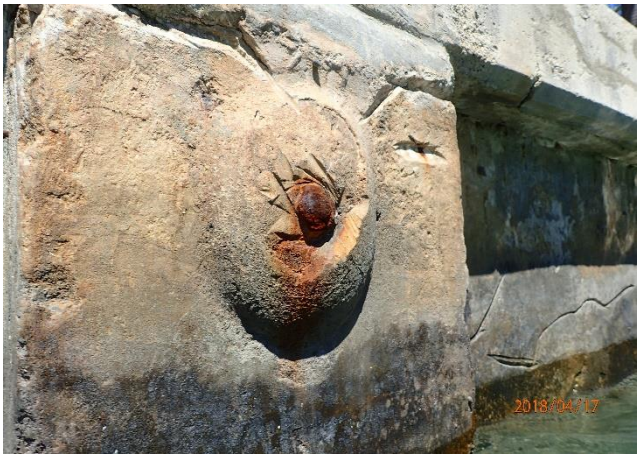
Observations:

Length: 150'
Seabed Elev.: ~-2.4' NAVD Cap Elev.: ~6.8' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Not Applicable
Toe Protection: Cement Bag Revetment

Comments:

- Cap– Moderate cracking at the soffit
- Wall Panels – Moderate rotation of the wall
- T-Piles – Moderate corrosion at anchor heads
- T-Piles – Pile/panel separation with sediment loss at fillets
- Previous cracks repairs inadequate

- Seawall Rating: Fair
- Dock Rating: N/A



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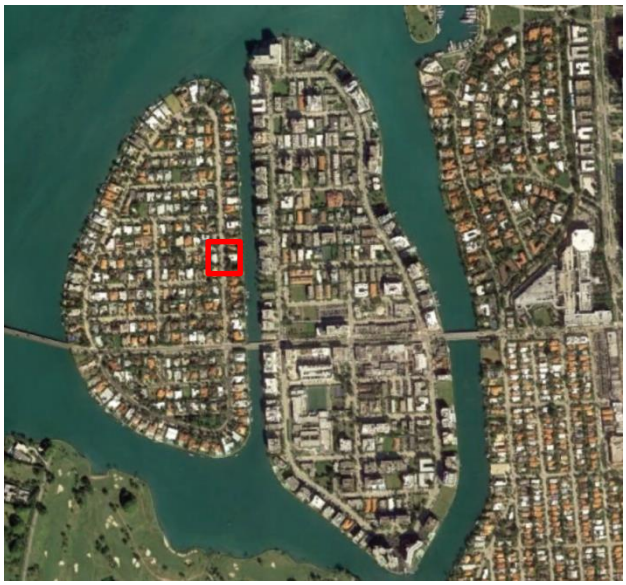
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9821 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#52
Date of Inspection: 4/17/2018 @ 11:20am



Observations:

Length: 77'
Seabed Elev.: ~-3.5' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Encased Timber Piles

Comments:

- T-Piles – Moderate corrosion at anchors
- T-Piles – Anchor corroded and pulled waterward
- Wall Panels – Rotation and chipping at splash zone
- Dock – Severe corrosion at fasteners
- Dock – Severe deterioration at timber piles above sleeves

- Seawall Rating: Poor
- Dock Rating: Critical

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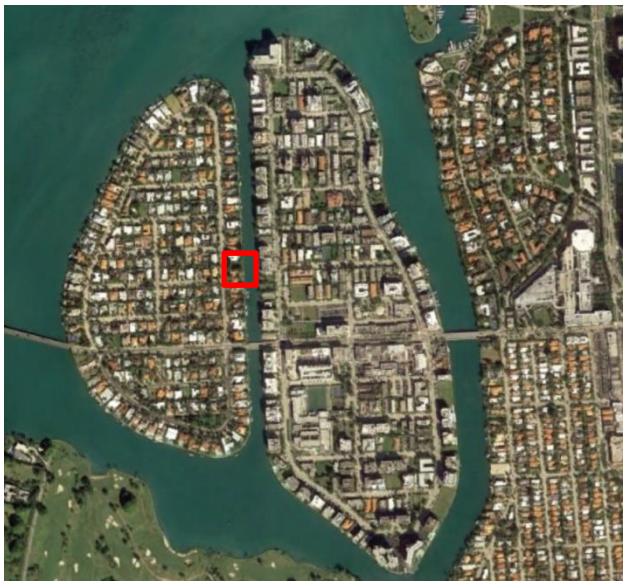
Property Address: 9801 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#53
Date of Inspection: 4/17/2018 @ 11:15am



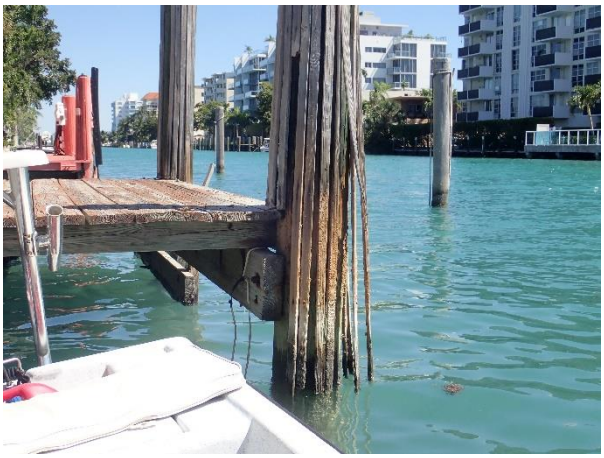
Observations:

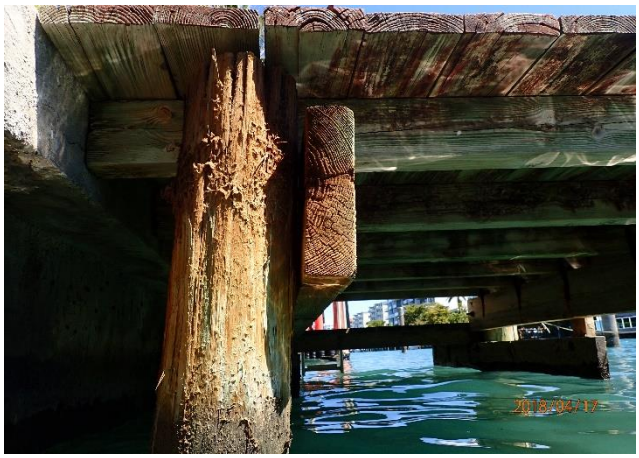
Length: 75'
Seabed Elev.: ~-3.8' NAVD Cap Elev.: ~6.8' NAVD
Seawall: Anchored T-Pile Anchored Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor to moderate cracking at wet fase
- T-Piles – Moderate to severe corrosion at anchor heads
- Dock – Severe corrosion at bolts and straps
- Dock– Moderate salt kill at timber piles

- Seawall Rating: Fair
- Dock Rating: Poor





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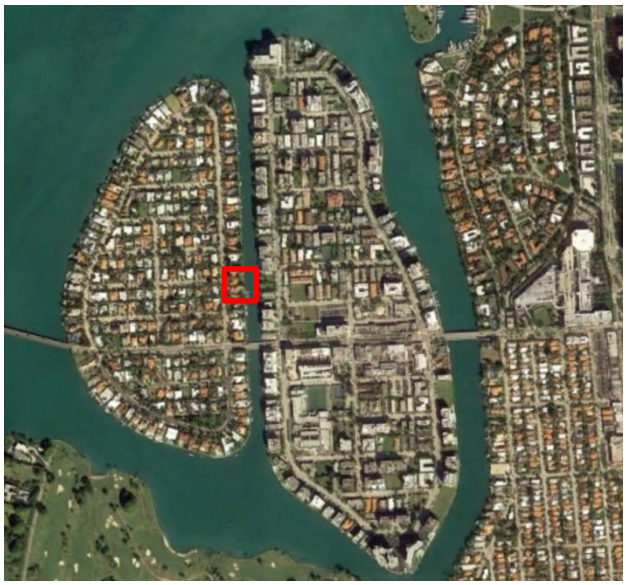
Property Address: 9741 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#54
Date of Inspection: 4/17/2018 @ 11:00am



Observations:

Length: 74'
Seabed Elev.: ~-4.1' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- Wall Panels – Rotation of wall through fillets
- Wall Panels – Moderate cracking
- T-Piles – Corrosion at anchor heads
- Dock – Corrosion at bolts and straps

- Seawall Rating: Poor
- Dock Rating: Fair

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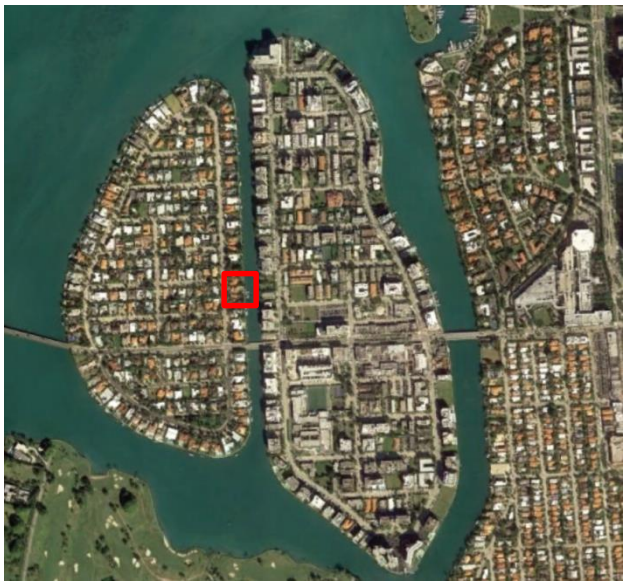
Property Address: 9721 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#55
Date of Inspection: 4/17/2018 @ 11:00am



Observations:

Length: 74'
Seabed Elev.: ~-3.5' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Floating Docks, Timber Piles

Comments:

- Cap – Moderate cracking at the soffit
- Wall Panels – Soil loss through fillets
- Wall Panels – Moderate cracking along panels
- Wall Panels – Moderate rotation of wall
- Dock – Fastener corrosion
- Dock – Wood decay/splitting

- Seawall Rating: Fair
- Dock Rating: Fair

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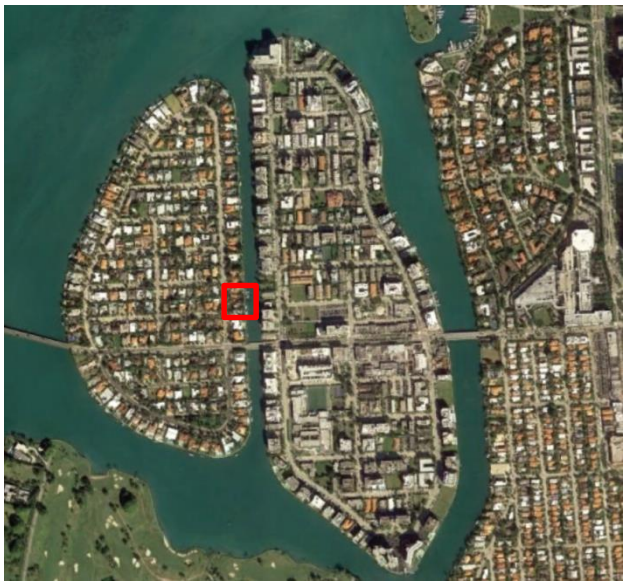
Property Address: 9705 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#56
Date of Inspection: 4/17/2018 @ 10:55am



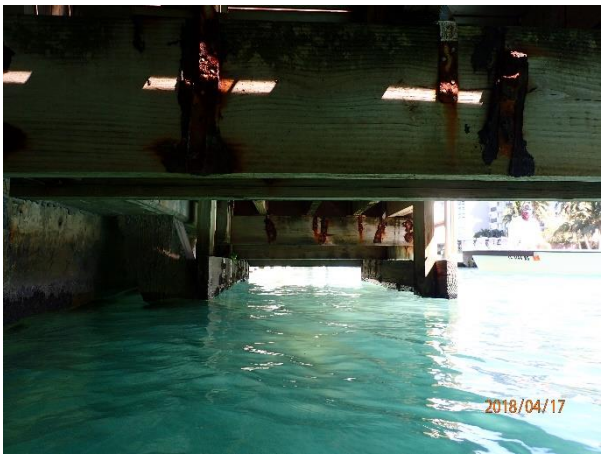
Observations:

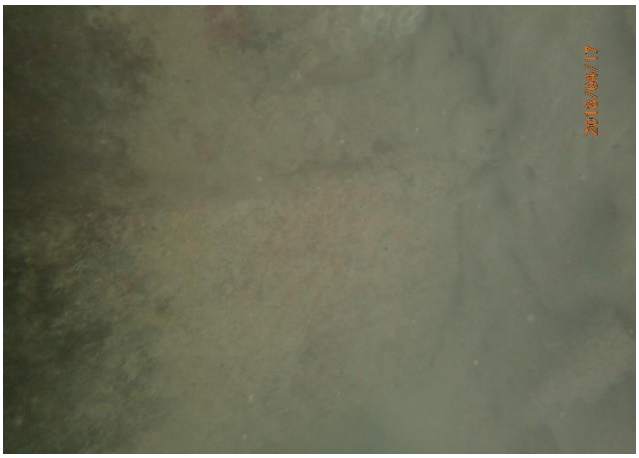
Length: 79'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate cracking throughout panels, spalling
- T-Piles – Moderate cracking, spalling
- Dock – Moderate to severe corrosion at fasteners
- Dock – Wood decay

- Seawall Rating: Fair
- Dock Rating: Fair





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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9661 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#57
Date of Inspection: 4/17/2018 @ 10:50am

Observations:

Length: 75'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Minor rotation of wall
- Batter Piles – Moderate cracking at spot locations
- T-Piles – Moderate cracking at spot locations
- Dock – Moderate corrosion at fasteners
- Dock – Remanence of demolished dock

- Seawall Rating: Fair
- Dock Rating: Poor

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9623 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#58
Date of Inspection: 4/17/2018 @ 10:50am

Observations:

Length: 101'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~6.9' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking at wet face
- Wall Panels – Rotation of wall
- Wall Panels – Severe cracking throughout panels
- T-Piles – Severe deterioration
- Batter Piles – Moderate cracking and unsound concrete (pre-spall) at pile heads
- Dock – Warped decking with salt kill at piles

- Seawall Rating: Poor
- Dock Rating: Poor

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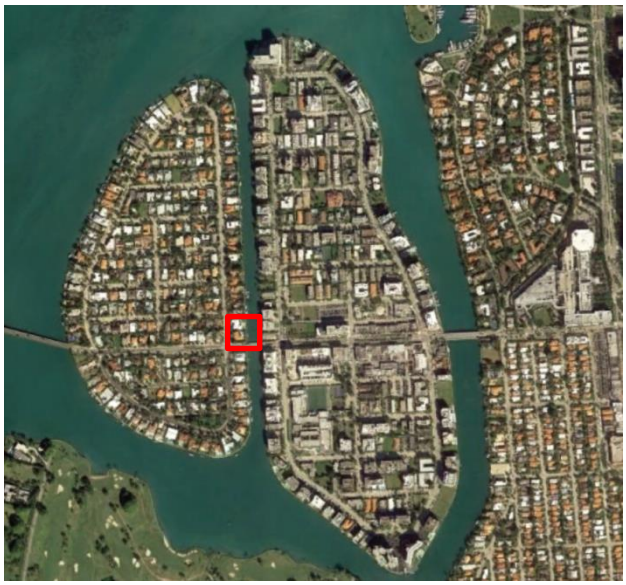
Property Address: 9601 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#59
Date of Inspection: 4/17/2018 @ 10:40am



Observations:

Length: 110'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Square Concrete Piles
Toe Protection: Aluminum Toe Wall

Comments:

- Cap – Moderate cracking at wet face
- Cap – Poor vibration during concrete installation
- Wall Panels – Rotation of wall
- Wall Panels – Severe cracking throughout panels
- Wall Panels – Upland depressions at cracking locations
- T-Piles – Cracking at spot locations
- Dock – Fastener corrosion

- Seawall Rating: Serious
- Dock Rating: Fair

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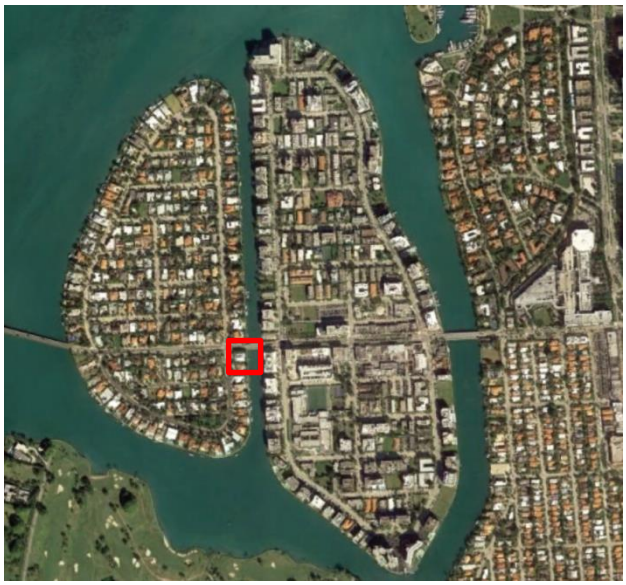
2018 Seawall Resiliency Inspection

Property Address: 9551 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#60
Date of Inspection: 4/16/2018 @ 9:50am



Observations:

Length: 114'
Seabed Elev.: ~-2.8' NAVD Cap Elev.: ~8.1' NAVD
Seawall: Battered T-Pile Panel
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Severe cracks at the wet face
- Cap – Retrofit caps at batter piles
- Wall Panels – Horizontal cracking along top panels
- Wall Panels –Cracking above North outfall
- T-Piles – Minor cracking at spot locations
- Dock – Moderate corrosion at ledger bolts, pile deterioration

- Seawall Rating: Fair
- Dock Rating: Fair

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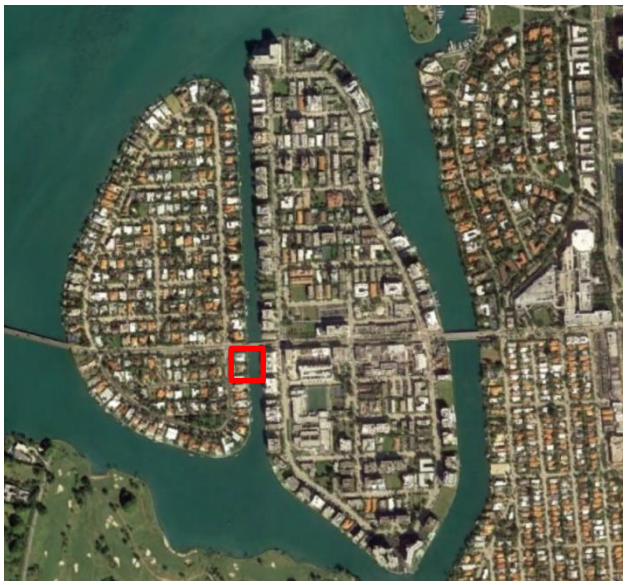
Property Address: 9525 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#61
Date of Inspection: 4/16/2018 @ 10:00am



Observations:

Length: 115'
Seabed Elev.: ~-4.0' NAVD Cap Elev.: ~7.7' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Upland depression adjacent to center section
- Wall Panels – Rotation along wall
- T-Piles – Severe corrosion at anchor heads
- T-Piles– Sediment accumulation at seabed
- Dock – Critical section loss of piles and salt kill
- Dock – Beam rotation

- Seawall Rating: Poor
- Dock Rating: Critical

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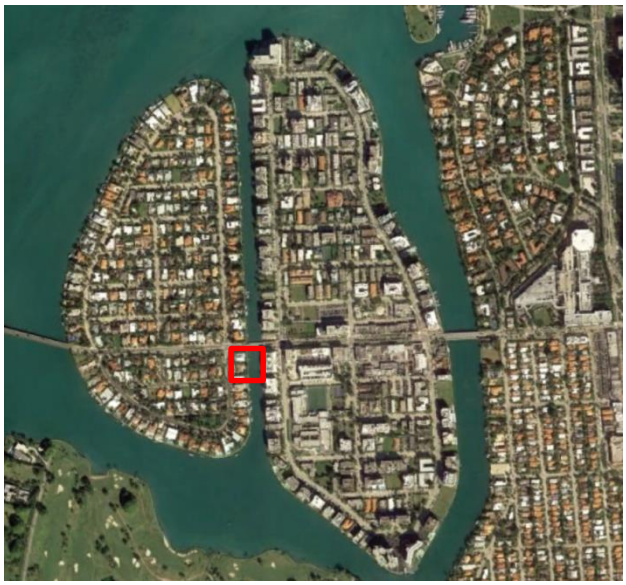
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9501 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#62
Date of Inspection: 4/16/2018 @ 11:05am



Observations:

Length: 75'
Seabed Elev.: ~-4.2' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate cracking along top of panels
- Wall Panels – Moderate concrete erosion below tidal zone
- T-Piles – Severe corrosion at anchor heads

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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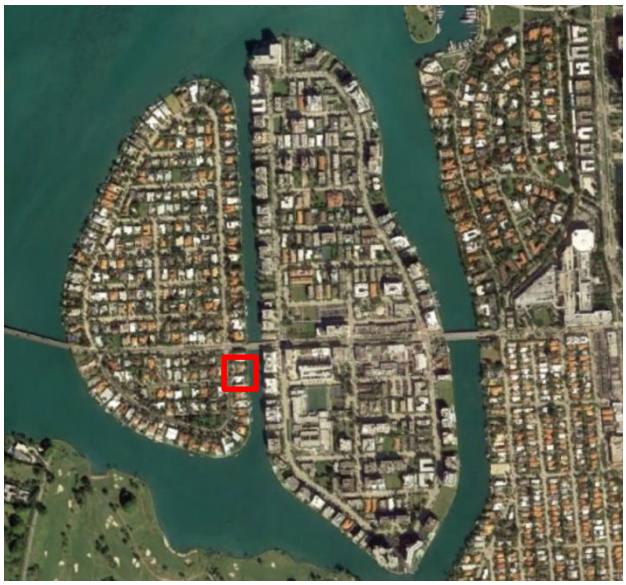
2018 Seawall Resiliency Inspection

Property Address: 9461 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#63
Date of Inspection: 4/16/2018 @ 11:10am



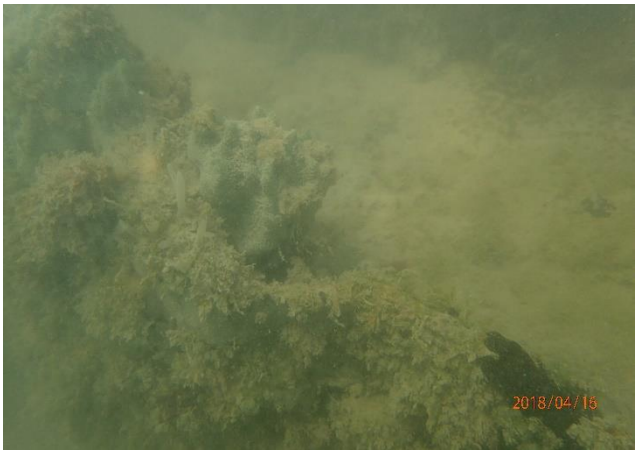
Observations:

Length: 76'
Seabed Elev.: ~-4.2' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Not Applicable
Toe Protection: Aluminum Toe Wall

Comments:

- Cap – Moderate cracking and spalling along soffit
- T-Piles – Severe corrosion at anchor heads
- Batter Piles – Spalling landward side of piles

- Seawall Rating: Fair
- Dock Rating: N/A



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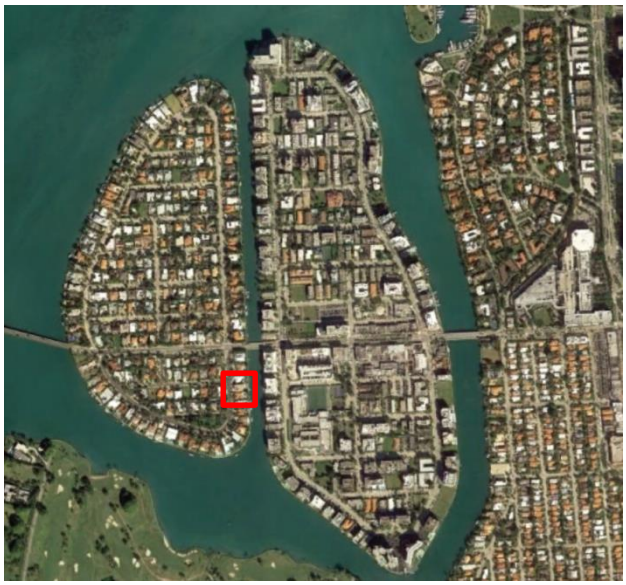
2018 Seawall Resiliency Inspection

Property Address: 9451 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#64
Date of Inspection: 4/16/2018 @ 11:20am



Observations:

Length: 75'
Seabed Elev.: ~-4.0' NAVD Cap Elev.: ~7.2' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking adjacent to davit pads
- Cap – Moderate spalling at South section of cap
- Wall Panels – Moderate spalling and horizontal cracking
- T-Piles – Moderate to severe corrosion at anchor heads
- Dock – Minor to moderate corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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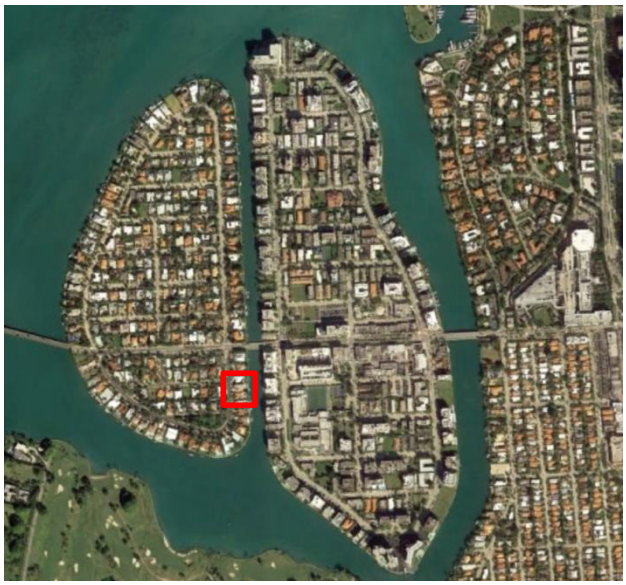
2018 Seawall Resiliency Inspection

Property Address: 9441 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#65
Date of Inspection: 4/16/2018 @ 11:25am



Observations:

Length: 74'
Seabed Elev.: ~-5.2' NAVD Cap Elev.: ~8.4' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate horizontal cracking along top
- T-Piles – Moderate cracking
- T-Piles – Moderate corrosion at partially sealed anchors
- Dock – Moderate corrosion at fasteners
- Dock – Failed anchor at dock pile

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9431 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#66
Date of Inspection: 4/16/2018 @ 11:30am

Observations:

Length: 75'
Seabed Elev.: ~-4.3' NAVD Cap Elev.: ~8.1' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate cracking along top
- Wall Panels – Moderate spalling at bottom panel section
- T-Piles – Moderate cracking
- Dock – Corrosion at fasteners
- Dock –Pile wraps loose

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9421 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#67
Date of Inspection: 4/16/2018 @ 11:35am

Observations:

Length: 118'
Seabed Elev.: ~-3.0' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Minor concrete erosion along tidal zone
- T-Piles – Severe corrosion at anchor heads
- T-Piles – Minor spalling at spot locations
- Batter Piles – Minor spalling at spot locations
- Dock – Timber piles exhibit salt kill
- Dock – Corrosion on bolts

- Seawall Rating: Fair
- Dock Rating: Fair

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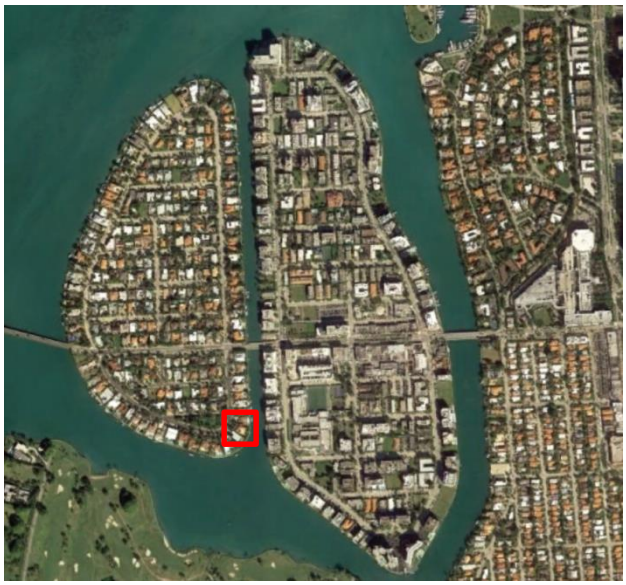
2018 Seawall Resiliency Inspection

Property Address: 9411 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#68
Date of Inspection: 4/16/2018 @ 11:40am



Observations:

Length: 97'
Seabed Elev.: ~-3.1' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate cracking with prior repairs
- T-Piles – Moderate deterioration at rounded corner
- T-Piles – Severe corrosion at anchor heads
- Dock – Splitting at bolt connections
- Dock – Bolts coated with anti-corrosion material
- Dock – Timber piles exhibit salt kill

- Seawall Rating: Poor
- Dock Rating: Poor

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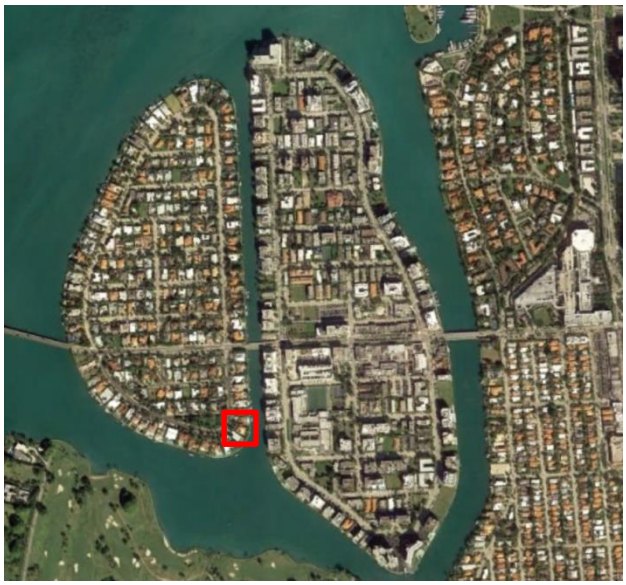
Property Address: 9407 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#69
Date of Inspection: 4/16/2018 @ 11:50am



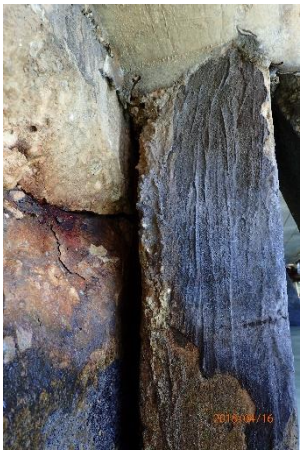
Observations:

Length: 103'
Seabed Elev.: ~-2.9' NAVD Cap Elev.: ~7.6' NAVD
Seawall: T-Pile Batter Pile Panel Retrofit Cap
Dock: Timber Dock Framing, Jacketed Concrete Piles
Toe Protection: Rip-Rap Toe Wall

Comments:

- Cap – Moderate cracking at wet face
- Wall Panels – Spalling at mid-panels
- Wall Panels – Severe fracture through concrete at South panel section and rotation of the wall around corner
- T-Piles – Pile/panel separation with sediment accumulation
- Dock – Advanced corrosion of bolts

- Seawall Rating: Poor
- Dock Rating: Poor



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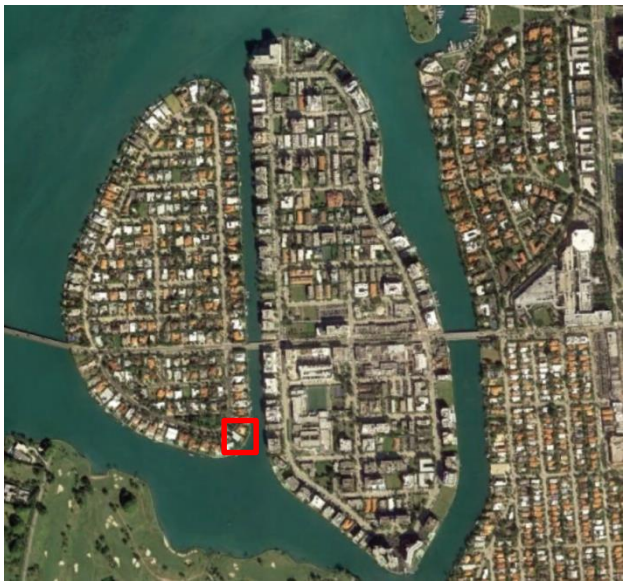
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9405 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#70
Date of Inspection: 4/16/2018 @ 12:00pm



Observations:

Length: 158'
Seabed Elev.: ~-3.8' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Anchored T-Pile Battered King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Rip-Rap Boulder Wall

Comments:

- Wall Panels – Severe spalling and fractures at North panels
- Wall Panels – Undermining at South closure pour
- Batter Piles– Spalling at pile heads and center
- Upland depressions

- Seawall Rating: Poor
- Dock Rating: Satisfactory

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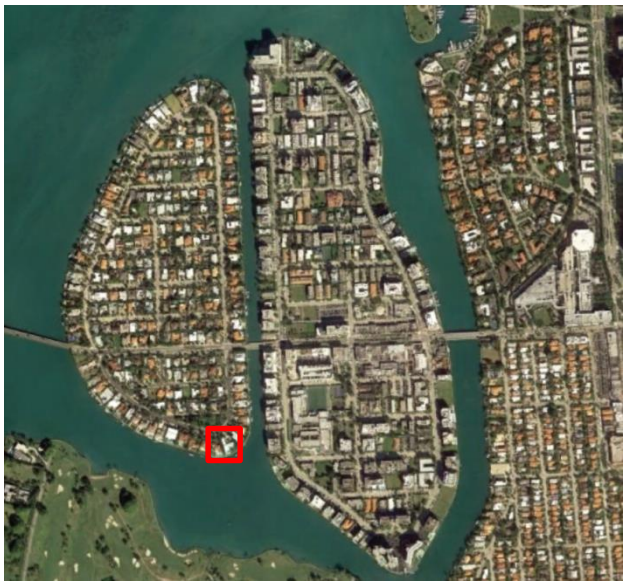
2018 Seawall Resiliency Inspection

Property Address: 9401 E BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#71
Date of Inspection: 4/16/2018 @ 12:10am



Observations:

Length: 152'
Seabed Elev.: ~-3.5' NAVD Cap Elev.: ~8.0' NAVD
Seawall: Battered T-Pile/King-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Severe corrosion at original wall anchors
- Wall Panels – Moderate cracking at South panels
- T-Piles – Moderate spalling at South property
- Batter Piles– Minor spalling
- Dock – Splitting at beam pile connection
- Dock – Timber piles exhibit salt kill

- Seawall Rating: Fair
- Dock Rating: Critical

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Property Address: 9406 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#72
Date of Inspection: 4/16/2018 @ 12:30am

Observations:

Length: 114'
Seabed Elev.: ~-5.4' NAVD Cap Elev.: ~9.3' NAVD
Seawall: Battered T-Pile/King-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- T-Piles – Minor concrete erosion at tidal zone
- Batter Piles– Severe spalling
- Wall Panels – Minor concrete erosion at tidal zone

- Seawall Rating: Fair
- Dock Rating: Fair

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2018 Seawall Resiliency Inspection

Property Address: 9408 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#73
Date of Inspection: 4/16/2018 @ 12:40am

Observations:

Length: 108'
Seabed Elev.: ~-3.3' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Battered T-Pile/King-Pile Panel
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Moderate cracking at the soffit and wet face
- T-Piles – Severe cracking
- King Piles– Severe cracking
- Batter Piles– Severe cracking and deterioration
- Dock– Minor corrosion at fasteners

- Seawall Rating: Poor
- Dock Rating: Satisfactory

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2018 Seawall Resiliency Inspection

Property Address: 9410 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#74
Date of Inspection: 4/16/2018 @ 12:50am

Observations:

Length: 114'
Seabed Elev.: ~-5.0' NAVD Cap Elev.: ~8.1' NAVD
Seawall: Battered T-Pile/King Pile Panel
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Severe spalling and deterioration
- Wall Panels – Pile/panel separation
- Wall Panels – Vertical cracking
- T-Piles – Outward movement at separation locations
- Batter Piles– Severe cracking and deterioration
- Dock – Severe corrosion at straps

- Seawall Rating: Poor
- Dock Rating: Fair

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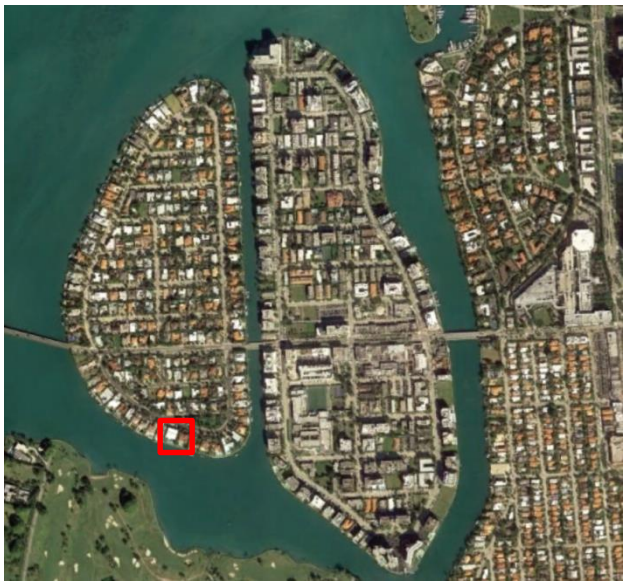
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9414 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#75
Date of Inspection: 4/16/2018 @ 12:55am



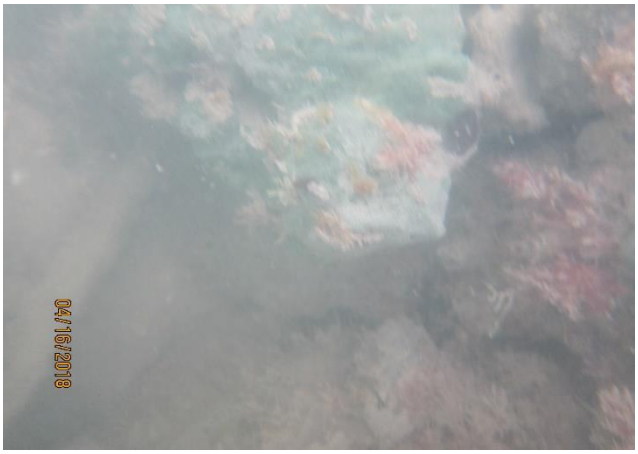
Observations:

Length: 130'
Seabed Elev.: ~-6.1' NAVD Cap Elev.: ~8.9' NAVD
Seawall: Battered T-Pile Pile Panel
Dock: N/A

Comments:

- Wall Panels –Rotation of wall
- Wall Panels – Moderate cracking and spalling
- T-Piles – Moderate to severe cracking and deterioration
- Batter Piles– Older 10 in. piles disintegrated below cap

- Seawall Rating: Poor
- Dock Rating: N/A



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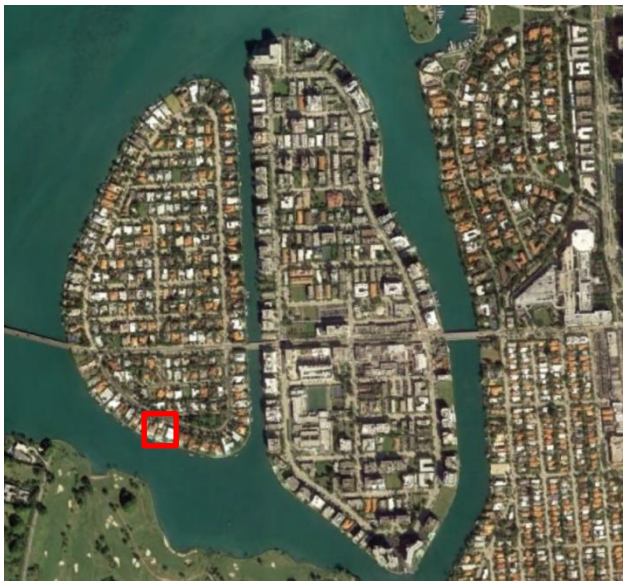
2018 Seawall Resiliency Inspection

Property Address: 9418 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#76
Date of Inspection: 4/16/2018 @ 1:00pm



Observations:

Length: 89'
Seabed Elev.: ~-4.4' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Anchored T-Pile Panel Wall with Retrofitted Caps and Batter Piles
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Severe cracking and spalling along cap/retrofit caps
- T-Piles – Moderate concrete erosion and cracking
- T-Piles – Severe corrosion at anchor heads
- Batter Piles– Severe cracking and spalling
- Dock – Corrosion at fasteners and straps
- Dock – Missing east end support

- Seawall Rating: Poor
- Dock Rating: Critical

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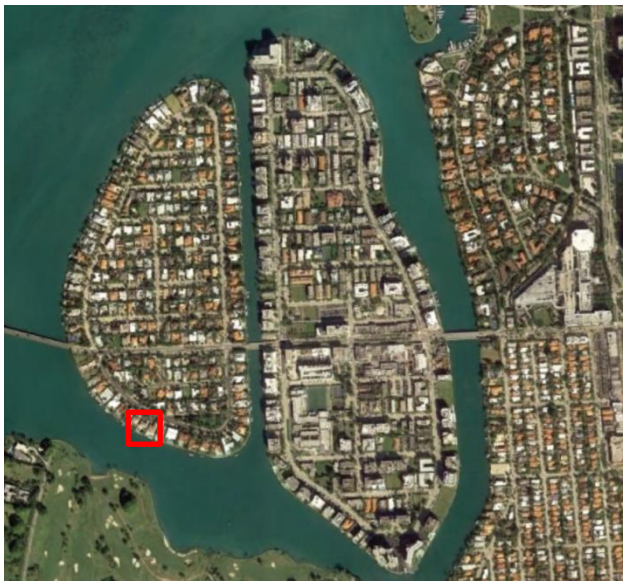
Property Address: 9420 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#77
Date of Inspection: 4/16/2018 @ 1:10pm



Observations:

Length: 92'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~6.8' NAVD
Seawall: Battered T-Pile Panel
Dock: Concrete Dock, Concrete Piles

Comments:

- Cap – Cracking at wet face and spalling at soffit
- Wall Panels – Moderate horizontal and diagonal cracking
- Dock – Minor spalling at pile heads
- Dock – Minor spalling at wet face and top of dock, cracking

- Seawall Rating: Fair
- Dock Rating: Fair

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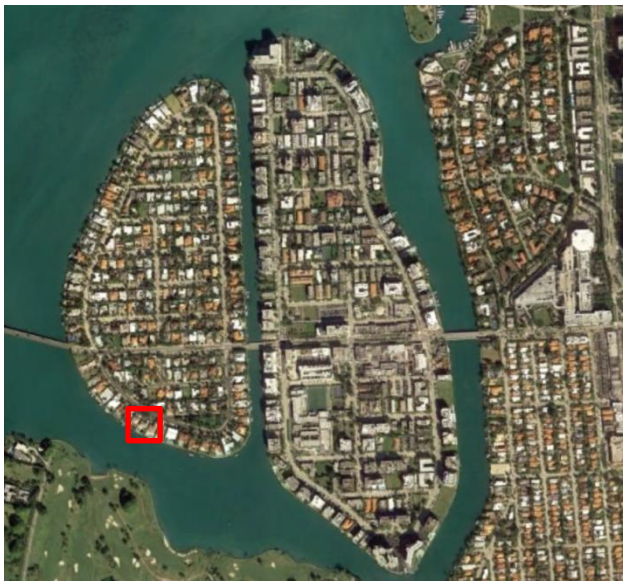
Property Address: 9424 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#78
Date of Inspection: 4/16/2018 @ 1:10pm



Observations:

Length: 94'
Seabed Elev.: ~-7.1' NAVD Cap Elev.: ~9.3' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Secondary cap above original
- Dock – Timber Piles with sleeves

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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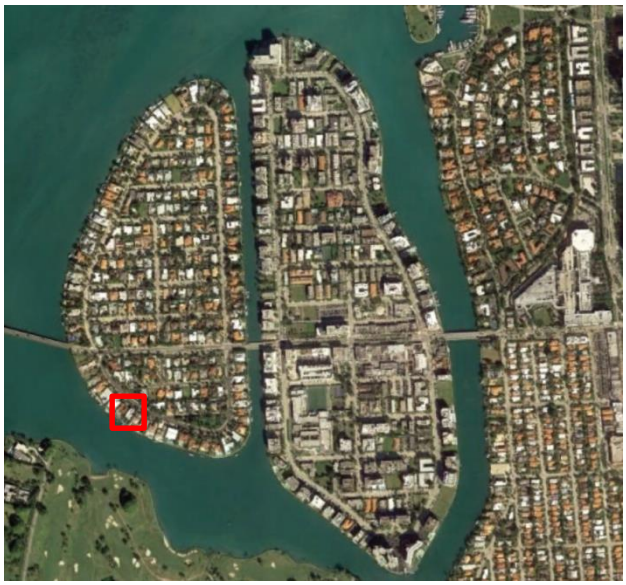
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9430 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#79
Date of Inspection: 4/16/2018 @ 1:20pm



Observations:

Length: 83'
Seabed Elev.: ~-4.2' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking at East section and wet face
- Wall Panels – Minor to moderate cracking at panels
- T-Piles – Minor cracking
- T-Piles – Moderate erosion in tidal zone
- Batter Piles – Moderate cracking at North West piles
- Dock – Critical/failing framing with piles exhibiting salt kill

- Seawall Rating: Fair
- Dock Rating: Critical

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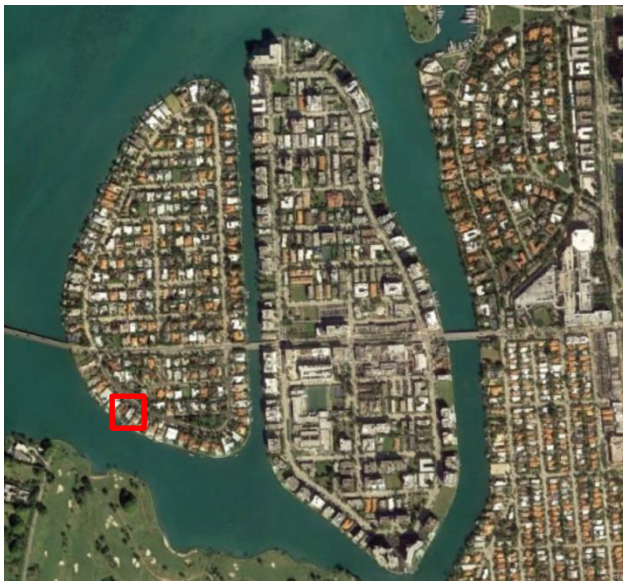
Property Address: 9434 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#80
Date of Inspection: 4/16/2018 @ 1:30pm



Observations:

Length: 78'
Seabed Elev.: ~-4.2' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Battered King Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Rip-Rap Toe Wall

Comments:

- Wall Panels – Minor cracking along top of panels
- Wall Panels – Minor concrete erosion at tidal zone
- Dock – Corrosion at fasteners, wood splitting

- Seawall Rating: Fair
- Dock Rating: Fair

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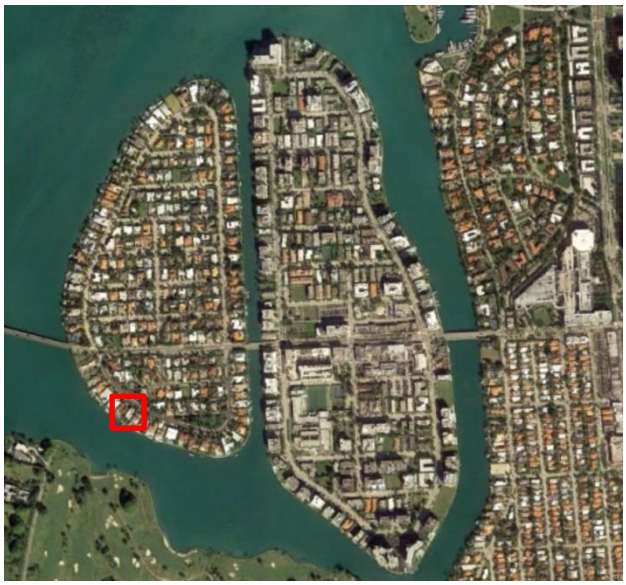
2018 Seawall Resiliency Inspection

Property Address: 9440 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#81
Date of Inspection: 4/16/2018 @ 1:40pm



Observations:

Length: 105'
Seabed Elev.: ~-2.2' NAVD Cap Elev.: ~6.6' NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Minor to severe cracking and spalling with corrosion staining at wet face and soffit
- Wall Panels – Minor cracking
- Wall Panels – Large cavity beneath panels
- Wall Panels – Void with severe cracking at West outfall
- Dock – Fastener corrosion

- Seawall Rating: Poor
- Dock Rating: Fair

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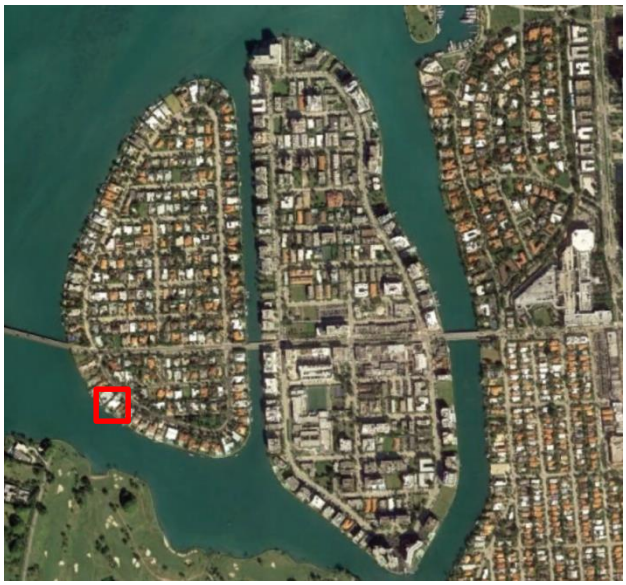
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9448 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#82
Date of Inspection: 4/16/2018 @ 1:40pm



Observations:

Length: 98'
Seabed Elev.: ~-6.4' NAVD Cap Elev.: ~8.4' NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Moderate cracking at the wet face
- Cap – Moderate cracking at soffit
- Wall Panels – Moderate concrete erosion in tidal zone
- King Piles – Moderate cracking
- Dock – Hardware corrosion

- Seawall Rating: Fair
- Dock Rating: Fair

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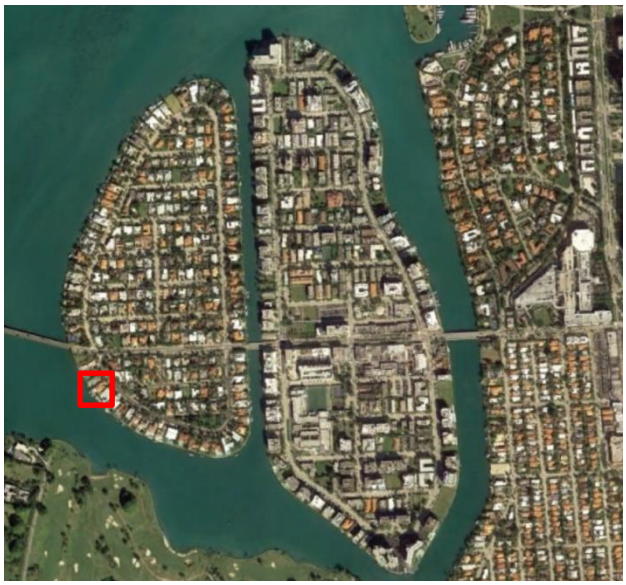
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9500 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#83
Date of Inspection: 4/16/2018 @ 1:50pm



Observations:

Length: 122'
Seabed Elev.: ~-5.3' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Moderate spalling with exposed reinforcement
- Wall Panels – Moderate concrete erosion at splash zone
- T-Piles – Moderate concrete erosion in tidal zone
- Dock – Timber mooring piles exhibit salt kill

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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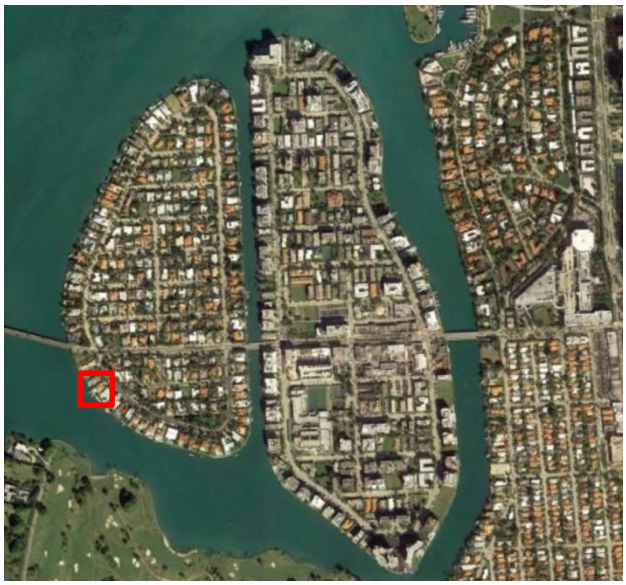
Property Address: 9510 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#84
Date of Inspection: 4/16/2018 @ 2:00pm



Observations:

Length: 79'
Seabed Elev.: ~-6.0' NAVD Cap Elev.: ~5.9' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Moderate spalling at West property line
- Cap – Moderate cracking with corrosion staining wet face
- Wall Panels – Moderate cracking and spalling at West property line
- T-Pile – Pile/panel separation
- Dock – Moderate corrosion at bolts

- Seawall Rating: Fair
- Dock Rating: Fair

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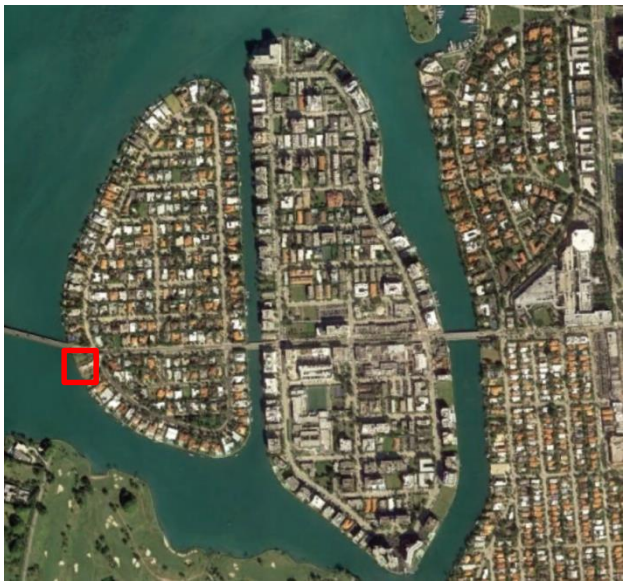
Property Address: 9520 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#85
Date of Inspection: 4/16/2018 @ 1:10pm



Observations:

Length: 82'
Seabed Elev.: ~-6.0' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Minor cracking wet face with corrosion staining
- Wall Panels – Severe spalling at northwest end of property
- Wall Panels – Severe rotation of panels
- T-Piles – Deterioration at the head for 2/3 of the property
- Dock – Wood decay
- Dock – Severe corrosion and deterioration of straps and fasteners
- Dock – Deterioration at piles

- Seawall Rating: Poor
- Dock Rating: Poor

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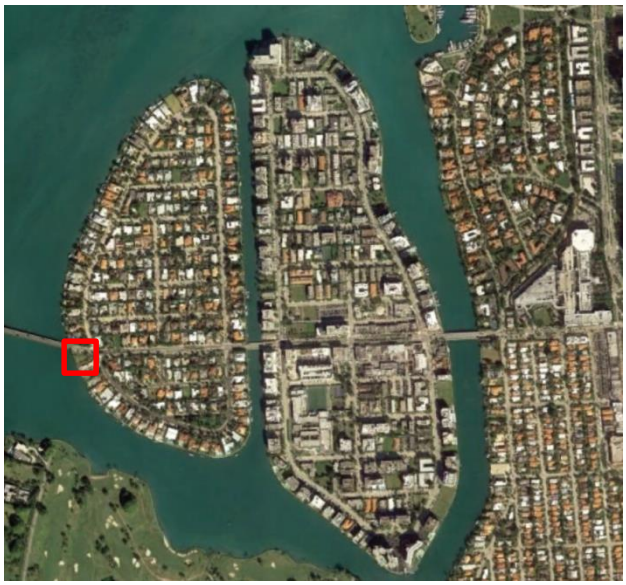
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9530 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#86
Date of Inspection: 4/16/2018 @ 2:20pm



Observations:

Length: 76'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: N/A

Comments:

- Cap – Cracking and section loss with exposed reinforcement
- T-Piles – Deterioration piles replaced with king piles
- King Piles – Minor cracking at pile heads
- Wall Panels – Minor concrete erosion at tidal zone
- Dock – Wood deck demolished

- Seawall Rating: Fair
- Dock Rating: N/A

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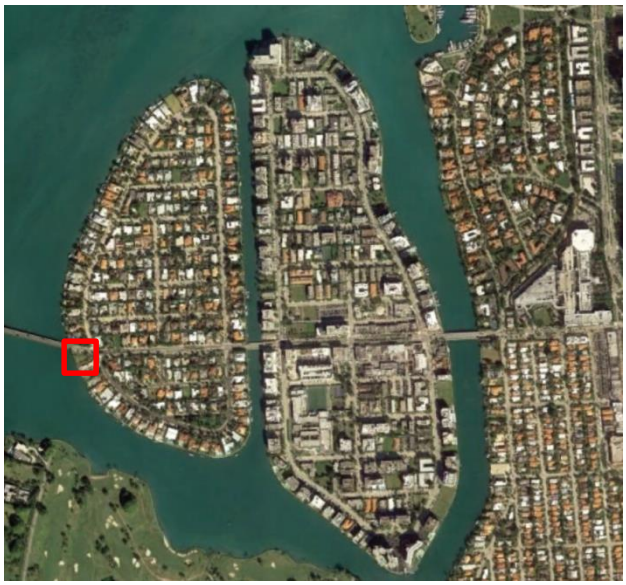
Property Address: 9540 W BROADVIEW DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#87
Date of Inspection: 4/16/2018 @ 2:30pm



Observations:

Length: 87'
Seabed Elev.: ~-5.8' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Battered T-Pile/King Pile Panel Wall
Dock: N/A
Toe Protection: Aluminum Toe Wall

Comments:

- Cap – Moderate cracking at wet face
- Cap – Severe spalling at Northern property line
- King Piles – Moderate cracking at Northern piles
- Batter Piles – Cracking at pile heads

- Seawall Rating: Fair
- Dock Rating: N/A

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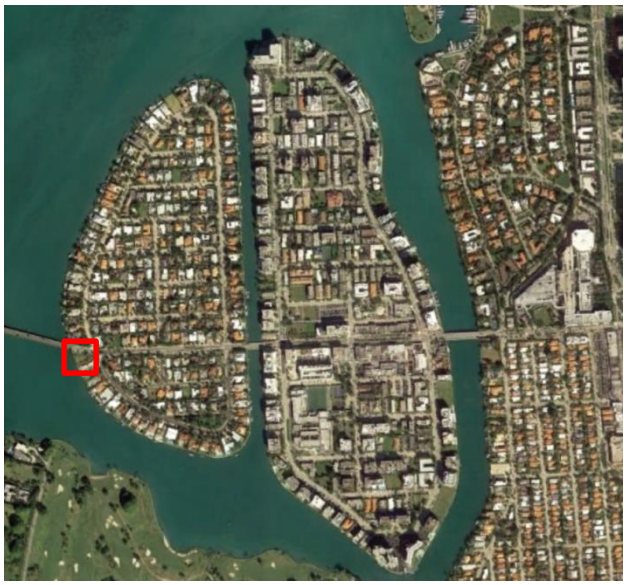
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: Address Not Applicable
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#88
Date of Inspection: 4/16/2018 @ 2:30pm



Observations:

Length: 161'
Seabed Elev.: ~-6.3' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: N/A
Toe Protection: Aluminum Toe Wall

Comments:

- Cap – Severe spalling at South property line
- Cap – Moderate vertical cracking wet face
- T-Piles – Moderate spalling and deterioration
- Batter Piles – Moderate cracking at center piles
- Toe Wall – Separation from wall panels

- Seawall Rating: Poor
- Dock Rating: N/A

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Appendix B-1.1 – East Island Report Cards

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9600 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#1
Date of Inspection: 5/11/2018 @ 2:30pm

Observations:

Length: 60'
Seabed Elev.: ~-3.6' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Concrete Dock, Concrete Piles

Comments:

- Wall Panels – Moderate concrete erosion in tidal zone
- Wall Panels – Moderate cracking along panels
- T-Piles – Moderate cracking and necking at tidal zone
- Dock – Severe cracking and deterioration throughout concrete dock and piles

- Seawall Rating: Fair
- Dock Rating: Critical

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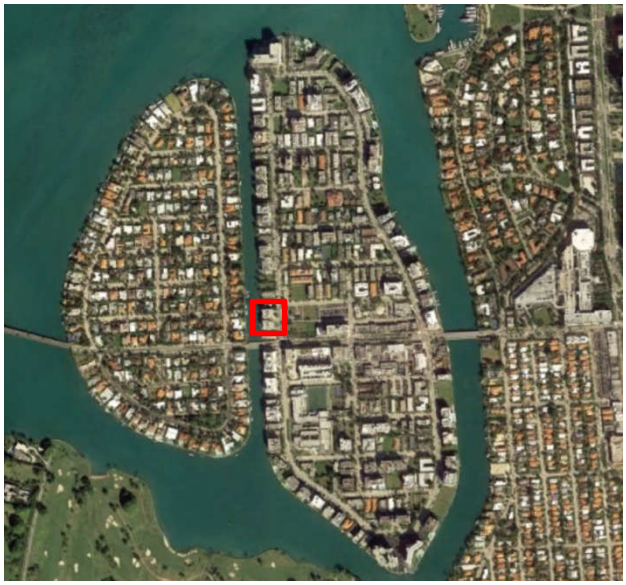
Property Address: 9660 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#2
Date of Inspection: 5/11/2018 @ 2:30pm



Observations:

Length: 224'
Seabed Elev.: ~-4.3' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate to severe cracking and spalling along tops of panels
- Wall Panels – Moderate concrete erosion in splash zone
- T-Piles – Cracking and necking of piles in the tidal zones
- Dock – Mooring piles severe deterioration
- Dock – Moderate corrosion at fasteners
- Dock – Moderate cracking at joists

- Seawall Rating: Poor
- Dock Rating: Fair

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Property Address: 9700 W BAY HARBOR DR
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Location: S-1.1 Lot#3
Date of Inspection: 5/11/2018 @ 2:20pm

Observations:

Length: 80'
Seabed Elev.: ~-4.7' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: N/A

Comments:

- Cap – Minor cracking and spalling at wet face
- T-Piles – Necking concrete erosion at tidal zones
- Wall Panels – Erosion of the concrete in wall panels in the splash zone
- Wall Panels – Minor to moderate cracking at panels

- Seawall Rating: Fair
- Dock Rating: N/A

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Property Address: 9720 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#4
Date of Inspection: 5/11/2018 @ 2:20pm

Observations:

Length: 75'
Seabed Elev.: ~-3.1' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking at wet face
- Wall Panels – Severe cracking through panels
- T-Piles – Severe cracking and necking at tidal zone
- T-Piles – Moderate to severe corrosion at anchor heads
- Dock – Advanced corrosion at fasteners
- Dock – Splitting at beams, pile decay/rotation, partial deck collapse

- Seawall Rating: Poor
- Dock Rating: Serious

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Property Address: 9740 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#5
Date of Inspection: 5/11/2018 @ 2:10pm

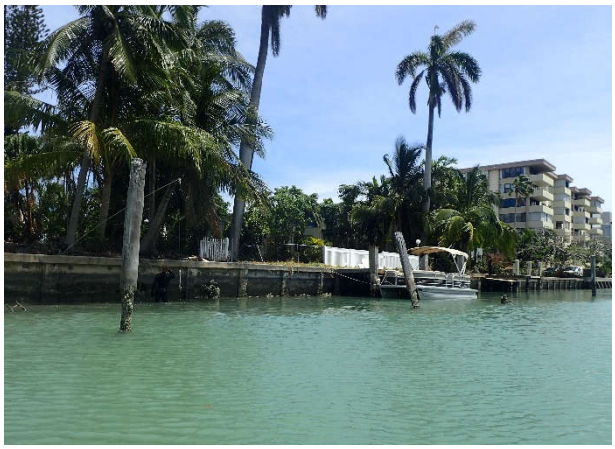
Observations:

Length: 74'
Seabed Elev.: ~-3.1' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Rip-Rap Wall

Comments:

- Cap – Minor cracking and spalling at wet face and soffit
- Wall Panels – Moderate concrete erosion at tidal zone
- T-Piles – Necking at tidal zone
- Dock – Moderate corrosion at fasteners
- Dock – Splitting at bolted beam connections
- Dock – Pile decay

- Seawall Rating: Fair
- Dock Rating: Critical



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Property Address: 9760 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#6
Date of Inspection: 5/11/2018 @ 2:10pm

Observations:

Length: 75'
Seabed Elev.: ~-3.2' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Demolished

Comments:

- Cap – Minor cracking and spalling at wet face
- Wall Panels – Moderate cracking through panels
- T-Piles – Necking and concrete erosion at tidal zone
- T-Piles – Moderate to severe cracking
- Dock – Demolished timber components

- Seawall Rating: Poor
- Dock Rating: N/A

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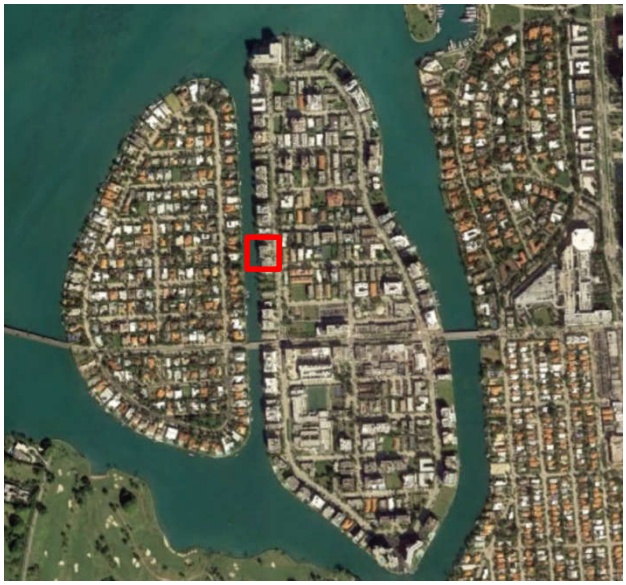
Property Address: 9800 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#7
Date of Inspection: 5/11/2018 @ 2:00pm



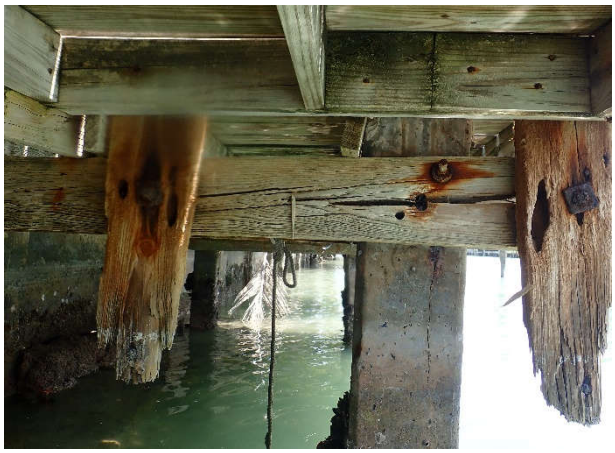
Observations:

Length: 301'
Seabed Elev.: ~-4.0' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete and Jacketed Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Minor cracking at wet face
- Wall Panels – Moderate cracking and concrete erosion
- T-Piles – Moderate necking and concrete erosion
- T-Piles – Sediment accumulation through fillets at seabed
- Dock – Collapse at North framing , wood decay/splitting, bolt corrosion

- Seawall Rating: Poor
- Dock Rating: Critical



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Property Address: 9880 W BAY HARBOR DR
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Location: S-1.1 Lot#8
Date of Inspection: 5/11/2018 @ 1:50pm

Observations:

Length: 77'
Seabed Elev.: ~-2.4' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking and spalling at wet face
- Wall Panels – Moderate cracking and concrete erosion
- T-Piles – Necking and concrete erosion
- Dock – Rotted timber decking
- Dock – Moderate corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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Property Address: 9900 W BAY HARBOR DR
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Location: S-1.1 Lot#9
Date of Inspection: 5/11/2018 @ 1:50pm

Observations:

Length: 75'
Seabed Elev.: ~-2.8' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking and spalling with exposed steel reinforcement
- Wall Panels – Concrete erosion at tidal zone
- T-Piles – Necking and moderate corrosion at anchor heads
- Dock – Corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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Property Address: 9940 W BAY HARBOR DR
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Location: S-1.1 Lot#10
Date of Inspection: 5/11/2018 @ 1:40pm

Observations:

Length: 222'
Seabed Elev.: ~-6.4' NAVD Cap Elev.: ~9.0' NAVD
Seawall: Battered Steel Sheet Pile Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Rip-Rap Boulder

Comments:

- Wall Panels – Corrosion
- Seawall – New Construction
- Dock – New construction

- Seawall Rating: Satisfactory
- Dock Rating: Good

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Property Address: 10000 W BAY HARBOR DR
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Location: S-1.1 Lot#11
Date of Inspection: 5/11/2018 @ 1:30pm

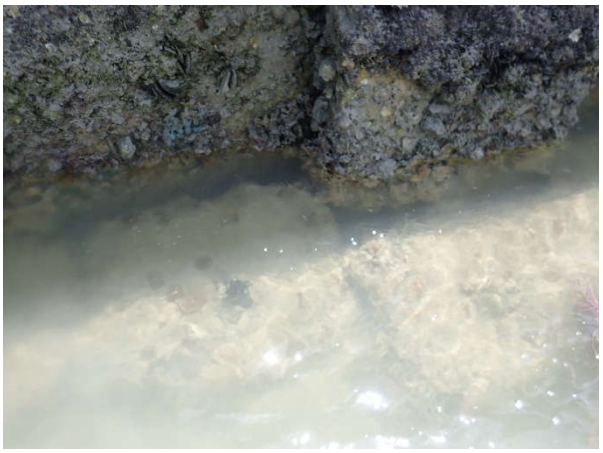
Observations:

Length: 380'
Seabed Elev.: ~-2.2' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Cement Bag Rip-Rap

Comments:

- Cap – Moderate cracking along wet face
- Wall Panels – Horizontal cracking along panels
- Wall Panels – Concrete erosion at tidal zone
- T-Piles – Pile/panel separation
- T-Piles – Moderate necking
- Dock – Minor deflection at joists

- Seawall Rating: Fair
- Dock Rating: Fair



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Property Address: 10084 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#12
Date of Inspection: 5/11/2018 @ 1:20pm

Observations:

Length: 74'
Seabed Elev.: ~-3.5' NAVD Cap Elev.: ~7.5' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Demolished Dock

Comments:

- Cap – Severe cracking along wet face
- Wall Panels – Moderate concrete erosion at tidal zone
- Wall Panels – Moderate rotation of wall
- Wall Panels – Moderate to severe horizontal cracking
- T-Piles – Moderate necking and cracking in tidal zone
- Dock – Concrete fender piles in fair condition

- Seawall Rating: Poor
- Dock Rating: N/A

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Property Address: 10110 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#13
Date of Inspection: 5/11/2018 @ 1:20pm

Observations:

Length: 74'
Seabed Elev.: ~-4.1' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Rip-Rap

Comments:

- Wall Panels – Moderate concrete erosion at tidal zone
- Wall Panels – Moderate rotation of the wall
- T-Piles – Moderate necking at tidal zone
- T-Piles – Failed pile anchor
- Dock – Moderate corrosion at bolts

- Seawall Rating: Fair
- Dock Rating: Fair

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Property Address: 10140 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#14
Date of Inspection: 5/11/2018 @ 1:10pm

Observations:

Length: 151'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor cracking with corrosion staining
- Wall Panels – Moderate horizontal cracking along panels
- Wall Panels – Moderate concrete erosion in splash zone
- T-Piles – Moderate necking at tidal zone
- Dock – Severe corrosion at bolts and straps

- Seawall Rating: Fair
- Dock Rating: Poor

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Property Address: 10180 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#15
Date of Inspection: 5/11/2018 @ 1:00pm

Observations:

Length: 149'
Seabed Elev.: ~-3.9' NAVD Cap Elev.: ~8.3' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor cracking and spalling at old cap
- Wall Panels – Severe cracking with concrete erosion
- T-Piles – Moderate cracking with pile/panel separation
- T-Piles – Pile failure with voids at spot piles
- Batter Piles – Driving damage at pile heads
- Dock – Moderate corrosion at fasteners and straps
- Dock – Severe wood decay

- Seawall Rating: Poor
- Dock Rating: Serious

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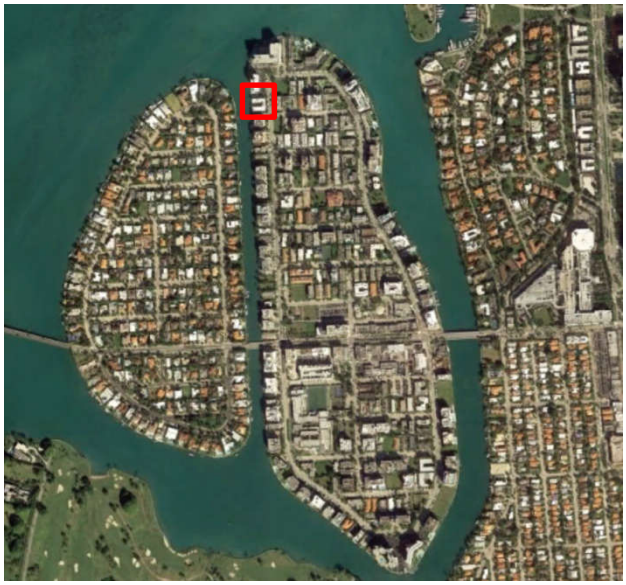
Property Address: 10250 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#16
Date of Inspection: 5/11/2018 @ 12:50pm



Observations:

Length: 147'
Seabed Elev.: ~-5.0' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor to moderate cracking and spalling with exposed steel reinforcement
- Wall Panels – Moderate to severe concrete erosion at splash zone
- T-Piles – Moderate to severe flexural cracking
- T-Piles – Sediment accumulation at seabed
- Dock – Severe corrosion at fasteners

- Seawall Rating: Poor
- Dock Rating: Poor

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Property Address: 10300 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#17
Date of Inspection: 5/11/2018 @ 12:40pm

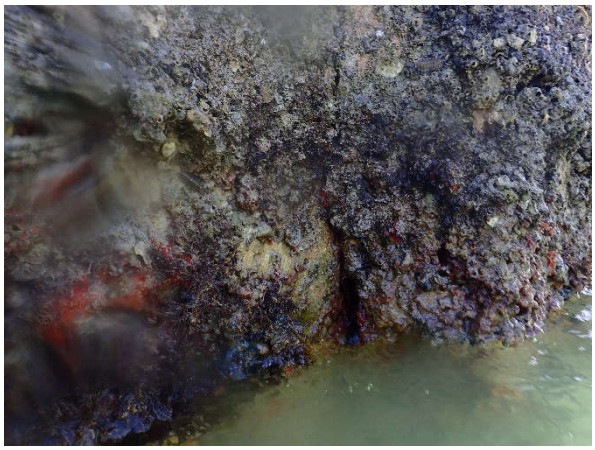
Observations:

Length: 249'
Seabed Elev.: ~-5.2' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Jacketed Timber Piles
Toe Protection: Coral Rock Toe Wall

Comments:

- Cap – Moderate cracking and spalling with exposed steel
- Wall Panels – Moderate pile/panel separation with sediment erosion through fillets
- Wall Panels – Moderate to severe erosion and cracking
- T-Piles – Severe cracking and necking
- Dock – Severe deterioration of piling, bolt corrosion

- Seawall Rating: Poor
- Dock Rating: Poor



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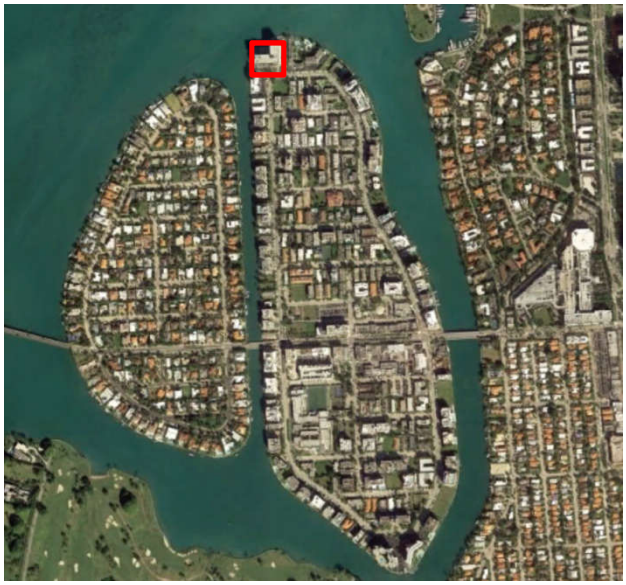
Property Address: 10350 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#18
Date of Inspection: 5/11/2018 @ 12:30pm



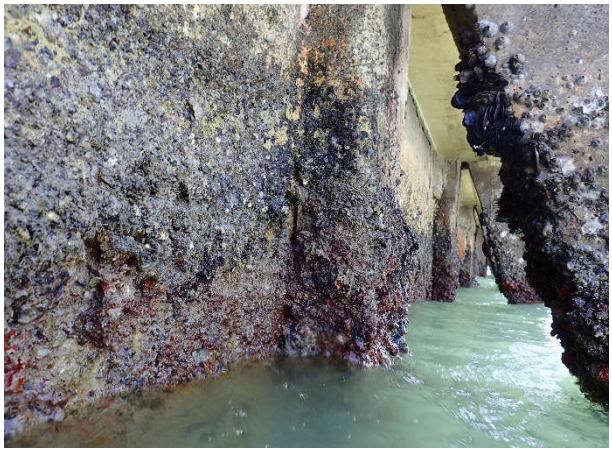
Observations:

Length: 550'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~8.0' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag & Rock Toe Wall

Comments:

- Wall Panels – Severe concrete erosion and cracking with wall rotation at West end
- Wall Panels – Undermining along toe wall
- T-Piles – Severe pile/panel separation
- T-Piles – Moderate necking and cracking, deterioration
- Dock – Moderate corrosion at fasteners/straps, wood splitting

- Seawall Rating: Poor
- Dock Rating: Fair



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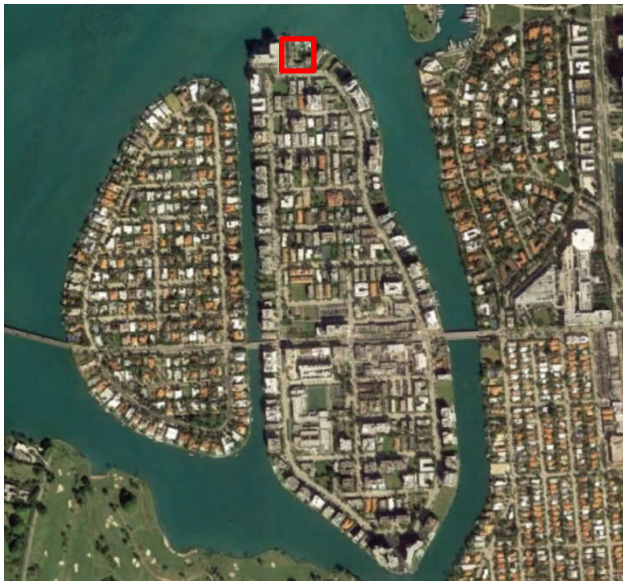
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 1155 103 ST
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#19
Date of Inspection: 5/11/2018 @ 12:20pm



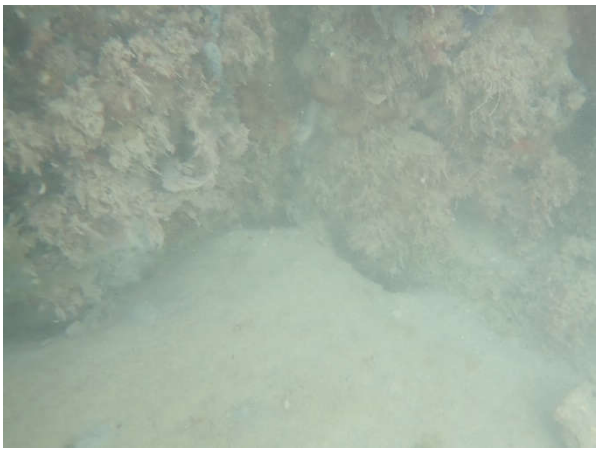
Observations:

Length: 157'
Seabed Elev.: ~-5.2' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Jacketed Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate spalling with exposed steel reinforcement
- Wall Panels – Moderate to severe cracking and outward rotation
- T-Piles – Moderate necking
- Dock – Splitting and deterioration at beams, fastener corrosion
- Dock – Dock piles rotated, deteriorated

- Seawall Rating: Poor
- Dock Rating: Poor



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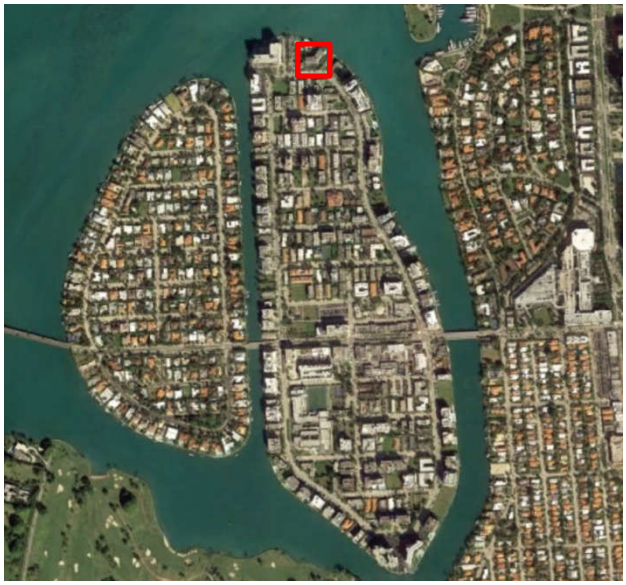
Property Address: 1135 103 ST
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#20
Date of Inspection: 5/11/2018 @ 12:10pm



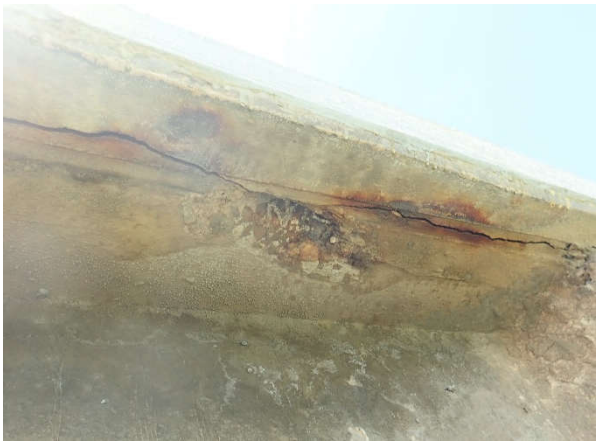
Observations:

Length: 306'
Seabed Elev.: ~-4.6' NAVD Cap Elev.: ~7.8' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Demolished
Toe Protection: Aluminum & Cement Bag Toe Wall

Comments:

- Cap – Severe cracking and spalling with exposed steel reinforcement
- Wall Panels – Moderate concrete erosion at splash zone
- Wall Panels – Rotation of wall at North end
- T-Piles – Severe necking and erosion
- Dock – Demolished, moderate rotation at remaining piles

- Seawall Rating: Poor
- Dock Rating: N/A



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10301 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#21
Date of Inspection: 5/11/2018 @ 12:00pm

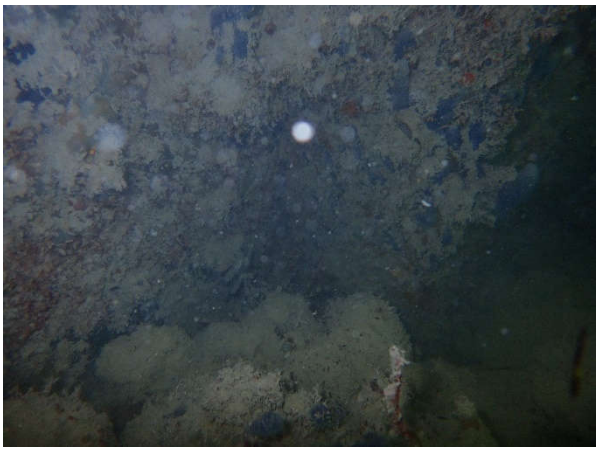
Observations:

Length: 78'
Seabed Elev.: ~-5.2' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Moderate cracking at wet face
- Wall Panels – Moderate concrete erosion at splash zone
- T-Piles – Pile/panel separation
- T-Piles – Moderate cracking and necking with fillet erosion
- Dock – Severe corrosion at fasteners
- Dock – Spalling at piles, Severe crack at north pile

- Seawall Rating: Poor
- Dock Rating: Poor



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2018 Seawall Resiliency Inspection

Property Address: 10281 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#22
Date of Inspection: 5/11/2018 @ 10:50am

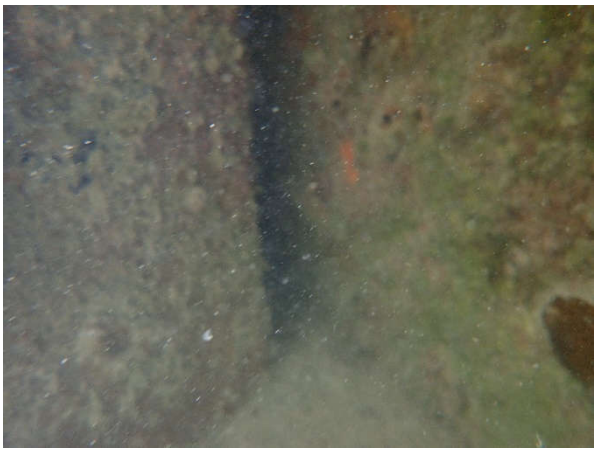
Observations:

Length: 150'
Seabed Elev.: ~-4.3' NAVD Cap Elev.: ~7.5' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking
- Wall Panels – Moderate concrete erosion at splash zone
- T-Piles – Pile panel separation with fillet erosion
- T-Piles – Moderate cracking above seabed
- Batter Piles – Moderate cracking/ corrosion at pile heads
- Dock – Severe corrosion at fasteners

- Seawall Rating: Poor
- Dock Rating: Poor



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Property Address: 10271 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#23
Date of Inspection: 5/11/2018 @ 10:40am

Observations:

Length: 80'
Seabed Elev.: ~-3.3' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking with corrosion staining
- Wall Panels – Pile panel separation at North end
- Wall Panels – Moderate cracking and concrete erosion
- King Piles – Moderate necking
- King Piles – Void at fillets at North end
- Dock – Severe corrosion at fasteners

- Seawall Rating: Poor
- Dock Rating: Poor

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Property Address: 10261 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#24
Date of Inspection: 5/11/2018 @ 10:30am

Observations:

Length: 78'
Seabed Elev.: ~-3.9' NAVD Cap Elev.: ~7.8' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Concrete and Timber Dock Framing, Timber Piles
Toe Protection: Partial Concrete Toe Wall

Comments:

- Cap – Moderate spalling at cap corner
- Wall Panels – Minor cracking and concrete erosion
- T-Piles – Moderate necking and cracking at tidal zones
- Dock – Severe corrosion of fasteners
- Dock –Prior crack repairs at soffit
- Dock – Severe deterioration of piles

- Seawall Rating: Fair
- Dock Rating: Serious

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Town of Bay Harbor
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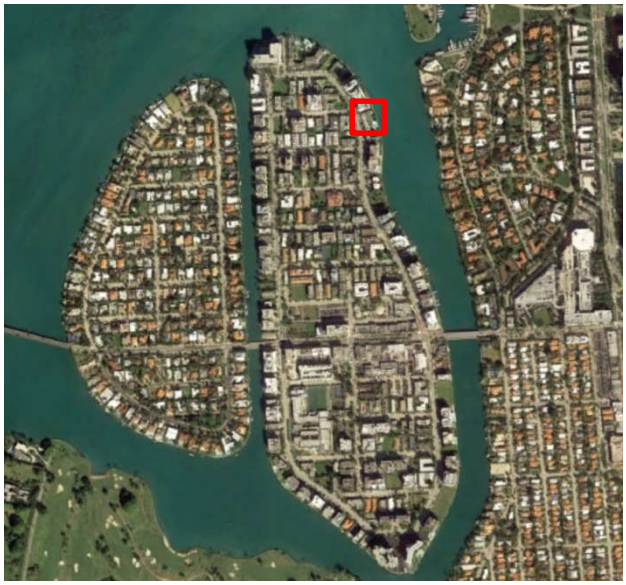
Property Address: 10201 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#25
Date of Inspection: 4/26/2018 @ 2:30pm



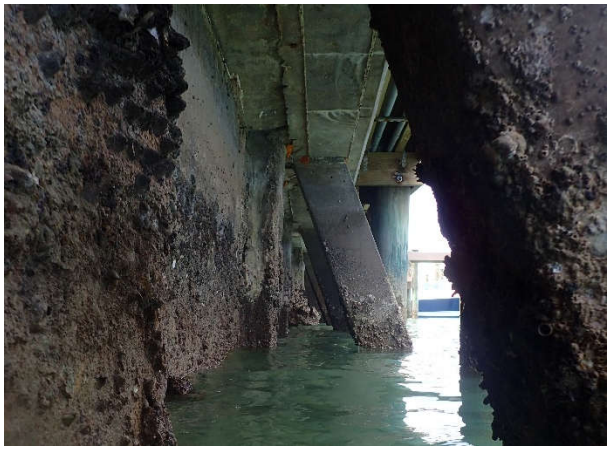
Observations:

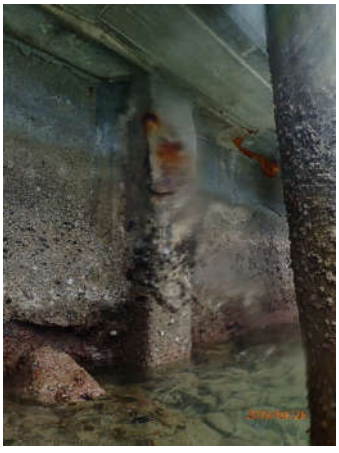
Length: 248'
Seabed Elev.: ~-6.0' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Severe fracture and void adjacent to t-pile
- T-Pile – Severe spalling
- Dock – Minor corrosion of bolts

- Seawall Rating: Poor
- Dock Rating: Satisfactory





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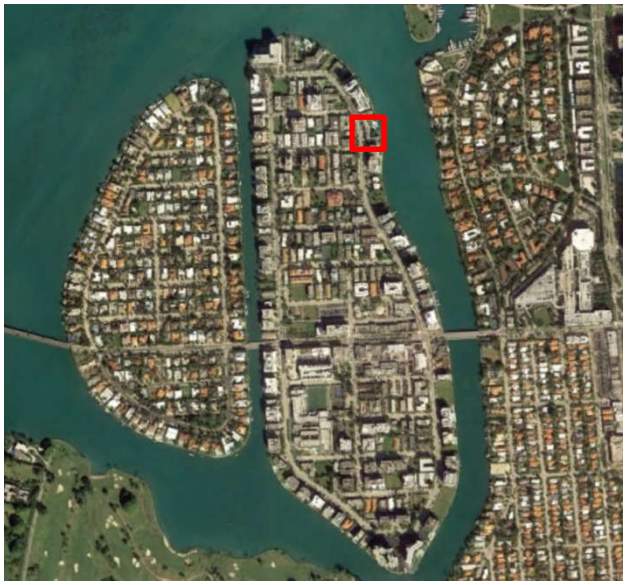
2018 Seawall Resiliency Inspection

Property Address: 10141 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#26
Date of Inspection: 4/26/2018 @ 2:10pm



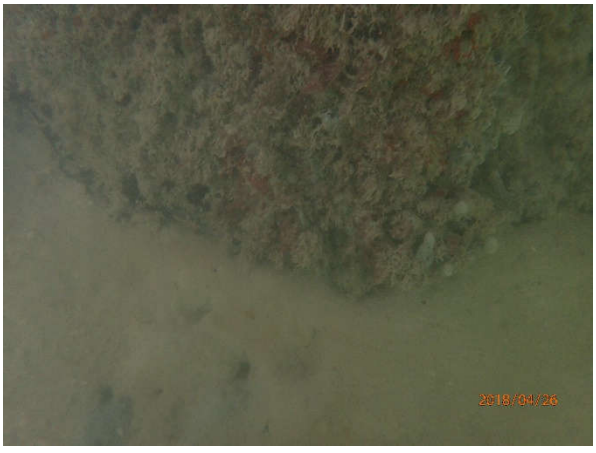
Observations:

Length: 317'
Seabed Elev.: ~-4.4' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking at soffit and wet face
- Wall Panels – Moderate cracking and concrete erosion
- Wall – Panels – Moderate cracking 1ft from seabed
- T-Piles – Pile panel separation with sediment accumulation through fillets at seabed
- T-Piles – Moderate cracking and necking
- Dock – Moderate corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair



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Property Address: 10101 E BAY HARBOR DR
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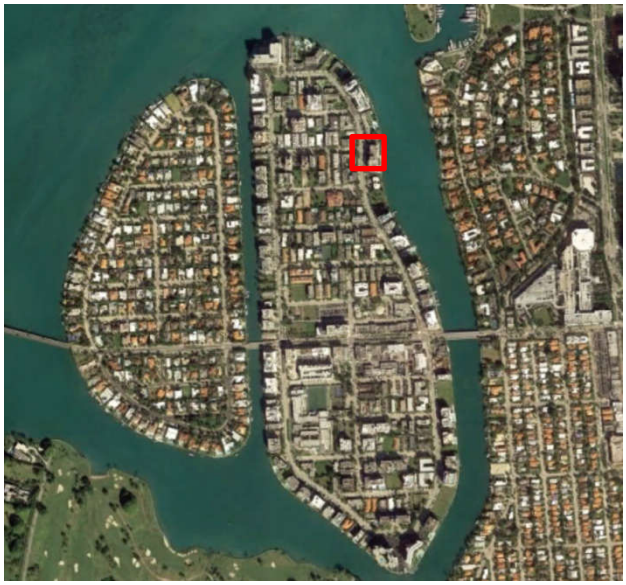
Location: S-1.1 Lot#27
Date of Inspection: 4/26/2018 @ 2:00pm



Observations:

Length: 314'
Seabed Elev.: ~-3.6' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Concrete Dock Framing, Concrete Piles

Comments:

- Cap – Minor cracking and spalling at wet face and soffit
- Wall Panels – Minor concrete erosion at wall panels
- T-Piles – Moderate cracking and necking
- Dock – Moderate cracking at pile beam caps
- Dock – Severe deterioration at timber mooring piles

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 10001 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#28
Date of Inspection: 4/26/2018 @ 2:00pm

Observations:

Length: 137'
Seabed Elev.: ~-4.2' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored Pile T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles encased in Concrete

Comments:

- Cap – Minor cracking at wet face and soffit
- T-Piles – Moderate necking
- Wall Panels – Moderate concrete erosion
- Dock – Severe corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Poor

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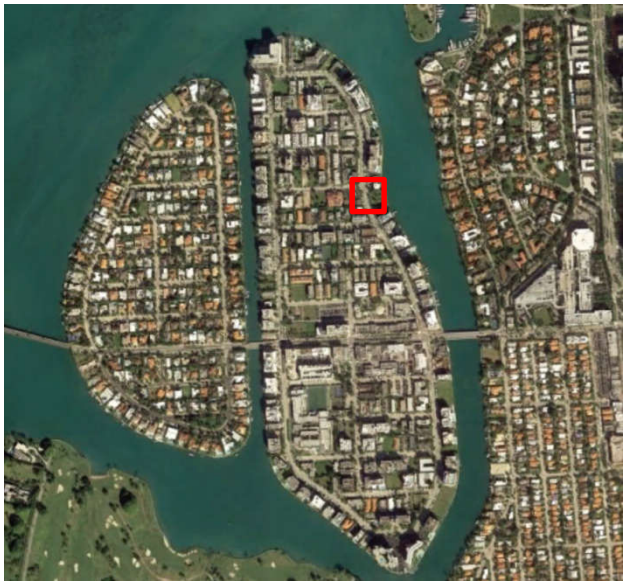
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9955 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#29
Date of Inspection: 4/26/2018 @ 1:50pm



Observations:

Length: 138'
Seabed Elev.: ~-3.9' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored Pile T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking at wet face
- Wall Panels – Moderate cracking and concrete erosion
- T-Piles – Moderate to severe cracking and necking
- Dock – Moderate to severe corrosion at fasteners
- Dock – Deck boards missing

- Seawall Rating: Fair
- Dock Rating: Poor

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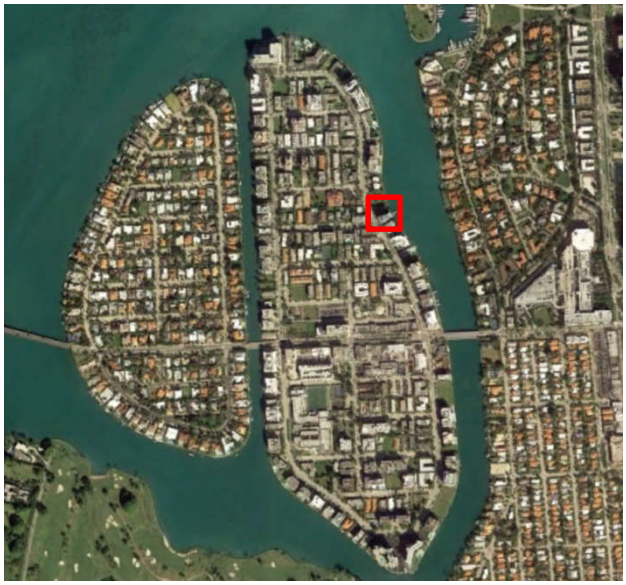
Property Address: 9927 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#30
Date of Inspection: 4/26/2018 @ 1:50pm



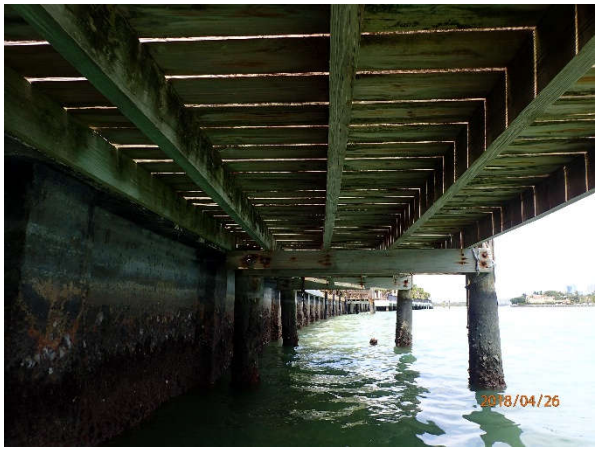
Observations:

Length: 70'
Seabed Elev.: ~-3.9' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored Pile T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking at wet face
- Wall Panels – Moderate cracking and concrete erosion
- T-Piles – Moderate to severe cracking and necking
- Dock – Moderate to severe corrosion at fasteners
- Dock – Deck boards missing

- Seawall Rating: Fair
- Dock Rating: Fair



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9901 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#31
Date of Inspection: 4/26/2018 @ 1:40pm

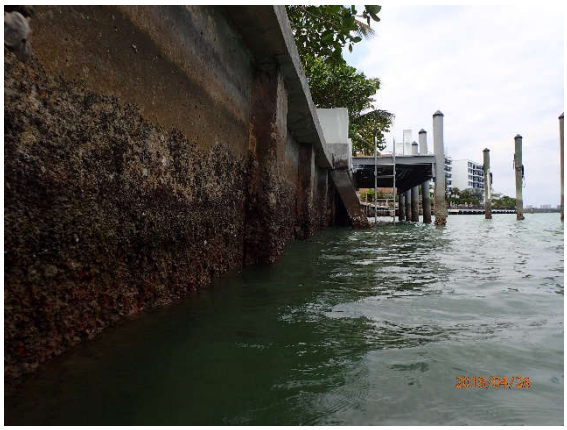
Observations:

Length: 72'
Seabed Elev.: ~-5.9' NAVD Cap Elev.: ~7.9' NAVD
Seawall: Batter Pile T-Pile Panel
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate concrete erosion and cracking
- T-Piles – Moderate to severe cracking through piles

- Seawall Rating: Fair
- Dock Rating: Satisfactory



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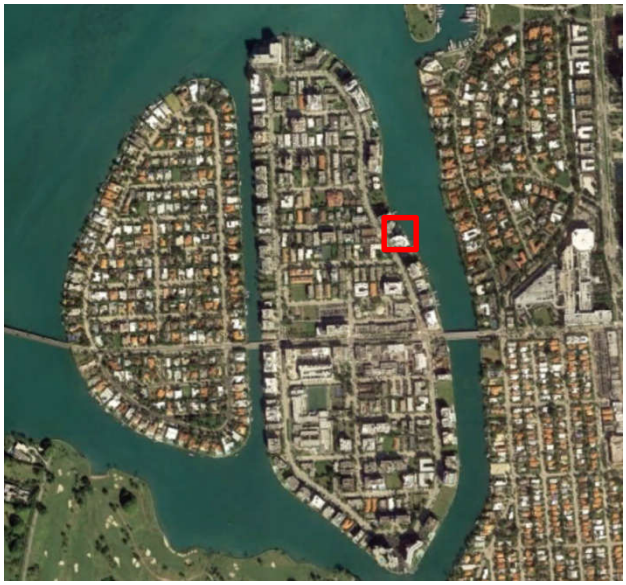
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9881 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#32
Date of Inspection: 4/26/2018 @ 1:40pm



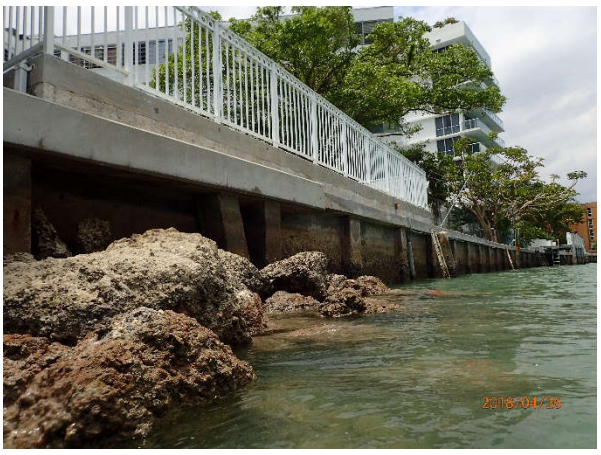
Observations:

Length: 149'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~6.9' NAVD
Seawall: Anchored & Battered T-Pile King Pile Panel Wall
Dock: Not Applicable
Toe Protection: Rip-Rap

Comments:

- Cap – Moderate cracking and spalling
- Wall Panels – Moderate cracking and spalling
- T-Piles – Moderate cracking and spalling
- Upland depression adjacent to outfall

- Seawall Rating: Fair
- Dock Rating: N/A



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2018 Seawall Resiliency Inspection

Property Address: 9821 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#33
Date of Inspection: 4/26/2018 @ 1:30pm

Observations:

Length: 160'
Seabed Elev.: ~-3.9' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor cracking at wet face
- Wall Panels – Minor to moderate cracking
- T-Piles – Moderate cracking
- T-Piles – Two anchors at piles North of dock
- Batter Piles – Minor to moderate cracking with erosion
- Dock – Severe corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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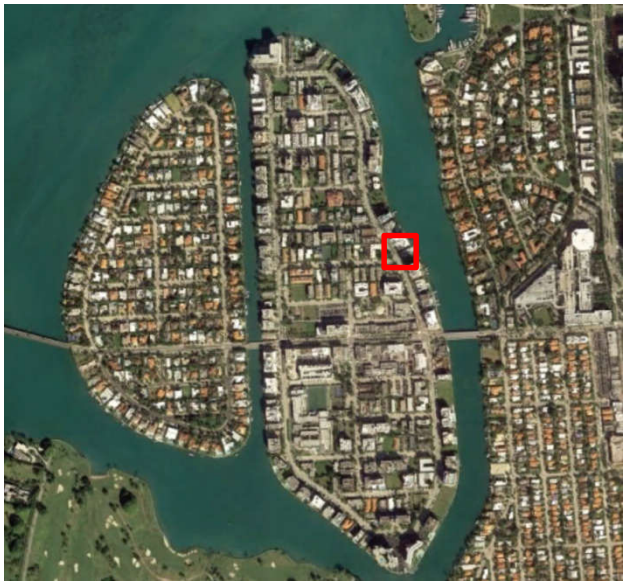
2018 Seawall Resiliency Inspection

Property Address: 9801 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#34
Date of Inspection: 4/26/2018 @ 1:30pm



Observations:

Length: 60'
Seabed Elev.: ~-4.1' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Battered King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Rip-Rap

Comments:

- Wall Panels – Minor cracking along panels
- Batter Piles – Moderate cracking at the heads with erosion at the tidal zone
- Dock – Moderate corrosion at fasteners
- Dock – Timber piles decaying

- Seawall Rating: Fair
- Dock Rating: Fair

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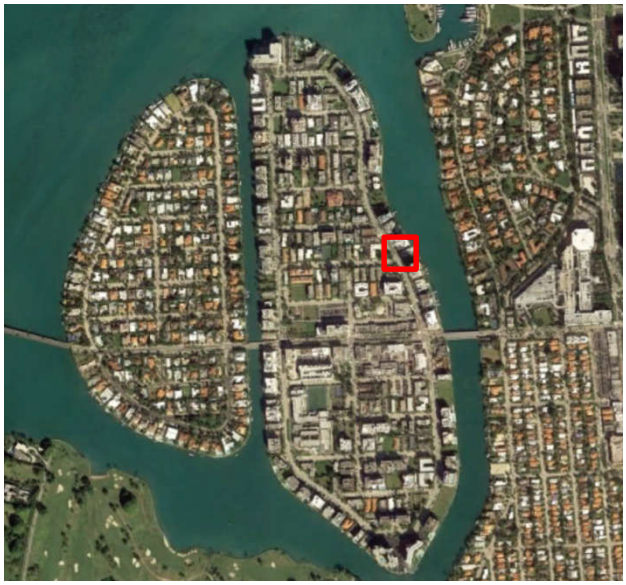
2018 Seawall Resiliency Inspection

Property Address: 9781 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#35
Date of Inspection: 4/26/2018 @ 1:20pm



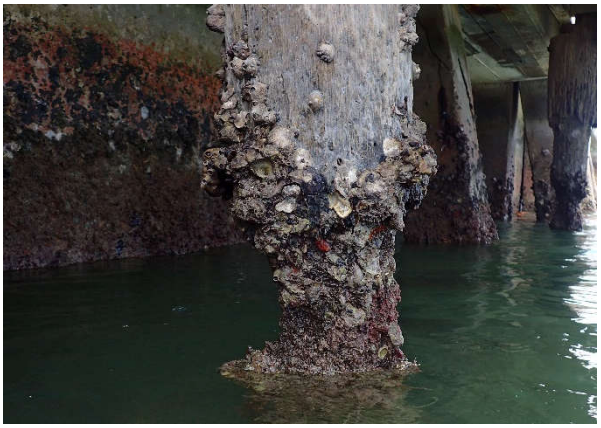
Observations:

Length: 75'
Seabed Elev.: ~-4.2' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking
- Wall Panels – Moderate concrete erosion and cracking
- Batter Piles – Moderate to severe cracking
- Dock – Severe deterioration of timber piles
- Dock – Severe corrosion of fasteners

- Seawall Rating: Fair
- Dock Rating: Serious



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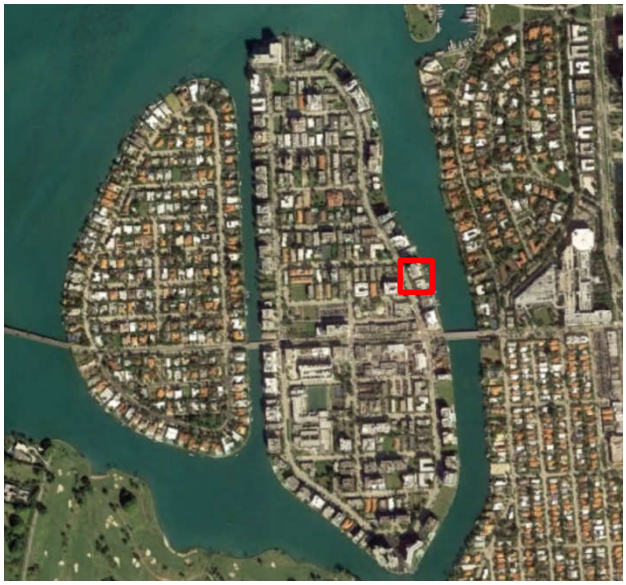
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9751 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#36
Date of Inspection: 4/26/2018 @ 1:20pm



Observations:

Length: 160'
Seabed Elev.: ~-4.4' NAVD Cap Elev.: ~7.5' NAVD
Seawall: Battered King Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Sheet Pile Toe Wall with Cap

Comments:

- Cap – Moderate cracking with corrosion staining
- Wall Panels – Moderate concrete erosion and cracking
- T-Piles – Moderate cracking with concrete erosion
- Cracking at sheet pile toe wall
- Dock – Fastener corrosion

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9721 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#37
Date of Inspection: 4/26/2018 @ 1:10pm

Observations:

Length: 152'
Seabed Elev.: ~-3.9' NAVD Cap Elev.: ~7.7' NAVD
Seawall: Battered King Pile Panel Wall
Dock: Not Applicable
Toe Protection: Cement Bag and Concrete Toe Wall

Comments:

- Cap – Moderate cracking with corrosion staining and exposed steel reinforcement
- Wall Panels – Moderate cracking and concrete erosion
- King Piles – Moderate concrete erosion and cracking
- Batter Piles – Moderate cracking

- Seawall Rating: Fair
- Dock Rating: N/A

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9655 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#38
Date of Inspection: 4/26/2018 @ 1:00pm

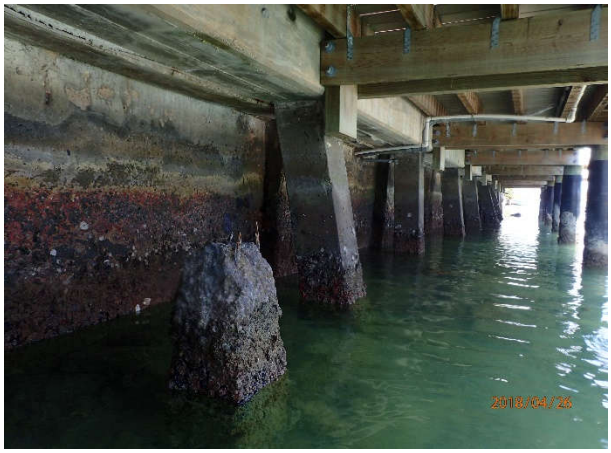
Observations:

Length: 155'
Seabed Elev.: ~-4.3' NAVD Cap Elev.: ~7.8' NAVD
Seawall: Battered T-Pile Panel
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate cracking and concrete erosion
- T-Piles –Moderate cracking and necking

- Seawall Rating: Fair
- Dock Rating: Satisfactory



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9601 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#39
Date of Inspection: 4/26/2018 @ 12:50pm

Observations:

Length: 245'
Seabed Elev.: ~-7.5' NAVD Cap Elev.: ~8.1' NAVD
Seawall: Battered King Pile Panel Wall
Dock: Not Applicable

Comments:

- Wall Panels – Moderate concrete erosion and spalling
- Wall Panels – Moderate cracking below waterline with voids along seabed
- T-Piles –Pile panel separation

- Seawall Rating: Fair
- Dock Rating: N/A

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9551 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#40
Date of Inspection: 4/26/2018 @ 12:40pm

Observations:

Length: 152'
Seabed Elev.: ~-4.0' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Minor to moderate cracking
- Wall Panels – Moderate outward rotation along wall
- T-Piles – Moderate concrete erosion and necking
- Batter Piles – Moderate cracking at pile heads
- Docks – Corrosion at fasteners
- Docks – Splitting at beam connections, missing fasteners

- Seawall Rating: Fair
- Dock Rating: Poor

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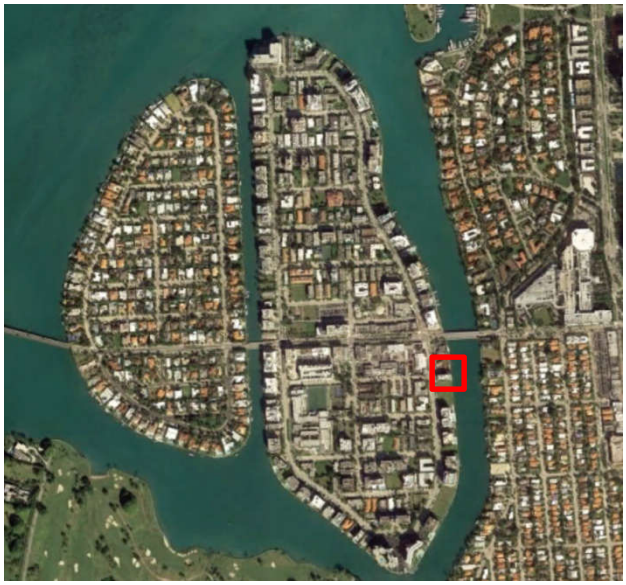
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9541 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#41
Date of Inspection: 4/26/2018 @ 12:40pm



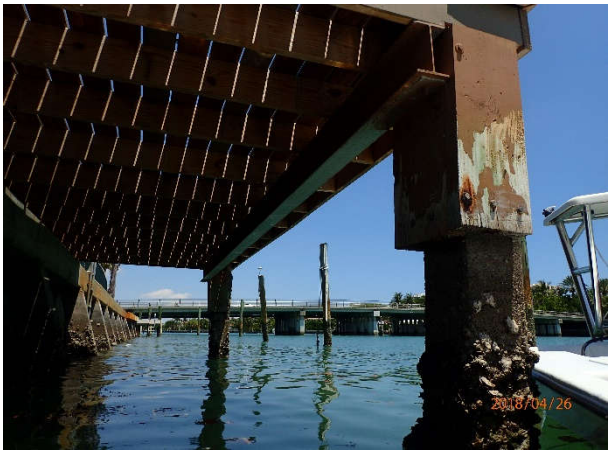
Observations:

Length: 76'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Wall Panels – Cracking
- Wall Panels – Cracking
- T-Piles – Severe cracking and deterioration
- Batter Piles – Cracking
- Dock – Fastener corrosion

- Seawall Rating: Fair
- Dock Rating: Fair



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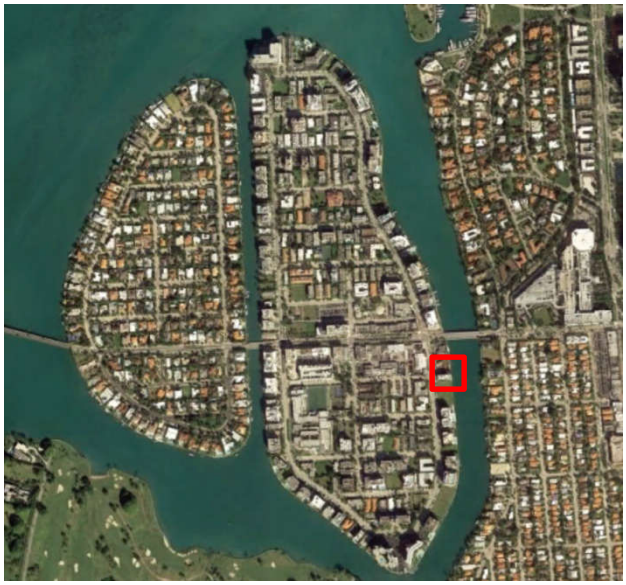
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9521 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#42
Date of Inspection: 4/26/2018 @ 12:30pm



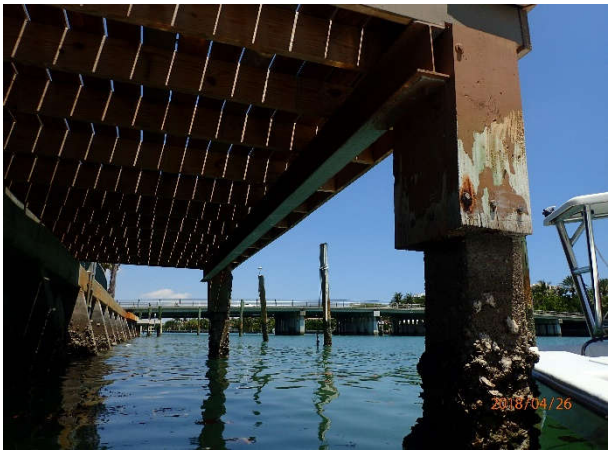
Observations:

Length: 78'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Wall Panels – Severe cracking and spalling South of outfall
- Wall Panels – Rotation of panels causing flexural failure
- T-Piles – Severe cracking and deterioration at South end
- Dock – Fastener corrosion

- Seawall Rating: Serious
- Dock Rating: Fair



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9501 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#43
Date of Inspection: 4/26/2018 @ 12:20pm

Observations:

Length: 75'
Seabed Elev.: ~-4.0' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Spalling with exposed steel reinforcement
- Wall Panels – Minor to moderate concrete erosion
- King Piles – Moderate impact damage at pile heads
- T-Piles – Moderate concrete erosion at piles
- Batter Piles – Moderate spalling with cavities at spot piles
- Dock – Severe corrosion at fasteners

- Seawall Rating: Poor
- Dock Rating: Poor

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9481 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#44
Date of Inspection: 4/26/2018 @ 12:20pm

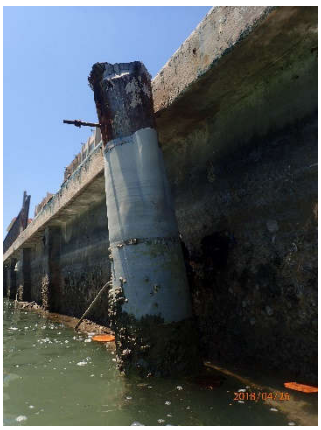
Observations:

Length: 152'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking and concrete erosion
- Cap – Spalling with exposed reinforcement
- Wall Panels – Severe rotation and cracking along panels
- T-Piles – Severe deterioration at splash zone
- Dock – Deck demolished
- Upland depressions along wall

- Seawall Rating: Poor
- Dock Rating: N/A



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9461 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#45
Date of Inspection: 4/26/2018 @ 12:20pm

Observations:

Length: 102'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~7.0' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking and concrete erosion
- Cap – Spalling with exposed reinforcement
- Wall Panels – Severe rotation and cracking along panels
- T-Piles – Severe deterioration at splash zone
- Dock – Deck demolished
- Upland depressions along wall

- Seawall Rating: Poor
- Dock Rating: N/A

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9431 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#46
Date of Inspection: 4/26/2018 @ 12:10pm

Observations:

Length: 77'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~7.3' NAVD
Seawall: Anchored Pile T-Pile Panel
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking and concrete erosion
- Cap – Spalling with exposed reinforcement
- Wall Panels – Severe rotation and cracking along panels
- T-Piles – Severe deterioration at splash zone
- Dock – Severe deterioration at dock framing
- Dock – Severe deterioration at dock piles
- Upland depressions along wall

- Seawall Rating: Poor
- Dock Rating: Serious

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9381 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#47
Date of Inspection: 4/26/2018 @ 12:00pm

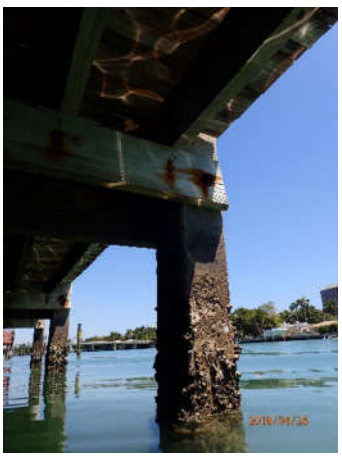
Observations:

Length: 224'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered T-Pile King Pile Panel Wall
Dock: Timber Dock Framing, Square Concrete Piles

Comments:

- Wall Panels – Moderate concrete erosion
- T-Piles – Severe necking and concrete erosion
- T-Piles – Pile panel separation with sediment washout
- Dock – Severe corrosion at fasteners
- Dock – Missing decking and splitting at beams
- Dock – Collapsed beam

- Seawall Rating: Poor
- Dock Rating: Critical



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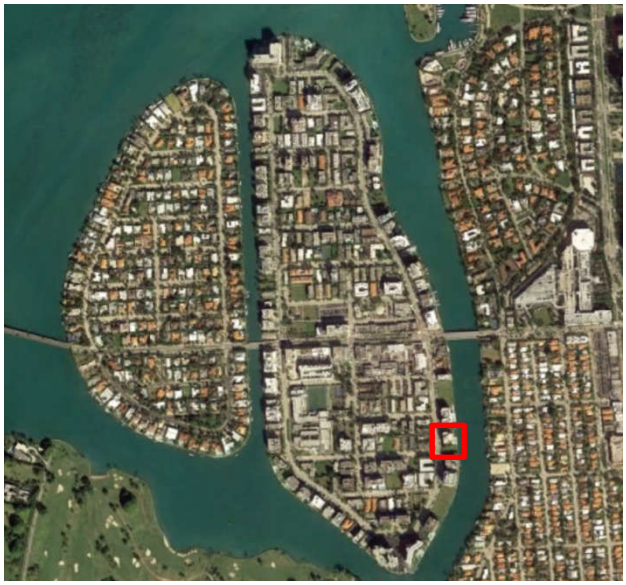
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9341 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#48
Date of Inspection: 4/26/2018 @ 11:50am



Observations:

Length: 148'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Concrete Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Moderate cracking at soffit and wet face
- Wall Panels – Undermining and cracking at footing
- Wall Panels – Spalling adjacent to outfall
- King Piles – Moderate concrete erosion and necking
- Dock – Fastener corrosion

- Seawall Rating: Fair
- Dock Rating: Satisfactory

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9301 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#49
Date of Inspection: 4/26/2018 @ 11:40am

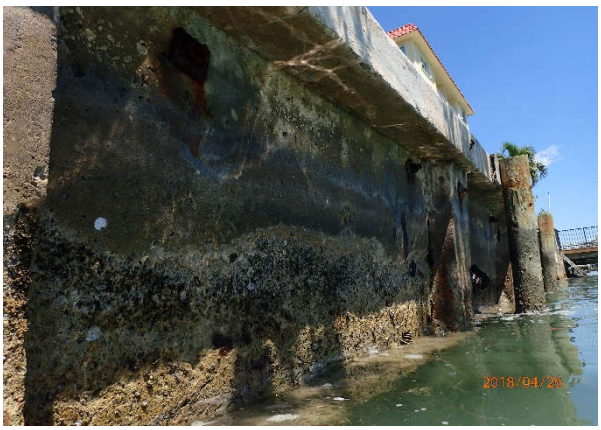
Observations:

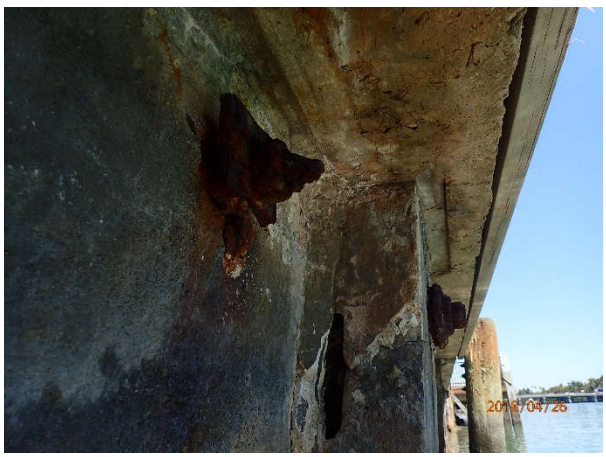
Length: 75'
Seabed Elev.: ~-3.8' NAVD Cap Elev.: ~6.9' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Demolished Framing, Timber Piles

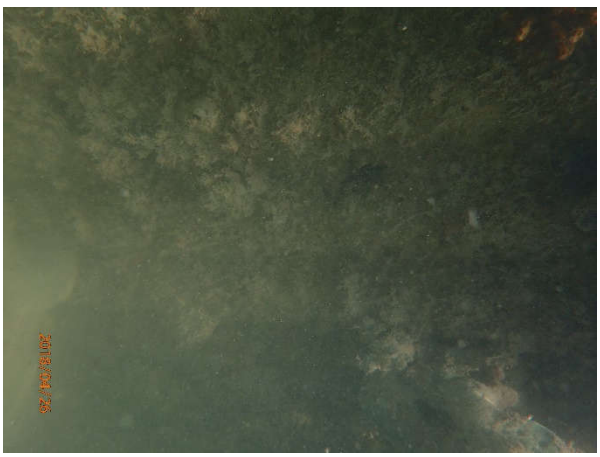
Comments:

- Cap – Moderate cracking with exposed steel reinforcement
- Wall Panels – Moderate to severe wall rotation
- Wall Panels – Moderate concrete erosion at tidal zone
- T-Piles – Moderate concrete erosion at tidal zone
- Dock – Deck demolished, mooring pile deterioration and failure
- Upland depressions along South wall

- Seawall Rating: Poor
- Dock Rating: N/A







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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9291 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#50
Date of Inspection: 4/26/2018 @ 11:30am

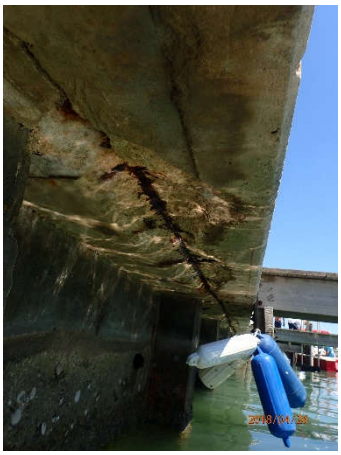
Observations:

Length: 167'
Seabed Elev.: ~-5.6' NAVD Cap Elev.: ~6.7' NAVD
Seawall: Anchored T-Pile Batter Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Severe spalling along length of wall
- Cap – Moderate cracking at wet face North of dock
- Wall Panels – Severe diagonal cracking with moderate concrete erosion at tidal zone
- T-Piles – Severe corrosion at pile anchors
- Dock – Severe corrosion and rupture at fasteners, beams splitting at bolts

- Seawall Rating: Poor
- Dock Rating: Serious



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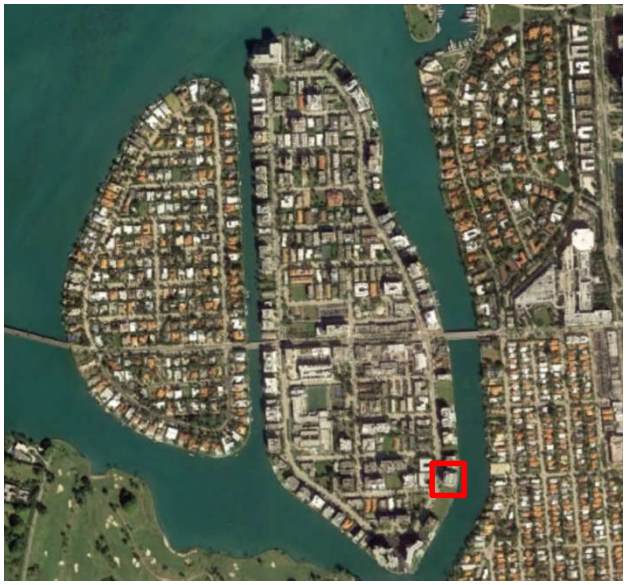
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9261 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#51
Date of Inspection: 4/26/2018 @ 11:20am



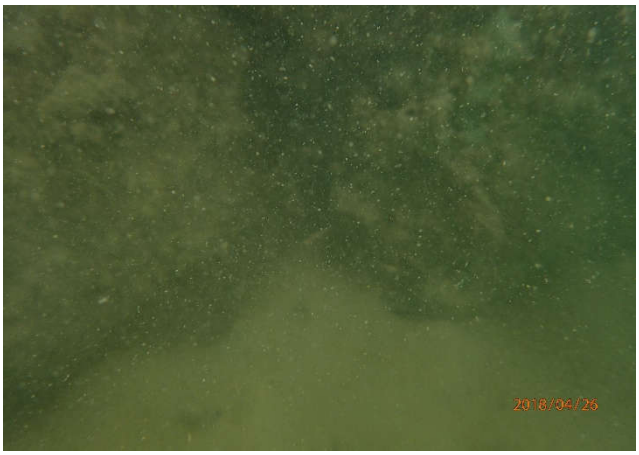
Observations:

Length: 158'
Seabed Elev.: ~-6.9' NAVD Cap Elev.: ~8.9' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: N/A

Comments:

- Cap – Concrete overpour along cap with moderate cracking
- Wall Panels – Severe cracking and concrete erosion
- T-Piles – Moderate to severe cracking and necking
- T-Piles – Severe corrosion at anchors providing minimal support
- T-Piles – North end T-Piles necking and cracking causing snapping

- Seawall Rating: Critical
- Dock Rating: N/A



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9201 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#52
Date of Inspection: 4/26/2018 @ 11:00am

Observations:

Length: 166'
Seabed Elev.: ~-3.3' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered King Pile Panel Wall
Dock: Demolished Dock Framing, Timber Piles
Toe Protection: Rock Revetment

Comments:

- Cap – Minor to moderate cracking and concrete erosion
- Wall Panels – Critical cracking with concrete erosion and rotation of wall
- King Piles – Critical fractures and flexural failure
- King Piles – Grouted fillets with re-cracking and failure
- Dock – Deck demolished

- Seawall Rating: Critical
- Dock Rating: N/A

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9161 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#53
Date of Inspection: 4/26/2018 @ 10:50am

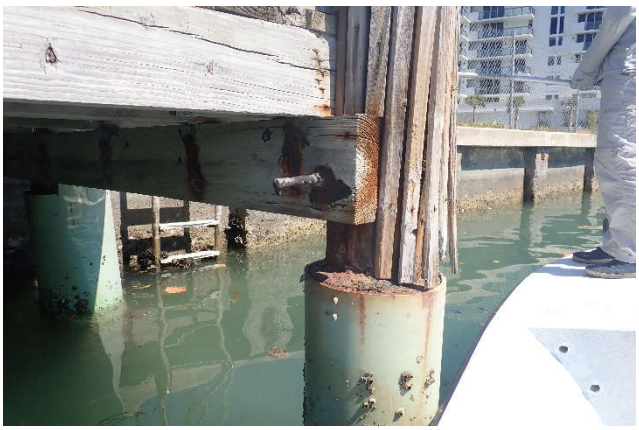
Observations:

Length: 155'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Moderate cracking
- Wall Panels – Minor cracking and concrete erosion
- T-Piles – Moderate cracking and concrete erosion
- Dock – Severe corrosion at fasteners and straps
- Dock – Deterioration at piles

- Seawall Rating: Fair
- Dock Rating: Poor



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9111 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#54
Date of Inspection: 4/26/2018 @ 10:30am

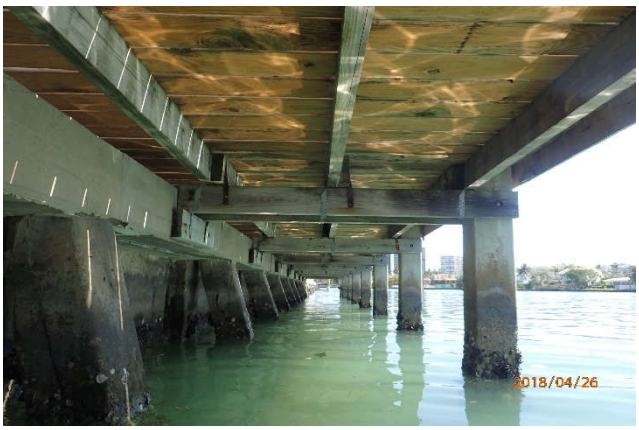
Observations:

Length: 230'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~7.4' NAVD
Seawall: T-Pile Batter Pile Panel
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Cap – Severe cracking and spalling along North wet face and soffit
- Wall Panels – Moderate to severe cracking mid-panels
- Wall Panels – Moderate concrete erosion at tidal zone
- T-Piles – Necking at tidal zones
- Batter Piles – Severe cracking
- Dock – Minor erosion of piles in tidal zones
- Dock – Fastener corrosion

- Seawall Rating: Poor
- Dock Rating: Fair



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9101 E BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#55
Date of Inspection: 4/17/2018 @ 5:05pm

Observations:

Length: 417'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~8.0' NAVD
Seawall: Battered T-Pile Panel Wall with Retrofit Caps at Batter Piles
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Wall Panels – Moderate cracking along panels
- T-Piles – Moderate corrosion and deterioration at anchors
- T-Piles – Flexural cracking at piles

- Seawall Rating: Poor
- Dock Rating: Satisfactory

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9100 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#56
Date of Inspection: 4/17/2018 @ 5:00pm

Observations:

Length: 423'
Seabed Elev.: ~-5.5' NAVD Cap Elev.: ~8.0' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Wall Panels – Moderate cracking throughout panels
- T-Piles – Moderate deterioration with sediment accumulation through fillets at seabed
- Batter Piles – Moderate cracking
- Dock – Failed boat lift
- Dock – Corrosion staining on concrete

- Seawall Rating: Poor
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9110 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#57
Date of Inspection: 4/17/2018 @ 4:55pm

Observations:

Length: 93'
Seabed Elev.: ~-3.7' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Battered Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles

Comments:

- Wall Panels – Moderate concrete erosion at tidal zone
- Batter Piles – Moderate cracking and deterioration

- Seawall Rating: Poor
- Dock Rating: Satisfactory

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2018 Seawall Resiliency Inspection

Property Address: 9120 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#58
Date of Inspection: 4/17/2018 @ 4:50pm

Observations:

Length: 77'
Seabed Elev.: ~-3.4' NAVD Cap Elev.: ~7.2' NAVD
Seawall: Battered Anchored T-Pile Panel Wall
Dock: Concrete Dock Framing, Concrete Piles

Comments:

- Cap – Severe spalling with exposed steel reinforcement
- Wall Panels – Moderate cracking and concrete erosion
- Dock – Spalling at beams

- Seawall Rating: Poor
- Dock Rating: Poor

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9140 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#59
Date of Inspection: 4/17/2018 @ 4:50pm

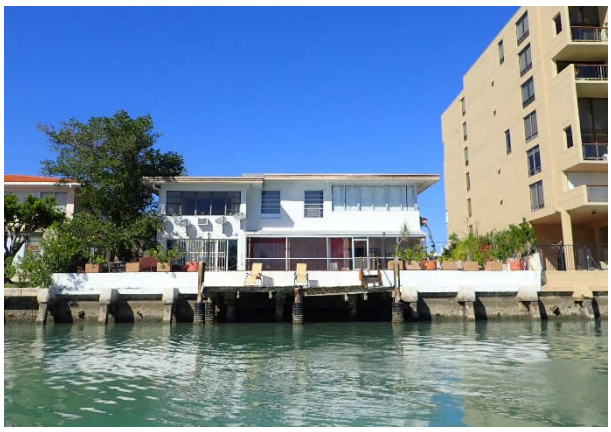
Observations:

Length: 149'
Seabed Elev.: ~-3.2' NAVD Cap Elev.: ~7.1' NAVD
Seawall: Battered Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Cracking and spalling
- Piles – Moderate cracking and deterioration
- Dock – Severe corrosion at fasteners and straps
- Dock – Wood splitting
- Dock – Unsupported beams

- Seawall Rating: Poor
- Dock Rating: Critical



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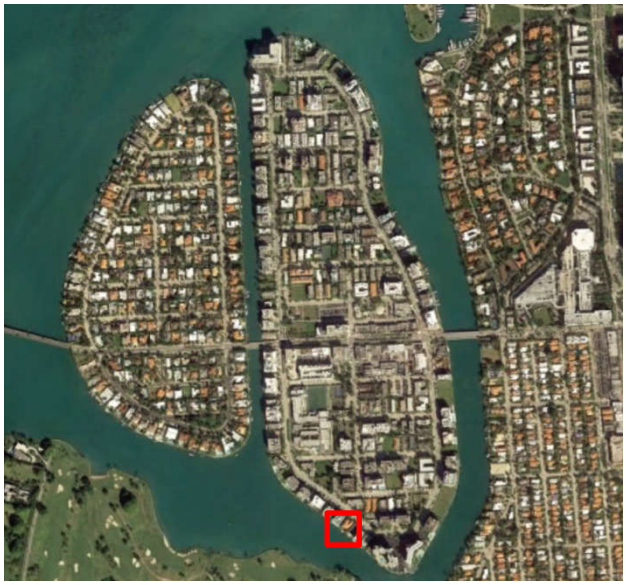
2018 Seawall Resiliency Inspection

Property Address: 9160 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#60
Date of Inspection: 4/17/2018 @ 4:45pm



Observations:

Length: 77'
Seabed Elev.: ~-5.6' NAVD Cap Elev.: ~7.5' NAVD
Seawall: Battered Anchored T-Pile Panel Wall
Dock: Concrete Dock Framing, Concrete Piles

Comments:

- Cap – Moderate cracking along soffit
- T-Piles – Moderate cracking
- Batter Piles – Moderate cracking
- Dock – Severe cracking and spalling at slab at beams with exposed steel reinforcement
- Dock Piles – Advanced spalling

- Seawall Rating: Fair
- Dock Rating: Serious

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9180 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#61
Date of Inspection: 4/17/2018 @ 4:40pm

Observations:

Length: 99'
Seabed Elev.: ~-2.8' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Cement Bag Revetment

Comments:

- T-Piles – Moderate cracking
- Dock – Severe corrosion at fasteners
- Dock – Moderate to severe cracking at piles
- Dock – Collapsed beam
- Dock – Moderate to severe corrosion at fasteners and bolts

- Seawall Rating: Fair
- Dock Rating: Critical

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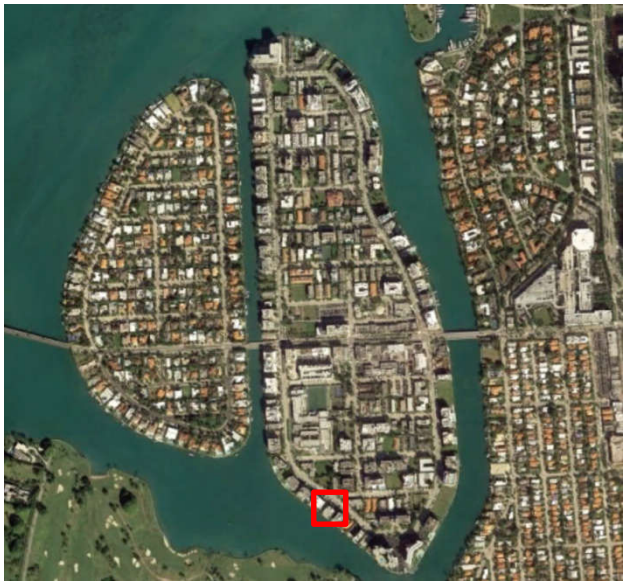
Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9200 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#62
Date of Inspection: 4/17/2018 @ 4:35pm



Observations:

Length: 111'
Seabed Elev.: ~-2.8' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Moderate cracking at the soffit, spalling
- Wall Panels – Moderate concrete erosion
- T-Piles – Moderate concrete erosion
- Dock – Severe corrosion at fasteners, missing fasteners
- Dock – Splitting at beams and piles

- Seawall Rating: Fair
- Dock Rating: Serious

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Property Address: 9240 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#63
Date of Inspection: 4/17/2018 @ 4:30pm

Observations:

Length: 152'
Seabed Elev.: ~-3.6' NAVD Cap Elev.: ~7.6' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate spalling and cracking
- T-Piles – Moderate cracking
- Batter Piles – Moderate cracking
- Dock – Moderate corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9250 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#64
Date of Inspection: 4/17/2018 @ 4:30pm

Observations:

Length: 147'
Seabed Elev.: ~-3.5' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Sleeved Timber Piles

Comments:

- Cap – Cracking and spalling at wet face and soffit
- Wall Panels – Moderate cracking
- T-Piles – Moderate cracking
- Batter Piles – Cracking
- Dock – Advanced corrosion at fasteners, missing fasteners
- Dock – Wood splitting, wood decay

- Seawall Rating: Poor
- Dock Rating: Poor

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9270 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#65
Date of Inspection: 4/17/2018 @ 4:20pm

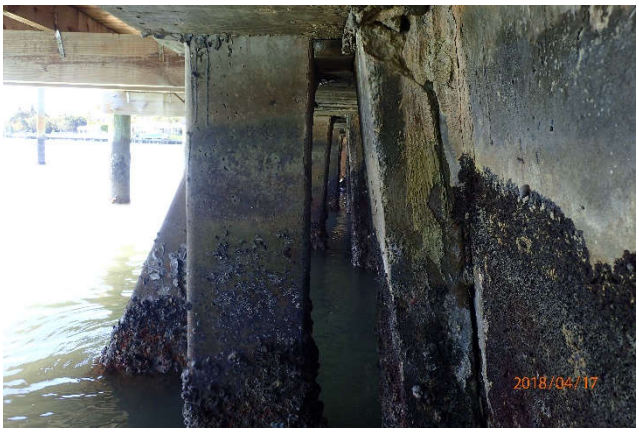
Observations:

Length: 166'
Seabed Elev.: ~-4.0' NAVD Cap Elev.: ~8.4' NAVD
Seawall: Battered T-Pile King Piles Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Wall Panels – Moderate cracking along tops of panels with wall rotation
- King Piles – Moderate cracking
- T-Piles – Necking with moderate to severe cracking
- Dock – Fastener corrosion

- Seawall Rating: Poor
- Dock Rating: Fair



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9290 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#66
Date of Inspection: 4/17/2018 @ 4:10pm

Observations:

Length: 87'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~7.8' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles

Comments:

- Cap – Cracking at the soffit
- Wall Panels – Moderate cracking at soffit
- Dock – Moderate to severe corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9300 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#67
Date of Inspection: 4/17/2018 @ 4:00pm

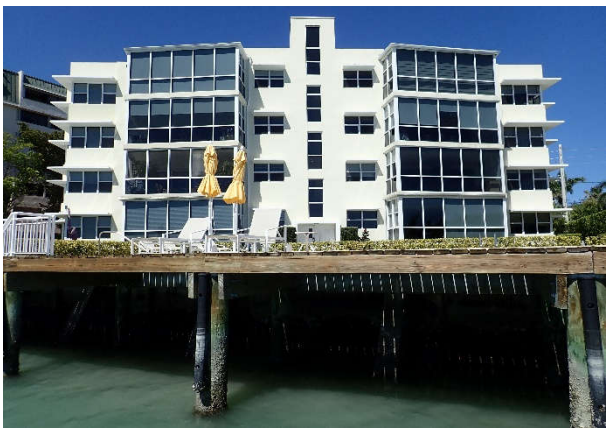
Observations:

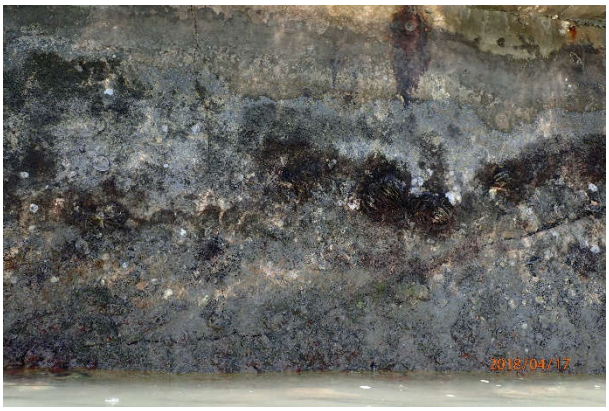
Length: 165'
Seabed Elev.: ~-4.5' NAVD Cap Elev.: ~8.6' NAVD
Seawall: Battered T-Pile Panel Walls
Dock: Timber Dock Framing, Timber Piles

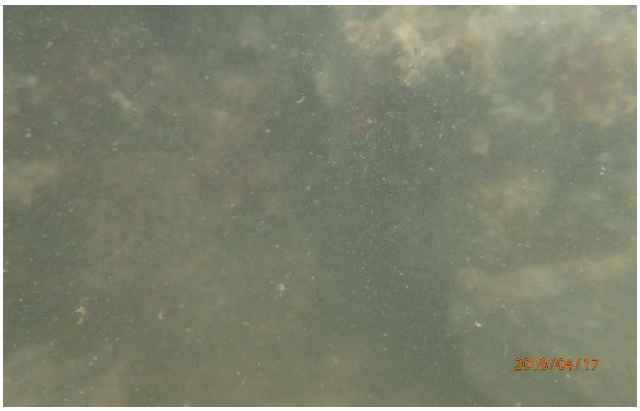
Comments:

- Batter Piles – Moderate cracking
- Wall Panels – Moderate cracking

- Seawall Rating: Fair
- Dock Rating: Satisfactory







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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9350 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#68
Date of Inspection: 4/17/2018 @ 3:50pm

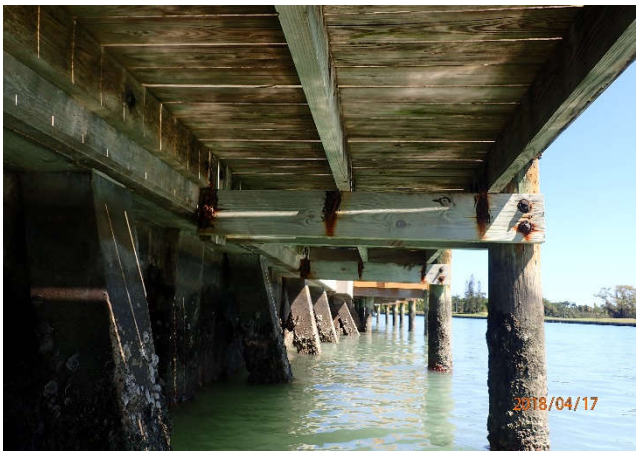
Observations:

Length: 244'
Seabed Elev.: ~-2.8' NAVD Cap Elev.: ~7.9' NAVD
Seawall: Battered T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Rock Revetment

Comments:

- Cap – Cracking at the soffit
- Wall Panels – Moderate diagonal cracking along top panels
- Dock – Advanced corrosion at fasteners

- Seawall Rating: Fair
- Dock Rating: Poor



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9370 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#69
Date of Inspection: 4/17/2018 @ 3:50pm

Observations:

Length: 72'
Seabed Elev.: ~-5.3' NAVD Cap Elev.: ~8.4' NAVD
Seawall: Anchored T-Pile Panel
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag Revetment

Comments:

- Wall Panels – Spalling adjacent to outfall
- Wall Panels – Severe cracking at South end
- T-Piles – Moderate cracking at South piles
- T-Piles – Spalling with exposed reinforcement at tops
- Docks: Severe corrosion at straps

- Seawall Rating: Poor
- Dock Rating: Fair

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9420 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#70
Date of Inspection: 4/17/2018 @ 3:40pm

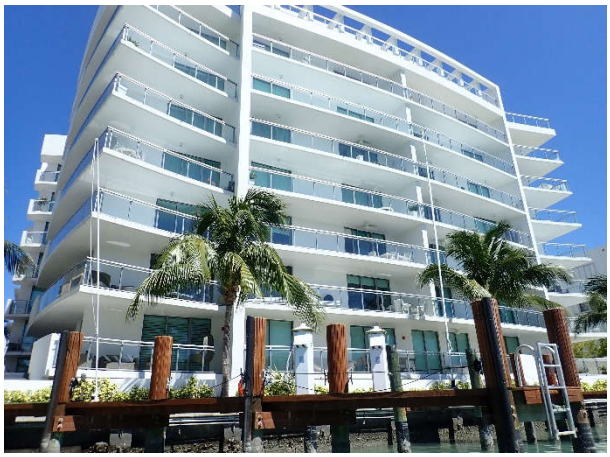
Observations:

Length: 146'
Seabed Elev.: ~-2.8' NAVD Cap Elev.: ~8.2' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Timber Piles
Toe Protection: Cement Bag and Rock Revetment

Comments:

- T-Piles – Moderate deterioration at tidal zone
- Docks – Minor splitting at end connections
- Docks – Hardware corrosion

- Seawall Rating: Fair
- Dock Rating: Satisfactory



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9440 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#71
Date of Inspection: 4/17/2018 @ 3:20pm

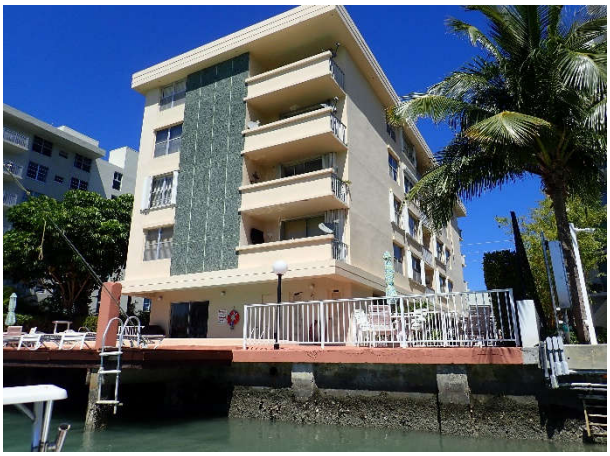
Observations:

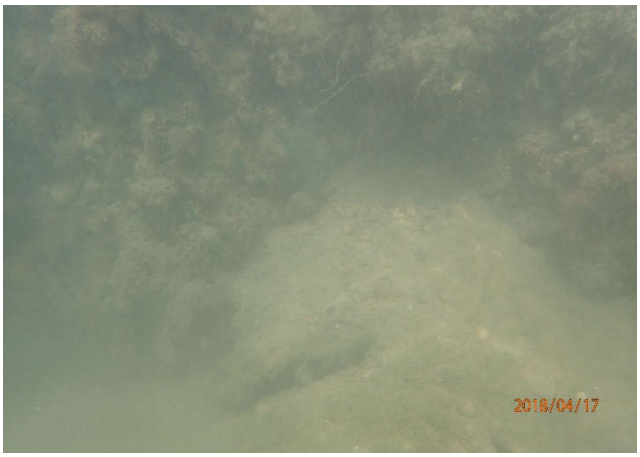
Length: 75'
Seabed Elev.: ~-1.8' NAVD Cap Elev.: ~7.4' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Timber Dock Framing, Concrete Piles
Toe Protection: Cement Bag Toe Wall

Comments:

- Cap – Moderate cracking at South soffit
- T-Piles – Sediment accumulation through fillets at seabed
- Docks – Severe corrosion at straps
- Upland depression along North wall

- Seawall Rating: Fair
- Dock Rating: Fair





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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9500 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#72
Date of Inspection: 4/17/2018 @ 3:00pm

Observations:

Length: 226'
Seabed Elev.: ~-3.5' NAVD Cap Elev.: ~8.1' NAVD
Seawall: Anchored T-Pile Panel Wall
Dock: Concrete Dock, Concrete Piles, Timber Piles

Comments:

- Cap – Minor spalling along cap
- Wall Panels – Moderate cracking and spalling along panels
- T-Piles – Necking with moderate cracking and spalling
- Dock – Severe cracking and deterioration at piles
- Dock – Moderate cracking with exposed reinforcement

- Seawall Rating: Fair
- Dock Rating: Poor

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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9540 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#73
Date of Inspection: 4/17/2018 @ 2:40pm

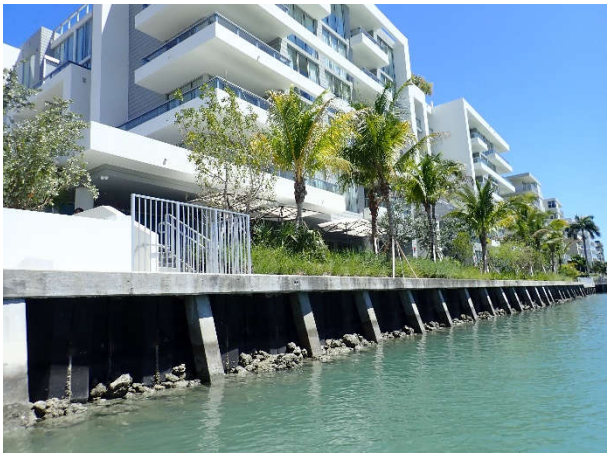
Observations:

Length: 78'
Seabed Elev.: ~-3.5' NAVD Cap Elev.: ~8.1' NAVD
Seawall: Battered Steel Sheet Pile Wall
Dock: Not Applicable
Toe Protection: Rip-Rap

Comments:

- Cap – Minor cracking
- Wall Panels – Minor corrosion at splash zone
- Batter Piles – Minor cracking at pile heads

- Seawall Rating: Satisfactory
- Dock Rating: N/A



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Town of Bay Harbor
2018 Seawall Resiliency Inspection

Property Address: 9540 W BAY HARBOR DR
Bay Harbor Islands, FL 33154
Location: S-1.1 Lot#74
Date of Inspection: 4/17/2018 @ 2:30pm

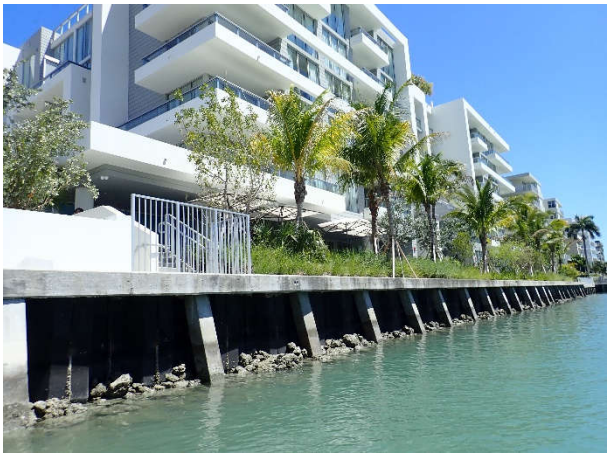
Observations:

Length: 153'
Seabed Elev.: ~-3.6' NAVD Cap Elev.: ~9.5' NAVD
Seawall: Battered Steel Sheet Pile Wall
Dock: Not Applicable
Toe Protection: Rip-Rap

Comments:

- Cap – New Construction
- Batter Piles – Cracking at pile heads
- Minor corrosion of sheet piles in splash zone

- Seawall Rating: Satisfactory
- Dock Rating: N/A



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Appendix C
Broad Causeway Island Photos

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Broad Causeway Island

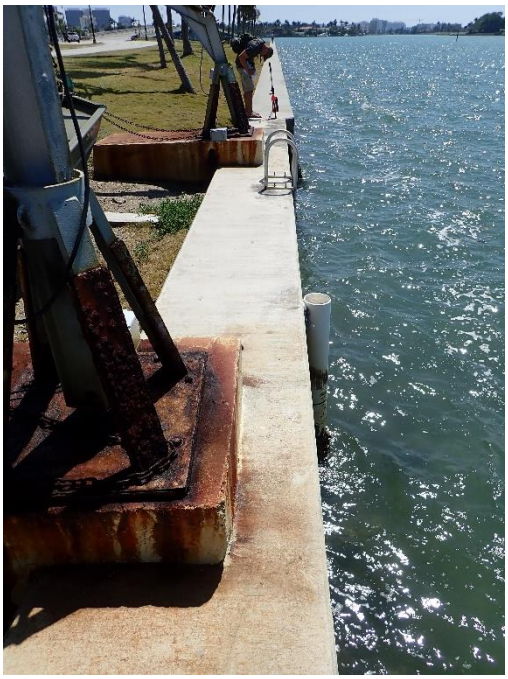

Photo C.1: View of boat lift adjacent to Station 39+75' exhibiting heavy corrosion

Photo C.2: Cracking at the wet face of the cap at the return wall junction adjacent to Station 39+50'

Broad Causeway Island

Photo C.3: Cracking and section loss at batter pile at South East seawall

Photo C.4: Exposed steel reinforcement at the cap soffit at South East seawall

Broad Causeway Island

Photo C.5: Severe cracking, spalling and exposed steel reinforcement at cap soffit and batter pile heads at East seawall

Photo C.6: Cracking with corrosion staining at wet face of concrete cap at East seawall

Broad Causeway Island

Photo C.7: Sediment loss and undermining adjacent to seawall seabed

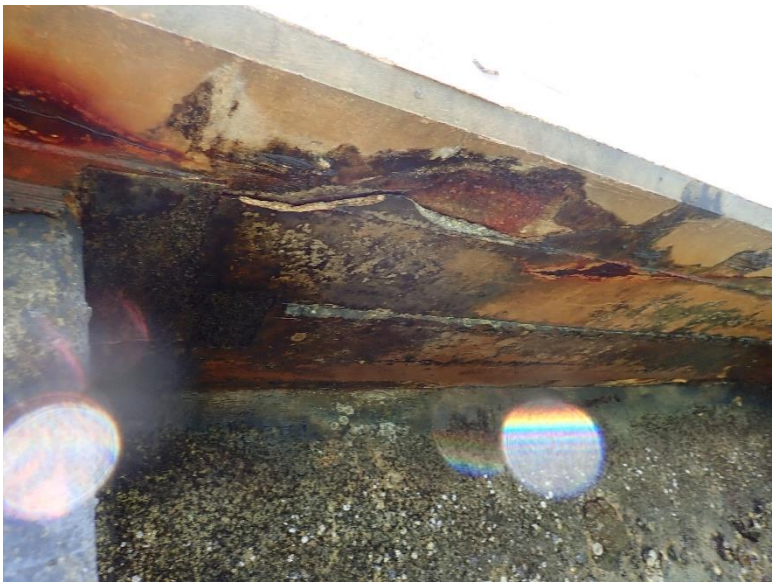

Photo C.8: Cracking with corrosion station at the soffit at East seawall cap

Broad Causeway Island

Photo C.9: Spalling at wet face and soffit at South East seawall cap

Photo C.10: Cracking at king pile head with spalling and corrosion staining at batter pile

Broad Causeway Island

Photo C.11: Concrete erosion along wall panels of East seawall North of bridge

Photo C.12: Concrete spalling and section loss at batter pile heads at North East seawall

Broad Causeway Island

Photo C.13: Cracking along wet face of cap at North East seawall

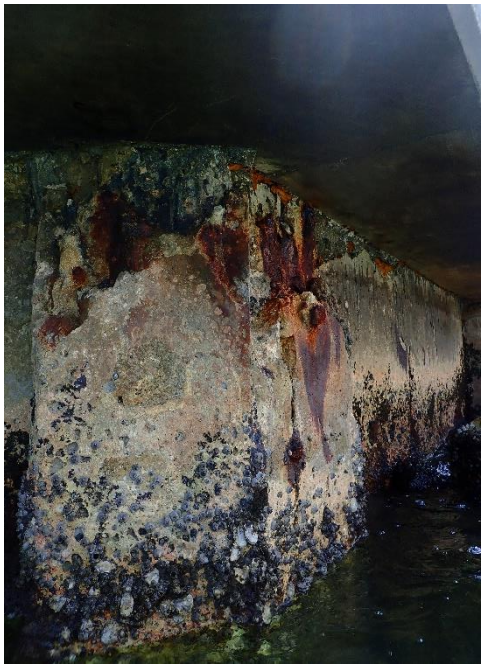

Photo C.14: Severe deterioration at concrete piles with exposed steel reinforcement at North seawall

Broad Causeway Island

Photo C.15: Outfall and concrete debris along Northern rock revetment

Photo C.16: Spalling with exposed steel reinforcement at South East corner of West bridge bulkhead

Broad Causeway Island

Photo C.17: Severe concrete deterioration and section loss with exposed steel reinforcement at South bulkhead at West bridge seawall

Photo C.18: Washout and debris along South shoreline rock revetment

Broad Causeway Island

Photo C.19: View of flat rock revetment along South shoreline

Photo C.20: View of shoreline erosion and washout along South shoreline rock revetment

Broad Causeway Island

Photo C.21: View of return seawall at Station 39+50' with wash out and debris at shoreline rock revetment

Appendix D
Stationing

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GRAPHIC SCALE
11X17: 1"=200'

PROJECT
BAY HARBOR ISLANDS
INSPECTION PROJECT
BAY HARBOR ISLANDS, FLORIDA

CLIENT
CHEN MOORE AND ASSOCIATES
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SEAL

JASON TAYLOR, FL. PE NO 60277

ISSUE	DATE	SUBMISSION / REVISION
1	3/29/18	INSPECTION LAYOUT

PROJECT NO.	57000
DRAWN	LBA
CHECKED	JT/JAC
SCALE	AS SHOWN

SHEET TITLE
BROAD CAUSEWAY ISLAND

SHEET 1 OF 3

D-1.0

J:\Projects\57000 Bay Harbor Islands\Drawing\Working\Inspection\(2018-09-04)_Inspection_Layout.dwg

0 300 600

GRAPHIC SCALE
11X17: 1"=300'

PROJECT
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PROJECT NO.	57000
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SCALE	AS SHOWN

SHEET TITLE
WEST ISLAND

SHEET 2 OF 3

D-1.1

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N

0 375 750

GRAPHIC SCALE
11X17: 1"=375'

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1	3/29/18	INSPECTION LAYOUT

PROJECT NO.	57000
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CHECKED	JT/JAC
SCALE	AS SHOWN

SHEET TITLE
EAST ISLAND

SHEET 3 OF 3

D-1.2

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Appendix E
Condition Mapping

CUMMINS | CEDERBERG
Coastal & Marine Engineering

LEGEND:

- CRITICAL CONDITION
- SERIOUS CONDITION
- POOR CONDITION
- FAIR CONDITION
- SATISFACTORY CONDITION
- GOOD CONDITION

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PROJECT NO.	57000
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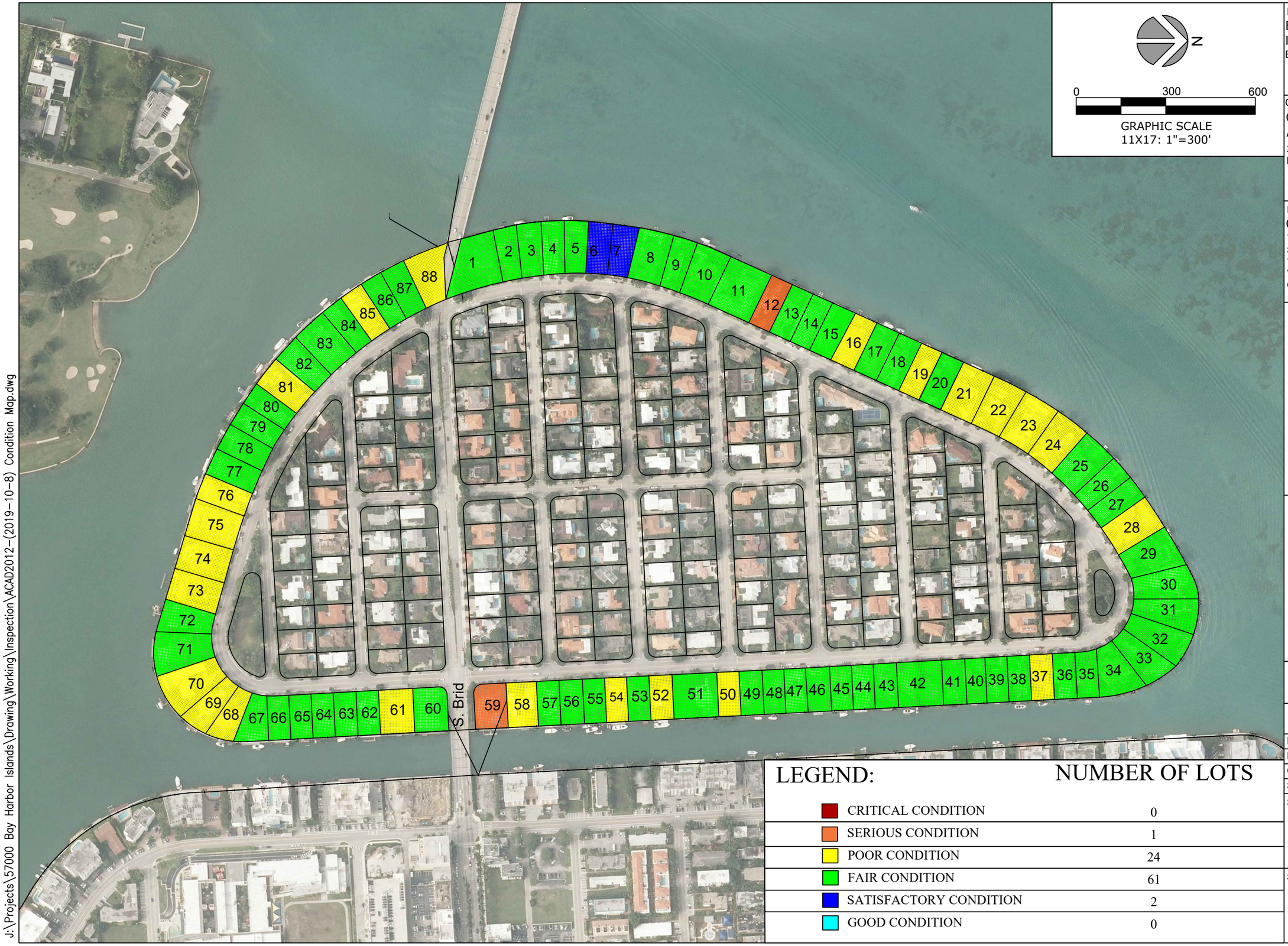
CHECKED	JT/JAC
SCALE	AS SHOWN

SHEET TITLE
BROAD CAUSEWAY ISLAND REVETMENT & SEAWALL CONDITION

SHEET 1 OF 5

E-1.0

J:\Projects\57000 Bay Harbor Islands\Drawing\Working\Inspection\ACAD2012-(2019-10-8) Condition Map.dwg



N

0 300 600

GRAPHIC SCALE
11X17: 1"=300'

LEGEND:	NUMBER OF LOTS
CRITICAL CONDITION	0
SERIOUS CONDITION	1
POOR CONDITION	24
FAIR CONDITION	61
SATISFACTORY CONDITION	2
GOOD CONDITION	0

PROJECT
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ISSUE	DATE	SUBMISSION / REVISION

PROJECT NO.	57000
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SCALE	AS SHOWN

SHEET TITLE
BROADVIEW ISLAND
CONDITION MAP -
SEAWALL

SHEET 2 OF 5

E-1.1

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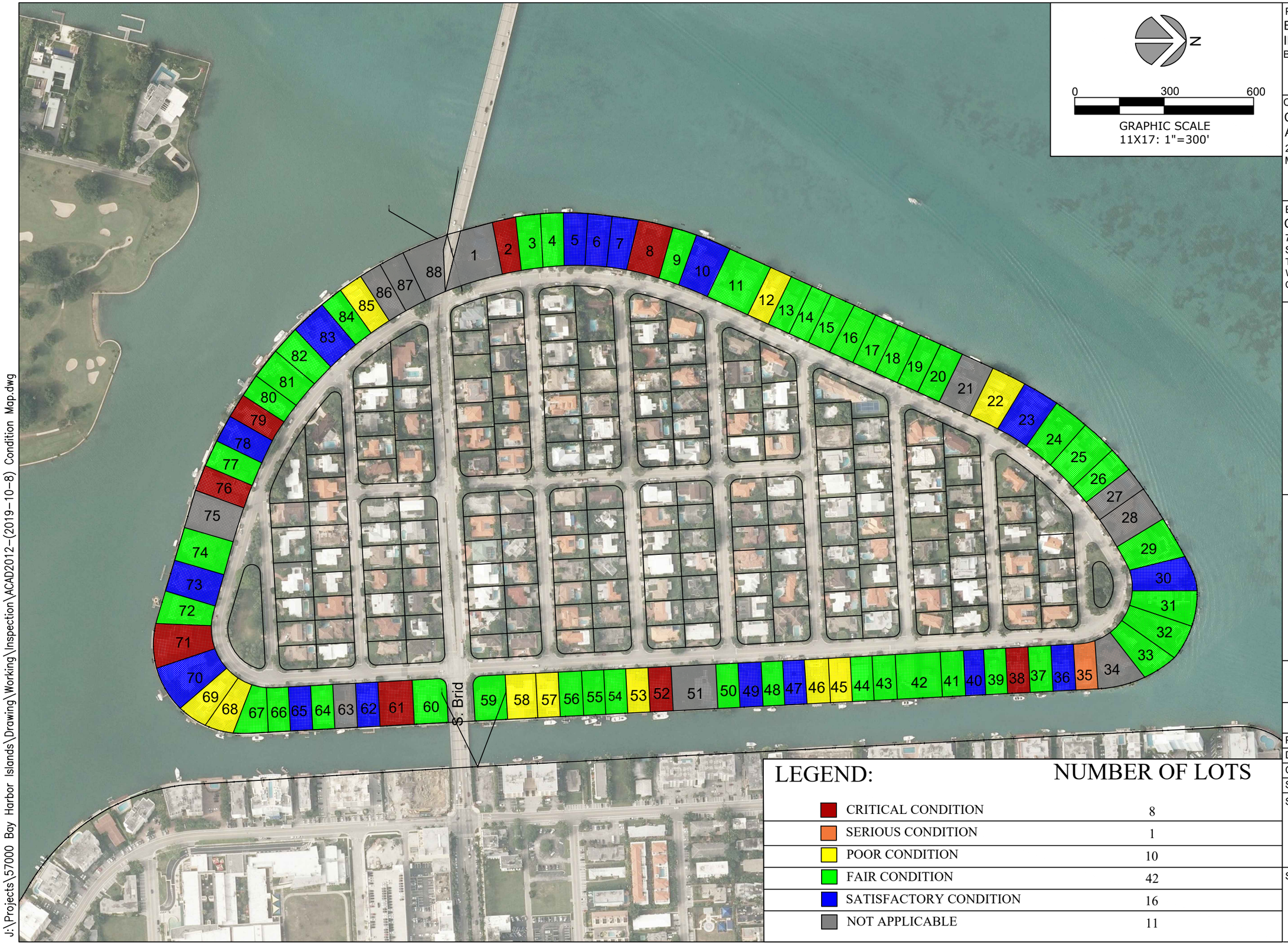

LEGEND:	NUMBER OF LOTS
CRITICAL CONDITION	8
SERIOUS CONDITION	1
POOR CONDITION	10
FAIR CONDITION	42
SATISFACTORY CONDITION	16
NOT APPLICABLE	11

PROJECT
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ISSUE	DATE	SUBMISSION / REVISION

PROJECT NO.	57000
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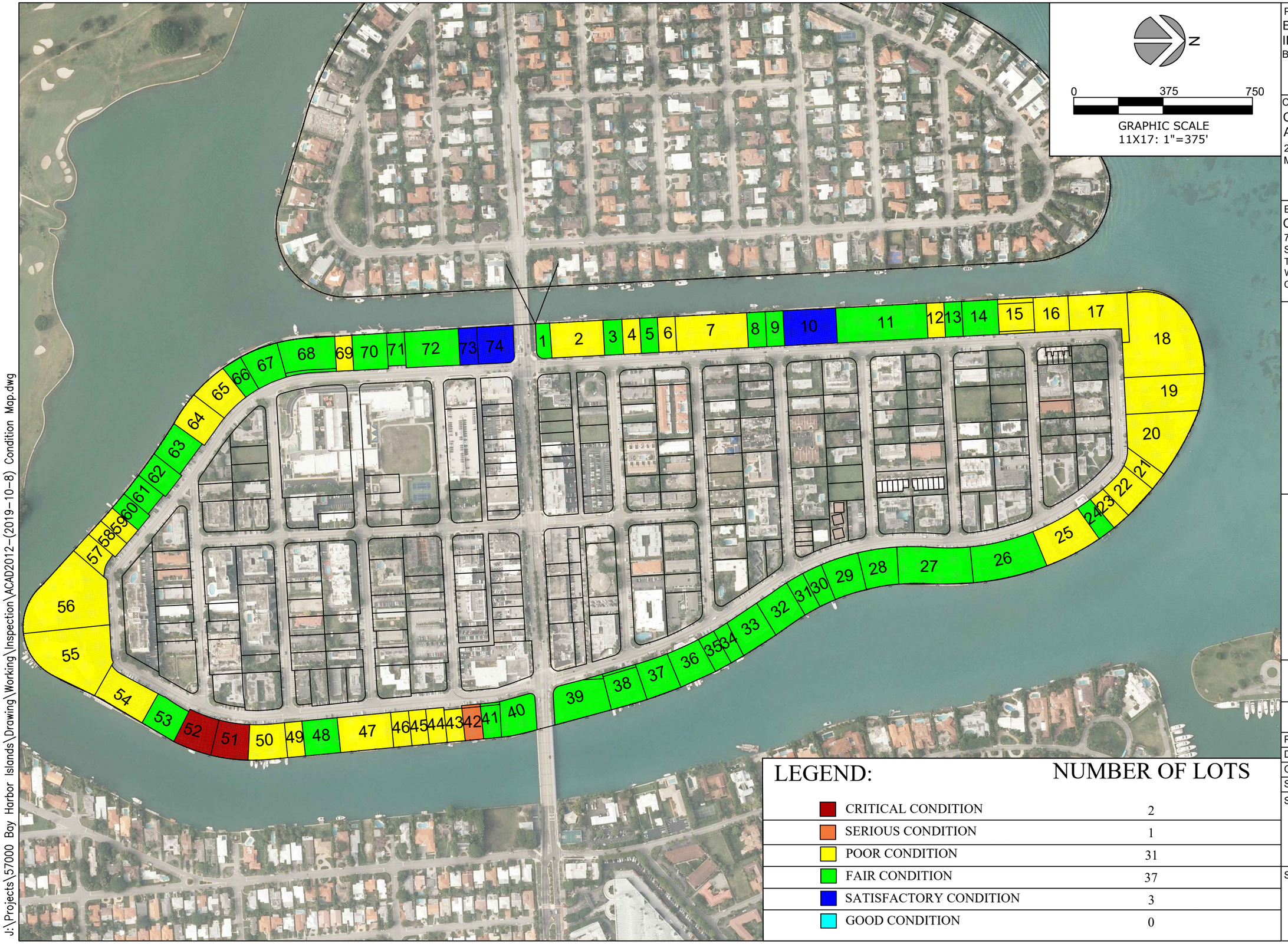
SCALE	AS SHOWN

SHEET TITLE
BROADVIEW ISLAND CONDITION MAP - DOCKS

SHEET 3 OF 5

E-1.2

J:\Projects\57000 Bay Harbor Islands\Drawing\Working\Inspection\ACAD2012-(2019-10-8) Condition Map.dwg



N

0 375 750

GRAPHIC SCALE
11X17: 1"=375'

LEGEND:

	NUMBER OF LOTS
CRITICAL CONDITION	2
SERIOUS CONDITION	1
POOR CONDITION	31
FAIR CONDITION	37
SATISFACTORY CONDITION	3
GOOD CONDITION	0

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PROJECT NO.	57000
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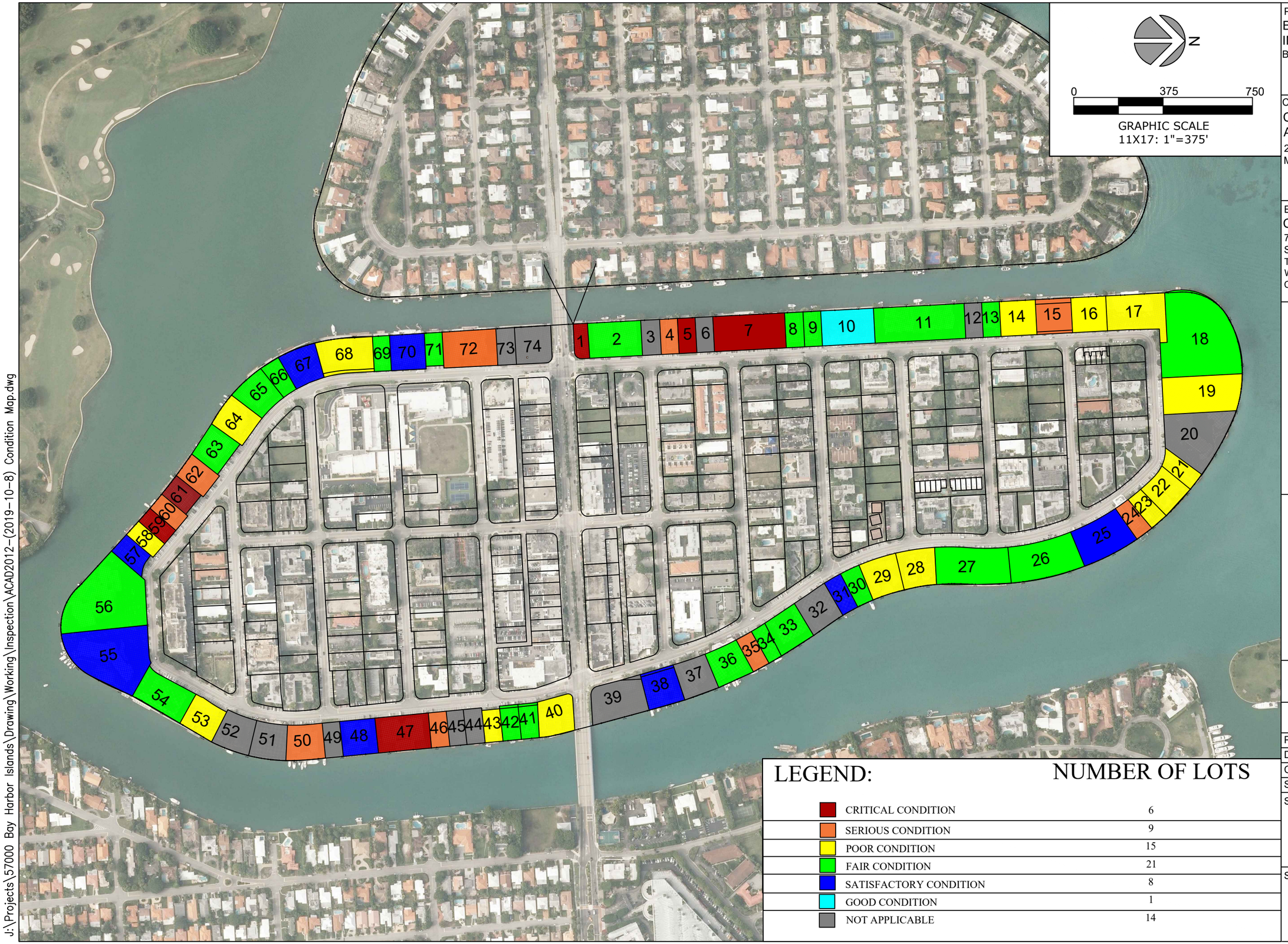
SCALE	AS SHOWN

SHEET TITLE
BAY HARBOR ISLAND CONDITION MAP - SEAWALL

SHEET 4 OF 5

E-1.3

J:\Projects\57000 Bay Harbor Islands\Drawing\Working\Inspection\ACAD2012-(2019-10-8) Condition Map.dwg



N

0 375 750

GRAPHIC SCALE
11X17: 1"=375'

LEGEND:

	NUMBER OF LOTS
CRITICAL CONDITION	6
SERIOUS CONDITION	9
POOR CONDITION	15
FAIR CONDITION	21
SATISFACTORY CONDITION	8
GOOD CONDITION	1
NOT APPLICABLE	14

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PROJECT NO.	57000
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SCALE	AS SHOWN

SHEET TITLE
BAY HARBOR ISLAND CONDITION MAP - DOCKS

SHEET 5 OF 5

E-1.4

J:\Projects\57000 Bay Harbor Islands\Drawing\Working\Inspection\ACAD2012-(2019-10-8) Condition Map.dwg

Appendix F
Seawall Type Mapping

CUMMINS | CEDERBERG
Coastal & Marine Engineering

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INSPECTION PROJECT
BAY HARBOR ISLANDS, FLORIDA

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PROJECT NO.	57000
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SCALE	AS SHOWN

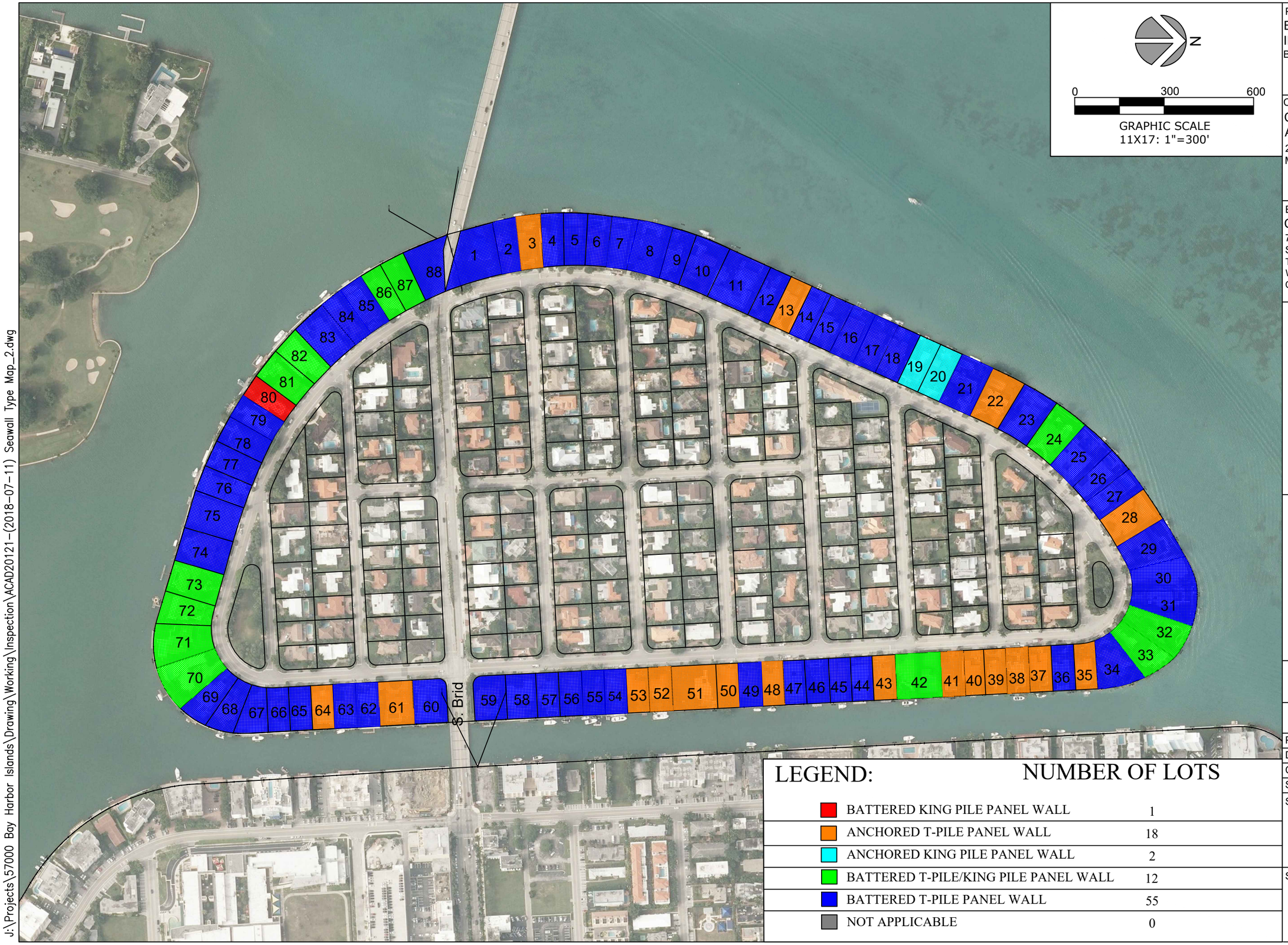
SHEET TITLE

SEAWALL TYPE MAP

SHEET 1 OF 3

F-1.0

J:\Projects\57000 Bay Harbor Islands\Drawing\Working\Inspection\ACAD20121-(2018-08-30) Seawall Type Map_2.dwg



N

0 300 600

GRAPHIC SCALE
11X17: 1"=300'

PROJECT
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INSPECTION PROJECT
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LEGEND:	NUMBER OF LOTS
BATTERED KING PILE PANEL WALL	1
ANCHORED T-PILE PANEL WALL	18
ANCHORED KING PILE PANEL WALL	2
BATTERED T-PILE/KING PILE PANEL WALL	12
BATTERED T-PILE PANEL WALL	55
NOT APPLICABLE	0

ISSUE	DATE	SUBMISSION / REVISION

PROJECT NO.	57000
DRAWN	LBA
CHECKED	JT/JAC
SCALE	AS SHOWN

SHEET TITLE

SEAWALL TYPE MAP

SHEET 2 OF 3

F-1.1

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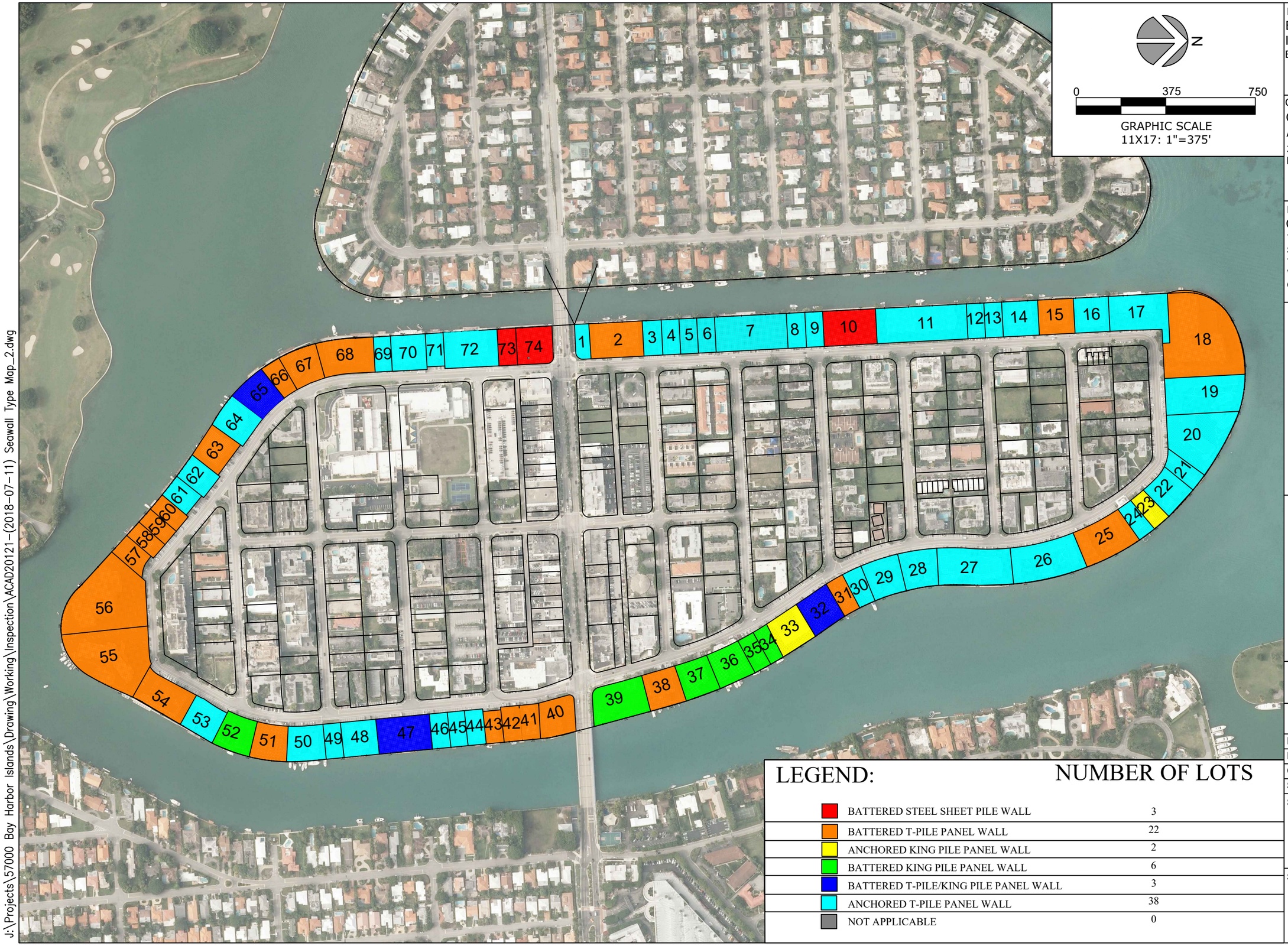

N

0 375 750

GRAPHIC SCALE
11X17: 1"=375'

LEGEND:

	NUMBER OF LOTS
BATTERED STEEL SHEET PILE WALL	3
BATTERED T-PILE PANEL WALL	22
ANCHORED KING PILE PANEL WALL	2
BATTERED KING PILE PANEL WALL	6
BATTERED T-PILE/KING PILE PANEL WALL	3
ANCHORED T-PILE PANEL WALL	38
NOT APPLICABLE	0

PROJECT
BAY HARBOR ISLANDS
INSPECTION PROJECT
BAY HARBOR ISLANDS, FLORIDA

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ISSUE	DATE	SUBMISSION / REVISION

PROJECT NO.	57000
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CHECKED	JT/JAC
SCALE	AS SHOWN

SHEET TITLE

SEAWALL TYPE MAP

SHEET 3 OF 3

F-1.2

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Appendix G
ASCE Routine Underwater Condition Assessment Rating

CUMMINS | CEDERBERG
Coastal & Marine Engineering

Table G-1: Routine Underwater Condition Assessment Ratings[1]

Rating		Description
6	Good	No visible damage, or only minor damage is noted. Structural elements may show very minor deterioration, but no overstressing is observed. No Repairs are required.
5	Satisfactory	Limited minor to moderate defects or deterioration are observed, but no overstressing is observed. No Repairs are required.
4	Fair	All primary structural elements are sound, but minor to moderate defects or deterioration is observed. Localized areas of moderate to advance deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3	Poor	Advanced deterioration or overstressing is observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority bases with urgency.
1	Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high priority basis with strong urgency.

Reference: American Society of Civil Engineers (ASCE) Manual on Engineering Practice No. 101: Underwater Investigations: Standard Practice Manual, 2001

[1] Ratings are used to describe the existing in-place structure compared with the structure relative to its condition when newly built. The fact that the structure may have been designed for loads that are lower than the current standards for design should have no influence on the ratings.

Appendix H
Condition Rating Photos

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Coastal & Marine Engineering

Seawall Condition Examples

Satisfactory

Fair

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Seawall Condition Examples

Poor

Serious (Severe)

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Seawall Condition Examples

Critical

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Dock Condition Examples

Satisfactory

Fair

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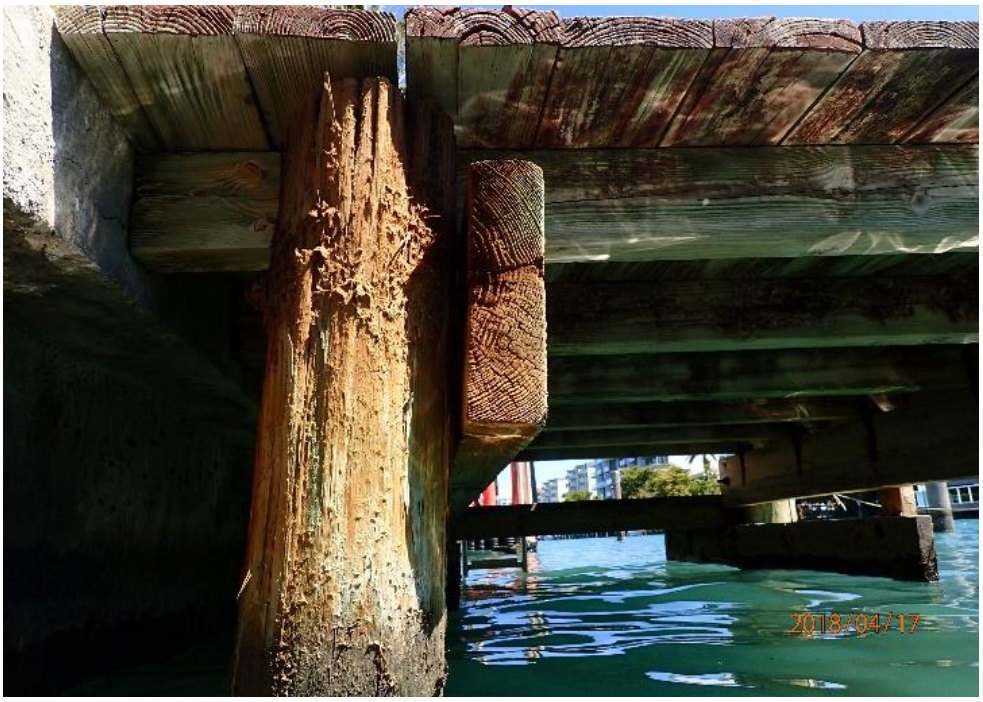
Dock Condition Examples



Poor

Serious (Severe)

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Town of Bay Harbor Islands
2018 Seawall Inspection

Dock Condition Examples

Critical

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Appendix I
Topographic Maps

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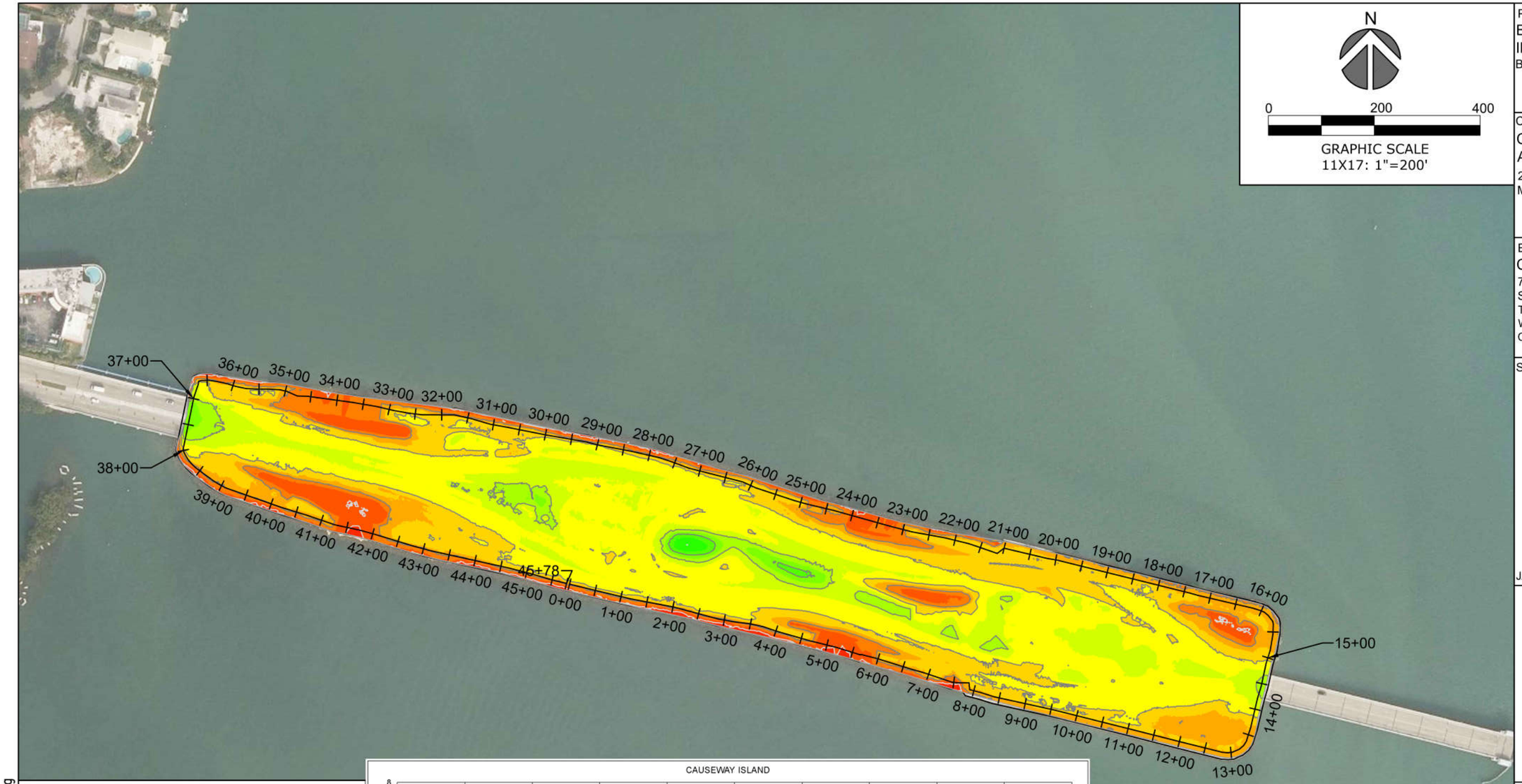
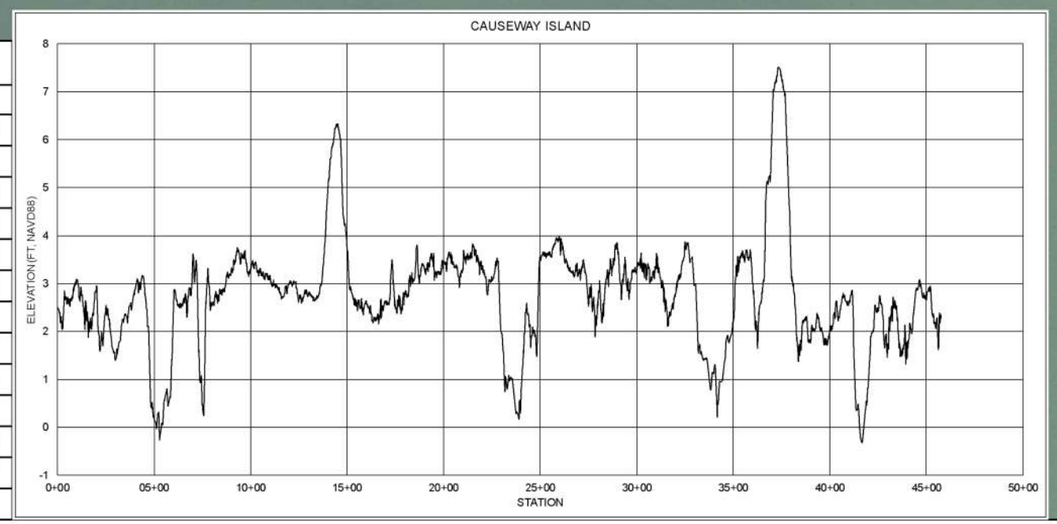
Coastal & Marine Engineering



Elevations Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-2.00	-1.00	28.91	
2	-1.00	0.00	5586.08	
3	0.00	1.00	34338.15	
4	1.00	2.00	37757.93	
5	2.00	3.00	59628.82	
6	3.00	4.00	115105.77	
7	4.00	5.00	227529.77	
8	5.00	6.00	78585.19	
9	6.00	7.00	17796.32	
10	7.00	8.00	5999.64	
11	8.00	9.00	2130.59	
12	9.00	10.00	1318.24	
13	10.00	11.00	0.79	



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BAY HARBOR ISLANDS, FLORIDA

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1	3/29/18	INSPECTION LAYOUT

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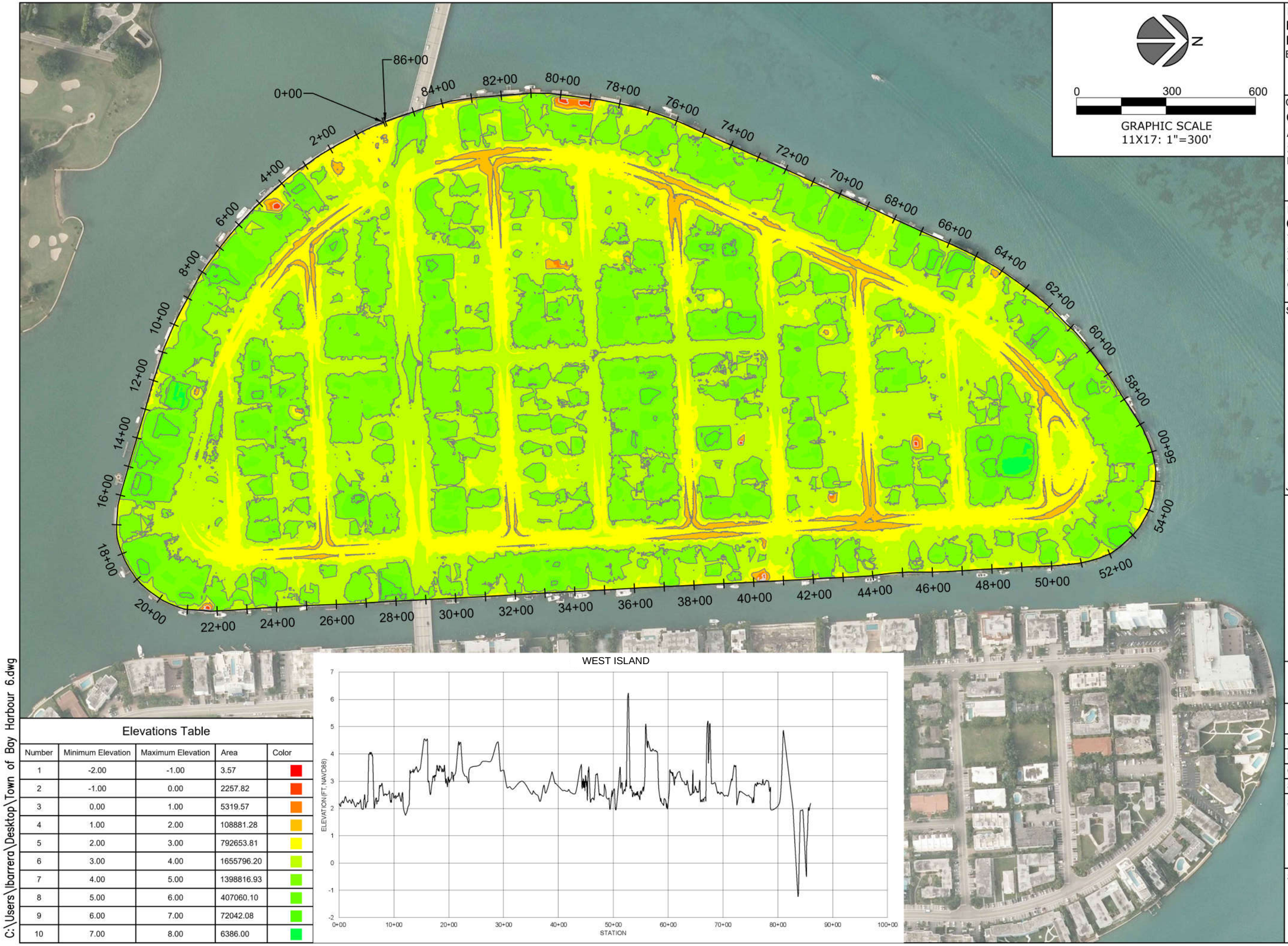
SCALE	AS SHOWN

SHEET TITLE
BROAD CAUSEWAY ISLAND

SHEET 1 OF 3

I-1.0



N

0 300 600

GRAPHIC SCALE
11X17: 1"=300'

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
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2	-1.00	0.00	2257.82	
3	0.00	1.00	5319.57	
4	1.00	2.00	108881.28	
5	2.00	3.00	792653.81	
6	3.00	4.00	1655796.20	
7	4.00	5.00	1398816.93	
8	5.00	6.00	407060.10	
9	6.00	7.00	72042.08	
10	7.00	8.00	6386.00	

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PROJECT NO.	57000
DRAWN	LBA
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SCALE	AS SHOWN

SHEET TITLE
WEST ISLAND

SHEET 2 OF 3

I-1.1

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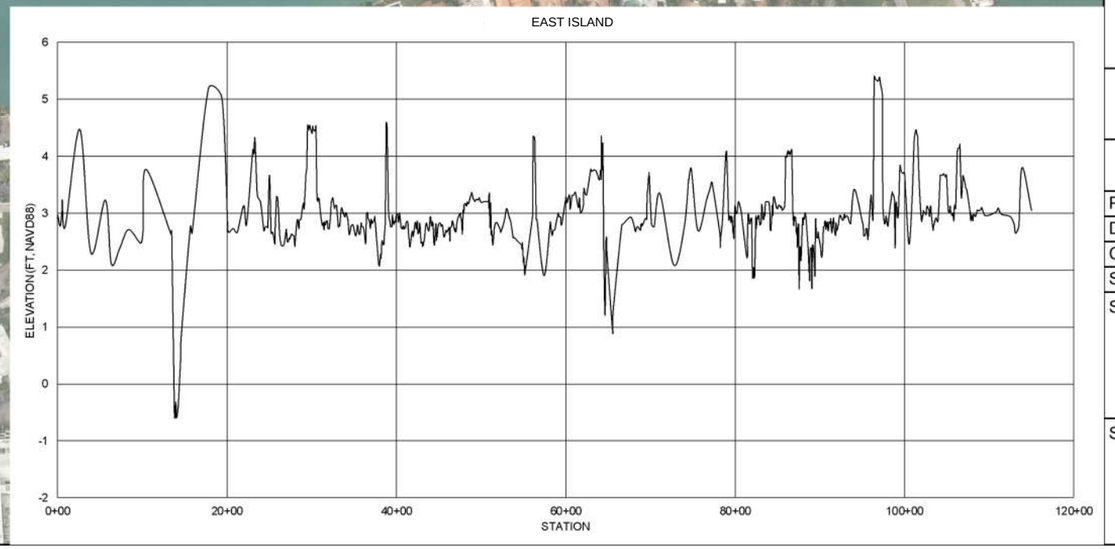
N

0 375 750

GRAPHIC SCALE
11X17: 1"=375'

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-13.00	-3.00	21143.55	
2	-3.00	-2.00	3723.68	
3	-2.00	-1.00	5795.74	
4	-1.00	0.00	17286.84	
5	0.00	1.00	25519.67	
6	1.00	2.00	60270.04	
7	2.00	3.00	1191416.92	
8	3.00	4.00	2622364.18	
9	4.00	7.00	2518893.53	
10	7.00	9.00	82231.94	



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1	3/29/18	

PROJECT NO.	57000
DRAWN	LBA
CHECKED	JT/JAC
SCALE	AS SHOWN

SHEET TITLE

EAST ISLAND

SHEET 3 OF 3

I-1.2

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Appendix J
Examples of Seawall Types

CUMMINS | CEDERBERG
Coastal & Marine Engineering

Seawall Type Examples

Anchored T-Pile

Battered T-Pile

Seawall Type Examples

Anchored King Pile

Battered King Pile

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Seawall Type Examples

Battered King/T-Pile

Battered Steel Sheet Pile