

TIN CITY



WATERFRONT RESTORATION AFTER HURRICANE IRMA



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Introduction and History

by Todd Turrell

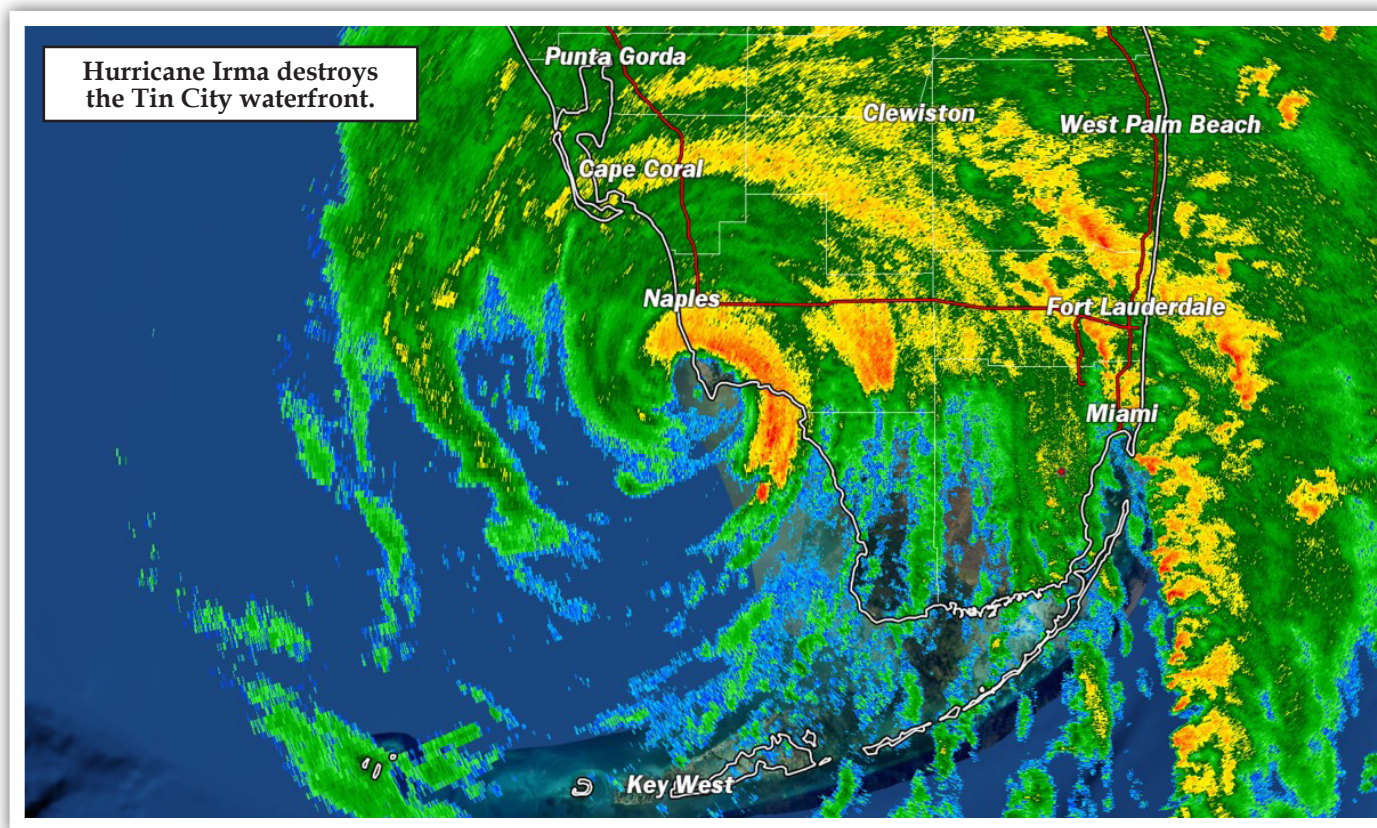
Tin City is a group of metal buildings along the Gordon River just south of U.S. 41. These tin-roofed buildings were the center of Naples Waterfront economic development in the 1920s, and in the 1970s they were transformed to become “The Old Marine Marketplace at Tin City.” Historically the property served as a dock for fishery operations including shellfish (clams, crabs, shrimp and oysters) and fin fish including kingfish and spanish mackerel, grouper, snapper, mullet, snook, redfish and sea trout. The buildings that remain today were also used for boat building and repairs, including a boat lift on rails in a slipway that was filled in along the shoreline in 1975. A portion of the steel rails and some of the wheels for the boat lift have been preserved on the site.

The concrete seawall that failed during Hurricane Irma on Sept. 10, 2017 was built 42 years earlier in 1975 and consisted of steel reinforced concrete panels buried down to hard rock along the shoreline, with a concrete cap and steel tie backs anchoring the top of the wall back to land. When the wall failed during the storm two older wood seawalls were exposed, one built in front of the other. The oldest of the wood walls likely dates back to early development in the 1920s or 1930s. While dredging the river during those early years a Naples pioneer found several Mastodon vertebrae in the mud. Mastodons are elephant-like mammals that lived in a much cooler Florida during the last Ice Age, up to their extinction some 10,000 years ago. Sea level was more than 100 feet lower then and the Tin City shoreline would have looked much different!



The north entrance to Tin City restaurants and shops.





Above: Hurricane Irma radar image Sept. 10, 2017 at 5:15 P.M., with the eye of the storm over Naples.



Seawall and boardwalk destruction after the hurricane. The old concrete seawall under the boardwalk broke away and leaned dangerously into the river.



The new boardwalk opened Thanksgiving 2018, atop a modern steel and concrete seawall.

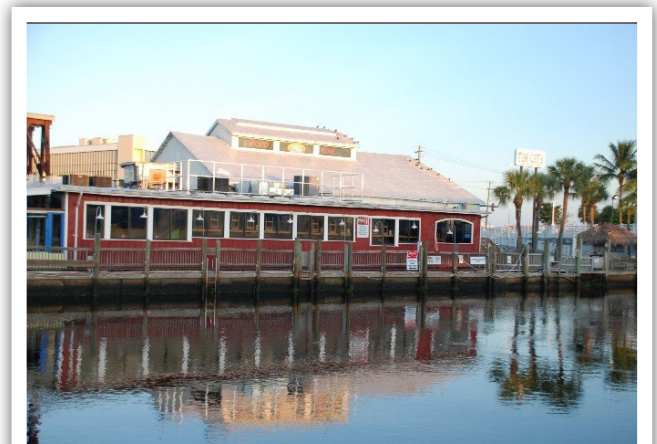
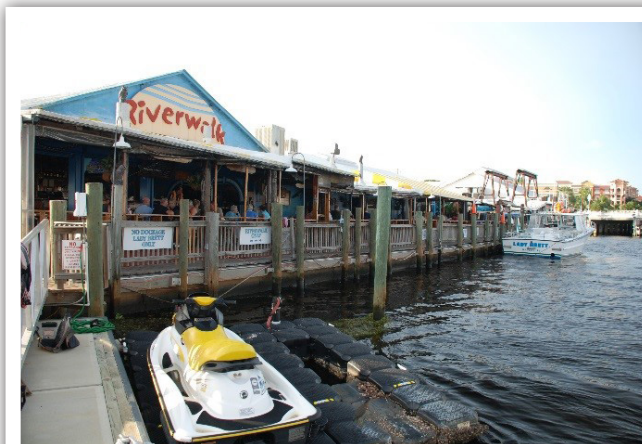


The Effects of Hurricane Irma on Tin City and Naples Bay

On Sept. 10, 2017 Hurricane Irma struck Naples and Tin City as a Category 3 hurricane. The storm formed in the Atlantic and passed over Barbuda and St. Martin before moving through the British Virgin Islands, the southern Bahamas, northern Cuba, then onward to the United States. Hurricane Irma caused severe property damage, estimated around \$50 billion dollars, and over 100 deaths (84 in Florida).



After causing widespread devastation while passing over the Florida Keys, particularly in areas between Marathon and Key West, Irma approached Naples from the south coming ashore near Marco Island. Widespread damage was experienced on Marco including seawalls, docks, homes, businesses and the utilities that serve them.



Riverwalk and Pinchers in 2015. Hundreds of people were employed at these restaurants, boat tours and the shops in Tin City before Hurricane Irma impacted the area.



After the storm passed over Marco Island it traveled north along the coast, striking Naples with devastating winds and rains. The maximum wind gust at the Naples airport was reported to be 142 mph. As Irma's eye approached Naples the strong easterly winds caused extremely low water levels not seen since Hurricane Donna (1960) in Naples Bay and along the Gordon River where Tin City is located.



Water rushing under the U.S. 41 Bridge just north of Tin City as the storm approached Naples, easterly winds blowing the water out of Naples Bay. Taken Sept. 10, 2017 at 9:00 A.M.

Hurricane Irma would have done even more damage if the full tidal surge predicted had impacted Naples Bay after the eye had passed. Winds prior to the eye were from the east due to the counter clockwise rotation of the storm and were dampened by having to pass over the land mass of Florida. These winds pushed water out of Naples Bay. After the eye passed the wind reversed and came out of the west over the open waters of the Gulf of Mexico, pushing water back into the Bay. These westerly winds could have pushed a dangerous storm surge into the Naples area, causing widespread flooding and additional property damage.

Fortunately, as the storm came ashore near Marco Island the winds began to subside, reducing the storm surge to much less than the 15 feet possible and only a small surge came over the seawall at Tin City. Unfortunately, the worst case scenario for the wall had already occurred when hurricane force easterly winds pushed water out

of the Bay. This caused a large differential in water levels between high water on the landward side of the seawall and very low water on the seaward face of the wall along the river. This difference was increased since rain had swollen ground water levels to the top of the seawall's cap. The resulting pressure was too much for the seawall to withstand and failure occurred as the concrete cap and attached panels rotated towards the river. When the wall failed the boardwalk went with it, closing down Tin City's waterfront promenade for over a year.

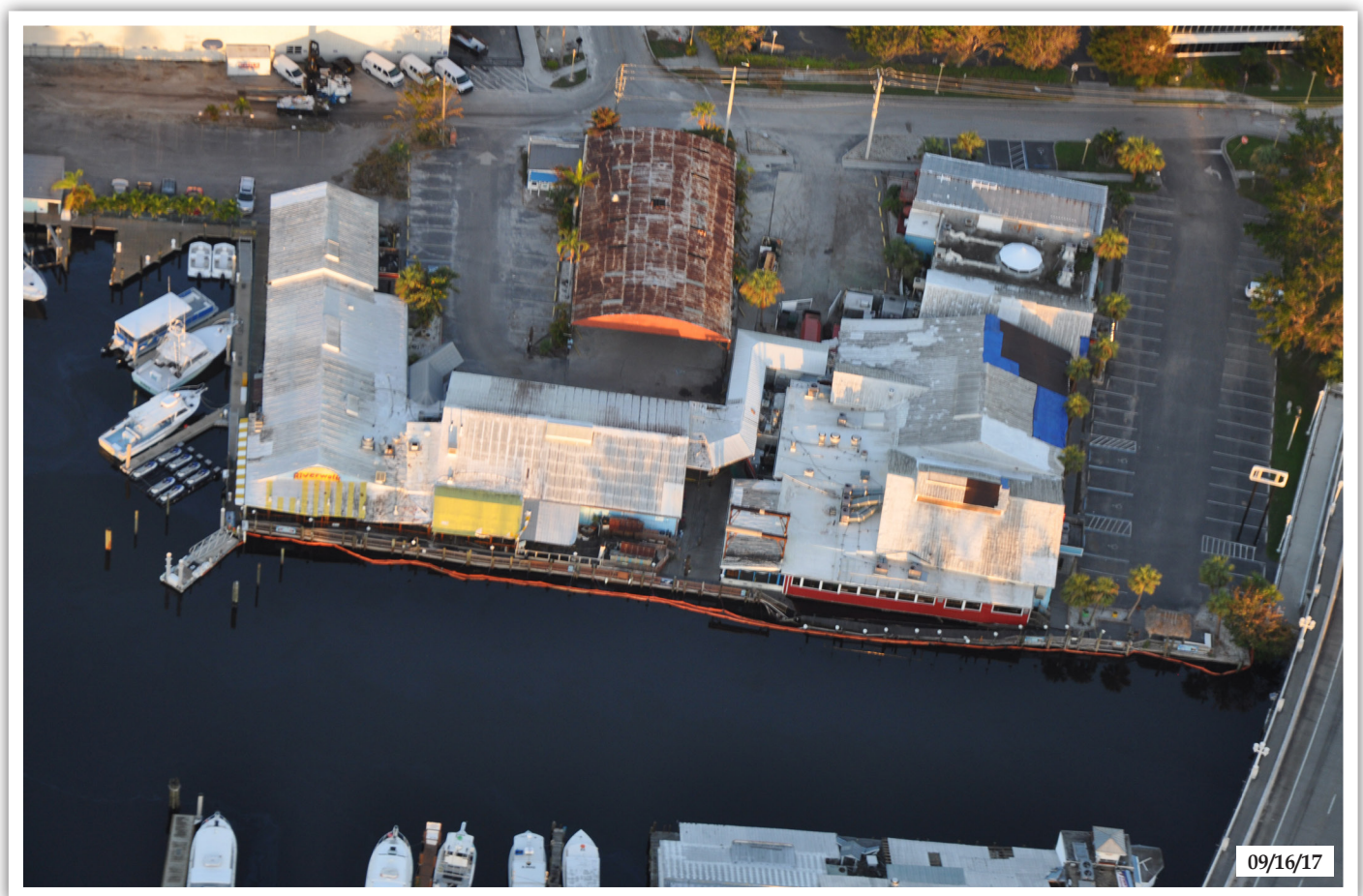


Extreme low water in an area of Naples Bay caused by Hurricane Irma. Note the large, exposed areas of pilings over the canal bottom and the height of the boat on the left next to shore.



Post Hurricane Damage Photos & Failure of Tin City's Seawall

Hurricane Irma was the most damaging storm to hit the southwest coast of Florida since Hurricane Donna exactly 57 years earlier on Sept. 10, 1960. At that time Naples had a population of about 5,000 and Collier County 15,000, compared to today's populations of Naples (just over 20,000) and Collier County (370,000). Wind speeds in Donna were reported to be 145 mph when she made landfall in the Florida Keys and a storm surge of roughly 11 feet was reported in Southwest Florida. The top wind speed from Irma was measured in Naples at 142 mph but the storm surge was much less. The water in Naples Bay was sucked down to historically low levels by Irma, just like what occurred in Donna, but the storm surge was less as the winds subsided after the hurricane's eye passed.



Aerial view of Tin City six days after the storm impacted the area. The orange line along the shoreline was a floating turbidity curtain used to contain debris from the damaged boardwalk area.





Damage to Tin City in front of Pinchers Restaurant two days after Hurricane Irma impacted the area.



A fallen tree in Tin City's parking lot up-ended a Florida Power & Light transformer, seen behind the tree roots.





Looking south down the failed seawall and boardwalk.



A view from atop the U.S. 41 bridge.





Looking south in front of Pinchers where sections of the wall sheared apart.



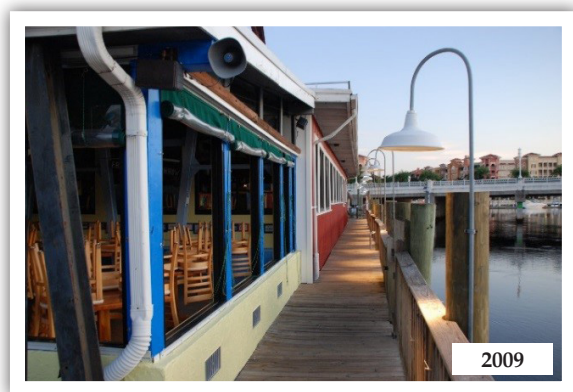
The damaged boardwalk in front of Riverwalk at the southern end of Tin City.



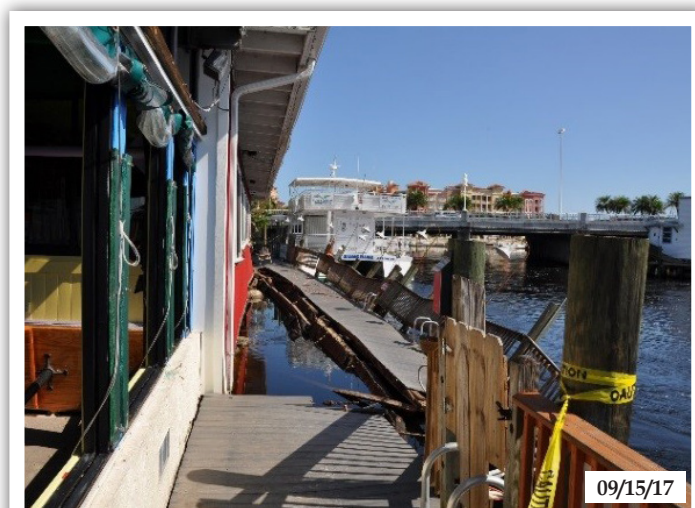
Emergency Stabilization to Allow Restaurants to Open for 2017/2018 Season

Tin City is made of several metal buildings with a wooden boardwalk that provides public access along the Gordon River. The buildings house a variety of shops popular with tourists along with two very busy waterfront restaurants; Pinchers Crab Shack and Riverwalk. Pure Florida is also located on site, offering sunset cruises, boat rentals and fishing trips. The shops, restaurants and tour boats depend on each other to bring people into the facility. It was imperative for the seawall to be stabilized as soon as possible so hundreds of people employed there could go back to work including shopkeepers, cooks, servers, boat crews, the managers and support staff.

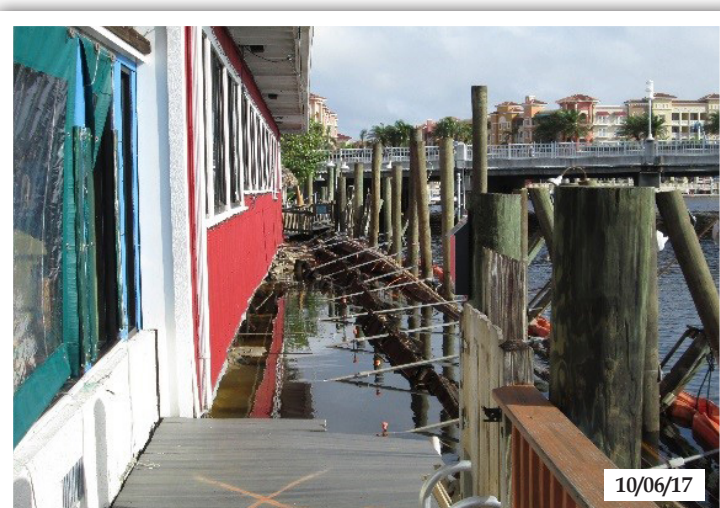
Stabilization of the seawall was accomplished with wooden marine pilings, some of which were tied back to land using horizontal steel anchors. The restaurant decks were repaired with vertical piles drilled down to solid rock. Once the piles reached rock, they were fitted with jack plates that were attached to beams supporting the wood decks. The decks were then lifted up until they were level enough for their former use as restaurant seating areas. A structural engineer certified the work as completed, then deck planking that had been removed for the piling installation was replaced and the restaurants reopened.



Tin City Waterfront in 2009.



View looking north towards U.S. 41 after Hurricane Irma in September 2017.



The same view in October after wood pilings were placed to stabilize the old seawall in place until a new wall could be built.



PINCHERS



Pinchers seawall leaning into the river before stabilization work began.



Pinchers seawall after stabilization pilings and horizontal steel tiebacks were put in place, keeping the seawall from leaning further into the river.





Helical screw anchor (tieback) being installed to support the seawall stabilization pile.



Restaurant deck in Pinchers removed to install vertical helical piles inside of building where the old sub-floor framing had to be rebuilt.



The old framing under the floor boards was rotten and needed to be replaced in areas before the restaurant floors could be jacked up to their former elevation.



New sub-floor framing with screw jacks attached to lift Pinchers restaurant deck back up.

The bar floor at Pinchers after the floor boards were put back in place once repairs were complete.



RIVERWALK



Damage from the hurricane shown in front of Riverwalk looking north towards U.S. 41.



Installing steel helical tiebacks connected through the new seawall stabilization piles at Riverwalk.





Vertical helical piles on alternating sides of new sub-floor beams at Riverwalk.



Riverwalk seawall stabilization piles.



Riverwalk seawall stabilization pilings in place looking south.





New decking in place after the sub-floor had been rebuilt and jacked back up into place.



Riverwalk reopened for service in October 2017, tables and chairs in place on level decking after repairs were complete.



Grand Re-Opening on October 9, 2017 - Governor Scott's Dedication

On October 9, 2017, Florida Governor Rick Scott officially reopened the Tin City Waterfront. The event was led by the Honorable Bill Barnett, Naples Mayor, along with Collier County Commissioner Penny Taylor and Project Engineer Todd Turrell of Turrell, Hall & Associates. Attendees enjoyed a presentation of the restoration efforts and a ribbon cutting ceremony with the owner of Tin City Bert Pohlmann and the Naples Chamber of Commerce. Governor Scott toured the Tin City shops afterwards, greeting happy shop owners and employees.



Governor Scott in his signature blue "Navy" cap addresses crowd at the Grand Re-Opening.



Ribbon cutting by Governor Scott, Naples Mayor Bill Barnett and Tin City owner Bert Pohlmann.





Project Engineer Todd Turrell describes the storm impacts and repairs.



Above and below right: Governor Scott surveys the repairs and tours the shops and restaurants.





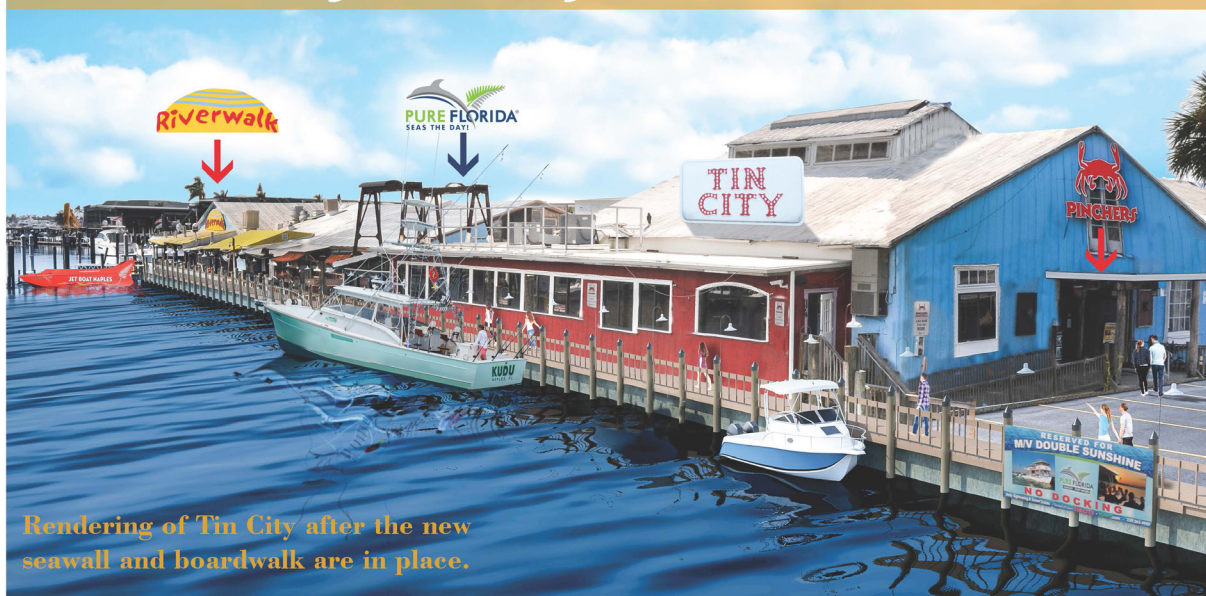
Governor Scott visits with Tin City employees, including Riverwalk (above) and Pinchers (right).



Governor Scott and Commissioner Penny Taylor with Lance and Harry Julian of Pure Florida, displaying an informational sign regarding Hurricane Irma and the repair efforts at Tin City.



Tin City Waterfront Restoration



Hurricane Irma Damage



Tin City, looking south from U.S. 41 after the storm.



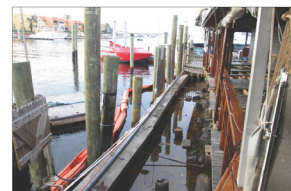
Close up of Irma's damage to Tin City.



White water under U.S. 41 bridge north of Tin City during Hurricane Irma's easterly winds with over 140 mph gusts. Water rushed out of Naples Bay to historic low water levels that led to the collapse of the old seawall. A new, stronger seawall will be installed over the coming months.



Anchors being installed to stabilize the wall at Pincher's.



New pilings in place, stabilizing Riverwalk's wall.

Restoration Team

Turrell, Hall & Associates, Inc. Todd T. Turrell, P.E.
Existing Structures Engineering, Inc. Byron Evetts, P.E.
Toscana Homes, Rich Compagnone, Contractor
Florida Marine Construction, Inc., seawall stabilization
Seascape Builders, Jack Brugger, Contractor
Property Manager, Filippo Mastrocola
Ram Jack, helical piling installers
Coastline Construction, framing and substructure
City of Naples Building Department

Special thanks to the Tin City ownership who never hesitated to immediately initiate the repairs needed to get people back to work.

Turrell, Hall & Associates, Inc.
marine & environmental consulting

Hurricane Irma Over Naples



Hurricane Irma impacted Naples on September 10, 2017.
Radar image taken at 5:18 p.m.

Sign posted at Tin City to inform visitors of the impacts from Hurricane Irma and the restoration plan.



New Seawall and Boardwalk Plans for Summer 2018 Construction

After the remains of the old seawall and boardwalk were stabilized and the restaurant decks were jacked back into place, the restaurants were opened and people went back to work at Tin City in October 2017.

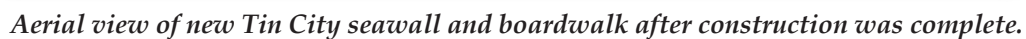
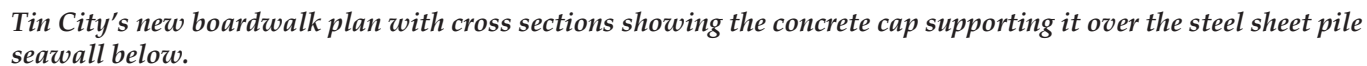
Meanwhile the engineering team went to work devising plans for a new type of seawall that would stand on its own and not depend on tie-backs, the reason the former wall failed (steel tie-backs anchored the landward side of the seawall had rusted away, leaving the wall vulnerable during the hurricane).

The new system of seawall would rely on thick, steel piles drilled deep into rock under the river bottom. A new concrete cap would then tie sections of steel sheetpile together, all supported by the new pilings independent of any tie backs. The new boardwalk would be supported on the seaward side by the concrete cap and on the landward side by a new row of pressure treated pilings driven deep into the ground. A special hardwood was used to construct the boardwalk deck, the same material the engineers had used on the new City Dock and for repairs to the Naples Pier after Hurricane Irma.

The new plans were permitted by Federal, State and Naples building officials and then put out to bid with local and regional marine contractors capable of doing the work, which commenced in May 2018.

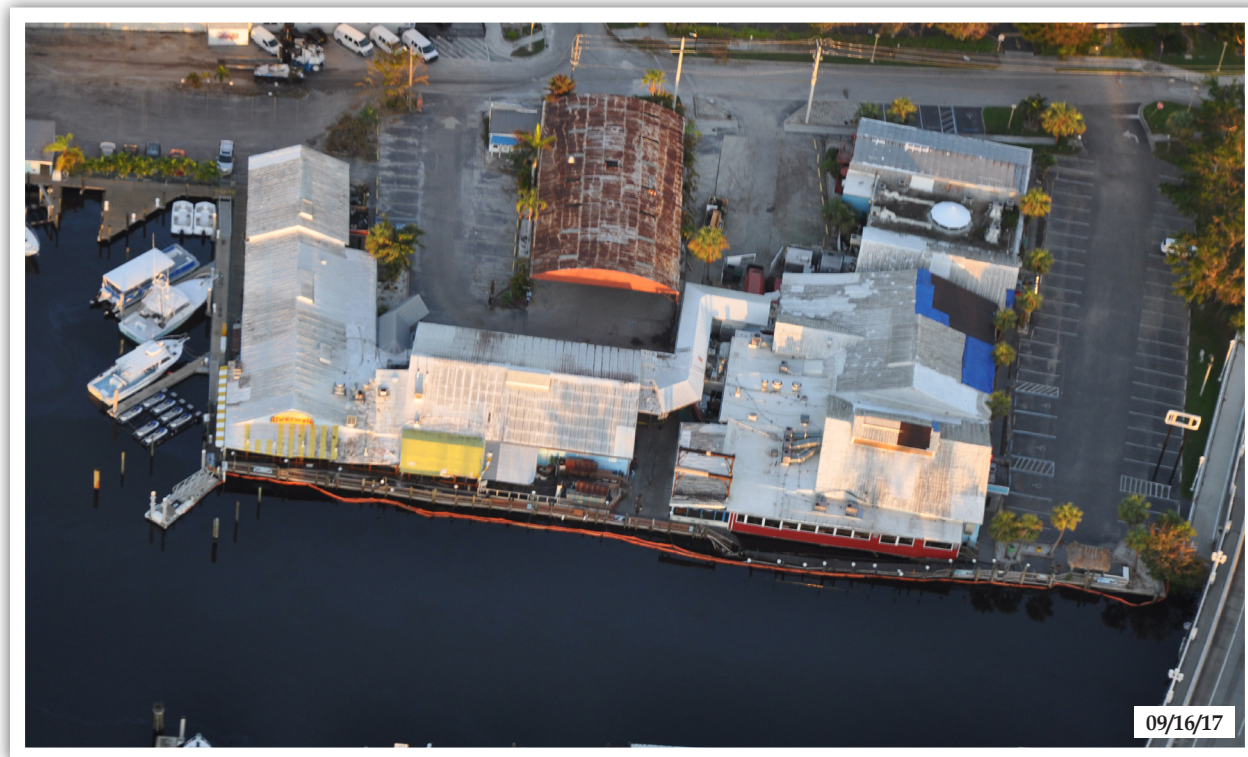
*The new seawall and boardwalk,
December 28, 2018.*



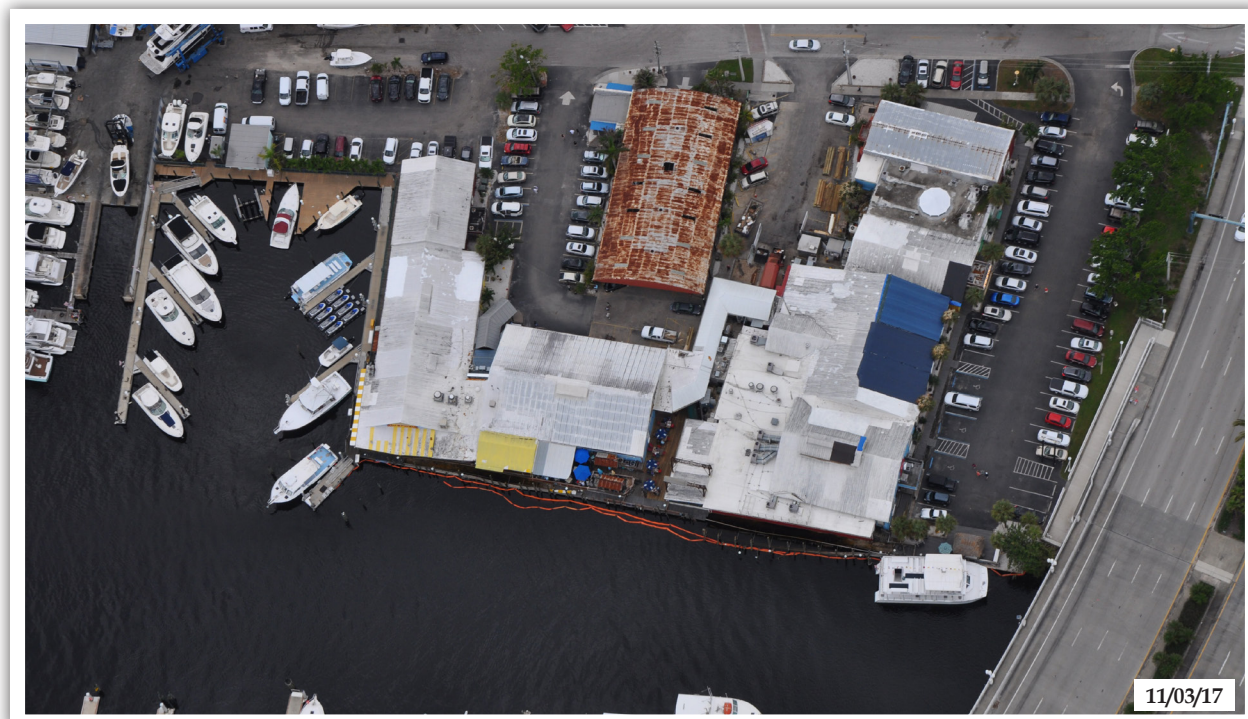


Aerial Photo Chronology

Tin City is on the final approach to Runway 5 at Naples Airport. All aerals were taken by Project Engineer Todd Turrell from his plane in close coordination with the Naples Airport Tower, whose assistance was greatly appreciated.



Tin City 6 days after Hurricane Irma. Note the orange turbidity curtains along the shoreline which were put in place to contain any floating debris from the damaged seawall and boardwalk.



By early October 2017 the shoreline had been stabilized but could not be rebuilt until the summer of 2018 due to intensive use of the property during tourist season. The restaurants were opened in this photo and tour boat "Double Sunshine" can be seen next to the U.S. 41 Bridge (at right).





Construction of the new seawall and boardwalk required the use of a barge mounted crane and rock drill. The blue and white crane can be seen on the left side of the barge and the yellow rock drill on the right side next to the bridge. "Double Sunshine" was moved to a temporary mooring on south side of the property (at left).



The completed project with Tin City's new seawall and boardwalk in place. The orange turbidity curtains have been removed from the shoreline and "Double Sunshine" has moved back to her permanent berth near the U.S. 41 Bridge. The new Indian Chickee Hut can be seen on shore at the far right side.



Construction Progress Photos

Repairs in progress from Hurricane Irma.

We apologize for any inconvenience caused.

TIN CITY

Signs went up in June 2018 as construction began.

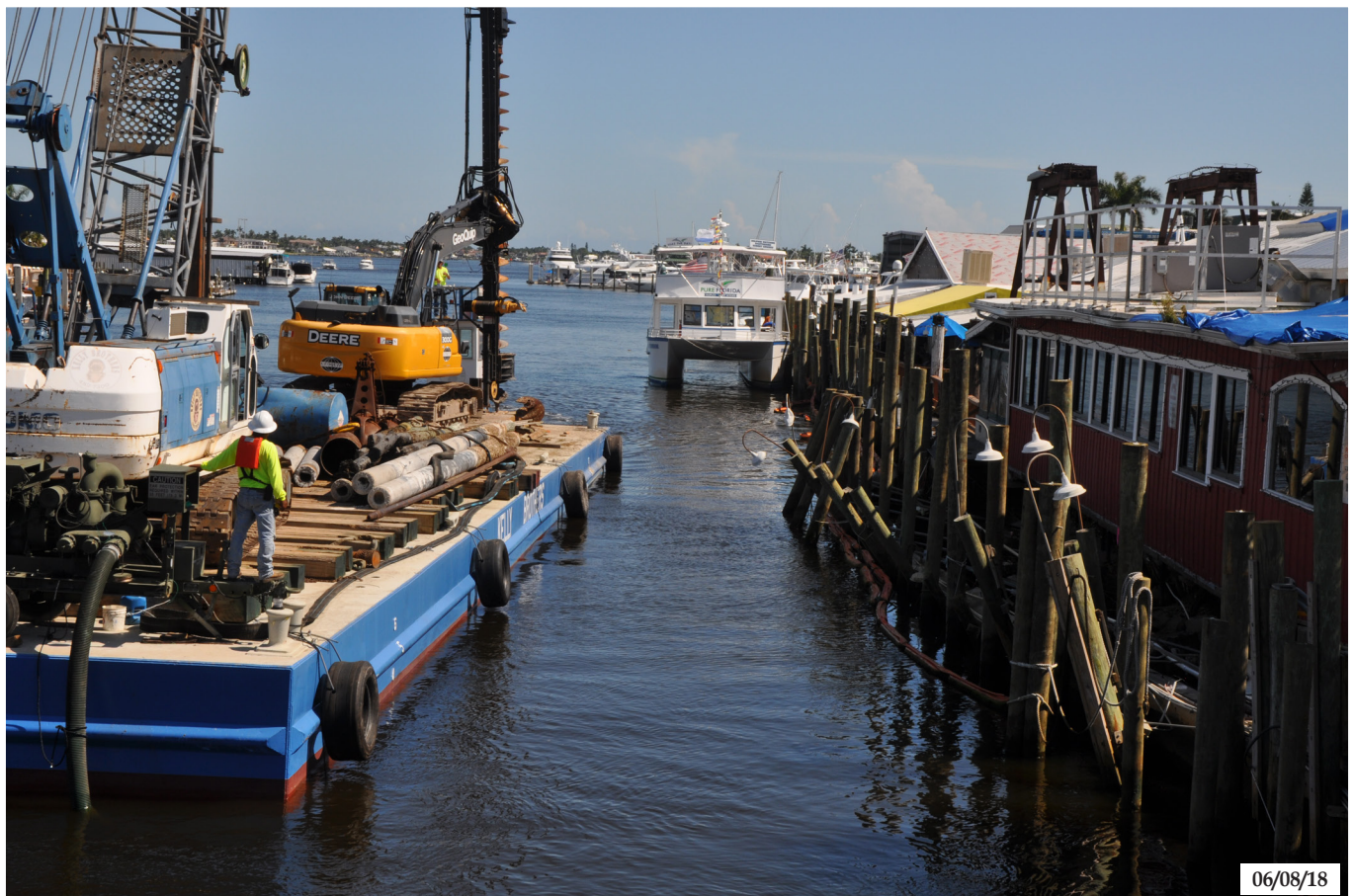


Kelly Brothers marine contractors' barge arriving on site with a large crane, passing Double Sunshine in front of Riverwalk.





Pelicans enjoying the turbidity curtains that were deployed to contain construction debris.



Kelly Brothers' barge moving into place with rock drill ready.





Original Chickee Hut being removed prior to deck demolition.



The damaged state of the Tin City waterfront as construction begins on the new seawall.





Drilling for steel H-piles to support the new wall.



Drilling equipment for steel H-piles, drill to left.





Eroded sediment under Pinchers Restaurant showing storm debris.



Cutting off old concrete seawall panel landward of the new steel wall.





Zinc anode welded on steel sheet pile below the water line for corrosion control.



Steel H-piles arriving on site by truck.



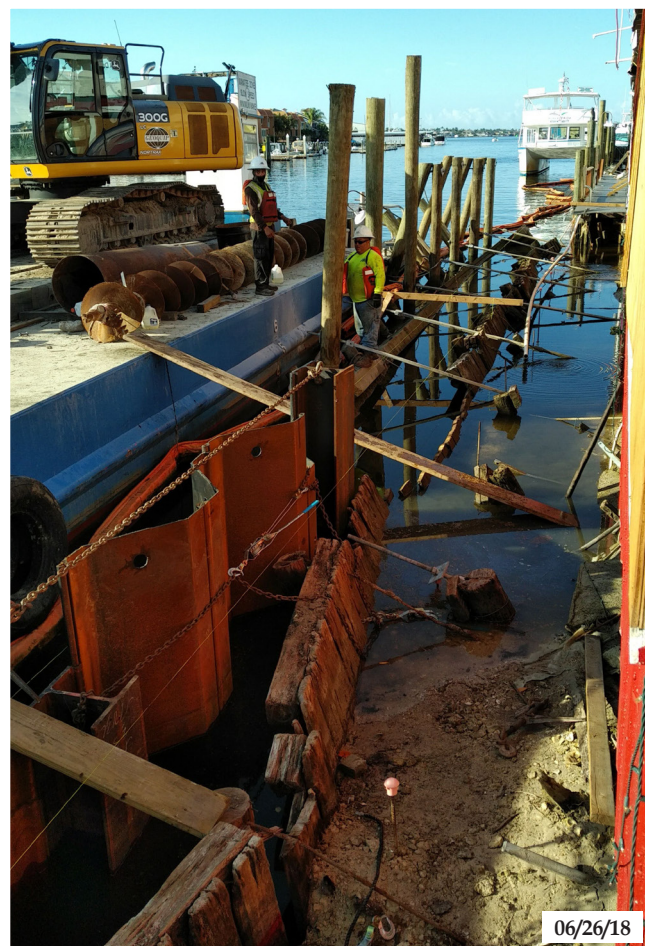


Drilling into rock for “H” piles that would eventually support the new wall.





Steel sheet pile lifted into place in front of Pinchers.



Steel sheet pile taking shape outside the old wood wall in the foreground, tour boat Double Sunshine in the background.





Old concrete seawall panel being lifted onto shore for disposal.





Project Engineer on site, making sure the old wood wall was retained to hold soil during construction.



Drilling for H-piles in front of Pinchers.





Seawall cap form with steel in place next to U.S. 41 bridge.



Crew placing steel re-bar for inside the seawall cap.





Seawall cap formed with steel reinforcement ready for concrete to be poured in front of Pinchers.





Pouring concrete into the seawall cap form.





Concrete being pumped from the black hose into the form, forcing the water out.



Concrete being vibrated into seawall cap form to prevent voids in the mixture.





Concrete cap being finished before it hardens.



Completed area of cap with the next section of form and steel ready for concrete.



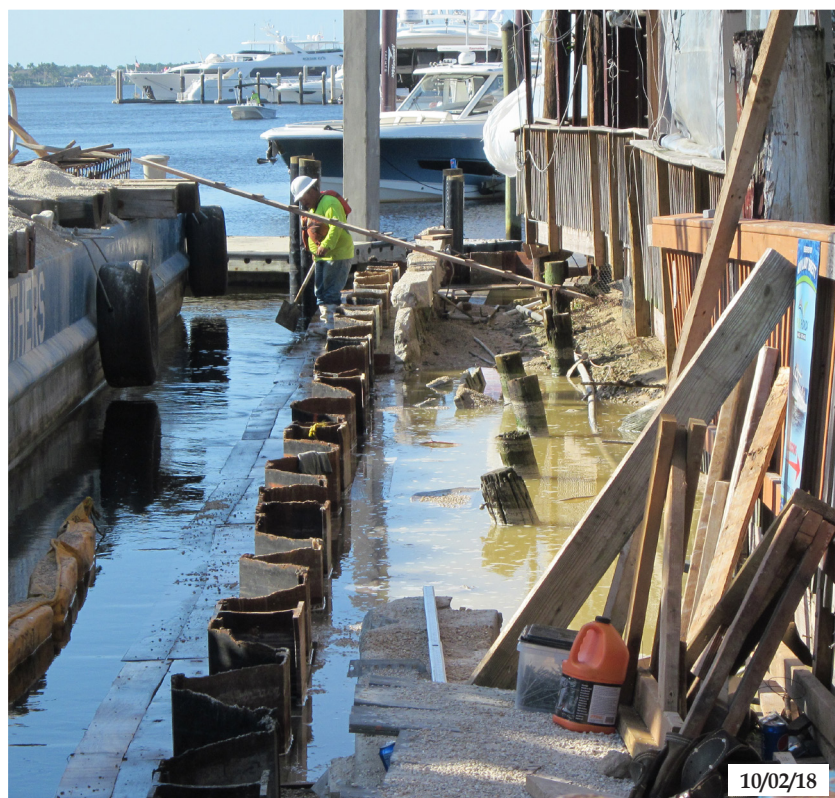


Concrete cap in place with boardwalk support stringers being bolted together.

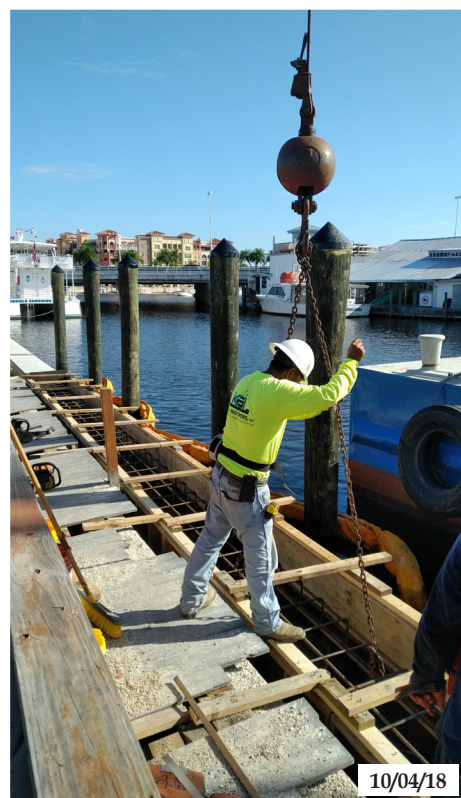


First section of new IPE boardwalk taking shape south of the U.S. 41 bridge.





Steel sheet pile in front of Riverwalk nearing completion.



Lifting the steel reinforcing (re-bar) cage into place just before concrete is poured for the cap.

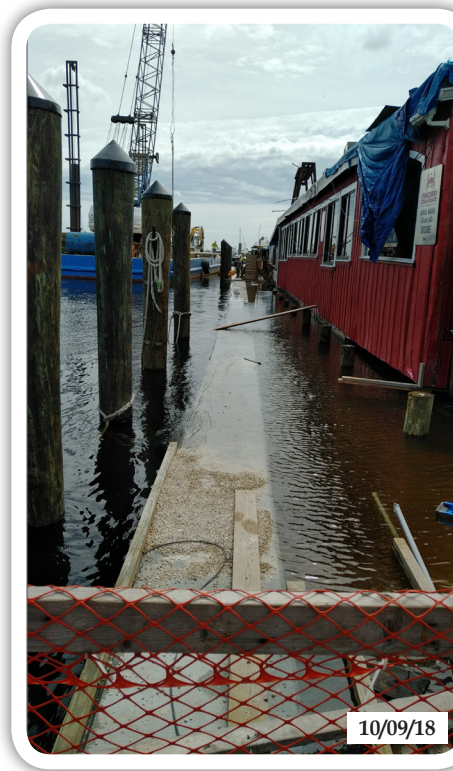


New seawall cap after being poured on the south corner of Tin City.



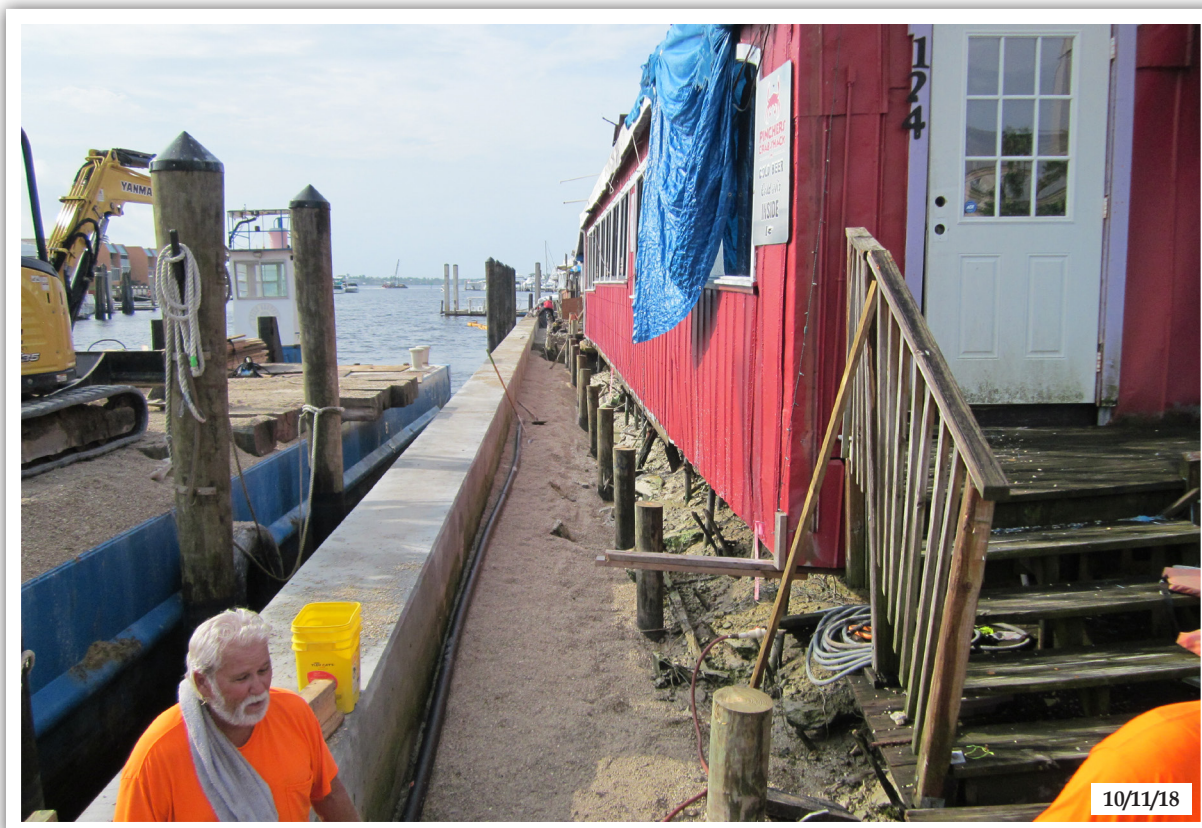


10/09/18



10/09/18

Above: U.S. 41 underpass and Tin City construction site flooded by "king" tides and onshore winds created from Hurricane Michael on Oct. 9, 2018, the day before it impacted the Florida panhandle.



10/11/18

Fire line being installed prior to burial, the area now dry just two days after the high tide from Hurricane Michael.



Old concrete wall, wood wall and debris prior to being entombed under new fill.





Boardwalk piles poking up from new fill after being driven deep underground.



Boardwalk stringers in place by Riverwalk ready for utility conduits and decking.



Utility conduits being placed within stringers.





Project manager for Turrell, Hall & Associates, Patrick Scheele (center) reviewing final construction details with Travis Kelly (blue cap) and the KBI crew.



Kelly Brothers (KBI) construction crew as the project nears completion, crew leader Raul Benieze at center.





Newly completed boardwalk, with piles in place awaiting construction of the north deck and Chickee Hut.



North Deck area being decked over. The four tall pilings in the foreground will support the thatched roof Chickee Hut.





Above & below: Crowds line the new boardwalk at Tin City to watch the 2018 Annual Christmas Boat Parade.

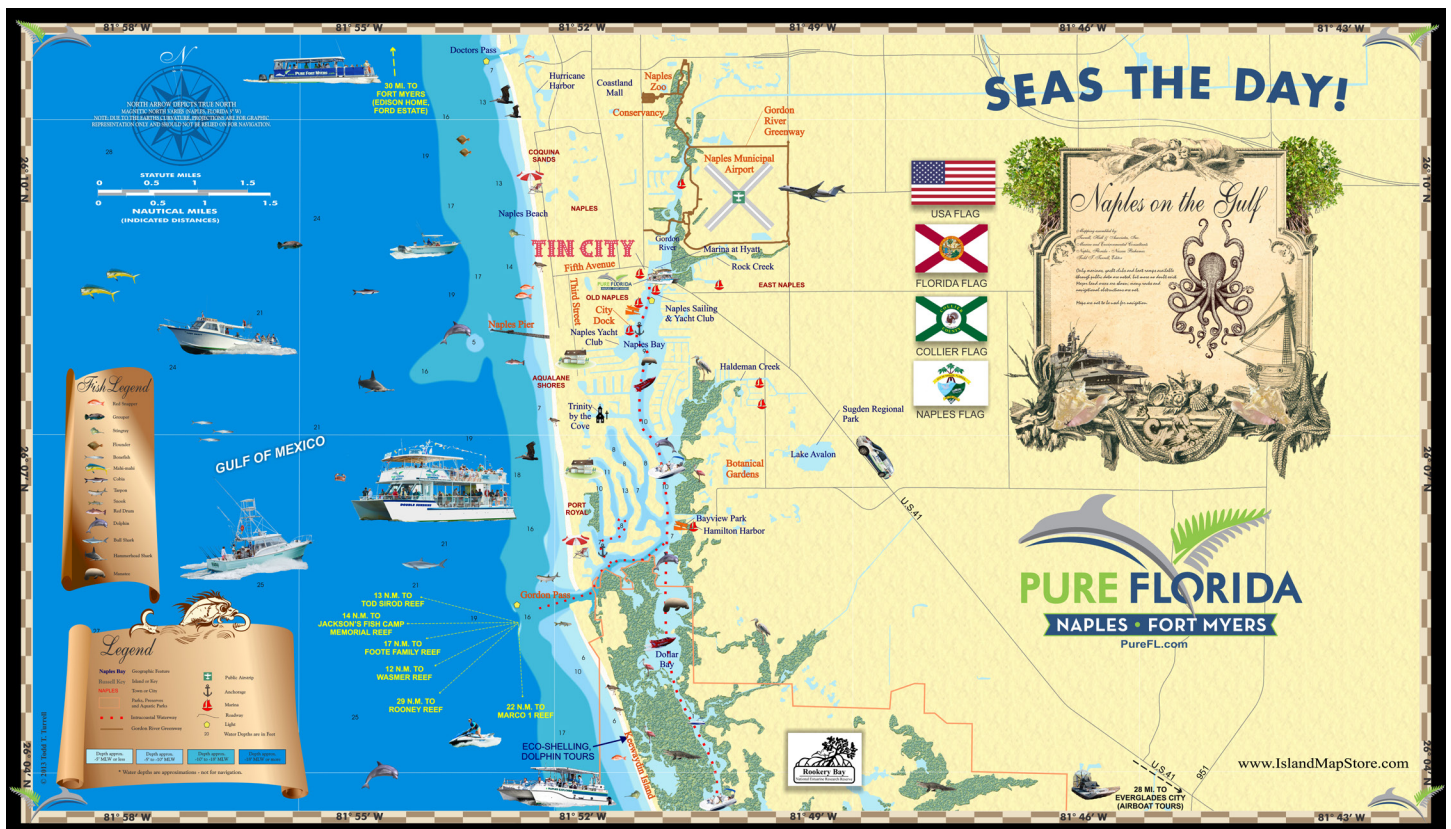


A decorated boat featured in the 2018 Christmas Boat Parade hosted by the Marine Industries Association of Collier County.





Pure Florida's "Double Sunshine" tour boat featuring a map of Naples Bay on its lower deck (enlarged below). The company offers sightseeing and sunset cruises, rental boats and fishing excursions.





Cypress log framing complete on the new Chickee Hut, palm fronds piled on the ground ready for weaving onto roof.



Newly completed Seminole Indian Chickee Hut. The green palm fronds will eventually turn brown as they dry out, but are durable and will last for many years.



Seminole Indian Chickee Huts



*Above: Chickee Huts on the Seminole Indian Reservation in Immokalee.
Below right: Interior cypress logs supporting a thatched roof.*

Indian Chickee Huts are the signature architectural style of the Seminole Tribe of Florida. Members of the Tribe still take pride in building the historic structures which have become landmarks in South and Central Florida.

Chickee Huts are typically built with cypress logs topped by a thatch made from the fronds of cabbage palms. Cypress trees grow all over Florida in “swampy” forests where the soil is saturated at least part of the year. Cabbage palms also grow throughout Florida so both building materials, cypress logs and palm thatch, are common in the Florida wilderness.

Seminole Indians use the word Chickee for “house.” This type of house was born of necessity in the 1800s as the U.S. Army fought to drive the Native American Tribes out of Florida and relocate them to reservations west of the Mississippi River. The sometimes constant pursuit of the Army kept the Seminoles on the move and Chickees were built for shelter from easily available materials. Cypress logs and palm thatch could be woven together in a short period of time with native vines or rope. Platforms would be built elevated over the ground under the thatch roof to provide a dry living surface in the often very wet conditions. These structures could be quickly abandoned and then new ones built in a different location.

The Seminole and related Miccosukee Indian Tribes of Florida are thriving today and the Chickee lives on. Though few choose to live in them as in the past, they are still used on the reservations for outdoor activities, ceremonies and remembrance of their forefathers who never surrendered to the Army, or anyone else!

Seminole Indian Chickee builder, Jimmy Wayne Holdiness.
JimmyHoldiness@gmail.com ~ Phone: 239-503-0663



 Turrell, Hall & Associates, Inc.
marine & environmental consulting



Completed Tin City Project Photos, opened for 2018/2019 Season



Tin City's new boardwalk sits atop the reconstructed seawall, ready for the 2018/2019 tourist season.





Restaurants along the new waterfront, Riverwalk to left and Pinchers to the right.



View along the boardwalk from the Chickee Hut looking south.





Tin City's new pedestrian boardwalk connecting under U.S. 41.



The new boardwalk now allows pedestrian access along the river without traversing the parking lot. Kelly's Fish House in background.





Northern boardwalk connection next to Pinchers.





Pelicans enjoying Tin City's newly restored waterfront from the rooftop.



View of Tin City's new boardwalk between Riverwalk and Pinchers. Overhead cranes are from the historical boat yard use.





Riverwalk's dining deck on the Gordon River during a slow period over the 2018 Christmas holidays. The tables are full during peak hours.



The popular bar at Riverwalk over looking the Gordon River and Naples Bay to the south.





Pinchers riverfront bar in mid-afternoon before the crowds arrive during Christmas season in 2018.



The seafood showcase at Pinchers featuring the fresh catch of the day including blue crabs, stone crabs, grouper, snapper and salmon.





The public seating area in the center of Tin City's north building amongst the many shops.



The entrance to Tin City from the central parking area to the many shops inside. Pinchers Restaurant is to the left, Pure Florida boat tours in the middle and Riverwalk Restaurant to the right.







