



# Dinner Key Marina Repairs Design Criteria Package

Program Requirements  
9450-08

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## 1. Project Overview

The City of Miami (Owner) has retained Moffatt and Nichol (M&N) as the Design Criteria Engineer (DCE) to provide the drawings and design criteria to be used by Design-Build (D/B) firms to bid on the Dinner Key Marina Project (Project) which includes the repair and/or replacement of the marina docks and associated utilities. The Project includes the design and construction of waterside structures and utilities that were damaged during Hurricane Irma in September 2017.

D/B firms shall provide, at a minimum, the services of a general D/B Team, as well as the services of engineering professionals as necessary to provide the Owner with a submittal as part of the procurement process that includes the design and installation of the following components in compliance with the criteria presented herein:

- Repair and replacement of damaged timber finger piers.
- Repair of concrete walkway decks, pile caps, and piles.
- Replacement of FRP grating on concrete walkway decks.
- Replacement of damaged timber mooring and fender piles.
- Replacement of potable water and fire protection system.
- Replacement of trash receptacles and dock boxes throughout the marina.
- Repair of sewage pump-out system.
- Replacement of electrical system including: shore power pedestals, lighted bollards, associated electrical infrastructure, four upland service entrance locations and associated distribution systems.
- Installation of installation of empty conduits with pull strings, and pull boxes, as necessary for the wiring and installation of equipment “by others” for Wi-Fi communication, Security/Access control, and CCTV system.

The construction shall be phased to allow the marina to remain partially operational during construction. The construction phasing shall be scheduled to complete up to two piers at a time.

In addition to the Base Bid components listed above, there are three additive alternatives under consideration. The additive alternatives are included on sheets S-121 through S-129 of the DCP Drawings:

- Additive Alternative 1 – includes the repair and replacement of marina components that have sustained non-storm related damage.
- Additive Alternative 2 – includes Finger Piers indicated as “replacement” in the DCP Drawings to be replaced using prestressed concrete piles, aluminum or fiberglass reinforced polymer (FRP) composite framing, with FRP grating. Diagonal bracing



shall be provided, if needed, to provide sufficient lateral load capacity for the design loads indicated.

- Additive Alternative 3 – includes the upgrade of all utility pedestals to include an electronic package to remotely monitor Ground Fault levels and Energy Consumption.
- Additive Alternative 4 – includes replacement of timber mooring and fender piles with Greenheart piles per the City of Miami standard pile specification.
- Additive Alternative 5 – includes the increase of the top of pile cut-off elevation of all timber piles by 5 feet; which will include the additional embedment depth and diameter as determined by the D/B Team.
- Additive Alternative 6 – includes the furnish and installation of stainless steel hurricane straps in lieu of the specified galvanized hardware.
- Additive Alternative 7 – includes the replacement of concrete bent caps between two adjacent walkway spans in lieu of the proposed repair.
- Additive Alternative 8 – includes the price to replace the remaining aluminum cleats with HDG steel cleats.

## 1.1. Existing Conditions

Dinner Key Marina was constructed in 1986 and has been repaired over the past 30+ years. See Appendix B for a list of available record drawings and reference documents for the project. The marina is currently in a state of disrepair from damage sustained during Hurricane Irma in September 2017.

### 1.1.1. Concrete Walkways

Piers 1 through 7 consist of prestressed, flanged concrete U-beams that span between concrete pile caps with prestressed concrete piles. The U-beams have openings to allow light and water to pass through the walkways. The top of the U-beams are covered with sections of FRP bar grating that are in various states of disrepair or missing. During Hurricane Irma, many sections of grating became disconnected from the concrete. Some of the grating was lost and the grating that was recovered was reinstalled on the concrete. However, some of the connections are not sound and the grating tends to shift on the concrete bearing lip. Additionally, some of the flanges of the U-beams sustained impact damage resulting in section loss.

The chase beneath the grating of the concrete walkways is used to run utilities along the length of the pier. The U-beam walls and flanges have penetrations at each utility pedestal for conduits and water line connections. The concrete flanges of the U-beams are used to support utility pedestals, electrical transformers, firewater stations, cleats, dock boxes, and life rings.



The general condition of the concrete structures is typical of approximately 30+ year old docks that are exposed to the marine environment. For example, corrosion cracks, open and closed corrosion spalls are noted throughout the pile caps, U-beams and piles.

Piers 8 and 9 are located along the concrete bulkheads. Pier 8 has timber finger piers extending from the bulkhead. Many of the boat slips at Pier 9 have mooring piles only, and no finger piers.

### 1.1.2. Finger Piers

Timber finger piers jut out from the concrete walkways and are supported by three or four rows of 2-pile bents depending on the size of the slip. The finger piers consist of a ramped section and a leveled section. The finger piers are typically 4-ft wide and are constructed of timber piles, pile caps, stringers and deck.

### 1.1.3. Utility Services

Electrical power service, potable water, and central sanitary sewer are existing at the marina and shall be repaired/replaced as noted on sheets P-101, P-102, E-001, E-010, E-011 and E-101 through E-111 of the DCP Drawings. Single line diagrams, E-601 through E-604 depict the general pier electrical design. D/B Team will be responsible for final design, drawings, and calculations. Existing telephone system including hardware and panels will be removed from service. Existing landside electrical conduits will be reused from landside service entrance locations out to electrical handholes which feeds each pier its electrical service.

## 1.2. Marina Structural Work

The marina work includes demolition of existing waterfront structures, repair of damaged waterfront structures, and the design and construction of new infrastructure as indicated on the DCP Drawings.

A Damage Assessment Report issued by Marine Specialties Limited dated June 2018 combined with a field assessment of the marina conducted by M&N and their subconsultants in June 2018 was used to identify which waterfront structures must be replaced entirely, and which can be repaired. These structures are labeled on the DCP Drawings as needing to be Replaced, Type 1 Repair, or Type 2 Repair. Detailed descriptions of these categories are found in section 1.2.2.

### 1.2.1. Structural Demolition

- Demolish and dispose of damaged timber mooring piles identified on DCP Drawings to be replaced.
- Demolish and dispose of damaged timber finger pier piles for finger piers slated for replacement.



- Demolish and dispose of timber finger pier framing components (stringers, pile caps, decking, and bracing) as necessary to facilitate Replacement, Type 1 and Type 2 repairs as indicated on DCP Drawings.

In addition to the preceding list, the D/B team shall conduct an underwater survey identifying submerged debris throughout the marina, including in the fairways, slips and underneath the docks. The Owner has removed some of the debris after the hurricane, however some submerged debris remains within the Project area. Submerged debris shall be removed and disposed of prior to commencement of new construction, and this requirement will likely be included in the environmental permit conditions. The D/B Team is responsible for disposal of all demolished materials and debris. A unit cost for this line item is included in the bid form with an estimated quantity. The D/B Team will be responsible for compiling a pre/post debris removal survey report along with documentation of the dumpsters with removal measured by the cubic yard.

## 1.2.2. Structural Repairs

### 1.2.2.1 Finger Pier Repairs

Timber finger piers that sustained moderate or localized damage during Hurricane Irma shall be repaired by reconstructing only the damaged components. Based on field observations, finger piers in need of repair come in two categories: Type 1 and Type 2.

Type 1 Repairs: include the replacement of the timber pile caps, cross bracing, and any other components required to meet the loading criteria provided in Part 3 of this document. For finger piers flagged for type 1 repairs, the timber piles were determined to be structurally sound and the stringers and decking were recently replaced.

Type 2 Repairs: include the replacement of all components except for the timber piles. Finger piers flagged for Type 2 Repairs have structurally sound piles, but the pile caps, cross bracing, stringers and decking have sustained significant enough damage as to require replacement.

### 1.2.2.2 Concrete Walkway Repairs

The prestressed concrete U-beams that comprise the walkways have localized damage from vessel impacts, as well as spalling and cracking typical of 30+ year old waterfront structures. Areas of repair are indicated on sheets S-101 through S-109 with alternative repairs on sheets S-121 through S-129. D/B Team shall provide a design-level inspection to catalog the defects and the locations, dimensions, and quantities of required repairs.

### 1.2.2.3 Pile Cap Repairs

Some of the pile caps have spalling that requires repair. Pile caps slated for repairs are indicated on sheets S-121 through S-129. Repairs are indicated as Type A (open corrosion spall) and Type B (closed corrosion spall). Details regarding the approximate size of the spall are located on sheet S-502.





### 1.2.2.4 Pile Repairs

Some of the concrete piles on Piers 3 and 5 have cracks and spalls that require repair. A concrete pile jacket shall be installed around the defect to restore structural capacity and prevent further deterioration of the piles. The location of damaged piles are provided in the table below, reference *2018 Hurricane Irma Assessment Report* by M&N:

Concrete Pile Defect Locations Table

Pier	Pile Cap	Pile Location	Defect
3	22	West	Crack below water
3	23	West	Spall above water
5	9	West	Spall above water
5	10	East	Spall above water
5	10	West	Spall above water
5	18	West	Spall above water
5	20	East	Crack above water
5	22	East	Crack above water
5	26	South	Spall above water

### 1.2.3. Structural Replacement

#### 1.2.3.1 Finger Pier Replacement

Timber finger piers that were irreparably damaged during Hurricane Irma shall be replaced in the existing footprint. The materials to be replaced include timber piles, pile caps, cross bracing, stringers, and decking. Overall dimensions and elevations of the piers shall match the existing piers, and where practical, timber piles shall be driven in the same location as extracted piles. Timber piles and diagonal bracing shall be wrapped as indicated in the DCP Drawings. The elevation of the top of the timber piles shall be +10 feet above mean high water level (NAVD).

##### 1.2.3.1.1. ADA Compliance

The repairs to Dinner Key Marina shall comply with the Americans with Disabilities Act (ADA) Standard 1003 and the Florida Accessibility Code for Building Construction, section 235. These guides provide the accessibility requirements for recreational facilities. Based on the total number of boat slips in the marina a minimum number of accessible slips must be provided, and those slips must be dispersed throughout the various types of slips the marina provides. These standards require a



minimum of 8 ADA accessible slips for a total number of slips at the marina in the range of 501-600.

### 1.2.3.2 Concrete Walkway Replacement

Spans of the concrete walkways that sustained damage too significant to repair shall be replaced. The spans slated for replacement are indicated on sheets S-101 through S-109 with the alternative spans on sheets S-121 through S-129 on the DCP Drawings. The concrete beams being replaced may be cast in place, or hybrid beams (a combination of prestressed and cast in place concrete). Typical section views of these beam replacement options are provided on sheet S-410 of the DCP Drawings, however the D/B Team may design other “in kind” replacement solutions that meet building code requirements.

## 1.3. Marina Utility Work

### 1.3.1. Utility Demolition

#### 1.3.1.1 Electrical

- Demolish and dispose of existing conduit and conductors to each dockside transformer-and pedestal. Reuse conduit and bulkhead sleeves from landside utility to walkway/pier. Capture and extend existing conduit to new distribution equipment as required.
- Demolish and dispose of all light bollards and associated existing conduit and conductors on each pier.
- Demolish and dispose of all telephone wiring, and enclosures, from each service entrance to all piers, and pedestals. Remove all telephone conductors back to telephone service, cap and label empty conduits as spare.
- Demolish and dispose of electrical disconnect(s) for each individual pier feed and disconnects for vacuum/sewage system. Maintain conduit from power source to sewage pump. Coordinate electrical changeover to new service with marina owner to minimize disruption of sanitary service.
- Demolish and dispose of electrical service for sewer pump-out station. Underground conduit to remain and be reused.

#### 1.3.1.2 Potable Water

- Demolish and dispose of existing potable water piping, valves, and pipe supports from the bulkhead to each dockside potable water service connection. Components landside of the bulkhead to remain.



### 1.3.1.3 Fire Water

- Demolish and dispose of existing fire water piping, valves, standpipes, hose stations, and pipe supports from the bulkhead to each dockside firewater standpipe. Components landside of the bulkhead to remain.

### 1.3.1.4 Sanitary Sewer

- Existing sanitary sewer mains and laterals to remain unless otherwise noted on attached drawings.
- Demolish and dispose of identified damaged or broken vacuum sewer pump out hydrants, as indicated on drawings.
- Remove broken pipe connection as indicated on drawings. Piping that will remain will require temporary support until permanent pipe supports have been installed.

### 1.3.1.5 Utility Replacement

Electrical power service, potable water, and central sanitary sewer are existing at the marina and shall be replaced as noted on the drawings. Wi-Fi access, CCTV and Security/Access control will be added to upgrade the services at the marina. The Owner has retained a vendor, Quality Wiring, to supply and install the “low voltage” programming as coordinated with marina management. The D/B Team will be responsible for coordinating the utilities design with vendor (and Owner) and for furnishing/installing empty conduits with pull strings, and pull boxes, as necessary for the wiring and installation of equipment by the vendor. The electrical design will need to account for the power requirements for this low voltage programming. There are no provisions for adding a fuel service.

### 1.3.1.6 Electrical

Pier and walkway lighting shall be evaluated to produce a lighting plan with photometric calculations to confirm adequate lighting levels. Lighting criteria based on OSHA requirements and Illuminating Engineering Society of North America (IESNA) recommendations for pier and walkway usage. Refer to drawings for specific criteria. Note, as Wi-Fi & CCTV functions are new to the marina, additional components and equipment may be required (CCTV and Wi-Fi access point poles). D/B Team will be responsible for furnishing a complete, and functional system.

### 1.3.1.7 Potable Water

All existing marina potable water systems will be replaced entirely; a new potable water system consisting of potable water mains, isolation valves, supporting members, and service at each connection shall be provided. The sizing of the potable water system shall comply with the 2017 Florida Building Code occupant load and fixture requirements; materials, installation,



sterilization, and commissioning shall be per the Miami Dade County standards and requirements.

### 1.3.1.8 Fire Water

All existing marina fire water systems will be replaced by a new, NFPA 303 compliant wet class III standpipe and hose station system, hydraulically designed to provide 250 gallons per minute at 100 pounds per square inch (psig) to the two most hydraulically remote hose stations. The D/B team will be responsible for meeting with the City Fire Department to confirm standards and requirements for the alarm system and other related appurtenances.

### 1.3.1.9 Sanitary Sewer

The marina currently has one vacuum sewer pumpout station that serves all marina finger piers. Three new vacuum sewer pump stations shall be introduced to the marina, with one sewer pump station dedicated for every two marina finger piers. The existing sewer lift station onshore shall be bypassed with a new force main with connection to the existing sanitary sewer manhole on the Project site. The D/B Team will be responsible for removing and disposing of the existing sewage pump out equipment and capping/abandoning existing underground piping and services appropriately. Demolition of the existing building is not required, as the Owner anticipates re-purposing the building. The demolition will require minor repairs to the concrete floor and walls to leave smooth and level finishes.

## 1.4. Marina Appurtenances

- Dock Boxes – Coordinate with Owner to furnish and install one Dock Box per boat slip throughout the marina.
- Trash & Recycling Receptacle – Furnish and install one receptacle at each main pier entrance along the bulkhead. Coordinate with Owner and marina management for style and exact location.
- Cleats – Cleats for replaced and repaired concrete walkways shall be 15-inch aluminum Almag-S cleats or approved equivalent.
- Line-Holders – Furnish and install two line-holders on either side of new mooring piles as indicated on S-501.
- Pile Hats – Furnish and install new pile hats on each new timber pile.
- Aluminum Ladder – Furnish and install new 6-rung, aluminum ladder as indicated on DCP Drawings.

## 1.5. Additive Bid Alternatives

In addition to the repairs of components damaged by Hurricane Irma, the Owner has requested three alternative bids to consider:



- **Additive Alternative 1** – includes a cost to include the repair and replacement of marina components that have sustained non-storm related damage.
- **Additive Alternative 2** – includes a cost to upgrade Finger Piers indicated as “replacement” in the DCP Drawings to be replaced using prestressed concrete piles, aluminum or FRP composite framing, with FRP grating. Diagonal bracing shall be provided, if needed, to provide sufficient lateral load capacity for the design loads indicated.
- **Additive Alternative 3** – includes the added cost to upgrade all utility pedestals to include an electronic remote monitoring system for each pedestal. Package shall include all components necessary to furnish a complete system to monitor individual pedestal energy usage (kWH), and pedestal ground fault level status. This package shall allow Dinner Key Marina to monitor pedestal status remotely via Wi-Fi communication protocols. Power monitoring accuracy shall be marked and tested to conform to Standard ANSI-C12.1, and NTEP standards with +/- 1% accuracy. Coordinate Wi-Fi inter-connectivity with Wi-Fi system as provided in DCP and drawings.
- **Additive Alternative 4** – Provide a lump sum price for the additional cost to install green heart mooring piles per the City of Miami’s standard mooring pile specification in-lieu of piles as indicated in the DCP.
- **Additive Alternative 5** – Provide a lump sum price for the additional cost to increase the cut-off elevation of all timber piles by 5-ft above the top of pile elevation indicated in the DCP. The price shall include additional embedment depth and diameter as determined by the D/B Team.
- **Additive Alternative 6** – Provide a lump sum price for the additional cost to provide stainless steel hurricane straps and connection hardware in-lieu of hot dipped galvanized.
- **Additive Alternative 7** – Provide a lump sum price for the additional cost to replace concrete bent caps between two adjacent walkway spans in-lieu of repair.
- **Additive Alternative 8** – Provide a price to replace the remaining aluminum cleats at the Marina with HDG steel cleats.



## 2. Marina Design Requirements

The calculations, construction drawings, specifications and shop drawings are outlined in this section. The marina repairs and upgrades shall be designed to meet the Technical and Performance Requirements provided in Chapter 3 of this document and on the DCP Drawings.

### 2.1. Calculations

Calculations shall be prepared for all repairs and upgrades to the Marina. A basis of design with supporting calculations shall be signed and sealed by a Professional Engineer licensed in the State of Florida. A group of engineers may be required to seal the document based on their respective trade(s), such as, but not limited to, structural, electrical, mechanical and plumbing, as applicable. The basis of design shall be submitted to the Owner and the DCE for review and approval. The basis of design shall include, at a minimum, the following design criteria, assumptions, and calculations for the following project elements:

#### 2.1.1 Structural Design

Provide structural design calculations for the project items, including, but not limited to:

- Timber finger piers
  - Deck
  - Stringers
  - Pile Caps
  - Bracing
  - Piles
- Mooring piles
- Fender piles
- Concrete Walkways
  - Prestressed and/or reinforced concrete design of replacement deck spans
  - FRP or carbon reinforced concrete repairs, as applicable
- FRP Bar Grating
- Concrete pile cap repairs
- Concrete pile jackets

##### 2.1.1. Structural Bid Alternate

Provide structural design calculations for the project items, including, but not limited to:

- Finger pier replacement using prestressed concrete piles, aluminum or fiberglass reinforced polymer (FRP) composite framing, with FRP grating



## 2.1.2. Electrical Design

Provide coordinated electrical design to feed shore power to pedestals as identified on the electrical layout drawings. An electrical layout depicting pedestal location with power configurations are included for each pier. Additionally, refer to electrical drawings to design specific requirements for each pier service and the required utility feed for additional and associated electrical equipment. D/B Team shall consider construction phasing for this project. As the current plan is to replace and rebuild two piers at a time, any diversity calculation for pier loading may need to be reconsidered in order for the marina to enable full usage at each pier. Coordinate with marina owner for expected pier demands to allow for nuisance-free power supply to boats for the duration of the construction period. Wireless Access Points, Security/Access Control, and lighting will be included in the electrical load for each pier, with loads coordinated with the vendor retained by the Owner. Calculations and/or drawings are required for all provided equipment and services as follows:

- Electrical service size calculations for Electrical Utility coordination.
- Ground Fault monitoring and protection settings as required per NEC Article 555 and required in RFP documents
- Connected and Demand Load calculations per dock
- Disconnect, panelboard, and transformer sizing calculations
- Short circuit calculations at distribution equipment and pedestals
- Wire sizes and voltage drop calculations
- Photometric calculations, including luminaire quantities and sizes
- Site plans, single line diagrams, equipment details, panel schedules, cables schedules.
- Low voltage/security infrastructure site plan, including locations, sizes of equipment, and installation details which will allow the vendor selected by the Owner for Low Voltage/Security System (LVSS) the ability to furnish and install the LVSS system. Requirements for this plan to be coordinated with Owner-selected LVSS/electronics provider.

### 2.1.2.1 Electronic Low Voltage/Security System Infrastructure

- Design of a wiring backbone/conduit system including all conduit, pull strings, pull boxes, fittings, all required appurtenances, and plans to provide a pathway for the Low Voltage/Security System (LVSS) provider (Quality Wiring, as selected by Owner) to supply, install, test and commission the marina with Gate Security, Closed Circuit TV coverage, WiFi access throughout the marina and connect to the required user interfaces and controls to be located inside the Marina Office 3<sup>rd</sup> floor server room.
- The design of this system must be coordinated with the Owner-selected LVSS provider to ensure the infrastructure system designed will allow the LVSS provider, “installation only” of the required LVSS/electronic equipment.
- The D/B Team design of this system must also be coordinated with their responsibilities for electrical power infrastructure and Structural/Mechanical work being done at the marina.



### 2.1.2.2 Plumbing Design

Provide coordinated utility design and installation for potable water, vacuum sewer system pump stations and discharge force main, and firewater systems for each finger pier. Coordinate installation with other trades. Specific utility design requirements include:

- Potable water
  - Provide water main, pipe branches, and hose bibb risers for each utility pedestal requiring water service, considering system demand using fixture unit counts for each water fixture per the FBC.
  - Select pipe size and complete hydraulic calculations considering minimum fixture delivery pressures at the hydraulically most remote fixture. Calculations to consider existing system pressure at tie in at the bulkhead and the pressure loss through piping infrastructure, inclusive of backflow preventers.
  - Design shall incorporate expansion/contraction requirements for the piping over the length of the distribution lines, and the required appurtenances shall be evaluated.
- Sewage Pump out system
  - Select peristaltic vacuum sewer pump out system with appurtenances to include a hose cart for each dock. Three (3) new stations are envisioned.
  - Hydraulic calculations shall account for existing piping, including repaired sections from hurricane damage. The design plans are included in the appendices of this DCP.
  - Size force main per industry practices from each pump station to empty into the existing sanitary sewer manhole at the Project site.
- Fire Protection System
  - Perform hydraulic calculations for standpipe system per NFPA 303 and NFPA 14 requirements
  - Size piping, valves, and standpipe systems – to account for City of Miami standards
  - Develop system design, inclusive of detailed piping layouts and material specifications
  - Design fire alarm system in accordance with NFPA and City of Miami requirements

## 2.2. Construction Drawings

Marina repair drawings shall be submitted to the Owner and DCE for review prior to construction. Drawing submittals are required at 50% and 100% levels of completion. The marina repair drawings may include a combination construction drawings and shop drawings, as applicable.

Allow 14 calendar days for Owner and DCE to review and comment.





## 2.3. Design-Builder Submittals

D/B Team submittals are required for all materials and equipment to be installed at the Marina. The submittals shall include product information and installation procedures for all items of work.

Allow 10 calendar days for Owner review of submittals.

## 2.4. Design Review Meetings

A review meeting with the Owner and D/B Team, including Engineer of Record, is required to discuss review comments and responses after each design submittal.

The design review meeting will include a round table discussion and a site visit to observed items discussed during the design review meeting.

## 2.5. Project Schedule

The D/B Team shall maintain a project schedule throughout the duration of the design and construction phases of the project. The schedule shall include an updated design and construction progress schedule. The schedule shall be provided in Microsoft Project “.mpp” format.

Key Milestones to be included on the D/B Team schedule:

Environmental Permitting – Estimated 9 to 12 months

- Application Submittal – November 2018
- Application Processing – January 2019 – September 2019

Design Phase

- D/B Team prepares 100% Design Drawings and Specifications
- City Review
- Building Department Review for Construction Permit

Construction Phase

The construction phase shall be phased to maintain operations during construction.

## 2.6. Permitting and Approvals

M&N will apply for environmental permits as required with the Division of Environmental Resources Management (DERM) Class I, the Florida Department of Environmental Protection (FDEP), and the U.S. Army Corps of Engineers (USACE). The D/B Team is responsible for obtaining all local and trade permits. The D/B team will be provided the environmental permit sketches utilized for the Class 1 permit process, and the D/B team will be responsible for obtaining preliminary approvals stamps from DERM. These plans will then



be processed by the D/B Team through the City of Miami building department to obtain the required approvals, and then the D/B Team will be responsible for obtaining the final DERM Class I permit. The D/B Team will also be responsible for processing the plans through the “DERM CORE” review process through Miami-Dade County, if required. The D/B Team is responsible for any required modifications to the permits that result from the D/B Team’s design. The Owner is responsible for all permitting fees.

The D/B Team is responsible for coordinating approval of the Authority Having Jurisdiction (AHJ). D/B Team is responsible for any variance applications resulting from code requirement deviations such as ASCE 24 Design Flood Elevations (DFE) and NEC Electrical Datum Plane requirements.



### 3. Technical and Performance Requirements

The service life of new structural components shall be a minimum of 25 years. The D/B Team shall not commence work on in-water and over-water marine structures or utilities until permits from the required state and local permitting agencies are obtained. Any work done below Mean Higher High Water (MHHW) is considered in-water work.

#### 3.1. Marine Structures

The Waterfront Structure System consists of all finger piers, concrete walkways, and appurtenances at the Dinner Key Marina project site that are necessary and required for safe access to and mooring of the design vessels.

Provide a Waterfront Structure System complete in place, as specified throughout this DCP, as needed for a complete, usable, and proper installation. All material and equipment shall be installed per the Manufacturer's recommendations and the criteria set in this DCP and by the D/B Team and Engineer of Record.

##### 3.1.1. Load Requirements

Design loads shall be in accordance with ASCE Manual No. 50, Planning and Design Guidelines for Small Craft Harbors. Live load combinations shall be in accordance with the Florida Building Code.

Dead Loads shall include the weight of the permanent structural, mechanical, and electrical components. Dock dead loads shall consist of the weight of the timber structure, miscellaneous connection devices, and all other permanently attached accessories such as cleats and pedestals. D/B shall exercise care to be sure that all dead loads are accurately determined and accounted for.

Live Loads shall include uniform and point loads as follows:

- 100 psf uniform live load for concrete walkways and finger piers.
- 1,000 lb golf cart live load for concrete walkways.
- 400 lb point load at any point on the concrete walkways, grating, and finger piers.

##### 3.1.2. Environmental Design Criteria

###### Wind Exposure

The docks and walkways at Dinner Key Marina are considered Risk Category 1 structures per Florida Building Code Table 1604.5. The design wind speed for the project site is based on the ASCE 7-16 Load Requirements for Building and Other Structures. The wind speeds listed below are based interpolation of the wind speed contours

(source: <http://hazards.atcouncil.org>)

- MRI 10-Year 90 mph



- MRI 25-Year 114 mph
- MRI 50-Year 129 mph
- MRI 100-Year 140 mph
- Risk Category 1 Wind Speed 157 mph

The hurricane damage to the docks and walkways was due to a combination of high water levels, vessel impacts, and vessel mooring line loads on the structures. The intent of the structural repairs for the Project is to replace the docks and walkways within the same layout as the existing structures.

The intent of the building code is to design the docks for the Risk Category 1 wind speed. However, when Hurricane force winds occur, it is likely the docks and walkways will be submerged, i.e. wind load on the docks equals zero. However, the docks shall be designed for the wind loads on the vessels which are tied to the mooring piles. The top of timber pile cutoff elevation will be increased to +10 feet NAVD for the project to provide additional protection from boats during high water events and allow boats to stay moored during high water events.

Therefore, the docks and lateral bracing shall be designed to maximize the lateral capacity of the docks to withstand a combination of storm surge and wind loads on the vessels.

#### Storm Surge

The waterfront structures shall be designed to survive a storm surge water level (including astronomical tidal component) of the FEMA 100-year flood elevation of +16 ft NGVD, see FIRMette map in the Attachments.

#### Berthing/Mooring

The finger piers and concrete walkways shall be designed for the mooring and berthing loads of the design vessels:

- Berthing load (impact load) – Vessel speed of 3 knots impacting the dock at 10 degrees from the centerline of the finger piers. For side tie conditions, the impact shall be considered at 30 degrees.
- Mooring load – Line pull acting in any direction at a 45-degree angle from the horizontal. The mooring loads shall be calculated based on the maximum operational wind and wave conditions. Shielded vessels shall take 20% of load experienced by the windward vessel.

### 3.1.3. Concrete Walkways

Spans of the concrete walkways that are indicated to be replaced or repaired are indicated on sheets S-101 through S-129 of the DCP Drawings. The concrete beams being replaced may be cast in place, or hybrid beams (a combination of prestressed and cast in place concrete).



Damage to concrete walkways eligible for repair include impact damage and corrosion damage. The D/B Team shall provide a design-level inspection to catalog the defects and the locations, dimensions, and quantities of repairs required.

Repair to prestressed concrete deck spans and piles require externally bonded reinforcement (such as FRP or carbon mesh) to restore capacity from loss of prestress. Minor cracks and spalls that do not result in the loss of prestress may be repaired by saw-cutting, chipping-out, cleaning and casting the defect with mortar.

Concrete walkways slated for repair may be replaced in lieu of repair if the replacement cost is comparable.

All concrete construction shall be in accordance with FDOT Standard Specifications. Concrete construction shall provide 3-inch clear cover over reinforcing steel and be designed for a maximum flexural crack width of 0.007 inches.

All concrete mixes shall be designed for an extremely aggressive environment, including:

- A corrosion inhibitor chemical admixture (ASTM C494)
- Type II cement (ASTM C150)
- Fly ash mineral admixture (ASTM C618)
- Water to cement ratio of 0.40 maximum

The mix design shall be submitted to the Owner for review.

Prestressed elements shall meet the following compressive strength requirements:

- 28-day Concrete strength - 8,000 psi
- Net compressive stress greater than zero in the bottom of the beam for dead load only
- Reinforcement layout shall be designed to allow space for pipe and conduit penetrations for utility risers and pedestals, and anchorage for cleats and other appurtenances.

FRP grating shall bear on a recessed ledge cast into the concrete beams and the top of the grating shall be flush with the concrete walkway. FRP grating shall be designed to meet the project requirements:

- FRP grating shall include a UV inhibitor and be designed for exposure to the marine environment.
- Bearing ledge shall be provided to support FRP grating.
- FRP grating shall have a 2-inch nominal height to fit the existing concrete walkways.
- FRP grating shall be anchored to the concrete to resist uplift forces when the walkways are submerged.



### 3.1.4. Timber Finger Piers

The timber finger piers shall be designed in accordance with the Florida Building Code, and the Southern Forest Products Association Marine Construction Guide, Best Management Practices, and Treated Wood in Aquatic Environments for the design loads indicated.

#### Timber Piles (Finger Piers and Mooring Piles)

- Timber piles shall conform to ASTM D25-99.
- Timber piles shall be a minimum of 12 inches in diameter, and of adequate length. Piles shall be one piece; splices are not permitted.
- Pile length shall be as determined by the D/B Team and Engineer of Record.
- Top of pile elevation shall be +10 feet NAVD.
- Piles shall be southern yellow pine treated with CCA in accordance with AWWA 5C for timbers subject to immersion in salt water. Preservative treatment for these members shall be 2.50 pounds per cubic foot (pcf). D/B Team to provide material certification prior to construction.
- Piles shall be wrapped as indicated in the DCP Drawings.
- Upon reaching full embedment, piles should be cut to final top elevation, and capped with a pile hat to protect the end grain.
- Pile hats shall be provided for all piles.
- Pile driving shall be performed in accordance with Section 455 of the FDOT Standard Specifications for Road and Bridge Design.

#### Framing (Pile Caps, Cross-Bracing, Decking and Stringers)

- All pile caps, stringers and decking shall be CCA-treated southern pine, Grade No. 1 or better. Members are to be treated in accordance with AWWA 5C for timbers subject to immersion in salt water. Preservative treatment shall be 0.60 pcf, unless otherwise noted. D/B to provide material certification prior to construction.
- Diagonal bracing shall be preservative treated to 2.5 pcf and wrapped for protection from marine borer damage.
- Field treat with preservative all cuts, abrasions, bolt holes, and other surface damage in treated timbers in accordance with AWWA M4.
- Stringer splices shall be located above pile caps, and shall be lapped a minimum of 12 inches.
- Stringers, pile caps, and bracing shall have a minimum nominal thickness of 3-inches.

#### Transitions



- D/B Team shall provide appropriate elevation transitions between the concrete walkway and finger pier elevation as indicated on DCP Drawings.

#### Connections and Fasteners

- Bolts in timber shall be hot dip galvanized steel with a minimum diameter of 0.75 inches, and in accordance with (ASTM A 307, Grade A, 60 ksi). Nuts and washers shall be hot dip galvanized steel (ASTM F 594).
- Hot dip galvanized steel washers shall be used under all bolt heads and nuts which would otherwise come in contact with timber. Check all bolts by burring the threads after the nuts have been fully tightened.,
- Do not undercut wood. Connections shall pull and hold members being joined into close contact.

#### 3.1.5. Subsurface Soils Information and Geotechnical Report

HP Consultants, Inc. shall provide geotechnical boring logs and report which may be used by D/B Team to determine the required tip elevations for dock and mooring piles.

The *Pier 3 Repair Drawings, 2008*, provided the following information regarding installation and capacity of timber and concrete replacement piles at Pier 3 Repairs. The following information regarding pile installation criteria is provided for reference only. It is not known if this criterion was modified during the pile indicator program or during construction.

##### *Pier 3 Repair Drawings, Pile Installation Criteria*

- *14-inch prestressed concrete piles shall be driven a minimum of 5-ft into the limestone layer. Pre-punch or pre-drill holes as necessary to install piling into limestone.*
- *14-inch pile bid length was 35-ft.*
- *Timber mooring piles shall be driven to achieve a minimum bearing capacity of 10 kips with the following penetration criteria:*
  - *Soft soil: 15 feet minimum embedment*
  - *Lime rock: 5 feet minimum embedment*

## 3.2. Utilities

### 3.2.1. Electrical

- The D/B Team shall submit a Bid to the Owner to replace/modify the existing electrical distribution for boat slips at Dinner Key Marina damaged during recent Hurricane Irma per RFP drawings and documents. This Bid shall also include the provision of infrastructure coordination and installation of empty conduit for a new Low Voltage/Security System installation to be provided by the Owner's vendor, Quality Wiring. Dinner Key Marina consists of nine separate piers, with each slip provided a marine utility pedestal connection point for electric, water and sewer services.



- The electrical distribution system shall be designed in accordance with NFPA 70, 2014 including NEC Article 555. Electrical utility power is provided by Florida Power & Light (FPL). D/B Team shall coordinate existing locations, connection and required load with FPL. Prior to bid, D/B Team will be responsible for site survey and inspection of existing locations in order to confirm that new electric equipment will have adequate room and clearances. Inspect Dinner Key Marina building, specifically the server room, for the capability to connect (utilizing existing conduit or provide new conduit as required) and integrate new communication systems equipment into the existing building and out to each pier. Drawings within this package will determine the extent of project scope. D/B Team to identify any questions or exceptions prior to issuing Bid. Design tasks and deliverables are as listed:
  - Electrical Area A: Provide electrical disconnects to replace existing disconnects located at the NE corner of City Hall. Disconnects shall be provided in NEMA 6P enclosures. Provide new conductors to feed electrical equipment as identified in drawings. Transition from landside to waterside with a flexible connection. Electrical Area “A” feeds electricity to Pier 1 & Pier 2.
  - Electrical Area B: Provide electrical disconnects to replace existing disconnects located at the SE corner of City Hall. Disconnects shall be provided in NEMA 6P enclosures. Provide new conductors to feed electrical equipment as identified in drawings. Transition from landside to waterside with a flexible connection. Electrical Area “B” feeds electricity to Pier 3, Pier 4 & Pier 8, slips #1 through #9.
  - Electrical Area C: Provide electrical disconnects to replace existing disconnects located at the SE corner of City Hall. Disconnects shall be provided in NEMA 6P enclosures. Provide new conductors to feed electrical equipment as identified in drawings. Transition from landside to waterside with a flexible connection. Electrical Area “C” feeds electricity to Pier 5 & Pier 8, slips #10 through #25.
  - Electrical Area D: Provide electrical disconnects to replace existing disconnects located at the SE corner of City Hall. Disconnects shall be provided in NEMA 6P enclosures. Provide new conductors to feed electrical equipment as identified in drawings. Transition from landside to waterside with a flexible connection. Electrical Area “D” feeds electricity to Pier 6, Pier 7, Pier 9 & Pier 8, slips #26 through #41.
  - Provide service entrance rated enclosed circuit breakers. Provide a 480V, 3 phase panel board located on each pier, as shown on drawings, to distribute single phase power to three NEMA 3R substations per pier, also located on each pier. Each substation shall serve one third of the pier, the load demand determining which substation will supply each pedestal. The D/B Team will design the size, quantity and location of distribution equipment to efficiently provide power to each Marine Power Pedestal. Demand factors (and resulting equipment sizing, etc.) will be determined Per NEC, Table 555.12 unless





otherwise noted in the RFP documents and drawings. Note, demand load for pedestals with arrangements of two of the same receptacle types shall be summed and counted as one shore power receptacle for the demand calculation described in NEC Article 555.12.

- Example: Pedestal with (2) 50A, 120/240V receptacles shall be calculated as:  $2 \times 50A \times 240V = 24 \text{ kVA}$  and shall count as one shore power receptacle for NEC 555.12 Table Demand Calculation
- Provide and install Marina Power Pedestals to replace existing damaged pedestals. Refer to drawing E-501 for pedestal requirements and configurations. Refer to electrical layout drawings for locations. Refer to Pedestal Lists below to match pedestal type to pedestal location. Pedestals shall be furnished with power receptacles as shown in Pedestal Configurations Table.
- Furnish Ground Fault Monitoring (GFM) at the following locations: Service Entrance rated circuit breaker (shunt trip), each 480V, 3 phase panelboard MCB (shunt-trip) on each pier. Panelboard to be provided with shunt-trip main circuit breaker. GFM set to trip shunt trip circuit breakers at 100mA ground fault current (maximum). Provide ground fault controller Bender Marine Guard or equal.
- Each of three substations per pier shall be protected by a ground fault monitoring system, set to shunt trip the substation main breaker at 100mA ground fault current.
- All pedestals shall be supplied with ground fault circuit breakers set to 30mA for shore power receptacles.
- All pedestals shall be provided with an LED laminated top hat with integral photocell for automated On/Off control. The LED illuminance shall be included in the photometric study. Refer to City purchasing documents for approval of offered equipment.

**Pedestal Configurations Table**

Item #	Boat Length (Ft)	# Of Slips	Receptacle Configuration
A1	30' (OR UNDER)	1	1-30 AMP @ 120VAC, 1 Phase
A2	30 (OR UNDER)	2	2-30 AMP
B1	31' - 50'	1	1-30 AMP & 1-50 AMP
B2	31' - 50'	2	2-30 AMP & 2-50 AMP
C1	51' - 60'	1	2-50 AMP
C2	51' - 60'	2	4-50 AMP
D1	61' - Over 80'	1	2-50 AMP & 1-100 AMP



<b>D2</b>	61' - Over 80'	2	4-50 AMP & 2-100 AMP
<b>E1</b>	61' - Over 80'	1	2-50 AMP & 1-100 AMP, 3 PHASE, 480V
<b>E2</b>	61' - Over 80'	2	4-50 AMP (1P) & 2-100 AMP, 3 PHASE, 480V
<b>F2</b>	61' - Over 80'	2	4-100 AMP, 3 PHASE, 480V

**Marina Pier #1 Pedestal List.**

Refer to Electrical Plan Layout Sheet E-101 for location of power pedestals on Pier #1:

Slip #	Pedestal Type	Boat Length (Ft)
1/2	A2	30
3/4	A2	30
5/6	A2	30
7/8	A2	30
9/10	A2	30
11/12	A2	30
13/14	A2	30
15/16	A2	30
17/18	A2	30
19/20	A2	30
21	E2	70
22	E1	70
23	B1	50
25/24	B2	50
27/26	B2	50
29/28	B2	50
31/30	B2	50
33/32	B2	50
35/34	B2	50
36	B1	40
37/38	B2	40
39/40	B2	40
41/42	B2	40
43/44	B2	40
45/46	B2	40



### Marina Pier #2 Pedestal List.

Refer to Electrical Plan Layout Sheet E-102 for location of power pedestals on Pier #2:

Slip #	Pedestal Type	Boat Length (Ft)
1	B1	35
2/3	B2	35
4/5	B2	35
6/7	B2	35
8/9	B2	35
10/11	B2	35
12/13	B2	35
14/15	B2	35
16/17	B2	35
18/19	B2	35
20/21	B2	35
22/23	B2	35
24/25	B2	35
26/27	B1/E1	35/60
28	E1	112
29	C1	60
30/31	B2	35
32/33	B2	35
34/35	B2	35
36/37	B2	35
38/39	B2	35
40/41	B2	35
42/43	B2	35
44/45	B2	35
46/47	B2	35
48/49	B2	35
50/51	B2	35
52/53	B2	35
54	B1	35



### Marina Pier #3 Pedestal List.

Refer to Electrical Plan Layout Sheet E-103 for location of power pedestals on Pier #3:

Slip #	Pedestal Type	Boat Length (Ft)
1/2	B2	35
3/4	B2	35
5/6	B2	35
7/8	B2	35
9/10	B2	35
11/12	B2	35
13/14	B2	35
15/16	B2	35
17/18	B2	35
19/20	B2	35
21/22	B2	35
23/24	B2	35
25/26	B2	35
27/28	B2	45
29/30	B2	45
31/32	B2	45
33/34	B2	45
35/36	B2	45
37/38	B2	45
39/40	B2	45
41	B1	50
42	E1	127
44/43	C1/E1	55
46/45	C2	55
48/47	C2	55
50/49	C2	55
52/51	C2	55
54/53	C2	55
56/55	B2	35/50
58/57	B2	35
60/59	B2	35
62/61	B2	35
64/63	B2	35
66/65	B2	35
68/67	B2	35
70/69	B2	35
72/71	B2	35
74/73	B2	35
76/75	B2	35
78/77	B2	35
80/79	B2	35
82/81	B2	35



### Marina Pier #4 Pedestal List.

Refer to Electrical Plan Layout Sheet E-104 for location of power pedestals on Pier #4:

Slip #	Pedestal Type	Boat Length (Ft)
1/2	A2	30
3/4	A2	30
5/6	A2	30
7/8	A2	30
9/10	A2	30
11/12	A2	30
13/14	A2	30
15/16	A2	30
17/18	A2	30
19/20	A2	30
21/22	A2	30
23/24	A2	30
25/26	A2	30
27/28	A2	30
29/30	A2	30
31/32	A2	30
33/34	B2	30/40
35/36	B2	40
37/38	B2	40
39/40	B2	45
41/42	B2	45
43A/43B	E2	60/60
45/44	B2	45
47/46	B2	45
49/48	B2	45
51/50	B2	40
53/52	B2	40
55/54	A2	30
57/56	A2	30
59/58	A2	30
61/60	A2	30
63/62	A2	30
65/64	A2	30
67/66	A2	30
69/68	A2	30
73/72	A2	30
75/74	A2	30
77/76	A2	30
79/78	A2	30
81/80	A2	30
83/82	A2	30
84	A1	30



### Marina Pier #5 Pedestal List.

Refer to Electrical Plan Layout Sheet E-105 for location of power pedestals on Pier #5:

Slip #	Pedestal Type	Boat Length (Ft)
1/2	A2	30
3/4	A2	30
5	A1	30
6/7	B2	35
8/9	B2	35
10/11	B2	35
12/13	B2	35/45
14/15	B2	45
16/17	B2	45
18/19	B2	45
20/21	B2	45
22/23	B2	45
24/25	B2	45
26/27	B2	45
28/29	B2	45
30/31	B2	45
32/33	B2	45
34/35	B2	45
36/37	B2	45
38/39	B2	45
40/41	B2	45
42/43	B2	45
44/45	E2	115
47/46	B2	45
49/48	B2	45
51/50	B2	45
53/52	B2	45
55/54	B2	45
57/56	B2	45
59/58	B2	45
61/60	B2	45
63/62	B2	45
65/64	B2	45
67/66	B2	45
69/68	B2	45
71/70	B2	45
73/72	B2	45
75/74	B2	45
77/76	B2	35/45
79/78	B2	35
81/80	B2	35
83/82	B2	35
84	A1	30
85/86	A2	30
87/88	A2	30



### Marina Pier #6 Pedestal List.

Refer to Electrical Plan Layout Sheet E-106 for location of power pedestals on Pier #6:

Slip #	Pedestal Type	Boat Length (Ft)
1/2	A2	30
3	A1	30
4/5	B2	40
6/7	B2	40
8/9	B2	40
10/11	B2	40
12/13	B2	40
14/15	B2	40
16/17	B2	40
18/19	B2	40
20/21	B2	40
22/23	B2	40
24/25	B2	40
26/27	B2	40
28/29	B2	40
30/31	B2	40
32/33	B2	40
34/35	C2	60
36	C1	55
37	F2	112
39/38	B2	40
41/40	B2	40
43/42	B2	40
45/44	B2	40
47/46	B2	40
49/48	B2	40
51/50	B2	40
53/52	B2	40
55/54	B2	40
57/56	B2	40
59/58	B2	40
61/60	B2	40
63/62	B2	40
65/64	B2	40
67/66	B2	40
69/68	B2	40
71/70	B2	40
72	A1	30
73/74	A2	30
75/76	A2	30



## Marina Pier #7 Pedestal List

Refer to Electrical Plan Layout Sheet E-107 for location of power pedestals on Pier #7:

Slip #	Pedestal Type	Boat Length (Ft)
1	B1	50
2/3	B2	50
4/5	B2	50
6/7	B2	40
8/9	B2	40
10/11	B2	40
12/13	B2	40
14/15	B2	40
16/17	B2	40
18/19	B2	40
20/21	B2	50/40
22/23	C2	50/60
24/25/	C2	60
26/27	C2	60
28/29	C2	60
30	E1	60
31	E1	112
33/32	B2	50
35/34	B2	50
73/36	B2	50
39/38	B2	50
41/40	B2	50
43/42	B2	50/40
45/44	B2	40
47/46	B2	40
49/48	B2	40
51/50	B2	40
53/52	B2	40
55/54	B2	40
57/56	B2	40
58	A1	30
59/60	A2	30
61/62	A2	30





### Marina Pier #8 Pedestal List

Refer to Electrical Plan Layout Sheet E-108 for location of power pedestals on Pier #8:

Slip #	Pedestal Type	Boat Length (Ft)
1/2	A2	30
3/4	A2	30
5/6	A2	30
7/8	A2	30
9	A1	30
10/11	A2	30
12/13	A2	30
14/15	A2	30
16/17	A2	30
18/19	A2	30
20/21	A2	30
22/23	A2	30
24/25	A2	30
26/27	A2	30
28/29	A2	30
31/32	A2	30
32/33	A2	30
34/35	A2	30
36/37	A2	30
38/39	A2	30
40/41	A2	30
42/43	A2	30
44/45	A2	30
46/47	A2	30



### Marina Pier #9 Pedestal List.

Refer to Electrical Plan Layout Sheet E-109 for location of power pedestals on Pier #9:

Slip #	Pedestal Type	Boat Length (Ft)
1/2	B2	40
3/4	B2	40
5/6	B2	40
7/8	B2	40
9/10	B2	40
11/12	B2	40
13/14	B2	40
15/16	B2	40
17/18	B2	40
19/20	B2	40
21/22	B2	40
23/24	B2	40
25/26	B2	40
27/28	B2	40

### Marina Pier #10 Pedestal List.

Refer to Electrical Plan Layout Sheet E-110 for location of power pedestals on Pier #10:

Slip #	Pedestal Type	Boat Length (Ft)
1	D2	61' - Over 80'
2	B2	40

### 3.2.2. Lighting Requirements:

- Per 2002 Edition of NFPA 101, also known as Life Safety Code, Section 5.8.1.3 requires: the lighting level within an exit and within the portions of the exit access and exit discharge designated in 5.8.1.1 shall be illuminated to values not less than 10 lux (1 ft-candle) measured at the floor. (at locked gates for each pier entrance)
- Per 2002 Edition of NFPA 101, also known as Life Safety Code, Section 5.8.1.4: Required illumination shall be arranged so that the failure of any single lighting unit will not result in an illumination level in any designated area of less than 2 lux (0.2 ft-candle).
- Provide additional light bollards as necessary to produce the required lighting levels on the pier.



### 3.2.3. Low Voltage/Security System Requirements:

- The LVSS will be designed by a vendor selected by the Owner, Quality Wiring, who will be responsible for the design, configuration, supply of hardware and associated interface for an integrated three part electronic package. The package shall include Wi-Fi access throughout the site, CCTV camera and security supervisor interface, and Gate Security Access for each pier entrance of the Dinner Key Marina. Each of these systems will be coordinated with an overall interface and control system that will be located on the 3<sup>rd</sup> floor server room of the Dinner Key Marina building.
- Design and provide an electrical infrastructure system of conduits and raceways allowing the City of Miami selected LVSS supplier/installer to install a Low Voltage/Security System (LVSS) at the Dinner Key Marina. This design shall be coordinated with the city selected LVSS provider to ensure adequate infrastructure to easily install the LVSS system.
- As a minimum, the electrical infrastructure system will provide all necessary connection paths and empty conduits, pull strings, pull boxes, conduit labeling/identification, and appurtenances required to install the LVSS by others.
- Provide mounting poles where necessary to meet Wi-Fi coverage requirements.
- Poles shall be rated to withstand Risk Category I design wind speed of 157 MPH winds.
- Coordinate with WiFi access point, Security/Gate Access control and CCTV design with LVSS provider for potential dual use of mounting poles.
- Coordinate Additive Alternative 4 pedestal remote monitoring system requirements with Wi-Fi system provider if Alternative 4 is chosen by marina and provided by BD Team.
- Coordinate with marina operator to confirm security functions and areas of concern prior to system design.

### 3.2.4. Potable Water

Potable Water Piping: The pipe material for installation is noted on Drawings. Fittings, flanges, and appurtenances shall be compatible with the pipe.

- Copper Tubing:
  - ASTM B88, Type K with ASME B16.18 or ASME B16.22 solder joint fittings. Provide ASTM B42 copper pipe nipples with threaded end connections. Provide approved lead-free solder.
  - Ball Valves shall be copper alloy with threaded ends. Ball Valves shall be full port have quarter turn lever handles and be rated for 600 psi. Ball valves shall



comply with MSS SP-110, while check valves shall comply with MSS SP-80 and be rated for 300 psi.

- Stainless Steel (SS) Piping:
  - SS piping shall be Schedule 40, Type 316 Stainless Steel.
- Polyvinyl Chloride (PVC) Piping:
  - PVC piping shall be Schedule 80 Plain end, ASTM D1784 and ASTM D1785 pipe and ASTM D2467 Schedule 80 fittings with solvent weld joints. Solvent shall conform to ASTM D2564. Where threaded joints are noted, Schedule 80 pipe and fittings shall be used in conformance with ASTM D 2467.
  - Shut off valves in dock potable water system shall be copper alloy ball valves as noted above in the "Potable Water Piping" Article above.
  - Plastic pipe and fittings shall bear the seal of the National Sanitation Foundation for potable water service.
- High Density Polyethylene (HDPE) Piping:
  - HDPE piping shall be SDR-11, per ASTM D3035 and ASTM F714.
  - Joints shall be butt fuse welded.
- Flexible Hose:
  - Flexible Hose and fitting materials shall be compatible with potable water and suitable for 24-hour contact with chlorine sterilization solution in the hose interior, and with seawater and sunlight on the hose exterior.
  - Factory assembled lengths with 200 psi working pressure and marine stainless-steel couplings each end.
- Hose Bibbs:
  - Dock hose bibb stations shall be 3/4-inch Arrowhead "Arrow-Breaker" with integral vacuum breaker or approved equal.
- Provide piping following the general arrangement shown on the attached drawings.
- Provide provisions for expansion and contraction of pipe lines where necessary. Piping shall be run essentially as indicated on Drawings, care being taken to avoid interference with other piping, conduit, or equipment. The location of piping to be run on gangways and docks shall be carefully coordinated with electrical conduits specified, other utility piping and equipment location.
- The Contractor shall ensure sufficient pipe flexibility and anchorage is provided for all lines for thermal expansion and contraction, pressure and dock flexing. The dock structure and components shall accommodate the piping layout requirements such that the pipe shall not become overstressed. The piping shall be properly supported and anchored.



- Provide pipe supports per the applicable plumbing code. Pipe supports shall be in compliance with MSS SP-58 and MSS SP-69. Manufacturer's listed maximum load ratings shall not be exceeded. Pipe shall not exceed spacing noted on Drawings or manufacturer's recommendation whichever is smaller.
- Potable water mains on docks shall be installed a minimum of 6-inches above the water line.
- Provide disconnect provisions for all utility services at the landside connection and at the head of each dock to accommodate maintenance.
- Before jointing and erection of piping, thoroughly clean interiors of pipe, and components. Before making final equipment connections, blow out each system with compressed air at 100 psig or more.
- The potable water system shall be subjected to hydrostatic test. Prior to application of the test pressure, install a calibrated test pressure gage in each system to indicate any loss in pressure occurring during the test. Apply and maintain the test pressure as noted below and in conformance with the agencies having jurisdiction, during which time there shall be no evidence of leakage as detected by a reduction in test pressure. Should a reduction occur, leaks shall be located, repaired, and the test repeated. Test pressure shall be as stated on Drawings. All equipment and apparatus required for the tests shall be furnished by the Contractor. Apply and maintain a test pressure of 150 psi for 4 hours.
- A solution of chlorine and water, containing not less than 50 parts per million of free chlorine, shall be injected into the potable water system in such a manner as to ensure that the entire system is completely filled with the solution. Disinfection shall be in conformance with AWWA C651. After injection, the system shall be isolated, and the solution held in retention for a minimum period of 24 hours. After satisfactory sterilization has been affected, the system shall be flushed with fresh water until the chlorine level is within acceptable limits as determined by the Health Department. The Contractor shall arrange for sampling and testing water for sterilization/chlorination and system flush with the Health Department. It shall be the Contractor's responsibility to ensure that the water in the system is not used for human consumption during the sterilization process and that sterilization solution is disposed of in accordance with local requirements.
- Chlorine solution shall not be injected into the fire water system.

### 3.2.5. Fire Water

Firewater Piping: The pipe material for installation on the docks is noted on Drawings. Fitting, flanges, and appurtenances shall be compatible with the pipe.

- Steel Piping:
  - ASTM A53, Grade B Steel, galvanized



- SS piping shall be Schedule 40, Type 316 Stainless Steel.
- The fire water system material, equipment and installation shall comply with NFPA 14 and NFPA 303. Signage for the fire department connections shall be as indicated on the DCP Drawings and as approved by a registered fire protection Engineer or fire protection professional and the local Fire Marshal or Fire Chief.
- Hose cabinets with 1.5-inch fire hose are not required. Standpipes on docks shall be in an appropriate marine fire cabinet, and the standpipes shall include the City of Miami standard 2.5-inch connection.
- Provide appropriate fire extinguisher in each standpipe cabinet at the appropriate spacing per NFPA 303 requirements.
- Provide provisions for expansion and contraction of pipe lines where necessary. Piping shall be run essentially as indicated on DCP Drawings, care being taken to avoid interference with other piping, conduit, or equipment. The location of piping to be run on gangways and docks shall be carefully coordinated with electrical conduits specified, other utility piping and equipment location.
- The Contractor shall ensure sufficient pipe flexibility and anchorage is provided for all lines for thermal expansion and contraction, pressure and dock flexing. The dock structure and components shall accommodate the piping layout requirements such that the pipe shall not become overstressed. The piping shall be properly supported and anchored.
- Provide pipe supports per the applicable plumbing code. Pipe supports shall be in compliance with MSS SP-58 and MSS SP-69. Hangers, straps, brackets, fasteners, and appurtenances shall be 316 stainless steel or galvanized steel as indicated on the Drawings. Manufacturer's listed maximum load ratings shall not be exceeded. Pipe shall not exceed spacing noted on Drawings or manufacturer's recommendation whichever is smaller.
- Coat all galvanized fire piping, valves, appurtenances, connections and mounts with two coats of commercial grade latex paint. Color shall be red.
- The firewater systems shall be subjected to hydrostatic test. Each system may be tested as a unit or in sections, subject to approval by the Engineer. Prior to application of the test pressure, install a calibrated test pressure gage in each system to indicate any loss in pressure occurring during the test. Apply and maintain the test pressure as noted below and in conformance with the agencies having jurisdiction, during which time there shall be no evidence of leakage as detected by a reduction in test pressure. Should a reduction occur, leaks shall be located, repaired, and the test repeated. Test pressure shall be as stated on Drawings. All equipment and apparatus required for the tests shall be furnished by the Contractor. All newly installed fire service lines shall pass hydrostatic and hydrodynamic testing requirements as performed by the local fire marshal. Apply and maintain a test pressure of 200 psi for two hours.



Provide marina fire alarm system consisting of pull stations along the docks that have strobe lights and horns, similar in nature to the existing alarm system on the docks that has limited function. The pull stations shall be connected to a new fire alarm panel that shall be installed on the wall (hallway area, between enclosed areas), above the FEMA 100-Year flood elevation, in the dockmaster building. The alarm panel shall have an independent connection to a telephone line for notification to the Fire Dept, or the D/B Team may be able to integrate the alarm system with the existing alarm system within the building. Each gate to the piers shall have a remote indicator, connected to the master alarm system, for the responding Fire Department to confirm which pier has the alarm with the emergency. The D/B Team shall also design and install appropriate fire lane striping, approximately 40 feet long, at each dock along the existing curb and paved access road.

### 3.2.6. Sanitary Sewer

Sewer Systems Pump-out Units:

- Dock sanitary sewer system shall include a central vacuum pump such as the model 1000 remote unit as manufactured by KECO, telephone number (800) 900-7867, or the Masterline CV5400 unit as manufactured by EMP industries, telephone number (800) 355-7867, or approved equal. All units shall have a minimum 5 horsepower motor, 60-gallon per minute capacity, and 29 inches of mercury vacuum.
- Each unit shall be capable of evacuating sewage from boats holding tanks and delivering to an atmospheric sewer system as noted on Drawings. The design drawings for the existing sewage pump out piping on the docks is included in the appendices of this DCP. The systems shall also be provided with a 1-1/2-inch hose connections. The pump-out unit manufacturer shall provide the hoses, with associated carts and controls. Hose shall be 1-1/2-inch size, flexible polypropylene, vacuum rated, UV resistant with quick-release fittings at each end. Controls for unit shall be mounted on or immediately adjacent to unit and also be mounted on the hose reel cart. Unit shall be base mounted, provided with a marine grade aluminum or stainless-steel enclosure, with powder coating finish. Final finish coat shall be white. Each unit shall be provided with the recommended spare parts for commissioning and two years of operation, including all required special tools.
- Manufacturer's warranty for pump out unit shall be a minimum of 3 years after installation.
- Provide piping repairs to existing piping following the general arrangement shown on the DCP Drawings. Design drawings for the existing piping are included in the appendices.
- Provide provisions for expansion and contraction of pipe lines where necessary.
- The Contractor shall ensure sufficient pipe flexibility and anchorage is provided for all lines for thermal expansion and contraction, pressure and dock flexing. The dock structure and components shall accommodate the piping layout requirements such



that the pipe shall not become overstressed. The piping shall be properly supported and anchored.

- Provide pipe supports per the applicable plumbing code. Pipe supports shall be in compliance with MSS SP-58 and MSS SP-69. Hangers, straps, brackets, fasteners, and appurtenances shall be 316 stainless steel or galvanized steel. Manufacturer's listed maximum load ratings shall not be exceeded. Pipe shall not exceed spacing noted on Drawings or manufacturer's recommendation whichever is smaller.
- Sanitary sewer systems shall be tested as a water line, using a test pressure of 125 psig.

## 4. D/B Team Submittals

### 4.1. Structural Submittals

- a) Concrete mix design. A mix design for all concrete placed on the project concrete shall be submitted to the Owner for review.
- b) Concrete test results. All concrete shall be sampled and tested for quality control. Testing shall be performed by a DOT approved testing lab, and the results shall be provided to the Owner.
- c) Concrete repair data tables and quantities
- d) Shop drawings for prestressed concrete components
- e) Timber material certifications for all components
- f) Timber pile and bracing wraps
- g) Pile driving logs, embedment length and tip elevation
- h) Connection hardware
- i) FRP Grating cut sheets and shop drawings
- j) Bid Alternate components – piles, framing, connection hardware

### 4.2. Electrical Submittals

#### 4.2.1. Electrical System Equipment Shop Drawings and Submittal Items

- a) Panelboards
- b) Substations
- c) Wires and Cables
  - a. Splice and termination components (including electrical enclosures).
  - b. Electrical Enclosures, junction boxes, pull boxes, cabinets.
  - c. Conduit, fittings, mounting straps, supports.
- d) Grounding and bonding equipment.
- e) Receptacles
- f) Circuit Breakers





- g) Disconnect Switches
- h) Service Entrance Equipment
- i) Motor starters
- j) Surge protective devices
- k) Ground fault monitoring system
- l) Power Pedestals
- m) Luminaire fixtures, driver/ballast data
- n) Lighting contactors/lighting control relay panel
- o) Photocell
- p) Aluminum Light & Camera poles
- q) Marine Navigation Light
- r) Electrical system schematics, single line diagrams, equipment layouts, electrical details sheets forming a complete construction package.

#### 4.2.2. Electrical Test Reports

- a) 600 volt wiring test
- b) Grounding system test
- c) Ground-fault monitoring test

#### 4.3. Potable Water Submittals

- a) Pipe operating and design pressure calculations
- b) Piping layout drawings
- c) Hydraulic calculations supporting the pipe layout and sizing
- d) Material submittals and specifications, including:
  - a. Pipe
  - b. Valves
  - c. Fittings
  - d. Tees
  - e. Flanges
  - f. Hose Connections
- e) Pipe welding, fusing, or joining methodology and qualifications or certifications
- f) Pipe thermal expansion / contraction calculations



- g) Pipe support details
- h) Hydrostatic test report

#### 4.4. Fire Water Submittals

- a) Pipe operating and design pressure calculations
- b) Piping layout drawings
- c) Hydraulic calculations supporting the pipe layout and sizing
- d) Material submittals and specifications, including:
  - a. Pipe
  - b. Valves
  - c. Fittings
  - d. Tees
  - e. Flanges
  - f. Hose Connections
- e) Material Fire Marshall or UL Listing
- f) Pipe welding, fusing, or joining methodology and qualifications or certifications
- g) Pipe thermal expansion / contraction calculations
- h) Pipe support details
- i) Coating for galvanized piping
- j) Fire Extinguisher
- k) Standpipe Cabinet – for marina applications, including mounting details
- l) City of Miami – standard 2.5-inch connection for standpipes
- m) Hydrostatic test report
- n) Fire Alarm Master Panel – manufacturer information and technical details. Including wiring diagram for connection to power from building, and communications connections. Include mounting bracket details for mounting and connections.
- o) Fire Alarm Remote Panel – (for each dock) including wiring diagram for connection to power and connection to master alarm panel. Include mounting bracket and installation.
- p) Fire Alarm – pole, pull box, strobes and horns – assembly for marinas; catalog cuts, etc.
- q) Fire Lane Striping Plan – including specifications for pavement striping in accordance with City of Miami Public Works Standards.



#### 4.5. Sanitary Sewer Submittals

- a) Pipe operating and design pressure calculations (force main)
- b) Pump station specifications
- c) Piping layout drawings
- d) Hydraulic calculations supporting the pipe layout and sizing
- e) Material submittals and specifications, including:
  - a. Pipe
  - b. Valves
  - c. Fittings
  - d. Tees
  - e. Flanges
  - f. Hose Connections
- f) Pipe welding, fusing, or joining methodology and qualifications or certifications
- g) Pipe thermal expansion / contraction calculations
- h) Pipe support details
- i) Hydrostatic test report

#### 4.6. Marina Appurtenances

Submit product cut sheets for the following marina appurtenances:

- a) Dock boxes
- b) Trash/Recycling Receptacle
- c) Cleats
- d) Line holders
- e) Pile hats
- f) Aluminum Ladders



## Appendix A: DCP Drawings



## Appendix B: List of DCP Reference Documents

1. 2018 Topographic Survey
2. 1946 Underground Record Survey
3. 1950 Underground Survey
4. 1995 Peter De La Rosa Survey
5. Geotechnical Report (pending completion by HP Consultants, Inc.
6. 2018 Hurricane Irma Assessment Report by M&N

The following as-built drawings are referenced for this DCP and will be available for download from the City of Miami:

- 1986 Marina Construction Drawings
- 2008 Pier 3 Repairs Drawings
- 2010 Maintenance Dredging Permit Drawings
- 2015 Sewage Pump Out System Drawings



moffatt & nichol