ATM | DESIGN ENGINEERING CONSULTING

Addendum #2
Request for Bids (RFB) 2020-03
Isle of Palms Marina Rehabilitation
August 28, 2020

This addendum is intended to provide further clarification to the Bid Documents for this project, dated July 10, 2020. Specifically, this addendum intends to address the bidder questions received by the City. Also, note a revised bid form is provided along with several attachments. The bid due date is also hereby extended to September 11, 2020. Bids shall be due by 11am local time on this date.

Q: ***Can ATM provide Voltage Drop calculations?***
A: No.

Q: ***Are As-built Drawings of the Existing Bulkhead available? This would be very helpful in pricing the cleaning and recoating pricing.***
A: Attached pleased find the original design drawings for the bulkhead as well as a recent inspection report.

Q: ***Drawing FD2 shows the Omegaflex piping transition from existing bulkhead transition to new dock transition sump.***
Are you requiring the Omegaflex "Double wall Dock Connector" for this specific transition?
A: Yes.

Q: ***Shown on Drawing FD2 and FD3 detail***
Can the new in dock transition sump be fiberglass in place of stainless steel?
A: Yes. Provide as manufactured by Petroleum Containment, Inc.

Q: ***Omegaflex warranty installation recommends the piping be evenly supported at a minimum of 6' intervals using Omegaflex 2" vibration resistant cushion clamps/ or equal .***
FD3 detail shows a " piping longitudinal restraint detail" that does not meet Omegaflex recommendation for a warranty installation
Can the " piping longitudinal restraint be eliminated from the installation requirements?
A: Yes.

Q: ***FD3 Existing transition sump detail***
Can the specified water tight H20-rated diamond plate cover be replaced by a composite cover meeting the same ratings?
A: The transition sump is existing, and a new lid is not required.

Q: ***Reporting including Critical Paths for each project milestone as well as the project as a whole (with early and late starts and finishes for each activity) is an enormous amount of information not usually used for a rehabilitation project. A classic project schedule reports with each pay application containing actual and forecast starts and finishes along with the originally planned construction schedule provided as a baseline should be an effective approach. The schedule married with the narrative to provide understanding of field conditions should be sufficient.***
Would IOP be open to value engineering of this portion to include a classic CPM report? It will add significant costs to a contractor to provide such detail that can be easily provided in a classic CPM report.

A: Refer to performance specifications section 01000, 1.7 for schedule submittal/tracking requirements.

Q: ***What are the capabilities of the existing Scribble system?***

A: The existing scribble software is Pure Retail 8.01.

Q: ***Does the existing scribble system include Pure Fuel POS software and hardware?***

A: No. Provide all necessary hardware and software upgrades to incorporate PureFuel scribble system, with integral fuel monitoring capabilities.

Q: ***What manufacture & model compliance monitoring system is being used at the marina for inventory, secondary containment monitoring?***

A: The existing fuel management system in the fuel hut located on the dock is a TMS management system. This system is to be removed and the existing VEEDER-ROOT and Scribble systems are to be modified to integrate the marina. The existing fuel inventory and secondary containment and monitoring system is a Veeder-Root TLS-350. Provide additional sensors, conduit, and cabling to monitor marina piping, dispenser sumps and transition sumps. The system is approximately 125' from the existing bulkhead transition sump. Coordinate with exact system provided and provide dispensers with proper communications modules.

Q: ***Will the existing monitoring system be used for sump sensors for the new over the water fuel system?***

A: Yes.

Q: ***Will a new monitor system be required to monitor the over the water sumps as part of the new construction.***

A: No, the existing VEEDER-ROOT TLS-350 shall be extended to monitor marina sensors.

Q: ***Bid Bond is listed as the 7th item under Submittal Requirements (page 8 of the RFB), what value or percentage is required?***

A: 10% of the bid amount.

Q: ***Does this project have Liquidated Damages. If so, please provide a value.***
A: Yes. $1,000/day.

Q: ***Is there an Engineer's Estimate available?***
A: Yes, the Engineer's Estimate for this project (base bid) is $2.46M. The City has relied on this estimate for project budgeting purposes.

Q: ***Ravens Marine would like to submit pricing on the Isle of Palms Marina Rehabilitation bid as a supplier of aluminum floating docks and gangways. Could you please advise what we would need to send over to you to be considered an approved equal supplier? Our estimate would meet all project specifications.***
A: The floating dock suppliers have been specified. Any proposed alternates shall be approved by the Design Criteria Professional and shall have a minimum 10 years continuous experience in floating dock design and fabrication and shall be required to submit a list of previous experience to the Design Criteria Professional prior to bid submittal. This experience should include design of floating docks capable of berthing megayachts.

Gangway providers must meet/exceed all specifications listed in Specification Section 02885 Aluminum Gangway.

Q: ***Multiple inquiries related to the form of contract presented in the RFP, AIA A101 and A201.***
A: Final contract terms will be negotiated with the City within the general framework of the provided/AIA-standard contract document forms.

Q: ***The Request for Bids, pg. 5, requires Contractor to "make every effort to locate other possible unknown utility lines" but does not comment on compensability. Please confirm that unmarked, undisclosed utilities shall be treated as a differing site condition, or explain what is intended.***
A: It shall be the contractor's responsibility to review existing site conditions as indicated in the RFB. An historic site utility survey is attached hereto for reference. Contractor shall also utilize a utility location service such as South Carolina 811 and/ or other responsible means to ensure safe digging.

Q: ***Section A in the Request for Bids page 6, states that Professional Liability Insurance is required. As Prime Bidder, we do not carry and cannot obtain this insurance. I understand that portions of the project are "design-build". Would you consider waiving this requirement for the Prime Bidder as long as our designers for the "design-build" portions of the work carry this insurance?***
A: This is acceptable.

Q: ***Section G in the Technical Specifications Section 01000, 1.2 D states the Contractor shall maintain a construction office within the general vicinity of the project work area. Can our unpowered tool trailers on our barge serve as this construction office?***

A: This is acceptable, however the Contractor shall have a resident project representative on site at all times during execution of the work. Contact information of a responsible project representative must also be provided to the Owner, Marina Operator, and Design Criteria Professional as well. This representative must be available for telephone contact at all times during the course of construction.

Q: ***Given the amount of public traffic accessing the boat ramp and Marina Store (for obvious safety concerns), will you allow the Contractor to use the site for the following activities: Loading out of old docks and piles from floating barge to trucks / dumpsters, unloading new docks / gangways / piles, etc. from trucks to floating barge?***

A: Yes, given proper prior notice and coordination with marina operator. Contractor shall be responsible for any/all traffic control and safety during such exercises.

Q: ***Can you define the limits of any upland contractor storage space that may be provided?***

A: See the below figure. Note: upland boat storage, convenience store operations, upland fuel station operations, restaurant construction, boat ramp use/parking, charter vessel operation, and other activities will be ongoing at the site during the course of the project. Further clarification/discussion on this topic will be conducted during the pre-construction conference.

Photo 1 – Contractor Laydown Area

Q: ***Section G in the Technical Specifications Section 02454, 3.2 D list the pile driving equipment that can be utilized. Will you allow the use of a vibratory hammer for the demolition of old piles and installation of new pipe piles? Will you allow the use of diesel impact hammers for the installation of timber piles, pile piles, or concrete piles?***

A: Vibratory hammers shall be allowed for pile demolition and installation purposes. Diesel impact hammers shall be allowed for the installation of new piling. Refer to project specifications and regulatory permit conditions for additional information.

Q: ***Will the Owner supply the potable water for the sheet pile bulkhead water blasting operations?***

A: Yes.

Q: ***There's no mention in the project documents on phasing the work. Is the contractor allowed to perform the demolition work on 100% of the Marina prior to beginning the rebuilding of the Marina? If not, please define the phases.***

A: Phasing is not specifically addressed in the original bid documents. However, the marina operator would strongly prefer to keep one portion of the floating docks on Morgan Creek open/available for his use at all times during construction. In such a scenario, it is preferred that the demolition and reconstruction of Dock Areas A and B occur first. This would allow the marina operator to continue to utilize Dock Area C for vessel berthing and then once Dock Areas A and B are suitably complete to provide vessel dockage/usage, boats would be relocated to these areas and then the contractor could commence demolition and reconstruction of Dock Area C.

A Bid Alternate has been included to address this topic. No relief from project schedule/deadlines shall be granted due to the implementation of a phased construction approach.

Q: ***Will you allow a combination of the various types of piles (concrete, timber, or steel pipe piles) to be used in the Marina if our design calculations prove that they meet or exceed loading requirements?***

A: Yes. However, this will be carefully scrutinized by the Design Criteria Professional during the submittal process. This scrutiny will include differential deflection of pile types if multiple pile types are proposed for a single dock area/structure.

Q: ***There's an aluminum gate at the entrance to the restaurant and face dock which is supported by the wood fixed pier that gets demolished. Is the Contractor to remove this gate completely and rebuild the handrail system to match adjacent handrail design?***

A: Yes.

Q: ***Bid Form Alt. 4 is to provide the floating docks with IPE decking. Is this for the Base Bid only (Meeco Sullivan)? Since you have several alternate dock manufacturers in the bid options this IPE decking price will vary. Please clarify.***

A: Refer to updated bid form. Pricing is requested for each floating dock option.

Q: ***The new 6'x40' aluminum gangway that goes to the Restaurant Dock gets tied into the bulkhead at odd angle. Do you envision a pile supported fixed dock to support the gangway or do you envision a cantilevered support from the bulkhead to support this gangway?***

A: A cantilevered support was envisioned, but the ultimate design of this connection shall be the responsibility of the contractor/gangway manufacturer. Additional piling/fixed pier development in this area may require a permit amendment. This is not a preferred scenario.

Q: ***Section G in the Technical Specifications Section 02853 1.4 B requires the Contractor to submit with his bid an example floating dock and anchorage calculations from a previous project… Does this apply only to the Base Bid (Meeco Sullivan)?***

A: Bidders may omit this submittal requirement for the specified dock manufacturers.

Q: ***There are no details for the fuel hut other than it needs to be 14'x14'. I understand addendum #1 addresses some of the questions. Would you consider adding a bid item for the fuel hut specifying a set allowance since a lot of details are not provided? If not please clarify the following:***

a) Can this fuel hut be pre-fabricated?
b) What building standard or code does this fuel hut fall under?
c) One window AC unit?
d) Are we to include wall cabinets like existing ones?
e) Are we to include any chairs?
f) Are we to include desk / credenza like existing?
g) Are we to include interior customer counters like existing?
h) How many windows and do they need to be slide type windows?
i) Interior lights and type?
j) Desired interior wall materials?
k) Any exterior flood lights and type?
l) Interior receptacles only and how many?
m) Ceiling type?
n) Exterior siding material?
o) One door and material type?
p) Interior flooring material type?
q) Insulation in walls?
r) Define any shelving required
s) There's an overhang around the 4 sides of the current fuel hut, do you want any overhangs? If so define where and size?
t) Describe the type of roof you desire and construction materials
u) Does the new fuel hut get any gutters? The existing one has one gutter on the channel side face.
v) There are video surveillance cameras on the existing fuel hut. Are these required on the new fuel hut?
w) Are we to include an exterior counter for customers?

A: The intent for the fuel hut is to replace the existing structure in a "like for like" manner. Materials should be similar to the existing. Answers to the specific questions above are provided below.

a) Yes.
b) The building and the fuel equipment would be governed by the 2018 International Building Code, 2018 International Fire Code and the 2017 National Electrical Code. The Building Official indicates that special attention should be paid to Section 2310 of the fire code and Section 514, 553 and 555 of the NEC.
c) A package through the wall air conditioner with heating capability is preferred.
d) Those that are framed in/permanent, yes. Those that are portable, no.
e) No chairs.
f) Those that are framed in/permanent, yes. Those that are portable, no.
g) Yes.
h) Similar to existing.
i) Similar to existing.
j) Similar to existing.
k) Similar to existing.
l) Similar to existing. Minimum 1 per wall.
m) Similar to existing.
n) Similar to existing.
o) Yes. One door. Similar to existing material.
p) Similar to existing.
q) Similar to existing.
r) That which is currently framed in.
s) Yes. The overhang shall include the entirety of the 24' x 24' platform. The existing flagpole shall also be retained and integrated into the new fuel hut installation.
t) Similar to existing.
u) Similar to existing.
v) The surveillance cameras shall be carefully removed and provided to the marina manager. Reinstallation of these devices shall be the responsibility of others. Coordinate this work with the City and Marina Manager.
w) Yes.

Demolition of this structure shall be coordinated with the marina manager and Design Criteria Professional.

Bidders shall submit pricing for this element as well as a basic/brief written narrative of assumptions for City consideration.

NOTE: THIS PROJECT ELEMENT IS NOW DESIGNATED AS A BID ALTERNATE. SEE REVISED BID FORM. FLOATING DOCK IN THIS AREA SHALL BE DESIGNED TO ACCOMMODATE FUEL HUT AS PART OF BASE BID AND RELATED ALTERNATES.

Q: ***Note #8 on Sheet E1 indicates that all floating dock cables shall be installed in "…utility trench within the dock system". Also, there's a note under the "Wire and Conduit Schedule" on Sheet E8 which states essentially the same thing. We've never seen a wood dock system come with conduits furnished in them. Further, we've never installed Type "G" cable within conduits in wood dock systems. That***

type cable is used primarily because it has a very heavy duty outer jacket and is generally considered to be suitable to be installed directly in the wood dock framing. Please clarify.

A: Refer to Specification Section 02853 3.3 B. Type G cable can be installed directly in the timber dock system. Coordinate to ensure it is properly supported and restrained to prevent chafing and damage.

Q: Please see the comment from our Insurance company…. "Technically the requirement that the City be named as additional insured on <u>all such</u> policies cannot be met because due to the nature of Workers' Compensation, there is no such thing as adding a third party as an additional insured on Workers' Compensation".

A: Not adding the City as an additional insured on the worker's compensation policies is acceptable provided that the prime contractor and all sub-contractors, suppliers, etc. visiting the site maintain and provide proof of worker's compensation coverage.

Q: Sheet E6, keyed note 1, is asking for us to compare design of panel rating with utility fault currents, are we to assume all new panels, etc., require a complete arc flash/coordination study by a PE engineer?

A: The exact transformer selection has not been specified by the power company, once the transformer is selected EPIC engineering can assist with this calculation. The AIC rating on the drawings should exceed the available fault current.

Q: To confirm; we are to use G-GC cable from each MDP, down the gangways, and onto the floating docks to each substation, and from substations to each pedestal correct? No splicing at either end of the gangways?

A: Correct. No splicing.

Q: Sheet E8, note with asterisk below cable schedule; are there "conduits" on the floating dock system, or is the note referring to the "dock utility trench system" from note 8, on E1?

A: The cable from the transformer to the main distribution panels is to be type THHN/THWN in conduit. The cables from the main distribution panel to the substation and throughout the rest of the marina is to be type G-GC. Conduit is only necessary if more support than the dock system can provide is required.

Q: Sheet E8, referring to the gangway cable installation details, is there a specific amount of cable sag required or suggested, at the bottom of the gangway to allow for tidal fluctuations?

A: There is not a specific amount required or suggested. There needs to be enough to allow for the local rise and fall of tides without damage to the cable.

Q: Do local building codes at this site require vertical pickets or aluminum wire mesh installed on the outside framework of the ADA gangways to prevent a 4" sphere pass thru rule that is normally an ADA federal requirement?

A: Refer ADAAG, specifically Sections 4.8 and 15.2.

Q: Should not the 6ft. x 80ft. ADA gangways and the 6ft. x 40ft. gangway be designed for 100PSF/Deflection L/240 rather than the 50 PSF live load in you performance specifications?

A: The gangways should meet the criteria listed in the performance specifications as a minimum.

Q: What is the width of the 6ft. x 80ft. gangway landing float on sheet M5/M7 Dock area C?

A: 16-ft.

As a bid alternate, pricing is requested from the responding bidders for work related to the existing Intracoastal Dock. The general scope of work is as follows and a general schematic is included in the plans for reference.

- Contractor to remove and dispose of all mooring piles, finger piers and finger end anchor piles (and related hardware) from existing Intracoastal Dock. Full removal of the pilings is preferred.
- Seven anchor piles shall be installed on the shore-side of the existing dock. Pile guides shall be structurally integrated into the existing framing structure to generally match structural detail at existing, adjacent pile guides.
- The Intracoastal side of the dock shall be improved such that it is suitable for side tide berthing. This shall include the installation of a new, continuous vinyl bumper strip that is consistent with that indicated in the floating dock specifications. Cleats shall be installed along both sides of the dock at 10-ft. intervals. Cleat installation shall be as per the performance specifications and sized similar to existing. Existing cleats may be re-used provided they are in good, functional condition.
- The dock shall float in a level manner consistent with that indicated in the floating dock performance specifications. Contractor to install additional flotation if necessary.
- Existing anchor piling may be re-used to the extent practical (if existing piling are extracted without damage).
- All contractor proposed materials should generally conform with applicable sections of the performance specifications.
- Design drawings for the existing Intracoastal Dock are provided for reference.

This work is intended to be a temporary arrangement until such time that this dock is relocated and/or replaced. Detailed engineering design submittals shall not be required. Contractor to provide basic/schematic shop drawings and product data to design criteria professional for review prior to execution of the work. A basic/brief narrative of bidder assumptions for this work shall be provided with the bid. No warranty is required for this bid alternate.

Attachments

Bulkhead Inspection Report
Bulkhead Design Drawings (embedded within Bulkhead Inspection Report)
Historic Site Utility Survey
Revised Drawings
Revised Bid Form

Engineering A Brighter Future®

October 14, 2016

Linda Lovelorn Tucker
City Administrator
City of Isle of Palms
1207 Palm Boulevard,
Isle of Palms, South Carolina 29451

RE: Isle of Palms Marina Bulkhead Investigation
JMT Job No. 16-0833-001
Client Ref No. RFP#2016-04

Ms. Lovelorn Tucker:

Johnson, Mirmiran & Thompson (JMT) is pleased to submit our findings during the investigation into the potential cause of the cause of severe erosion at the Isle of Palms Marina. The attached report also details several recommendations for remediation and cost estimates for those recommendation options.

If you have any questions or need further information, please do not hesitate to contact me at 804-205-5581 or NLehr@jmt.com.

Very truly yours,

JOHNSON, MIRMIRAN & THOMPSON, INC.

Nancy E. Lehr, PE, APMP
Associate
Facilities-Structures and Coastal Engineering

NEL/djo

Enclosures

Cc: Jim O'Connor, PE

October 14, 2016

Isle of Palms Marina Report

ISLE OF PALMS MARINA BULKHEAD INVESTIGATION

Findings of the potential cause of the severe erosion at the Isle of Palms Marina

RFP #2016-04

Submitted to:
Linda Lovelorn Tucker
City of Isle of Palms

INTRODUCTION:

JMT was contracted by the City of Isle of Palms to investigate the landward erosion concerns behind the existing seawall at the Isle of Palms Marina. The Isle of Palms Marina and Morgan Creek Grill are located at the northern end of Isle of Palms, South Carolina, along Morgan Creek and the Intracoastal Waterway. The marina is connected to the Atlantic Ocean via a short boat ride along the Intracoastal to Dewees Inlet, but is well protected from ocean storms heavy seas.

Based on information provided in Request for Proposal 2016-04, gathered at our meetings with Mr. Brian Berrigan, Manager of the Isle of Palms Marina, recent site visits and investigations, and detailed review of provided documents, we have summarized our findings and recommendations in the below sections of this report. We have thoroughly documented the current conditions along the bulkhead and several options for the City to consider to alleviate the erosion issues that persist.

BACKGROUND:

The Isle of Palms Marina was originally constructed with a timber bulkhead, timber cap, and all original buildings on timber piles. During routine monitoring and inspection of the condition of the wall in 2008 by Jon Guerry Taylor and Associates, Inc. (JGT), it was noticed that there was severe decay, soil loss, marine borer damage, bowing (deflection), and toe kick-out (translation at the toe of the bulkhead) as documented in their report dated June 11, 2008. Subsequently, it was recommended that the wall be replaced with a steel sheet pile wall directly waterside of the existing timber bulkhead leaving it in place. Attachment 1 provides the 2008 construction drawings by JGT.

In recent years, severe erosion behind the wall, both in front of the Morgan Creek Grill and the Marina store, have been documented by the City of Isle of Palms and Mr. Berrigan. This report is to document JMT's investigation into the potential engineering and construction cause(s) of this erosion and provide recommendations to the City on remediation fixes to the bulkhead.

SITE INVESTIGATIONS:

JMT structural engineers performed an initial site visit in May 2016, prior to submitting the proposal for the site investigation work, to gain insight into the severity of the erosion issue. During discussions with Mr. Berrigan and Jay Clarke, owner of Morgan Creek Grill, areas of severe erosion were documented on the northeast corner of the new bulkhead where the restaurant has installed patio blocks to create a seating area between the restaurant building and the edge of the concrete cap for the new bulkhead. It was indicated that the restaurant is taking up the patio blocks monthly to replace lost soil underneath (*Photo 1 & 2*). JMT engineers evaluated the sheet pile wall from the waterside, while there was no indication of broken welds or failure of the wall, significant soil deposits out of the existing weep holes were observed in this area (*Photo 3 & 4*). In our opinion, the quantity of sand visibly leaking from the weep holes did not seem to justify the amount of fill that Mr. Berrigan and Mr. Clark described adding to the different areas of erosion around the site. This caused some concern, as the weep holes can be

known to be defective or installed improperly. It also raised the possibility that there may be some other issues, such as subterranean consolidation triggered by the pile installation, causing the upland erosion issues. The existing soils information would need to be evaluated by a geotechnical engineer to provide expert knowledge pertaining to possible consolidation effects.

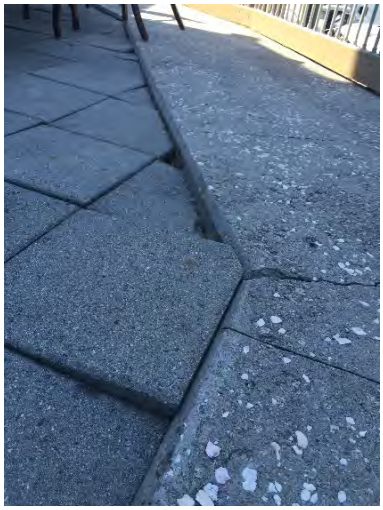


Photo 1

Photo 2

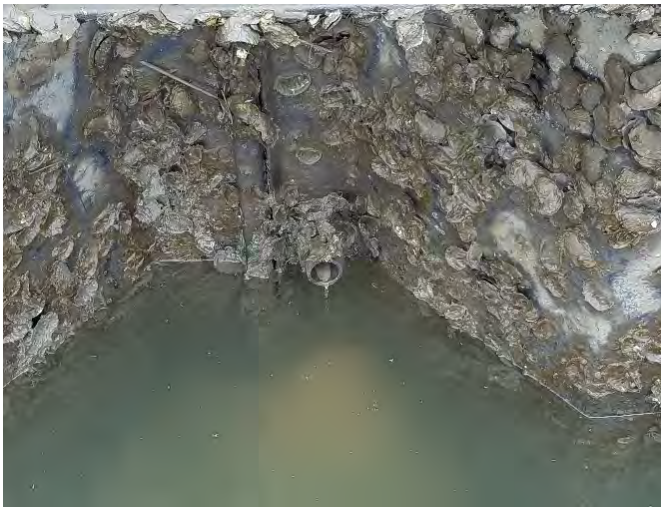


Photo 3

Photo 4

Other areas of erosion were pointed out along the southern bulkhead (*Photo 5*), specifically near the electrical junction box on the south side of the Marina store building (Photo 6), along the southern edge of the bulkhead (*Photo 7*), and severe erosion beneath the deck extension of the Marina store (*Photo 8*), which is severe enough to limit access to this area by pedestrians (*Photo 9 & 10*). Mr. Berrigan and Mr. Clarke also mentioned during our discussion, that there has been no standing water on the site after a heavy rain.

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

It should be noted that the original buildings, both the Marina Store and Morgan's Grill, were constructed on driven piles, but none of the subsequent additions and deck extensions to each of the buildings appear to not be built in the same manner. There is also a 4" corrugated pipe *(Photo 8)* that appears to have been part of the downspout system of the original building, prior to the deck and porch additions, that has evidence of water continuing to flow through the pipe. The termination of the pipe could not be located at the time of the site investigation.

JMT's structural engineers returned to the project site in August 2016, after award of the contract, to conduct a more detailed and official site investigation. It was at this time that Mr. Berrigan provided JMT with all of the construction documents and reports for the construction of the steel sheet pile wall that was installed in 2008 by Misener Marine Construction, Inc. As part of this package, a previous geotechnical soil boring investigation was included and delivered to JMT's geotechnical department for analysis, while preparations were made to inspect the area between the walls, underneath the concrete cap. During this site visit, high tide prevented a clear view of most of the weep holes that were observed to be depositing soil during the previous site visit. It did allow for more investigation into the condition of several of the steel sheets and welds, particularly at the corners of the sheet pile wall, anchor whaler connections, and electrical and plumbing through ports. Several broken welds were documented, but none severe enough to cause alarm or indicate that being the cause of the erosion issue (*Photo 11*). Several steel sheets show advanced signs of corrosion (*Photo 12*). The areas in which corrosion was observed are not critical locations or detrimental to the structural rigidity of the wall, therefore do not cause alarm for impending wall failure. Our visual inspection did not indicate that the sheet pile wall was translation or bowing to indicate a further issue (*Photo 13*).

Photo 11

Photo 12

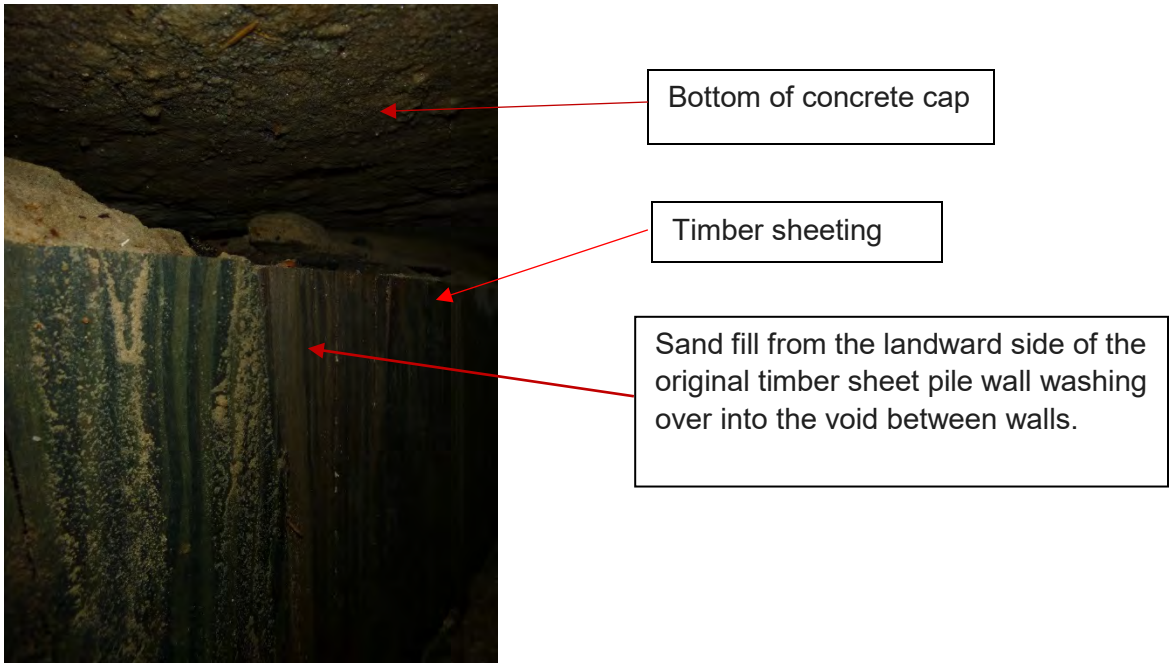
Photo 13

JMT returned to the project site in September 2016 to cut five 4" diameter cores, through the concrete cap of the bulkhead, in order to investigate the conditions between the walls and under the concrete cap. Attachment 2 provides the approximate location of the cores, located on the proposed new bulkhead plan sheet from the 2008 construction drawings and all of the photo documentation taken at

the time of the cores. JMT used an electric core drill fitted with a 4" diameter barrel to cut observation holes into the existing concrete cap, providing access for a camera to be lowered and document the current conditions between the walls. Photos were taken as evidence of our findings. All drilling locations were between the steel cap of the new wall and the pervious timber wall, providing the best visibility, with the least invasive method of accessibility.

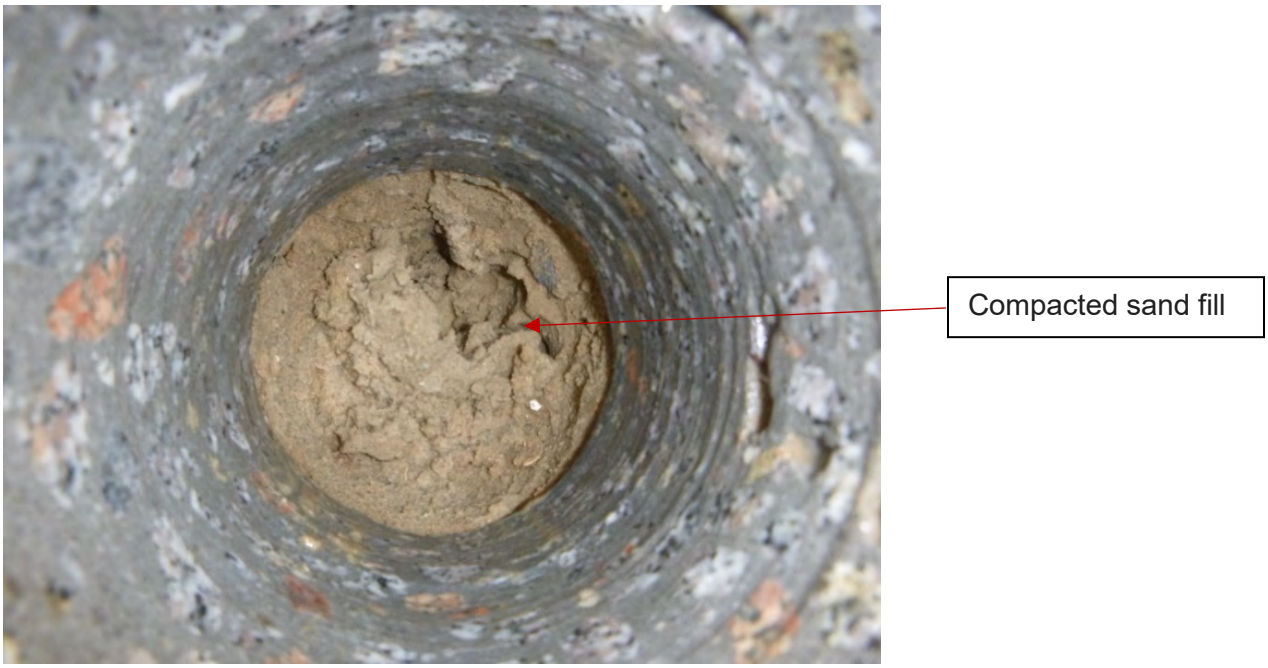
CORE LOCATION 1:

The first core was taken on the northeastern corner of the property, in front of the Morgan Creek Grill, in the corner of the sheet pile wall where Morgan Creek meets the Intracoastal Waterway. After cutting through, the core fell into a hole, and was not recovered. The concrete cap was measured to be 5-3/4" thick and the soil between the walls was found to be 22" below the top of the concrete. The landward side of the steel sheets appeared to be in good repair. No penetrations where visible. The weeps holes were at a lower elevation than the fill condition according to the provided plan set. The previous timber wall was also visible. It was observed that the top of the timber sheeting was lower than the concrete cap. These conditions indicate that the sand fill being added by Mr. Clarke and Mr. Berrigan has been washing over the timber bulkhead, between the concrete and the top of the timber wall into the void between the two walls. It is also important to note that the bottom surface of the concrete was textured in such a way that it was clearly evident that the concrete cap had been cast on a soil surface between the walls indicating that original fill between the wall has been migrating or being lost.



CORE LOCATION 2:

The second concrete core was taken in front of the tent covered area between core 1 and the boat ramp. This core revealed compacted sand fill to the bottom of the cap, there was no void below. The concrete was measured at 5-1/2" thick. This location did not have any external indications of erosion.

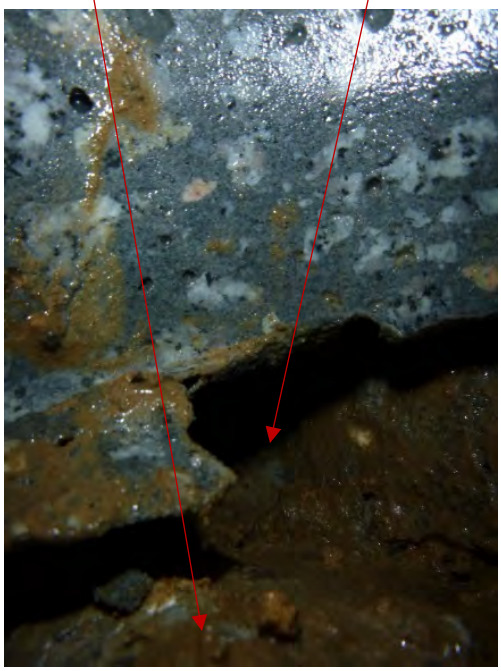


CORE LOCATION 3:

The third concrete core was taken in front of the porch of the marina store, in the area where pedestrian activity has been restricted due to the erosion hazard. This area has the most visible settlement where the concrete cap has separated along the steel cap beam of the newer steel sheet pile wall and the landward side of the concrete cap having settled more than 1". The concrete at this location was measured at 9-3/4" thick, considerably more than the construction documents indicated. Removing the concrete core revealed broken concrete rubble filling a portion of the void between the two walls. There was evidence of previous sand fill, but it was no longer visible. It did appear that surface flow of rainwater was washing material through the concrete rubble. The area under the deck was another location where Mr. Berrigan reported having to add fill routinely.

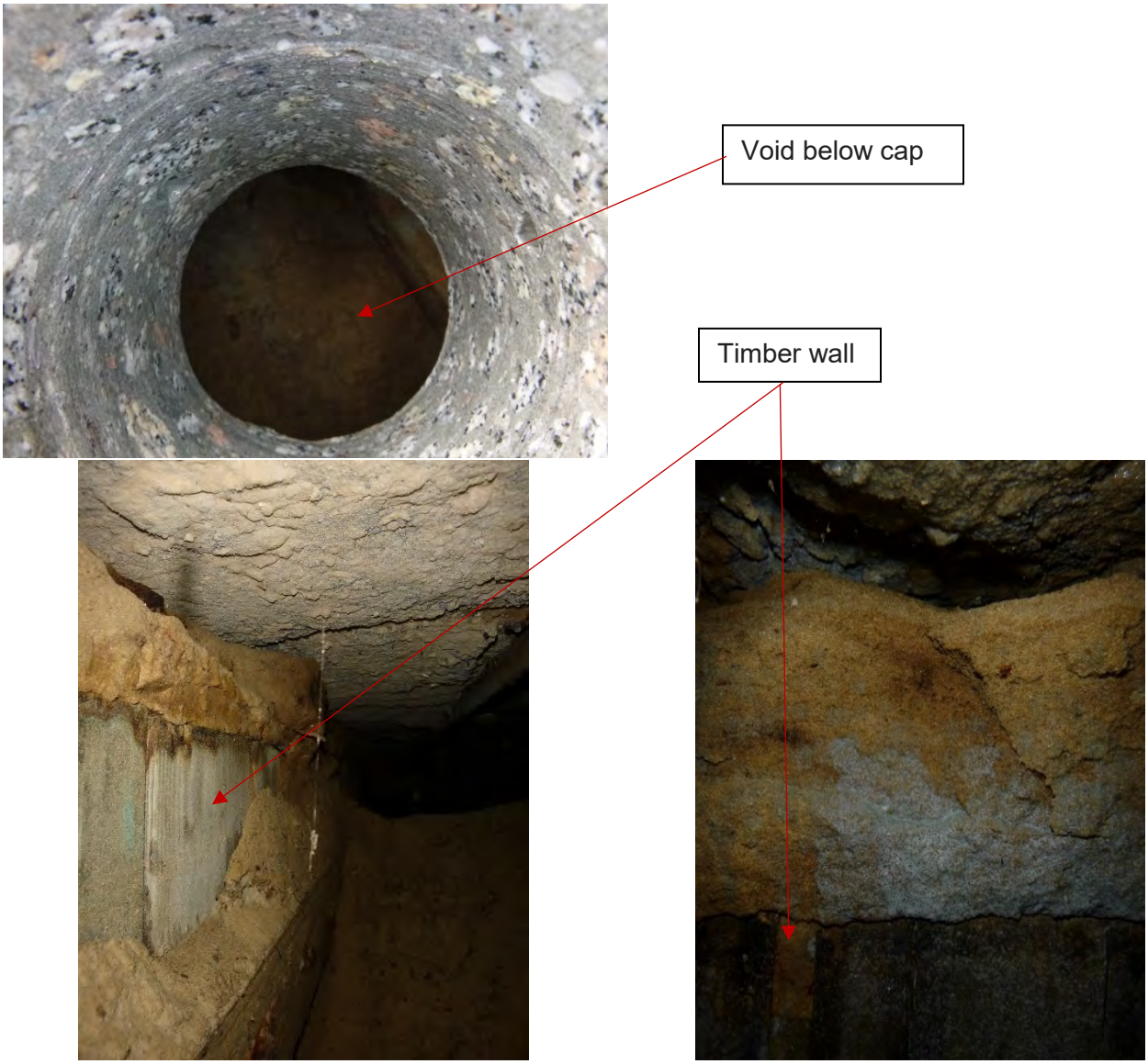
Concrete rubble exposed under concrete cap

Voids in concrete rubble



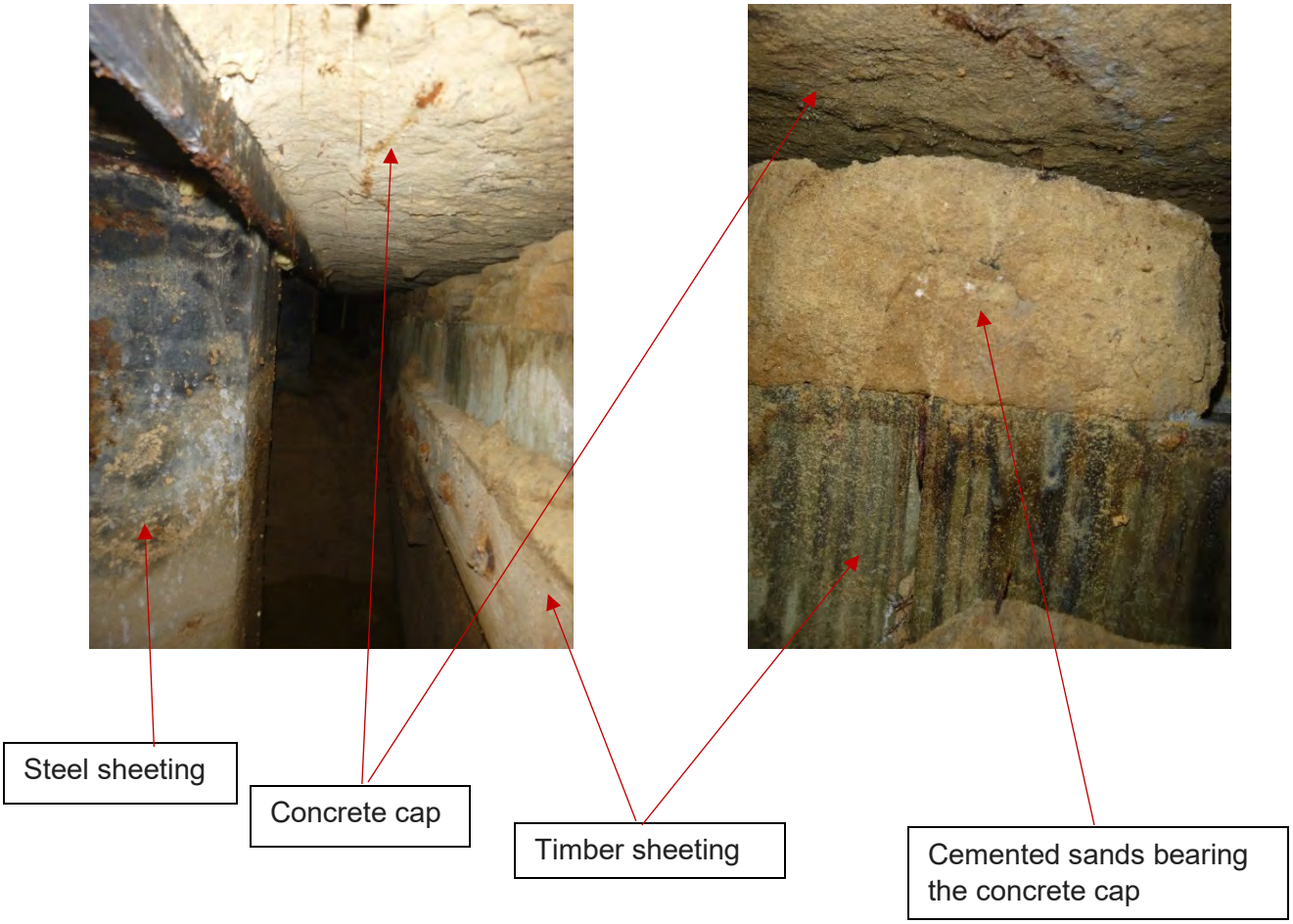
CORE LOCATION 4:

The fourth core was located near the utility bank, approximately 100' south of the marina store. This core was very similar to the 1st core. The soil fill was observed to be 23" below the top of the cap. The concrete measure 6" thick. The steel sheeting appeared to be in good condition and the timber wall was also visible. Photos showed that sand landward of the timber wall was evidently washing over the top into the void between the two walls. The bottom of the concrete cap was textured in a manner to indicate it had been cast on sand fill during construction activities.



CORE LOCATION 5:

The fifth concrete core was located near the southern corner of the bulkhead, in an effort to get an idea of the conditions at the southern corner of the property. The sand fill was measured to be 60” below the top of the concrete cap. The concrete measured 5” thick. The steel sheeting of the newer wall was in observed to be good condition, showing minimal signs of corrosion, and the timber wall was also observed as having similar conditions as found in core 1 and 4, where the sand fill landward of the timber wall shows signs that it has been washing over the top and into the void between the two walls. This location provided excellent visibility for some distance south along the southern wall. Observations were that the sand fill was missing and was unevenly graded for a great distance, which coincides with the erosion that is present along the southern portion of the bulkhead.



GEOTECHNICAL CONSIDERATIONS:

The geotechnical review by JMT for this project consisted of a document review of the following:

1. Construction Documents, Isle of Palms Marina Bulkhead Replacement Isle of Palms, dated July 24, 2008.
2. Geotechnical Data Report, prepared by Soil Consultants, Inc., dated January 11, 2006.
3. The Online Map of the Geology of South Carolina, posted by the South Carolina Geological Survey
4. USGS Historical Topographic Mapping

The project is located on the west side of the Isle of Palms which is separated from the mainland by the Intracoastal Waterway. The unconsolidated sediments that form the Isle are of Pleistocene Age and consist of fluvial sands, backbarrier muds, and barrier beach sands. Holocene deposits overlie the Pleistocene and generally consist of similar materials. According to USGS historical Topographic Mapping, the stream of Meeting Reach was enlarged to the Intracoastal Waterway between 1920 and 1943. Material from that excavation may have been placed on the site. The historic topography also show that the original timber wall was built between 1960 and 1971 and it forms the south bank of a channel that was excavated in that time period to provide access to a body of water landlocked within the Isle. The mapping does not show if the channel excavation and wall construction were made at the same time.

The borings were made in 2005 and boring logs do not have elevations, so an EL 9 was assumed, based on the elevation of the existing wall. The samples from these borings are not available, so it is difficult to determine limits of fill. Although it is reasonable to assume that Sand with Silt (SP-SM) material encountered in the borings is backfill, it is not possible to determine the amount. However, it is noted that the SP-SM material changes from brown to gray in all three borings at EL 0 to 4, based on the assumed surface elevation where the borings were made.

Based on the available geotechnical data and magnitude of the void below the steel sheet pile wall cap, it does not appear that current distress is due to consolidation settlement of the soft and loose subsurface soils. It is possible that some settlement of the soft and loose subsurface soils may have occurred, but it should not be of the magnitude of the void observed in the test holes Considering observations in the test holes and visible signs of soils migrating from the weep holes, it appears that the sand backfill is migrating into the well-point weep holes and out in to the harbor. The Construction Documents shows that the drains should have been constructed of Slotted Schedule 80 PVC well-point pipe with a slot size of 0.010 inch. This slot size is common for use to filter sand soils. A sequence of construction is not available, but if the Contractor would have installed the weep holes after backfilling and prior to tieback installation. The tensioning of the tiebacks could have compressed the backfill and damaged the well-point weep holes. Other possible scenarios that could have damaged the weep holes are (1) damaged during installation, (2) broke due to settlement of the sand backfill, (3) broken due to settlement of the underlying soft and loose subsurface soils, and/or (4) the sand backfill consisted of very fine sands and silts that would have not have been filtered by the slots in the well-point weep holes and (5) are migrating through the joints of the sheet pile wall.

CONCLUSIONS:

Based on our Plan and Construction documentation review, field investigations and exploration, and geotechnical analysis, JMT is confident in our findings. It is the opinion of JMT that there are no alternate geotechnical issues contributing to the upland erosion. Based on our observations, it can be stated to a reasonable degree of engineering certainty that we are confident the weep drains are faulty, were damaged somehow, or were not installed properly during construction which is negatively impacted by sheetflow of rainwater running to the wall, therefore causing the fill between the original wall and the new sheet pile wall to erode.

Deficiency 1: A large number of the 2" diameter well-points installed in the wall as weep drains are faulty. Either they were installed improperly or were damaged during backfilling and compacting operations.

Recommended Action: Replace current weep drains with JETfilter® dewatering filters, or engineer approved equivalent product. The JETfilter product can be installed permanently from the waterside and provides a maintainable and replaceable filter.

Deficiency 2: A large quantity of fill between the walls is missing or has been lost through the weep holes, as indicated in our site investigation.

Recommended Action: Install new soil fill after replacing weep drains. There are a number of means and methods to accomplish this task. Such as, demolishing all of the concrete landward of the steel wall cap, installing compacted fill and re-casting a new concrete walk.

Deficiency 3: Another considerable factor in the missing fill is the apparent lack of consideration of the surface flow during a rainfall event. The sheet flow was clearly washing sand over the timber wall into the void between.

Recommended Action: Install a drain system landward of the concrete sidewalk, piping the rainwater through or around the wall. This will reduce the head pressure the could have been exacerbating the loss of fill material.

Based on the deficiencies listed above, JMT has the following recommendations for the City to evaluate.

1. As always, there is the "do nothing" option, where the City will keep filling the eroded areas and maintaining, to the best of their ability, proper walkway and pedestrian access. Please keep in mind that the concrete sidewalk is no longer properly supported and is subject to collapse, and the erosion areas will increase in size and frequency. See drawing SK-0 for a representation of this option.

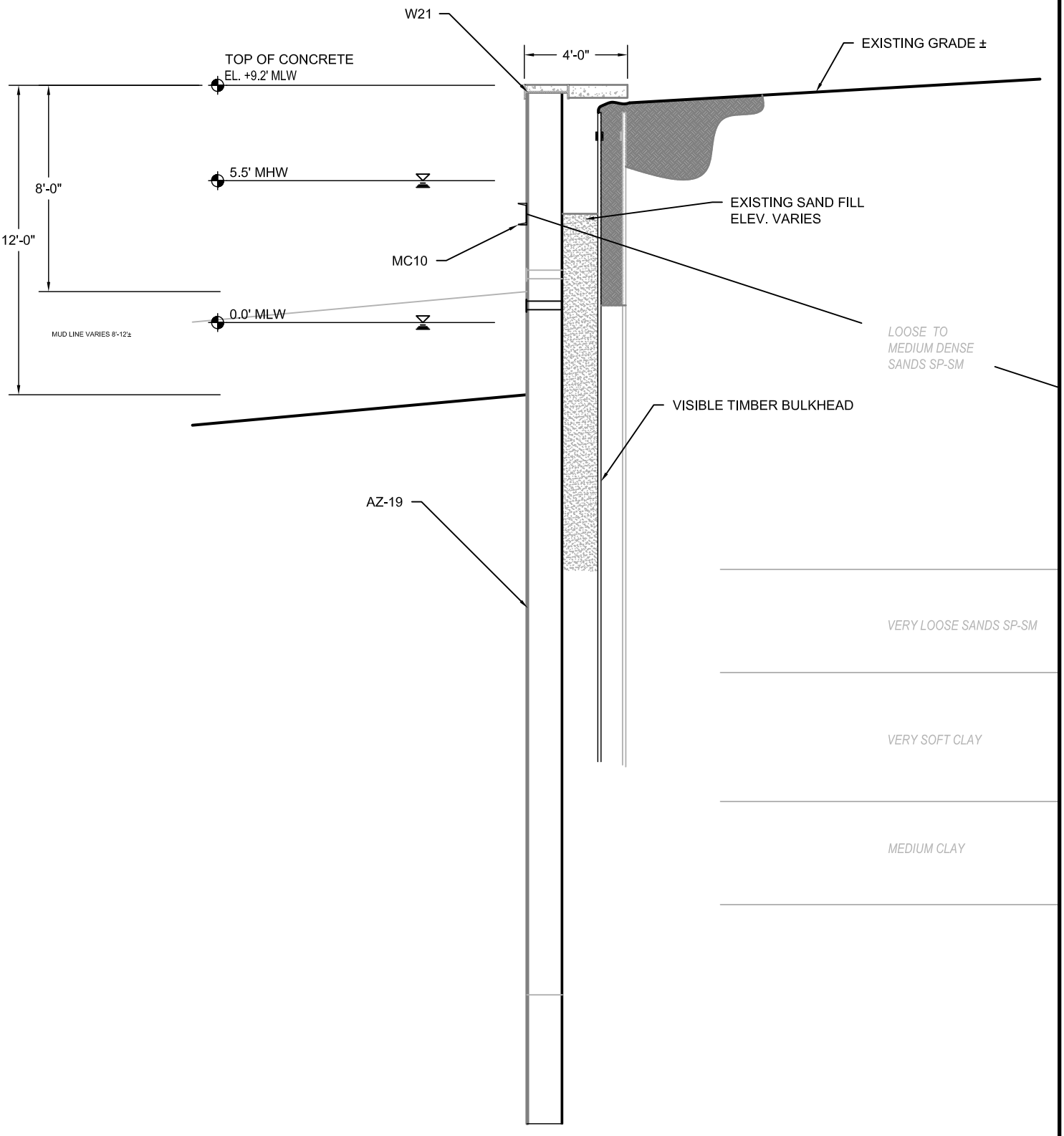
2. To provide the most longevity and surety to the City, JMT recommends demolishing the concrete cap in order to gain access to the back of the steel sheet pile wall and expose the

buried timber wall. Excavate the fill between the walls along the entire length of the bulkhead and remove the existing weep drains. Each weep drain location will then be replaced with a JETfilter®, or engineer approved equivalent product, the entire excavation lined with filter fabric and backfilled with a combination of SCDOT #67 stone, pea gravel and quality fill material. After proper compaction, a french drain or curb and gutter system would be installed behind the timber wall, at the inland side of the concrete, to collect and distribute the sheetflow water coming from the parking and grassed areas. This sheetflow water would be directed through the trench drain system and dispersed through designed release points on either end of the bulkhead. The concrete cap would then be replaced, including recast over the timber wall to seal from any material washing over the wall. This work would take an estimated 110 days and cost approximately $310,000. See drawing SK-1 for a representation of this option.

3. A lesser invasive option would recommend demolishing the current weep drains in place and refitting with JETfilter®, or engineer approved equal product, utilizing the same hole. It would then be recommended to demolish the concrete cap, back fill, as necessary, the void areas between the two walls, installing the french drain or curb and gutter system behind the timber wall, and recast the concrete cap. This work would take an estimated 90 days and cost approximately $260,000. See drawing SK-2 for a representation of this option.

4. The least invasive option would be to simply demolishing the current weep drains in place and refitting with JETfilter®, or engineer approved equal product, utilizing the same hole and back filling the voids by pumping the back fill material through the various core hole locations. This work would take an estimated 55 days and cost approximately $180,000. While this is likely the least expensive repair option, it is very unlikely that this will provide a 100% fill of the void. See drawing SK-3 for a representation of this option.

Each option presented above could have several iterations based on the type and size of filter used, the backfill soil, and the method of demolition and backfill to provide the City with the most cost effective solution to resolve the erosion issue. The above cost estimates are ranges in which JMT feels these options would fall into. Once an option is selected, more detailed estimates could be provided through further engineering and analysis.



NOT FOR CONSTRUCTION

SOUTH CAROLINA
JOHNSON, MIRMIRAN & THOMPSON, INC.
No. 3943
CERTIFICATE OF AUTHORIZATION

ISLE OF PALMS MARINA
INVESTIGATION OF MARINA BULKHEAD

CHARLESTON, SOUTH CAROLINA

JOB NO:	
16-0833-001	
DWG	DJO
DES	DJO
CHK	NL

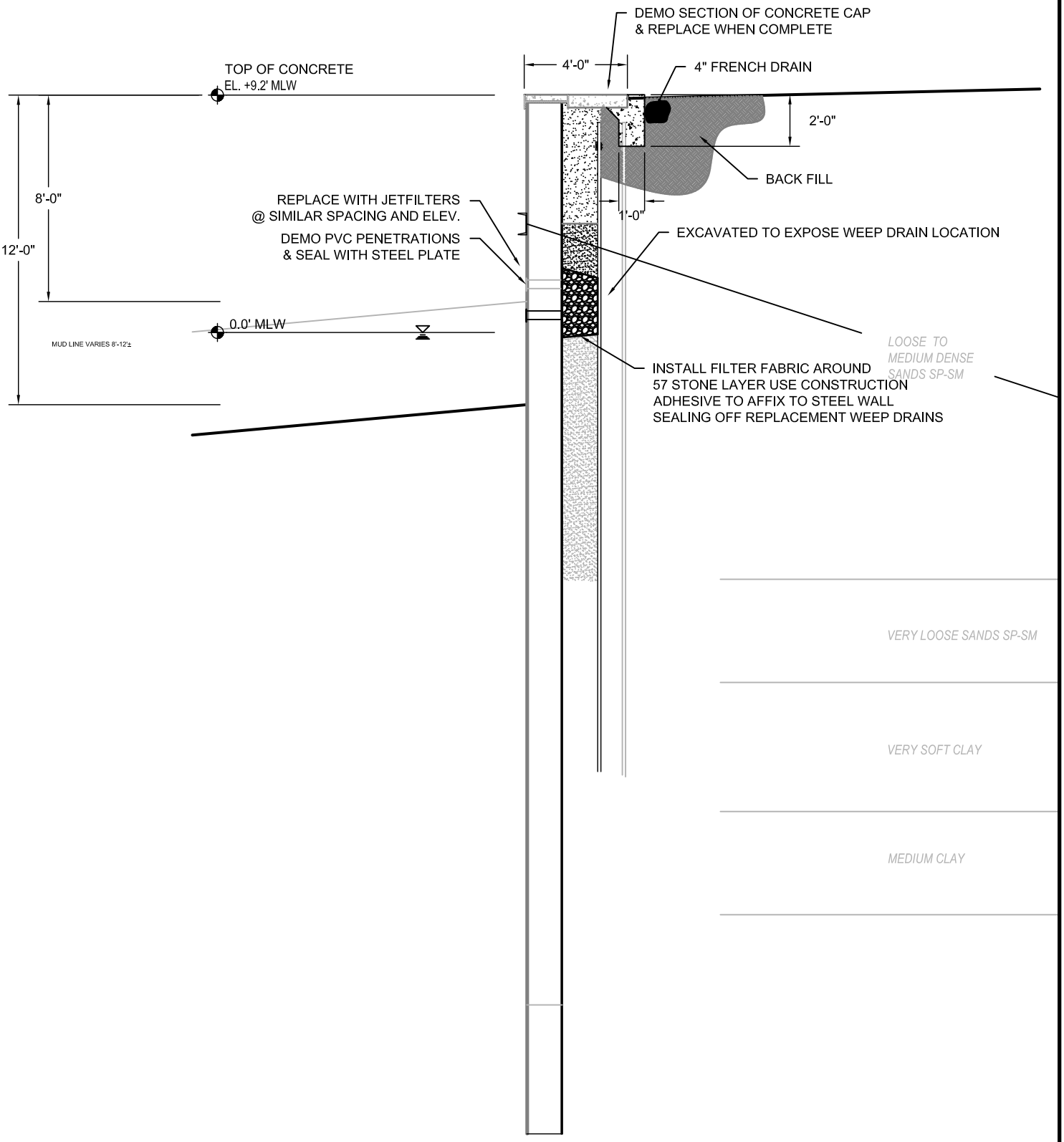
JMT, INC.
952 HOUSTON-NORTHCUTT BLVD
SUITE 100
CHARLESTON, SC 29464
843-556-2624 WW.JMT.COM

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

SHEET
SK-0

DATE: OCTOBER 14, 2016 SKETCH REF. DRAWING NUMBER: N/A

DRAWING: BULKHEAD REPAIR - EXISTING CONDITIONS



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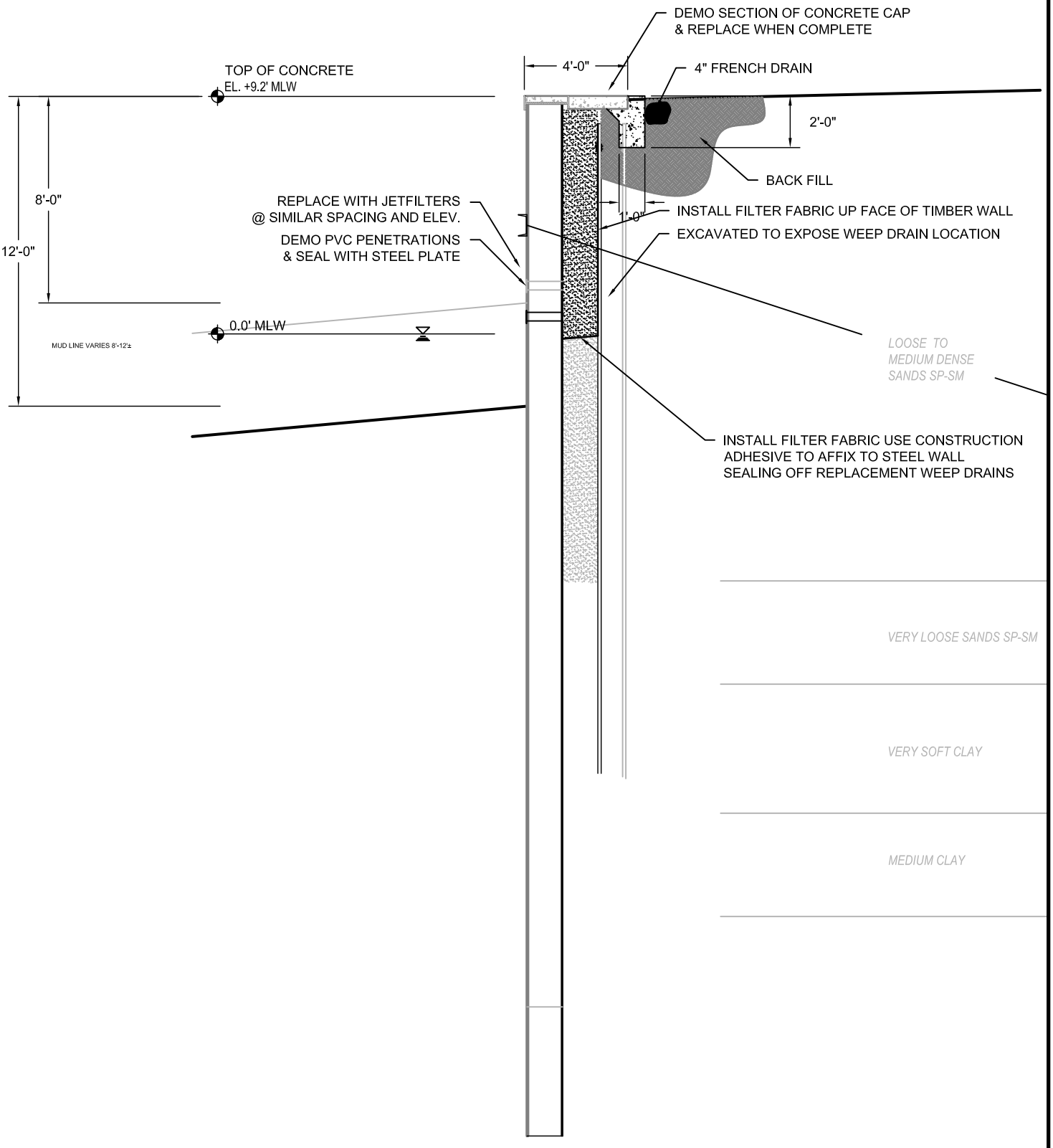
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

SHEET
SK-1

DATE: OCTOBER 14, 2016 SKETCH REF. DRAWING NUMBER: N/A

DRAWING: BULKHEAD REPAIR OPTION 1



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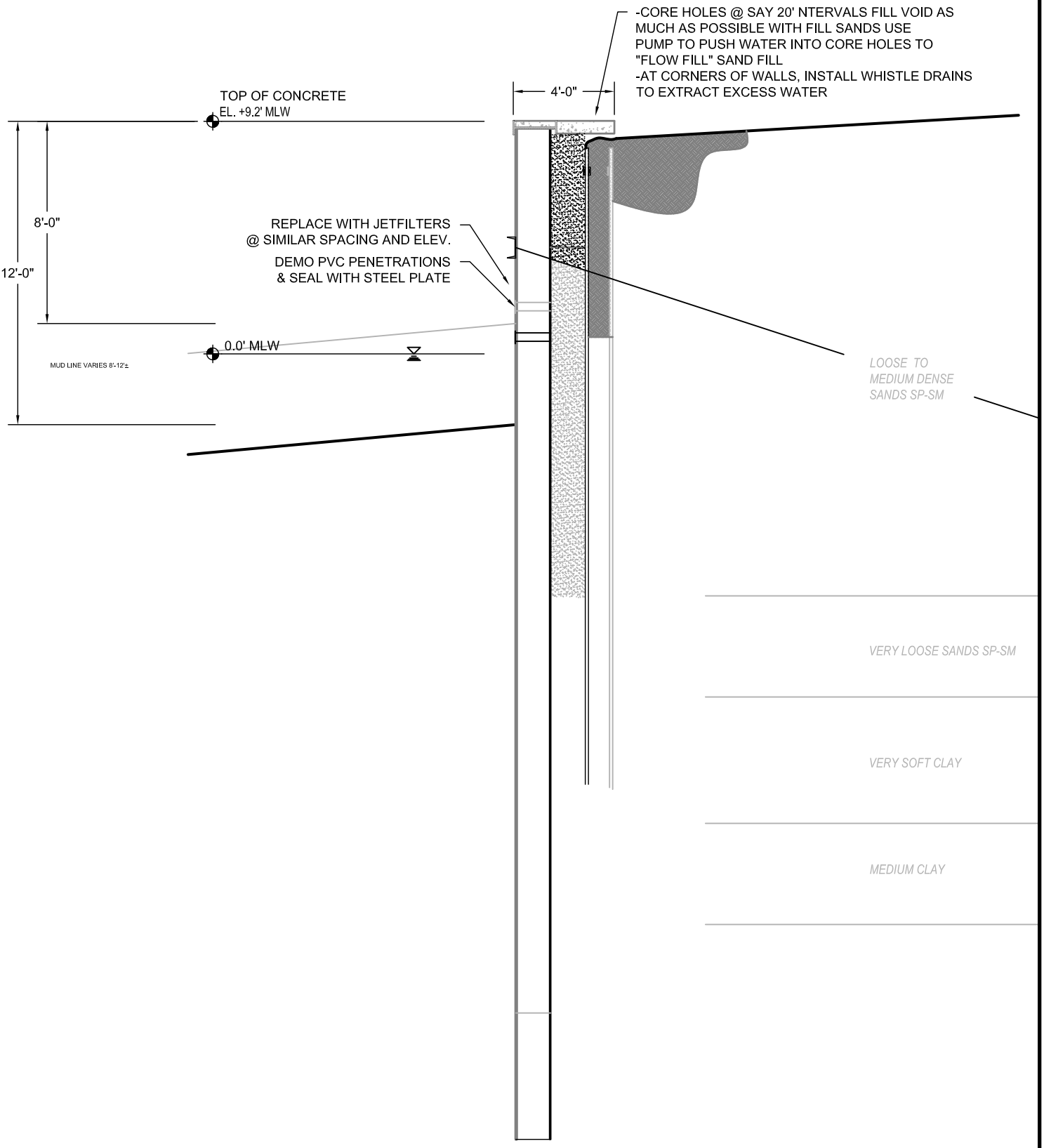
952 HOUSTON-NORTHCUTT BLVD
SUITE 100
CHARLESTON, SC 29464
843-556-2624 WW.JMT.COM

SHEET
SK-2

DATE: OCTOBER 14, 2016 SKETCH REF. DRAWING NUMBER: N/A

DRAWING: BULKHEAD REPAIR OPTION 2



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CHARLESTON, SC 29464
843-556-2624 WW.JMT.COM

SHEET
SK-3

DATE: OCTOBER 14, 2016 SKETCH REF. DRAWING NUMBER: N/A

DRAWING: BULKHEAD REPAIR OPTION 3

Attachment 1
2008 Construction Drawings

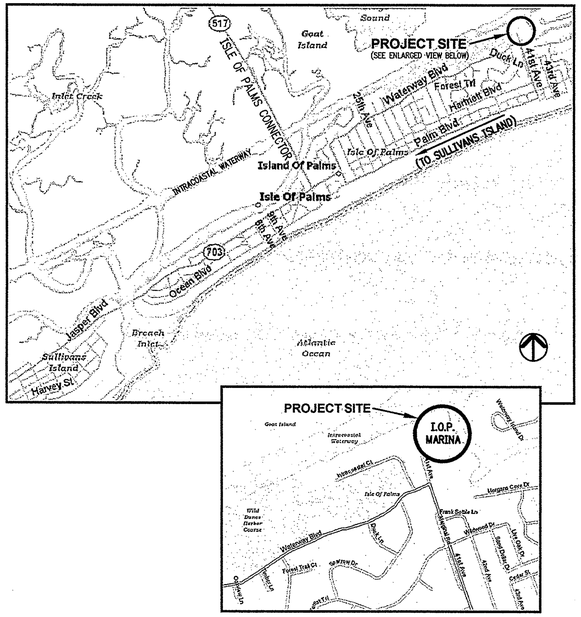
CONSTRUCTION DOCUMENTS

ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
ISLE OF PALMS, SOUTH CAROLINA

DRAWING INDEX

ISSUE DATE
07/24/08

REVISION DATE



PROJECT LOCATION PLAN

Jon Guerry Taylor & Associates, Inc.

ENGINEERS, PLANNERS, and ENVIRONMENTAL CONSULTANTS

P.O. BOX 1082; MOUNT PLEASANT, SOUTH CAROLINA 29465
PHONE: 843.884.6415; FAX: 843.884.4026
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

SOUTH CAROLINA PROFESSIONAL ENGINEER CHRISTOPHER W. MOORE No. 22003 7/29/08

SOUTH CAROLINA JON GUERRY TAYLOR & ASSOCIATES,INC No. 3571 CERTIFICATE OF AUTHORIZATION

ISLE OF PALMS MARINA BULKHEAD REPLACEMENT; ISLE OF PALMS, SOUTH CAROLINA

Set #11

UTILITY ASBUILT
TRACT 1
AKA CITY OF ISLE OF PALMS MARINA
CITY OF ISLE OF PALMS
CHARLESTON COUNTY
SOUTH CAROLINA

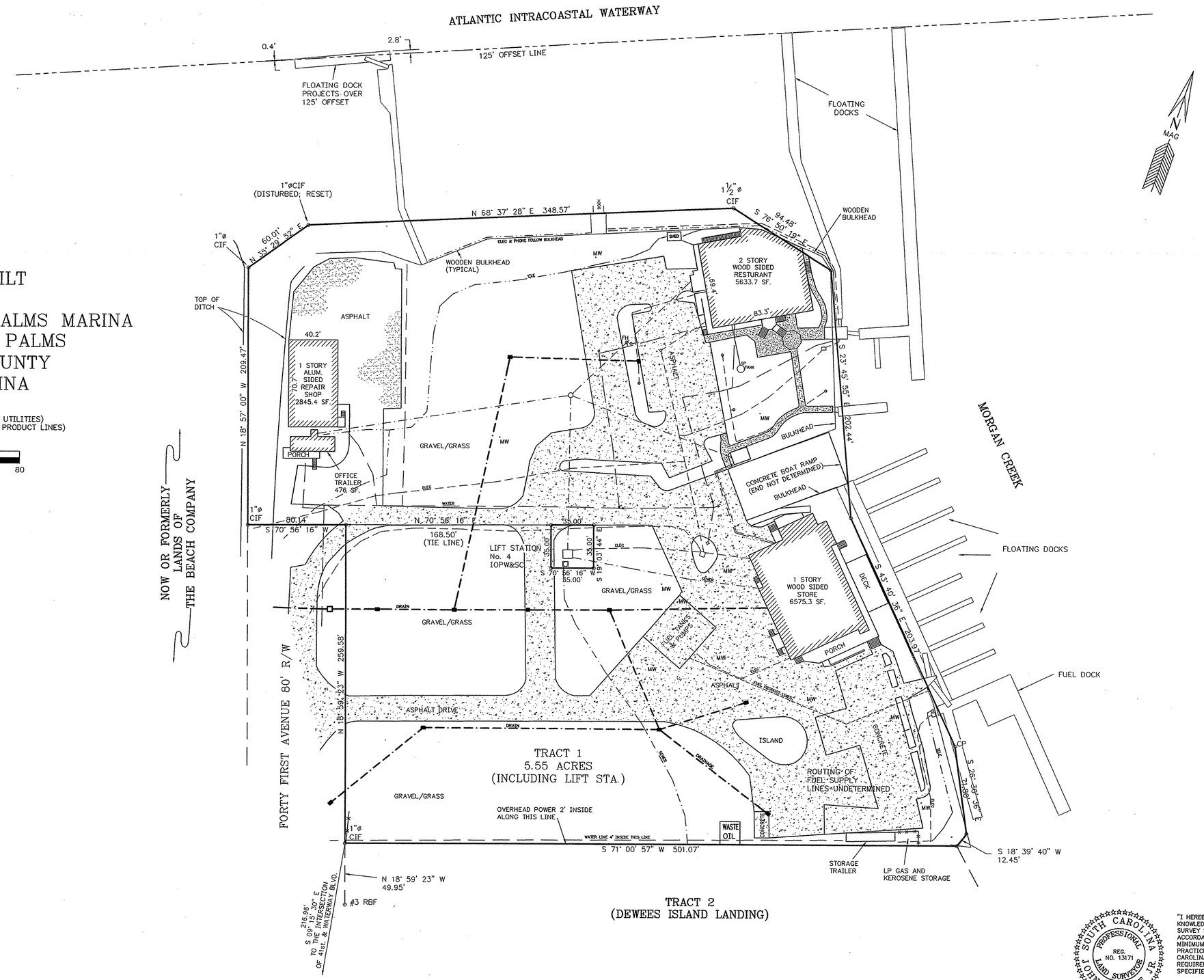
DATE: JANUARY 26, 1995
REVISED: NOVEMBER 22, 2005 (ADDED UTILITIES)
REVISED: DECEMBER 12, 2005 (ADDED FUEL PRODUCT LINES)

SCALE: 1" = 40'

40 0 40 80

LEGEND:
CIF CRIMPED IRON FOUND (SIZE AS NOTED)
IRS IRON ROD SET (5/8"ø)
CP COMPUTED POINT
RBF REBAR FOUND (SIZE AS NOTED)
SEWER MW MONITORING WELL
DRAINAGE
ELECTRIC & LIGHT POLE
TELEPHONE
WATER & VALVE
FUEL PRODUCT LINES

NOTES:
1) REFERENCE PLAT BOOK AH, PAGE 100
2) TAX MAP NUMBER 571-08-00-007
3) SURVEY REQUESTED BY:
THE CITY OF ISLE OF PALMS
4) UTILITIES SHOWN AS LOCATED IN FIELD BY WEST LOCATION SERVICES (NO IN GROUND VERIFICATION AS OF THIS DATE)



JOHN E. WADE JR., RLS
POST OFFICE BOX 686
ISLE OF PALMS
SOUTH CAROLINA
29451
(803) 886-6262

FILE: 15-95

SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR JOHN E. WADE JR. REG. NO. 13171

"I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN."

JOHN E. WADE JR., R.L.S.
S.C. REG. NO. 13171

CONSIDERABLE EFFORT HAS BEEN MADE TO DETERMINE THE LOCATION OF UNDERGROUND UTILITIES. SOME LOCATIONS ARE ACTUAL FIELD MEASUREMENTS AND SOME ARE TAKEN FROM UTILITY RECORDS. THESE PLANS DO NOT WARRANT THAT UTILITIES ARE SHOWN ACCURATELY NOR THAT ALL UTILITIES ARE SHOWN. UTILITIES DAMAGED OR DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.

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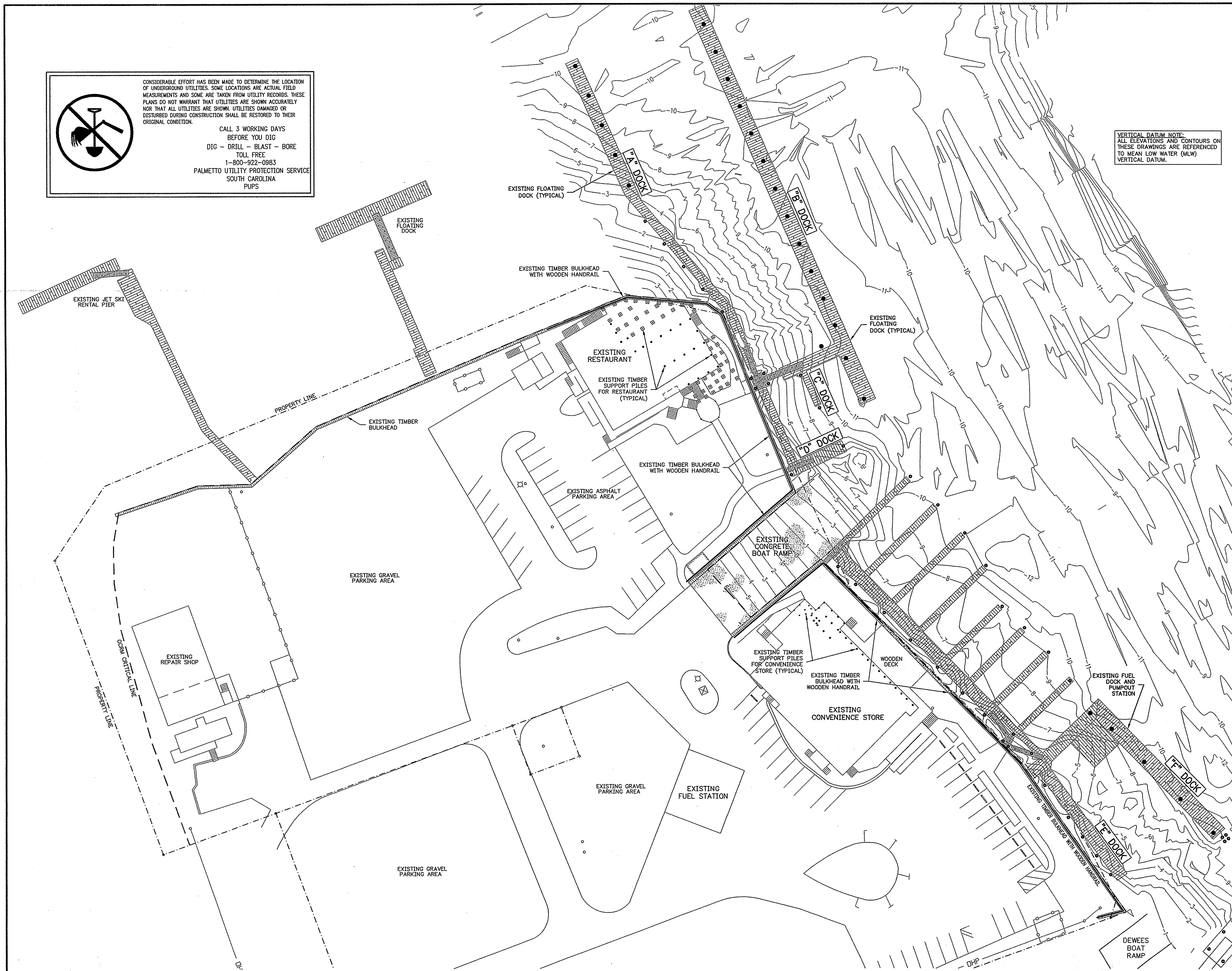


VERTICAL DATUM NOTE:
ALL ELEVATIONS AND CONTOURS ON THESE DRAWINGS ARE REFERENCED TO MEAN LOW WATER (MLW) VERTICAL DATUM.

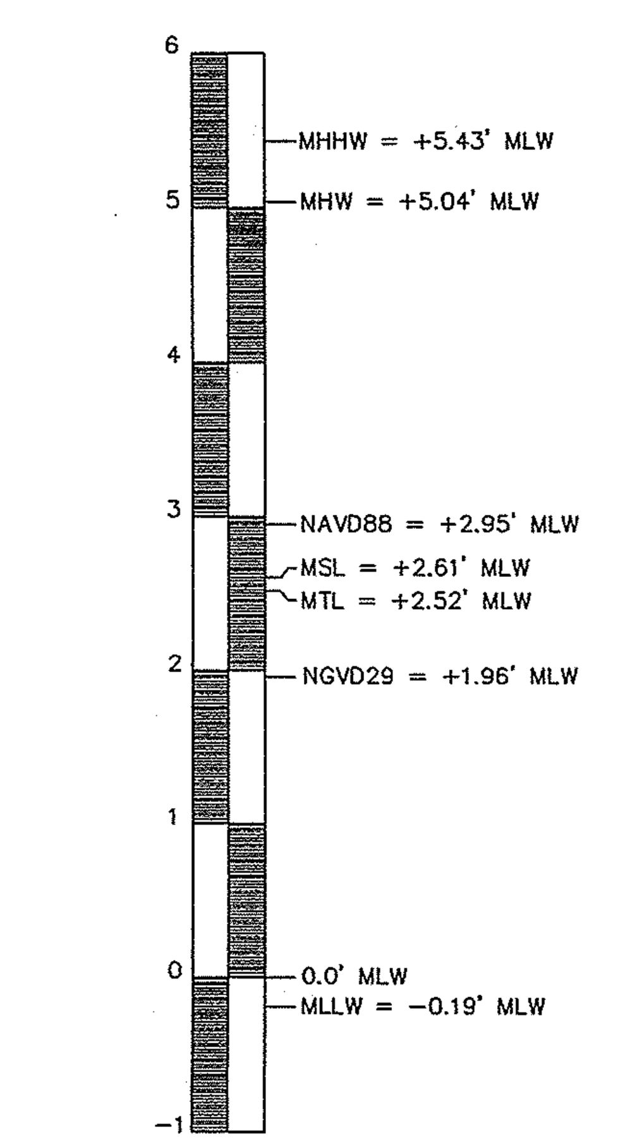
SURVEY NOTES:

1. BASE MAP SITE SURVEY INFORMATION (SHEET C1 AND C2), AND THE UTILITY ASBUILT (SHEET U1) WERE PROVIDED BY JOHN E. WADE JR., RLS, OF ISLE OF PALMS SOUTH CAROLINA. SURVEY CONDUCTED ON JANUARY 26, 1995 AND REVISED ON NOVEMBER 22, 2005 (ADDED UTILITIES) AND DECEMBER 12, 2005 (ADDED FUEL PRODUCT LINES).
2. LOCATIONS OF THE UTILITIES SHOWN ON THE UTILITY ASBUILT PLAN (SHEET U1) WERE OBTAINED IN THE FIELD BY WEST LOCATION SERVICES. THESE LOCATIONS ARE SHOWN ON THE PLANS FOR THE CONTRACTORS CONVENIENCE AND NO RESPONSIBILITY IS ASSUMED FOR THEIR ACCURACY OR COMPLETENESS. CONTRACTOR SHALL VERIFY.
3. HYDROGRAPHIC SURVEY INFORMATION PROVIDED BY GENERAL ENGINEERING AND ENVIRONMENTAL, LLC (G.E.L.) OF CHARLESTON, SOUTH CAROLINA. HYDROGRAPHIC SURVEY WAS CONDUCTED ON JULY 8 AND AUGUST 4, 2003 AFTER THE MAINTENANCE DREDGING IN MORGAN CREEK AND THE ISLE OF PALMS MARINA OF 2003. ALL CONTOURS AND OTHER ELEVATIONS ARE REFERENCED TO MEAN LOW WATER (MLW).

EXISTING TIE-BACKS AND ANCHORAGE NOTE:
CONTRACTOR SHALL BE AWARE THAT THERE ARE EXISTING TIE-BACK CABLES, ANCHOR PILES, AND/OR DRAG PILES THROUGHOUT THE SITE. THE CONTRACTOR SHALL MAKE HIS OWN DETERMINATION AS TO THE LOCATION AND DEPTH OF THESE EXISTING STRUCTURES, AND SHALL TAKE MEASURES TO ENSURE THE PROPER AND COMPLETE INSTALLATION OF ALL NEW TIE-BACKS AND EARTH ANCHORS AS SPECIFIED ON THESE DRAWINGS. EXPLORATORY EXCAVATION MAY BE REQUIRED. CONTRACTOR SHALL INCLUDE THE COST OF ANY EXPLORATORY EXCAVATION IN HIS PRICE FOR THIS WORK. NO ADDITIONAL FEES MAY BE CHARGED FOR THIS OR FOR WORKING AROUND ANY OBSTRUCTIONS ENCOUNTERED DURING CONSTRUCTION.

LEGEND

- 21 — CONTOUR REFERENCED TO MEAN LOW WATER (MLW)
- OHP — OVERHEAD POWERLINE
- EXISTING FENCE
- PROPERTY BORDER
- EXISTING TIMBER BULKHEAD
- OCRM CRITICAL LINE
- EXISTING ELECTRIC BOX
- EXISTING FIRE HYDRANT
- EXISTING POWER/LIGHT POLE



(DATUM RELATIONSHIPS)
TIDE RANGE SCALE
NOT TO SCALE

EXISTING CONDITIONS PLAN VIEW
SCALE: 1" = 30'

0 30
GRAPHIC SCALE 1" = 30'

NO.	DATE	REVISION
7		
6		
5		
4		
3		
2		
1		

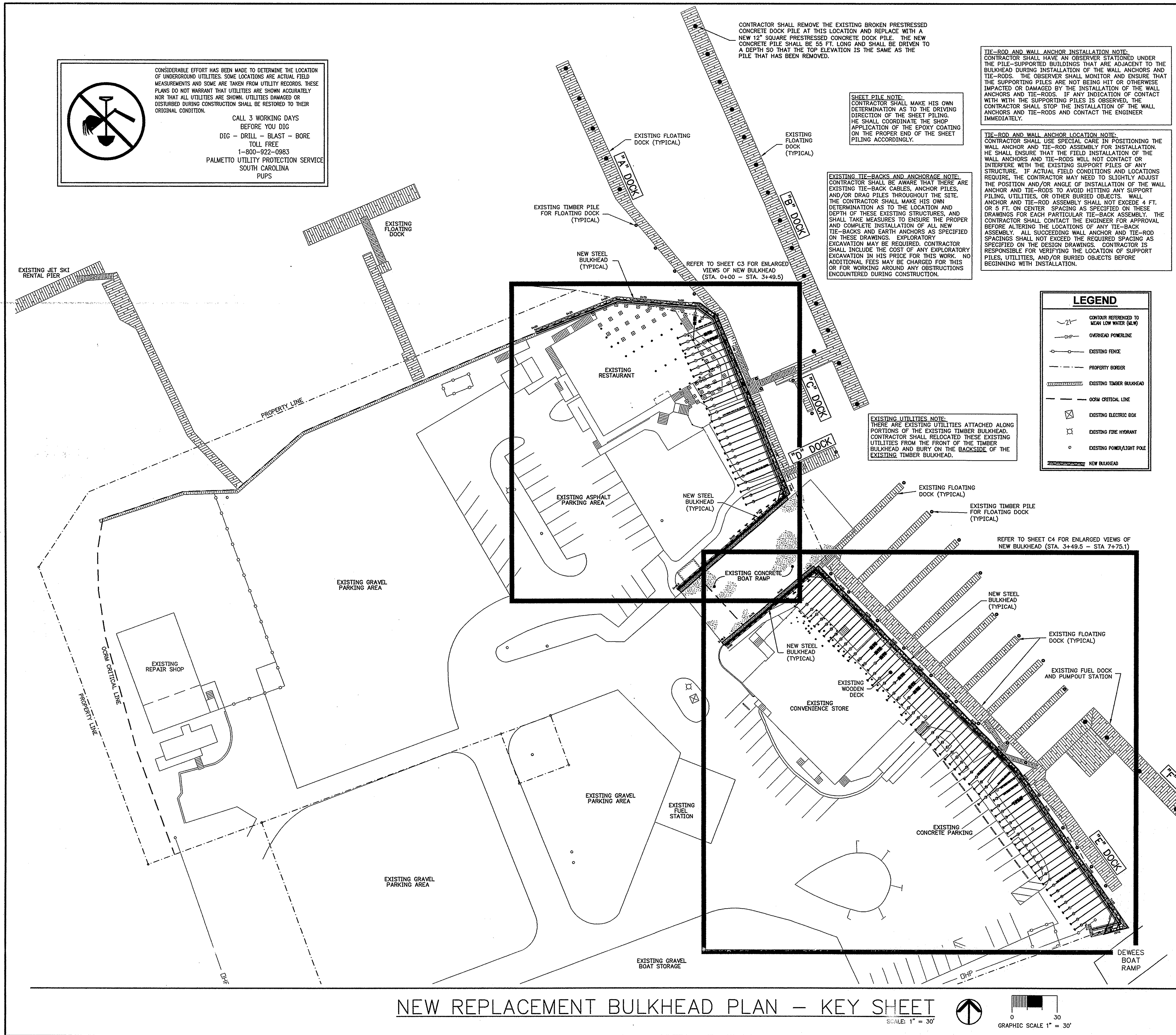
DRAWING TITLE:
EXISTING CONDITIONS PLAN
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 22003 CHRISTOPHER W. MOORE 7/25/08

SOUTH CAROLINA JON GUERRY TAYLOR & ASSOCIATES, INC. No. 3671 CERTIFICATE OF AUTHORIZATION

Jon Guerry Taylor & Associates, Inc.
ENGINEERS, PLANNERS, and ENVIRONMENTAL CONSULTANTS
P.O. BOX 1082; MOUNT PLEASANT, SOUTH CAROLINA 29465
PHONE: 843.884.6415; FAX: 843.884.4026
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: I.O.P. MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020



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CONTRACTOR SHALL REMOVE THE EXISTING BROKEN PRESTRESSED CONCRETE DOCK PILE AT THIS LOCATION AND REPLACE WITH A NEW 12" SQUARE PRESTRESSED CONCRETE DOCK PILE. THE NEW CONCRETE PILE SHALL BE 55 FT. LONG AND SHALL BE DRIVEN TO A DEPTH SO THAT THE TOP ELEVATION IS THE SAME AS THE PILE THAT HAS BEEN REMOVED.

SHEET PILE NOTE:
CONTRACTOR SHALL MAKE HIS OWN DETERMINATION AS TO THE DRIVING DIRECTION OF THE SHEET PILING. HE SHALL COORDINATE THE SHOP APPLICATION OF THE EPOXY COATING ON THE PROPER END OF THE SHEET PILING ACCORDINGLY.

EXISTING TIE–BACKS AND ANCHORAGE NOTE:
CONTRACTOR SHALL BE AWARE THAT THERE ARE EXISTING TIE–BACK CABLES, ANCHOR PILES, AND/OR DRAG PILES THROUGHOUT THE SITE. THE CONTRACTOR SHALL MAKE HIS OWN DETERMINATION AS TO THE LOCATION AND DEPTH OF THESE EXISTING STRUCTURES, AND SHALL TAKE MEASURES TO ENSURE THE PROPER AND COMPLETE INSTALLATION OF ALL NEW TIE–BACKS AND EARTH ANCHORS AS SPECIFIED ON THESE DRAWINGS. EXPLORATORY EXCAVATION MAY BE REQUIRED. CONTRACTOR SHALL INCLUDE THE COST OF ANY EXPLORATORY EXCAVATION IN HIS PRICE FOR THIS WORK. NO ADDITIONAL FEES MAY BE CHARGED FOR THIS OR FOR WORKING AROUND ANY OBSTRUCTIONS ENCOUNTERED DURING CONSTRUCTION.

TIE–ROD AND WALL ANCHOR INSTALLATION NOTE:
CONTRACTOR SHALL HAVE AN OBSERVER STATIONED UNDER THE PILE–SUPPORTED BUILDINGS THAT ARE ADJACENT TO THE BULKHEAD DURING INSTALLATION OF THE WALL ANCHORS AND TIE–RODS. THE OBSERVER SHALL MONITOR AND ENSURE THAT THE SUPPORTING PILES ARE NOT BEING HIT OR OTHERWISE IMPACTED OR DAMAGED BY THE INSTALLATION OF THE WALL ANCHORS AND TIE–RODS. IF ANY INDICATION OF CONTACT WITH WITH THE SUPPORTING PILES IS OBSERVED, THE CONTRACTOR SHALL STOP THE INSTALLATION OF THE WALL ANCHORS AND TIE–RODS AND CONTACT THE ENGINEER IMMEDIATELY.

TIE–ROD AND WALL ANCHOR LOCATION NOTE:
CONTRACTOR SHALL USE SPECIAL CARE IN POSITIONING THE WALL ANCHOR AND TIE–ROD ASSEMBLY FOR INSTALLATION. HE SHALL ENSURE THAT THE FIELD INSTALLATION OF THE WALL ANCHORS AND TIE–RODS WILL NOT CONTACT OR INTERFERE WITH THE EXISTING SUPPORT PILES OF ANY STRUCTURE. IF ACTUAL FIELD CONDITIONS AND LOCATIONS REQUIRE, THE CONTRACTOR MAY NEED TO SLIGHTLY ADJUST THE POSITION AND/OR ANGLE OF INSTALLATION OF THE WALL ANCHOR AND TIE–RODS TO AVOID HITTING ANY SUPPORT PILING, UTILITIES, OR OTHER BURIED OBJECTS. WALL ANCHOR AND TIE–ROD ASSEMBLY SHALL NOT EXCEDE 4 FT. OR 5 FT. ON CENTER SPACING AS SPECIFIED ON THESE DRAWINGS FOR EACH PARTICULAR TIE–BACK ASSEMBLY. THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR APPROVAL BEFORE ALTERING THE LOCATIONS OF ANY TIE–BACK ASSEMBLY. ALL SUCCEEDING WALL ANCHOR AND TIE–ROD SPACINGS SHALL NOT EXCEED THE REQUIRED SPACING AS SPECIFIED ON THE DESIGN DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF SUPPORT PILES, UTILITIES, AND/OR BURIED OBJECTS BEFORE BEGINNING WITH INSTALLATION.

EXISTING UTILITIES NOTE:
THERE ARE EXISTING UTILITIES ATTACHED ALONG PORTIONS OF THE EXISTING TIMBER BULKHEAD. CONTRACTOR SHALL RELOCATED THESE EXISTING UTILITIES FROM THE FRONT OF THE TIMBER BULKHEAD AND BURY ON THE BACKSIDE OF THE EXISTING TIMBER BULKHEAD.

LEGEND

~21~	CONTOUR REFERENCED TO MEAN LOW WATER (MLW)
—OHP—	OVERHEAD POWERLINE
—o—o—	EXISTING FENCE
—·—·—	PROPERTY BORDER
	EXISTING TIMBER BULKHEAD
— — —	OCRM CRITICAL LINE
⊠	EXISTING ELECTRIC BOX
¤	EXISTING FIRE HYDRANT
o	EXISTING POWER/LIGHT POLE
	NEW BULKHEAD

GENERAL SITE CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND BE PREPARED TO ADEQUATELY CARE FOR AND SAFEGUARD HIMSELF AND THE OWNER FROM DAMAGE. IF THE CONTRACTOR DISCOVERS FIELD CONDITIONS DIFFERENT THAN WHAT IS SHOWN ON THESE PLANS HE SHALL NOTIFY THE ENGINEER IMMEDIATELY.

2. DAMAGE DONE TO EXISTING STRUCTURES NOT LABELED AS BEING REMOVED OR MODIFIED SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE. DAMAGE TO ANY EXISTING STRUCTURE ADJACENT TO THE EXISTING BULKHEAD OR ANY OTHER STRUCTURE ON NEIGHBORING PROPERTIES AS A RESULT OF WORK PERFORMED FOR THIS PROJECT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE. CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF ANY SUCH DAMAGE SHOULD OCCUR.

3. SHOULD THE CONTRACTOR FIND ANY DISCREPANCIES ON THE DRAWINGS OR IN THE FIELD PRIOR TO BEGINNING WORK OR DURING CONSTRUCTION, HE SHALL NOTIFY THE ENGINEER IMMEDIATELY. DO NOT BID OR BUILD ANY PART OF THE PROJECT BASED ON AN ASSUMPTION OR SPECULATION OF DESIGN INTENT.

4. THERE SHALL BE NO CHANGE OR DEVIATION FROM THESE DESIGN PLANS UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER.

5. THE NEW BULKHEAD SHALL BE CONSTRUCTED AS DETAILED ON THESE PLANS. CONTRACTOR & ENGINEER TO ESTABLISH EXACT LOCATION OF NEW BULKHEAD IN THE FIELD BASED ON ACTUAL FIELD CONDITIONS, AND AS DESCRIBED IN NOTE #6 BELOW.

6. THE NEW STEEL BULKHEAD MUST BE INSTALLED NOT MORE THAN 18" OUT IN FRONT OF THE EXISTING TIMBER BULKHEAD (ON THE WATER SIDE). THE CONTRACTOR SHALL MAKE USE OF ADEQUATE CONTROLS TO ENSURE THAT THE NEW BULKHEAD DOES NOT EXTEND MORE THAN 18" BEYOND THE EXISTING BULKHEAD (ON THE WATER SIDE).

7. ALL FILL MATERIAL USED FOR LANDSCAPING (IF REQUIRED) SHALL BE CLEAN GRANULAR FILL THAT IS FREE OF ROCKS, ROOTS, STUMPS, STICKS, DEBRIS, TRASH, OR OTHER ORGANIC MATERIAL.

8. USACOE AND SCDHEC–OCRM PERMITS FOR THIS WORK HAVE BEEN OBTAINED BY THE ENGINEER AND ARE INCLUDED AT THE END OF THE "PROJECT MANUAL" FOR THE CONTRACTORS REFERENCE. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL OTHER PERMITS REQUIRED FOR DEMOLITION AND CONSTRUCTION. CONTRACTOR SHALL NOT START WORK WITHOUT ALL REQUIRED PERMITS. ANY FINES DUE TO NOT HAVING PROPER PERMITS WILL BE THE RESPONSIBILITY OF THC CONTRACTOR.

9. CONTRACTOR SHALL VERIFY THE LOCATIONS, SIZES, AND ELEVATIONS OF ALL UTILITIES AND UNDERGROUND STRUCTURES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS TO AVOID ANY CONTACT WITH HIGH–VOLTAGE TRANSMISSION LINES, UNDERGROUND GAS LINES, WATER LINES AND ALL OTHER UTILITIES DURING DEMOLITION AND CONSTRUCTION. (SEE SURVEY NOTES ON SHEETS C1 & C2)

10. ANY UTILITIES OR UNDERGROUND STRUCTURES DAMAGED DURING DEMOLITION OR CONSTRUCTION THAT ARE NOT DESIGNATED AS BEING REMOVED OR RELOCATED AS PART OF THIS PROJECT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.

11. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED PER THE ENGINEERS PLAN OR DIRECTION PRIOR TO THE BEGINNING OF ANY WORK AND SHALL BE MAINTAINED DURING ALL CONSTRUCTION ACTIVITIES OR PROJECT LIFE.

12. ADDITIONAL EROSION CONTROL MEASURES MAY BE EMPLOYED WHERE DETERMINED NECESSARY BY ACTUAL SITE CONDITIONS AND/OR AS DIRECTED BY SCDHEC–OCRM, THE CITY OF ISLE PALMS, OR THE ENGINEER.

13. IF DETERMINED NECESSARY BY THE ENGINEER OR AGENCY DURING CONSTRUCTION, THE CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL MEASURES TO PREVENT SAND SEDIMENT FROM WASHING INTO THE WATERWAY AS PART OF THE WORK FOR THIS PROJECT.

14. ALL DEMOLITION AND CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE SITE AS PART OF THE DEMOLITION ITEM UNLESS OTHERWISE DIRECTED BY THE PLANS, ENGINEER OR OWNER. THERE SHALL BE NO BURNING ON SITE. DEBRIS AND TRASH SHALL NOT BE BURIED.

15. ANY BURIED DEBRIS ENCOUNTERED DURING DEMOLITION OR CONSTRUCTION SHALL ALSO BE PROPERLY DISPOSED OF OFF SITE BY THE CONTRACTOR. NO BURYING OF DEBRIS OF ANY KIND WILL BE ALLOWED ON SITE.

16. CONTRACTOR SHALL MONITOR THE ALIGNMENT AND STABILITY OF THE EXISTING TIMBER BULKHEAD THAT IS TO REMAIN IN PLACE THROUGHOUT THE DEMOLITION AND CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR USING APPROPRIATE MEANS AS DETERMINED BY HIMSELF AND THE FIELD CONDITIONS THAT EXIST AT THE TIME OF CONSTRUCTION FOR ENSURING THAT THE EXISTING TIMBER BULKHEAD IS KEPT IN PLACE AND SUPPORTED AGAINST FAILURE DURING ALL CONSTRUCTION ACTIVITIES FOR THIS PROJECT. IF MOVEMENT OF THE EXSITING TIMBER BULKHEAD OCCURS OR IS SUSPECTED, THE CONTRACTOR SHALL STOP WORK AND CONTACT THE ENGINEER IMMEDIATELY.

17. ALL GRASSED AREAS DISTURBED DURING CONSTRUCTION SHALL BE FILLED AND GRADED SMOOTH TO MATCH THE EXISTING SURROUNDING GRADE AND SHALL BE SEEDED OR SODDED PER THE ENGINEER'S DIRECTION AT THE TIME OF PROJECT COMPLETION.

EXISTING ITEMS RELOCATION NOTE:
CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR RELOCATING ALL UTILITIES; INCLUDING ELECTRICAL, WATER, SEWER, GASOLINE, COMMUNICATIONS LINES, ETC., THAT MAY BE IN THE WAY OF CONSTRUCTION ACTIVITIES OR THAT MAY CONFLICT WITH THE LOCATION OF THE NEW BULKHEAD. IN ADDITION, CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR MODIFYING ANY OF THE FLOATING DOCKS THAT MAY BE IN THE WAY OF THE NEW BULKHEAD. EXISTING FLOATING DOCKS MAY NEED TO BE MOVED OR MODIFIED TO ALLOW ENOUGH ROOM FOR PROPER FUNCTIONING, ACCESS, AND FLOATATION OF THE FLOATING DOCK SYSTEM AFTER THE NEW BULKHEAD HAS BEEN CONSTRUCTED. FLOATING DOCK PILES SHALL BE PULLED AND REPLACED AS CALLED FOR.

UTILITIES SPLICE NOTE:
REFER TO SHEETS E1 & E2 FOR INFORMATION AND DETAILS ON SPICING EXISTING UTILITIES THAT PASS THROUGH THE BULKHEAD.

CONTRACTOR SHALL BE AWARE THAT FUEL LINE(S) MUST ALSO BE SPLICED TO ALLOW FOR CONSTRUCTION OF THE NEW STEEL BULKHEAD.

ALL COSTS ASSOCIATED WITH CUTTING AND SPLICING OF EXISTING UTILITIES, INCLUDING FUEL LINES SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID FOR THIS WORK.

SURVEY NOTES:

1. BASE MAP SITE SURVEY INFORMATION (SHEET C1 AND C2), AND THE UTILITY AS–BUILT (SHEET U1) WERE PROVIDED BY JOHN E. WADE JR., RLS, OF ISLE OF PALMS SOUTH CAROLINA. SURVEY CONDUCTED ON JANUARY 26, 1995 AND REVISED ON NOVEMBER 22, 2005 (ADDED UTILITIES) AND DECEMBER 12, 2005 (ADDED FUEL PRODUCT LINES).

2. LOCATIONS OF THE UTILITIES SHOWN ON THE UTILITY ASBUILT PLAN (SHEET U1) WERE OBTAINED IN THE FIELD BY WEST LOCATION SERVICES. THESE LOCATIONS ARE SHOWN ON THE PLANS FOR THE CONTRACTORS CONVENIENCE AND NO RESPONSIBILITY IS ASSUMED FOR THEIR ACCURACY OR COMPLETENESS. CONTRACTOR SHALL VERIFY.

3. HYDROGRAPHIC SURVEY INFORMATION PROVIDED BY GENERAL ENGINEERING AND ENVIRONMENTAL, LLC (G.E.L.) OF CHARLESTON, SOUTH CAROLINA. HYDROGRAPHIC SURVEY WAS CONDUCTED ON JULY 8 AND AUGUST 4, 2003 AFTER THE MAINTENANCE DREDGING IN MORGAN CREEK AND THE ISLE OF PALMS MARINA OF 2003. ALL CONTOURS AND OTHER ELEVATIONS ARE REFERENCED TO MEAN LOW WATER (MLW).

NEW REPLACEMENT BULKHEAD PLAN – KEY SHEET

SCALE: 1" = 30'

DRAWING TITLE:
NEW BULKHEAD PLAN – KEY SHEET
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

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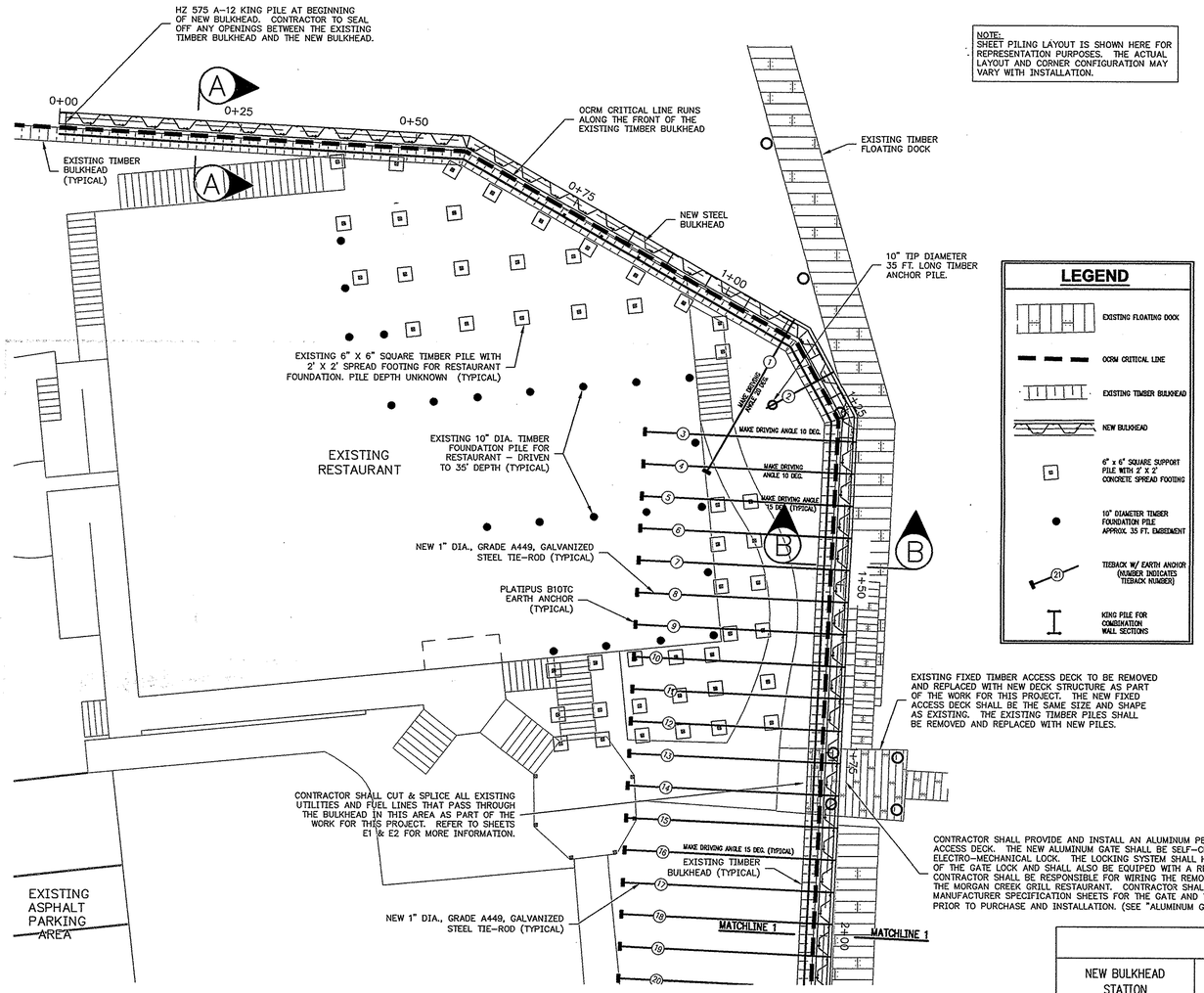
DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: I.O.P. MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020

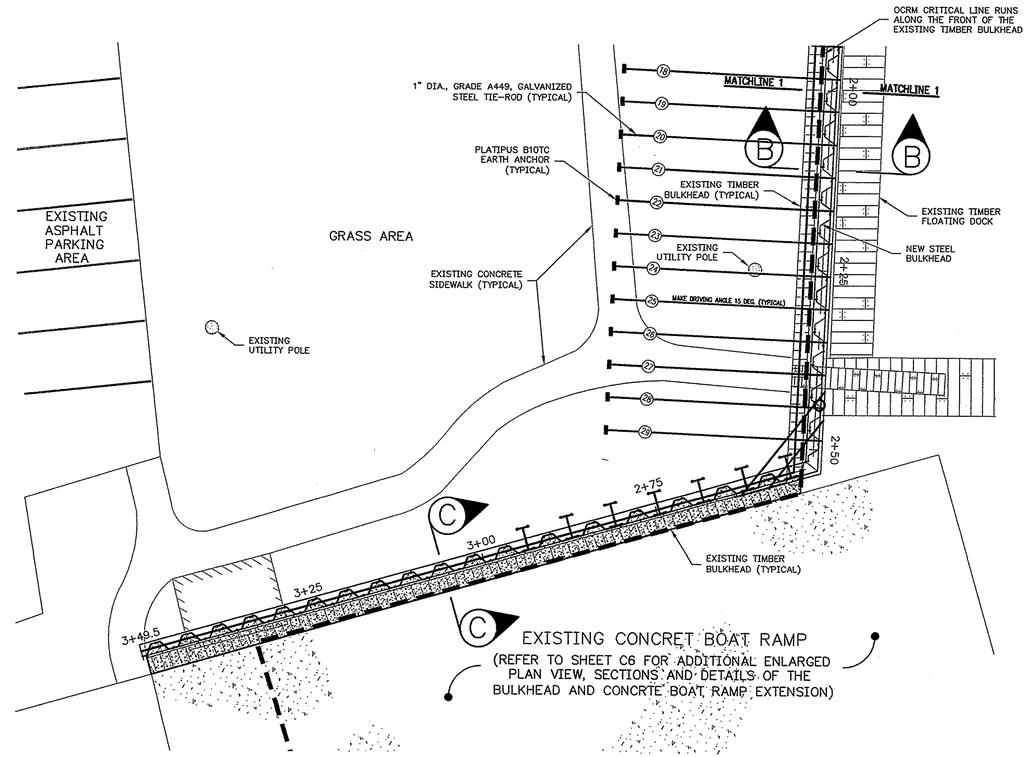


NOTE:
SHEET PILING LAYOUT IS SHOWN HERE FOR REPRESENTATION PURPOSES. THE ACTUAL LAYOUT AND CORNER CONFIGURATION MAY VARY WITH INSTALLATION.

LEGEND

- EXISTING FLOATING DOCK
- OCRM CRITICAL LINE
- EXISTING TIMBER BULKHEAD
- NEW BULKHEAD
- 6" x 6" SQUARE SUPPORT PILE WITH 2' X 2' CONCRETE SPREAD FOOTING
- 10" DIAMETER TIMBER FOUNDATION PILE APPROX. 35 FT. EMBEDMENT
- TIEBACK W/ EARTH ANCHOR (NUMBER INDICATES TIEBACK NUMBER)
- KING PILE FOR COMBINATION WALL SECTIONS

NEW BULKHEAD PLAN (STA. 0+00 – STA. 2+00)



NEW BULKHEAD PLAN (STA. 2+00 – STA. 3+49.5)

CONTRACTOR SHALL PROVIDE AND INSTALL AN ALUMINUM PEDESTRIAN GATE AT THE ENTRANCE TO THE ACCESS DECK. THE NEW ALUMINUM GATE SHALL BE SELF-CLOSING AND SHALL BE EQUIPED WITH AN ELECTRO-MECHANICAL LOCK. THE LOCKING SYSTEM SHALL HAVE A KEY PAD CONTROL ON BOTH SIDES OF THE GATE LOCK AND SHALL ALSO BE EQUIPED WITH A REMOTE OPERATING CONTROL SWITCH. CONTRACTOR SHALL BE RESPONSIBLE FOR WIRING THE REMOTE GATE CONTROL TO THE INSIDE OF THE MORGAN CREEK GRILL RESTAURANT. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH MANUFACTURER SPECIFICATION SHEETS FOR THE GATE AND THE LOCK SYSTEM FOR APPROVAL PRIOR TO PURCHASE AND INSTALLATION. (SEE "ALUMINUM GATE DETAIL" ON SHEET C12).

EXISTING ITEMS RELOCATION NOTE:
CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR RELOCATING ALL UTILITIES; INCLUDING ELECTRICAL, WATER, SEWER, GASOLINE, COMMUNICATIONS LINES, ETC., THAT MAY BE IN THE WAY OF CONSTRUCTION ACTIVITIES OR THAT MAY CONFLICT WITH THE LOCATION OF THE NEW BULKHEAD. IN ADDITION, CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR MODIFYING ANY OF THE FLOATING DOCKS THAT MAY BE IN THE WAY OF THE NEW BULKHEAD. EXISTING FLOATING DOCKS MAY NEED TO BE MOVED OR MODIFIED TO ALLOW ENOUGH ROOM FOR PROPER FUNCTIONING, ACCESS, AND FLOATATION OF THE FLOATING DOCK SYSTEM AFTER THE NEW BULKHEAD HAS BEEN CONSTRUCTED. FLOATING DOCK PILES SHALL BE PULLED AND REPLACED AS CALLED FOR.

FLOATING DOCK PILE REPLACEMENT NOTE:
CONTRACTOR SHALL REMOVE ALL TIMBER FLOATING DOCK PILES THROUGHOUT THE MARINA AND REPLACE WITH NEW TIMBER PILES. NEW GALVANIZED HOOP PILE GUIDES SHALL ALSO BE INSTALLED AT ALL LOCATIONS WHERE THE NEW TIMBER FLOATING DOCK PILES HAVE BEEN REPLACED (WHERE APPLICABLE). ALSO INCLUDED WITH THE TIMBER PILE REPLACEMENT IS THE REMOVAL AND REPLACEMENT OF THE TIMBER PILES THAT SUPPORT THE TWO (2) FIXED TIMBER ACCESS DECKS (ONE IS LOCATED AT THE DOCK ACCESS AT THE MORGAN CREEK GRILL AND ONE IS LOCATED AT THE FUEL DOCK ACCESS). ALL NEW TIMBER PILES SHALL BE TREATED TO 2.5 PCF-CCA AND SHALL MEET THE REQUIREMENTS OF ASTM D25. ALL PILES SHALL BE STRAIGHT AND FREE OF DEFECTS. NO WANE ALLOWED IN NEW DOCK PILES. ALL NEW DOCK PILES SHALL BE MIN. 8" TIP DIAMETER. 31 NEW TIMBER PILES SHALL BE 40 FT. LONG AND 7 NEW TIMBER PILES SHALL BE 50 FT. LONG.

ONE EXISTING CONCRETE DOCK PILE SHALL BE REMOVED AND REPLACED. THIS PILE IS LOCATED AT THE END OF THE TRANSIENT DOCK AT THE ICWW. THIS CONCRETE DOCK PILE SHALL BE REPLACED WITH A NEW 12" SQUARE CONCRETE PRESTRESSED PILE THAT IS 55 FT. LONG AND SHALL BE DRIVEN TO SAME THE TOP ELEVATION AS THE EXISTING CONCRETE PILE TO BE REMOVED.

TABLE 1-A. NEW BULKHEAD SPECIFICATION

NEW BULKHEAD STATION	WALL TYPE (CANTILEVER OR TIED-BACK)	TIE-ROD SPACING	WALL SECTION	SHEET LENGTH	LENGTH OF EPOXY COATING
STA. 0+00 – STA. 0+74.3	CANTILEVER	——	AZ 19-700	15 FT.	ENTIRE LENGTH
STA. 0+74.3 – STA. 0+83.5	CANTILEVER	——	AZ 19-700	35 FT.	20 FT.
STA. 0+83.5 – STA. 1+29.9	CANTILEVER W/ TIE-BACKS	VARIES	HZ 575 A-12/AZ 19-700	35 FT.	20 FT.
1st TIE-BACK FOR THIS SECTION OF THE NEW BULKHEAD IS LOCATED AT APPROX. STA. 1+27.8					
STA. 1+29.9 – STA. 1+52.8	TIED-BACK	4'-7"	AZ 19-700	35 FT.	20 FT.
STA. 1+52.8 – STA. 1+72.8	TIED-BACK	4'-7"	AZ 19-700	35 FT.	20 FT.
STA. 1+72.8 – STA. 2+42.8	TIED-BACK	4'-7"	AZ 19-700	35 FT.	20 FT.
STA. 2+42.8 – STA. 2+50.8	TIED-BACK	4'-7"	AZ 19-700	35 FT.	20 FT.
STA. 2+50.8 – STA. 2+54.8	CANTILEVER (CORNER)	——	AZ 19-700	35 FT.	20 FT.
STA. 2+54.8 – STA. 2+94.5	CANTILEVER	——	HZ 975 A-14/AZ 19-700	35 FT.	20 FT.
STA. 2+94.5 – STA. 3+15.1	CANTILEVER	——	AZ 19-700	25 FT.	ENTIRE LENGTH
STA. 3+15.1 – STA. 3+49.5	CANTILEVER	——	AZ 19-700	15 FT.	ENTIRE LENGTH

** CORNER TIE-RODS TO ALSO BE INSTALLED FROM STA. 2+41.8 – STA. 2+63.1 (4 FT. MAX. SPACING)

TABLE 1-B. NEW TIE-ROD AND ANCHOR SPECIFICATION

TIE-ROD NUMBER	TIE-ROD LENGTH	TIE-ROD ANGLE	ANCHOR TYPE
1	25 FT.	20 DEG.	PLATIPUS B10TC
2	12 FT.	10 DEG.	10" TIP DIA., 35 FT. LONG TIMBER PILE, TREATED TO 2.5 PCF-CCA (ASTM D25) TOP ELEVATION AT -5 FT. BELOW EXISTING GROUND.
3-4	30 FT.	10 DEG.	PLATIPUS B10TC
5-29	30 FT.	15 DEG.	PLATIPUS B10TC

NOTE ALL TIE-RODS SHALL BE MIN. 1" DIAMETER, GRADE A449 GALVANIZED STEEL.

NEW REPLACEMENT BULKHEAD PLAN VIEW

SCALE: 1" = 10'

GRAPHIC SCALE 1" = 10'

NO.	DATE	REVISION
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DRAWING TITLE:
NEW BULKHEAD LAYOUT PLAN (STA. 0+00 – STA. 3+49.5)
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

Jon Guerry Taylor & Associates, Inc.
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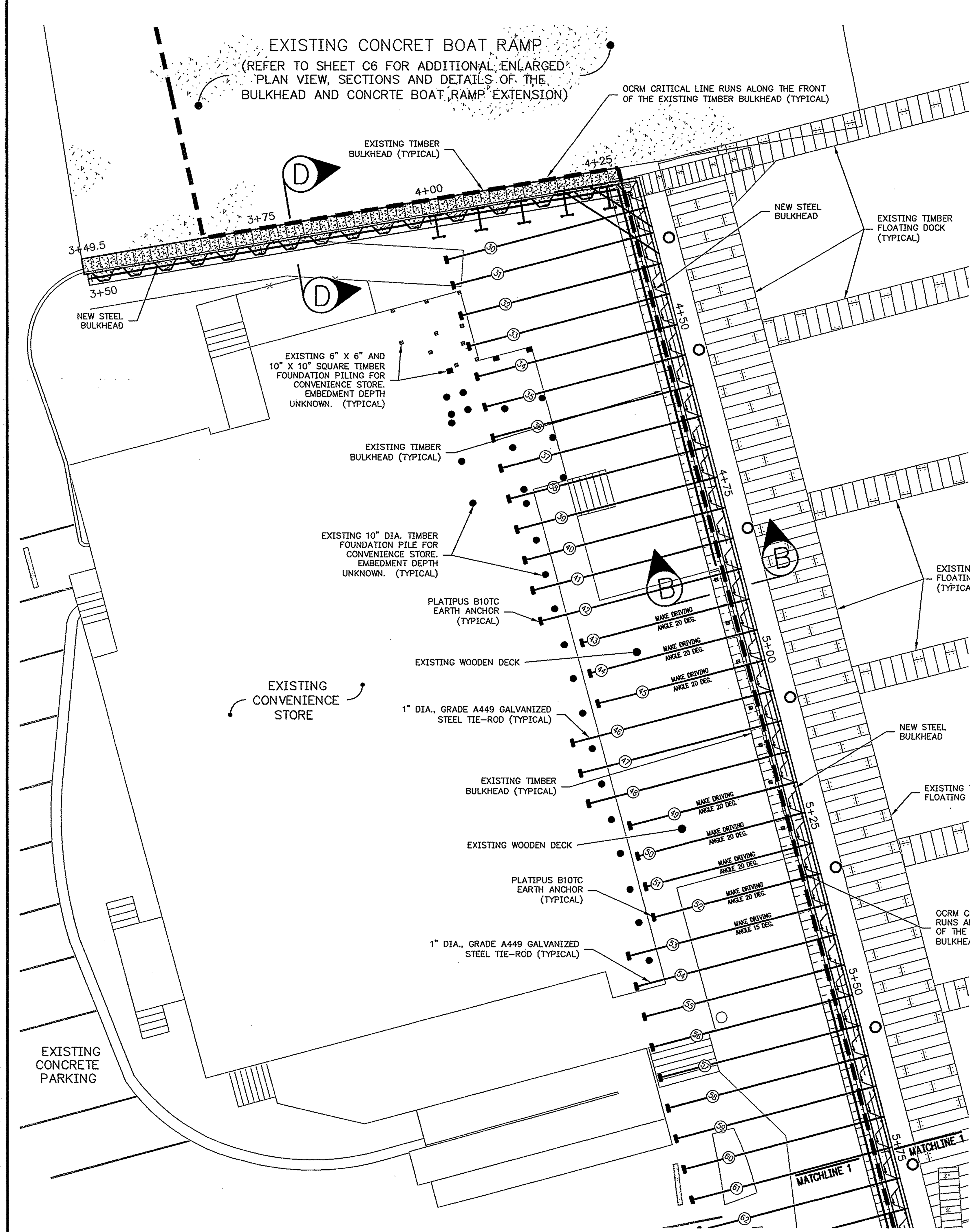
EMAIL: JIM@JUSTINC.COM; WEB: WWW.JUSTINC.COM

DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: 1.05 MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020



NEW BULKHEAD PLAN (STA. 3+49.5 – STA. 5+75)

TABLE 2-A. NEW BULKHEAD SPECIFICATION

NEW BULKHEAD STATION	WALL TYPE (CANTILEVER OR TIED-BACK)	TIE-BACK SPACING	WALL SECTION	SHEET LENGTH	LENGTH OF EPOXY COATING
STA. 3+49.5 – STA. 3+81.6	CANTILEVER	——	AZ 19-700	15 FT.	ENTIRE LENGTH
STA. 3+81.6 – STA. 4+00	CANTILEVER	——	AZ 19-700	25 FT.	ENTIRE LENGTH
STA. 4+00 – STA. 4+26.9	CANTILEVER	——	HZ 975 A-14/AZ 19-700	35 FT.	20 FT.
STA. 4+26.9 – STA. 4+33.7	CANTILEVER (CORNER)	——	AZ 19-700	35 FT.	20 FT.
STA. 4+33.7 – STA. 5+45.4	TIED-BACK	4'-7"	AZ 19-700	35 FT.	20 FT.
STA. 5+45.4 – STA. 5+91.2	TIED-BACK	4'-7"	AZ 19-700	40 FT.	20 FT.
STA. 5+91.2 – STA. 6+40.4	TIED-BACK	4'-7"	AZ 19-700	35 FT.	20 FT.
STA. 6+40.4 – STA. 7+25.4	TIED-BACK	4'-7"	AZ 19-700	35 FT.	20 FT.
STA. 7+25.4 – STA. 7+42.7	CORNER TIE-RODS	4 FT.	AZ 19-700	35 FT.	20 FT.
STA. 7+42.7 – STA. 7+55.3	CORNER TIE-RODS	4 FT.	HZ 975 A-14/AZ 19-700	35 FT.	20 FT.
STA. 7+55.3 – STA. 7+59.9	CORNER TIE-RODS	4 FT.	AZ 19-700	35 FT.	20 FT.
STA. 7+59.9 – STA. 7+66.8	CANTILEVER	——	AZ 19-700	20 FT.	ENTIRE LENGTH
STA. 7+66.8 – STA. 7+75.1	CANTILEVER	——	AZ 19-700	10 FT.	ENTIRE LENGTH

** CORNER TIE-RODS TO ALSO BE INSTALLED FROM STA. 4+19.5 – STA. 4+40.1 (4 FT. MAX. SPACING)

** CORNER TIE-RODS TO ALSO BE INSTALLED FROM STA. 7+25.4 – STA. 7+59.5 (4 FT. MAX. SPACING)

TABLE 2-B. NEW TIE-ROD AND ANCHOR SPECIFICATION

TIE-ROD NUMBER	TIE-ROD LENGTH	TIE-ROD ANGLE	ANCHOR TYPE
30-42	30 FT.	15 DEG.	PLATIPUS B10TC
43-45	25 FT.	20 DEG.	PLATIPUS B10TC
46-48	30 FT.	15 DEG.	PLATIPUS B10TC
49-52	25 FT.	20 DEG.	PLATIPUS B10TC
53-69	30 FT.	15 DEG.	PLATIPUS B10TC
70	35 FT.	10 DEG.	PLATIPUS B10TC
71-72	25 FT.	20 DEG.	PLATIPUS B10TC
73-94	30 FT.	15 DEG.	PLATIPUS B10TC

NOTE: ALL TIE-RODS SHALL BE MIN. 1" DIAMETER, GRADE A449 GALVANIZED STEEL.

LEGEND

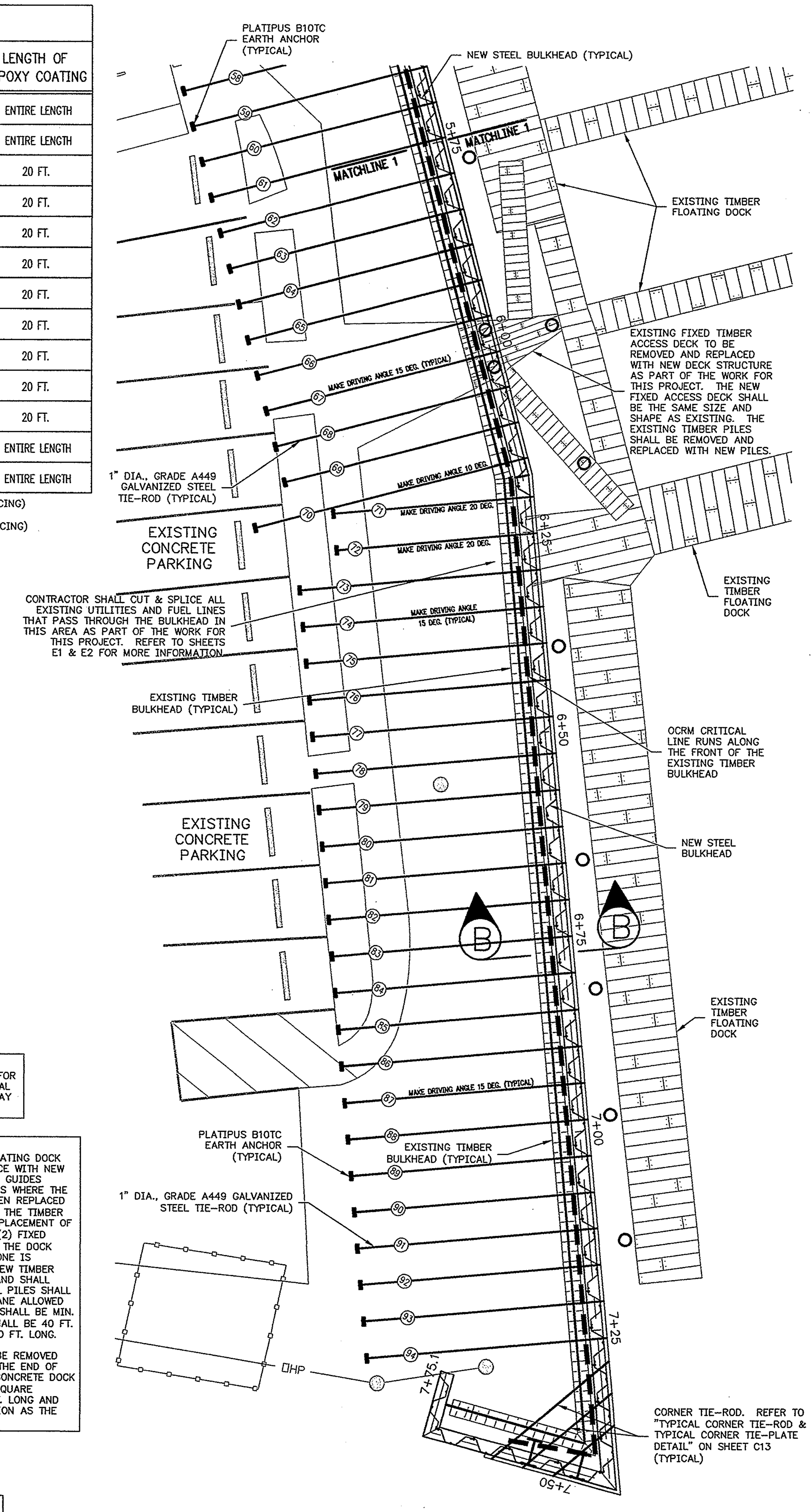
- EXISTING FLOATING DOCK
- OCRM CRITICAL LINE
- EXISTING TIMBER BULKHEAD
- NEW BULKHEAD
- 6" x 6" SQUARE SUPPORT PILE WITH 2' X 2' CONCRETE SPREAD FOOTING
- 10" DIAMETER TIMBER FOUNDATION PILE APPROX. 35 FT. EMBEDMENT
- TIEBACK W/ EARTH ANCHOR (NUMBER INDICATES TIEBACK NUMBER)
- KING PILE FOR COMBINATION WALL SECTIONS

NOTE:
SHEET PILING LAYOUT IS SHOWN HERE FOR REPRESENTATION PURPOSES. THE ACTUAL LAYOUT AND CORNER CONFIGURATION MAY VARY WITH INSTALLATION.

FLOATING DOCK PILE REPLACEMENT NOTE:
CONTRACTOR SHALL REMOVE ALL TIMBER FLOATING DOCK PILES THROUGHOUT THE MARINA AND REPLACE WITH NEW TIMBER PILES. NEW GALVANIZED HOOP PILE GUIDES SHALL ALSO BE INSTALLED AT ALL LOCATIONS WHERE THE NEW TIMBER FLOATING DOCK PILES HAVE BEEN REPLACED (WHERE APPLICABLE). ALSO INCLUDED WITH THE TIMBER PILE REPLACEMENT IS THE REMOVAL AND REPLACEMENT OF THE TIMBER PILES THAT SUPPORT THE TWO (2) FIXED TIMBER ACCESS DECKS (ONE IS LOCATED AT THE DOCK ACCESS AT THE MORGAN CREEK GRILL AND ONE IS LOCATED AT THE FUEL DOCK ACCESS). ALL NEW TIMBER PILES SHALL BE TREATED TO 2.5 PCF-CCA AND SHALL MEET THE REQUIREMENTS OF ASTM D25. ALL PILES SHALL BE STRAIGHT AND FREE OF DEFECTS. NO WANE ALLOWED IN NEW DOCK PILES. ALL NEW DOCK PILES SHALL BE MIN. 8" TIP DIAMETER. 31 NEW TIMBER PILES SHALL BE 40 FT. LONG AND 7 NEW TIMBER PILES SHALL BE 50 FT. LONG.

ONE EXISTING CONCRETE DOCK PILE SHALL BE REMOVED AND REPLACED. THIS PILE IS LOCATED AT THE END OF THE TRANSIENT DOCK AT THE ICWW. THIS CONCRETE DOCK PILE SHALL BE REPLACED WITH A NEW 12" SQUARE CONCRETE PRESTRESSED PILE THAT IS 55 FT. LONG AND SHALL BE DRIVEN TO SAME THE TOP ELEVATION AS THE EXISTING CONCRETE PILE TO BE REMOVED.

EXISTING ITEMS RELOCATION NOTE:
CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR RELOCATING ALL UTILITIES; INCLUDING ELECTRICAL, WATER, SEWER, GASOLINE, COMMUNICATIONS LINES, ETC., THAT MAY BE IN THE WAY OF CONSTRUCTION ACTIVITIES OR THAT MAY CONFLICT WITH THE LOCATION OF THE NEW BULKHEAD. IN ADDITION, CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR MODIFYING ANY OF THE FLOATING DOCKS THAT MAY BE IN THE WAY OF THE NEW BULKHEAD. EXISTING FLOATING DOCKS MAY NEED TO BE MOVED OR MODIFIED TO ALLOW ENOUGH ROOM FOR PROPER FUNCTIONING, ACCESS, AND FLOATATION OF THE FLOATING DOCK SYSTEM AFTER THE NEW BULKHEAD HAS BEEN CONSTRUCTED. FLOATING DOCK PILES SHALL BE PULLED AND REPLACED AS CALLED FOR.



NEW BULKHEAD PLAN (STA. 5+75 – STA. 7+75.1)

NEW REPLACEMENT BULKHEAD PLAN VIEW

SCALE: 1" = 10'

0 10
GRAPHIC SCALE 1" = 10'

DRAWING TITLE:
NEW BULKHEAD LAYOUT PLAN (STA. 3+49.5 – STA. 7+75.1)
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

NO.	DATE	REVISION
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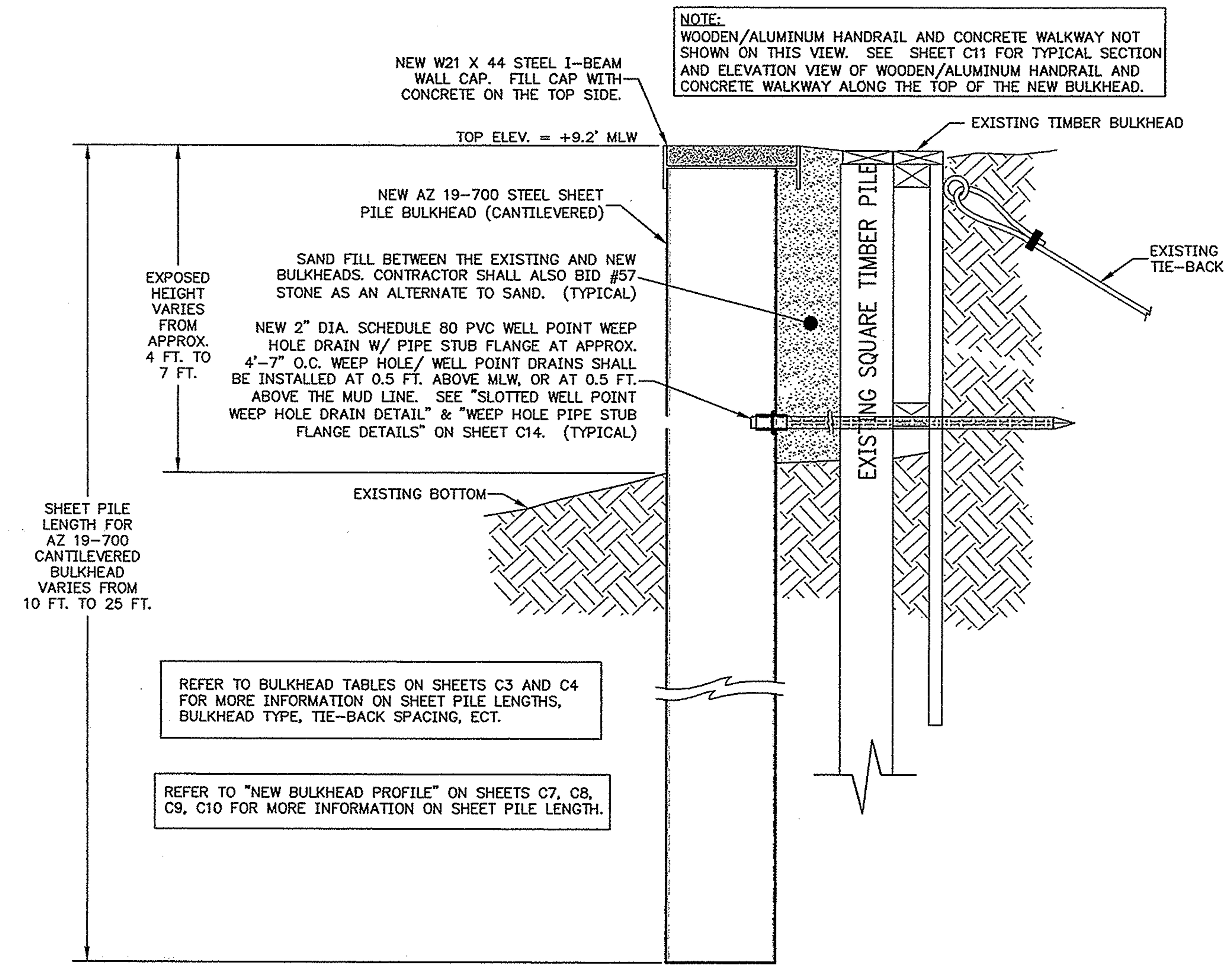


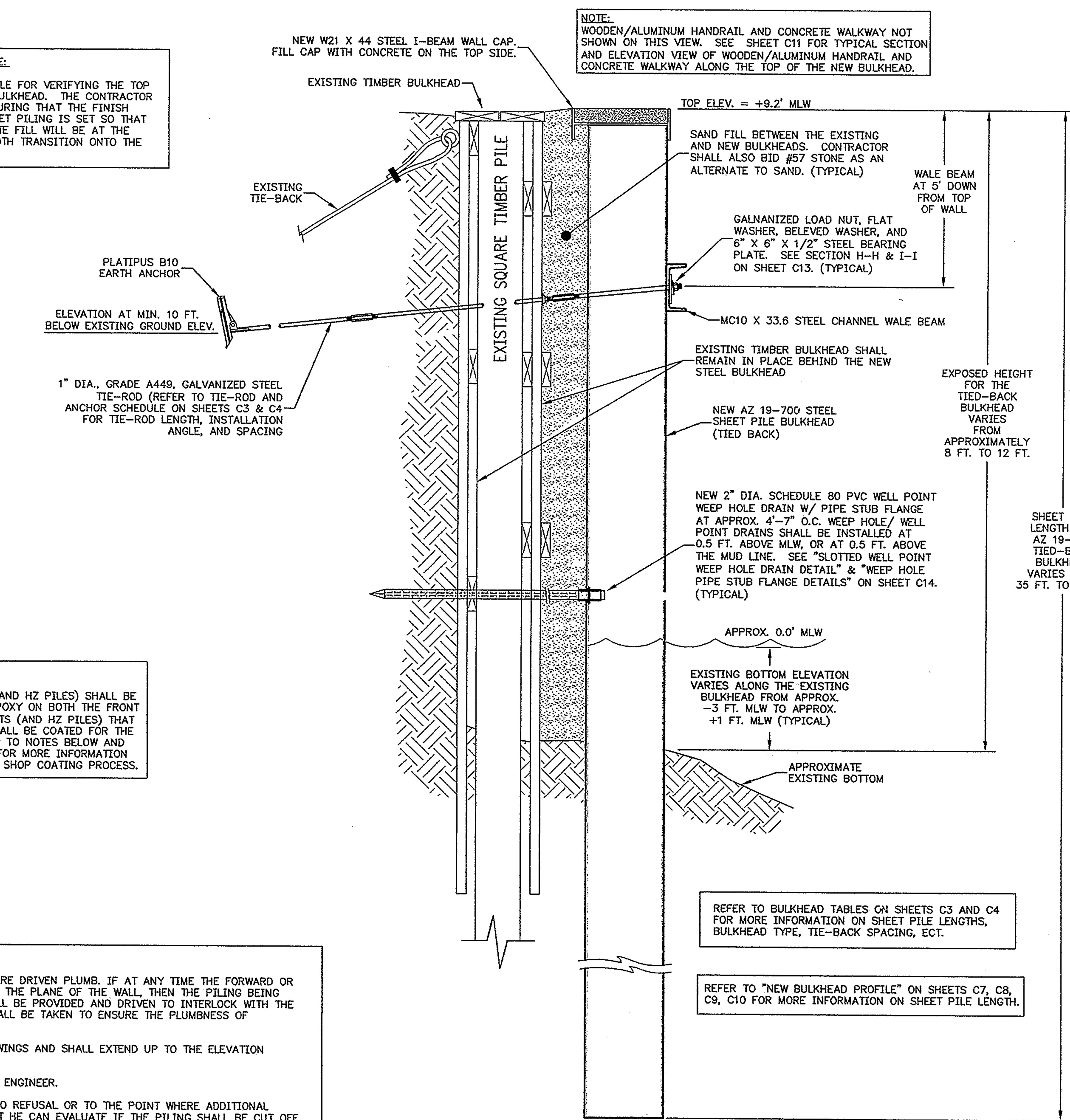
SECTION A–A
NOT TO SCALE

NEW BULKHEAD FINISH ELEVATION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE TOP ELEVATION OF THE EXISTING TIMBER BULKHEAD. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ENSURING THAT THE FINISH ELEVATION OF THE NEW BULKHEAD SHEET PILING IS SET SO THAT THE NEW BULKHEAD CAP WITH CONCRETE FILL WILL BE AT THE PROPER ELEVATION TO ENSURE A SMOOTH TRANSITION ONTO THE ADJACENT LAWN AND LANSCAPED AREA.

COAL-TAR EPOXY COATING NOTE:

THE TOP 20 FT. OF ALL SHEETS (AND HZ PILES) SHALL BE SHOP-COATED WITH COAL-TAR EPOXY ON BOTH THE FRONT AND BACK OF ALL SHEETS. SHEETS (AND HZ PILES) THAT ARE 20 FT. LONG OR SHORTER SHALL BE COATED FOR THE ENTIRE LENGTH OF SHEET. REFER TO NOTES BELOW AND THE TECHNICAL SPECIFICATIONS FOR MORE INFORMATION ON THE EPOXY COATING AND THE SHOP COATING PROCESS.



SECTION B–B
NOT TO SCALE

BULKHEAD MATERIAL AND CONSTRUCTION NOTES:

1. MATERIALS DELIVERED TO THE SITE SHALL BE NEW AND UNDAMAGED AND SHALL BE ACCOMPANIED BY CERTIFIED TEST REPORTS. THE MANUFACTURER'S LOGO AND MILL IDENTIFICATION MARK SHALL BE PROVIDED ON THE SHEET PILING AS REQUIRED BY THE REFERENCED SPECIFICATIONS. SHEET PILING SHALL BE STORED AND HANDLED IN THE MANNER RECOMMENDED BY THE MANUFACTURER TO PREVENT PERMANENT DEFLECTION, DISTORTION, OR DAMAGE TO THE INTERLOCKS. STORAGE OF SHEET PILING SHOULD ALSO FACILITATE REQUIRED INSPECTION ACTIVITIES.

2. STEEL SHEETS SHALL BE AZ 19–700 AS MANUFACTURED BY SKYLINE STEEL OR APPROVED EQUAL. THE PILES SHALL BE IN LENGTHS AS SHOWN ON THE DRAWINGS. ALTERNATE SHEETS MAY BE CONSIDERED PROVIDED THEY MEET THE MINIMUM REQUIREMENTS AS LISTED IN #4 & #5 OF THE NOTES BELOW.

3. STEEL SHEET PILING SHALL BE ASTM–A 572 GRADE 50, f_y = 50 ksi (MIN.), OR APPROVED EQUAL.

4. STEEL SHEET PILING AND COMBINED WALL SECTIONS SHALL HAVE THE FOLLOWING MINIMUM SECTION PROPERTIES:

SECTION	NOMINAL WEB THICKNESS (IN)	SECTION MODULUS PER LIN FT OF WALL (IN^3)	MOMENT OF INERTIA PER SQ. FT OF WALL (IN^4)	MOMENT CAPACITY PER LIN. FT. OF PILING (FT.-LBS./FT.)
AZ 19-700	0.375	34.8	288.4	72,413
HZ 575 A-12 / AZ 19-700	0.375	61.0	808.7	126,932
HZ 975 A-14 / AZ 19-700	0.375	152.3	2925.1	316,913

5. THE INTERLOCKS OF SHEET PILING SHALL BE FREE–SLIDING, PROVIDE A SWING ANGLE SUITABLE FOR THE INTENDED INSTALLATION BUT NOT LESS THAN 5 DEGREES WHEN INTERLOCKED, AND MAINTAIN CONTINUOUS INTERLOCKING WHEN INSTALLED. SHEET PILING SHALL BE FULL–LENGTH SECTIONS OF THE DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS.

6. LOADING, UNLOADING, STORAGE AND PREPARATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION UNLESS OTHERWISE CHANGED OR APPROVED BY THE ENGINEER.

7. CONTRACTOR TO SUBMIT PROPOSED LAYOUT PLAN AND SEQUENCE OF OPERATION AND SHEET INSTALLATION AT PRECONSTRUCTION MEETING.

8. DRIVING HAMMERS SHALL BE APPROVED BY THE ENGINEER AND SHALL BE SINGLE ACTING, DOUBLE ACTING, DIFFERENTIAL ACTING, OR VIBRATING TYPE.

9. NO JETTING OF SHEETS ALLOWED UNLESS PRIOR APPROVAL IS GIVEN IN WRITING BY THE ENGINEER.

10. ANY EXCAVATION REQUIRED WITHIN THE AREA WHERE SHEET PILINGS ARE TO BE INSTALLED SHALL BE COMPLETED PRIOR TO PLACING SHEET PILINGS. PILINGS SHALL BE CAREFULLY LOCATED AS SHOWN ON THE DRAWINGS. PILINGS SHALL BE PLACED PLUMB WITH OUT–OF–PLUMPNESS NOT EXCEEDING 1/8 INCH PER FOOT OF LENGTH AND TRUE TO LINE. SHEET PILES PROPERLY PLACED AND DRIVEN SHALL BE INTERLOCKED THROUGHOUT THEIR LENGTH WITH ADJACENT SHEET PILES TO FORM A CONTINUOUS DIAPHRAGM THROUGHOUT THE LENGTH OR RUN OF PILING WALL.

11. PILINGS DAMAGED DURING DRIVING OR DRIVEN OUT OF INTERLOCK SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

12. PILINGS SHALL BE DRIVEN WITH THE PROPER SIZE HAMMER AND BY APPROVED METHODS SO AS NOT TO SUBJECT THE PILINGS TO DAMAGE AND TO ENSURE PROPER INTERLOCKING THROUGHOUT THEIR LENGTHS. DRIVING HAMMERS SHALL BE MAINTAINED IN PROPER ALIGNMENT DURING DRIVING OPERATIONS BY USE OF LEADS OR GUIDES ATTACHED TO THE HAMMER. CAUTION SHALL BE TAKEN IN THE SUSTAINED USE OF VIBRATING HAMMERS WHEN A HARD DRIVING CONDITION IS ENCOUNTERED TO AVOID INTERLOCK–MELT OR DAMAGES. THE USE OF VIBRATING HAMMERS SHOULD BE DISCONTINUED AND IMPACT HAMMERS EMPLOYED WHEN THE PENETRATION RATE DUE TO VIBRATING LOADING IS ONE FOOT OR LESS PER MINUTE.

... continued: BULKHEAD MATERIAL AND CONSTRUCTION NOTES:

13. ADEQUATE PRECAUTIONS SHALL BE TAKEN TO ENSURE THAT SHEET PILES ARE DRIVEN PLUMB. IF AT ANY TIME THE FORWARD OR LEADING EDGE OF THE SHEET PILE WALL IS FOUND TO BE OUT–OF–PLUMB WITH THE PLANE OF THE WALL, THEN THE PILING BEING DRIVEN SHALL BE DRIVEN TO THE REQUIRED DEPTH AND TAPERED PILINGS SHALL BE PROVIDED AND DRIVEN TO INTERLOCK WITH THE OUT–OF–PLUMB LEADING EDGE OR OTHER APPROVED CORRECTIVE MEASURES SHALL BE TAKEN TO ENSURE THE PLUMBNESS OF SUCCEEDING PILINGS.

14. SHEET PILES SHALL BE DRIVEN TO DEPTHS SHOWN ON THE CONTRACT DRAWINGS AND SHALL EXTEND UP TO THE ELEVATION INDICATED ON THE CONTRACT DRAWINGS FOR THE TOP OF THE PILINGS.

15. NO CUTTING OR SPLICING OF PILINGS ALLOWED UNLESS APPROVED BY THE ENGINEER.

16. WHEN PILINGS, AS SPECIFIED ON THE CONTRACT DRAWINGS, ARE DRIVEN TO REFUSAL OR TO THE POINT WHERE ADDITIONAL DRIVING WILL DAMAGE THE PILES, THE ENGINEER SHALL BE CONSULTED SO THAT HE CAN EVALUATE IF THE PILING SHALL BE CUT OFF OR DRIVEN TO THE SPECIFIED PENETRATION.

17. IF THE TOPS OF PILINGS ARE DAMAGED DURING DRIVING, ENGINEER SHALL BE CONSULTED TO DETERMINE IF THE PILE IS TO BE CUT OFF OR TO BE EXTRACTED AND REPLACED WITH NEW SHEET PILES. ALL WORK ON DAMAGED PILES SHALL BE DONE AT NO COST TO THE OWNER. IF ALLOWED, PILING CUT–OFF SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.

18. THE CONTRACTOR SHALL CUT HOLES IN PILINGS FOR BOLTS, RODS, DRAINS OR UTILITIES AS SHOWN ON THE CONTRACT DRAWINGS OR AS DIRECTED. ALL CUTTING SHALL BE DONE IN A NEAT AND PRECISE MANNER. HOLES IN STEEL SHEET PILING SHALL BE DRILLED OR REAMED BY APPROVED METHODS THAT WILL NOT DAMAGE THE SURROUNDING METAL. HOLES SHALL BE REASONABLY SMOOTH AND THE PROPER SIZE FOR ITEMS TO BE INSERTED.

19. THE CONTRACTOR SHALL INSPECT THE INTERLOCKED JOINTS OF DRIVEN PILINGS EXTENDING ABOVE GROUND DAILY. PILINGS FOUND TO BE OUT OF INTERLOCK SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

20. ALL PVC COMPONENTS USED FOR WELL POINT WEEP HOLE DRAINS SHALL BE SCHEDULE 80.

21. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY AND REMOVE ALL DEBRIS THAT MAY IMPACT THE INSTALLATION OF THE NEW SHEET PILES AND/OR EARTH ANCHORS AND TIE–RODS.

22. ALL POTENTIALLY CORROSIVE MATERIALS USED IN THE BULKHEAD CONSTRUCTION SHALL BE ISOLATED FROM EACH OTHER TO PREVENT CORROSION DUE TO GALVANIC ACTION.

23. ALL LIFTING HOLES SHALL BE PLUGGED WITH STEEL OF THE SAME GRADE AND THICKNESS AS THAT OF THE SHEET PILING. EACH PLUGGED HOLE SHALL BE WELDED ALL AROUND. FIELD–COAT ALL DISTURBED AREAS AS SPECIFIED IN NOTE #25 BELOW.

24. ALL STEEL SHEET PILING, HZ PILING, WALE BEAMS, BULKHEAD CAP, CORNER PILES, ANGLE BRACKETS FOR HANDRAIL POST CONNECTION, AND ANY OTHER MISCELANEOUS BULKHEAD PARTS SHALL BE SHOP COATED WITH COAL–TAR EPOXY COATING, AFTER FABRICATION. PRIOR TO COATING STEEL, ABRASIVE BLAST CLEAN PER SSPC–SP–10 (NEAR WHITE). REQUIRED DRY FILM THICKNESS TO BE 16 MILS WHICH SHALL BE WITH A TWO–STEP PROCESS (8 MILS EACH). FIELD TOUCH–UP OF COATING AFTER INSTALLATION OF SHEET PILING SHALL BE MINIMAL AND SHALL ALSO MEET THE ABOVE STANDARDS. ALL LIFTING HOLES SHALL BE WITHIN THE TOP 6 INCHES OF THE SHEET. TOUCH–UP OF ALL AREAS DAMAGED DURING INSTALLATION, AND LIFTING HOLES SHALL MEET THE ABOVE REQUIREMENTS.

25. ALL TIE–RODS FOR BULKHEAD ANCHORS SHALL BE MIN. 1" DIA. STEEL, GRADE A449 WITH MINIMUM TENSILE STRENGTH OF 120 KSI. TIE–RODS SHALL BE INSTALLED AT SPACINGS AND AT ANGLES AS CALLED FOR IN TABLE 1–A, TABLE 1–B, TABLE 2–A, AND TABLE 2–B ON SHEETS C3 AND C4.

26. ALL BULKHEAD ANHORS SHALL BE PLATIPUS B10T ANCHORS. REFER TO SHEETS C3 AND C4 FOR ANCHOR SPACINGS.

NO.	DATE	REVISION
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DRAWING TITLE:
TYPICAL BULKHEAD SECTIONS AND NOTES
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

Jon Guerry Taylor & Associates, Inc.
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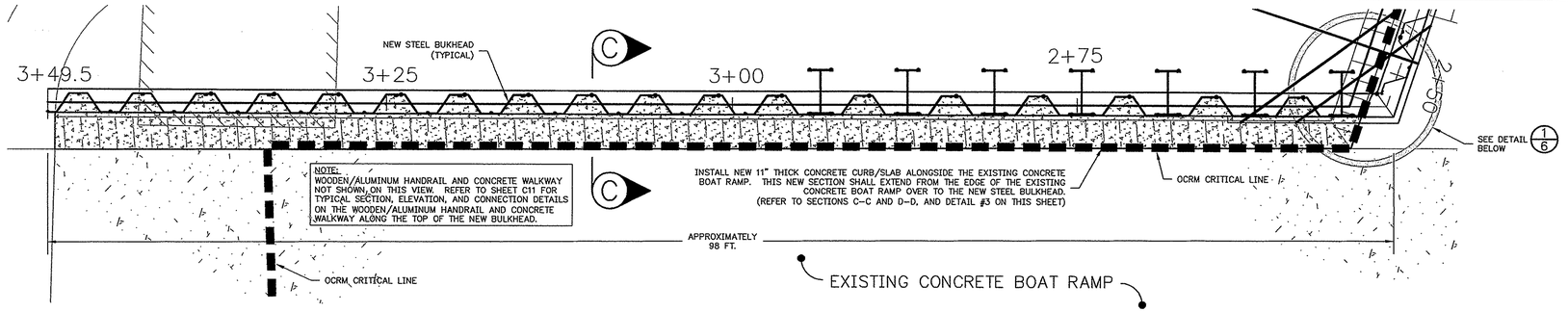
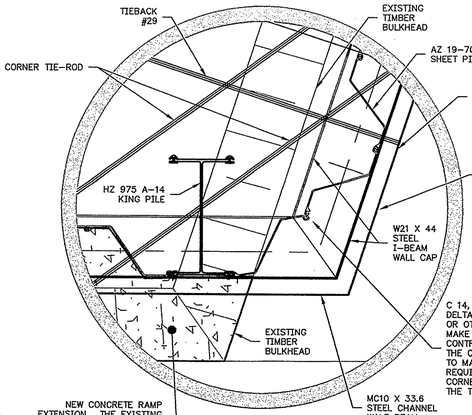
DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: I.O.P. MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020



(PLAN VIEW)

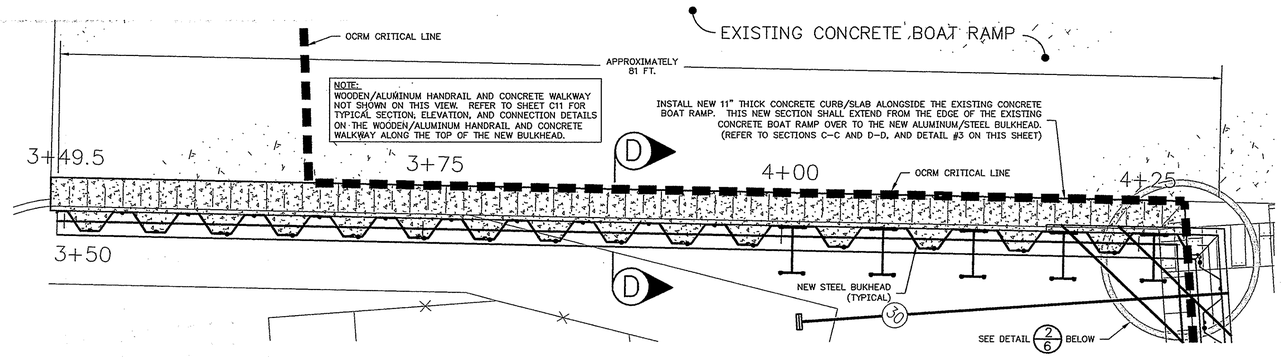
NEW BULKHEAD ALONGSIDE THE EXISTING BOAT RAMP (NORTHWEST SIDE)

SCALE: 1" = 5'



DETAIL 1/6
NOT TO SCALE

EXISTING BULKHEAD REMOVAL NOTE:
THE EXISTING TIMBER BULKHEAD THAT RUNS ALONG BOTH SIDES OF THE ISLE OF PALMS MARINA BOAT RAMP SHALL BE REMOVED AS PART OF THIS WORK. CONTRACTOR SHALL COMPLETELY REMOVE THE EXISTING TIMBER BULKHEAD AND ALL BULKHEAD TIE-BACKS, OR ANY OTHER APPURTENANCES TO THE EXISTING TIMBER BULKHEAD IN THIS AREA. ALL TIMBER SHEETS, TIMBER PILING OR OTHER BULKHEAD MATERIALS SHALL BE REMOVED TO AT LEAST TWO (2) FEET BELOW THE EXISTING ELEVATION OF THE ADJACENT CONCRETE BOAT RAMP. ALL VOIDS CREATED BY REMOVAL OF THESE ITEMS SHALL BE COMPLETELY FILLED AND COMPACTED WITH CLEAN GRANULAR FILL MATERIAL. THE LAST 8 INCHES (MIN.) OF THE BASE UNDER THE NEW CONCRETE BOAT RAMP EXTENSIONS SHALL BE FILLED WITH #4 STONE.

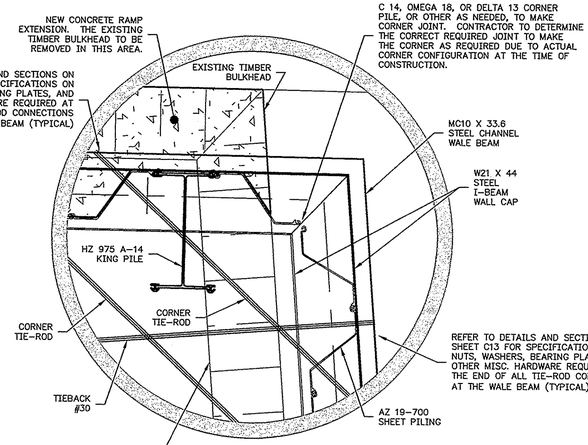


(PLAN VIEW)

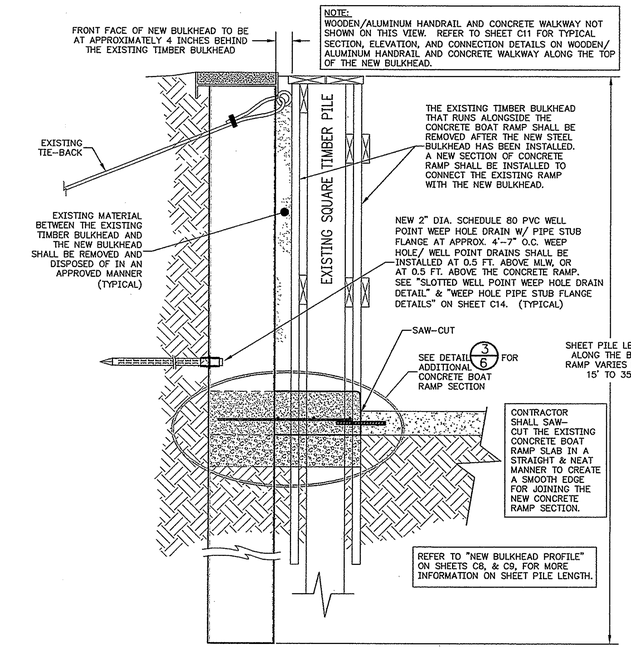
NEW BULKHEAD ALONGSIDE THE EXISTING BOAT RAMP (SOUTHEAST SIDE)

SCALE: 1" = 5'

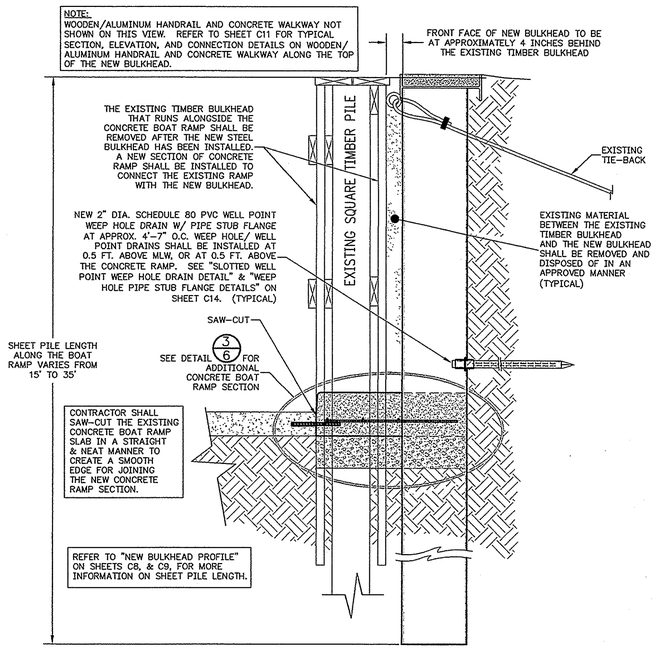
COAL-TAR EPOXY COATING NOTE:
THE TOP 20 FT. OF ALL SHEETS (AND HZ PILES) SHALL BE SHOP-COATED WITH COAL-TAR EPOXY ON BOTH THE FRONT AND BACK OF ALL SHEETS. SHEETS (AND HZ PILES) THAT ARE 20 FT. LONG OR SHORTER SHALL BE COATED FOR THE ENTIRE LENGTH OF SHEET. REFER TO NOTES BELOW AND THE TECHNICAL SPECIFICATIONS FOR MORE INFORMATION ON THE EPOXY COATING AND THE SHOP COATING PROCESS.



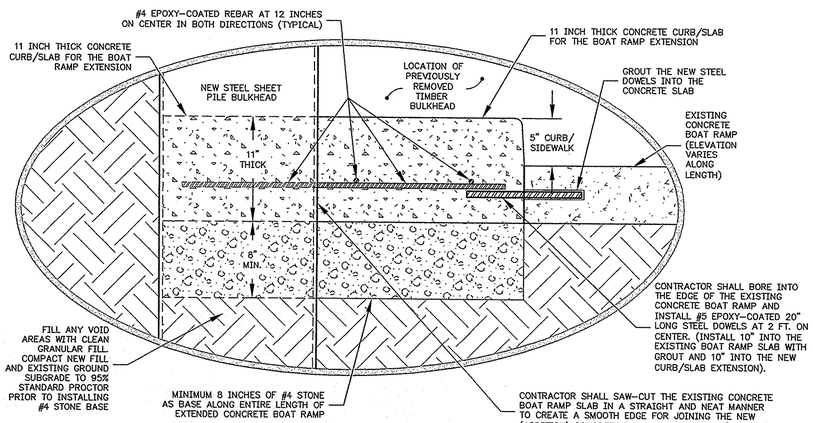
DETAIL 2/6
NOT TO SCALE



SECTION C-C
NOT TO SCALE



SECTION D-D
NOT TO SCALE



DETAIL 3/6
NOT TO SCALE

VIEW IS REVERSED FOR SECTION D-D

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DRAWING TITLE:

NEW BULKHEAD ALONGSIDE THE EXISTING BOAT RAMP
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL No. 22003 CHRISTOPHER M. KNOX 7-25-08

SOUTH CAROLINA JON GUERRY TAYLOR & ASSOCIATES, INC. No. 3877 CERTIFICATE OF AUTHORIZATION

Jon Guerry Taylor & Associates, Inc.
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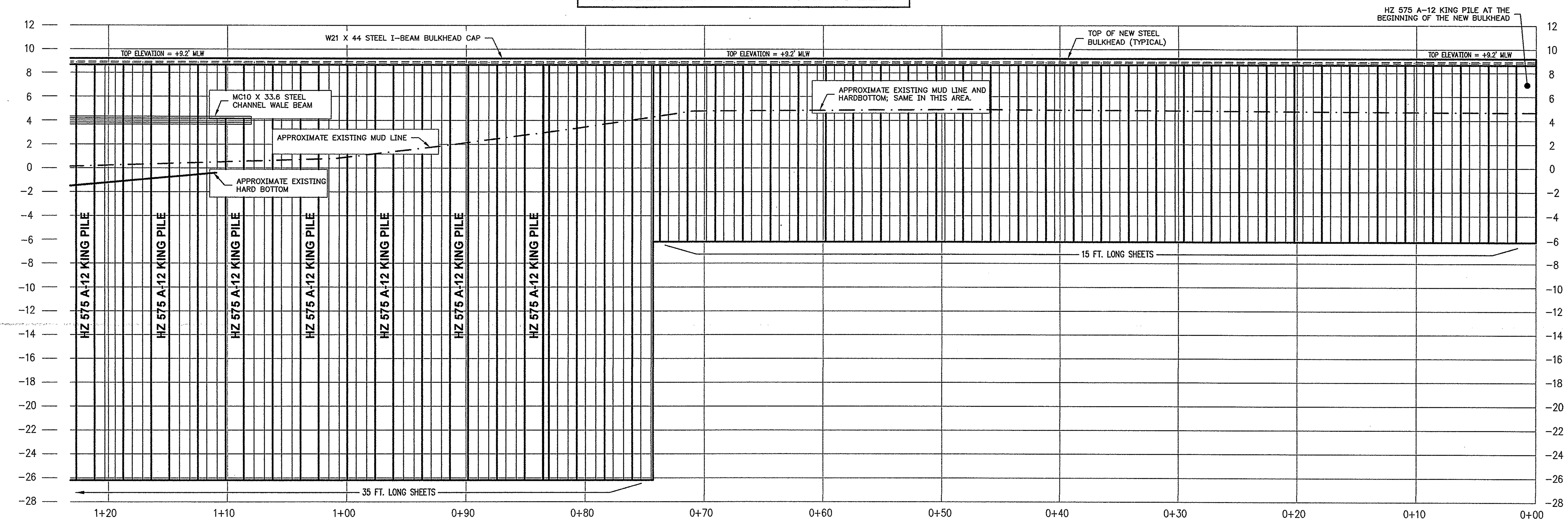
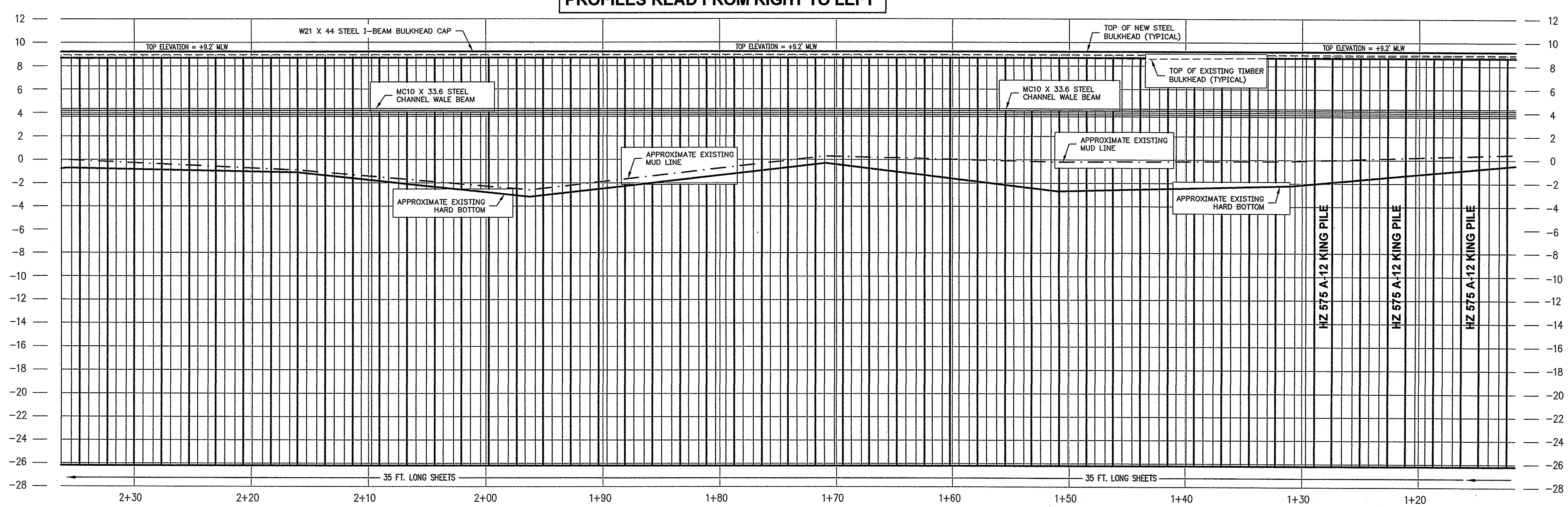
DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: 108 MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020

PROFILES READ FROM RIGHT TO LEFT



(STA. 0+00 – STA. 1+20)

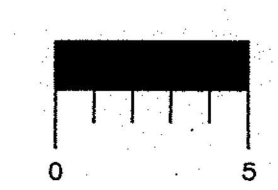
PROFILES READ FROM RIGHT TO LEFT



(STA. 1+20 – STA. 2+30)

NEW BULKHEAD PROFILE (STA. 0+00 – STA. 2+30)

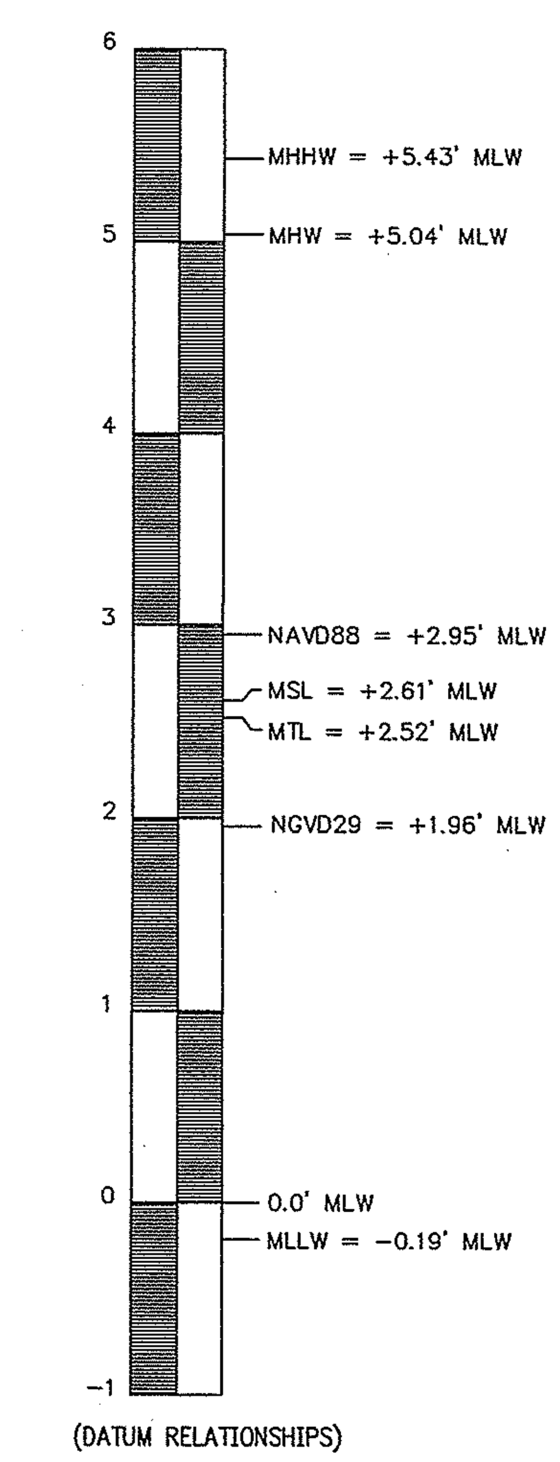
SCALE: 1" = 5'



GRAPHIC SCALE 1" = 5'

COAL-TAR EPOXY COATING NOTE:
THE TOP 20 FT. OF ALL SHEETS (AND HZ PILES) SHALL BE SHOP-COATED WITH COAL-TAR EPOXY ON BOTH THE FRONT AND BACK OF ALL SHEETS. SHEETS (AND HZ PILES) THAT ARE 20 FT. LONG OR SHORTER SHALL BE COATED FOR THE ENTIRE LENGTH OF SHEET. REFER TO NOTES BELOW AND THE TECHNICAL SPECIFICATIONS FOR MORE INFORMATION ON THE EPOXY COATING AND THE SHOP COATING PROCESS.

NOTE:
WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY NOT SHOWN FOR CLARITY. REFER TO SHEET C11 FOR TYPICAL SECTION, ELEVATION, AND CONNECTION DETAILS ON WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY ALONG THE TOP OF THE NEW BULKHEAD.



VERTICAL TIDE RANGE SCALE

VERTICAL DATUM NOTE:
ALL ELEVATIONS AND CONTOURS ON THESE DRAWINGS ARE REFERENCED TO MEAN LOW WATER (MLW) VERTICAL DATUM.

DRAWING TITLE:
NEW BULKHEAD PROFILE (STA. 0+00 – STA. 2+30)
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

NO.	DATE	REVISION
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Jon Guerry Taylor & Associates, Inc.
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DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
DATE: 07-24-08
PROJ. NO.: 05-020

PROFILES READ FROM RIGHT TO LEFT

COAL-TAR EPOXY COATING NOTE:

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NOTE:
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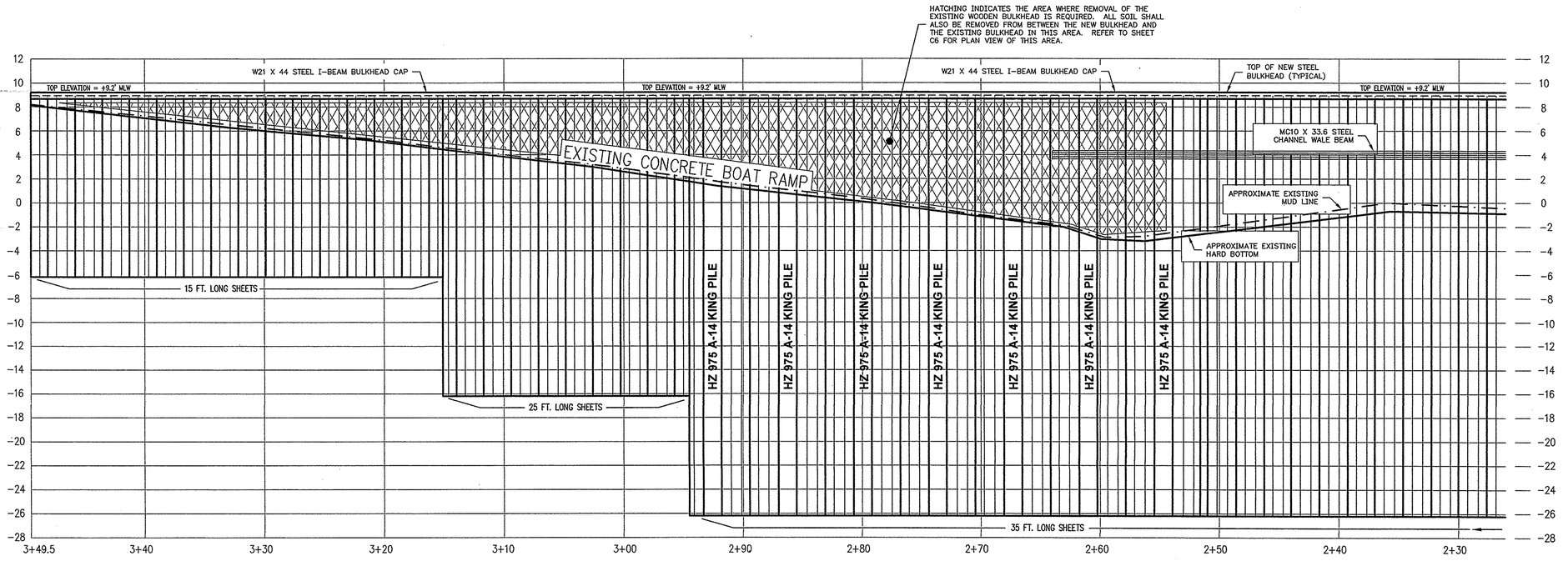
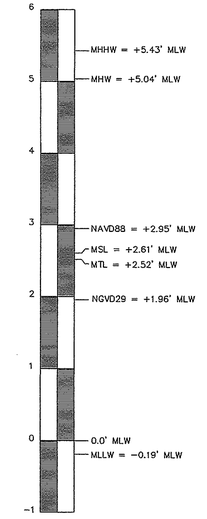


(STA. 2+30 – STA. 3+49.5)



(DATUM RELATIONSHIPS)

VERTICAL TIDE RANGE SCALE

VERTICAL DATUM NOTE:
ALL ELEVATIONS AND CONTOURS ON THESE DRAWINGS ARE REFERENCED TO MEAN LOW WATER (MLW) VERTICAL DATUM.

NEW BULKHEAD PROFILE (STA. 2+30 – STA. 3+49.5)

SCALE: 1" = 5'

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GRAPHIC SCALE 1" = 5'

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DRAWING TITLE:
NEW BULKHEAD PROFILE (STA. 2+30 – STA. 3+49.5)
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

Jon Guerry Taylor & Associates, Inc.
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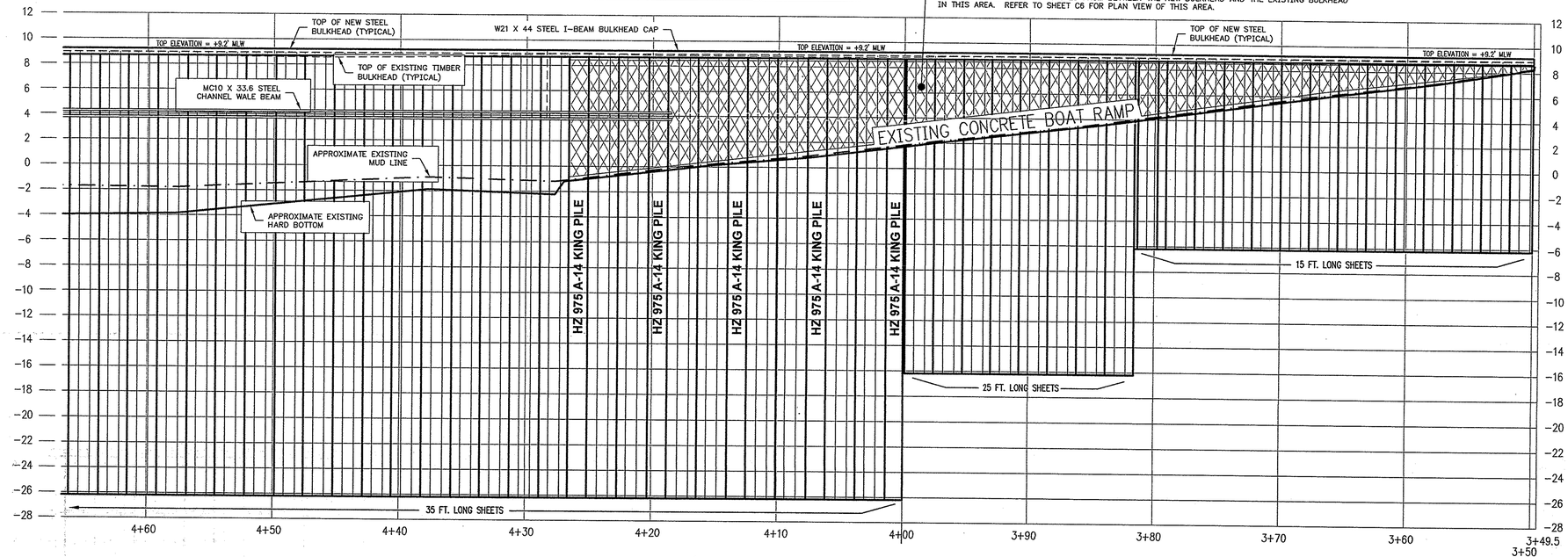
DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: 10P_MARINA BULKHEAD D-WGS
DATE: 07-24-08
PROJ. NO.: 05-020

PROFILES READ FROM RIGHT TO LEFT



(STA. 3+49.5 – STA. 4+60)

COAL–TAR EPOXY COATING NOTE:

THE TOP 20 FT. OF ALL SHEETS (AND HZ PILES) SHALL BE SHOP–COATED WITH COAL–TAR EPOXY ON BOTH THE FRONT AND BACK OF ALL SHEETS. SHEETS (AND HZ PILES) THAT ARE 20 FT. LONG OR SHORTER SHALL BE COATED FOR THE ENTIRE LENGTH OF SHEET. REFER TO NOTES BELOW AND THE TECHNICAL SPECIFICATIONS FOR MORE INFORMATION ON THE EPOXY COATING AND THE SHOP COATING PROCESS.

NOTE:
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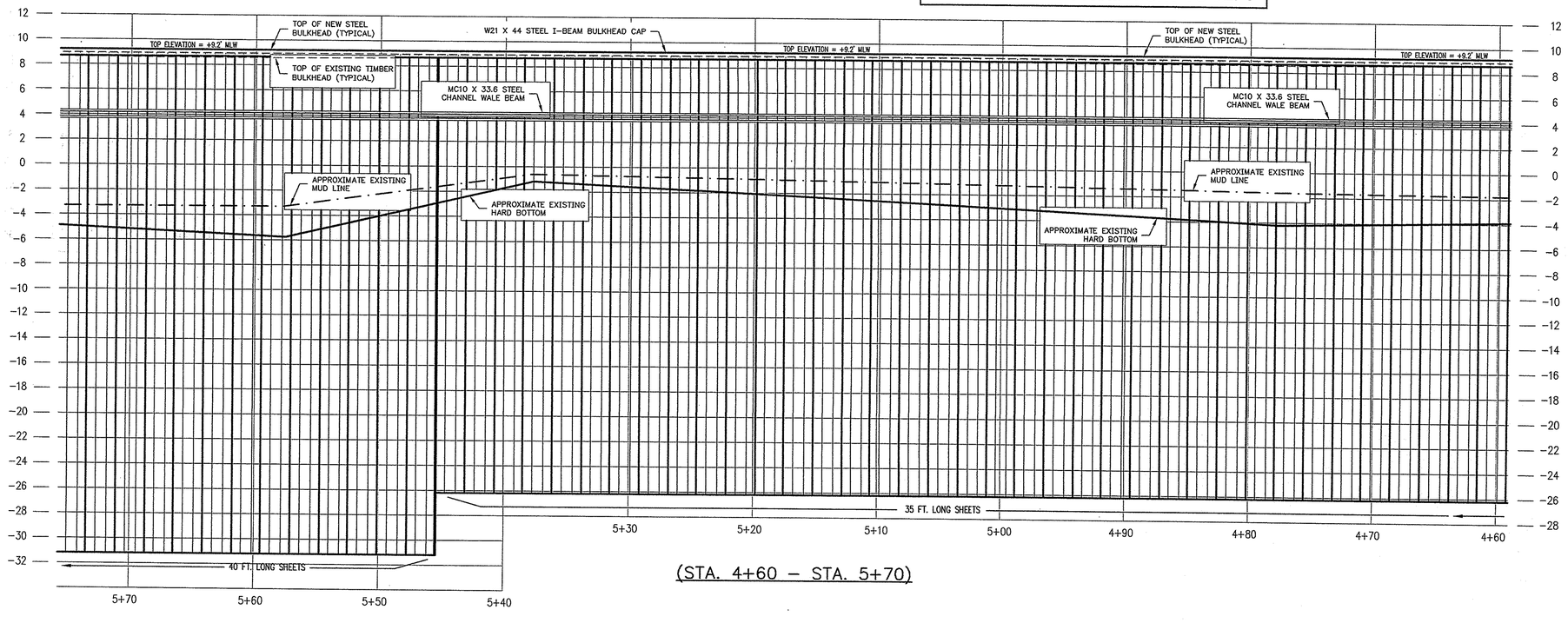
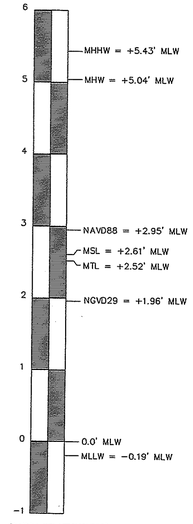
PROFILES READ FROM RIGHT TO LEFT



(STA. 4+60 – STA. 5+70)



(DATUM RELATIONSHIPS)

VERTICAL TIDE RANGE SCALE

VERTICAL DATUM NOTE:
ALL ELEVATIONS AND CONTOURS ON THESE DRAWINGS ARE REFERENCED TO MEAN LOW WATER (MLW) VERTICAL DATUM.

NEW BULKHEAD PROFILE (STA. 3+49.5 – STA. 5+70)

SCALE: 1" = 5'

GRAPHIC SCALE 1" = 5'

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DRAWING TITLE:
NEW BULKHEAD PROFILE (STA. 3+49.5 – STA. 5+70)
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: 10FI MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020

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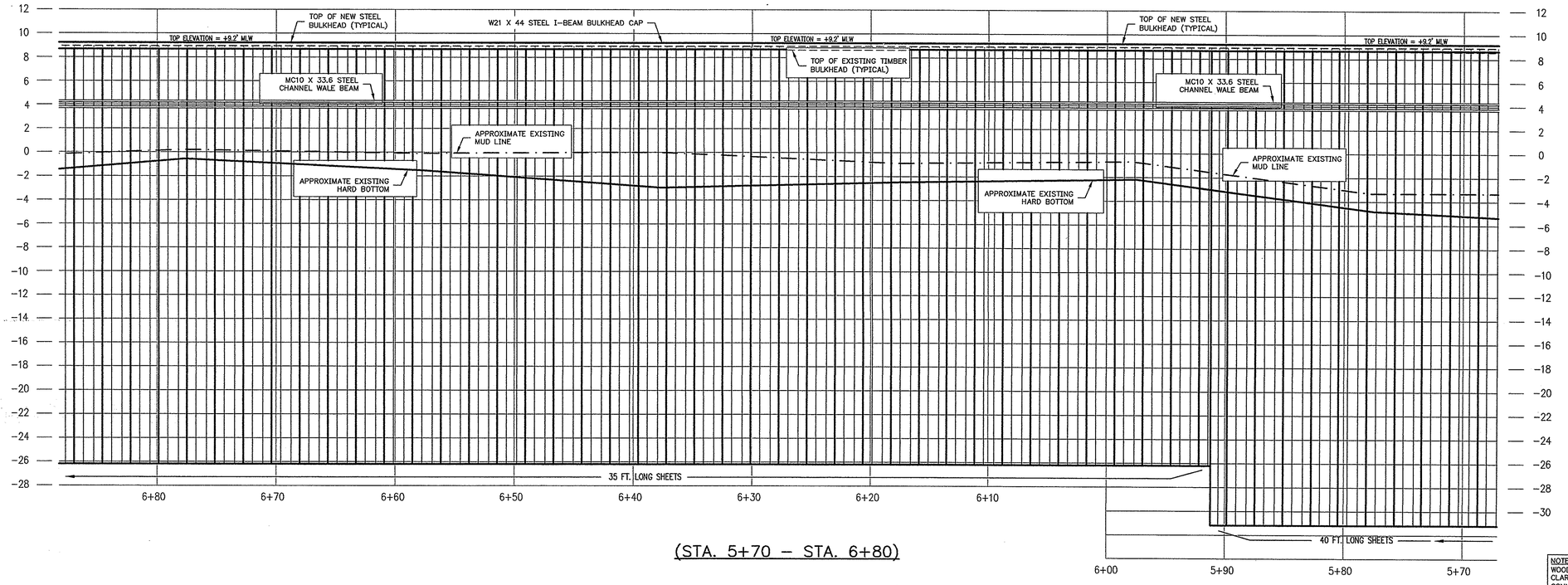
PROFILES READ FROM RIGHT TO LEFT



(STA. 5+70 – STA. 6+80)

COAL–TAR EPOXY COATING NOTE:

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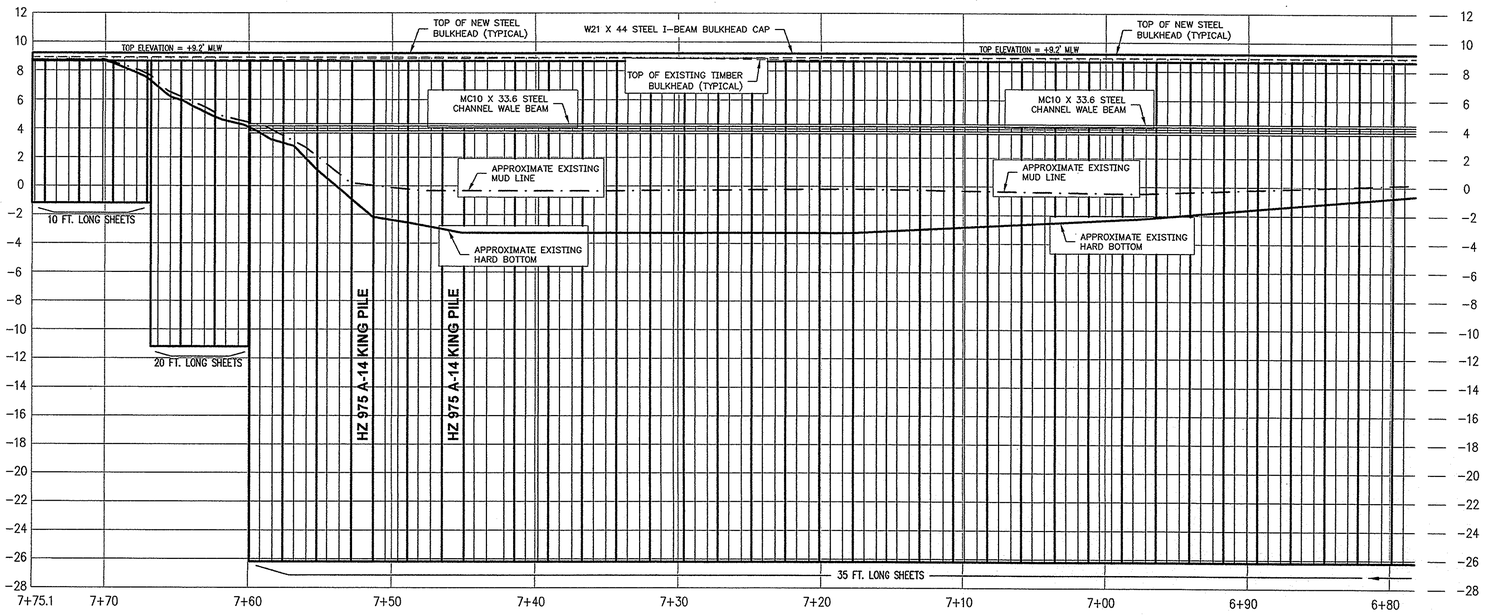
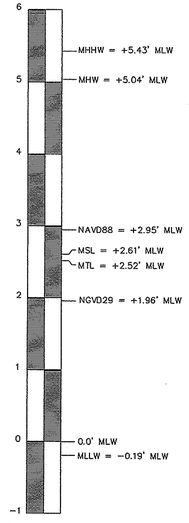
WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY NOT SHOWN FOR CLARITY. REFER TO SHEET C11 FOR TYPICAL SECTION, ELEVATION, AND CONNECTION DETAILS ON WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY ALONG THE TOP OF THE NEW BULKHEAD.

PROFILES READ FROM RIGHT TO LEFT



(STA. 6+80 – STA. 7+75.1)



(DATUM RELATIONSHIPS)

VERTICAL TIDE RANGE SCALE

VERTICAL DATUM NOTE:
ALL ELEVATIONS AND CONTOURS ON THESE DRAWINGS ARE REFERENCED TO MEAN LOW WATER (MLW) VERTICAL DATUM.

NEW BULKHEAD PROFILE (STA. 5+70 – STA. 7+75.1)

SCALE: 1" = 5'

GRAPHIC SCALE 1" = 5'

NO.	DATE	REVISION
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DRAWING TITLE:

NEW BULKHEAD PROFILE (STA. 5+70 – STA. 7+75.1)
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

Jon Guerry Taylor & Associates, Inc.
ENGINEERS, PLANNERS, and ENVIRONMENTAL CONSULTANTS
P.O. BOX 1082; MOUNT PLEASANT, SOUTH CAROLINA 29465
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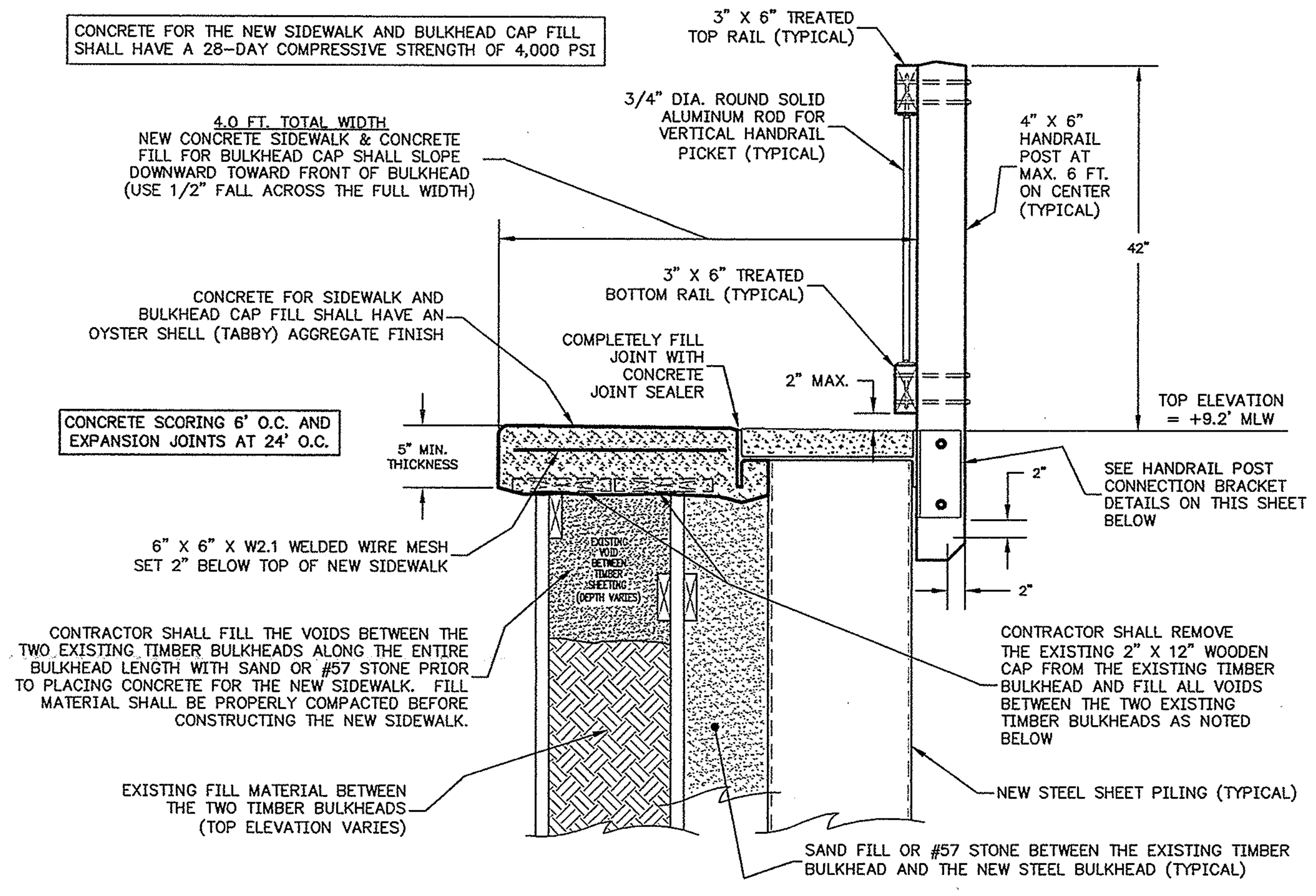
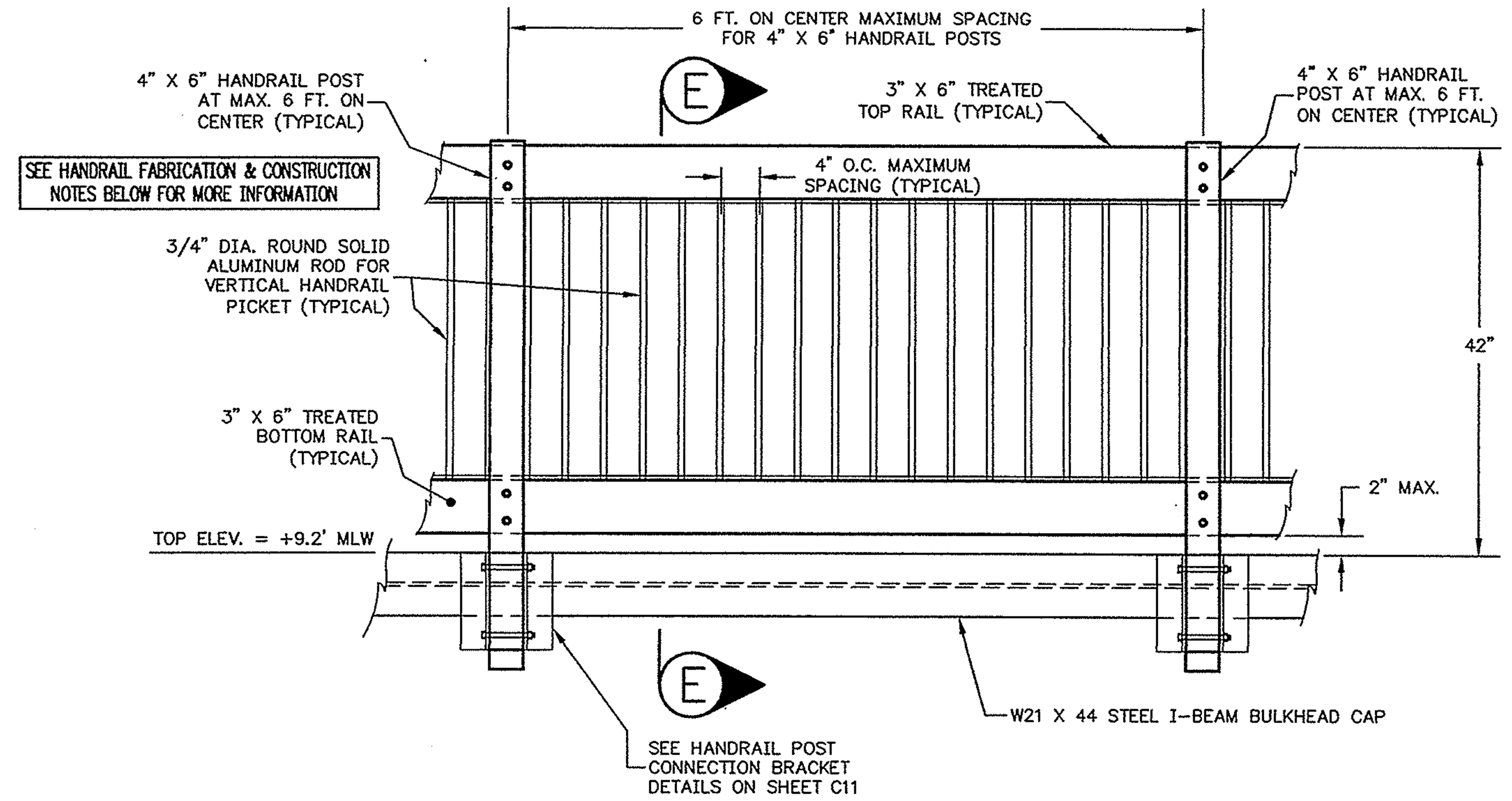
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

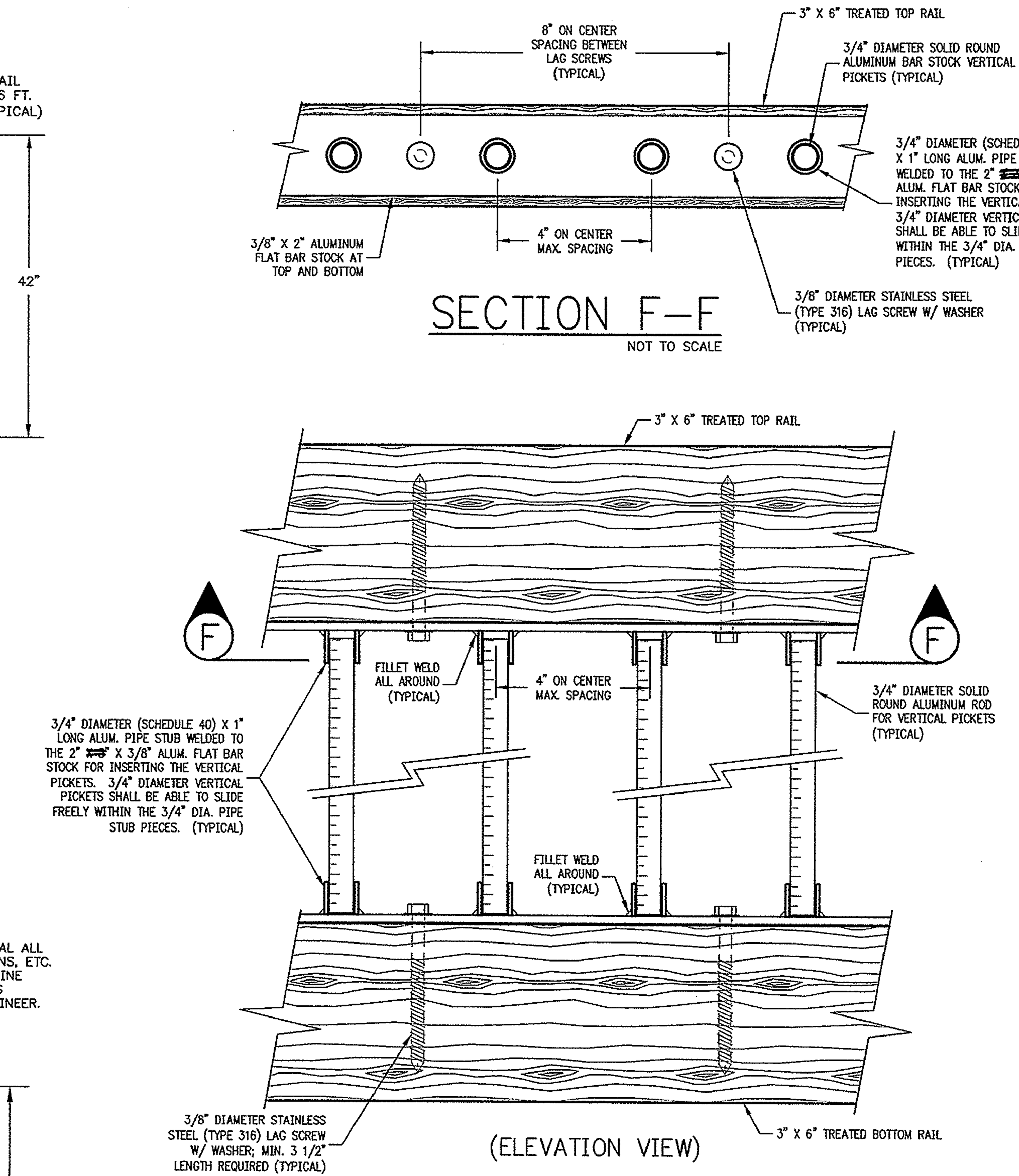
DESIGNED:	MWK
DRAWN:	MWK
APPROVED:	CWM
SCALE:	AS SHOWN
FILE:	10P_MARINA BULKHEAD D-BASE
DATE:	07-24-08
PROJ. NO.:	05-020



HANDRAIL AND WALKWAY TYPICAL SECTION
NOT TO SCALE

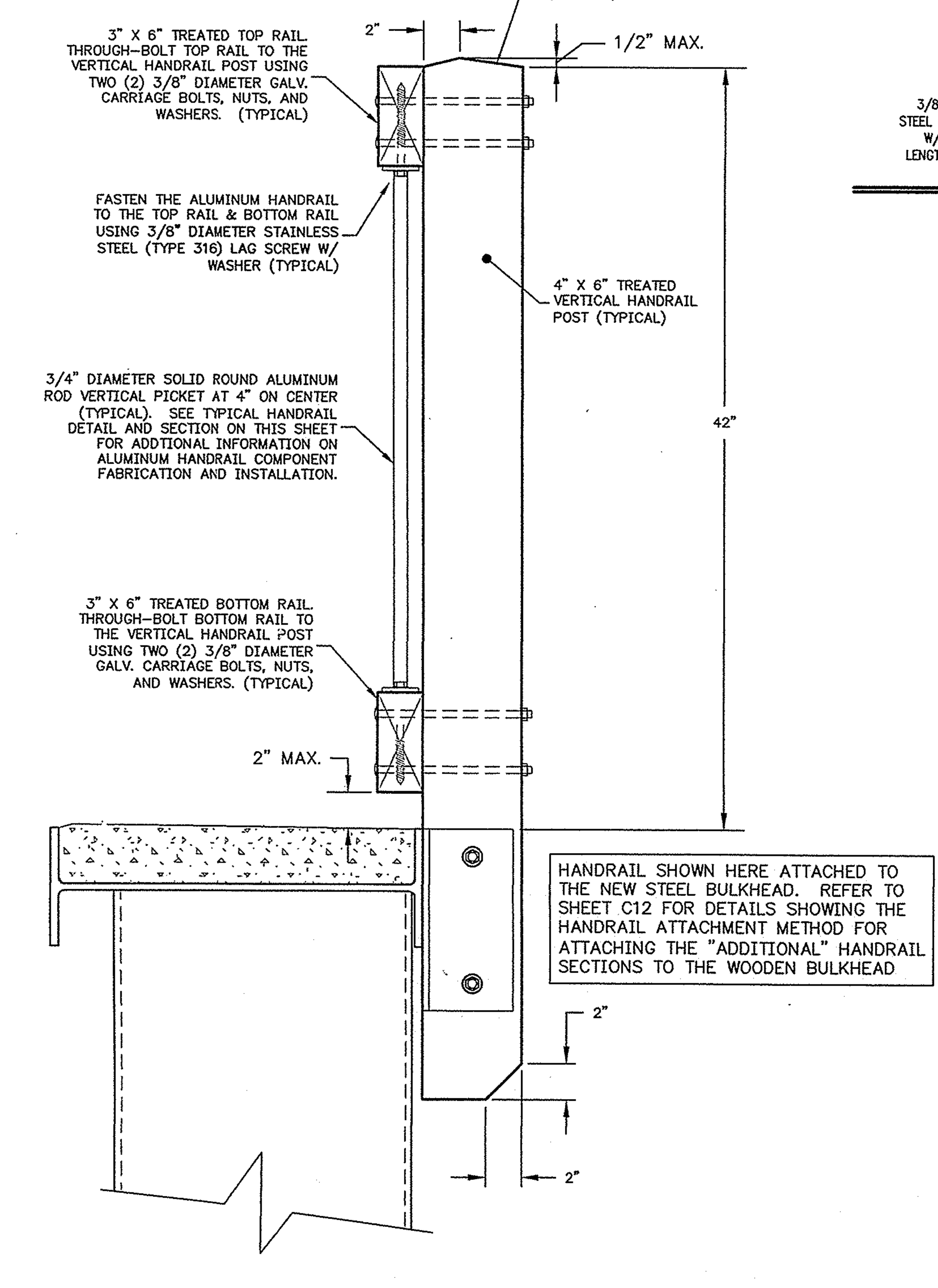


TYPICAL HANDRAIL ELEVATION VIEW
NOT TO SCALE

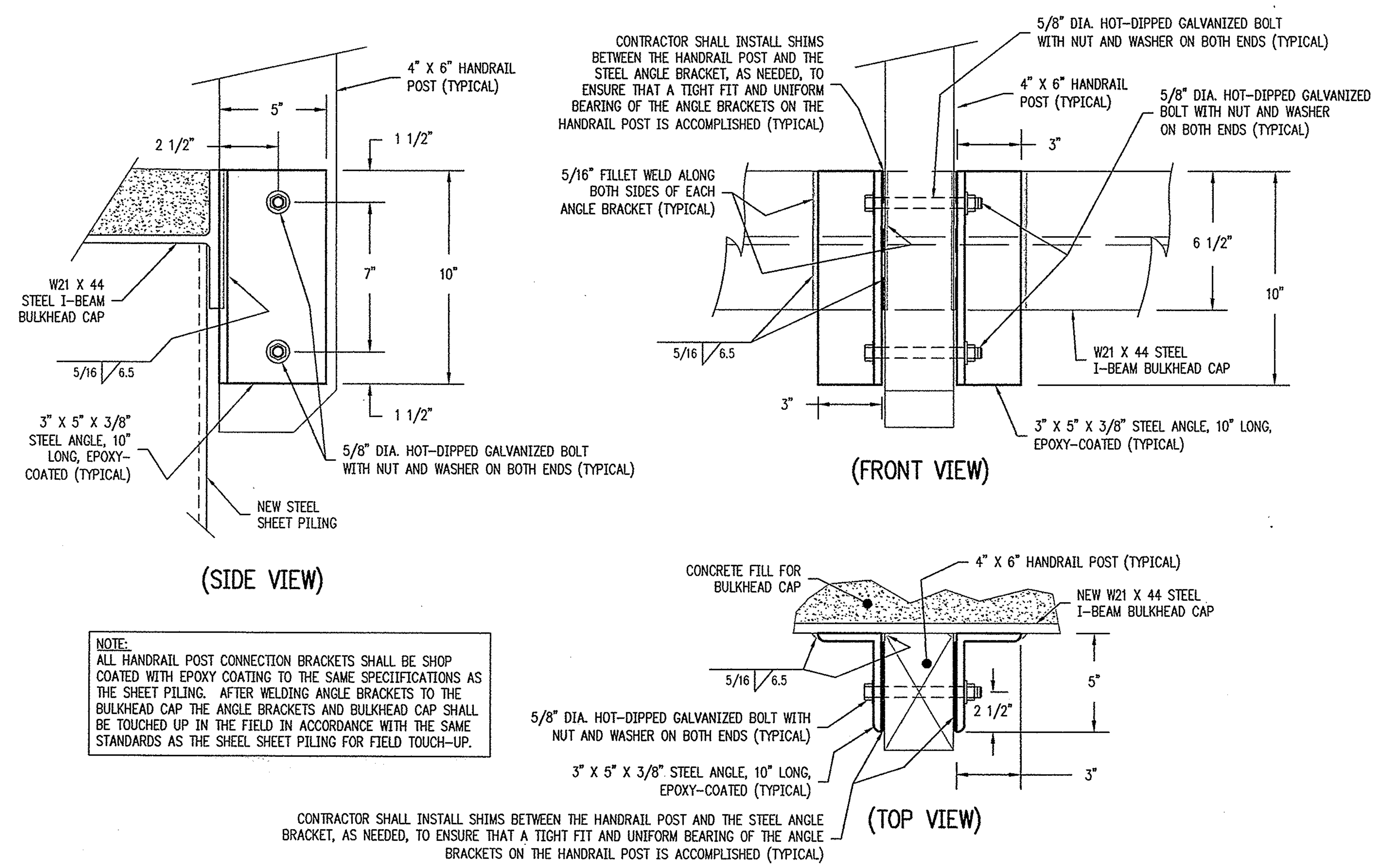


TYPICAL HANDRAIL DETAIL
NOT TO SCALE

TYPICAL HANDRAIL SECTIONS, ELEVATIONS, AND DETAILS SHOWN ON THIS SHEET ARE THE SAME AS FOR THE "ADDITIONAL" HANDRAIL SECTIONS THAT WILL BE INSTALLED ON THE TIMBER BULKHEAD AS SHOWN ON SHEET C12.



SECTION E–E
NOT TO SCALE



NEW WOODEN HANDRAIL POST CONNECTION BRACKET
NOT TO SCALE

WOODEN/ALUMINUM HANDRAIL FABRICATION & CONSTRUCTION NOTES:

1. CONTRACTOR TO CULL DOWNGRADES AND UNSUITABLE LUMBER ON DELIVERY – NO WANE ALLOWED.

2. ALL CUTS, HOLES, AND ABRASIONS ON THE SURFACE OF ANY LUMBER USED FOR HANDRAIL CONSTRUCTION SHALL BE FIELD-TREATED WITH COP-R-TOX (COPPER NAPTHENATE), OR OTHER ONLY AS APPROVED BY THE ENGINEER. FIELD TREATMENT SHALL COMPLY WITH REQUIREMENTS OF AWPA STANDARD P-8, AND M4-99 (OR LATEST ISSUE).

3. ALL TREATED WOOD PRODUCTS SHALL BE HANDLED AND FIELD-FABRICATED IN ACCORDANCE WITH AWPA STANDARD M4-99 (OR LATEST ISSUE) FOR THE CARE OF PRESERVATIVE TREATED WOOD PRODUCTS.

4. ALL LUMBER USED IN HANDRAIL CONSTRUCTION SHALL BEAR THE QUALITY MARK OF AN APPROVED AGENCY ("SPIB", OR "TP") IN ACCORDANCE WITH THE SPECIFIED STANDARDS.

5. CONTRACTOR TO PROVIDE TREATMENT CERTIFICATION ON EACH SIZE AND LOAD. TREATER TO BE CERTIFIED IN ACCORDANCE WITH STANDARDS OF AWPA LATEST ISSUE.

6. ALL LUMBER USED FOR HANDRAIL CONSTRUCTION AND FOR TIMBER BULKHEAD CAP REPLACEMENT (AS SHOWN ON SHEET C-12) SHALL BE NO. 1 GRADE AND SHALL BE TREATED TO 0.10 PCF-CA (COPPER AZOLE), OR 0.25 PCF-ACQ (ALKALINE COPPER QUAT).

7. 4" X 6" HANDRAIL POSTS SHALL BE BOLTED TO ANGLE BRACKETS USING TWO (2) 5/8" DIAMETER HOT-DIPPED GALVANIZED (HDG) BOLTS W/ NUT AND WASHERS AT BOTH ENDS. TWO (2) BOLTS ON EACH POST. INSTALL SPACER SHIMS THAT ARE THE SAME SIZE AS THE BEARING SURFACE OF THE HANDRAIL POST AGAINST THE STEEL ANGLE BRACKETS (IF NEEDED) TO ENSURE THAT A TIGHT BEARING FIT IS ACHIEVED BETWEEN THE HANDRAIL POST AND THE STEEL ANGLE MOUNTING BRACKET. SPACER SHIMS, IF NEEDED, SHALL BE OF A NON-CORRODING MATERIAL, THAT WILL NOT DECAY OR DETERIORATE.

8. 3" X 6" HANDRAIL TOP RAIL AND BOTTOM RAIL SHALL BE BOLTED TO THE HANDRAIL POSTS USING TWO (2) 3/8" DIA. GALVANIZED CARRIAGE BOLTS WITH NUT AND WASHERS AT EACH HANDRAIL POST. AT SPLICE JOINTS, THE TOP AND BOTTOM RAILS SHALL BE MITERED 45 DEGREES AND TWO (2) CARRIAGE BOLTS IN EACH END OF THE SPLICED RAIL BOARDS.

9. NAIL GUNS NOT ALLOWED IN HANDRAIL CONSTRUCTION.

10. ALL LUMBER FOR HANDRAIL CONSTRUCTION SHALL BE S4S, (SURFACED FOUR SIDES) AND SHALL HAVE MOISTURE CONTENT NOT MORE THAN 19%.

11. ALL FASTENERS SHALL BE OF THE SIZE AND TYPE SHOWN ON THESE PLANS. ALL GALVANIZED FASTENERS, BOLTS, NUTS, WASHERS, SCREWS, AND NAILS SHALL BE HOT-DIPPED GALVANIZED TO MEET THE REQUIREMENTS OF ASTM A153. ALL STAINLESS STEEL BOLTS, NUTS, WASHERS, SCREWS, AND NAILS SHALL BE STAINLESS STEEL TYPE 316.

12. ALL MISCELLANEOUS HARDWARE FOR WOODEN AND ALUMINUM HANDRAIL COMPONENT INSTALLATION SHALL BE PROVIDED BY THE CONTRACTOR AND SHALL BE HOT-DIPPED GALVANIZED OR STAINLESS STEEL TYPE 316 AS INDICATED ON THE DRAWINGS. CONTRACTOR SHALL ENSURE THAT ALL HANDRAIL COMPONENTS ARE PROPERLY INSTALLED TO ENSURE THAT THE ALUMINUM PICKETS AND ALL OTHER ALUMINUM COMPONENTS ARE SECURELY FASTENED IN THE HANDRAIL SYSTEM.

13. VERTICAL ALUMINUM HANDRAIL PICKETS SHALL BE SPACED AT 4" ON CENTER (MAXIMUM). CONTRACTOR SHALL ENSURE DURING CONSTRUCTION/INSTALLATION THAT THE CLEAR SPACING BETWEEN THE HANDRAIL PICKETS IS NOT GREATER THAN 3 1/2".

14. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT THE HANDRAILS ARE FABRICATED AND INSTALLED AS SHOWN ON THESE PLANS.

15. CONTRACTOR SHALL MAKE SURE THAT CORNERS AND OTHER TRANSITIONS ARE CONFIGURED SO THAT THE CLEAR SPACE BETWEEN ADJACENT ALUM. VERTICAL RAILS OR RAIL POSTS WILL NOT ALLOW A 4" SPHERE TO PASS THROUGH.

16. IT IS RECOMMENDED THAT THE ALUMINUM RAILING SECTIONS SHOULD BE FABRICATED WITH EXTRA LENGTH TO ALLOW FOR FIELD-ADJUSTMENTS THAT MAY BE NECESSARY DUE TO POSSIBLE VARIATIONS IN ACTUAL CONSTRUCTED DIMENSIONS OF THE HANDRAIL SYSTEM. ALUMINUM RAILING SECTIONS MAY BE TRIMMED TO FIT ON SITE AS NEEDED DURING INSTALLATION.

17. CONTRACTOR SHALL SUBMIT INFORMATION ON THE INTENDED ALUMINUM RAILING/BALUSTER FABRICATOR TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION. SHOP DRAWINGS FOR THE ALUMINUM RAILINGS SHALL ALSO BE REQUIRED.

18. ALL ALUMINUM USED IN HANDRAIL COMPONENT FABRICATION SHALL BE ALLOY TYPE 6061-T6. ALUMINUM SHALL BE EXTRUDED IN ACCORDANCE WITH APPLICABLE SECTIONS OF FEDERAL SPECIFICATION QQ-A-200.

19. CONTRACTOR SHALL BE RESPPONSIBLE FOR ENSURING THAT ONLY 316 STAINLESS STEEL SHALL BE ALLOWED TO COME IN CONTACT WITH THE ALUMINUM HANDRAIL COMPONENTS.

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DRAWING TITLE:
HANDRAIL DETAILS AND NOTES
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

Jon Guerry Taylor & Associates, Inc.
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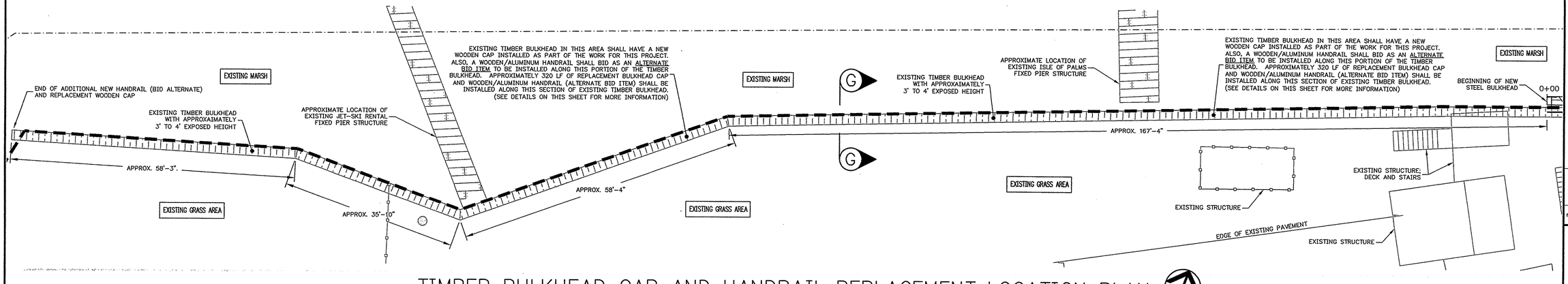
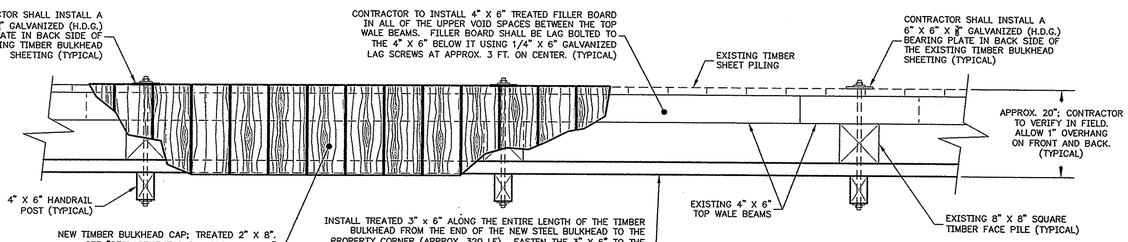
DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: IOP MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020



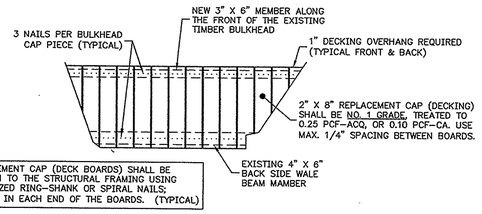
TIMBER BULKHEAD CAP AND HANDRAIL REPLACEMENT LOCATION PLAN

SCALE: 1" = 10'



SEE HANDRAIL FABRICATION & CONSTRUCTION NOTES ON SHEET C11 FOR MORE INFORMATION

ADDITIONAL HANDRAIL – ALTERNATE BID ITEM NOTE:
THE ADDITIONAL HANDRAIL (APPROX. 320 LF) SHOWN HERE, THAT IS TO RUN ALONG THE TOP OF THE EXISTING TIMBER BULKHEAD FROM STA. 0+00 OF THE NEW BULKHEAD TO THE END OF THE PROPERTY, SHALL BE BID AS AN ALTERNATE BID ITEM. REFER TO "THE SCHEDULE OF PRICES" IN THE PROJECT MANUAL FOR LINE ITEM FOR THE ADDITIONAL HANDRAIL.

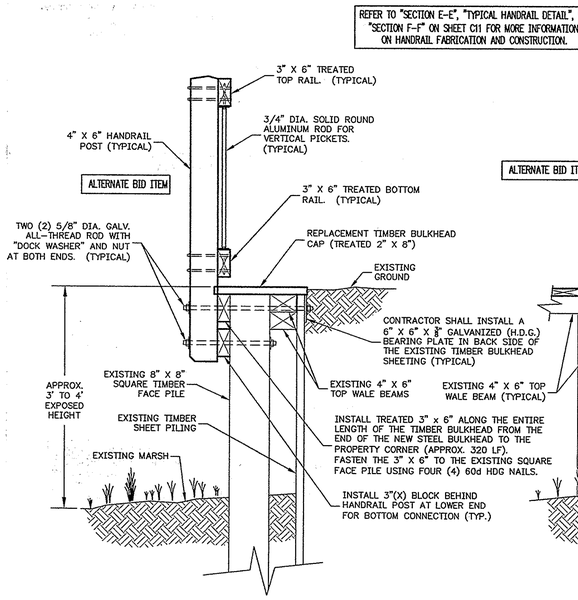


NEW REPLACEMENT CAP (DECK BOARDS) SHALL BE NAILED DOWN TO THE STRUCTURAL FRAMING USING 12d GALVANIZED RING-SHANK OR SPIRAL NAILS; THREE NAILS IN EACH END OF THE BOARDS. (TYPICAL)

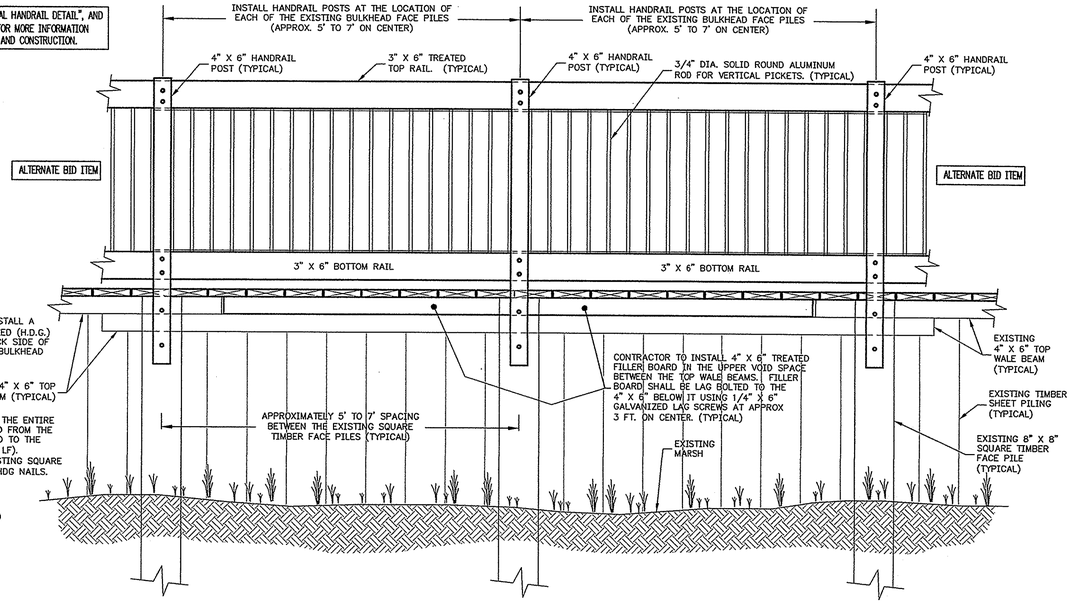
REPLACEMENT CAP NAILING DETAIL

NOT TO SCALE

REFER TO "SECTION E-E", "TYPICAL HANDRAIL DETAIL", AND "SECTION F-F" ON SHEET C11 FOR MORE INFORMATION ON HANDRAIL FABRICATION AND CONSTRUCTION.



SECTION G-G



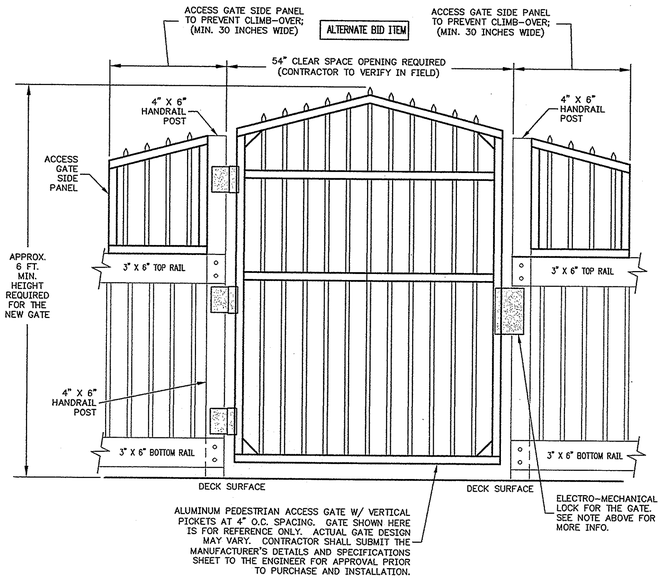
ELEVATION VIEW

TIMBER BULKHEAD CAP REPLACEMENT & HANDRAIL ATTACHMENT DETAILS

NOT TO SCALE

THE ADDITIONAL HANDRAIL SHOWN HERE (APPROX. 320 LF) SHALL BE BID AS AN ALTERNATE BID ITEM. SEE NOTE ABOVE.

THE NEW ALUMINUM GATE SHALL BE SELF-CLOSING AND SHALL BE EQUIPPED WITH AN ELECTRO-MECHANICAL LOCK. THE LOCKING SYSTEM SHALL HAVE A KEY PAD CONTROL ON BOTH SIDES OF THE GATE LOCK AND SHALL ALSO BE EQUIPPED WITH A REMOTE OPERATING CONTROL SWITCH. CONTRACTOR SHALL BE RESPONSIBLE FOR WIRING THE REMOTE GATE CONTROL TO THE INSIDE OF THE MORGAN CREEK GRILL RESTAURANT. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH MANUFACTURER SPECIFICATION SHEETS FOR THE GATE AND THE LOCK SYSTEM FOR APPROVAL PRIOR TO PURCHASE AND INSTALLATION.



ALUMINUM GATE DETAIL

NOT TO SCALE

ALUMINUM ACCESS GATE – ALTERNATE BID ITEM NOTE:
THE ALUMINUM PEDESTRIAN ACCESS GATE SHOWN HERE SHALL BE BID AS AN ALTERNATE BID ITEM. REFER TO "THE SCHEDULE OF PRICES" IN THE PROJECT MANUAL FOR LINE ITEM FOR THE ALUMINUM PEDESTRIAN ACCESS GATE.

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DRAWING TITLE:
TIMBER BULKHEAD CAP REPLACEMENT & HANDRAIL & ALUMINUM GATE DETAILS FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT LOCATED ON ISLE OF PALMS IN CHARLESTON COUNTY, SOUTH CAROLINA FOR THE CITY OF ISLE OF PALMS

Jon Guerry Taylor & Associates, Inc.
ENGINEERS, PLANNERS, and ENVIRONMENTAL CONSULTANTS
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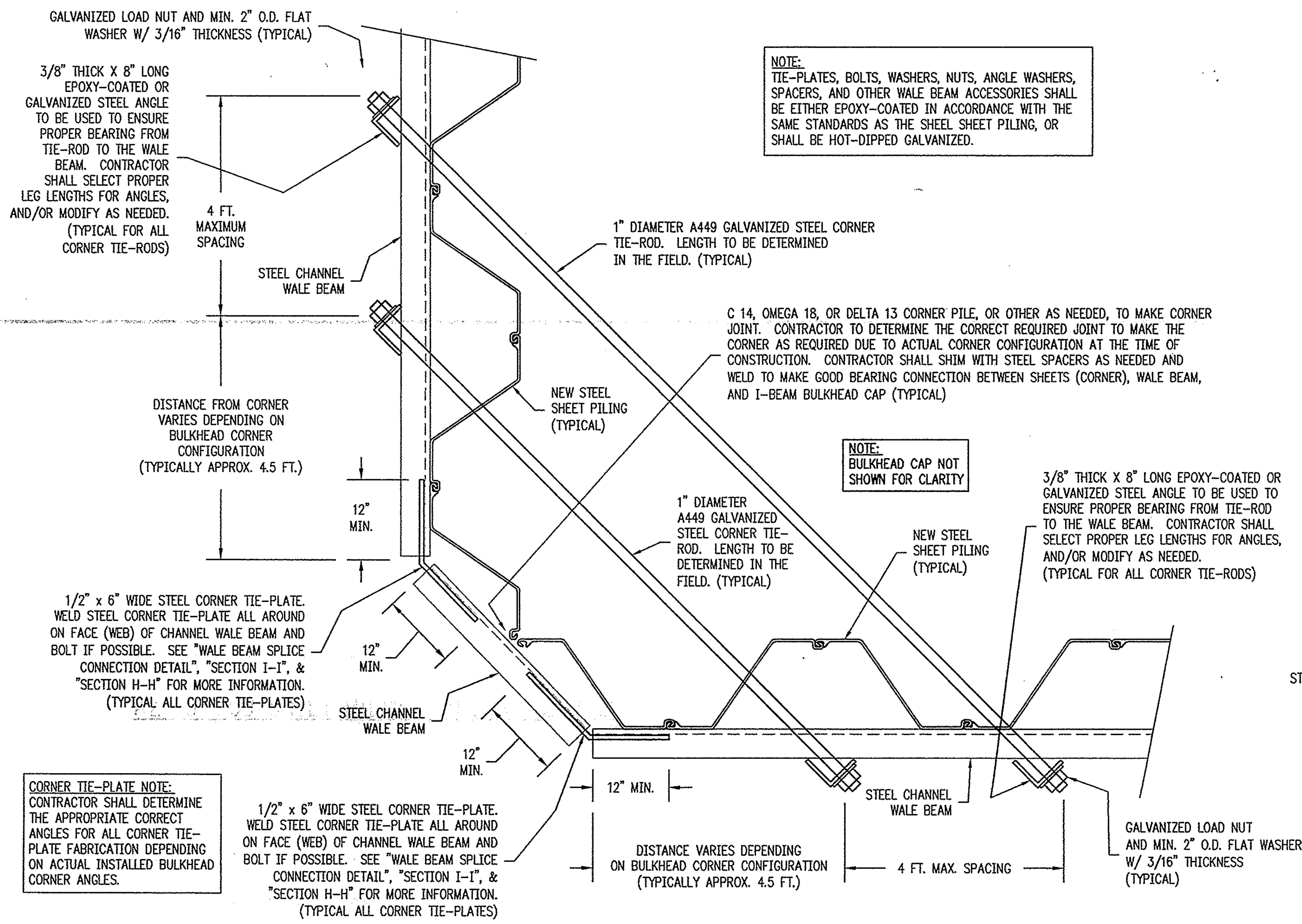
DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: 1.09 MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020

TYPICAL CORNER TIE-ROD & CORNER TIE-PLATE DETAIL

NTS



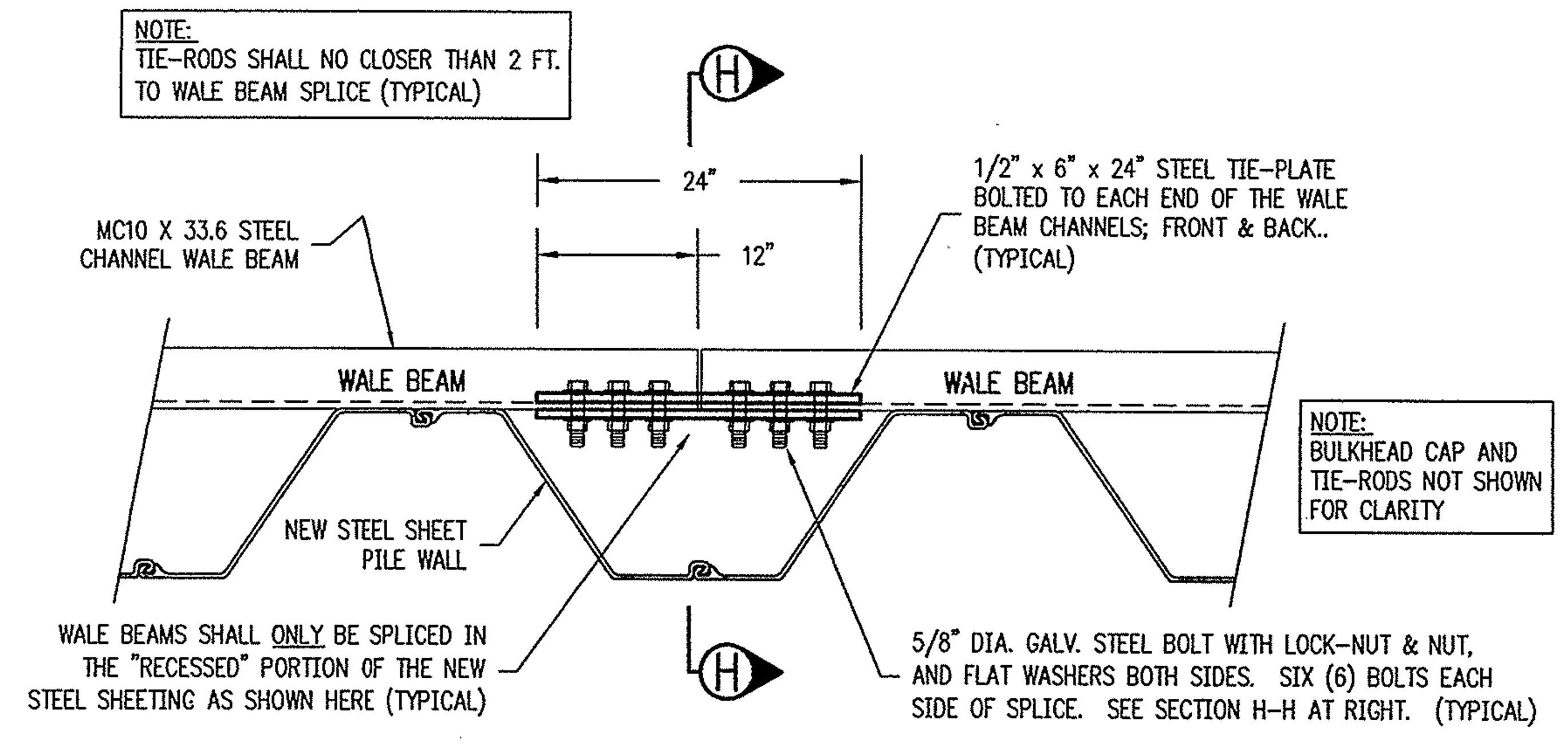
NOTE:
TIE-PLATES, BOLTS, WASHERS, NUTS, ANGLE WASHERS, SPACERS, AND OTHER WALE BEAM ACCESSORIES SHALL BE EITHER EPOXY-COATED IN ACCORDANCE WITH THE SAME STANDARDS AS THE STEEL SHEET PILING, OR SHALL BE HOT-DIPPED GALVANIZED.

CORNER TIE-PLATE NOTE:
CONTRACTOR SHALL DETERMINE THE APPROPRIATE CORRECT ANGLES FOR ALL CORNER TIE-PLATE FABRICATION DEPENDING ON ACTUAL INSTALLED BULKHEAD CORNER ANGLES.

(TYPICAL TIE-PLATE PLAN VIEW)
WALE BEAM SPLICE CONNECTION DETAIL

NTS

NOTE:
TIE-RODS SHALL NO CLOSER THAN 2 FT. TO WALE BEAM SPLICE (TYPICAL)

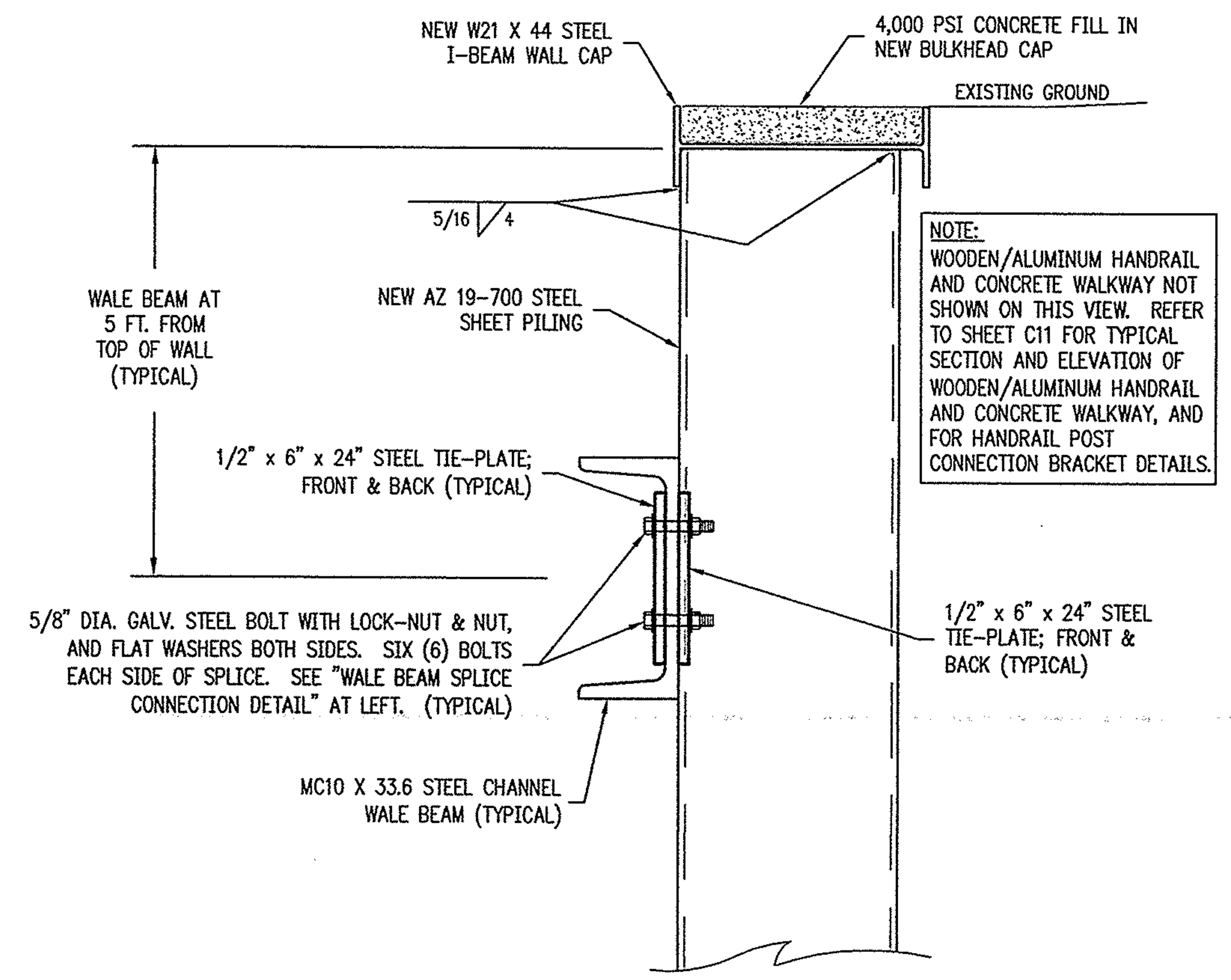


TIE-ROD NOTE:
TIE-RODS SHALL BE INSTALLED AT SPACINGS AS SPECIFIED ON THIS SHEET AND ON DRAWING SHEETS C3 AND C4. ALSO REFER TO THE TABLE FOR TIE-ROD SPACING AND INSTALLATION ANGLES ON SHEETS C3 & C4.

TIE-ROD SPACING MAY NEED TO BE VARIED SLIGHTLY DUE TO ACTUAL FIELD CONDITIONS ENCOUNTERED BUT IN NO CASE SHALL THE SPACING BE GREATER THAN WHAT IS SPECIFIED WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

SECTION H-H

NTS



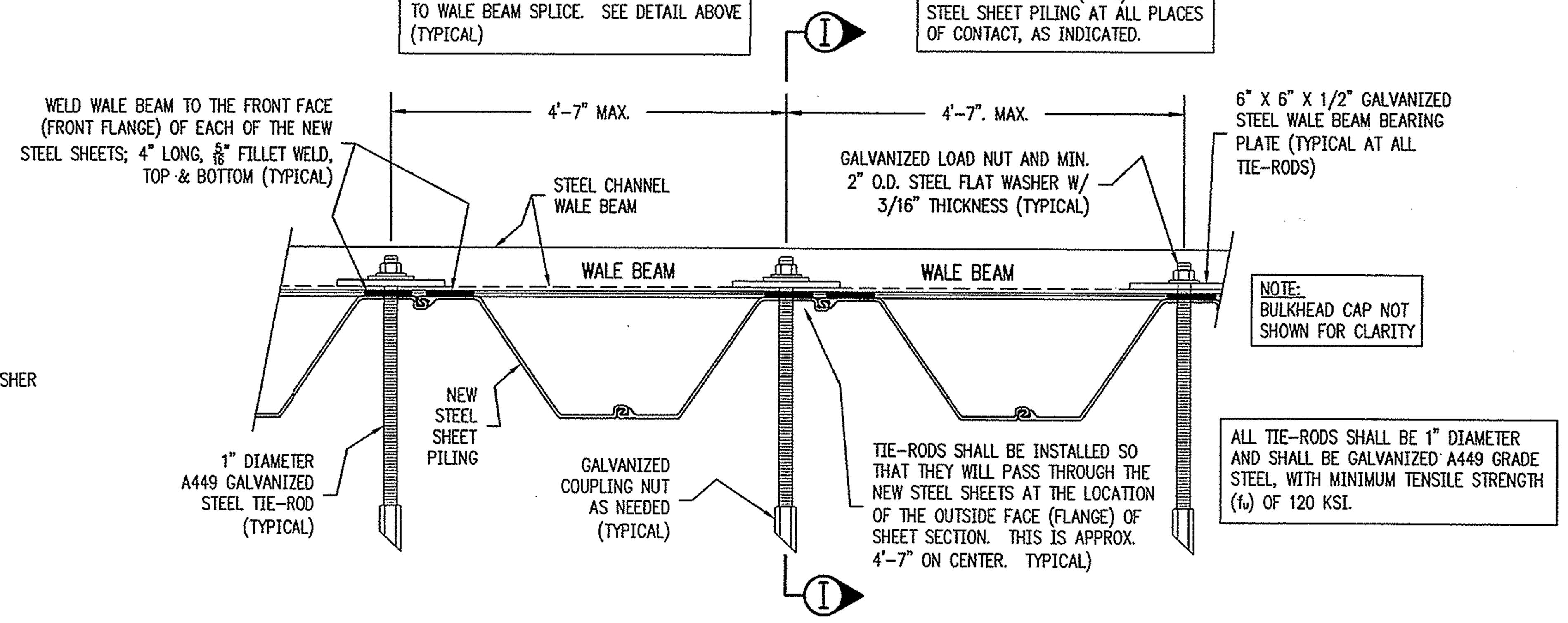
NOTE:
WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY NOT SHOWN ON THIS VIEW. REFER TO SHEET C11 FOR TYPICAL SECTION AND ELEVATION OF WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY, AND FOR HANDRAIL POST CONNECTION BRACKET DETAILS.

WALE BEAM AND TIE-ROD DETAIL

NTS

NOTE:
TIE-RODS SHALL NO CLOSER THAN 2 FT. TO WALE BEAM SPLICE. SEE DETAIL ABOVE (TYPICAL)

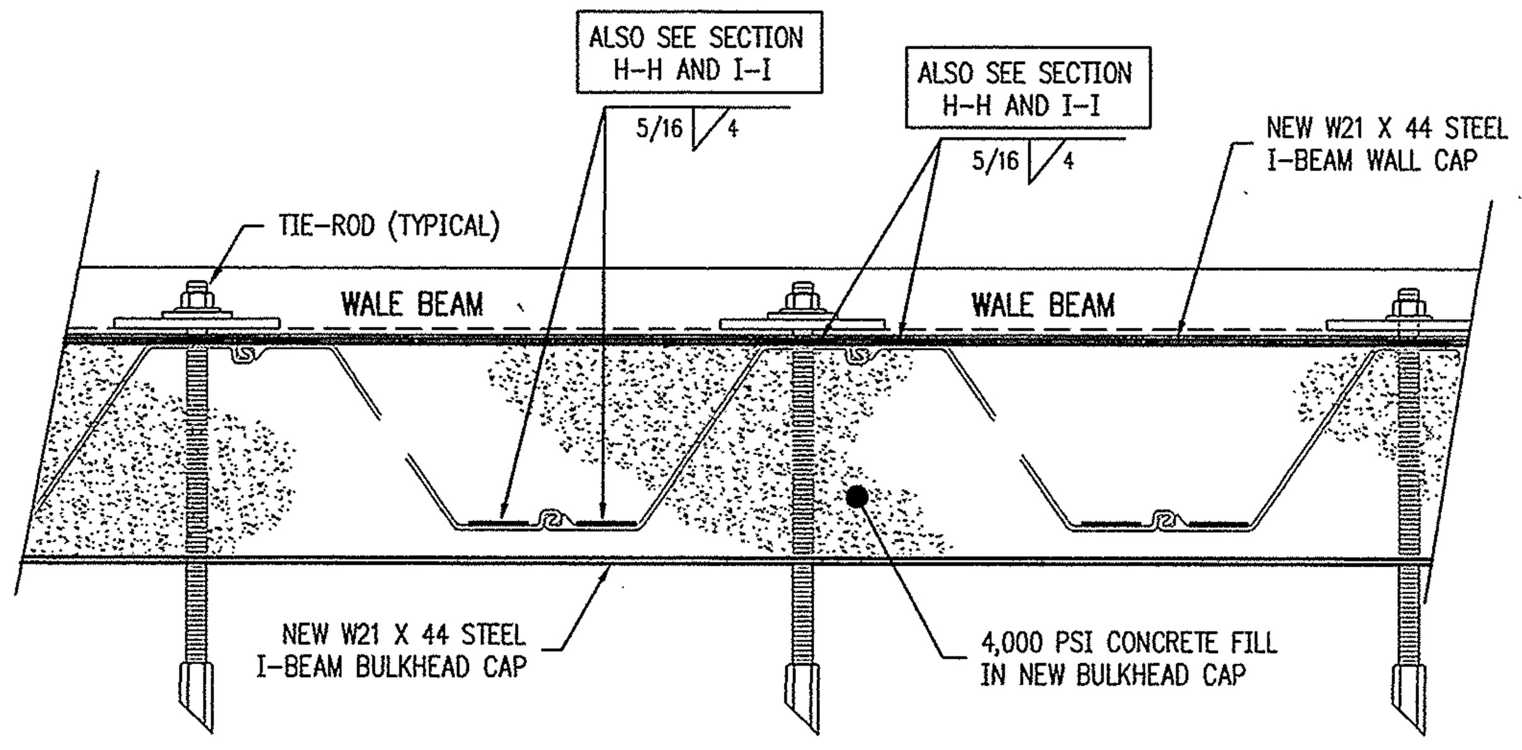
WALE BEAM SHALL BE WELDED TO THE FRONT FLANGE (FACE) OF THE STEEL SHEET PILING AT ALL PLACES OF CONTACT, AS INDICATED.



ALL TIE-RODS SHALL BE 1" DIAMETER AND SHALL BE GALVANIZED A449 GRADE STEEL, WITH MINIMUM TENSILE STRENGTH (6) OF 120 KSI.

NOTE:
WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY NOT SHOWN ON THIS VIEW. REFER TO SHEET C11 FOR TYPICAL SECTION AND ELEVATION OF WOODEN/ALUMINUM HANDRAIL AND CONCRETE WALKWAY, AND FOR HANDRAIL POST CONNECTION BRACKET DETAILS.

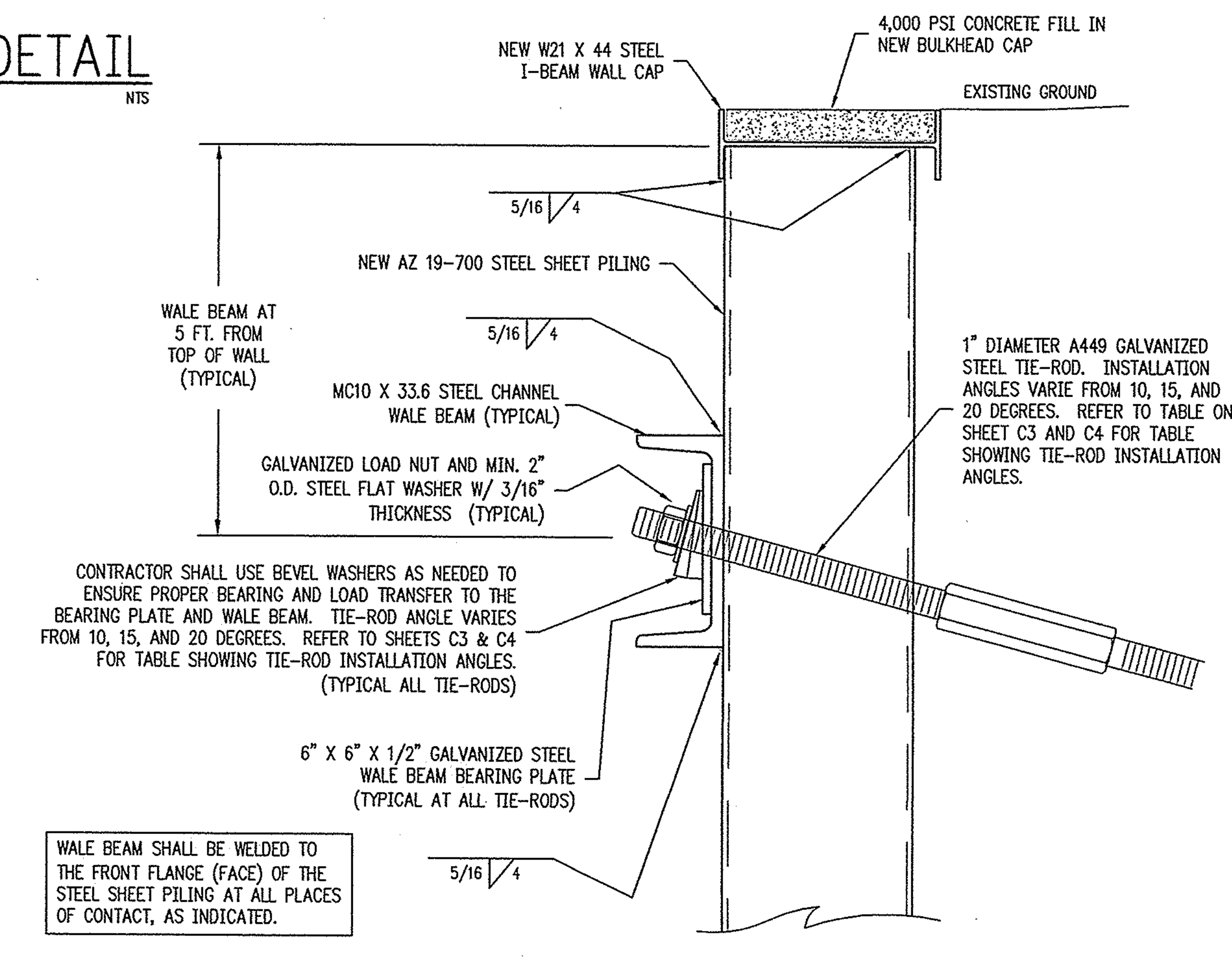
BULKHEAD CAP WELDING NOTE:
WELD THE BULKHEAD CAP TO THE TOP OF THE NEW SHEET PILING USING 4" LONG, 5/16" FILLET WELDS AT LOCATIONS AS SHOWN BELOW. FIELD TOUCH UP ALL DAMAGED AREAS WITH COAL TAR EPOXY AFTER WELDING.



BULKHEAD CAP AND WELDING DETAIL

NTS

COAL-TAR EPOXY COATING NOTE:
THE TOP 20 FT. OF ALL SHEETS (AND HZ PILES) SHALL BE SHOP-COATED WITH COAL-TAR EPOXY ON BOTH THE FRONT AND BACK OF ALL SHEETS. SHEETS (AND HZ PILES) THAT ARE 20 FT. LONG OR SHORTER SHALL BE COATED FOR THE ENTIRE LENGTH OF SHEET. REFER TO NOTES BELOW AND THE TECHNICAL SPECIFICATIONS FOR MORE INFORMATION ON THE EPOXY COATING AND THE SHOP COATING PROCESS.



WALE BEAM SHALL BE WELDED TO THE FRONT FLANGE (FACE) OF THE STEEL SHEET PILING AT ALL PLACES OF CONTACT, AS INDICATED.

SECTION I-I

NTS

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DRAWING TITLE:
BULKHEAD DETAILS
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

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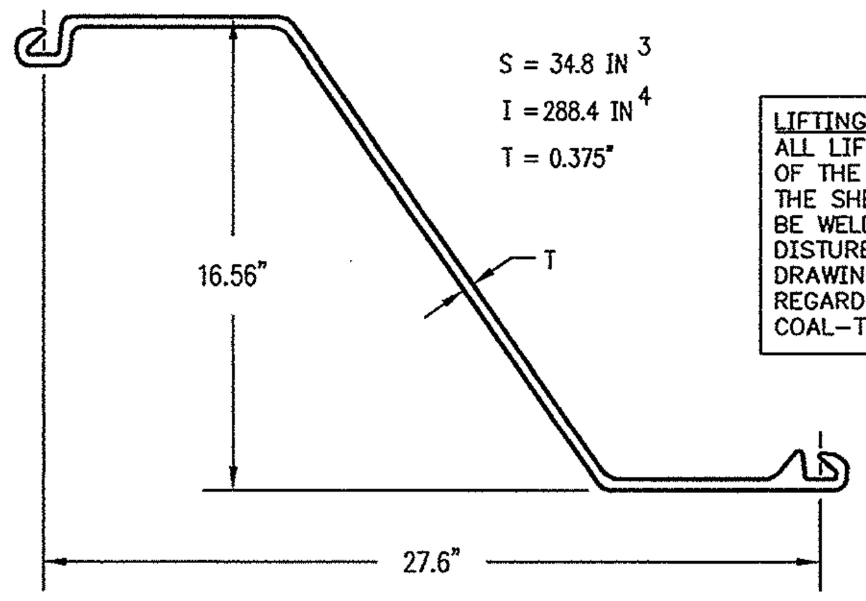
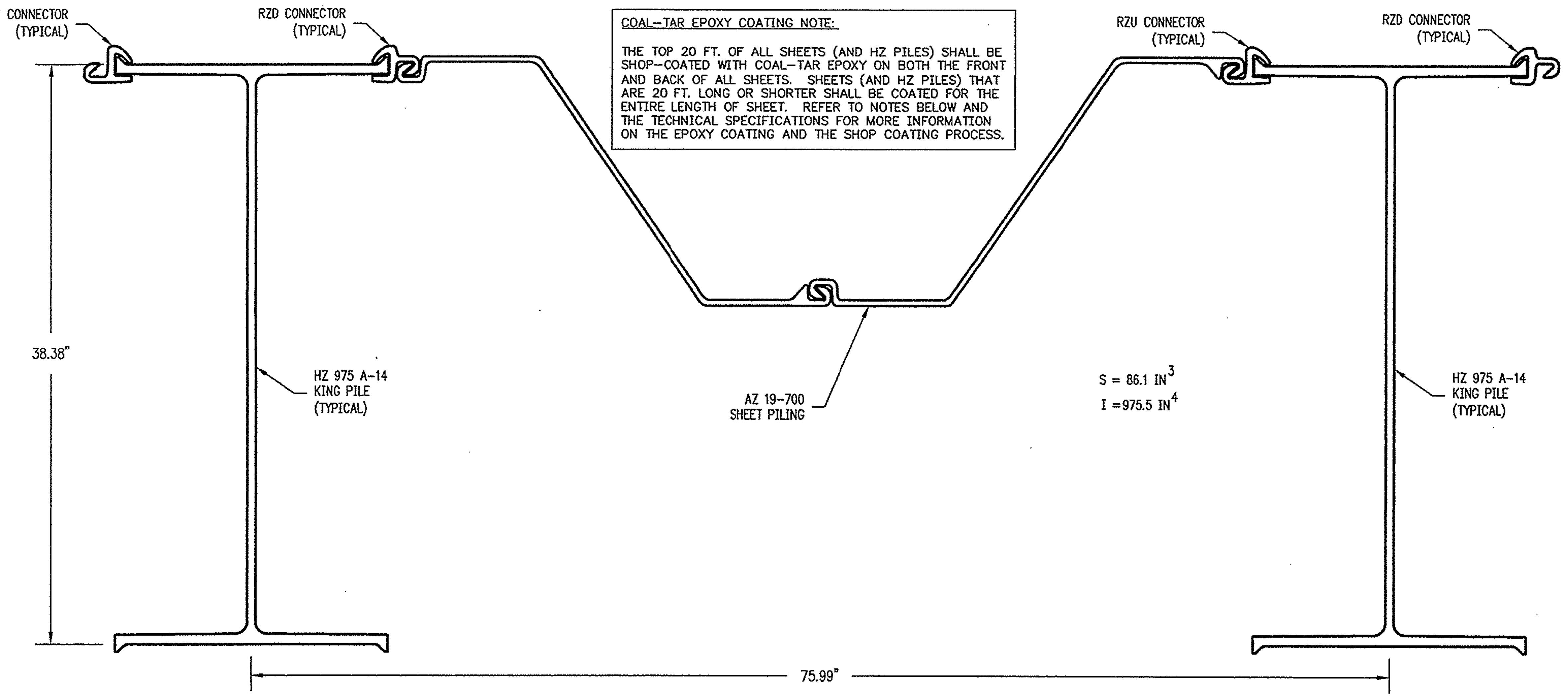
DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: I.O.P. MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020



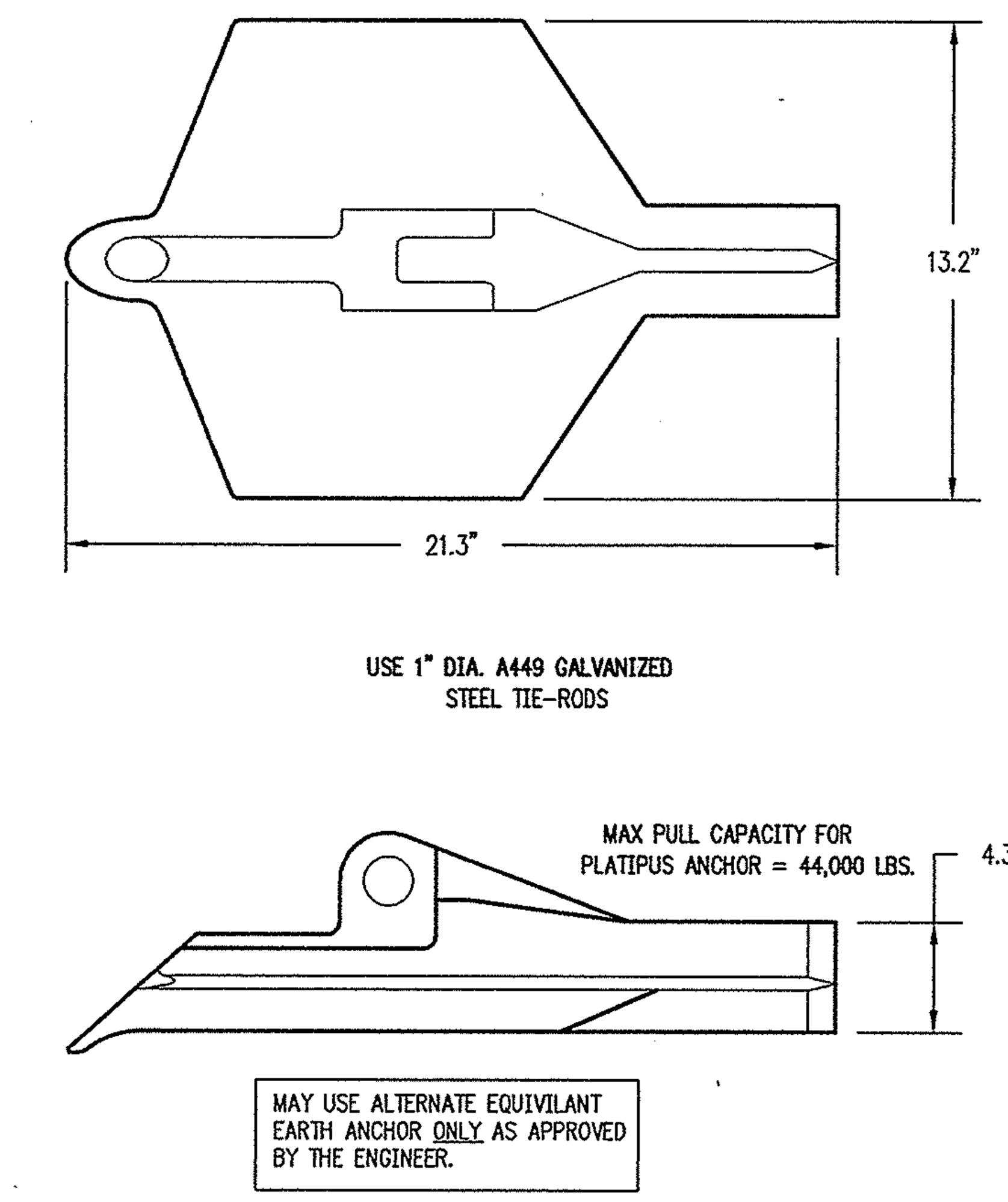
AZ 19–700 SHEET PILING TYPICAL SECTION
NTS

LIFTING HOLE NOTE:
ALL LIFTING HOLES SHALL BE PLUGGED WITH STEEL OF THE SAME GRADE AND THICKNESS AS THAT OF THE SHEET PILING. EACH PLUGGED HOLE SHALL BE WELDED ALL AROUND. FIELD-COAT ALL DISTURBED AREAS AS SPECIFIED IN NOTES ON DRAWINGS AND IN TECHNICAL SPECIFICATIONS REGARDING FIELD-COATING OR TOUCH-UP OF COAL-TAR EPOXY COATING.

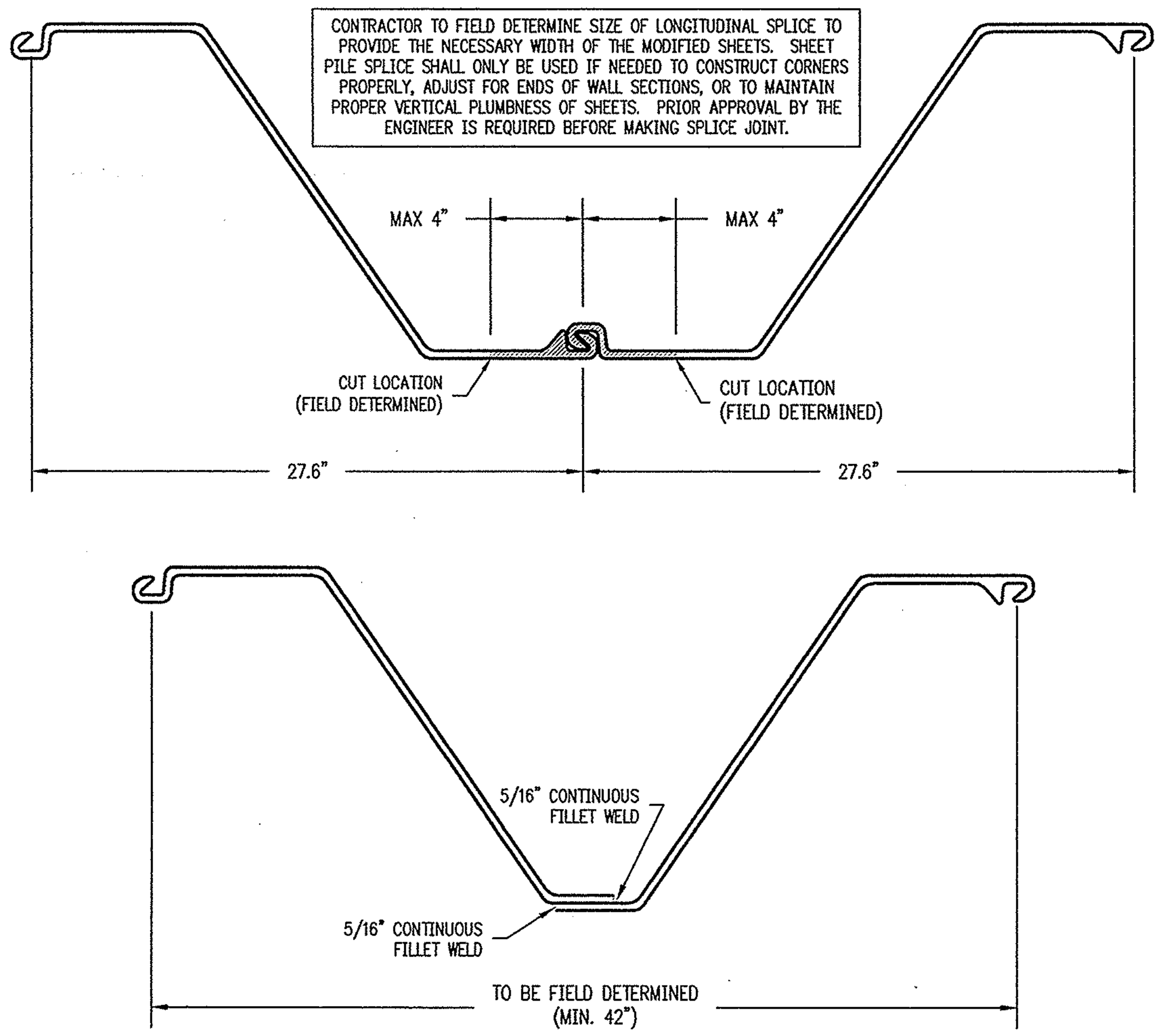
COAL-TAR EPOXY COATING NOTE:
THE TOP 20 FT. OF ALL SHEETS (AND HZ PILES) SHALL BE SHOP-COATED WITH COAL-TAR EPOXY ON BOTH THE FRONT AND BACK OF ALL SHEETS. SHEETS (AND HZ PILES) THAT ARE 20 FT. LONG OR SHORTER SHALL BE COATED FOR THE ENTIRE LENGTH OF SHEET. REFER TO NOTES BELOW AND THE TECHNICAL SPECIFICATIONS FOR MORE INFORMATION ON THE EPOXY COATING AND THE SHOP COATING PROCESS.



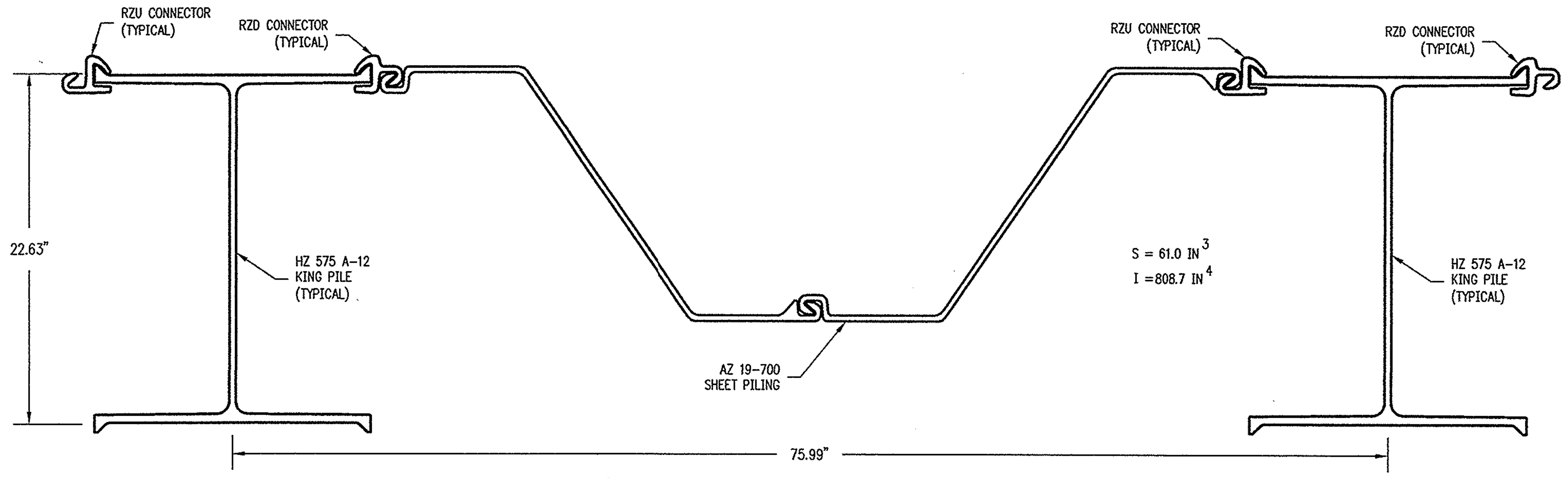
HZ 975 A–14 / AZ 19–700 COMBINED WALL SECTION – TYPICAL
NTS



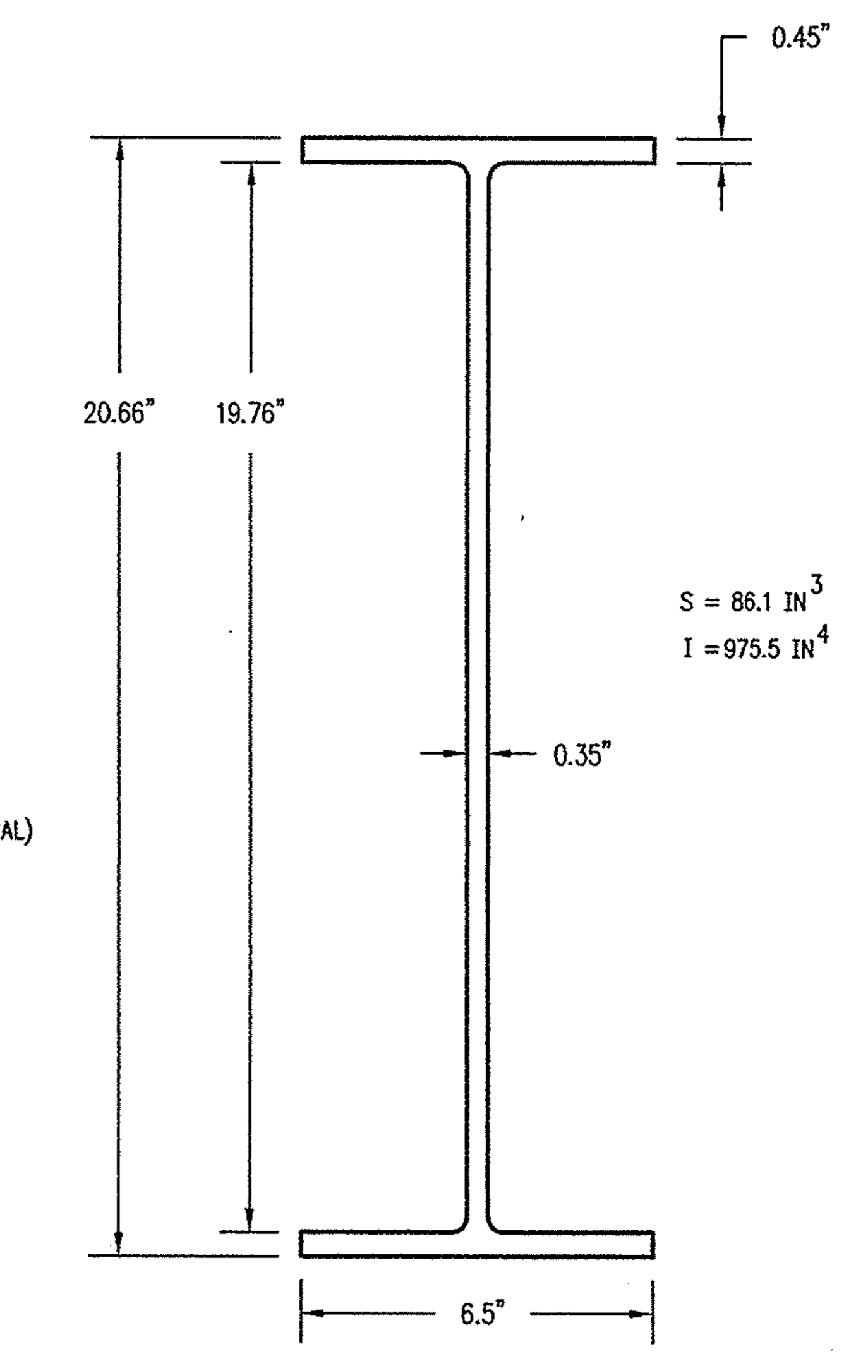
PLATIPUS B10T ANCHOR
NTS



LONGITUDINAL SHEET PILE SPLICE DETAIL
NTS

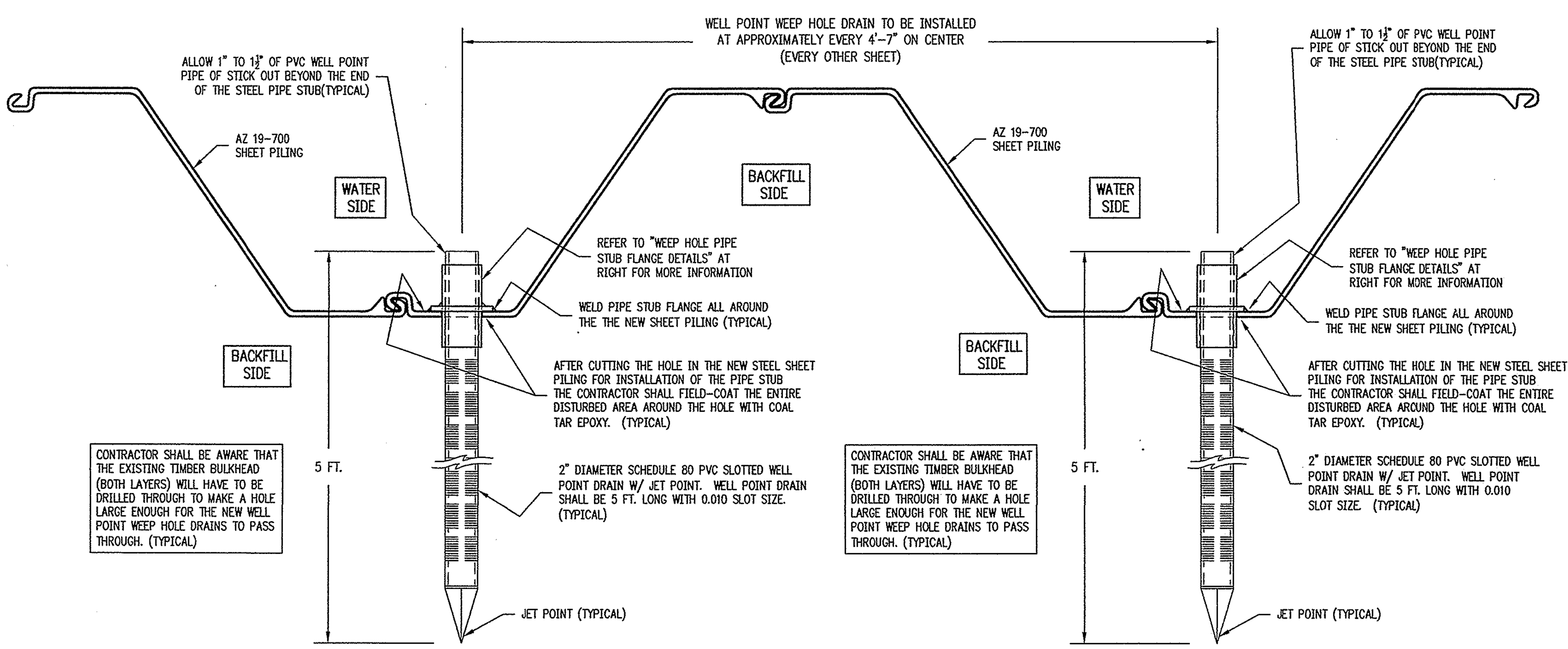


HZ 575 A–12 / AZ 19–700 COMBINED WALL SECTION – TYPICAL
NTS

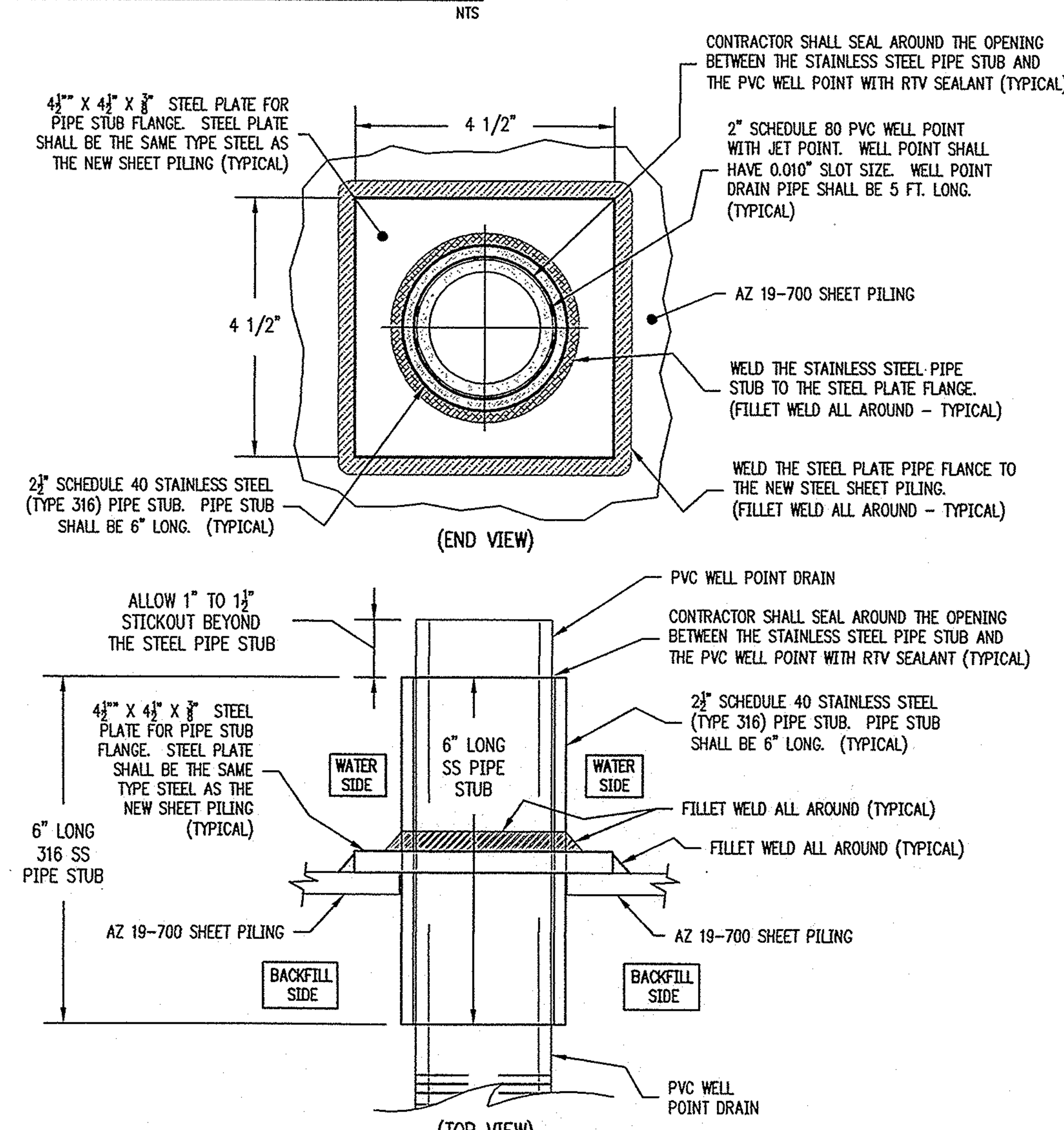


W21 X 44 BULKHEAD CAP – TYPICAL
NTS

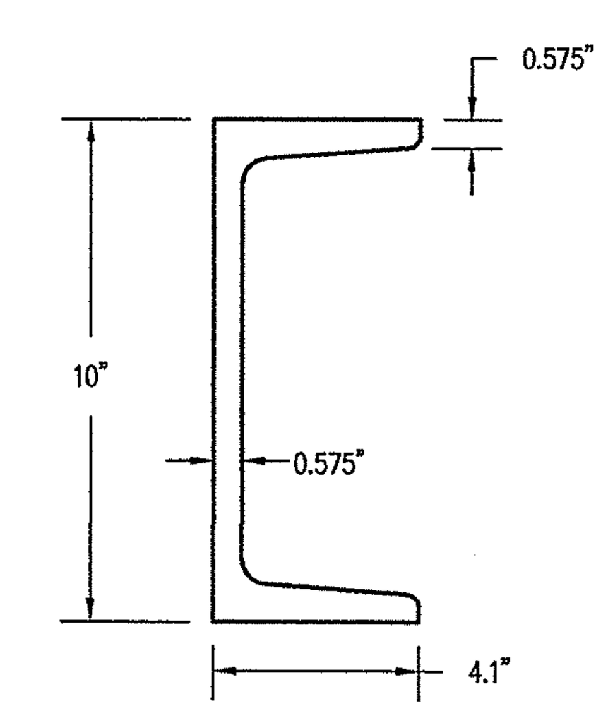
LIFTING HOLE NOTE:
ALL LIFTING HOLES SHALL BE PLUGGED WITH STEEL OF THE SAME GRADE AND THICKNESS AS THAT OF THE SHEET PILING. EACH PLUGGED HOLE SHALL BE WELDED ALL AROUND. FIELD-COAT ALL DISTURBED AREAS AS SPECIFIED IN NOTES ON DRAWINGS AND IN TECHNICAL SPECIFICATIONS REGARDING FIELD-COATING OR TOUCH-UP OF COAL TAR EPOXY COATING.



SLOTTED WELL POINT WEEP HOLE DRAIN DETAIL
NTS



WEEP HOLE PIPE STUB FLANGE DETAILS
NTS



MC10 X 33.6 CHANNEL FOR WALE BEAM – TYPICAL
NTS

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DRAWING TITLE:
BULKHEAD COMPONENT DETAILS
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 22003 CHRISTOPHER W. MOORE 7-23-08

SOUTH CAROLINA JON GUERRY TAYLOR & ASSOCIATES, INC No. 3671 CERTIFICATE OF AUTHORIZATION

Jon Guerry Taylor & Associates, Inc.
ENGINEERS, PLANNERS, and ENVIRONMENTAL CONSULTANTS
P.O. BOX 1082; MOUNT PLEASANT, SOUTH CAROLINA 29465
PHONE: 843.884.6415; FAX: 843.884.4026
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
FILE: I.O.P. MARINA BULKHEAD D-BASE
DATE: 07-24-08
PROJ. NO.: 05-020

REMOVE AND RECONNECT THE FOLLOWING UTILITIES:

LOCATION #1

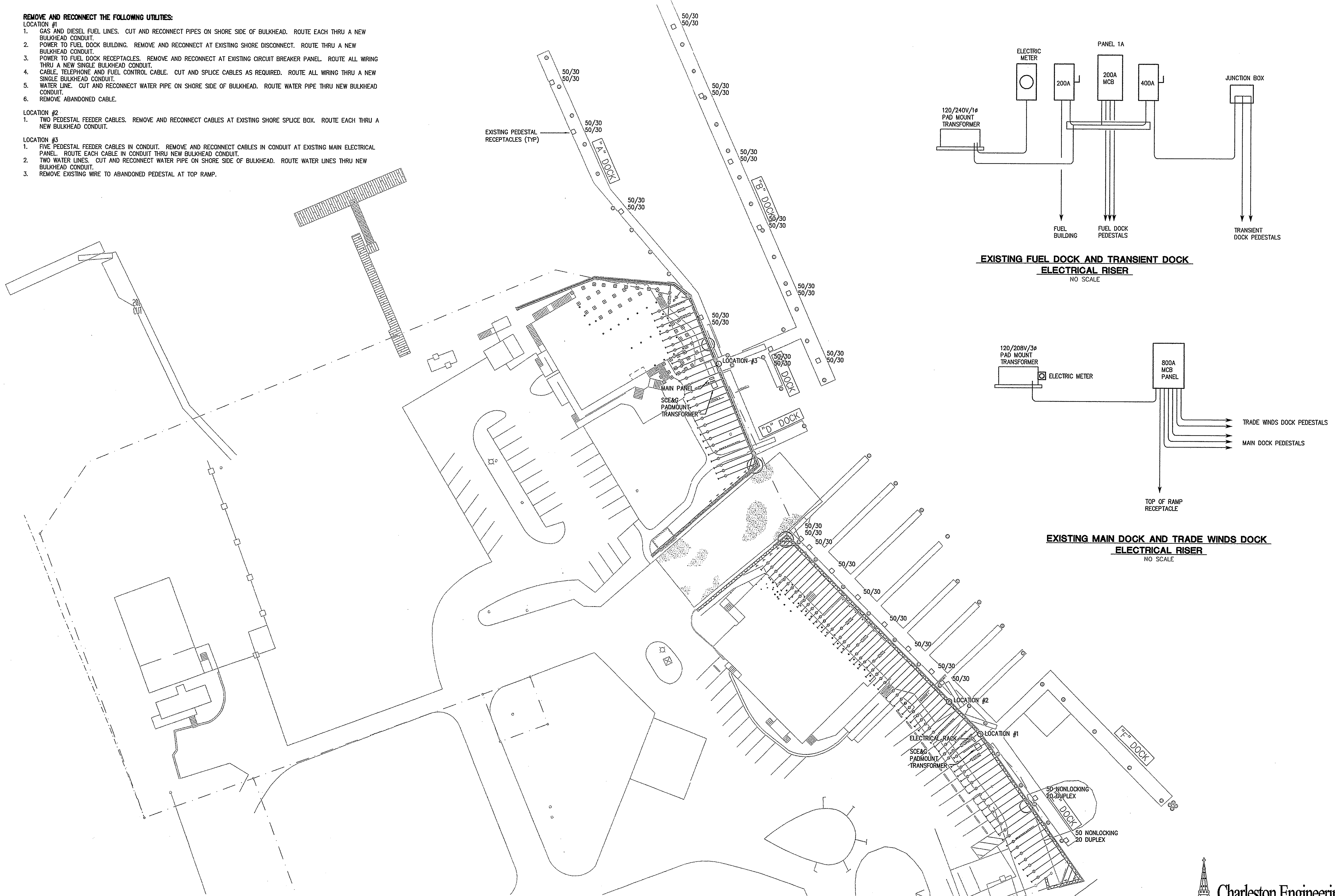
1. GAS AND DIESEL FUEL LINES. CUT AND RECONNECT PIPES ON SHORE SIDE OF BULKHEAD. ROUTE EACH THRU A NEW BULKHEAD CONDUIT.
2. POWER TO FUEL DOCK BUILDING. REMOVE AND RECONNECT AT EXISTING SHORE DISCONNECT. ROUTE THRU A NEW BULKHEAD CONDUIT.
3. POWER TO FUEL DOCK RECEPTACLES. REMOVE AND RECONNECT AT EXISTING CIRCUIT BREAKER PANEL. ROUTE ALL WIRING THRU A NEW SINGLE BULKHEAD CONDUIT.
4. CABLE, TELEPHONE AND FUEL CONTROL CABLE. CUT AND SPLICE CABLES AS REQUIRED. ROUTE ALL WIRING THRU A NEW SINGLE BULKHEAD CONDUIT.
5. WATER LINE. CUT AND RECONNECT WATER PIPE ON SHORE SIDE OF BULKHEAD. ROUTE WATER PIPE THRU NEW BULKHEAD CONDUIT.
6. REMOVE ABANDONED CABLE.

LOCATION #2

1. TWO PEDESTAL FEEDER CABLES. REMOVE AND RECONNECT CABLES AT EXISTING SHORE SPLICE BOX. ROUTE EACH THRU A NEW BULKHEAD CONDUIT.

LOCATION #3

1. FIVE PEDESTAL FEEDER CABLES IN CONDUIT. REMOVE AND RECONNECT CABLES IN CONDUIT AT EXISTING MAIN ELECTRICAL PANEL. ROUTE EACH CABLE IN CONDUIT THRU NEW BULKHEAD CONDUIT.
2. TWO WATER LINES. CUT AND RECONNECT WATER PIPE ON SHORE SIDE OF BULKHEAD. ROUTE WATER LINES THRU NEW BULKHEAD CONDUIT.
3. REMOVE EXISTING WIRE TO ABANDONED PEDESTAL AT TOP RAMP.



EXISTING FUEL DOCK AND TRANSIENT DOCK ELECTRICAL RISER

NO SCALE

EXISTING MAIN DOCK AND TRADE WINDS DOCK ELECTRICAL RISER

NO SCALE

GRAPHIC SCALE 1" = 30'

Charleston Engineering
125 B Wappoo Creek Dr.
Charleston, SC 29412
843-762-4242
Mechanical, Plumbing & Electrical

NO.	DATE	REVISION
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DRAWING TITLE:
BULKHEAD UTILITY ELECTRICAL SITE PLAN
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

SOUTH CAROLINA CHARLESTON ENGINEERING No. C00584 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 10079 JOHN D. DEDEN 7/23/08

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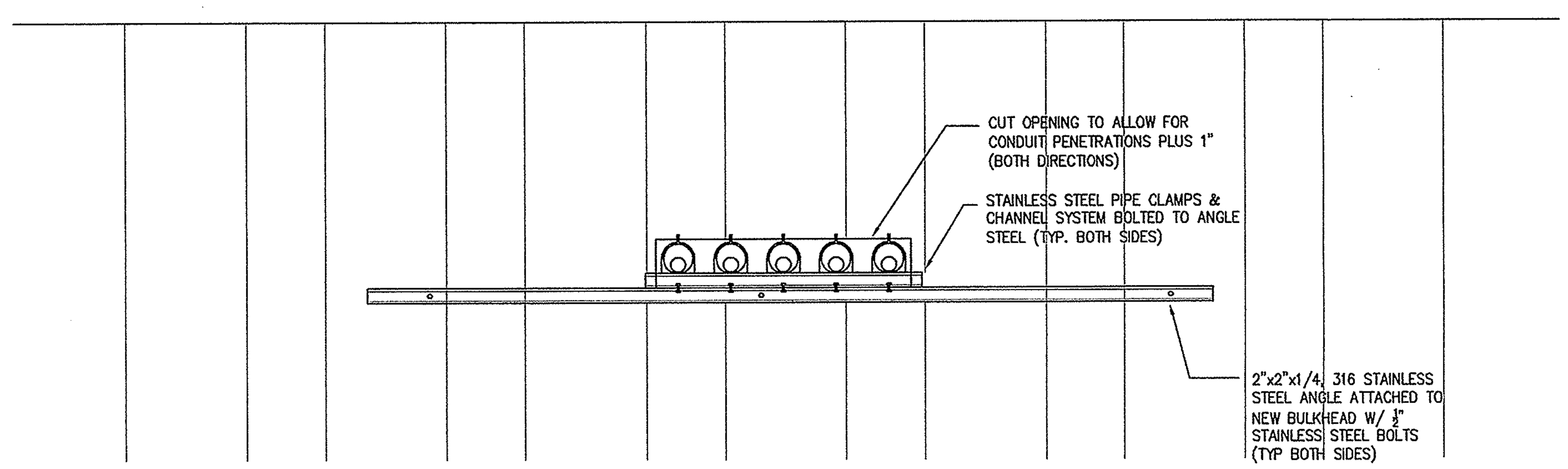
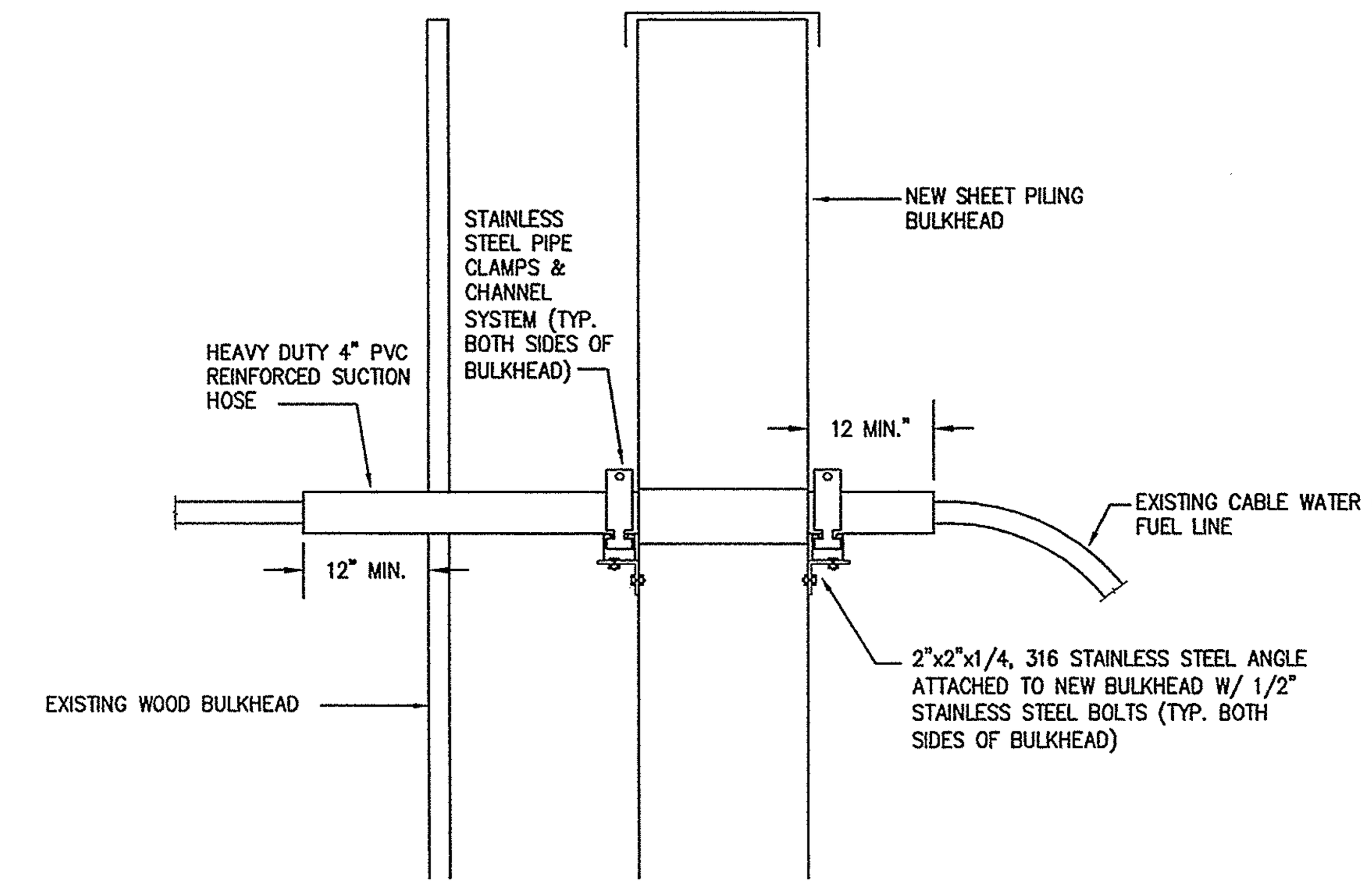
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

DESIGNED: DEDEN
DRAWN: HOLSEBERG
APPROVED: DEDEN
SCALE: AS SHOWN
FILE: IOP MARINA BULKHEAD D-BASE
DATE: 06-23-08
PROJ. NO.: 0667

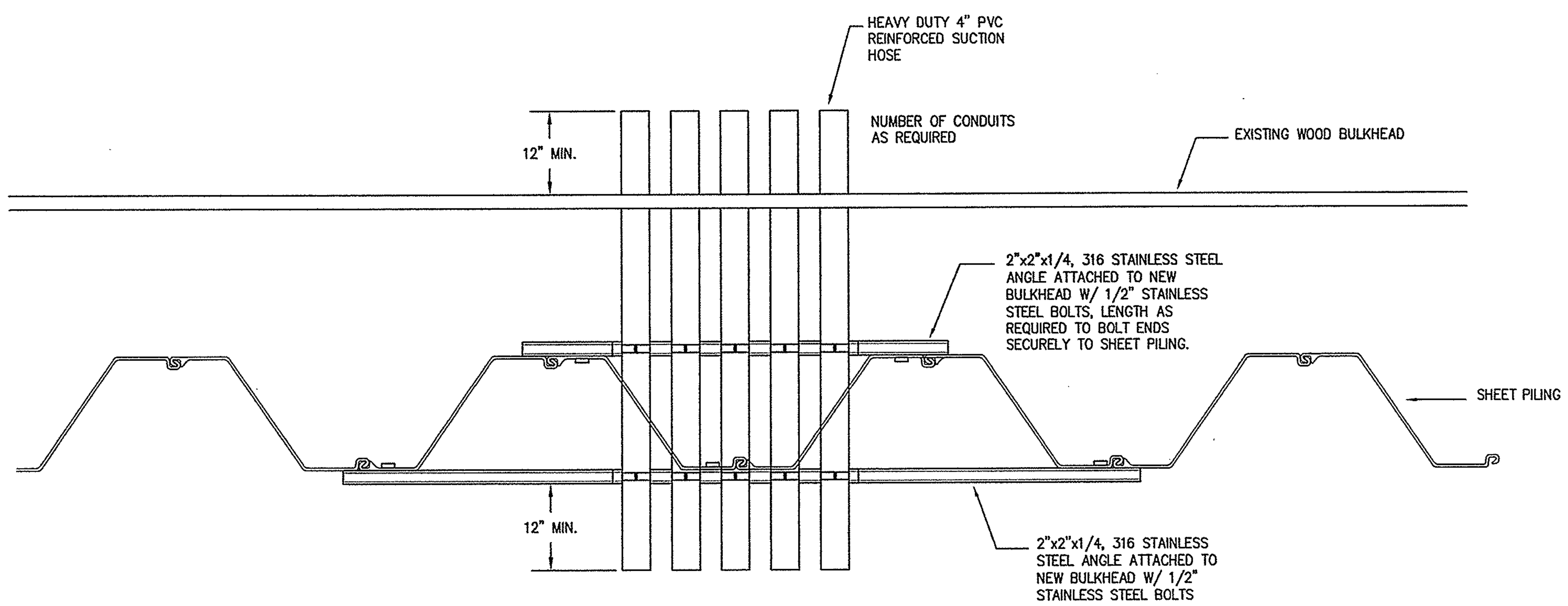
E1 OF 2



FRONT VIEW
TYPICAL BULKHEAD UTILITY PENETRATIONS
NO SCALE



SIDE VIEW
TYPICAL BULKHEAD UTILITY PENETRATIONS
NO SCALE



PLAN VIEW
TYPICAL BULKHEAD UTILITY PENETRATIONS
NO SCALE

Charleston Engineering
125 B Wappoo Creek Dr.
Charleston, SC 29412
843-762-4242
Mechanical, Plumbing & Electrical

DESIGNED: DEDEN
DRAWN: HOLSEBERG
APPROVED: DEDEN
SCALE: AS SHOWN
FILE: IOP MARINA BULKHEAD D-PAGE
DATE: 06-23-08
PROJ. NO.: 0667

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SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 10079 JOHN D. DEDEN 7/23/08

SOUTH CAROLINA CHARLESTON ENGINEERING No. C00584 CERTIFICATE OF AUTHORIZATION

DRAWING TITLE:
BULKHEAD UTILITY PENETRATION DETAILS
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

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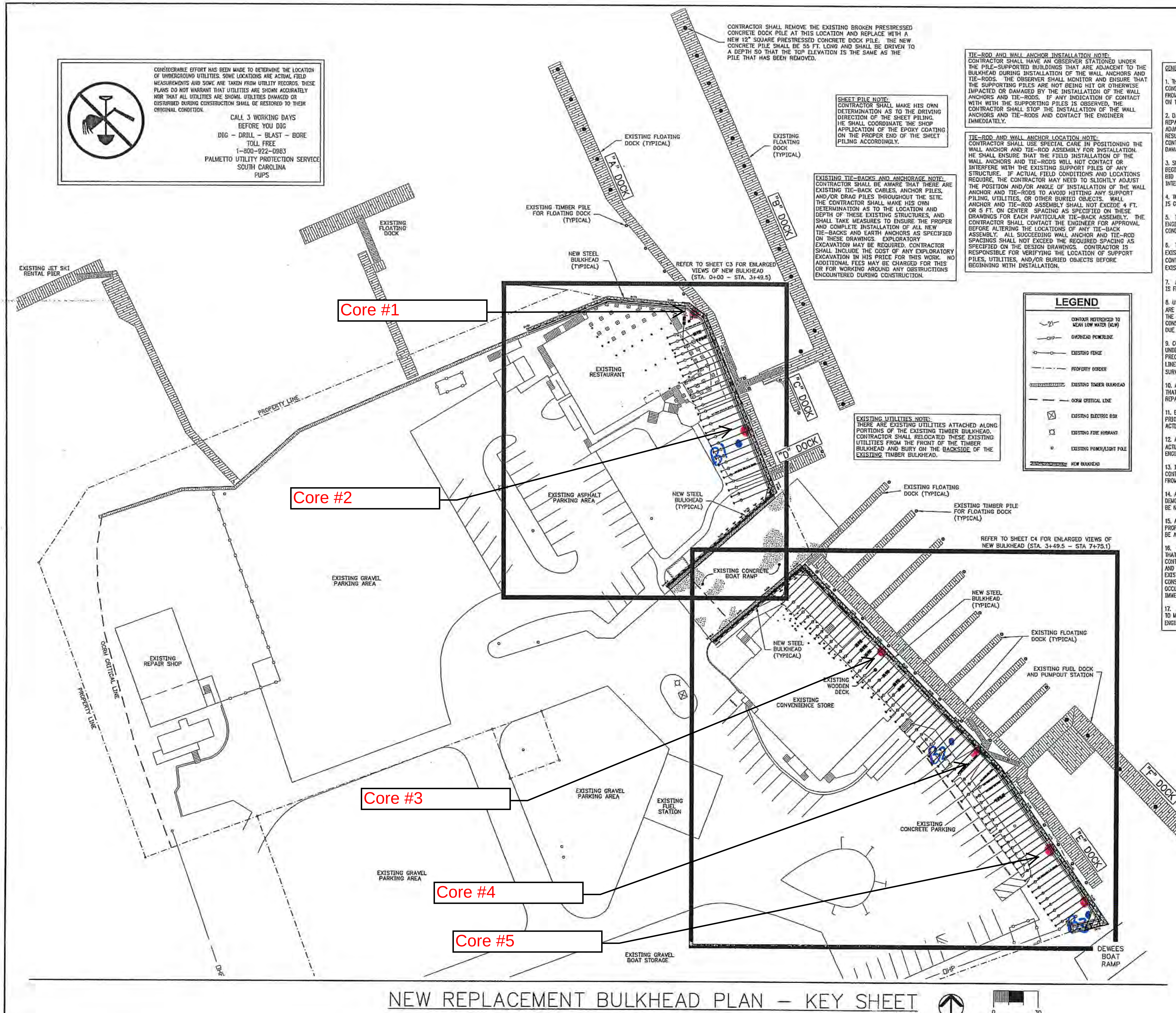
E2 OF 2

Attachment 2
Core Location Photo Documentation



CONSIDERABLE EFFORT HAS BEEN MADE TO DETERMINE THE LOCATION OF UNDERGROUND UTILITIES. SOME LOCATIONS ARE ACTUAL FIELD MEASUREMENTS AND SOME ARE TAKEN FROM UTILITY RECORDS. THESE PLANS DO NOT WARRANT THAT UTILITIES ARE SHOWN ACCURATELY NOR THAT ALL UTILITIES ARE SHOWN. UTILITIES DAMAGED OR DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.

CALL 3 WORKING DAYS
BEFORE YOU DIG
DIG – DRILL – BLAST – BORE
TOLL FREE
1-800-922-0983
PALMETTO UTILITY PROTECTION SERVICE
SOUTH CAROLINA
PUPS

CONTRACTOR SHALL REMOVE THE EXISTING BROKEN PRESTRESSED CONCRETE DOCK PILE AT THIS LOCATION AND REPLACE WITH A NEW 12" SQUARE PRESTRESSED CONCRETE DOCK PILE. THE NEW CONCRETE PILE SHALL BE 55 FT. LONG AND SHALL BE DRIVEN TO A DEPTH SO THAT THE TOP ELEVATION IS THE SAME AS THE PILE THAT HAS BEEN REMOVED.

SHEET PILE NOTE:
CONTRACTOR SHALL MAKE HIS OWN DETERMINATION AS TO THE DRIVING DIRECTION OF THE SHEET PILING. HE SHALL COORDINATE THE SHOP APPLICATION OF THE EPOXY COATING ON THE PROPER END OF THE SHEET PILING ACCORDINGLY.

EXISTING TIE-BACKS AND ANCHORAGE NOTE:
CONTRACTOR SHALL BE AWARE THAT THERE ARE EXISTING TIE-BACK CABLES, ANCHOR PILES, AND/OR DRAG PILES THROUGHOUT THE SITE. THE CONTRACTOR SHALL MAKE HIS OWN DETERMINATION AS TO THE LOCATION AND DEPTH OF THESE EXISTING STRUCTURES, AND SHALL TAKE MEASURES TO ENSURE THE PROPER AND COMPLETE INSTALLATION OF ALL NEW TIE-BACKS AND EARTH ANCHORS AS SPECIFIED ON THESE DRAWINGS. EXPLORATORY EXCAVATION MAY BE REQUIRED. CONTRACTOR SHALL INCLUDE THE COST OF ANY EXPLORATORY EXCAVATION IN HIS PRICE FOR THIS WORK. NO ADDITIONAL FEES MAY BE CHARGED FOR THIS OR FOR WORKING AROUND ANY OBSTRUCTIONS ENCOUNTERED DURING CONSTRUCTION.

TIE-ROD AND WALL ANCHOR INSTALLATION NOTE:
CONTRACTOR SHALL HAVE AN OBSERVER STATIONED UNDER THE PILE-SUPPORTED BUILDINGS THAT ARE ADJACENT TO THE BULKHEAD DURING INSTALLATION OF THE WALL ANCHORS AND TIE-RODS. THE OBSERVER SHALL MONITOR AND ENSURE THAT THE SUPPORTING PILES ARE NOT BEING HIT OR OTHERWISE IMPACTED OR DAMAGED BY THE INSTALLATION OF THE WALL ANCHORS AND TIE-RODS. IF ANY INDICATION OF CONTACT WITH WITH THE SUPPORTING PILES IS OBSERVED, THE CONTRACTOR SHALL STOP THE INSTALLATION OF THE WALL ANCHORS AND TIE-RODS AND CONTACT THE ENGINEER IMMEDIATELY.

TIE-ROD AND WALL ANCHOR LOCATION NOTE:
CONTRACTOR SHALL USE SPECIAL CARE IN POSITIONING THE WALL ANCHOR AND TIE-ROD ASSEMBLY FOR INSTALLATION. HE SHALL ENSURE THAT THE FIELD INSTALLATION OF THE WALL ANCHORS AND TIE-RODS WILL NOT CONTACT OR INTERFERE WITH THE EXISTING SUPPORT PILES OF ANY STRUCTURE. IF ACTUAL FIELD CONDITIONS AND LOCATIONS REQUIRE, THE CONTRACTOR MAY NEED TO SLIGHTLY ADJUST THE POSITION AND/OR ANGLE OF INSTALLATION OF THE WALL ANCHOR AND TIE-RODS TO AVOID HITTING ANY SUPPORT PILING, UTILITIES, OR OTHER BURIED OBJECTS. WALL ANCHOR AND TIE-ROD ASSEMBLY SHALL NOT EXCEDE 4 FT. OR 5 FT. ON CENTER SPACING AS SPECIFIED ON THESE DRAWINGS FOR EACH PARTICULAR TIE-BACK ASSEMBLY. THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR APPROVAL BEFORE ALTERING THE LOCATIONS OF ANY TIE-BACK ASSEMBLY. ALL SUCCEEDING WALL ANCHOR AND TIE-ROD SPACINGS SHALL NOT EXCEED THE REQUIRED SPACING AS SPECIFIED ON THE DESIGN DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF SUPPORT PILES, UTILITIES, AND/OR BURIED OBJECTS BEFORE BEGINNING WITH INSTALLATION.

EXISTING UTILITIES NOTE:
THERE ARE EXISTING UTILITIES ATTACHED ALONG PORTIONS OF THE EXISTING TIMBER BULKHEAD. CONTRACTOR SHALL RELOCATED THESE EXISTING UTILITIES FROM THE FRONT OF THE TIMBER BULKHEAD AND BURY ON THE BACKSIDE OF THE EXISTING TIMBER BULKHEAD.

LEGEND

—21—	CONTOUR REFERENCED TO MEAN LOW WATER (MLW)
—OHP—	OVERHEAD POWERLINE
—o—o—	EXISTING FENCE
—·—·—	PROPERTY BORDER
	EXISTING TIMBER BULKHEAD
— — —	OCRM CRITICAL LINE
☒	EXISTING ELECTRIC BOX
	EXISTING FIRE HYDRANT
	EXISTING POWER/LIGHT POLE
	NEW BULKHEAD

GENERAL SITE CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND BE PREPARED TO ADEQUATELY CARE FOR AND SAFEGUARD HIMSELF AND THE OWNER FROM DAMAGE. IF THE CONTRACTOR DISCOVERS FIELD CONDITIONS DIFFERENT THAN WHAT IS SHOWN ON THESE PLANS HE SHALL NOTIFY THE ENGINEER IMMEDIATELY.

2. DAMAGE DONE TO EXISTING STRUCTURES NOT LABELED AS BEING REMOVED OR MODIFIED SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE. DAMAGE TO ANY EXISTING STRUCTURE ADJACENT TO THE EXISTING BULKHEAD OR ANY OTHER STRUCTURE ON NEIGHBORING PROPERTIES AS A RESULT OF WORK PERFORMED FOR THIS PROJECT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE. CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF ANY SUCH DAMAGE SHOULD OCCUR.

3. SHOULD THE CONTRACTOR FIND ANY DISCREPANCIES ON THE DRAWINGS OR IN THE FIELD PRIOR TO BEGINNING WORK OR DURING CONSTRUCTION, HE SHALL NOTIFY THE ENGINEER IMMEDIATELY. DO NOT BID OR BUILD ANY PART OF THE PROJECT BASED ON AN ASSUMPTION OR SPECULATION OF DESIGN INTENT.

4. THERE SHALL BE NO CHANGE OR DEVIATION FROM THESE DESIGN PLANS UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER.

5. THE NEW BULKHEAD SHALL BE CONSTRUCTED AS DETAILED ON THESE PLANS. CONTRACTOR & ENGINEER TO ESTABLISH EXACT LOCATION OF NEW BULKHEAD IN THE FIELD BASED ON ACTUAL FIELD CONDITIONS, AND AS DESCRIBED IN NOTE #6 BELOW.

6. THE NEW STEEL BULKHEAD MUST BE INSTALLED NOT MORE THAN 18" OUT IN FRONT OF THE EXISTING TIMBER BULKHEAD (ON THE WATER SIDE). THE CONTRACTOR SHALL MAKE USE OF ADEQUATE CONTROLS TO ENSURE THAT THE NEW BULKHEAD DOES NOT EXTEND MORE THAN 18" BEYOND THE EXISTING BULKHEAD (ON THE WATER SIDE).

7. ALL FILL MATERIAL USED FOR LANDSCAPING (IF REQUIRED) SHALL BE CLEAN GRANULAR FILL THAT IS FREE OF ROCKS, ROOTS, STUMPS, STICKS, DEBRIS, TRASH, OR OTHER ORGANIC MATERIAL.

8. USACOE AND SCDHEC-OCRM PERMITS FOR THIS WORK HAVE BEEN OBTAINED BY THE ENGINEER AND ARE INCLUDED AT THE END OF THE "PROJECT MANUAL" FOR THE CONTRACTORS REFERENCE. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL OTHER PERMITS REQUIRED FOR DEMOLITION AND CONSTRUCTION. CONTRACTOR SHALL NOT START WORK WITHOUT ALL REQUIRED PERMITS. ANY FINES DUE TO NOT HAVING PROPER PERMITS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

9. CONTRACTOR SHALL VERIFY THE LOCATIONS, SIZES, AND ELEVATIONS OF ALL UTILITIES AND UNDERGROUND STRUCTURES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS TO AVOID ANY CONTACT WITH HIGH-VOLTAGE TRANSMISSION LINES, UNDERGROUND GAS LINES, WATER LINES AND ALL OTHER UTILITIES DURING DEMOLITION AND CONSTRUCTION. (SEE SURVEY NOTES ON SHEETS C1 & C2)

10. ANY UTILITIES OR UNDERGROUND STRUCTURES DAMAGED DURING DEMOLITION OR CONSTRUCTION THAT ARE NOT DESIGNATED AS BEING REMOVED OR RELOCATED AS PART OF THIS PROJECT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.

11. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED PER THE ENGINEERS PLAN OR DIRECTION PRIOR TO THE BEGINNING OF ANY WORK AND SHALL BE MAINTAINED DURING ALL CONSTRUCTION ACTIVITIES OR PROJECT LIFE.

12. ADDITIONAL EROSION CONTROL MEASURES MAY BE EMPLOYED WHERE DETERMINED NECESSARY BY ACTUAL SITE CONDITIONS AND/OR AS DIRECTED BY SCDHEC-OCRM, THE CITY OF ISLE PALMS, OR THE ENGINEER.

13. IF DETERMINED NECESSARY BY THE ENGINEER OR AGENCY DURING CONSTRUCTION, THE CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL MEASURES TO PREVENT SAND SEDIMENT FROM WASHING INTO THE WATERWAY AS PART OF THE WORK FOR THIS PROJECT.

14. ALL DEMOLITION AND CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE SITE AS PART OF THE DEMOLITION ITEM UNLESS OTHERWISE DIRECTED BY THE PLANS, ENGINEER OR OWNER. THERE SHALL BE NO BURNING ON SITE. DEBRIS AND TRASH SHALL NOT BE BURIED.

15. ANY BURIED DEBRIS ENCOUNTERED DURING DEMOLITION OR CONSTRUCTION SHALL ALSO BE PROPERLY DISPOSED OF OFF SITE BY THE CONTRACTOR. NO BURYING OF DEBRIS OF ANY KIND WILL BE ALLOWED ON SITE.

16. CONTRACTOR SHALL MONITOR THE ALIGNMENT AND STABILITY OF THE EXISTING TIMBER BULKHEAD THAT IS TO REMAIN IN PLACE THROUGHOUT THE DEMOLITION AND CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR USING APPROPRIATE MEANS AS DETERMINED BY HIMSELF AND THE FIELD CONDITIONS THAT EXIST AT THE TIME OF CONSTRUCTION FOR ENSURING THAT THE EXISTING TIMBER BULKHEAD IS KEPT IN PLACE AND SUPPORTED AGAINST FAILURE DURING ALL CONSTRUCTION ACTIVITIES FOR THIS PROJECT. IF MOVEMENT OF THE EXSITING TIMBER BULKHEAD OCCURS OR IS SUSPECTED, THE CONTRACTOR SHALL STOP WORK AND CONTACT THE ENGINEER IMMEDIATELY.

17. ALL GRASSED AREAS DISTURBED DURING CONSTRUCTION SHALL BE FILLED AND GRADED SMOOTH TO MATCH THE EXISTING SURROUNDING GRADE AND SHALL BE SEEDED OR SODDED PER THE ENGINEER'S DIRECTION AT THE TIME OF PROJECT COMPLETION.

EXISTING ITEMS RELOCATION NOTE:
CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR RELOCATING ALL UTILITIES; INCLUDING ELECTRICAL, WATER, SEWER, GASOLINE, COMMUNICATIONS LINES, ETC., THAT MAY BE IN THE WAY OF CONSTRUCTION ACTIVITIES OR THAT MAY CONFLICT WITH THE LOCATION OF THE NEW BULKHEAD. IN ADDITION, CONTRACTOR SHALL BE RESPONSIBLE FOR MOVING OR MODIFYING ANY OF THE FLOATING DOCKS THAT MAY BE IN THE WAY OF THE NEW BULKHEAD. EXISTING FLOATING DOCKS MAY NEED TO BE MOVED OR MODIFIED TO ALLOW ENOUGH ROOM FOR PROPER FUNCTIONING, ACCESS, AND FLOATATION OF THE FLOATING DOCK SYSTEM AFTER THE NEW BULKHEAD HAS BEEN CONSTRUCTED. FLOATING DOCK PILES SHALL BE PULLED AND REPLACED AS CALLED FOR.

UTILITIES SPLICE NOTE:
REFER TO SHEETS E1 & E2 FOR INFORMATION AND DETAILS ON SPICING EXISTING UTILITIES THAT PASS THROUGH THE BULKHEAD.

CONTRACTOR SHALL BE AWARE THAT FUEL LINE(S) MUST ALSO BE SPLICED TO ALLOW FOR CONSTRUCTION OF THE NEW STEEL BULKHEAD.

ALL COSTS ASSOCIATED WITH CUTTING AND SPLICING OF EXISTING UTILITIES, INCLUDING FUEL LINES SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID FOR THIS WORK.

SURVEY NOTES:

1. BASE MAP SITE SURVEY INFORMATION (SHEET C1 AND C2), AND THE UTILITY AS-BUILT (SHEET U1) WERE PROVIDED BY JOHN E. WADE JR., RLS, OF ISLE OF PALMS SOUTH CAROLINA. SURVEY CONDUCTED ON JANUARY 26, 1995 AND REVISED ON NOVEMBER 22, 2005 (ADDED UTILITIES) AND DECEMBER 12, 2005 (ADDED FUEL PRODUCT LINES).

2. LOCATIONS OF THE UTILITIES SHOWN ON THE UTILITY ASBUILT PLAN (SHEET U1) WERE OBTAINED IN THE FIELD BY WEST LOCATION SERVICES. THESE LOCATIONS ARE SHOWN ON THE PLANS FOR THE CONTRACTORS CONVENIENCE AND NO RESPONSIBILITY IS ASSUMED FOR THEIR ACCURACY OR COMPLETENESS. CONTRACTOR SHALL VERIFY.

3. HYDROGRAPHIC SURVEY INFORMATION PROVIDED BY GENERAL ENGINEERING AND ENVIRONMENTAL, LLC (G.E.L.) OF CHARLESTON, SOUTH CAROLINA. HYDROGRAPHIC SURVEY WAS CONDUCTED ON JULY 8 AND AUGUST 4, 2003 AFTER THE MAINTENANCE DREDGING IN MORGAN CREEK AND THE ISLE OF PALMS MARINA OF 2003. ALL CONTOURS AND OTHER ELEVATIONS ARE REFERENCED TO MEAN LOW WATER (MLW).

NEW REPLACEMENT BULKHEAD PLAN – KEY SHEET

SCALE: 1" = 30'

GRAPHIC SCALE 1" = 30'

NO.	DATE	REVISION
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DRAWING TITLE:
NEW BULKHEAD PLAN – KEY SHEET
FOR ISLE OF PALMS MARINA BULKHEAD REPLACEMENT
LOCATED ON ISLE OF PALMS
IN CHARLESTON COUNTY, SOUTH CAROLINA
FOR THE CITY OF ISLE OF PALMS

Jon Guerry Taylor & Associates, Inc.
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DESIGNED: MWK
DRAWN: MWK
APPROVED: CWM
SCALE: AS SHOWN
DATE: 07-24-08
PROJ. NO.: 05-020

C2 OF 14

Figure 1 Core 1a

Figure 2 Core 1b

Figure 3 Core 1c

Figure 4 Core 1d

Figure 5 Core 1e

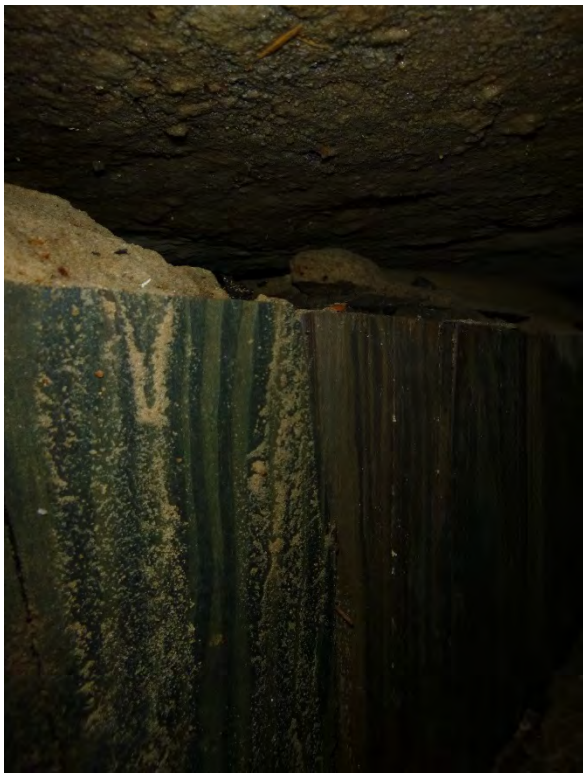


Figure 6 Core 1f

Figure 7 Core 1g

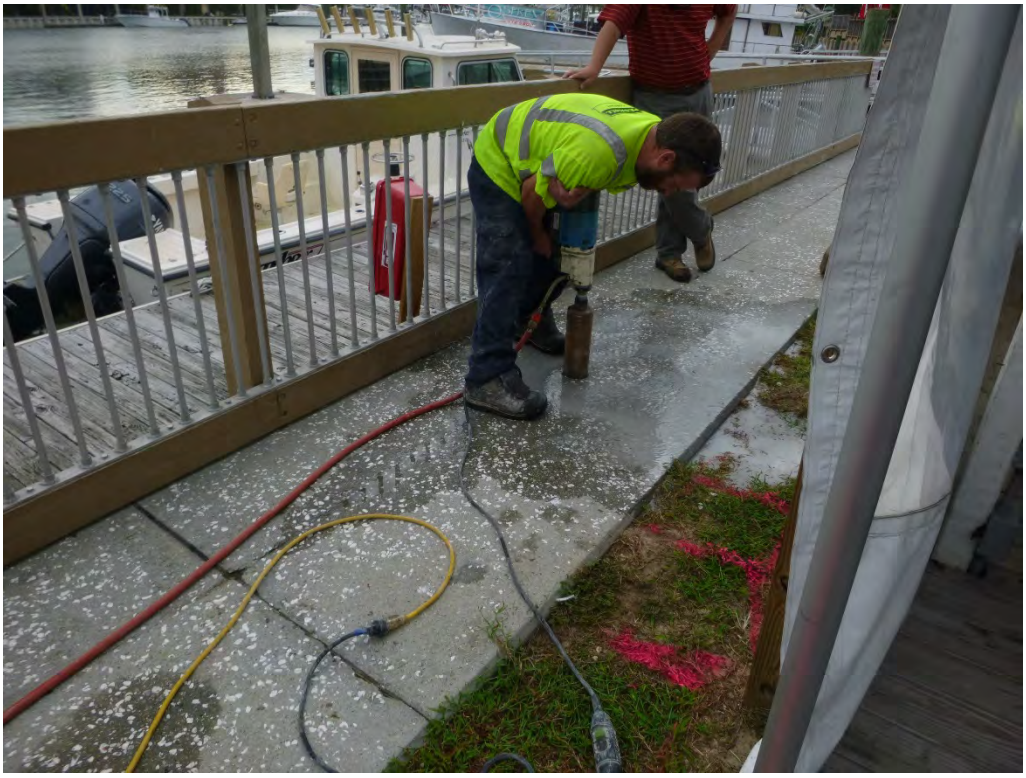


Figure 8 Core 2a

Figure 9 Core 2b

Figure 10 Core 2c

Figure 11 Core 2d

Figure 12 Core 2e

Figure 13 Core 3a

Figure 14 Core 2b

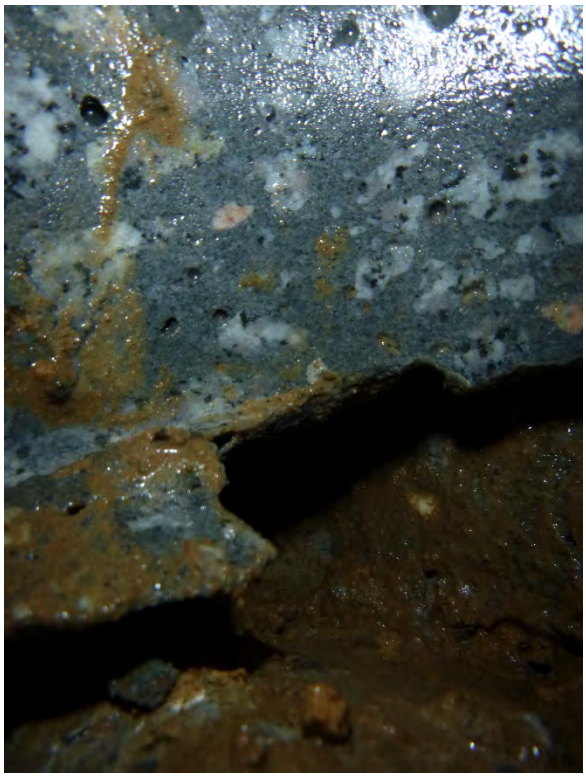


Figure 15 Core 3c

Figure 16 core 3d

Figure 17 core 4a

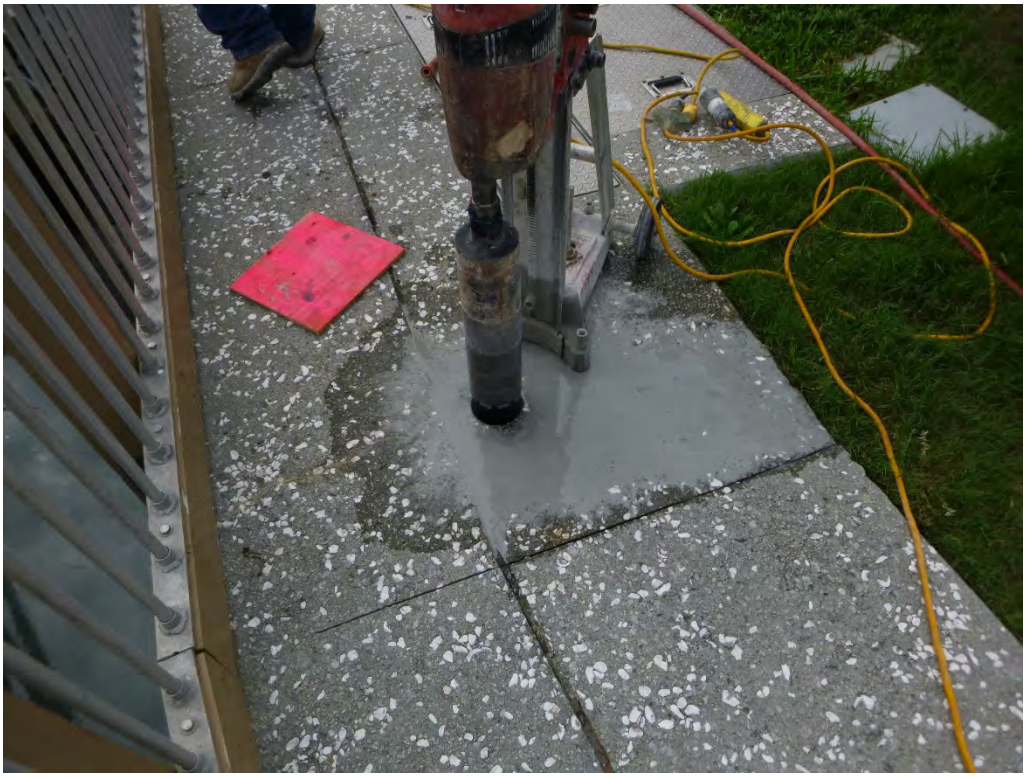


Figure 18 Core 4b

Figure 19 core 4c

Figure 20 Core 4d

Figure 21 Core 4e

Figure 22 Core 4f

Figure 23 Core 4g

Figure 24 core 4h

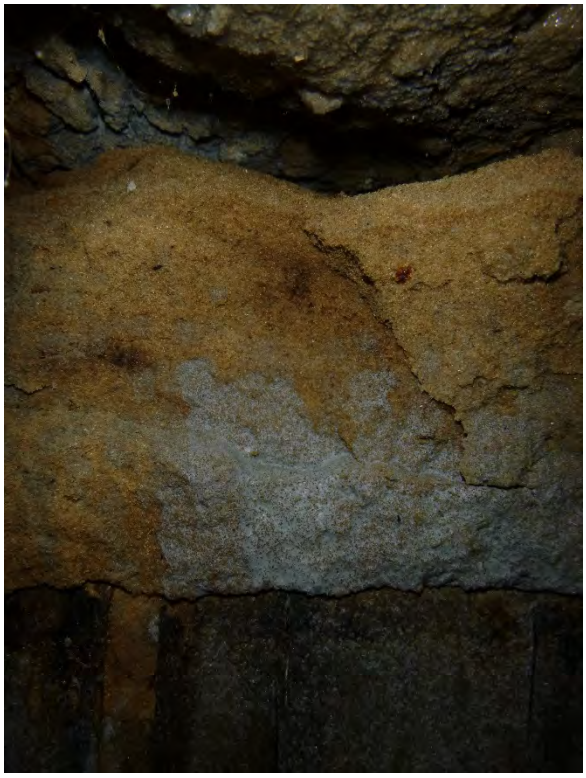


Figure 25 Core 4i

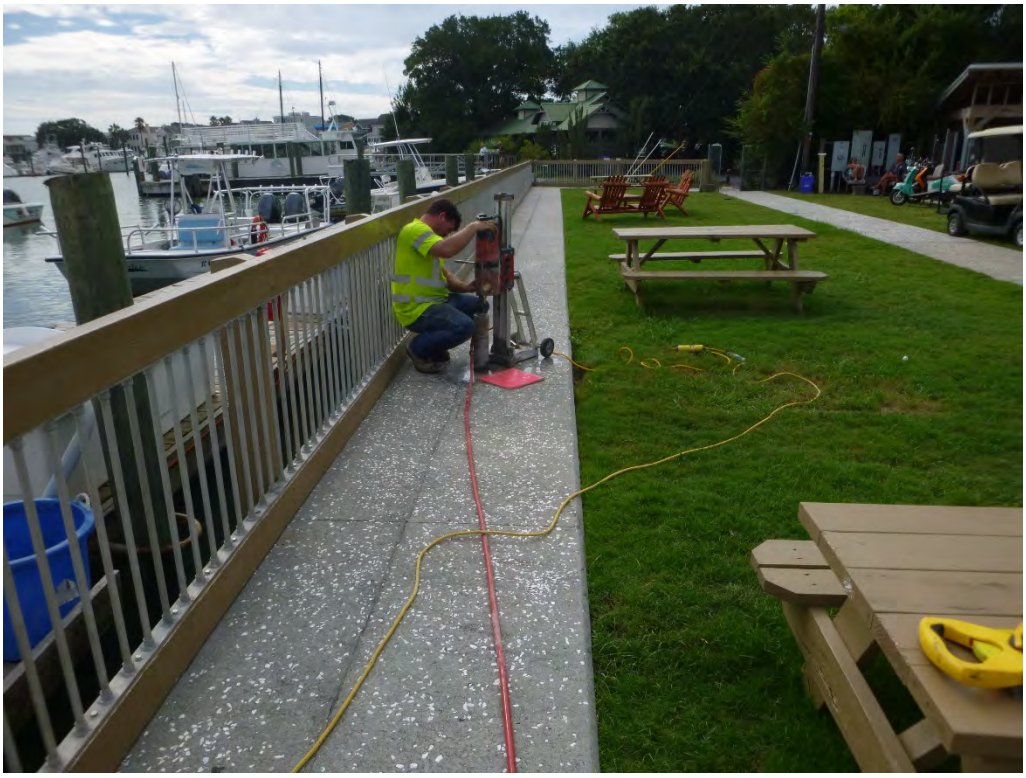


Figure 26 Core 5a

Figure 27 Core 5b

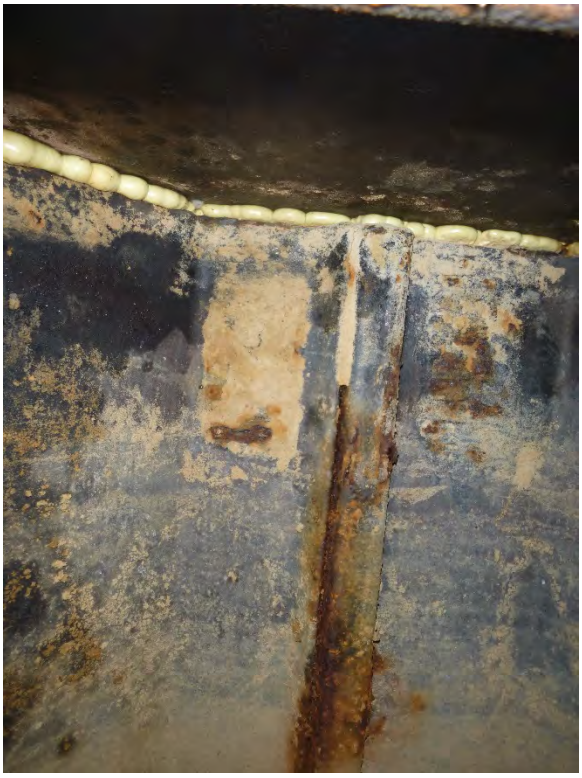


Figure 28 Core 5c

Figure 29 Core 5d

Figure 30 Core 5e

Figure 31 Core 5f

Figure 32 Core 5g

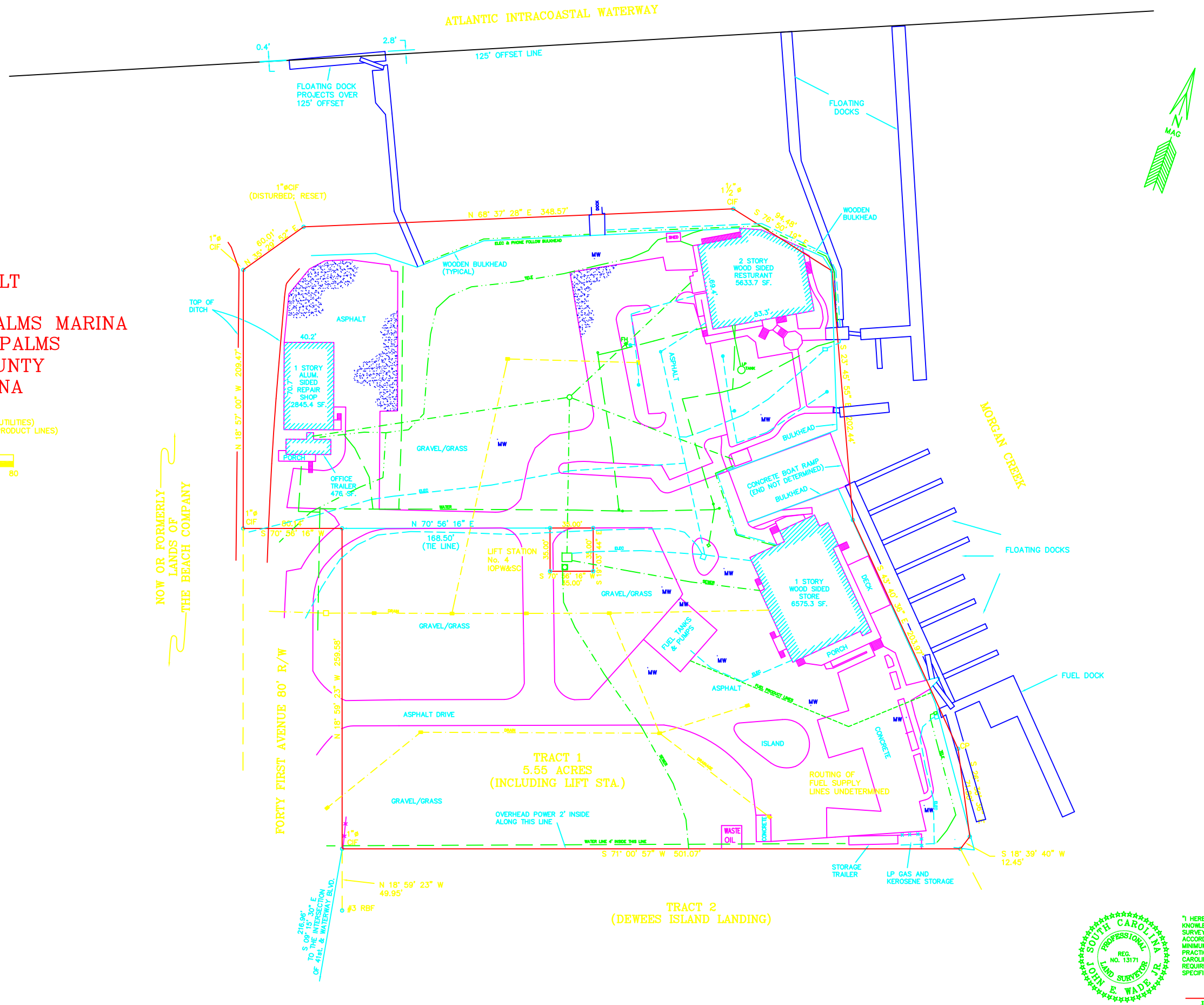
Core 1	
	thickness of concrete cap 5-3/4"
	Core exposed Void beneath the concrete cap the void measured 1'-10" to the top of concrete cap.
Core 2	
	thickness of concrete cap 5-1/2"
	Core exposed clean fill sand to base on concrete. No void was present.
Core 3	
	thickness of concrete cap 9-3/4"
	Core exposed concrete rubble beneath the cap. Some sand fill was present, however that could have been wash out from fill added by Marina staff under porch
Core 4	
	thickness of concrete cap 6"
	Core exposed Void beneath the concrete cap the void measured 1'-11" to the top of concrete cap.
Core 5	
	thickness of concrete cap 5"
	Core exposed Void beneath the concrete cap the void measured 5'-0" to the top of concrete cap.

UTILITY ASBUILT
TRACT 1
AKA CITY OF ISLE OF PALMS MARINA
CITY OF ISLE OF PALMS
CHARLESTON COUNTY
SOUTH CAROLINA

DATE: JANUARY 26, 1995
REVISED: NOVEMBER 22, 2005 (ADDED UTILITIES)
REVISED: DECEMBER 12, 2005 (ADDED FUEL PRODUCT LINES)

SCALE: 1" = 40'

40 0 40 80



LEGEND:

CIF CRIMPED IRON FOUND (SIZE AS NOTED)
IRS IRON ROD SET (5/8"ø)
CP COMPUTED POINT
RBF REBAR FOUND (SIZE AS NOTED)

- SEWER — MW MONITORING WELL
- DRAINAGE
- ELECTRIC & LIGHT POLE
- TELEPHONE
- WATER & VALVE
- FUEL PRODUCT LINES

NOTES:

1) REFERENCE PLAT BOOK AH, PAGE 100
2) TAX MAP NUMBER 571-08-00-007
3) SURVEY REQUESTED BY: THE CITY OF ISLE OF PALMS
4) UTILITIES SHOWN AS LOCATED IN FIELD BY WEST LOCATION SERVICES (NO IN GROUND VERIFICATION AS OF THIS DATE)

JOHN E. WADE JR., RLS
POST OFFICE BOX 686
ISLE OF PALMS
SOUTH CAROLINA
29451
(803) 886-6262

FILE: 15-95

SOUTH CAROLINA PROFESSIONAL LAND SURVEYOR JOHN E. WADE JR. REG. No. 13171

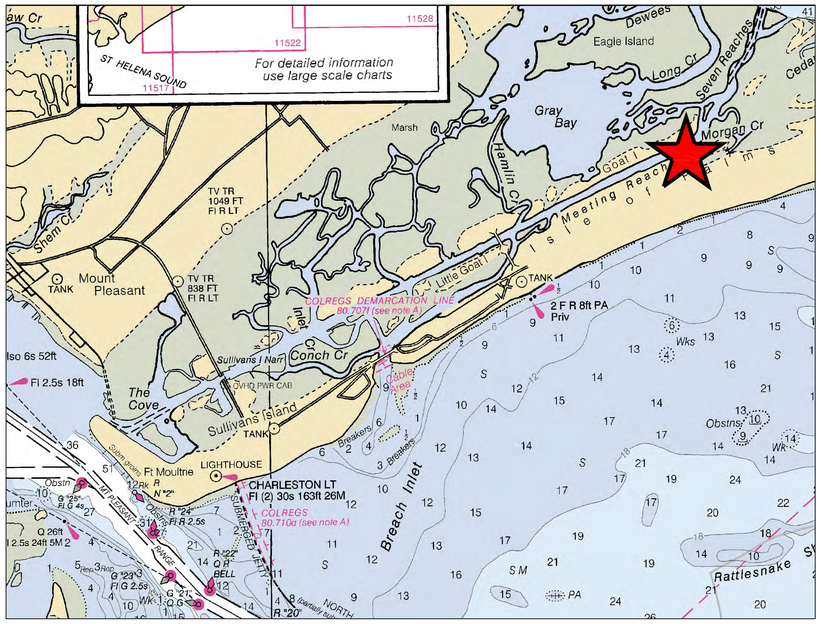
"I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN."

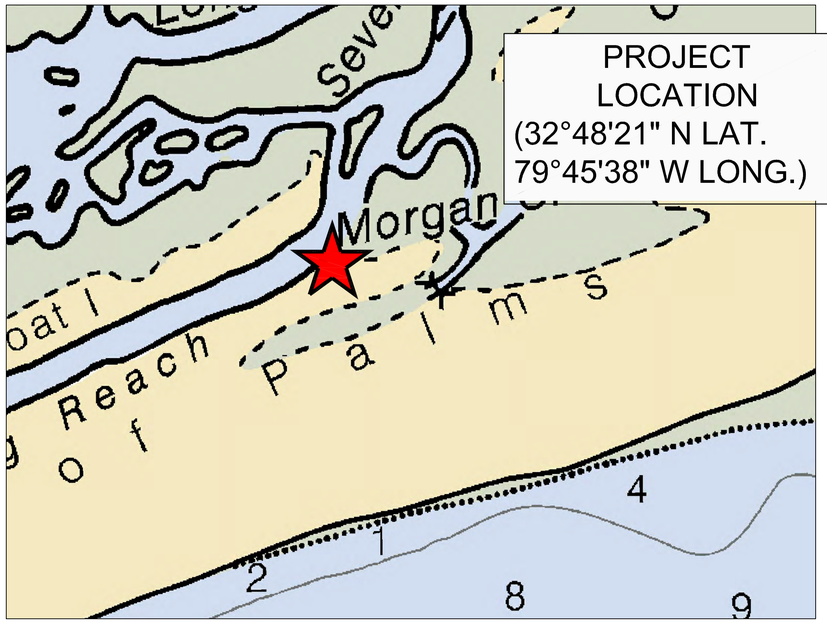
JOHN E. WADE JR., R.L.S.
S.C. REG. NO. 13171

FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION

BID DRAWINGS FOR ISLE OF PALMS MARINA

July 10, 2020





PROJECT LOCATION
(32°48'21" N LAT.
79°45'38" W LONG.)

DRAWING INDEX

PREPARED FOR:

CITY OF ISLE OF PALMS
1207 PALM BOULEVARD
ISLE OF PALMS, SC 29451

PROJECT LOCATION:

50 41ST AVENUE
ISLE OF PALMS, SC 29451

NOTE: THIS PROJECT IS FUNDED, IN PART, BY THE USFWS BOATING INFRASTRUCTURE GRANT PROGRAM, ADMINISTERED BY THE SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES.

PREPARED BY:

APPLIED TECHNOLOGY & MANAGEMENT, INC.
941 Houston Northcutt Blvd., SUITE 201
Mt. Pleasant, SC. 29464
(843) 414-1040

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NOT FOR CONSTRUCTION

ISLE OF PALMS MARINA

ATLANTIC INTRACOASTAL WATERWAY

CHANNEL CENTERLINE

LIMITS OF MARINE WORKS

USACE CHANNEL BOUNDARIES

WATERSPORTS DOCK

USACE CONSTRUCTION SETBACK LINE

PARCEL BOUNDARY EXTENSION

CRITICAL LINE

"INTRACOASTAL DOCK"

"RESTAURANT DOCK"

"FACE DOCK"

EXISTING FLOATING DOCK

RESTAURANT

EXISTING BOAT RAMP

MARINA STORE

UPLAND FUEL

"CHARTER DOCK"

FUEL DOCK & FUEL HUT

EXISTING FLOATING DOCK

MORGAN CREEK

LIMITS OF MARINE WORKS

DEWEES MARINA

N

0 80'

Scale in Feet

CRITICAL LINE SURVEY BY GEL AND SIGNED BY MATTHEW SLAGEL ON 2-22-2017.

NOTES:

1. CONTOURS BASED ON SURVEY BY GEL DATED NOVEMBER 2016.
2. CONTOURS ARE IN FEET & REFERENCE MLW.
3. BUILDING OUTLINES BASED ON GIS FROM CHARLESTON COUNTY GIS DATABASE.
4. COORDINATE WITH CITY AND MARINA OPERATOR ON SITE ACCESS AND LAYDOWN.
5. ANY DAMAGE TO THE SITE CAUSED BY THE CONTRACTOR SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE CITY.

Datum	*Abbreviation*	*Water Level ft (MLLW)*
Mean Higher High Water	MHHW	5.6
Mean High Water	MHW	5.2
North American Vertical Datum, 1988	NAVD88	3.1
Mean Sea Level	MSL	2.8
Mean Low Water	MLW	0.2
Mean Lower Low Water	MLLW	0.0

REMARKS

REV. No.	DATE	DRAWN BY	CHKD BY
4			
3			
2			
1			

Signature

Date

DESIGNED AM | DRAWN JJ | CHECKED AM

DATE: 07/10/2020

JOB NO. 18A3287

SCALE: 1"=40'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

EXISTING CONDITIONS

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC, SC 29464
(843) 414-1040

DRAWING NUMBER

G1

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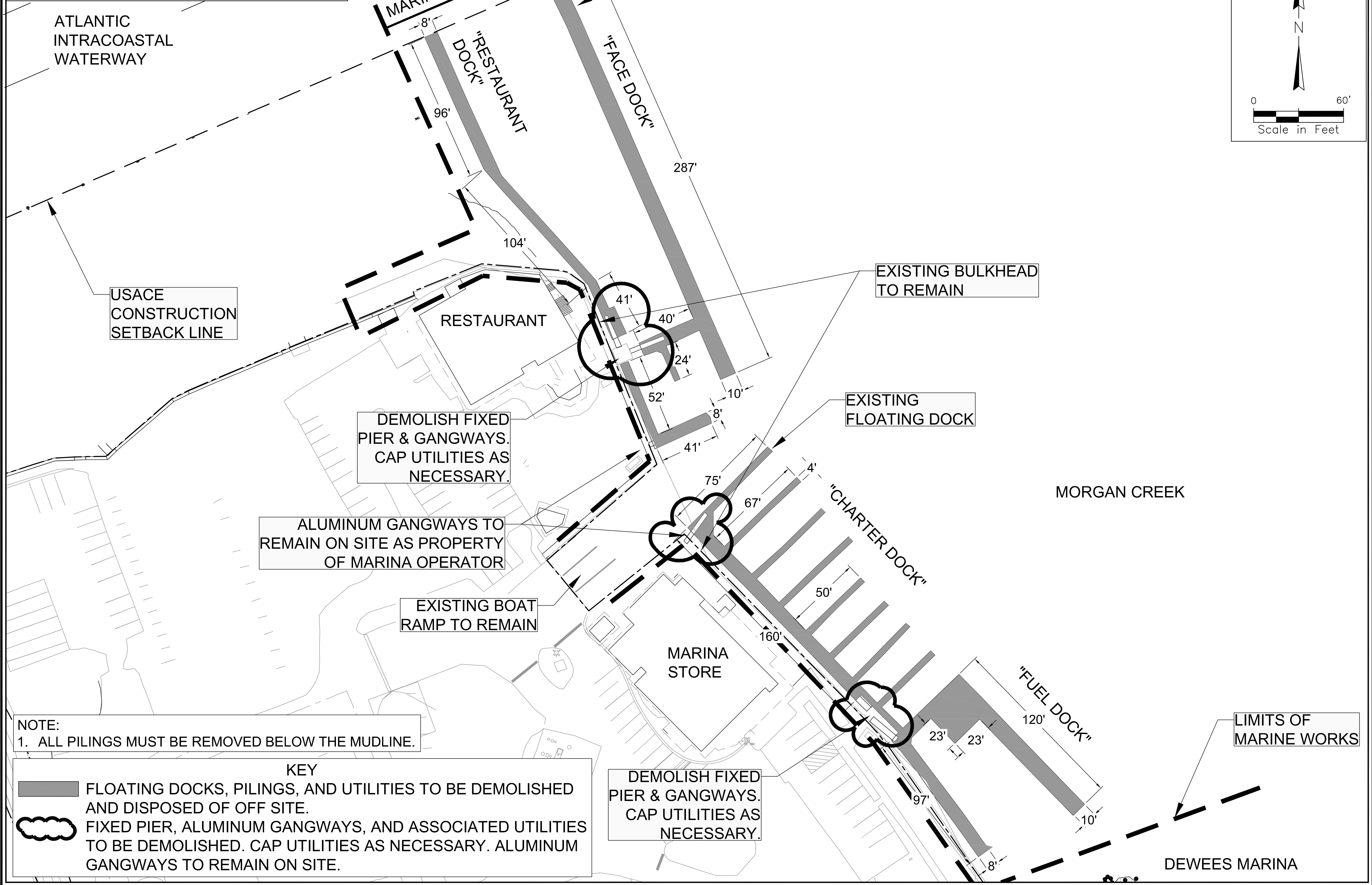
NOT FOR CONSTRUCTION



NOTE:
1. ALL PILINGS MUST BE REMOVED BELOW THE MUDLINE.

KEY

- FLOATING DOCKS, PILINGS, AND UTILITIES TO BE DEMOLISHED AND DISPOSED OF OFF SITE.
- FIXED PIER, ALUMINUM GANGWAYS, AND ASSOCIATED UTILITIES TO BE DEMOLISHED. CAP UTILITIES AS NECESSARY. ALUMINUM GANGWAYS TO REMAIN ON SITE.

Signature

Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

DESIGNED	DRAWN	CHECKED
KM	JJ	KM

DATE: 07/10/2020

JOB NO. 18-3287

SCALE: 1"=30'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

DEMOLITION PLAN

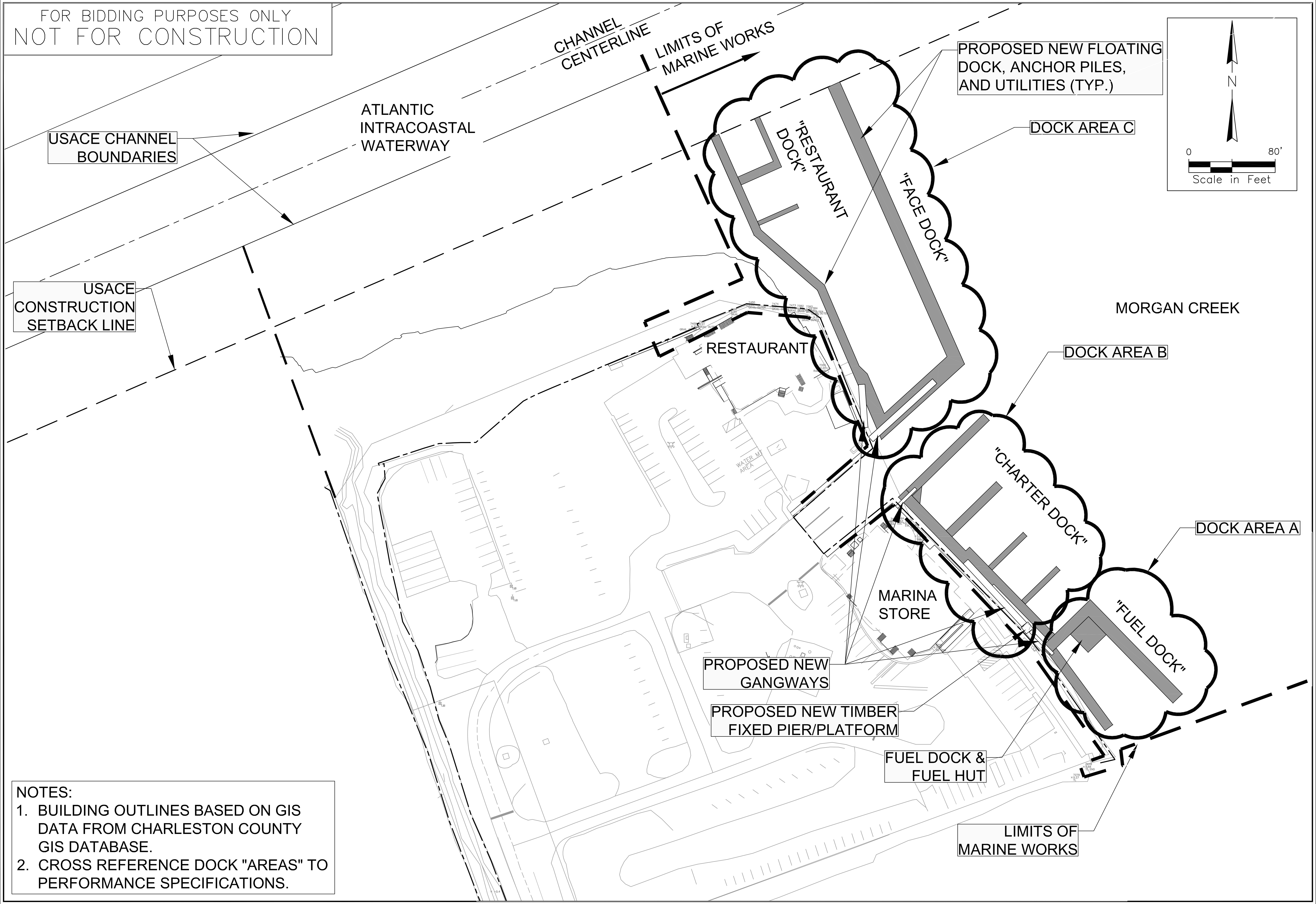
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M1

Xrefs Attached= !!atma00116-IOP [\\Chsbofps01\Groups\Charleston Shares\Shared\Projects\18-3287 IOP Marina Permitting & Design\DWG\xref\!!atma00116-iop.dwg]

...\18-3287 IOP Marina Permitting & Design\DWG\...-06-08-2020_rev8.dwg M1 7/8/20


FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION
CHANNEL CENTERLINE
LIMITS OF MARINE WORKS
PROPOSED NEW FLOATING DOCK, ANCHOR PILES, AND UTILITIES (TYP.)
DOCK AREA C
N
0
80'
Scale in Feet
ATLANTIC INTRACOASTAL WATERWAY
USACE CHANNEL BOUNDARIES
"RESTAURANT DOCK"
"FACE DOCK"
USACE CONSTRUCTION SETBACK LINE
MORGAN CREEK
RESTAURANT
DOCK AREA B
"CHARTER DOCK"
DOCK AREA A
"FUEL DOCK"
MARINA STORE
PROPOSED NEW GANGWAYS
PROPOSED NEW TIMBER FIXED PIER/PLATFORM
FUEL DOCK & FUEL HUT
LIMITS OF MARINE WORKS
NOTES:
1. BUILDING OUTLINES BASED ON GIS DATA FROM CHARLESTON COUNTY GIS DATABASE.
2. CROSS REFERENCE DOCK "AREAS" TO PERFORMANCE SPECIFICATIONS.

Signature | Date

REMARKS

REV No.	DATE	DRAWN BY	CHKD BY
4			
3			
2			
1			

DESIGNED: KM | DRAWN: JJ | CHECKED: KM

DATE: 07/10/2020
JOB NO. 18-3287
SCALE: 1"=40'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

PROPOSED OVERALL MARINA PLAN

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC, SC 29464
(843) 414-1040
ATM

DRAWING NUMBER
M2

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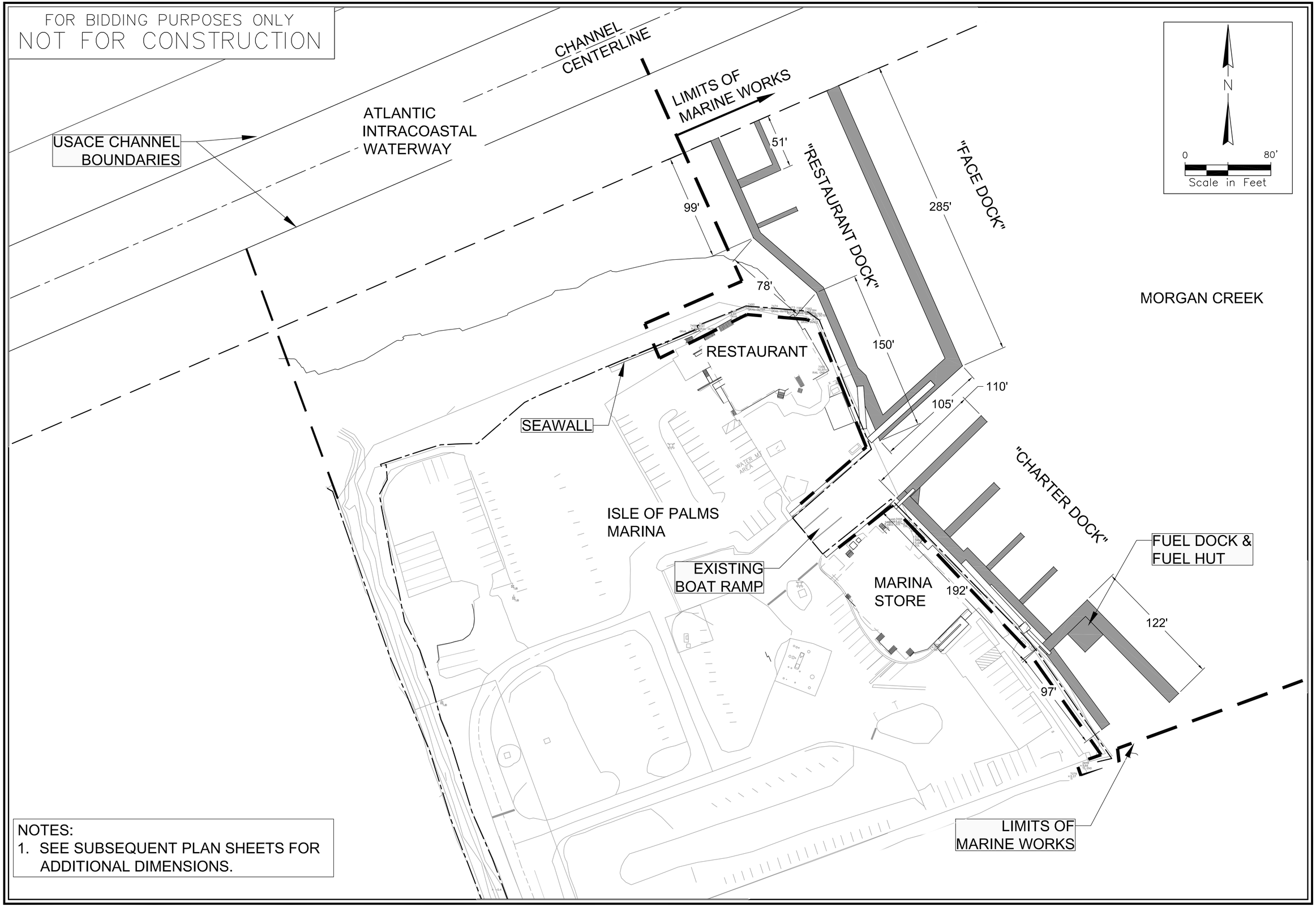
NOT FOR CONSTRUCTION



NOTES:
1. SEE SUBSEQUENT PLAN SHEETS FOR ADDITIONAL DIMENSIONS.

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

Signature
Date

DESIGNED: AM
DRAWN: JJ
CHECKED: AM
DATE: 07/10/2020
JOB NO.: 18-3287
SCALE: 1"-40'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
MARINA BASIN
DIMENSIONAL LAYOUT
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M3

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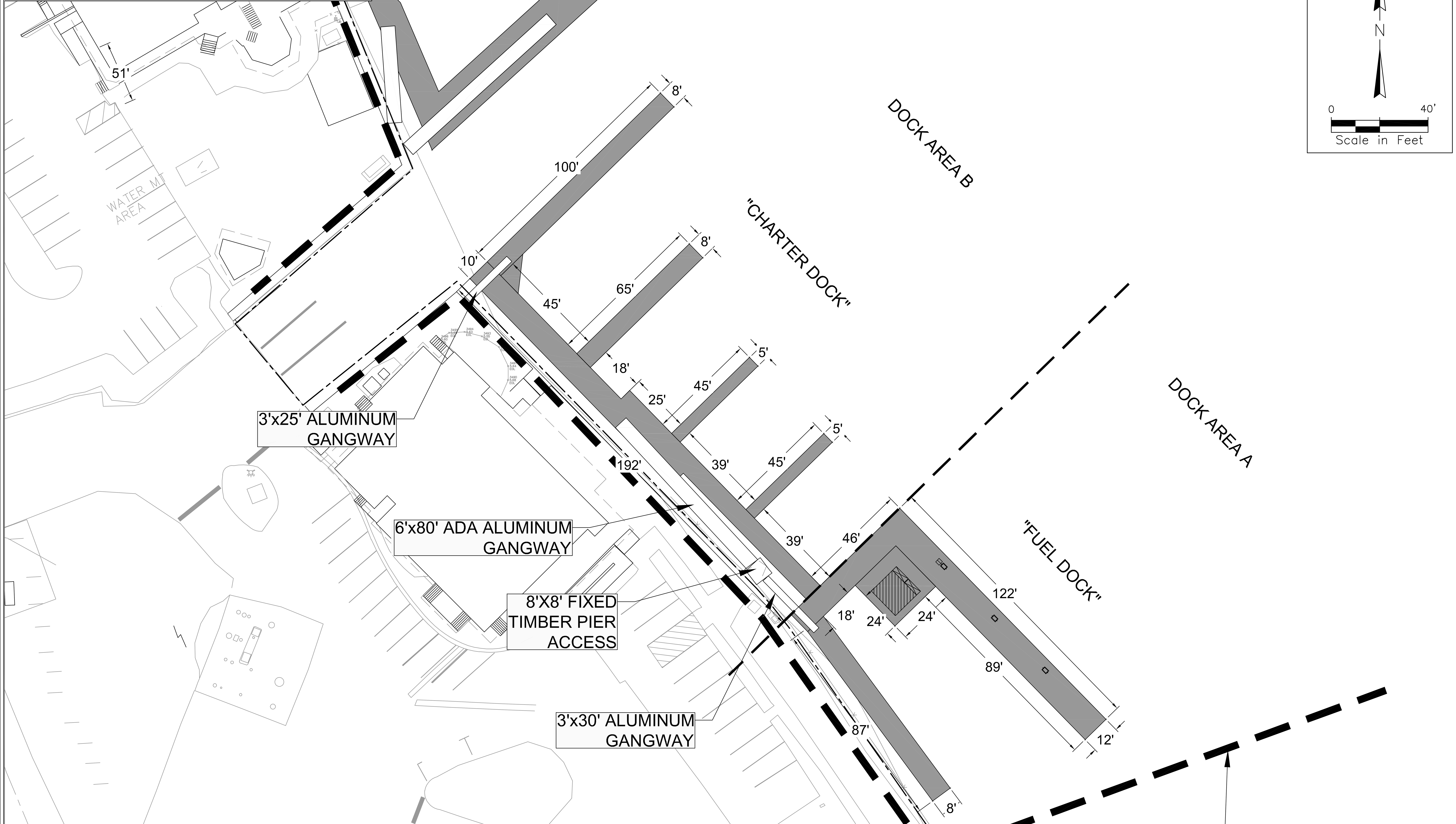
NOT FOR CONSTRUCTION



NOTES:

1. REFER TO PLAN SHEET M6 FOR ADDITIONAL DIMENSIONS OF FUEL DOCK AND APPARATUS.
2. CONTRACTOR TO PROVIDE DESIGN SUBMITTAL FOR FIXED TIMBER ACCESS AND FUEL HUT FOR APPROVAL.

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
DOCK AREA A AND B
DIMENSIONAL LAYOUT
CITY OF ISLE OF PALMS, SC

DESIGNED	DRAWN	CHECKED
KM	JJ	KM

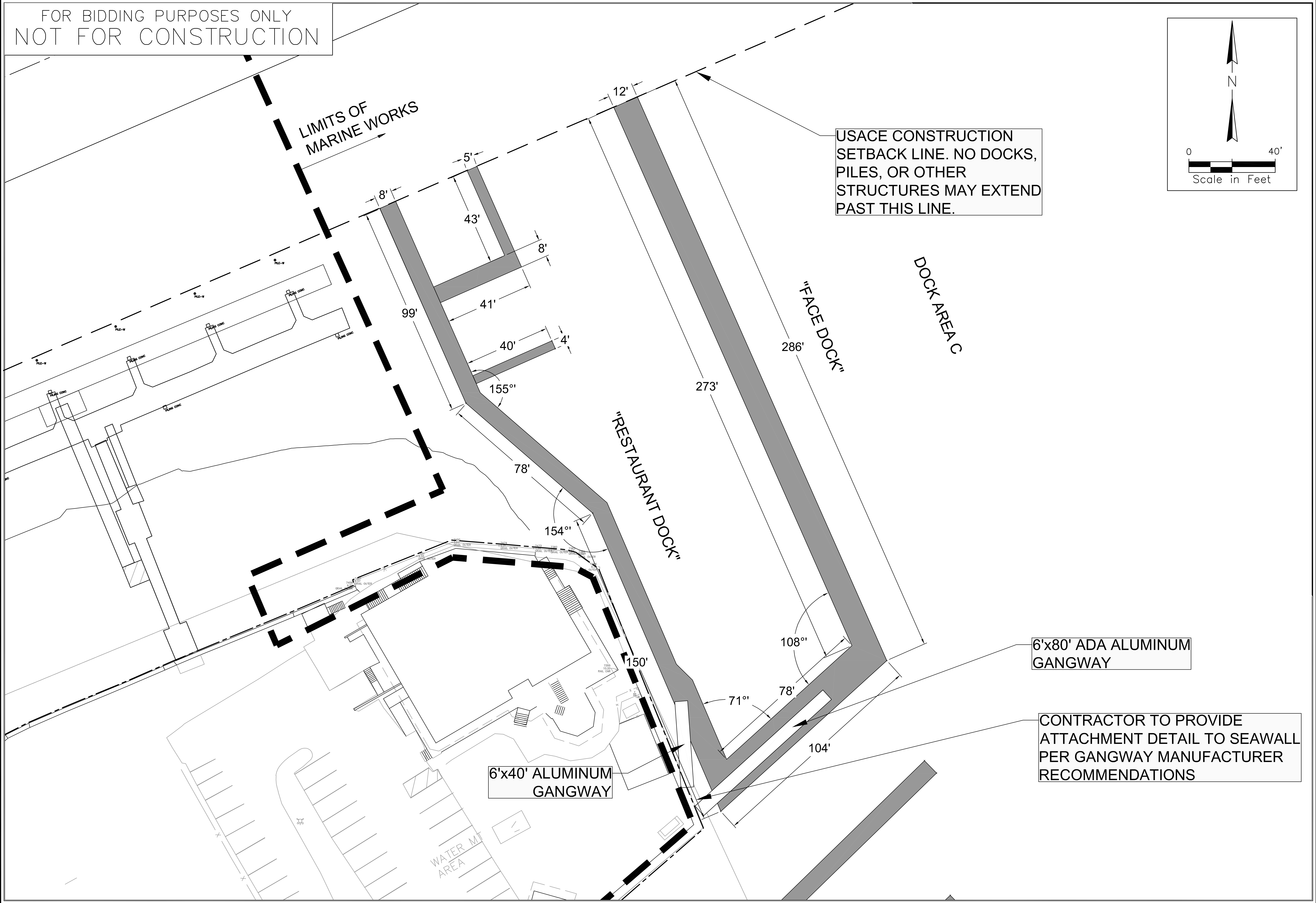
DATE: 07/10/2020
JOB NO. 18-3287
SCALE: 1"20'

REV No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

Signature
Date

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC, SC 29464
(843) 414-1040
ATM

DRAWING NUMBER
M4



REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

Signature
Date

DESIGNED KM | DRAWN JJ | CHECKED KM
DATE: 07/10/2020
JOB NO. 18-3287
SCALE: 1":20'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
DOCK AREA C
DIMENSIONAL LAYOUT
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M5

Xrefs Attached= !!!atma00116-IOP [\\Chsbofps01\Groups\Charleston Shares\Shared\Projects\18-3287 IOP Marina Permitting & Design\DWG\xref\!!!atma00116-iop.dwg]
\\Chsbofps01\Groups\Charleston Shares\Shared\Projects\18-3287 IOP Marina Permitting & Design\DWG\...07-08-2020_rev8.dwg M5 7/8/20

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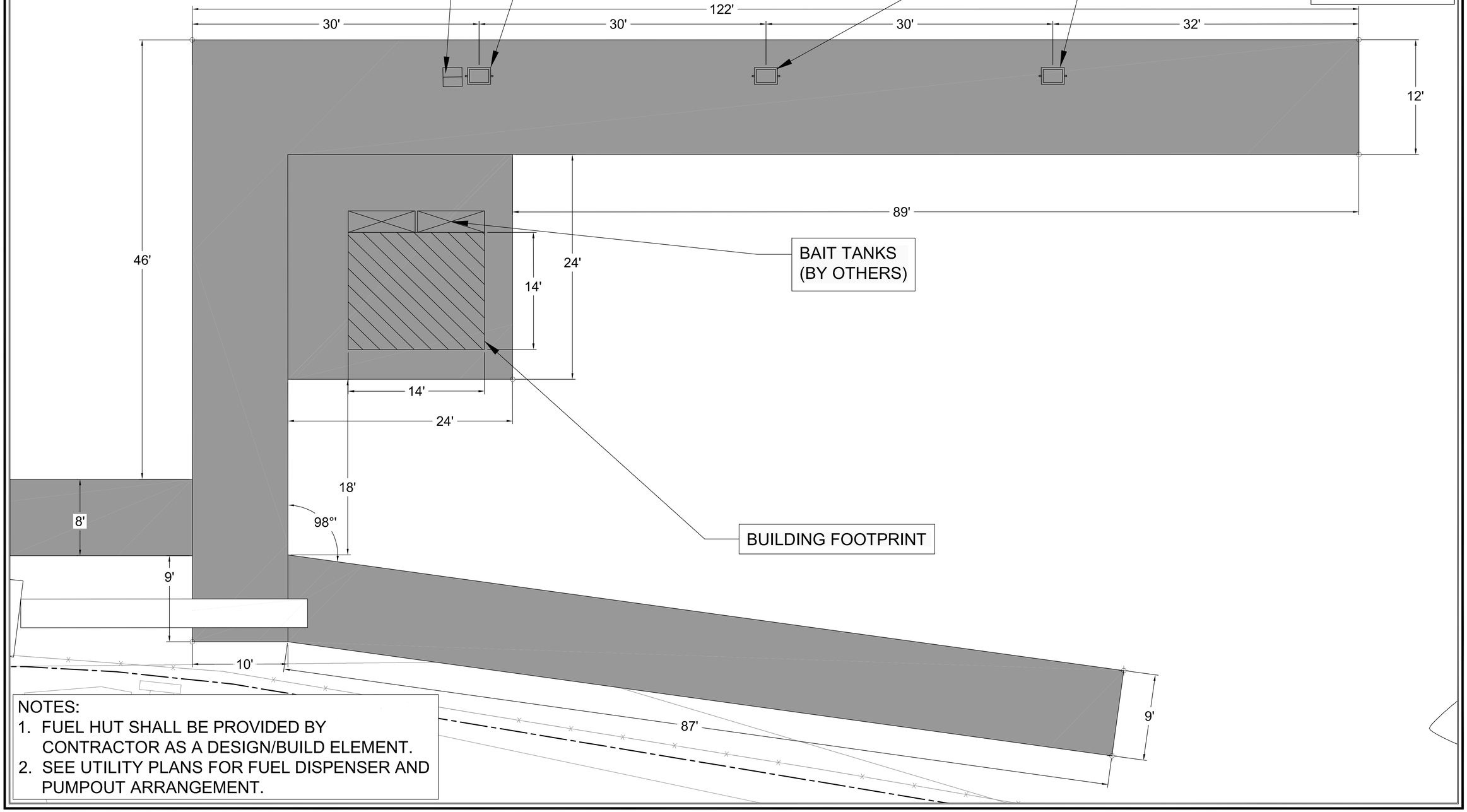
NOT FOR CONSTRUCTION

FUEL DOCK



NOTES:
1. FUEL HUT SHALL BE PROVIDED BY CONTRACTOR AS A DESIGN/BUILD ELEMENT.
2. SEE UTILITY PLANS FOR FUEL DISPENSER AND PUMPOUT ARRANGEMENT.

Signature
Date

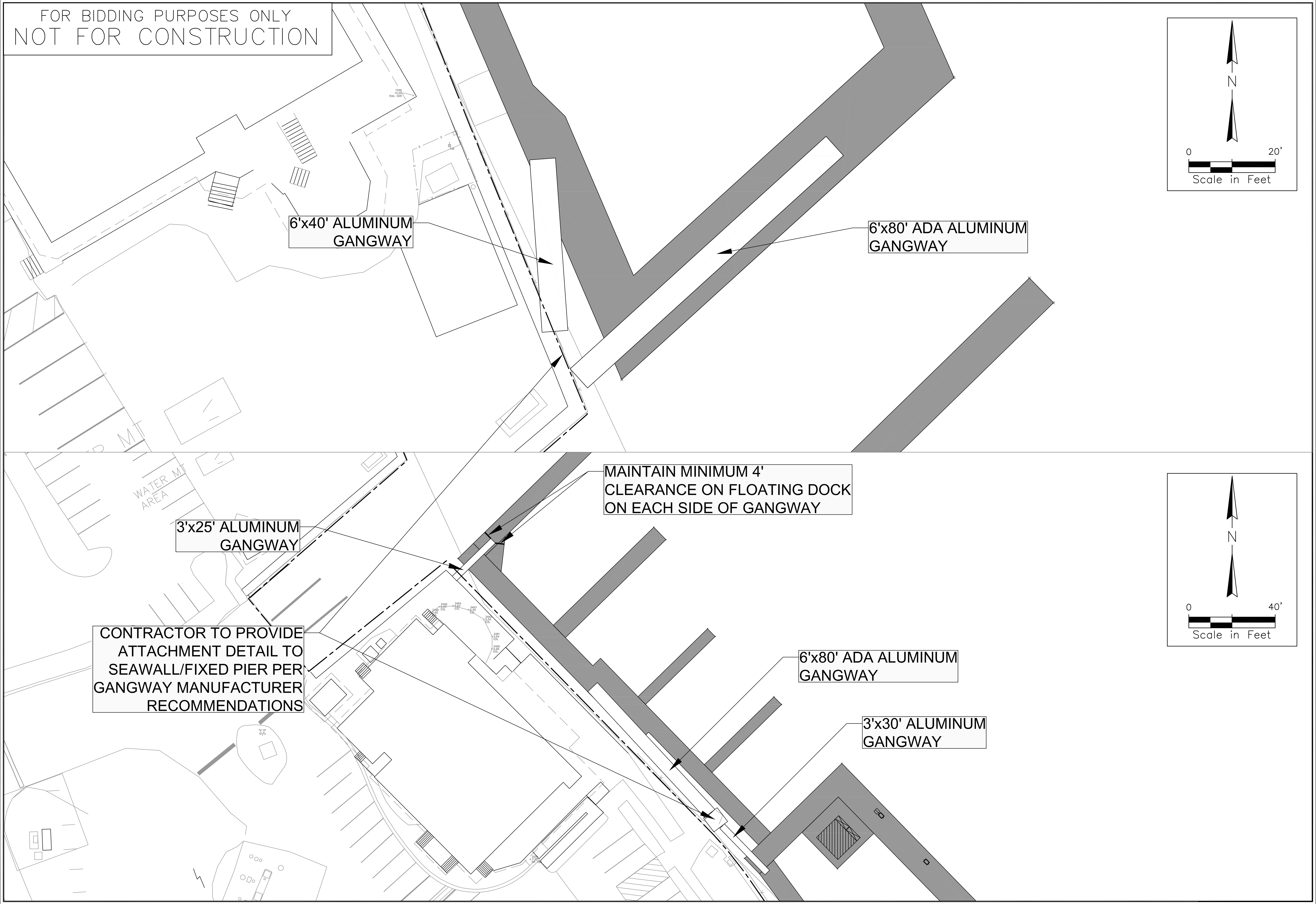
REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

DESIGNED AM | DRAWN JJ | CHECKED AM
DATE: 07/10/2020
JOB NO. 18-3287
SCALE: 1"-5'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
FUEL DOCK
DIMENSIONAL LAYOUT
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC, SC 29464
(843) 414-1040

DRAWING NUMBER
M6



Signature
Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
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2				
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DESIGNED	DRAWN	CHECKED
KM	JJ	KM

DATE: 07/10/2020
JOB NO. 18-3287
SCALE:

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

GANGWAY ARTICULATION LAYOUT

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
ATM
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M7

FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION

X: 2381022.7
Y: 356369.8

X: 2381011.7
Y: 356365.0

X: 2380910.7
Y: 356321.3

X: 2380948.4
Y: 356337.6

X: 2380903.4
Y: 356318.1

X: 2380943.8
Y: 356335.6

X: 2380983.0
Y: 356256.7

X: 2380984.7
Y: 356253.1

X: 2380943.3
Y: 356227.8

USACE
CONSTRUCTION
SETBACK LINE.

X: 2381002.0
Y: 356176.9

X: 2381138.2
Y: 356108.5

X: 2381155.7
Y: 356062.2

X: 2381161.3
Y: 356056.4

X: 2381167.6
Y: 355999.8

X: 2381173.2
Y: 355994.0

X: 2381061.3
Y: 356038.6

X: 2381192.5
Y: 355952.8

X: 2381196.0
Y: 355949.2

X: 2381076.9
Y: 355985.3

X: 2381223.2
Y: 355921.3

X: 2381226.7
Y: 355917.7

X: 2381254.6
Y: 355890.5

X: 2381252.6
Y: 355841.7

X: 2381209.6
Y: 355846.5

X: 2381275.4
Y: 355774.7

X: 2381339.8
Y: 355803.1

X: 2381331.2
Y: 355794.7

X: 2381268.2
Y: 355769.3

N

0 60'

Scale in Feet

NOTES:
1. CONTRACTOR SHALL ENSURE THAT NO ENCROACHMENT INTO USACE CONSTRUCTION SETBACK OCCURS.

REV/ No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
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1				

DESIGNED AM | DRAWN JJ | CHECKED AM
DATE: 07/10/2020
JOB NO. 18-3267
SCALE: 1"-30'

Signature

Date

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
MARINA BASIN
SETTING OUT PLAN
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
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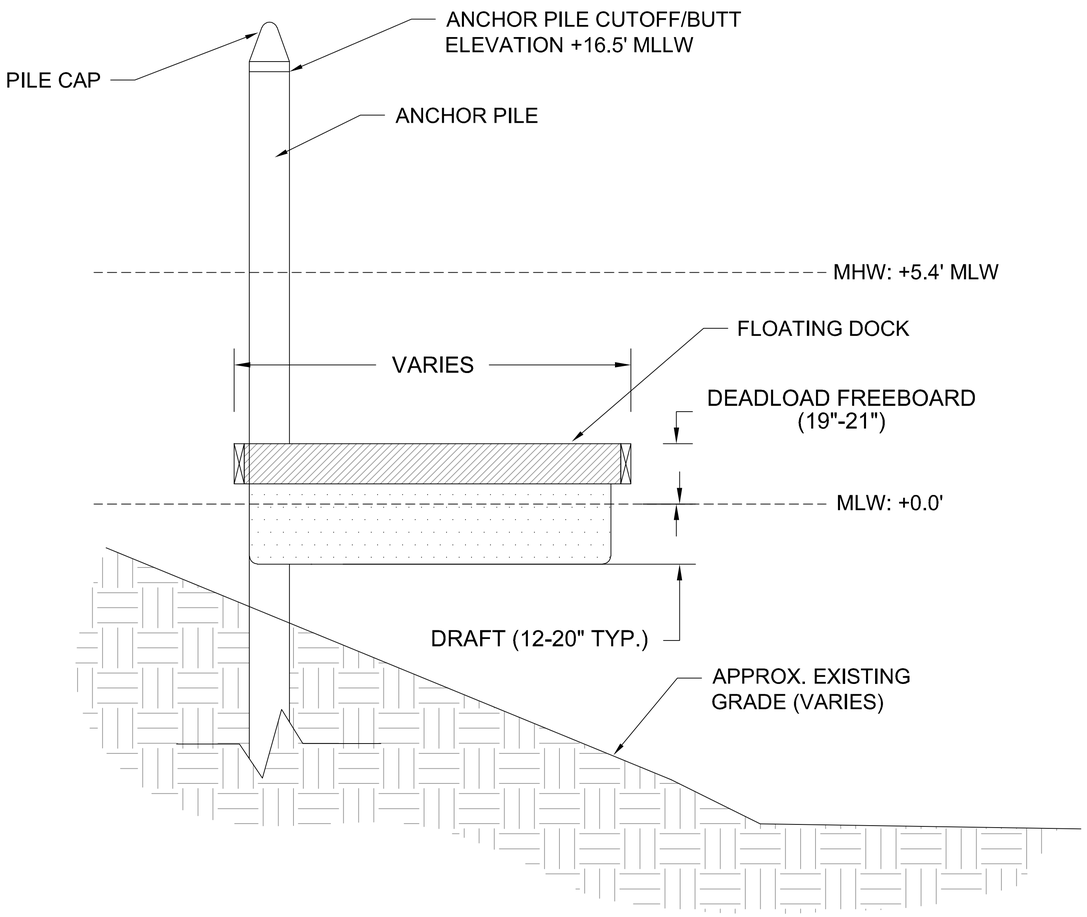
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M8



TYPICAL FLOATING DOCK SECTION

NOT TO SCALE

FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION

ISLE OF PALMS MARINA

Boating Infrastructure Grant (BIG) Program
US FISH & WILDLIFE SERVICE Sport Fish Restoration Fund
A Sport Fish Restoration - Boating Infrastructure Grant (Partially) funded this facility thanks to your purchase of fishing equipment and motorboat fuel.

2'

3'

BIG SIGN NOTES:

A. FURNISH AND INSTALL BOATING INFRASTRUCTURE GRANT (BIG) SIGN.

B. PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.

C. COORDINATE PLACEMENT WITH DESIGN CRITERIA PROFESSIONAL.

REV/ No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

Signature / Date

DESIGNED AM / JJ | DRAWN JJ | CHECKED AM | DATE: 07/10/2020 | JOB NO. 18-3287 | SCALE:

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
TYPICAL DETAILS
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
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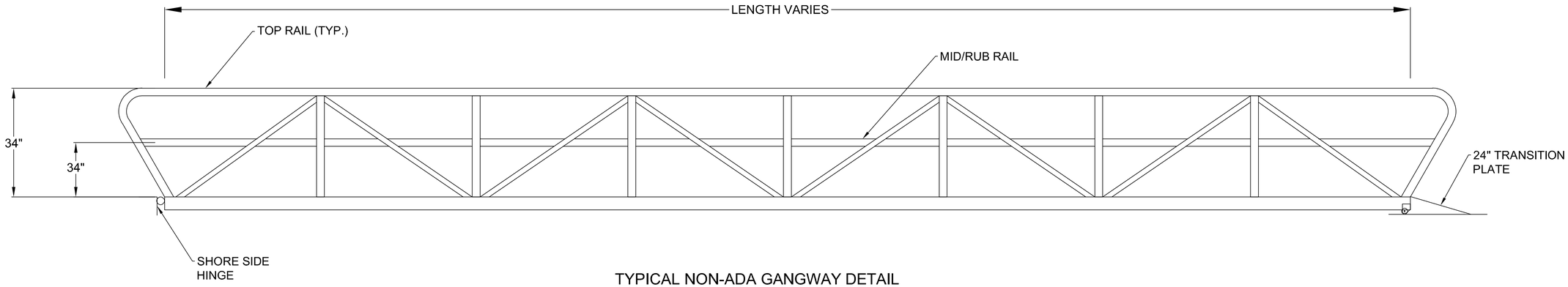
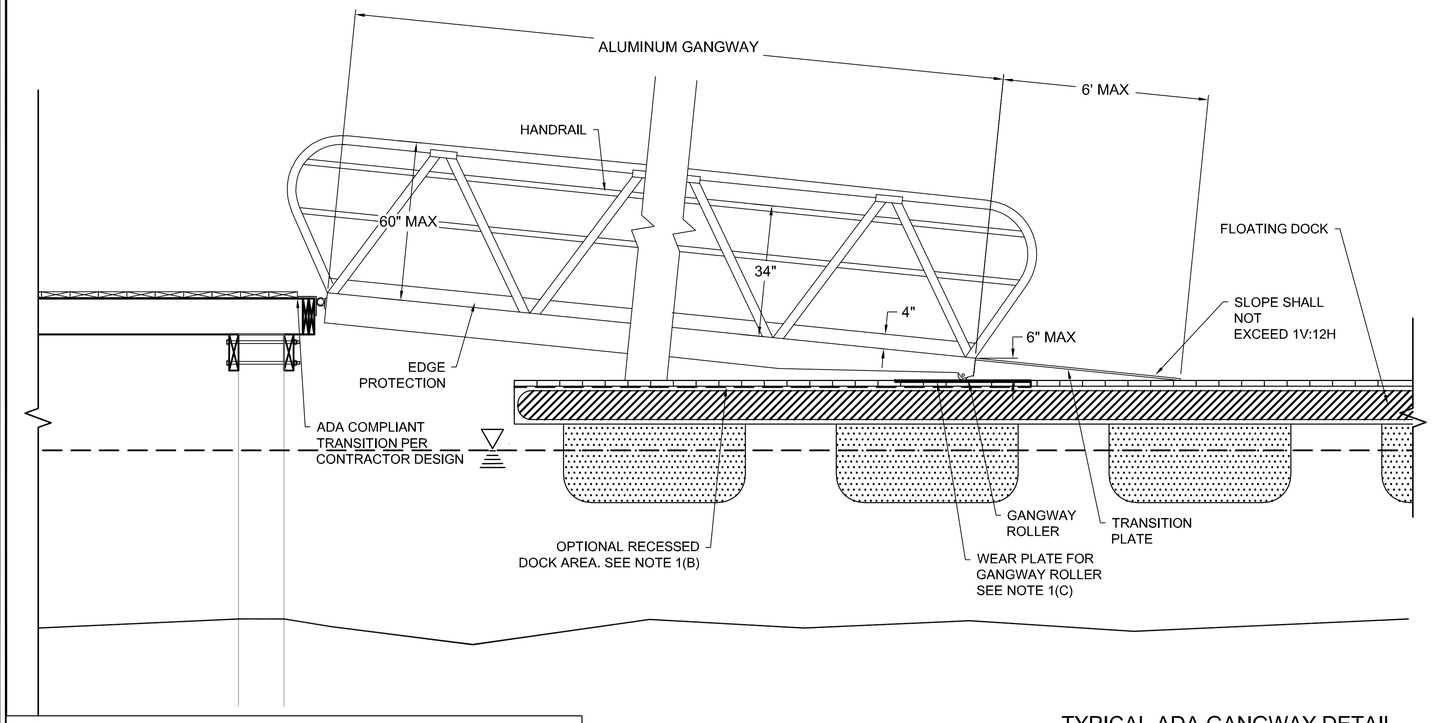
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M9



TYPICAL NON-ADA GANGWAY DETAIL

NOT TO SCALE



TYPICAL ADA GANGWAY DETAIL

NOT TO SCALE

DETAIL NOTES:

1. THE CONTRACTOR SHALL DEVELOP GANGWAY DESIGN TO MEET THE FOLLOWING MINIMUM CRITERIA:

   A. MAX. LENGTH OF TRANSITION PLATE SHALL BE 6 FT.

   B. TRANSITION PLATE/GANGWAY HINGE SHALL HAVE A MAX. HEIGHT ABOVE FLOATING DOCK DECK SURFACE OF 6 INCHES. FLOATING DOCK DECK SECTION MAY BE MODIFIED (RECESSED) IN THIS AREA TO ACCOMMODATE MAXIMUM TRANSITION PLATE HEIGHT.

   C. WEAR PLATE ON DOCK TO EXTEND MIN 2'-0" EACH SIDE WHEN ROLLERS CONTACT AT MID TIDE.

   D. ADD ALUMINUM HANDRAIL TO COMPLY WITH ADAAG SPECIFICATIONS. WELD HANDRAIL TO EXISTING ALUMINUM STRUCTURE. TOP OF GRIPPING SURFACE HANDRAIL SHALL BE 34" ABOVE WALKING SURFACE. DIAMETER OF GRIPPING SURFACE SHALL BE 1 ¼" - 1 ½". HANDRAIL MUST WITHSTAND 250 POUND LOAD, ANY DIRECTION.

   E. ADD ALUMINUM EDGE PROTECTION, MIN. 4" HIGH AND SHALL BE WELDED TO GANGWAY.

   F. DESIGNATED ADA GANGWAYS MUST BE FULLY ADA COMPLIANT, INCLUDING TRANSITIONS.

   G. CONSIDER HORIZONTAL MOVEMENT OF DOCK SYSTEMS IN GANGWAY DESIGN AND GANGWAY ATTACHMENT DESIGN.

   H. TOP CHORD/STRUCTURAL ELEMENT OF GANGWAY SHALL NOT EXCEED 60" ABOVE WALKING SURFACE.

   I. NON-ADA GANGWAYS SHALL BE SIMILAR IN CONSTRUCTION, BUT MAY OMIT THE EDGE PROTECTION, MAY HAVE SHORTER TRANSITION PLATES, AND MAY EXCEED THE 1:12 MAXIMUM SLOPE

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NOT FOR CONSTRUCTION

Signature / Date

REV. No.	DATE:	DRAWN BY:	CHKD BY:	REMARKS
4				
3				
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DESIGNED: AM | DRAWN: JJ | CHECKED: AM
DATE: 07/10/2020
JOB NO.: 18-3287
SCALE:

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

TYPICAL GANGWAY DETAILS

CITY OF ISLE OF PALMS, SC

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Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M10

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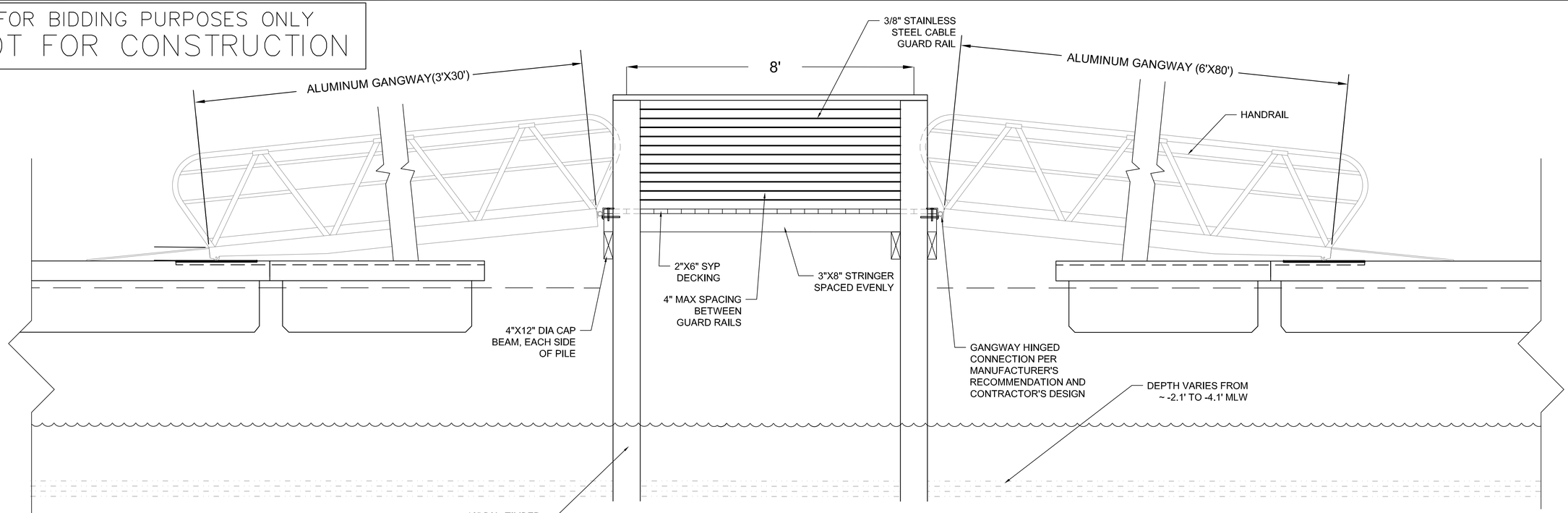
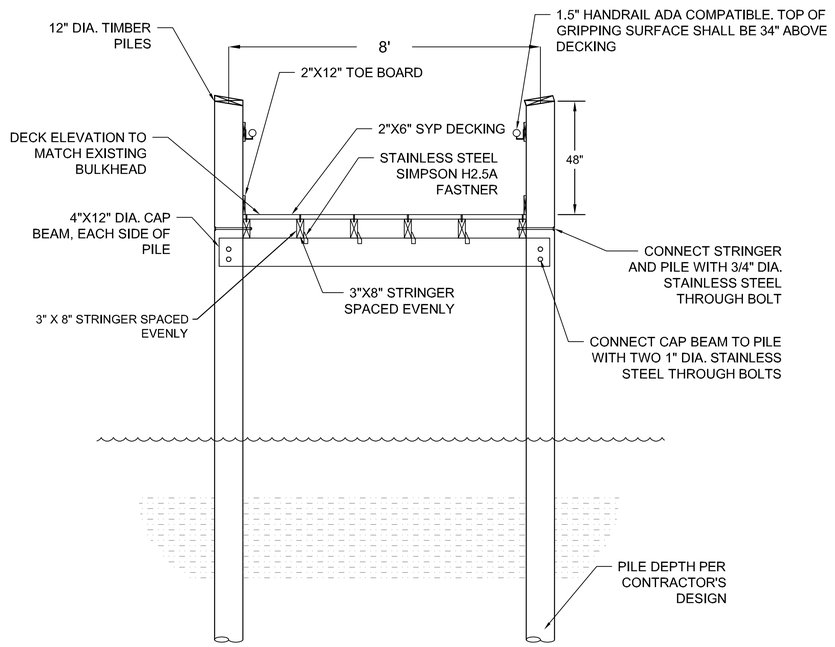
NOT FOR CONSTRUCTION



REPRESENTATIVE FIXED TIMBER DOCK SECTION
NOT TO SCALE

NOTE: SEE ADA GANGWAY DETAIL ON SHEET M10 FOR ADDITIONAL REQUIREMENTS FOR ADA GANGWAY.



REPRESENTATIVE FIXED TIMBER DOCK SECTION
NOT TO SCALE

FIXED TIMBER PIERS - CONTRACTOR TO PROVIDE DESIGN SUBMITTAL FOR FIXED TIMBER ACCESS FOR APPROVAL AND PROJECT RECORD.

1.0 MATERIALS

1.1 WOOD PILE

1.1.1 SOUTHERN YELLOW PINE, ASTM D25

1.1.2 2.5 CCA PRESSURE PRESERVATIVE TREATED OR AS SPECIFIED BY AWPA.

1.1.3 PILES SHALL BE VISUALLY STRAIGHT WITHOUT SPLITS OR VOIDS. PILES SHALL HAVE A CONSISTENT TAPER NOT EXCEEDING 3 INCHES FROM THE BUTT TO THE TIP.

1.1.4 WOOD PILES SHALL BE DRIVEN AS REQUIRED BY THE GEOTECHNICAL, AND/OR CONTRACTOR'S ENGINEER. PILE SPLICES SHALL NOT BE PERMITTED.

1.2 PIER CAP, BEAMS, STRINGERS, LEDGERS, AND BRACING

1.2.1 SOUTHERN YELLOW PINE, NO. 1 MARINE GRADE

1.2.2 S4S - SURFACED FOUR SIDES

1.2.3 0.6 CCA PRESSURE PRESERVATIVE TREATED FOR BEAMS, STRINGERS, AND LEDGERS OR AS SPECIFIED BY AWPA.

1.2.4 2.5 CCA PRESSURE PRESERVATIVE TREATED FOR BRACING LOCATED BELOW MEAN HIGH WATER ELEVATION

1.3 WOOD PIER DECKING

1.3.1 SOUTHERN YELLOW PINE, NO. 1, DENSE

1.3.2 S4S - SURFACED FOUR SIDES

1.3.3 COPPER AZOLE (CA) PRESSURE PRESERVATIVE TREATED FOR GROUND CONTACT OR AS SPECIFIED BY AWPA. MICRONIZED COPPER AZOLE (MCA) IS NOT PERMITTED.

1.3.4 DECK FASTENERS SHALL BE TYPE 316 STAINLESS STEEL #10 BUGLE HEAD SQUARE DRIVE SCREWS WITH A MINIMUM 2 INCH PENETRATION INTO STRINGERS.

1.3.5 DECK BOARD SPACING SHALL BE IN ACCORDANCE WITH THE SOUTHERN PINE COUNCIL'S RECOMMENDATIONS FOR INSTALLATION OF TREATED DECKING BASED ON THE DECK BOARD WIDTH DURING INSTALLATION.

1.3.5.1 5 5/8" WIDTH OR LESS (WET OR DRY): 1/16" MINIMUM TO 1/8" MAXIMUM

1.3.5.2 5 3/4" WIDTH (WET): BUTT BOARDS TOGETHER

1.3.5.3 OVER 5 3/4" WIDTH (WET): ALLOW DRYING PRIOR TO INSTALL

1.3.6 DECKING OVERHANG SHOULD NOT EXCEED 4 INCHES.

1.3.7 RASP OR SAND ENDS AND EDGES OF DECKING AROUND PERIMETER OF EACH PIER TO REMOVE ALL BURRS, SPLINTERS, AND SHARP EDGES.

1.3.8 FINISHED DECK SURFACE AT ACCEPTANCE AND PRIOR TO 1 YEAR FOLLOWING ACCEPTANCE SHALL NOT HAVE HORIZONTAL GAPS LARGER THAN 1/2 ". VERTICAL ELEVATION DIFFERENCE SHALL NOT EXCEED 1/4 ".

1.4 FASTENERS AND CONNECTORS

1.4.1 ALL BOLTS, SCREWS, THREADED RODS, NAIL, WASHERS, HEX NUTS, CONNECTORS, AND OTHER HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.

1.4.2 BOLTED CONNECTIONS SHALL CONSIST OF A HEX NUT (OR BOLT HEAD) AND ROUND WASHER AT EACH END. AFTER INSTALLATION, BOLTED CONNECTIONS SHALL BE CHECKED FOR TIGHTNESS AND PROTRUDING BOLT ENDS SHALL BE CUT OFF 1 INCH BEYOND THE NUT.

1.4.3 DECK SCREWS SHALL BE ALIGNED, UNIFORMLY SPACED, AND SET FLUSH TO ALLOW FOR A SMOOTH SURFACE.

Signature / Date

REV. No.	DATE:	DRAWN BY:	CHKD BY:	REMARKS
4				
3				
2				
1				

DESIGNED: AM | DRAWN: JJ | CHECKED: AM
DATE: 07/10/2020
JOB NO.: 18-3287
SCALE:

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

FIXED TIMBER DOCK DETAILS

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M11

FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION

DESIGN WAVE CONDITION
FULL OCCUPANCY
H=2.9 FT; T=2.5 SEC

DESIGN WAKE CONDITION
FULL OCCUPANCY
H=2.5 FT; T=3.5 SEC

DESIGN WAVE CONDITION
FULL OCCUPANCY
H=1.5 FT; T=2.5 SEC

DESIGN WAKE CONDITION
FULL OCCUPANCY
H=1.0 FT; T=3.5 SEC

N

0 60'

Scale in Feet

WATER MT AREA

NOTES:
1. REFER TO WRITTEN TECHNICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.

REV. No.	DATE:	DRAWN BY:	CHKD BY:	REMARKS
4				
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2				
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Signature

Date

DESIGNED AM	DRAWN JJ	CHECKED AM
DATE:	07/10/2020	
JOB NO.	18-3267	
SCALE:	1"=30'	

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

DESIGN WAVE CONDITIONS

CITY OF ISLE OF PALMS, SC

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Mt Pleasant SC, SC 29464
(843) 414-1040

DRAWING NUMBER
M12

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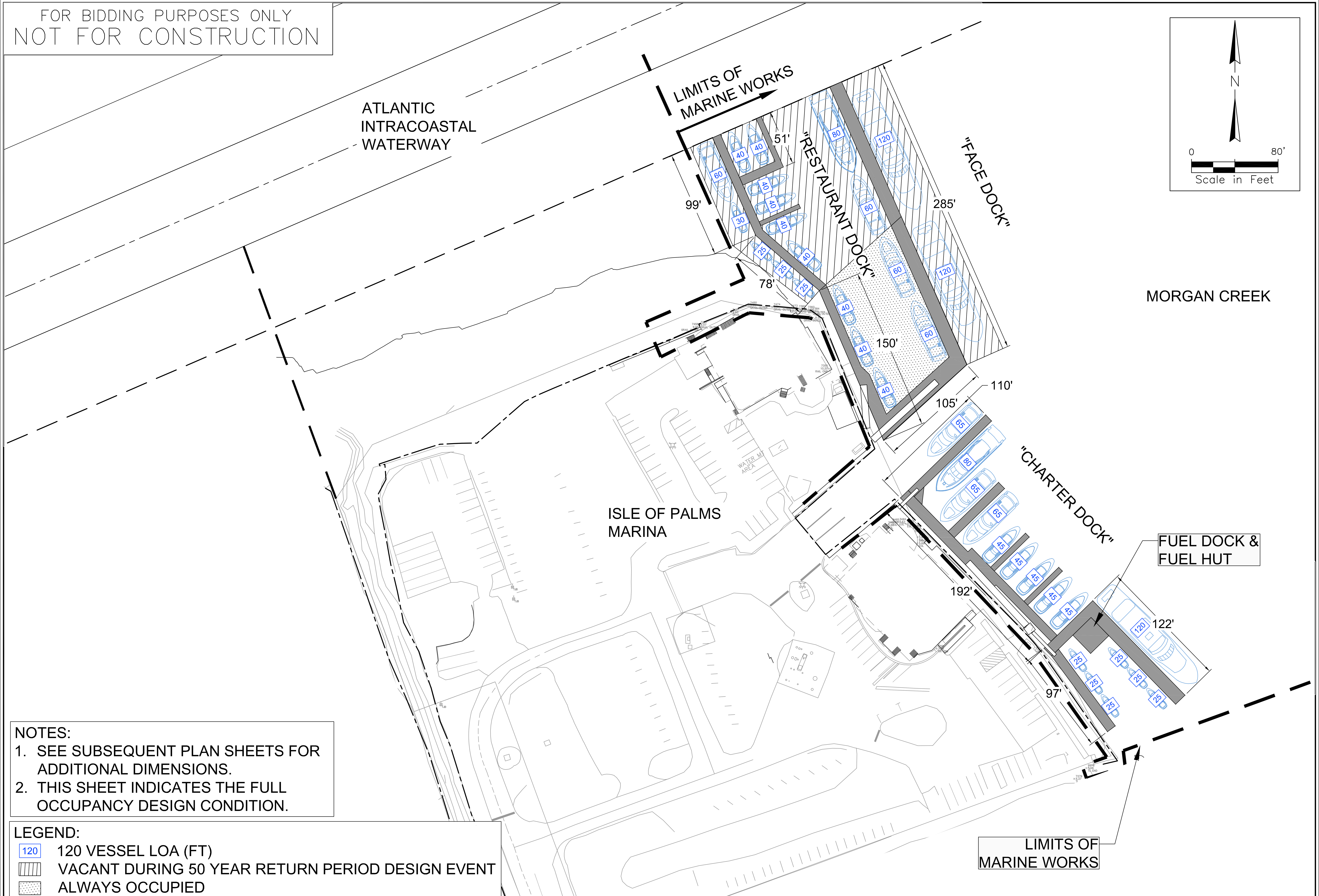


NOTES:

1. SEE SUBSEQUENT PLAN SHEETS FOR ADDITIONAL DIMENSIONS.
2. THIS SHEET INDICATES THE FULL OCCUPANCY DESIGN CONDITION.

LEGEND:

- 120 VESSEL LOA (FT)
- VACANT DURING 50 YEAR RETURN PERIOD DESIGN EVENT
- ALWAYS OCCUPIED

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

Signature
Date

DESIGNED	DRAWN	CHECKED
KM	JJ	KM

DATE: 07/10/2020
JOB NO. 18-3287
SCALE: 1":40'

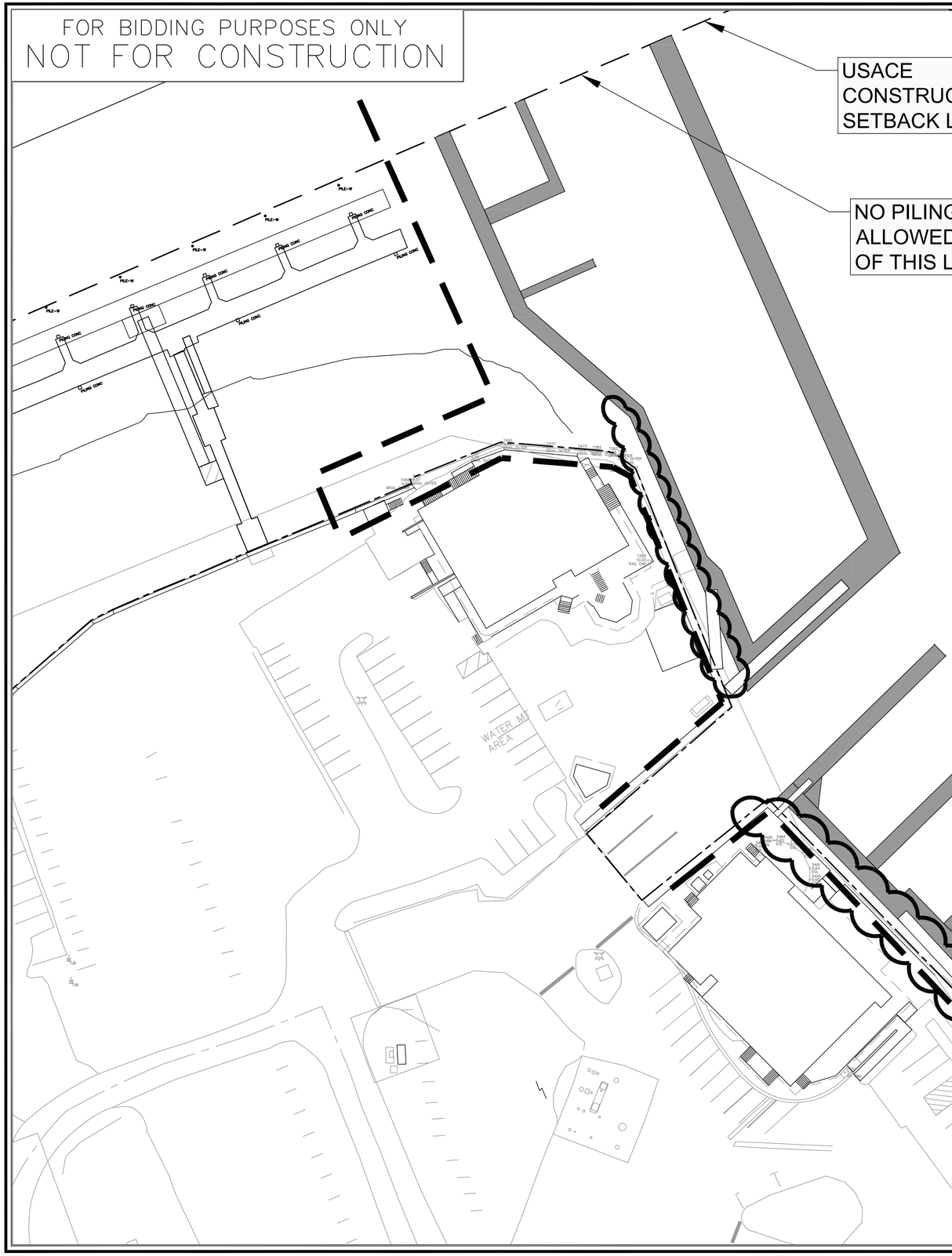
ISLE OF PALMS MARINA
ISLE OF PALMS, SC
FLOATING DOCK VESSEL OCCUPANCY
CITY OF ISLE OF PALMS, SC

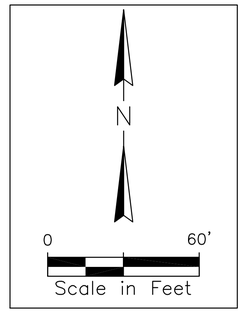
Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M13

FOR BIDDING PURPOSES ONLY

NOT FOR CONSTRUCTION





PILING NOTES:

1. PREFERRED PILE PLACEMENT AREA ON LAND-SIDE OF SHORELINE ADJACENT FLOATING DOCKS SO AS NOT TO IMPEDE CLEAR WALKWAY.
2. REMAINING PILING SHALL BE INTERNAL TYPE (INBOARD OF FLOAT EDGES) TO THE EXTENT PRACTICAL TO ENABLE CLEAR SIDE TIE BERTHING SPACE.
3. NO STRUCTURES/PILINGS MAY BE PLACED CHANNELWARD OF THE USACE CONSTRUCTION SETBACK.
4. PILE PLACEMENT SHALL NOT IMPEDE FREE/CLEAR ACCESS OF FLOATING DOCKS.
5. PROVIDE PILE PLACEMENT PLAN WITH DESIGN SHOP DRAWING SUBMITTAL FOR REVIEW AND APPROVAL.

Signature

Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
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DESIGNED AM | DRAWN JJ | CHECKED AM

DATE: 07/10/2020

JOB NO. 18-3287

SCALE: 1"-30'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

PREFERRED PILE PLACEMENT DIAGRAM

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
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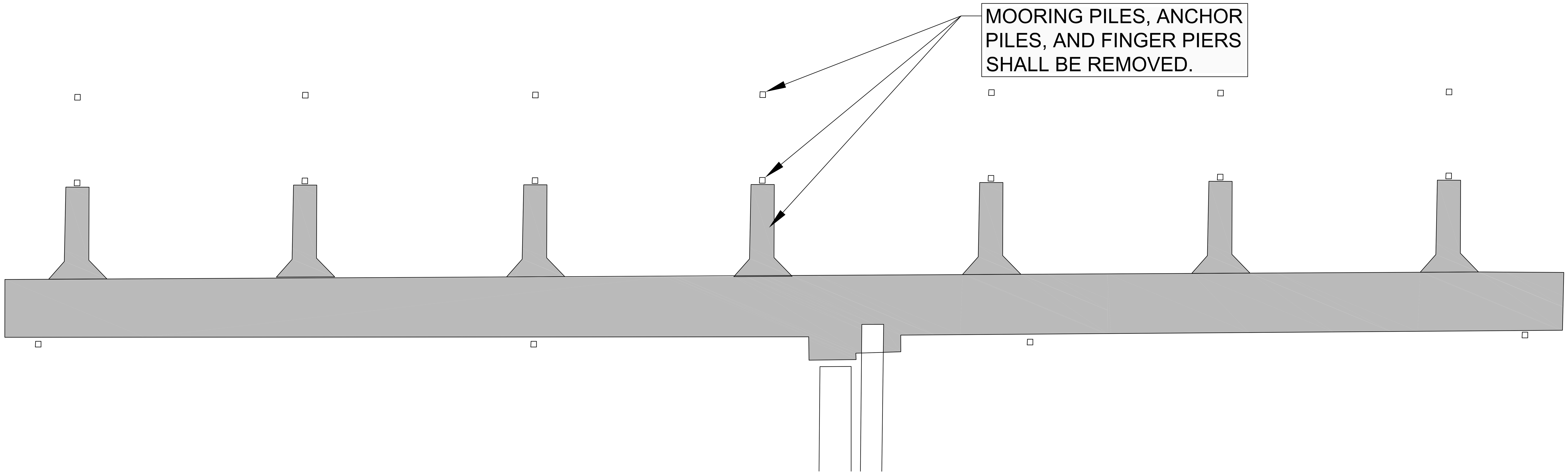
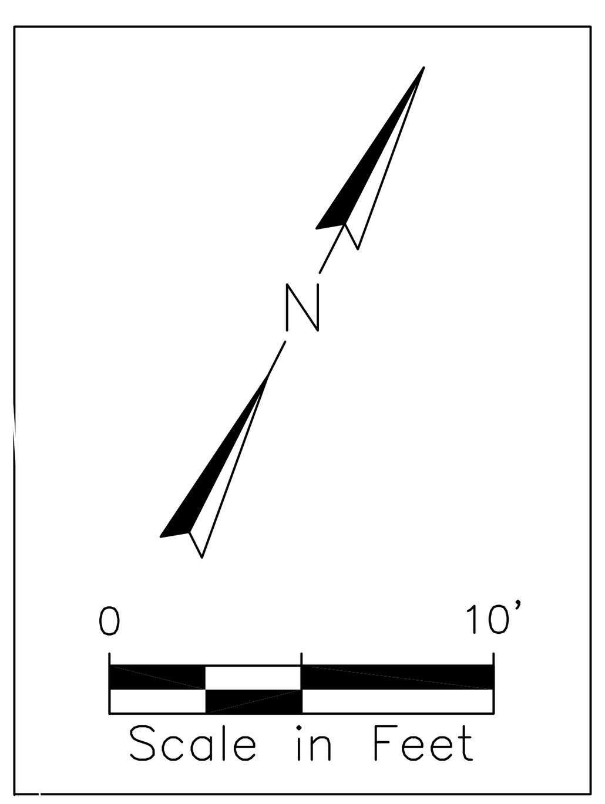
DRAWING NUMBER

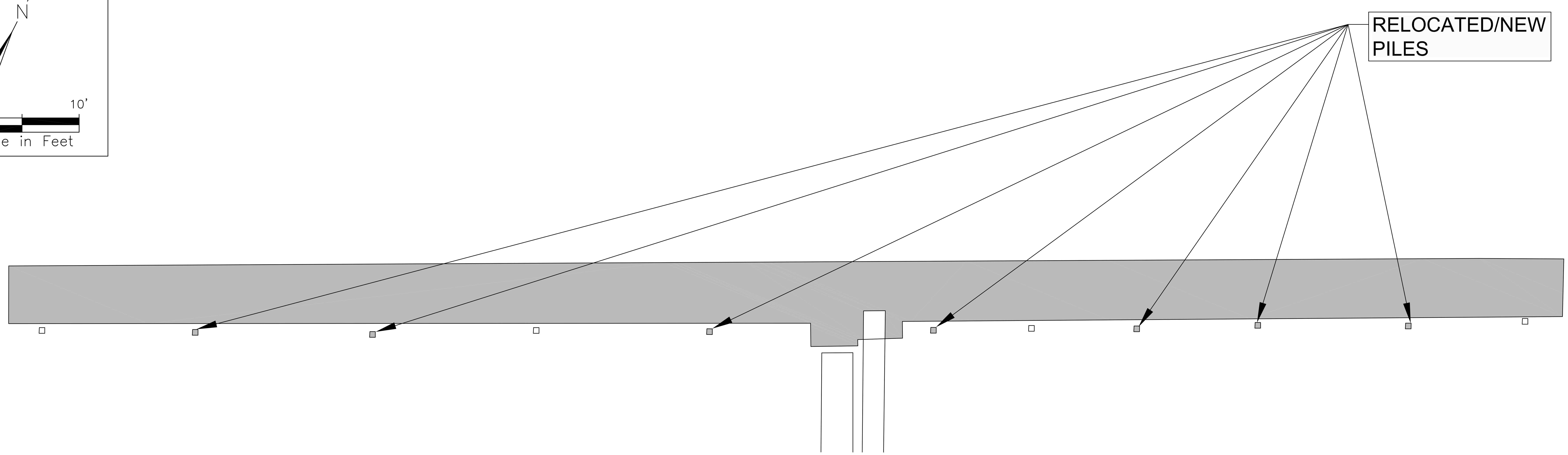
M14

FOR BIDDING PURPOSES ONLY
NOT FOR CONSTRUCTION



EXISTING CONDITIONS





NOTE: ANCHOR PILES TO BE LOCATED ON SHORE SIDE OF DOCK.

PROPOSED CONDITIONS

Signature

Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
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DESIGNED	DRAWN	CHECKED
KM	JJ	KM
DATE:	08/25/2020	
JOB NO.	18-3287	
SCALE:	1":10'	

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

INTRACOASTAL DOCK IMPROVEMENTS

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
M15

GENERAL ELECTRICAL NOTES

1. FURNISH ALL MATERIALS AND LABOR NECESSARY TO PROVIDE COMPLETE AND PROPERLY OPERATING ELECTRICAL SYSTEMS. FURNISH ALL MATERIALS AND LABOR NECESSARY TO DEMONSTRATE TO THE OWNER AND TO THE ENGINEER THAT ALL SYSTEMS ARE OPERATING PROPERLY AND AS SPECIFIED. WARRANTY ALL WORK AND ALL MATERIALS, EQUIPMENT AND DEVICES FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE.

2. WORK SHALL CONFORM TO THE LATEST EDITION OF:
   A. ANSI/NFPA 70 (NATIONAL ELECTRICAL CODE)
   B. NECA STANDARD OF INSTALLATION
   C. INTERNATIONAL BUILDING CODE
   D. NFPA 303 MARINAS AND BOATYARDS
   E. NFPA 307 STANDARD FOR CONSTRUCTION AND FIRE PROTECTION OF MARINE TERMINALS, PIERS, AND WHARVES.
   F. ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES
   G. LOCAL UTILITY COMPANY REGULATIONS

3. ALL MATERIALS, EQUIPMENT AND DEVICES SHALL, AS A MINIMUM, MEET THE REQUIREMENTS OF U.L. WHERE U.L. STANDARDS ARE ESTABLISHED FOR THOSE ITEMS, AND THE REQUIREMENTS OF NFPA 70. ALL ITEMS SHALL BE CLASSIFIED BY U.L. AS SUITABLE FOR THE PURPOSE USED. ALL ITEMS SHALL BE NEW AND ALL MATERIALS/EQUIPMENT/DEVICES SHALL BE CURRENT PRODUCTS BY MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF SUCH PRODUCTS.

4. COORDINATE WITH AND OBTAIN PERMITS AND INSPECTIONS FROM THE AUTHORITY HAVING JURISDICTION, AND INCLUDE ALL FEES IN BID.

5. PROVIDE A LAMINATED PLASTIC NAMEPLATE FOR EACH MAJOR ITEM OF ELECTRICAL EQUIPMENT (E.G. PANELBOARDS, DISCONNECT SWITCHES, TRANSFORMERS, ETC.). ATTACH WITH SCREWS, BOLTS OR RIVETS. NAME PLATES FOR DISCONNECTS SHALL INDICATE LOADS SERVED.

6. PROVIDE ALL PANELS WITH TYPED DIRECTORIES SHOWING AS-BUILT CONDITIONS AND LABEL ALL CIRCUITS.

7. THE NEUTRAL AND GROUND BUS SHALL BE BONDED TOGETHER AT THE SERVICE EQUIPMENT ONLY. THE GROUNDING CONDUCTOR SHALL BE BONDED TO THE GROUNDING ELECTRODE SYSTEM, WHICH SHALL BE COMPRISED OF A 3/4" X 10' DRIVEN GROUND ROD, METALLIC PIPING, BUILDING STEEL, ETC. ALL SUBPANELS SHALL HAVE INSULATED ISOLATED NEUTRALS PER N.E.C. ARTICLE 250.

8. 240/120V POWER CIRCUITS TO PEDESTALS HAVE BEEN DESIGNED UTILIZING INDUSTRIAL GRADE G-GC (75°C MINIMUM) AS MANUFACTURED BY AMERICAN INSULATED WIRE CORPORATION ROUTED IN UTILITY TRENCH WITHIN THE DOCK SYSTEM. SIMILAR CABLES WITH EQUAL CHARACTERISTICS AND AMPACITIES MAY BE SUBMITTED FOR APPROVAL. PROVIDE PROPER COMPRESSION TYPE TERMINAL LUGS FOR THIS TYPE CABLE. INSULATION SHALL ALLOW FOR MOVEMENT IN JOINTS TO PREVENT CABLE FROM SHEAR AND STRETCHING.

9. CIRCUITS FROM TRANSFORMERS TO PANELS SHALL BE TYPE THHN/THWN TYPE WIRE ROUTED IN CONDUIT. SEE SINGLE LINE DIAGRAMS.

10. SUBMIT SHOP DRAWINGS ON ALL MATERIALS FOR APPROVAL.

11. SUBMIT INSTALLATION DETAILS ON EXACT EQUIPMENT PROVIDED FOR APPROVAL.

12. FINAL LOCATIONS OF DOCK AND LANDSIDE EQUIPMENT SUBJECT TO OWNER APPROVAL. SUBMIT SHOP DRAWINGS OF ALL EQUIPMENT LOCATIONS PRIOR TO INSTALLATION.

13. CONTRACTOR SHALL COORDINATE UTILITIES WITH ENGINEER DRAWINGS AND OTHER TRADES FOR SPECIFIED UPLAND EQUIPMENT LOCATIONS AND SERVICE TO MARINA EQUIPMENT. CONTRACTOR SHALL ALSO COORDINATE FINAL LOCATION OF UPLAND EQUIPMENT WITH OWNER AND ENGINEER PRIOR TO INSTALLATION.

14. UTILIZE DIELECTRIC INSULATING MATERIALS TO SEPARATE ANY DISSIMILAR METALS. ALL FASTENERS SHALL BE STAINLESS STEEL ASTM A-316 (MINIMUM).

15. THIS DESIGN UTILIZED THE HARBOR LIGHT SERIES POWER PEDESTALS AS MANUFACTURED BY (MARINA ELECTRICAL EQUIPMENT, WILLIAMSBURG, VIRGINIA, USA. TEL. 1-865-258-3939) ALL POWER PEDESTALS TO BE TO BE PROVIDED WITH APPROPRIATELY SIZED CIRCUIT BREAKERS FOR THE RECEPTACLES INDICATED. SUBMIT SHOP DRAWINGS. POWER PEDESTALS TO BE PROVIDED WITH 2 EACH 19mm (3/4") HOSE BIBBS (COORDINATE WITH PLUMBING DRAWINGS). PROVIDE PHOTO-CELL CONTROLLED LED LIGHTS WITH WHITE LENSES AND GFI MAINTENANCE RECEPTACLE ON A SEPARATE 120V, 1P, 20A CIRCUIT BREAKER. REVIEW DRAWINGS FOR CABLE SIZES. PROVIDE OVERSIZED LUGS ON PEDESTALS AS NECESSARY. ALTERNATE PEDESTALS MAY BE APPROVED PRIOR TO BID. ALL PEDESTALS SHALL BE PROVIDED WITH DIGITAL KWH METERS TO MONITOR POWER USAGE FOR EACH BOAT SLIP.

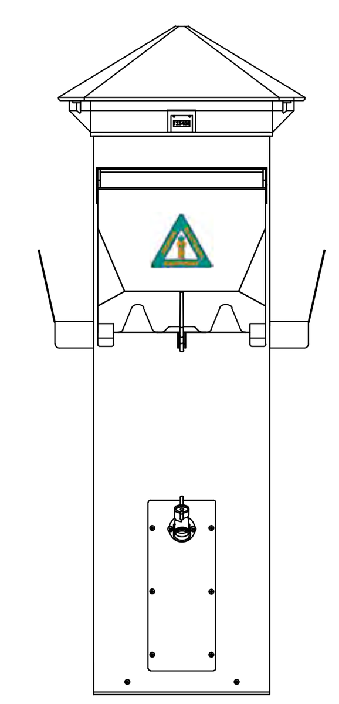
16. CONTRACTOR TO PROVIDE WIRING PULL PLAN SUBMITTAL. COORDINATE WITH ALL OTHER TRADES AND INCLUDE WATER, WASTE, FUEL, ETC. IN PULL PLAN SUBMITTAL.

17. MAKE ARRANGEMENTS WITH THE POWER COMPANY TO OBTAIN PERMANENT ELECTRICAL SERVICE TO THE PROJECT. PROVIDE SERVICE ENTRANCE AND PROVISIONS FOR METERING IN ACCORDANCE WITH THE POWER COMPANY'S REQUIREMENTS. INCLUDE ALL FEES IN BID.

18. MAKE ARRANGEMENTS WITH THE POWER COMPANY AND PROVIDE TEMPORARY ELECTRICAL SERVICE TO THE PROJECT FOR CONSTRUCTION POWER. INCLUDE ALL FEES IN BID.

19. ALL STAINLESS STEEL FITTINGS, CLAMPS, HANGERS AND MISCELLANEOUS APPURTENANCES SHALL BE ASTM A-316 OR BETTER.

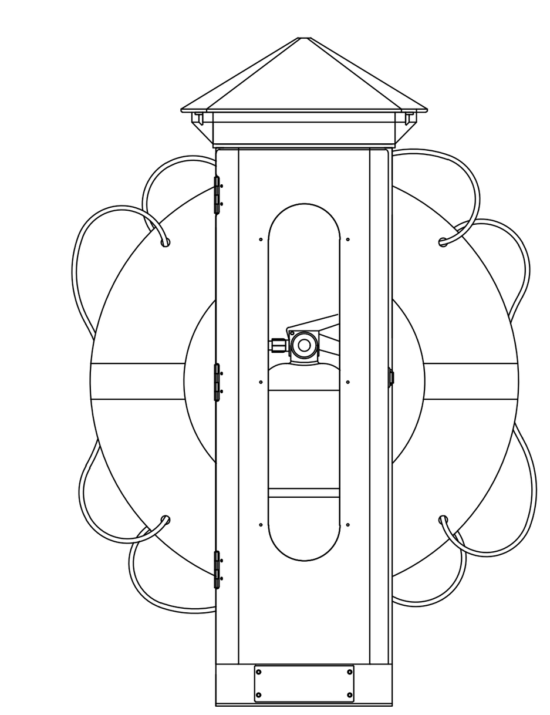
20. PROVIDE PIPE SLEEVES AND BULKHEAD PENETRATIONS AS NECESSARY TO FACILITATE INSTALLATION. SUBMIT PENETRATION DETAIL FOR APPROVAL. UTILIZE EXISTING PENETRATIONS TO THE GREATEST EXTENT POSSIBLE.



MEE HARBOR LIGHT SERIES PEDESTAL HC30100

SYMBOL LEGEND

- F — FIRE EXTINGUISHER PEDESTAL - 120V POWER NEEDED FOR LIGHT OBTAIN POWER FROM NEAREST PEDESTAL.
- POWER PEDESTAL WITH ONE 120V, 1P, 30A TWIST-LOCK TYPE RECEPTACLE, ONE 120V, 1P, 30A, 30mA GFCI CIRCUIT BREAKER AND A 120V, 1P, 20A, 30mA GFCI CIRCUIT BREAKER WITH ONE GFI TYPE RECEPTACLE ON EACH SIDE.
- POWER PEDESTAL WITH TWO 125/250V, 50A TWIST LOCK RECEPTACLES AND TWO 240V, 2P, 50A, 30mA GFCI CIRCUIT BREAKERS AND ONE 120V, 30A, TWIST LOCK RECEPTACLE AND ONE 120V, 1P, 30A, 30mA GFCI CIRCUIT BREAKER ON EACH SIDE. ALSO PROVIDE ONE 120V, 1P, 20A, 30mA GFCI CIRCUIT BREAKER AND GFI TYPE RECEPTACLE ON EACH SIDE.
- POWER PEDESTAL WITH ONE 125/250V, 50A TWIST LOCK RECEPTACLE AND A 240V, 2P, 50A, 30mA GFCI CIRCUIT BREAKER AND ONE 120V, 30A, TWIST LOCK RECEPTACLE AND A 120V, 1P, 30A, 30mA GFCI CIRCUIT BREAKER ON EACH SIDE. ALSO PROVIDE ONE 120V, 1P, 20A CIRCUIT BREAKER AND GFI TYPE RECEPTACLE ON EACH SIDE.
- POWER PEDESTAL WITH ONE 125/250V, 50A TWIST LOCK RECEPTACLE AND A 240V, 2P, 50A, 30mA GFCI CIRCUIT BREAKER AND ONE 120V, 30A, TWIST LOCK RECEPTACLE AND A 120V, 1P, 30A, 30mA GFCI CIRCUIT BREAKER ON ONE SIDE. ALSO PROVIDE ONE 120V, 1P, 20A CIRCUIT BREAKER AND GFI TYPE RECEPTACLE ON ONE SIDE.
- 2/0 TYPE THHW GREEN GROUND CABLE
- 5" PRIMARY POWER CONDUIT FOR POWER COMPANY USE.
- SECONDARY WIRING AND CONDUIT FROM TRANSFORMER TO PANEL.
- BRANCH CIRCUIT, ARROW INDICATES HOMERUN, CROSS LINES INDICATE NUMBER OF CONDUCTORS, GROUNDING CONDUCTOR IS NOT SHOWN BUT SHALL BE PROVIDED IN ALL CIRCUITS (2#12, 1#12G, 1/2"C UNLESS NOTED OTHERWISE).
- S/S — 480V TO 240/120V, 1Ø SUBSTATION. SEE SINGLE LINE DIAGRAM AND SCHEDULES FOR TRANSFORMERS RATINGS AND PANEL CIRCUIT BREAKER REQUIREMENTS.
- MY — 480V, 3Ø, 200A MEGAYACHT SUBSTATION. SEE DETAIL. PROVIDE WITH GROUNDING RECEPTACLE (POINT OF CONNECTION)
- ESTOP — MEE HARBOR LIGHT SS SERIES PEDESTAL. PROVIDE WITH EMERGENCY PUSH BUTTON SHUT OFF FOR FUEL DISPENSING SYSTEM. COORDINATE WITH FUEL DISPENSING CONTRACTOR.
- G — GAS DISPENSER LOCATION; SEE FUEL DISPENSING DRAWINGS
- D — DIESEL DISPENSER LOCATION; SEE FUEL DISPENSING DRAWINGS



MEE FIRE STATION PEDESTAL FS1020

SOUTH CAROLINA AARON CLEMENS TEMPEL No. 23556 07/08/2020

SOUTH CAROLINA EPIC ENGINEERING INC. No. C00259 CERTIFICATE OF AUTHORIZATION

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature: Aaron C. Tempel, P.E., ME Professional Eng. PE15477, 07/08/2020

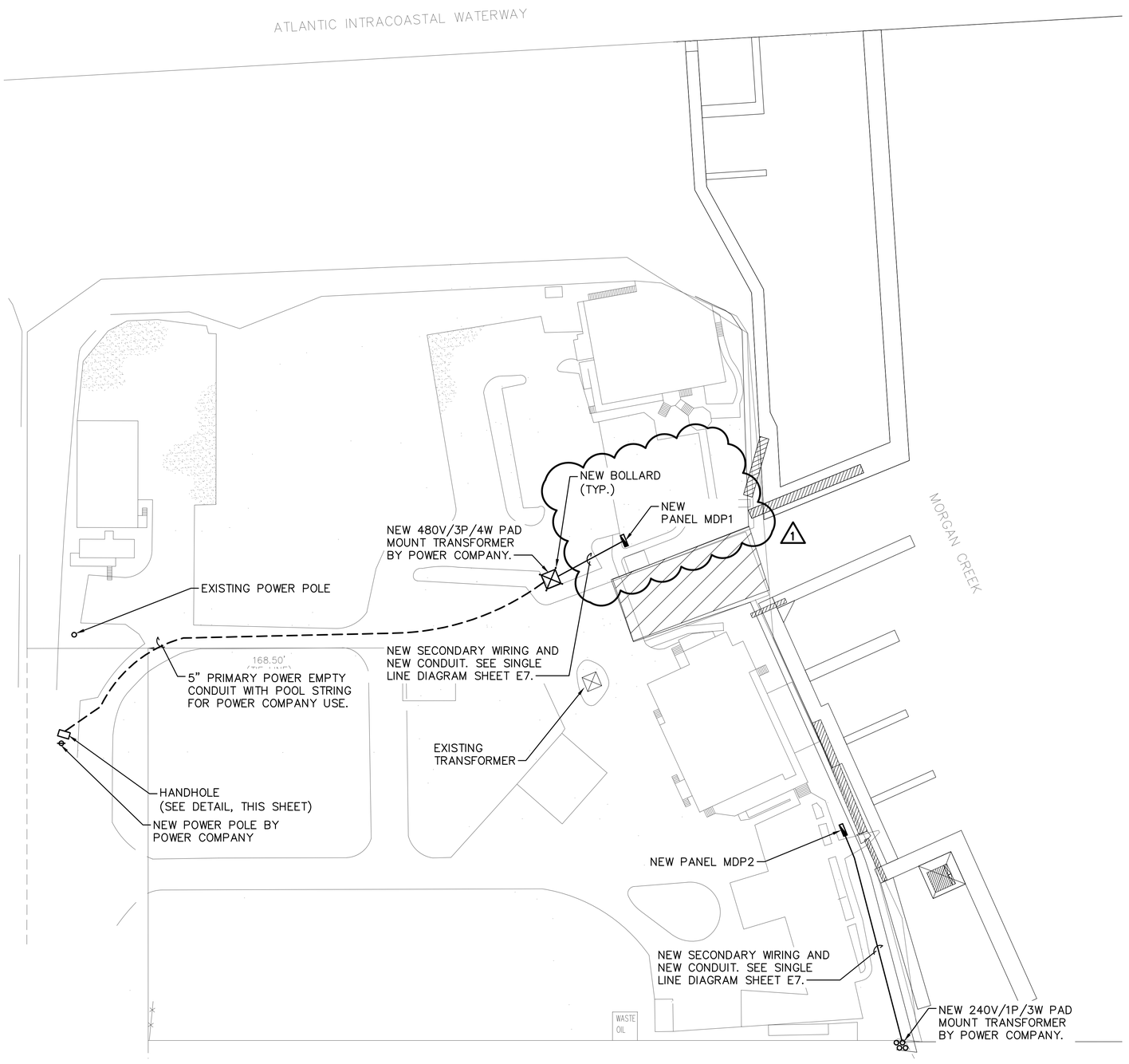
REV. No. | DATE | DRAWN BY | CHKD BY | REMARKS

DESIGNED: ACT | DRAWN: RAD | CHECKED: ACT | DATE: 12/06/2019 | JOB NO.: 19120 | SCALE: NONE

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
NOTES AND LEGEND
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

DRAWING NUMBER E1
SHEET: 1 OF 8



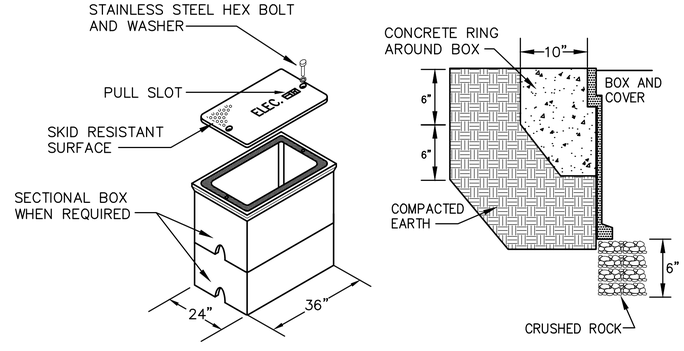
ELECTRICAL SITE PLAN
SCALE: 1"=40'-0"

SCOPE OF SITE WORK:

1. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE NEW TRANSFORMER PADS, UNDERGROUND CONDUITS, PULL STRINGS, HANDHOLES, AND ALL NECESSARY COMPONENTS REQUIRED BY THE POWER COMPANY FOR A COMPLETE AND FUNCTIONAL SYSTEM.
2. ALL ELECTRICAL DISTRIBUTION SHALL BE CONSTRUCTED IN ACCORDANCE WITH DOMINION ENERGY UNDERGROUND COMMERCIAL ELECTRIC SERVICE STANDARDS REVISED FEBRUARY 2020.
3. THE POWER COMPANY WILL BE RESPONSIBLE FOR THE DIP CONDUITS PRIMARY POWER CABLING AND PROVIDING NEW TRANSFORMERS. CONTRACTOR TO PROVIDE ALL CUTTING AND PATCHING AS NECESSARY.
4. CONTRACTOR TO PROVIDE ALL CUTTING AND PATCHING AS NECESSARY.
5. PROVIDE HANDHOLES IN RUNS EXCEEDING 350' IN LENGTH OR MORE THAN 360° IN BENDS.
6. THE CONDUITS ON LOCATIONS ARE SHOWN ON THIS PLAN FOR BIDDING PURPOSES. EXACT ROUTING TO BE VERIFIED WITH ACTUAL FIELD CONDITIONS AND ENGINEER. CONTRACTOR TO HIRE UTILITY LOCATION SERVICE TO MAP EXISTING CONDITIONS. UTILITY LOCATER TO COORDINATE EXACT LOCATIONS. PROVIDE AUTOCAD AS-BUILT DRAWING.
7. COORDINATE FINAL LOCATION OF EQUIPMENT AND APPURTENANCES WITH ENGINEER PRIOR TO CONSTRUCTION.
8. IT IS UNDERSTOOD THE FIRE MARSHAL HAS APPROVED THE LOCATION OF MDP1 AND THE RESTAURANT STAGE HAS A CONVENIENCE OUTLET WITHIN 25' OF THE PANEL.

1

9. AT THE CONTRACTOR'S OPTION, THE EXISTING 5" CONDUIT SERVING THE MARINA TRANSFORMER THAT IS BEING DEMOLISHED MAY BE REUSED. THE CONTRACTOR WILL HAVE TO FIELD LOCATE. PROVIDE OWNER WITH CREDIT AS APPLICABLE.



HANDHOLE REQUIREMENTS:

1. HOUSING SHALL BE A POLYMER CONCRETE REINFORCED WITH A HEAVY WEAVE FIBERGLASS REINFORCING WITH COMPRESSIVE STRENGTH OF NO LESS THAN 10,000 PSI.
2. COVER SHALL WITHSTAND A SERVICE LOAD OF NO LESS THAN 15,000 LBS OVER A 10" x 10" AREA FOR HEAVY DUTY, H20 LOADING.
3. PROVIDE STAINLESS STEEL BOLTS AND INSERTS.
4. PROVIDE WITH (2) 2 1/2" MOUSEHOLES.
5. PROVIDE LABEL "ELECTRICAL" FOR POWER HANDHOLES.

HANDHOLE DETAIL
SCALE: NONE

Aaron Tempel
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 23556
AARON CLEMENS TEMPEL
07/08/2020

EPIC ENGINEERING INC.
No. C00259
CERTIFICATE OF AUTHORIZATION

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Aaron Tempel
Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

REV No.	DATE	DRAWN BY	CHKD BY	REMARKS
1	8/25/20	RAD	ACT	ADDENDUM 2

DESIGNED ACT | DRAWN RAD | CHECKED ACT
DATE: 12/06/2019 | JOB NO. 19120 | SCALE: AS NOTED

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

ELECTRICAL SITE PLAN

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

ATM

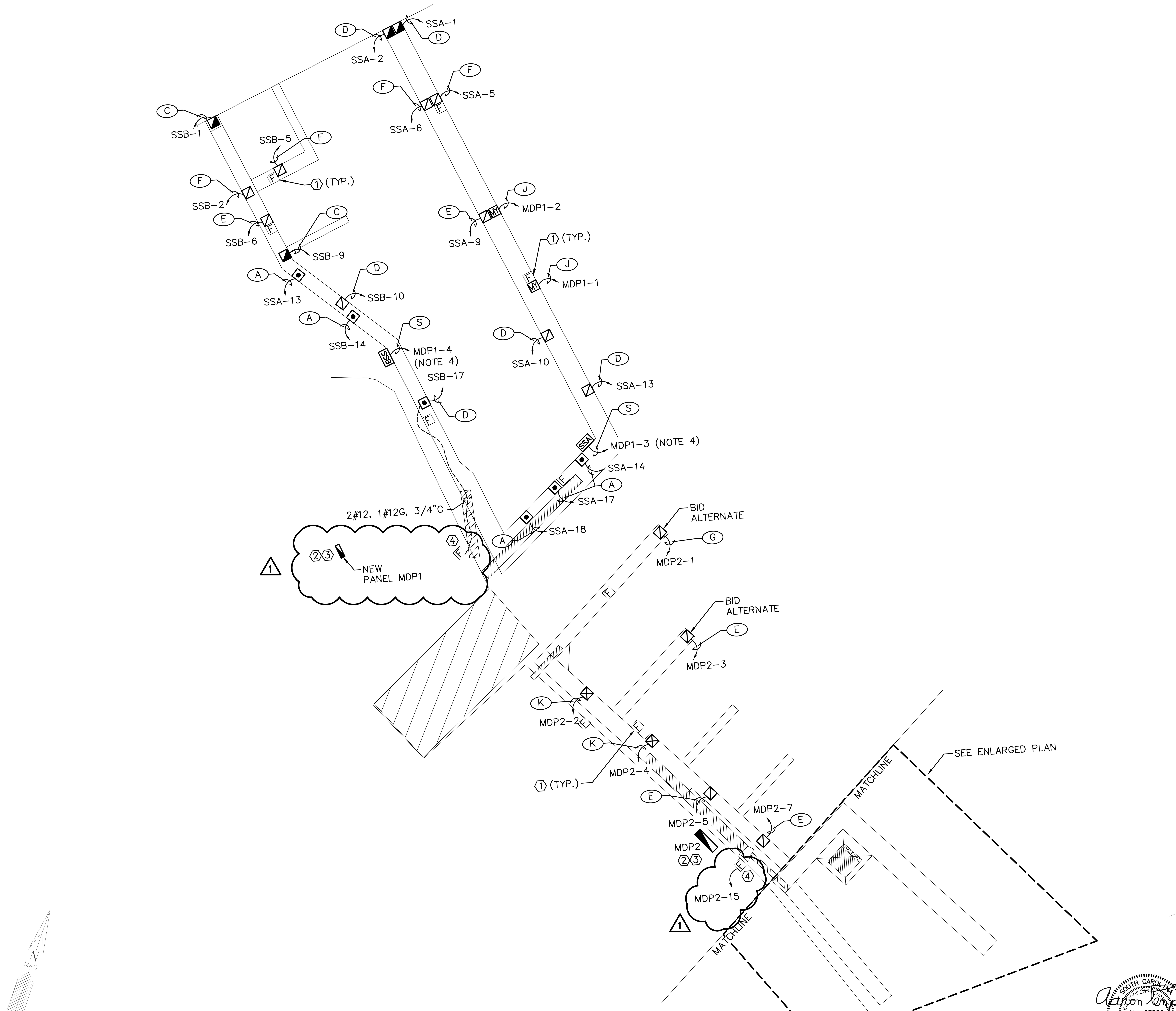
DRAWING NUMBER
E2
SHEET: 2 OF 8

GENERAL NOTES (THIS SHEET ONLY)

1. SEE WIRE AND CONDUIT SCHEDULE ON SHEET E8 FOR CIRCUITS WITH LETTER DESIGNATIONS.
2. COORDINATE EXACT LOCATION OF EQUIPMENT WITH DOCK SUPPLIER.
3. COORDINATE EXACT ROUTING OF CONDUIT WITH ACTUAL FIELD CONDITIONS. DO NOT OBSTRUCT FIRE PROTECTION STAND PIPE.
4. PROVIDE PONY FLOAT FOR SSA & SSB. COORDINATE WITH DOCK SUPPLIER AND INCLUDE ALL COSTS IN A BID.

KEYED NOTES (THIS SHEET ONLY)

1. PROVIDE POWER FOR FIREHOUSE PEDESTAL FROM 120V RECEPTACLE CIRCUIT IN NEAREST PEDESTAL INDICATED.
2. SEE POWER RISER DIAGRAMS FOR FEED CIRCUITS FROM TRANSFORMERS TO PANELS AND FROM PANELS TO SUBSTATIONS.
3. COORDINATE EXACT LOCATIONS WITH OWNER AND ENGINEER PRIOR TO INSTALLATION.
4. PROVIDE FIRE STATION PEDESTAL WITH 120V, 1 POLE BREAKER AND GFCI WEATHERPROOF RECEPTACLE. (1)



POWER PLAN
SCALE: 1"=30'-0"

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
1	6/25/20	RAD	ACT	ADDENDUM 2

DESIGNED: ACT DRAWN: RAD CHECKED: ACT
DATE: 12/06/2019 JOB NO. 19120 SCALE: 1" = 30'-0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
POWER PLAN
CITY OF ISLE OF PALMS, SC

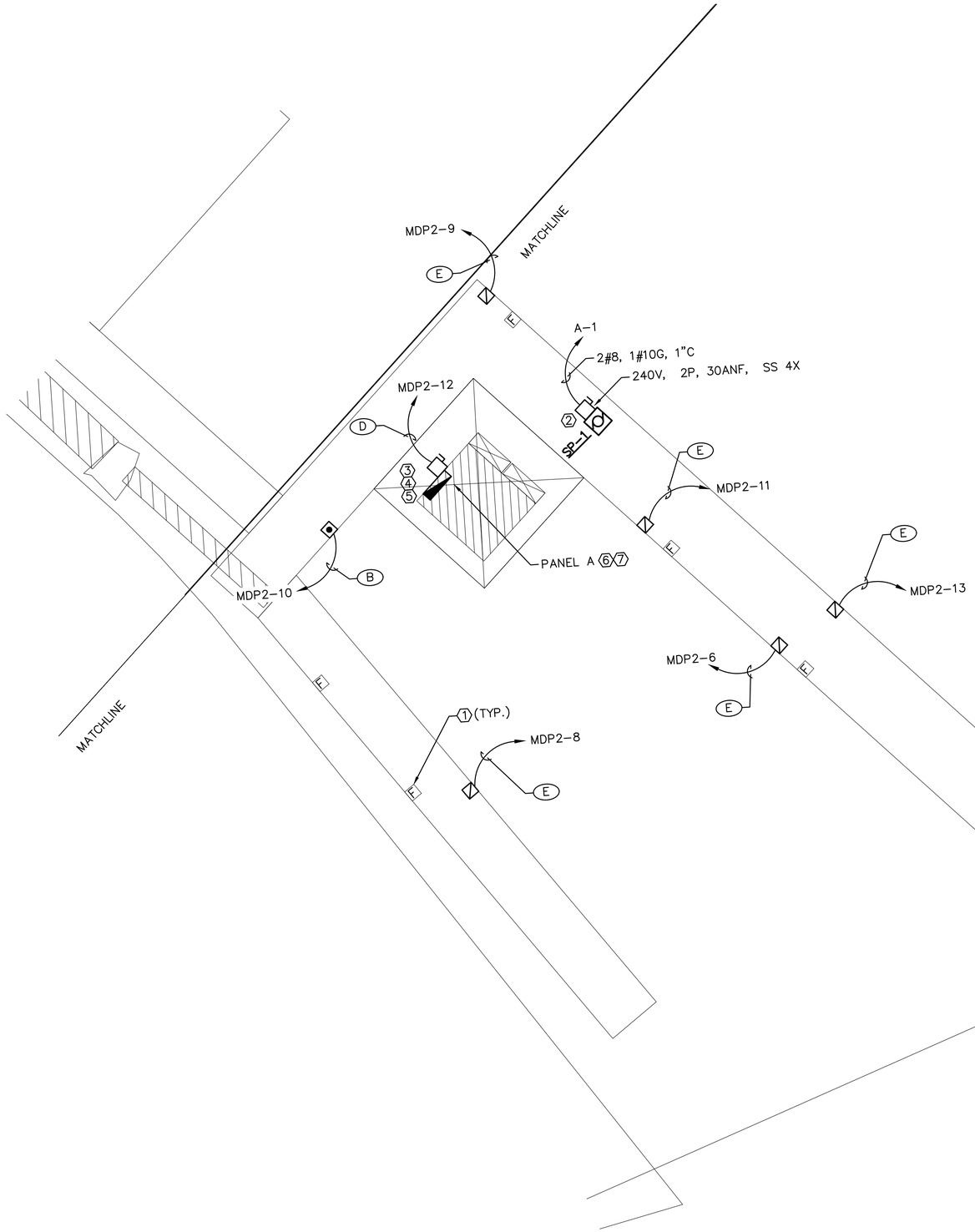
Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

Applied Technology & Management, Inc.
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

SOUTH CAROLINA AARON CLEMENS TEMPEL No. 23556
07/08/2020
SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION EPIC ENGINEERING INC. No. C00259

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

DRAWING NUMBER
E3
SHEET: 3 OF 8



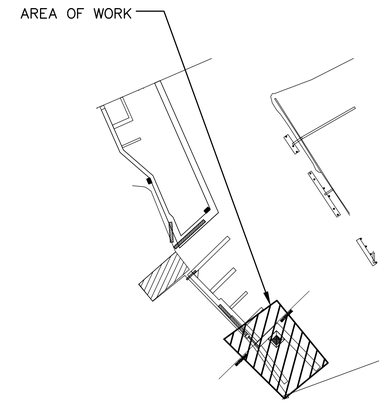
ENLARGED POWER PLAN
SCALE: 1"=10'-0"

GENERAL NOTES (THIS SHEET ONLY)

1. SEE WIRE AND CONDUIT SCHEDULE ON SHEET E8 FOR CIRCUITS WITH LETTER DESIGNATIONS.
2. COORDINATE EXACT LOCATION OF EQUIPMENT WITH DOCK SUPPLIER AND ENGINEER.
3. COORDINATE EXACT ROUTING OF CONDUIT WITH ACTUAL FIELD CONDITIONS. DO NOT OBSTRUCT FIRE PROTECTION STAND PIPE.
4. ALL SWITCHES, DISCONNECTS, DEVICES, ETC. ASSOCIATED TO THE FUEL SYSTEM SHALL BE EXPLOSION PROOF AND IN FULL COMPLIANCE WITH NEC 2017 ART. 514.

KEYED NOTES (THIS SHEET ONLY)

1. PROVIDE POWER FOR FIREHOUSE PEDESTAL FROM 120V RECEPTACLE CIRCUIT IN NEAREST PEDESTAL INDICATED.
2. MOUNT BOTTOM OF DISCONNECT SWITCH AT 24"(MIN.) ABOVE THE DOCK DECK. ALL STANDS, UNISTRUT, HARDWARE, ETC. SHALL BE STAINLESS STEEL ASTM A-304 (MIN.)
3. COORDINATE EXACT LOCATIONS WITH OWNER AND ENGINEER PRIOR TO INSTALLATION.
4. COORDINATE PANEL LOCATION AND DISCONNECT MOUNTING TO FUEL HUT WITH FINAL FUEL HUT CONFIGURATION.
5. COORDINATE POWER REQUIREMENTS WITH FINAL FUEL HUT DESIGN PRIOR TO CONSTRUCTION.



KEYPLAN
SCALE: NONE

SOUTH CAROLINA PROFESSIONAL ENGINEER
Aaron Tempel
No. 23556
AARON CLEMENS TEMPEL
07/08/2020

EPIC ENGINEERING INC.
No. C00259
CERTIFICATE OF AUTHORIZATION

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

X:\2019\19120\19120E4.dwg, 19120E4, 7/7/20

Aaron Tempel
Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

REMARKS	REV No.	DATE	DRAWN BY	CHKD BY

DESIGNED	DRAWN	CHECKED
ACT	RAD	ACT

DATE: 12/06/2019
JOB NO. 19120
SCALE: 1" = 10'-0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

ENLARGED POWER PLAN

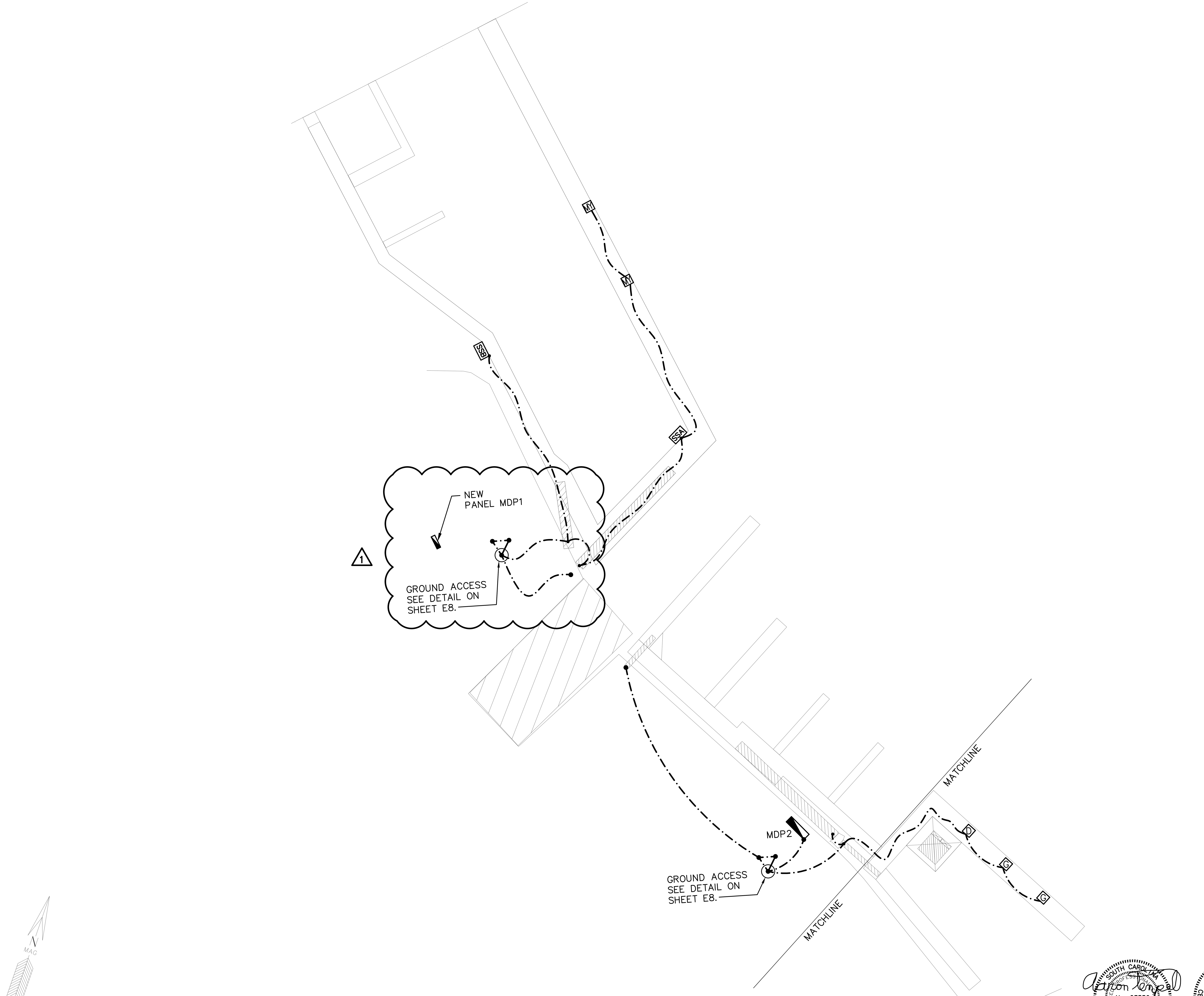
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

DRAWING NUMBER
E4
SHEET: 4 OF 8

GENERAL NOTES (THIS SHEET ONLY)

1. EACH DOCK SHALL BE PROVIDED WITH GROUND SYSTEM. ALL SUBSTATIONS, STEEL STRUCTURES, DISCONNECT SWITCHES, GANGWAYS, ETC. SHALL BE BONDED WITH 2/0 COPPER TYPE THHW GREEN CABLE TO THIS GROUND SYSTEM. PROVIDE THREE COPPER CLAD 3/4"X10' COPPER CLAD GROUND RODS SPACED IN 10' DELTA CONFIGURATION WITH ONE TEST WELL (SEE SHEET E8 FOR DETAIL).
2. COORDINATE EXACT LOCATIONS WITH OWNER, AND ENGINEER PRIOR TO INSTALLATION.



GROUNDING PLAN

SCALE: 1"=30'-0"

SOUTH CAROLINA AARON CLEMENS TEMPEL No. 23556 07/08/2020

SOUTH CAROLINA EPIC ENGINEERING INC. No. C00259 CERTIFICATE OF AUTHORIZATION

EPIC ENGINEERING INC.

P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
1	6/25/20	RAD	ACT	ADDENDUM 2

DESIGNED	DRAWN	CHECKED
ACT	RAD	ACT

DATE: 12/06/2019
JOB NO. 19120
SCALE: 1" = 30' - 0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
GROUNDING PLAN
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcutt Blvd., Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

DRAWING NUMBER
E5
SHEET: 5 OF 8

SUBSTATION A

600 AMP MAINS — SURFACE [X]
240/120 V, 1 PH, 3 W, 60 HZ — 600 AMP MAIN BKR *

(1) TYP. ALL BREAKERS SHALL HAVE A MINIMUM INTERRUPTING RATING OF 22,000 AMPS. PANEL SHALL BE PROVIDED WITH SEPARATE GROUND BUS.

CKT No.	LOAD DESCRIPTION	BREAKERS POLE	BREAKERS AMP	KVA	KVA	BREAKERS AMP	BREAKERS POLE	LOAD DESCRIPTION	CKT No.
1, 3	POWER PEDESTAL	2	50	12	12	50	2	POWER PEDESTAL	2, 4
5, 7	POWER PEDESTAL	2	100	24	24	100	2	POWER PEDESTAL	6, 8
9, 11	POWER PEDESTAL	2	100	24	24	100	2	POWER PEDESTAL	10, 12
13, 15	POWER PEDESTAL	2	100	24	7.2	30	2	POWER PEDESTAL	14, 16
17, 19	POWER PEDESTAL	2	30	7.2	7.2	30	2	POWER PEDESTAL	18, 20
21									22
23									24
25									26
27									28
29									30
31									32
33									34
35									36
37									38
39									40
41									42

TOTAL CONNECTED LOAD 165.6 KVA

* PROVIDE 30mA (ADJUSTABLE) GFCI TYPE BREAKER
DEMAND LOAD = 104.3KVA

SUBSTATION B

600 AMP MAINS — SURFACE [X]
240/120 V, 3 PH, 3 W, 60 HZ — 600 AMP MAIN BKR *

(1) TYP. ALL BREAKERS SHALL HAVE A MINIMUM INTERRUPTING RATING OF 22,000 AMPS. PANEL SHALL BE PROVIDED WITH SEPARATE GROUND BUS.

CKT No.	LOAD DESCRIPTION	BREAKERS POLE	BREAKERS AMP	KVA	KVA	BREAKERS AMP	BREAKERS POLE	LOAD DESCRIPTION	CKT No.
1, 3	POWER PEDESTAL	2	50	12	24	100	2	POWER PEDESTAL	2, 4
5, 7	POWER PEDESTAL	2	100	24	24	100	2	POWER PEDESTAL	6, 8
9, 11	POWER PEDESTAL	2	50	12	24	100	2	POWER PEDESTAL	10, 12
13, 15	POWER PEDESTAL	2	30	7.2	7.2	30	2	POWER PEDESTAL	14, 16
17, 19	POWER PEDESTAL	2	100	24					18, 20
21									22
23									24
25									26
27									28
29									30
31									32
33									34
35									36
37									38
39									40
41									42

TOTAL CONNECTED LOAD 158.4 KVA

* PROVIDE 30mA (ADJUSTABLE) GFCI TYPE BREAKER
DEMAND LOAD = 99.8KVA

KEYED NOTES (THIS SHEET ONLY)

(1) VERIFY INTERRUPTING RATING OF ALL PANELS AND SUBSTATION BRANCH BREAKERS WITH AVAILABLE FAULT CURRENT FROM IT'S TRANSFORMER.

PANEL MDP1

800 AMP MAINS — SURFACE [X]
480/277 V, 3 PH, 4 W, 60 HZ — 800 AMP MAIN BKR *

(1) TYP. ALL BREAKERS SHALL HAVE A MINIMUM INTERRUPTING RATING OF 65,000** AMPS. PANEL SHALL BE PROVIDED WITH SEPARATE GROUND BUS.

	CKT No.	LOAD DESCRIPTION	BREAKERS POLE	BREAKERS AMP	KVA	KVA	BREAKERS AMP	BREAKERS POLE	LOAD DESCRIPTION	CKT No.	
*	1	MEGA YACHT SUBSTATION	3	200	167	167	200	3	MEGA YACHT SUBSTATION	2	*
*	3	SUBSTATION A	2	350	104.3	99.8	350	2	SUBSTATION B	4	*
	5	SPACE	3	100	–	–	100	3	SPACE	6	

TOTAL CONNECTED LOAD 538.1 KVA

* PROVIDE 30mA (ADJUSTABLE) GFCI TYPE BREAKER
DEMAND LOAD = 339KVA
** VERIFY AIC RATING WITH ACTUAL AVAILABLE FAULT CURRENT FROM POWER COMPANY

PANEL MDP2

1200 AMP MAINS — SURFACE [X]
240/120 V, 1 PH, 3 W, 60 HZ — 1200 AMP MAIN BKR *

(1) TYP. ALL BREAKERS SHALL HAVE A MINIMUM INTERRUPTING RATING OF 65,000** AMPS. PANEL SHALL BE PROVIDED WITH SEPARATE GROUND BUS.

CKT No.	LOAD DESCRIPTION	BREAKERS POLE	BREAKERS AMP	KVA	KVA	BREAKERS AMP	BREAKERS POLE	LOAD DESCRIPTION	CKT No.
1	POWER PEDESTAL	2	100	24	48	200	2	POWER PEDESTAL	2
3	POWER PEDESTAL	2	100	24	48	200	2	POWER PEDESTAL	4
5	POWER PEDESTAL	2	100	24	24	100	2	POWER PEDESTAL	6
7	POWER PEDESTAL	2	100	24	24	100	2	POWER PEDESTAL	8
9	POWER PEDESTAL	2	100	24	7.2	30	2	POWER PEDESTAL	10
11	POWER PEDESTAL	2	100	24	5	60	2	FUEL SHACK	12
13	POWER PEDESTAL	2	100	24	–	–	2	SPACE	14
15	FIRE PEDESTAL	1	20	0.2	–	–	2	SPACE	16
17	SPACE	2	–	–	–	–	2	SPACE	18
19	SPACE	2	–	–	–	–	2	SPACE	20

TOTAL CONNECTED LOAD 324 KVA

* PROVIDE 30mA (ADJUSTABLE) GFCI TYPE BREAKER
DEMAND LOAD = 210KVA
** VERIFY AIC RATING WITH ACTUAL AVAILABLE FAULT CURRENT FROM POWER COMPANY

PANEL A

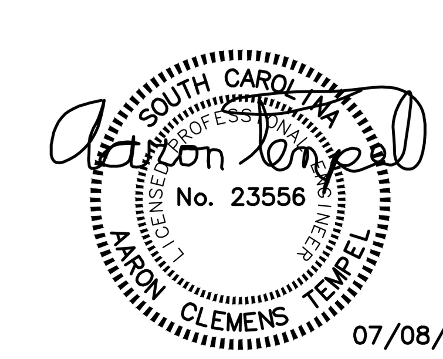
60 AMP MAINS — SURFACE [X]
240/120 V, 1 PH, 3 W, 60 HZ — 60 AMP MAIN BKR * — FUEL HUT PANEL

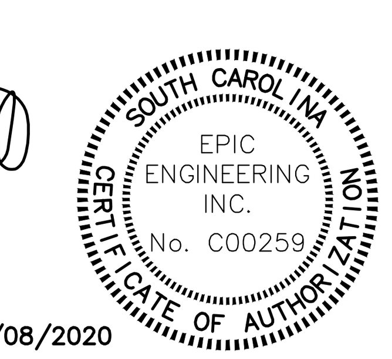
ALL BREAKERS SHALL HAVE A MINIMUM INTERRUPTING RATING OF 65,000** AMPS. PANEL SHALL BE PROVIDED WITH SEPARATE GROUND BUS.

CKT No.	LOAD DESCRIPTION	BREAKERS POLE	BREAKERS AMP	KVA	KVA	BREAKERS AMP	BREAKERS POLE	LOAD DESCRIPTION	CKT No.
1	SP–1	2	35	4.0	–	–	2	–	2
3	–	2	–	–	–	–	2	–	4
5	–	2	–	–	–	–	2	–	6
7	–	2	–	–	–	–	2	–	8
9	–	2	–	–	–	–	2	–	10
11	–	2	–	–	–	–	2	–	12

TOTAL CONNECTED LOAD – KVA

* PROVIDE 30mA (ADJUSTABLE) GFCI TYPE BREAKER
DEMAND LOAD = _____KVA
** VERIFY AIC RATING WITH ACTUAL AVAILABLE FAULT CURRENT FROM POWER COMPANY





EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS

DESIGNED ACT | DRAWN RAD | CHECKED ACT
DATE: 12/06/2019
JOB NO. 19120
SCALE: NONE

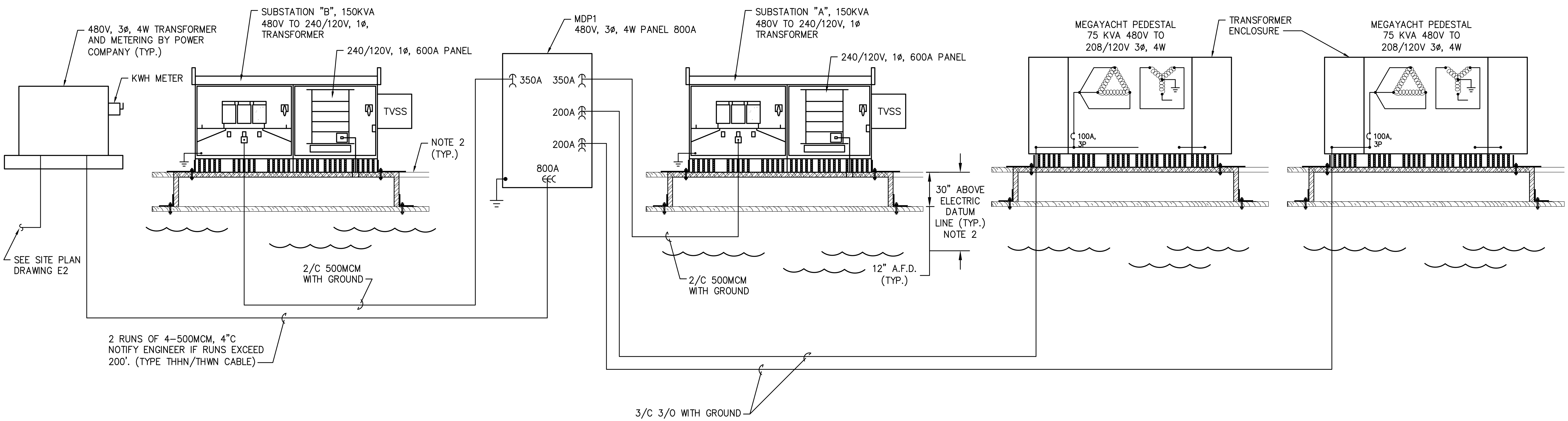
ISLE OF PALMS MARINA
ISLE OF PALMS, SC
PANEL SCHEDULES
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
ATM
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

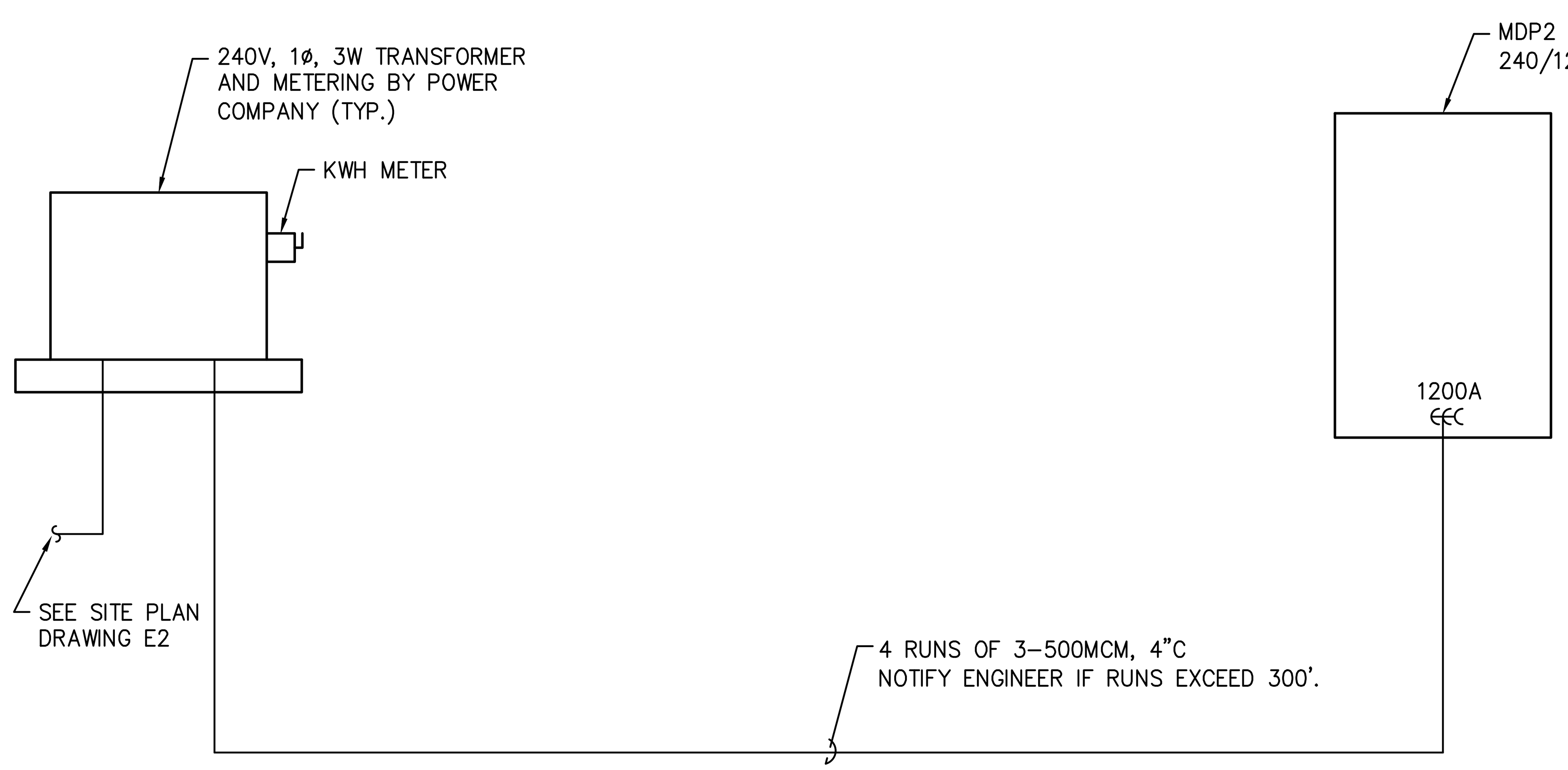
DRAWING NUMBER
E6
SHEET: 6 OF 8

GENERAL NOTES (THIS SHEET ONLY)

1. ALL SUBSTATIONS SHALL BE PROVIDED WITH PRIMARY CIRCUIT BREAKERS AS WELL AS SECONDARY BREAKERS AS INDICATED IN THE SCHEDULES. SUBSTATIONS SHALL BE CONSTRUCTED OF STAINLESS STEEL POWDER COATED WHITE IN NEMA 4X ENCLOSURES.
2. PLATFORMS MAY BE REMOVED IF SUBSTATION PROVIDED MEETS REQUIREMENTS OF DISTANCE ABOVE DATUM LINE. COORDINATE WITH SUBSTATION PROVIDER AND SUBMIT INFORMATION TO ENGINEER FOR REVIEW.



MDP1 480V SINGLE LINE DIAGRAM
SCALE: NONE



MDP2 240/120V SINGLE LINE DIAGRAM
SCALE: NONE

07/08/2020

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS

DESIGNED ACT | DRAWN RAD | CHECKED ACT
DATE: 12/06/2019
JOB NO. 19120
SCALE: NONE

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
POWER RISER DIAGRAMS
CITY OF ISLE OF PALMS, SC

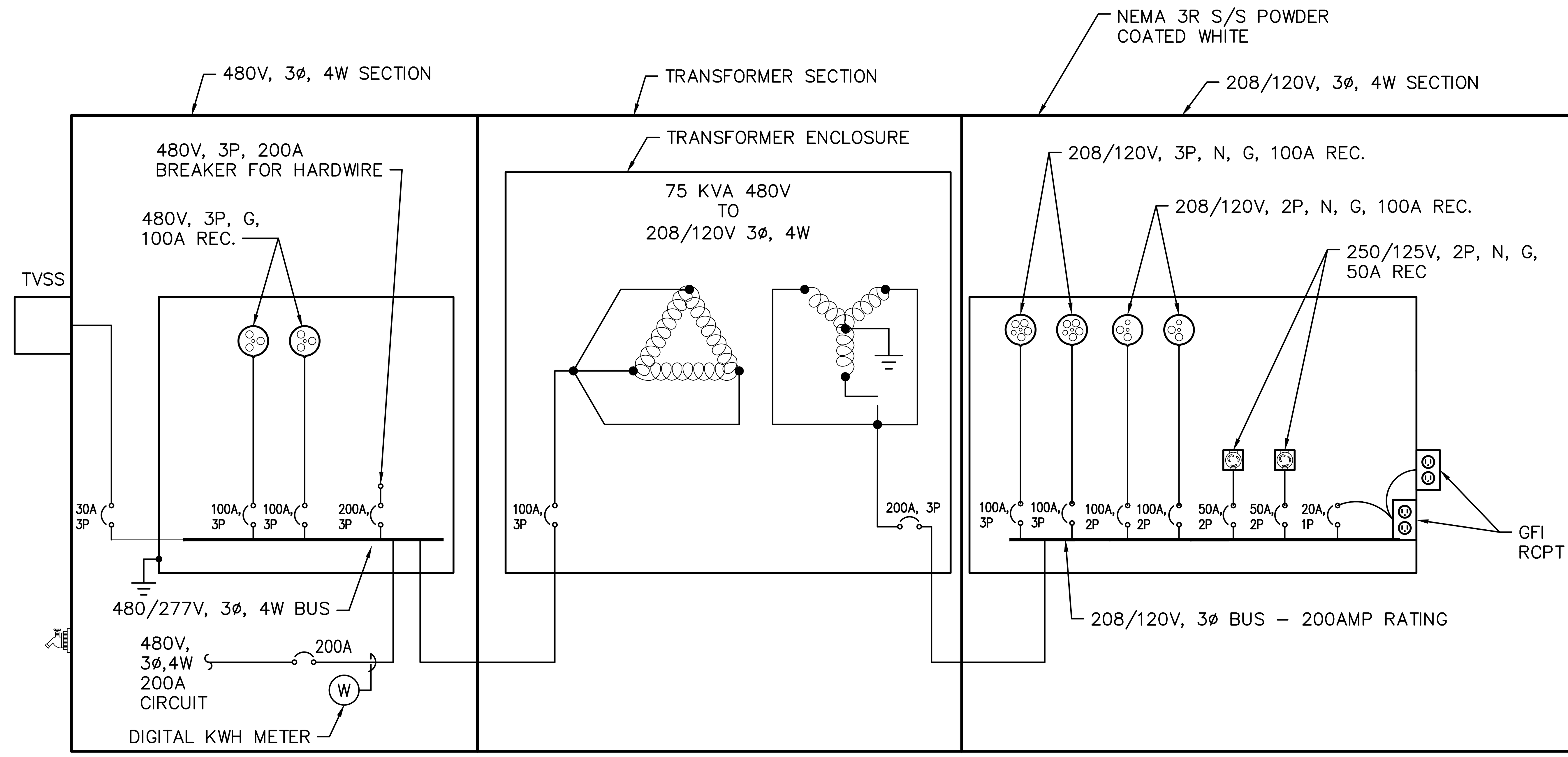
Applied Technology & Management, Inc.
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

DRAWING NUMBER
E7
SHEET: 7 OF 8

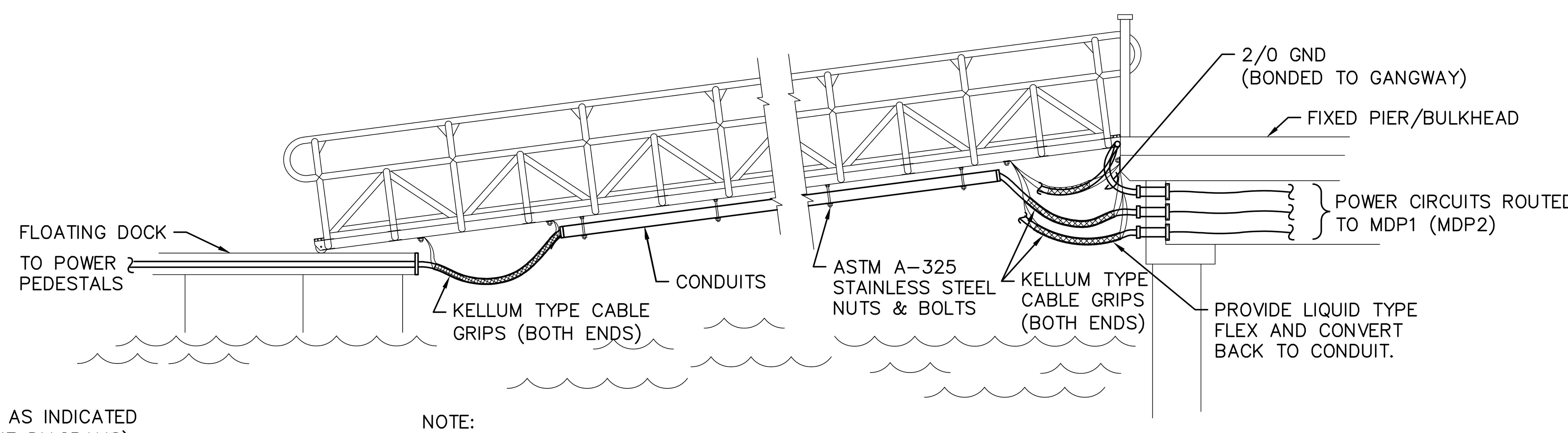
WIRE & CONDUIT SCHEDULE
(THIS SHEET ONLY)

SYMBOL	DESCRIPTION
(A)	3/C, #10 W/GND
(B)	3/C, #6 W/GND
(C)	3/C, #4 W/GND
(D)	3/C, #3 W/GND
(E)	3/C, #2 W/GND
(F)	3/C, #1 W/GND
(G)	3/C, 1/0 W/GND
(H)	3/C, 2/0 W/GND
(J)	3/C, 3/0 W/GND
(K)	3/C, 4/0 W/GND
(L)	3/C 250MCM W/GND
(M)	3/C, 300MCM W/GND
(N)	4/C, 3/0 W/GND
(P)	4/C, 4/0 W/GND
(R)	4/C, 250MCM W/GND
(S)	2/C, 500MCM W/GND

* ALL CIRCUITS TO BE ROUTED WITHIN CONDUITS PROVIDED IN DOCK SYSTEM. SIZES SHOWN IN SCHEDULE SHALL BE USED FOR ROUTING OF CIRCUITS TO PANELS ON LAND.

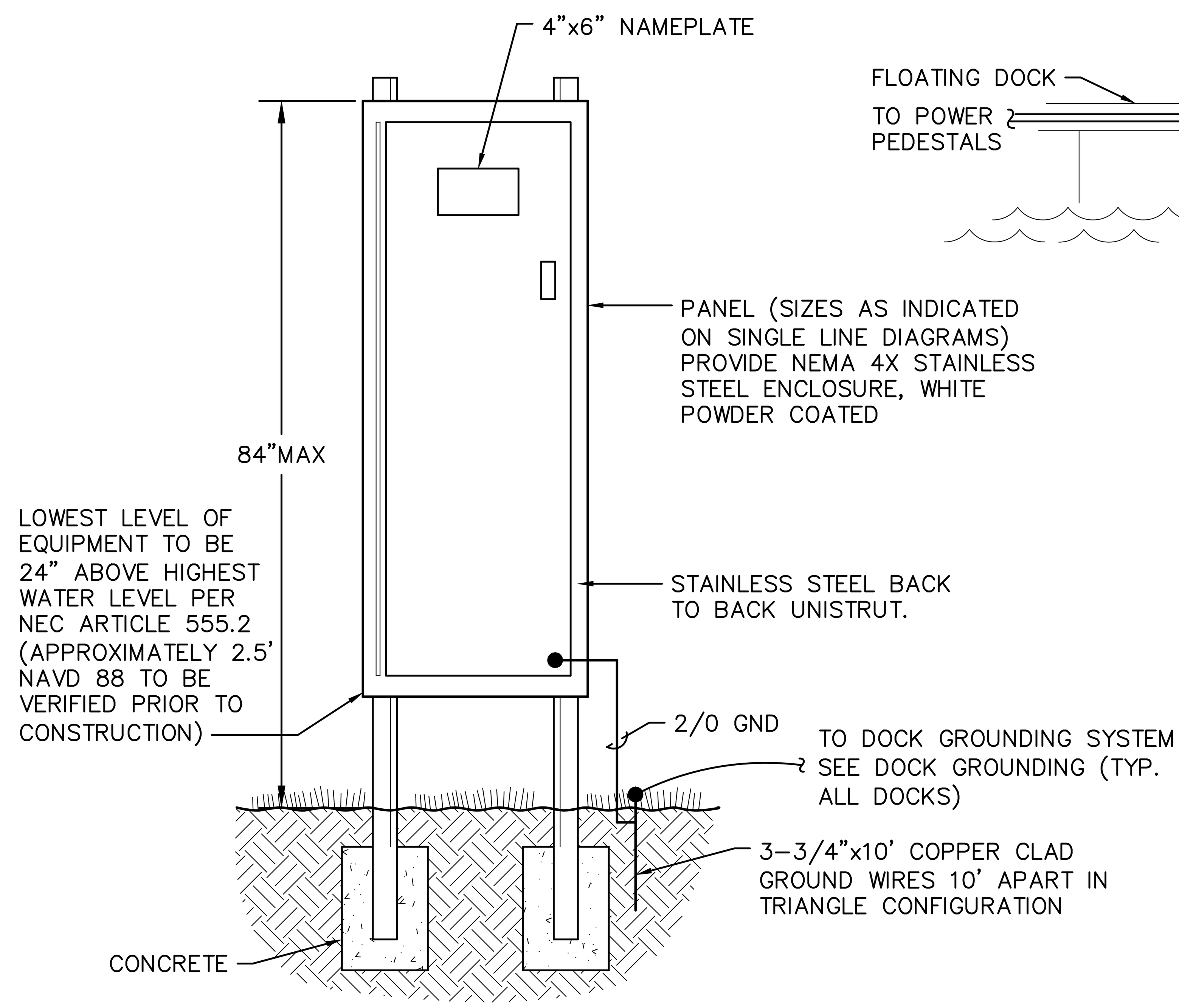


TYPICAL 480V, 200A MEGAYACHT PEDESTAL (MY)
SCALE: NONE

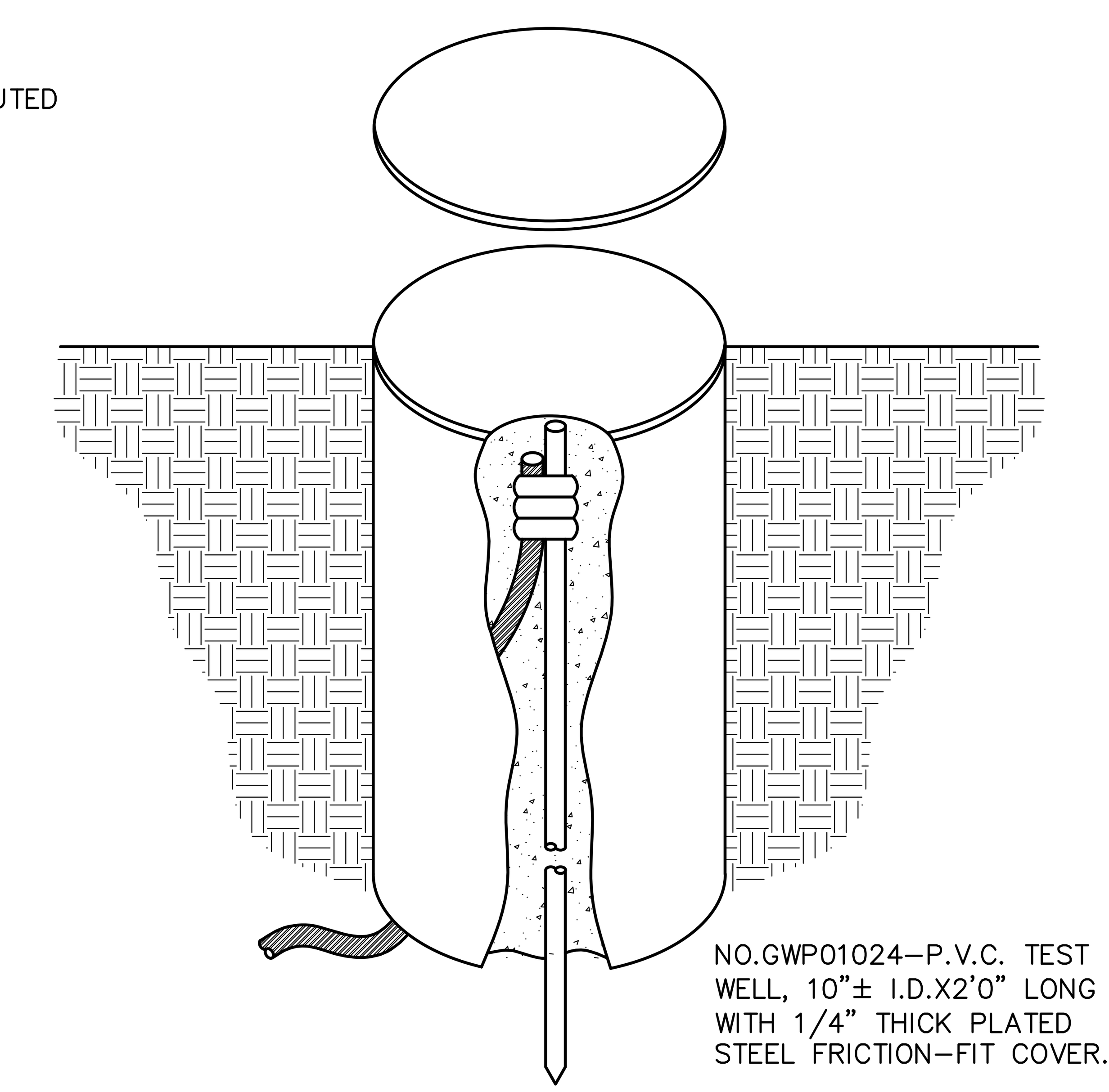


NOTE:
COORDINATE MOUNTING & INSTALLATION OF THE ELECTRICAL CABLING WITH GANGWAY PROVIDED. SUBMIT SHOP DRAWINGS FOR APPROVAL.

GANGWAY DETAIL
SCALE: NONE



PANEL MOUNTING DETAIL (MDP1 & MDP2)
SCALE: NONE



GROUND ACCESS WELL DETAIL
SCALE: NONE

Aaron Tempel — SOUTH CAROLINA No. 23556 AARON CLEMENS TEMPEL — 07/08/2020

SOUTH CAROLINA EPIC ENGINEERING INC. No. C00259 CERTIFICATE OF AUTHORIZATION

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature: Aaron C. Tempel, P.E. ME Professional Eng. PE15477
07/08/2020 Date

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DESIGNED ACT | DRAWN RAD | CHECKED ACT
DATE: 12/06/2019
JOB NO. 19120
SCALE: NONE

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
DETAILS
CITY OF ISLE OF PALMS, SC

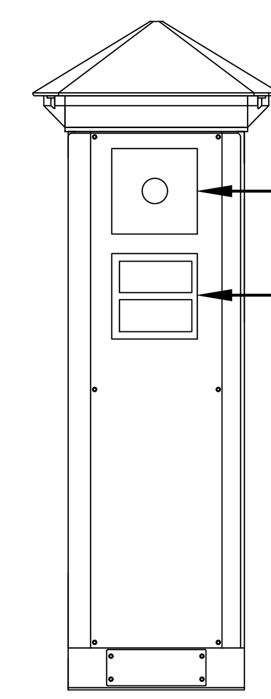
Applied Technology & Management, Inc.
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395
ATM

DRAWING NUMBER
E8
SHEET: 8 OF 8

GENERAL FUEL DISPENSING NOTES:

1. PROVIDE ALL MATERIALS AND LABOR NECESSARY FOR COMPLETE AND PROPERLY FUNCTIONING PETROLEUM STORAGE AND DISPENSING SYSTEMS. THIS WORK INCLUDES BUT NOT LIMITED TO ALL PIPING, DISPENSERS, ELECTRICAL WIRING, CONTROL WIRING, ELECTRICAL CONTROL CONDUIT, SEAL-OFF FITTINGS, EMERGENCY SHUTOFF DEVICES, AUDIO/VISUAL ALARMS, ETC. WARRANTY ALL WORK, ALL MATERIALS, EQUIPMENT, AND DEVICES FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE.
2. WORK SHALL CONFORM TO OR MEET THE REQUIREMENTS OF THE MOST CURRENT EDITION OF:
   - A: INTERNATIONAL FIRE CODE - 2018
   - B: NFPA 30 & 30A
   - C: PETROLEUM INSTITUTE RP100/200
   - D: STATE AND FEDERAL DEPARTMENT OF ENVIRONMENTAL PROTECTION
   - E: NEC ARTICLE 555 AND 514
3. COORDINATE WITH AND OBTAIN CONSTRUCTION PERMITS AND INSPECTIONS FROM AUTHORITY HAVING JURISDICTION. PROVIDE OWNER WITH CERTIFICATES OF FINAL INSPECTION AND ACCEPTANCE FROM AUTHORITY HAVING JURISDICTION.
4. PROVIDE THE OWNER WITH OPERATING AND MAINTENANCE MANUALS FOR ALL NEW SYSTEM COMPONENTS; RECOMMENDED MAINTENANCE SCHEDULES; AS-BUILT DRAWINGS; AND INSTRUCTIONS FOR THE COMPONENTS OF THE FUEL SYSTEM.
5. ALL MATERIAL SHALL BE NEW AND BY U.S. MANUFACTURER OF PROFESSIONAL QUALITY.
6. ALL MATERIALS, EQUIPMENT, AND DEVICES SHALL, AT MINIMUM, MEET THE REQUIREMENTS OF UL WHERE UL STANDARDS ARE ESTABLISHED FOR THOSE ITEMS. ALL ITEMS SHALL BE CLASSIFIED BY UL AS SUITABLE FOR THE PURPOSE USED.
7. ALL MATERIALS, EQUIPMENT, AND DEVICES SHALL BE CURRENT PRODUCTS BY MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF SUCH PRODUCTS.
8. ALL ITEMS SHALL BE NEW UNLESS NOTED OTHERWISE.
9. INSTALL ALL EQUIPMENT AND MATERIAL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
10. THE CONTRACTOR AND HIS SUBCONTRACTORS SHALL VISIT THE JOB SITE AND SHALL FAMILIARIZE THEMSELVES WITH ALL CONDITIONS UNDER WHICH WORK IS TO BE PERFORMED AND SHALL INCLUDE ALL LABOR, MATERIAL, AND OPERATIONS REQUIRED FOR A COMPLETE JOB.
11. VERIFY ALL EXISTING PUMPS, STORAGE TANKS, PIPING, CONTROLS, ETC. AND ASSOCIATED APPURTENANCES PRIOR TO CONSTRUCTION. NOTIFY ENGINEER AS NECESSARY.
12. COORDINATE LOCATION OF PETROLEUM WORK WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES.
13. ALL PETROLEUM EQUIPMENT SHALL HAVE A FACTORY APPLIED PAINTING.
14. PROVIDE EXPANSION-DEFLECTION JOINTS WHERE PIPE CROSSES DOCK SYSTEM EXPANSION, SEISMIC JOINTS, AND HINGE POINTS.
15. ALL PETROLEUM PIPING SHALL BE DOUBLE WALL COAXIAL FLEX PIPE AS MANUFACTURED BY DOUBLETRAC. THE PETROLEUM CONTRACTOR SHALL BE FACTORY CERTIFIED FOR INSTALLATION OF THIS PRODUCT. ALL PIPE TO SLOPE TOWARD A CONTAINMENT SUMP. PROVIDE WITH BULKHEAD TO FLOATING DOCK TRANSITION AS DESIGNED BY THE MANUFACTURER FOR LOCAL TIDAL CONDITIONS. SECURE OMEGAFLEX EVERY 6' (MIN.) USING OMEGAFLEX VIBRATION RESISTANT CUSHION CLAMPS OR EQUAL.
16. ELECTRICAL POWER AND COMMUNICATION TO BE PROVIDED FROM MARINA MARKET/DOCKMASTER'S' OFFICE. COORDINATE WITH EXISTING FIELD CONDITIONS.
17. THE EXISTING FUEL MANAGEMENT SYSTEM IN THE FUEL HUT LOCATED ON THE DOCK IS A TMS MANAGEMENT SYSTEM. THIS SYSTEM IS TO BE REMOVED AND THE EXISTING VEEDER-ROOT AND SCRIBBLE SYSTEMS ARE TO BE MODIFIED TO INTEGRATE THE MARINA. THE EXISTING FUEL INVENTORY AND SECONDARY CONTAINMENT AND MONITORING SYSTEM IS A VEEDER-ROOT TLS-350. PROVIDE ADDITIONAL SENSORS, CONDUIT, AND CABLING TO MONITOR MARINA PIPING, DISPENSER SUMPS AND TRANSITION SUMPS. THE SYSTEM IS APPROXIMATELY 125' FROM THE EXISTING BULKHEAD TRANSITION SUMP. COORDINATE WITH EXACT SYSTEM PROVIDED AND PROVIDE DISPENSERS WITH PROPER COMMUNICATIONS MODULES.
18. PROVIDE ALL NECESSARY HARDWARE AND SOFTWARE UPGRADES TO INCORPORATE PUREFUEL SCRIBBLE SYSTEM, WITH INTEGRAL FUEL MONITORING CAPABILITIES.
19. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO BE SCALED FOR DIMENSIONS. COORDINATE EXACT INSTALLATION WITH SITE PLAN AND ACTUAL DOCK SYSTEM PROVIDED. PROVIDE PIPING TRANSITIONS AS REQUIRED. INSTALL HOSE REELS, FUEL DISPENSERS AND DISPENSER SUMPS APPROXIMATELY AS SHOWN. THE CONTRACTOR SHALL COORDINATE FINAL LOCATION AS REQUIRED. PROVIDE OPENINGS IN THE DOCK AS REQUIRED TO ACCOMMODATE THE DISPENSER SUMPS. IT IS NOT THE INTENT TO DEPICT EVERY DETAIL OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY ITEMS FOR A COMPLETE AND FUNCTIONING SYSTEM. CONTRACTOR SHALL PROVIDE COMPLETE SHOP DRAWINGS INCLUDING EQUIPMENT, RISER DIAGRAMS, CONTROL SCHEMATICS, OPERATING MANUALS TO DEPICT COMPLETE AND OPERATING SYSTEM PRIOR TO CONSTRUCTION.
20. ALL COMPONENTS WITHIN THE CLASSIFIED AREAS SHALL BE CONSTRAINED IN ACCORDANCE WITH NFPA 30 AND 30A.
21. ALL STAINLESS STEEL FITTINGS, CLAPS, HANGERS AND MISCELLANEOUS APPURTENANCES SHALL BE ASTM A-316 OR BETTER.
22. THE FUEL DISPENSING CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY FUEL ELECTRICAL POWER WIRING, CONDUIT, BREAKERS, ETC.
23. COORDINATE TO ENSURE THE FUEL HUT IS PROVIDED WITH ALL REQUIRED COMMUNICATIONS PER NFPA 303 SECTION 6.8.

1



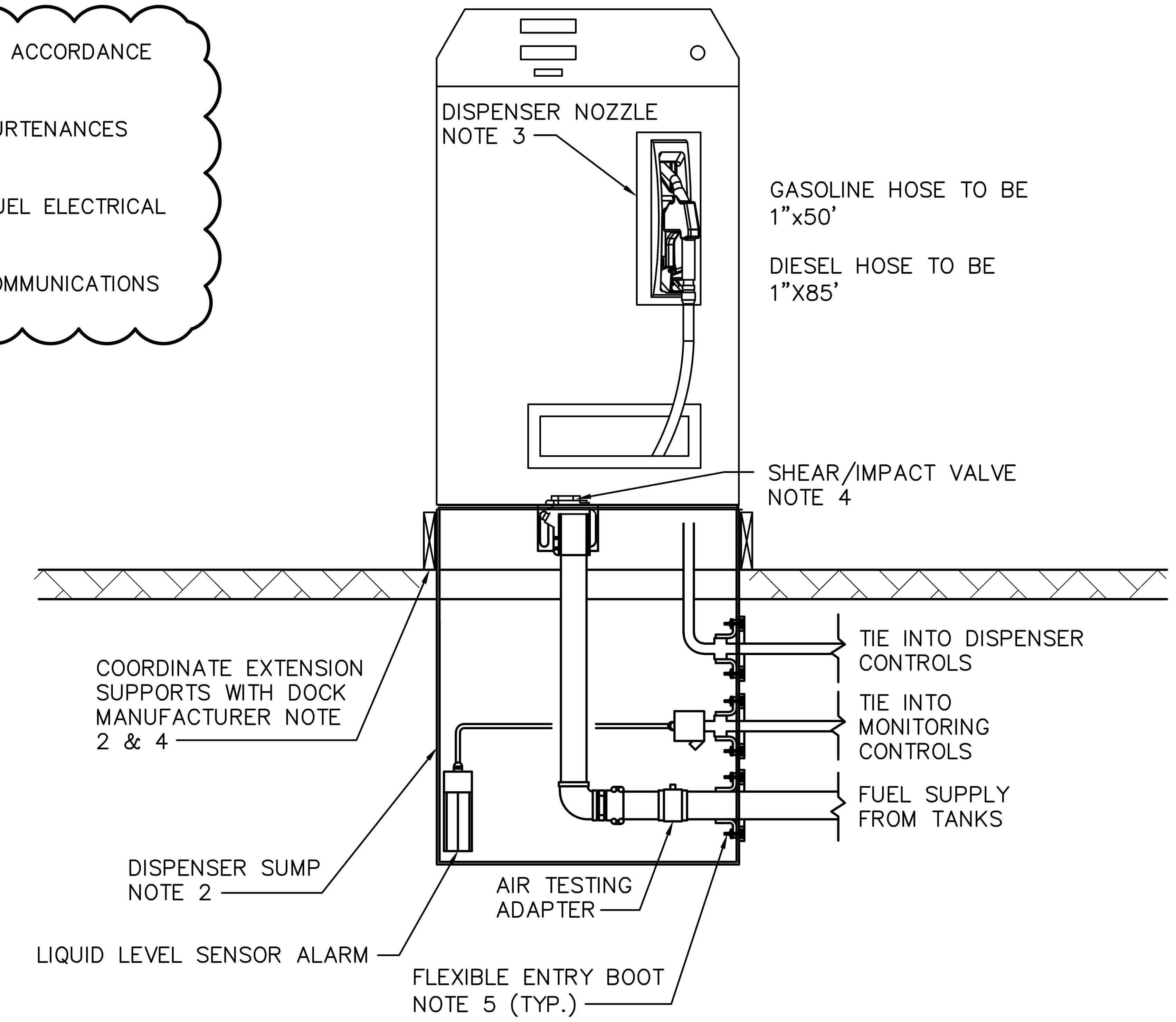
ESTOP-AUDIO/VISUAL ALARM
MEE HARBOR LIGHT SERIES PEDESTAL

NOTE:

THIS DESIGN UTILIZES MEE CUSTOM PEDESTALS AS MANUFACTURED BY MARINA ELECTRICAL EQUIPMENT (WILLIAMSBURG, VIRGINIA, USA. TEL. 1-865-258-3939). PROVIDE PHOTO-CELL CONTROLLED LED LIGHTS WITH WHITE LENSES.

LEGEND

Symbol	Description
GAS	GAS PIPING (G)
	DIESEL PIPING (D)
	ISOLATION VALVE
	CHECK VALVE
	UNION
	AUDIO/VISUAL ALARM
S.S.	STAINLESS STEEL
G	GASOLINE DISPENSER
D	DIESEL DISPENSER
ESTOP	MEE HARBOR LIGHT SS SERIES PEDESTAL. PROVIDE WITH EMERGENCY PUSH BUTTON SHUT OFF FOR FUEL DISPENSING SYSTEM. COORDINATE WITH FUEL DISPENSING CONTRACTOR.



DISPENSERS & SUMP DETAILS
SCALE: NONE

NOTES:

1. PROVIDE PMC GASOLINE FUEL DISPENSER(S), MODEL FH-510-MA-2M, WITH POWER REWIND. PROVIDE PMC DIESEL FUEL DISPENSER, MODEL FH-510-MA-2M, WITH POWER REWIND.
2. PROVIDE THE FUEL DISPENSER WITH STAINLESS STEEL DISPENSER CONTAINMENT SUMP. EMCO DISPENSER SUMP PMC FUELHOUSE MOUNTING FLANGE. VERIFY EXACT SIZE WITH DISPENSER AND DOCK SYSTEMS. THE DOCK SYSTEM SHALL BE MODIFIED BY THE DOCK MANUFACTURER TO ALLOW INSTALLATION. SPILL CONTAINMENT SUMPS TO BE LOCATED SO AS TO BE ACCESSIBLE FROM THE TOP
3. DISPENSER NOZZLES SHALL BE USED ONLY FOR FUELING VESSELS TO AVOID STAGE II VAPOR RECOVERY REQUIREMENT. AUTOMATIC SELF-CLOSING-TYPE DISPENSER NOZZLES SHALL BE INSTALLED WITHOUT LATCH-OPEN DEVICES.
4. INSTALL AN EMERGENCY SAFETY SHEER VALVE UNDER ALL DISPENSER SUMPS AS MANUFACTURED BY EMCO. CONNECT PIPING TO SAFETY VALVES WITH MARINA GRADE FLEX HOSE.
5. PROVIDE FLEXIBLE ENTRY BOOTS FOR EACH SUMP PENETRATION.

1

Aaron C. Tempel, Registered Professional Engineer, South Carolina, No. 23556 — 07/08/2020
EPIC Engineering Inc., South Carolina Certificate of Authorization No. C00259

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
1	8/25/20	RAD	ACT	ADDENDUM 2

DESIGNED	DRAWN	CHECKED
ACT	RAD	ACT
DATE:	12/06/2019	
JOB NO.	19120	
SCALE:	NONE	

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

NOTES, LEGEND AND DETAILS

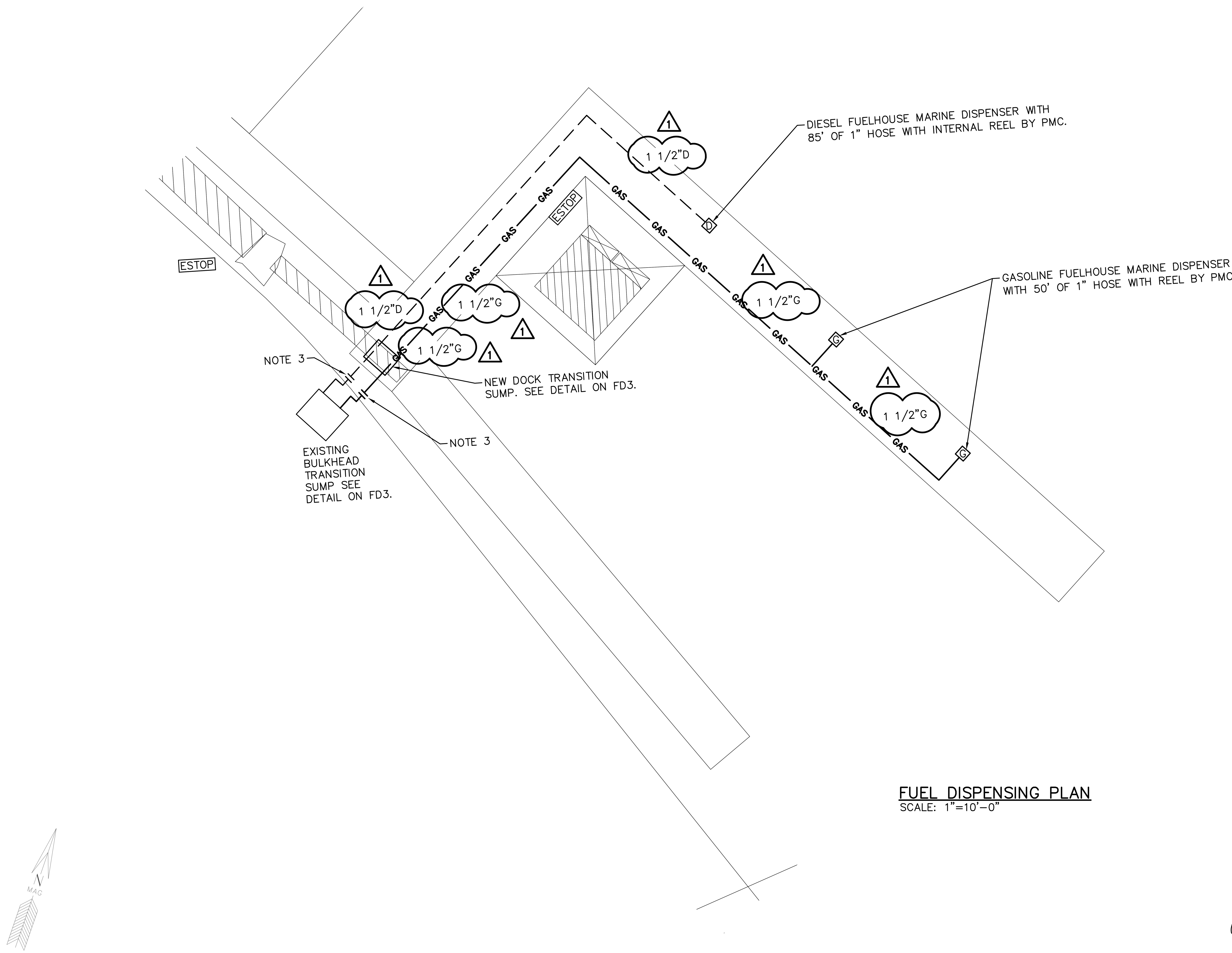
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcutt Blvd. Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

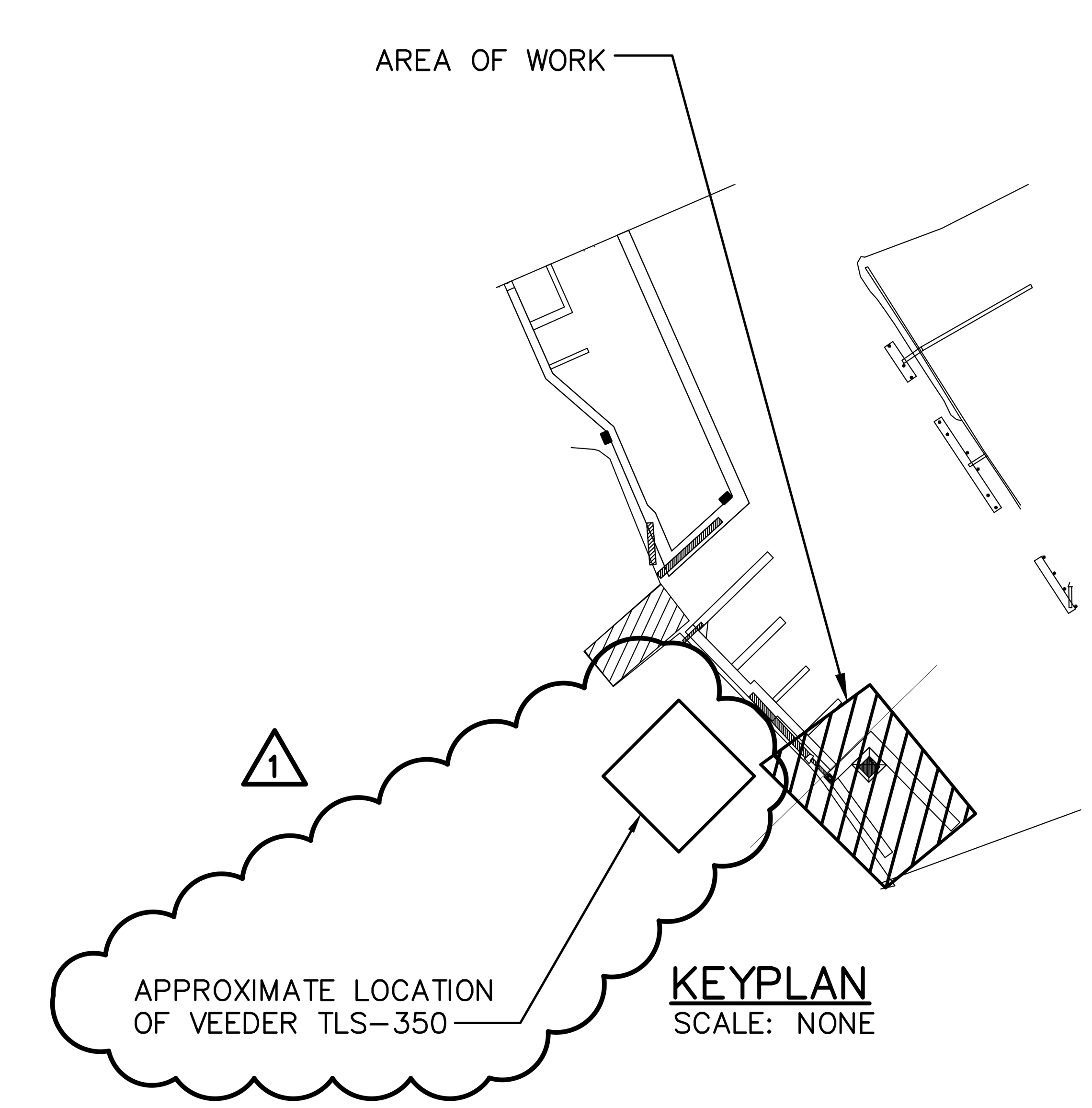
DRAWING NUMBER
FD1
SHEET: 1 OF 3

NOTES:

1. THE EXISTING TANKS, UPLAND FUEL DISPENSERS, TRANSITION SUMP AND UPLAND FUEL PIPING TO REMAIN.
2. COORDINATE LOCATIONS OF ESTOPS, INVENTORY & LEAK PANELS AND PUMP CONTROL PANELS WITH OWNER.
3. TIE NEW PIPING INTO EXISTING. PROVIDE NEW DOUBLEWALL DOCK CONNECTOR FROM BULKHEAD TO FLOATING DOCK AS MANUFACTURED BY DOUBLETRAC. COORDINATE LOCAL TIDE RISE AND FALL WITH MANUFACTURER.



FUEL DISPENSING PLAN
SCALE: 1"=10'-0"



KEYPLAN
SCALE: NONE

No. 23556 07/08/2020

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DATE: 12/06/2019
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SCALE: 1" = 10' - 0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
FUEL DISPENSING PLAN
CITY OF ISLE OF PALMS, SC

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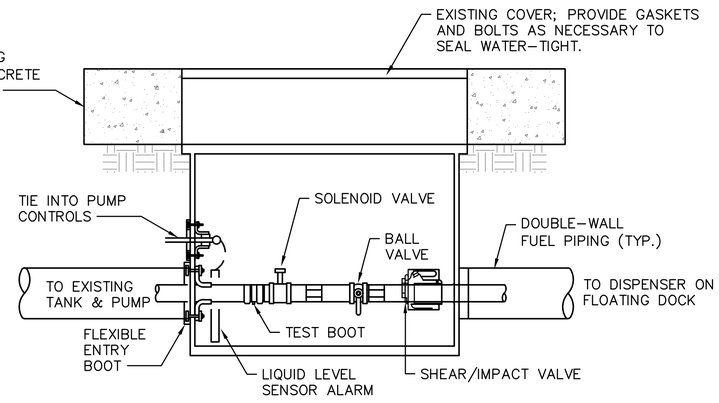
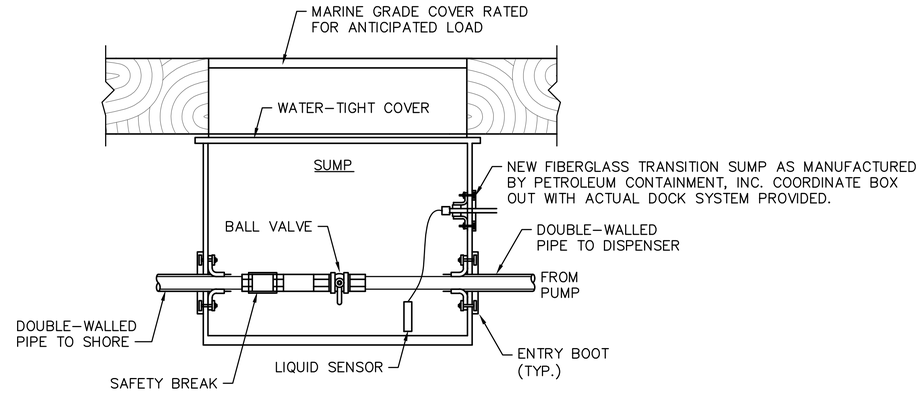
DRAWING NUMBER
FD2
SHEET: 2 OF 3

1



EXISTING BULKHEAD TRANSITION SUMP DETAIL

SCALE: NONE



NEW DOCK TRANSITION SUMP

SCALE: NONE

Aaron Tempel
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SCALE: NONE

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FUEL DISPENSING DETAILS

CITY OF ISLE OF PALMS, SC

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DRAWING NUMBER
FD3
SHEET: 3 OF 3

SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 23556
AARON CLEMENS TEMPEL
07/08/2020

SOUTH CAROLINA
EPIC ENGINEERING INC.
No. C00259
CERTIFICATE OF AUTHORIZATION

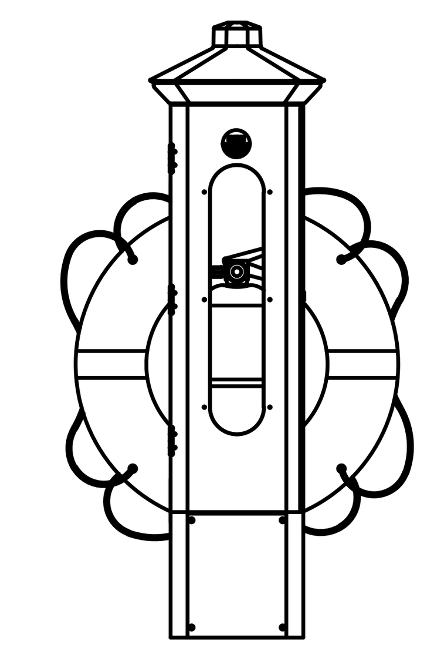
EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

GENERAL FIRE PROTECTION NOTES:

1. PROVIDE ALL MATERIALS AND LABOR NECESSARY FOR COMPLETE AND PROPERLY FUNCTIONING FIRE PROTECTION SYSTEMS.
2. WORK SHALL CONFORM TO OR MEET THE REQUIREMENTS OF THE MOST CURRENT EDITION OF:
   - A. INTERNATIONAL FIRE CODE – 2018
   - B. NFPA 303 – 2016
   - C. NFPA 14 – 2016
   - D. ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES WHICH APPLY TO THIS WORK.
3. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO BE SCALED FOR DIMENSIONS.
4. ALL MATERIALS SHALL MEET THE REQUIREMENTS OF UL WHERE UL STANDARDS ARE ESTABLISHED FOR THOSE ITEMS. ALL ITEMS SHALL BE CLASSIFIED BY UL AS SUITABLE FOR THE PURPOSE USED.
5. ALL ITEMS SHALL BE NEW AND ALL MATERIALS/EQUIPMENT/DEVICES SHALL BE CURRENT PRODUCTS BY MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF SUCH PRODUCTS.
6. COORDINATE LOCATION AND INSTALLATION OF FIRE PROTECTION WORK WITH DOCK SYSTEM AND OTHER TRADES TO AVOID CONFLICTS, INTERFERENCES. MODIFICATIONS AND ADJUSTMENTS MAY BE REQUIRED. PROVIDE WITH PIPING CHAFE PROTECTION AS REQUIRED. SUBMIT SHOP DRAWINGS DEPICTING LOCATIONS OF CHAFE PROTECTION, HANGERS AND RESTRAINTS.
7. IT IS NOT THE INTENT TO DEPICT EVERY DETAIL OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY ITEMS FOR A COMPLETE AND FUNCTIONING SYSTEM.
8. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND RECOMMENDATIONS.
9. COORDINATE AND OBTAIN PERMITS AND INSPECTIONS FROM AUTHORITY HAVING JURISDICTION.
10. PROVIDE OWNER WITH CERTIFICATE OF FINAL INSPECTION AND ACCEPTANCE FROM AUTHORITY HAVING JURISDICTION.
11. VALVES SHALL BE LINE SIZE UNLESS NOTED OTHERWISE.
12. FIRE PROTECTION (FM RATED) PIPING LOCATED WITHIN THE DOCK SHALL BE SDR 11 HIGH DENSITY POLYETHYLENE PIPING (HDPE) WITH UV PROTECTION. ALL JOINTS SHALL BE SOCKET FUSION FITTINGS. COORDINATE INSTALLATION WITH MANUFACTURER'S RECOMMENDATIONS TO ALLOW FOR THERMAL EXPANSION AND CONTRACTION. FIRE PROTECTION PIPING BELOW GRADE AWWA C151/ANSI A 21.5, STANDARD WEIGHT, TAR COATED, MECHANICAL JOINTS, DUCTILE IRON, WITH AWWA C104/ANSI A 21.5 CEMENT LINING C900 PVC PC150 (DR 18), OR FM HDPE.
13. SUBMIT SHOP DRAWINGS ON ALL MATERIALS FOR APPROVAL.
14. EACH JOINT SHALL BE LEFT EXPOSED FOR INSPECTION DURING HYDROSTATIC TESTING. THE PRESSURE SHALL BE AT LEAST 1.5 TIMES THE MAXIMUM WORKING PRESSURE AND THE TIME DURATION MUST BE AT LEAST 2 HOURS.
15. ALL STAINLESS STEEL FITTINGS, CLAMPS, HANGERS, AND MISCELLANEOUS APPURTENANCES SHALL BE ASTM A-316 OR BETTER.
16. THIS DESIGN UTILIZES MEE FIRE STATION SAFETY PEDESTALS MODEL FS1020 WITH 10 POUND TYPE ABC EXTINGUISHERS AS MANUFACTURED BY MARINA ELECTRICAL EQUIPMENT (WILLIAMSBURG, VIRGINIA, USA. TEL. 1-865-258-3939). PROVIDE PHOTO-CELL CONTROLLED LED LIGHTS WITH WHITE LENSES.
17. FUEL DOCK FIRE STATION SAFETY PEDESTALS TO BE PROVIDED WITH EXTRA (HIGH) HAZARD TYPE EXTINGUISHERS.
18. ALL STAINLESS STEEL FITTINGS, CLAPS, HANGERS AND MISCELLANEOUS APPURTENANCES SHALL BE ASTM A-316 OR BETTER.
19. PROVIDE PIPE SLEEVES AND BULKHEAD PENETRATIONS AS NECESSARY TO FACILITATE INSTALLATION. SUBMIT PENETRATION DETAIL FOR APPROVAL. UTILIZE EXISTING PENETRATIONS TO THE GREATEST EXTENT POSSIBLE.

LEGEND

———	FIRE PROTECTION (FP)
⋈	GATE VALVE
TYP.	TYPICAL
HDPE	HIGH DENSITY POLYETHYLENE PIPING
TBD	TO BE DETERMINED
Ⓢ	FIRE PROTECTION HOSE CONNECTION
F (boxed)	FIRE EXTINGUISHER PEDESTAL



MEE FIRE STATION SAFETY PEDESTAL

SOUTH CAROLINA ... AARON CLEMENS TEMPEL No. 23556 — 07/08/2020

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION — EPIC ENGINEERING INC. No. C00259

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07/08/2020
Date

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ACT	RAD	ACT

DATE: 12/06/2019
JOB NO. 19120
SCALE: NONE

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
NOTES AND LEGEND
CITY OF ISLE OF PALMS, SC

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941 Houston Northcutt Blvd. Suite 201
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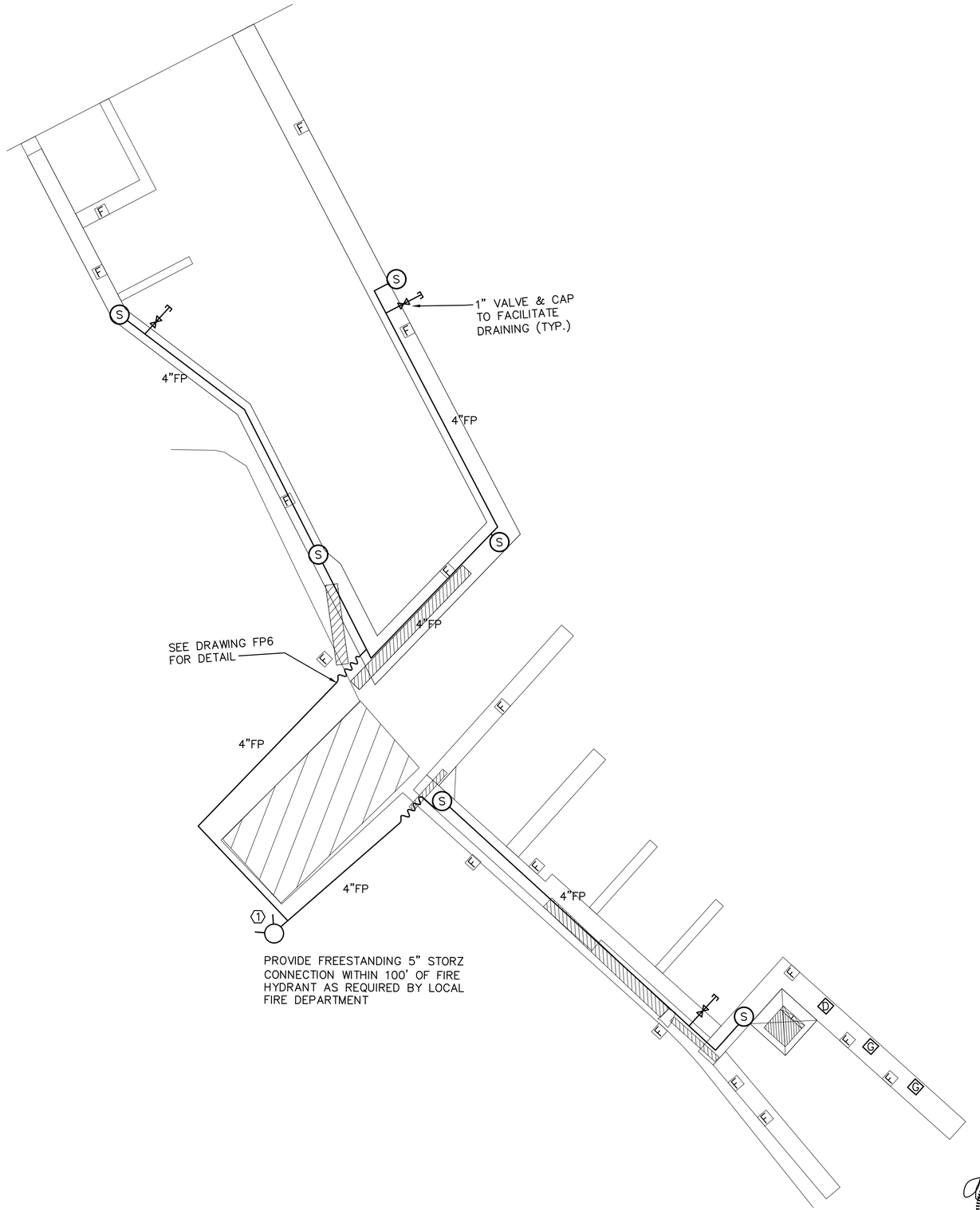
DRAWING NUMBER
FP1
SHEET: 1 OF 6



KEYED NOTES (THIS SHEET ONLY)

1. COORDINATE EXACT LOCATIONS WITH ENGINEER PRIOR TO INSTALLATION.

LEGEND

- FIRE PROTECTION (FP)
- GATE VALVE
- (S) FIRE PROTECTION HOSE CONNECTION
- [F] FIRE EXTINGUISHER PEDESTAL

FIRE PROTECTION PLAN
SCALE: 1"=30'-0"

SOUTH CAROLINA PROFESSIONAL ENGINEER AARON CLEMENS TEMPEL No. 23556 — 07/08/2020

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SCALE: 1" = 30'-0"

ISLE OF PALMS MARINA
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FIRE PROTECTION PLAN

CITY OF ISLE OF PALMS, SC

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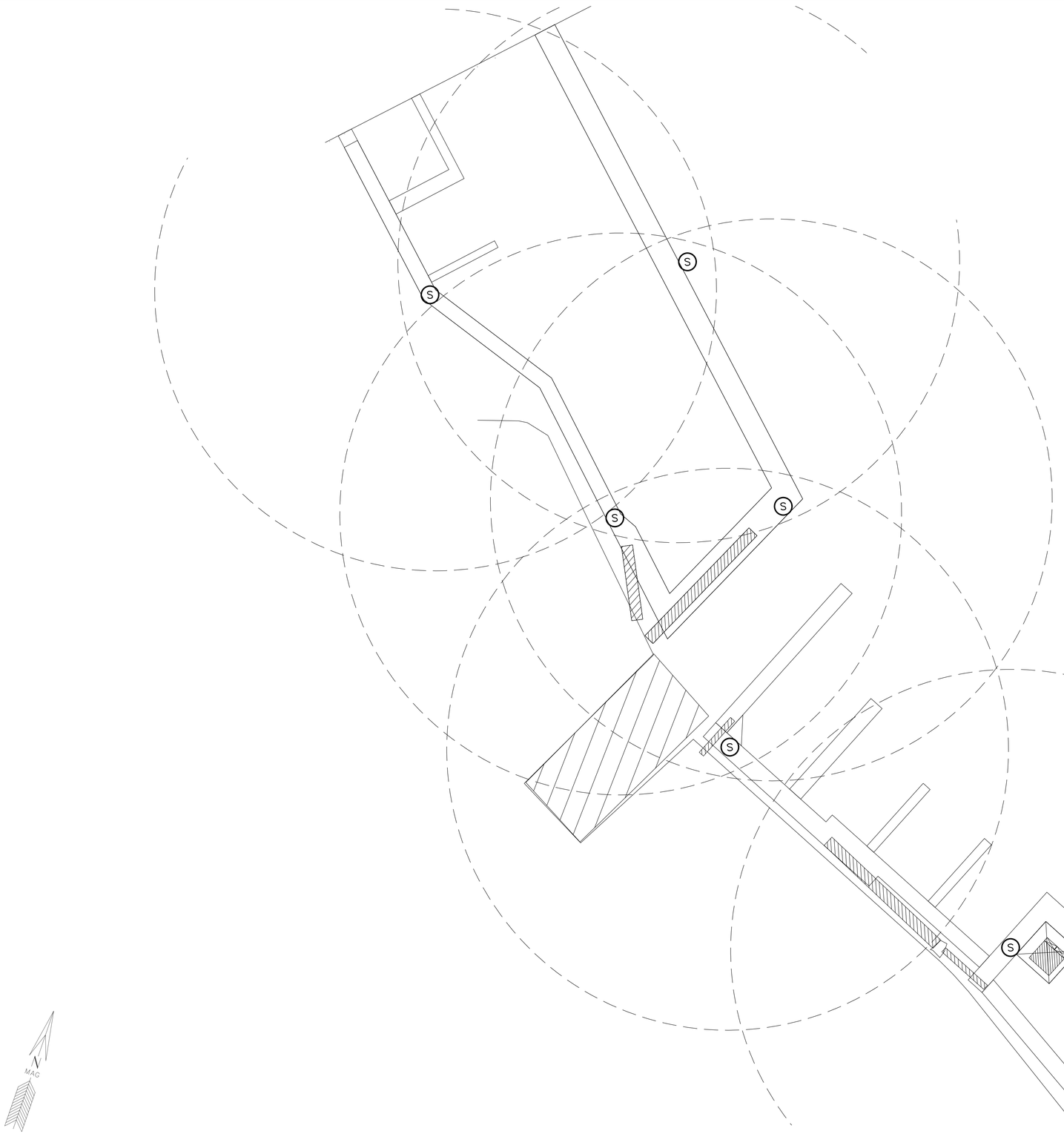
DRAWING NUMBER
FP2
SHEET: 2 OF 6



LEGEND

(S) FIRE PROTECTION HOSE CONNECTION

STANDPIPE COVERAGE ZONES
SCALE: 1"=30'-0"

SOUTH CAROLINA PROFESSIONAL ENGINEER AARON CLEMENS TEMPEL No. 23556 07/08/2020

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DATE: 12/06/2019
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SCALE: 1" = 30'-0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

FIRE PROTECTION PLAN
STANDPIPE COVERAGE ZONES

CITY OF ISLE OF PALMS, SC

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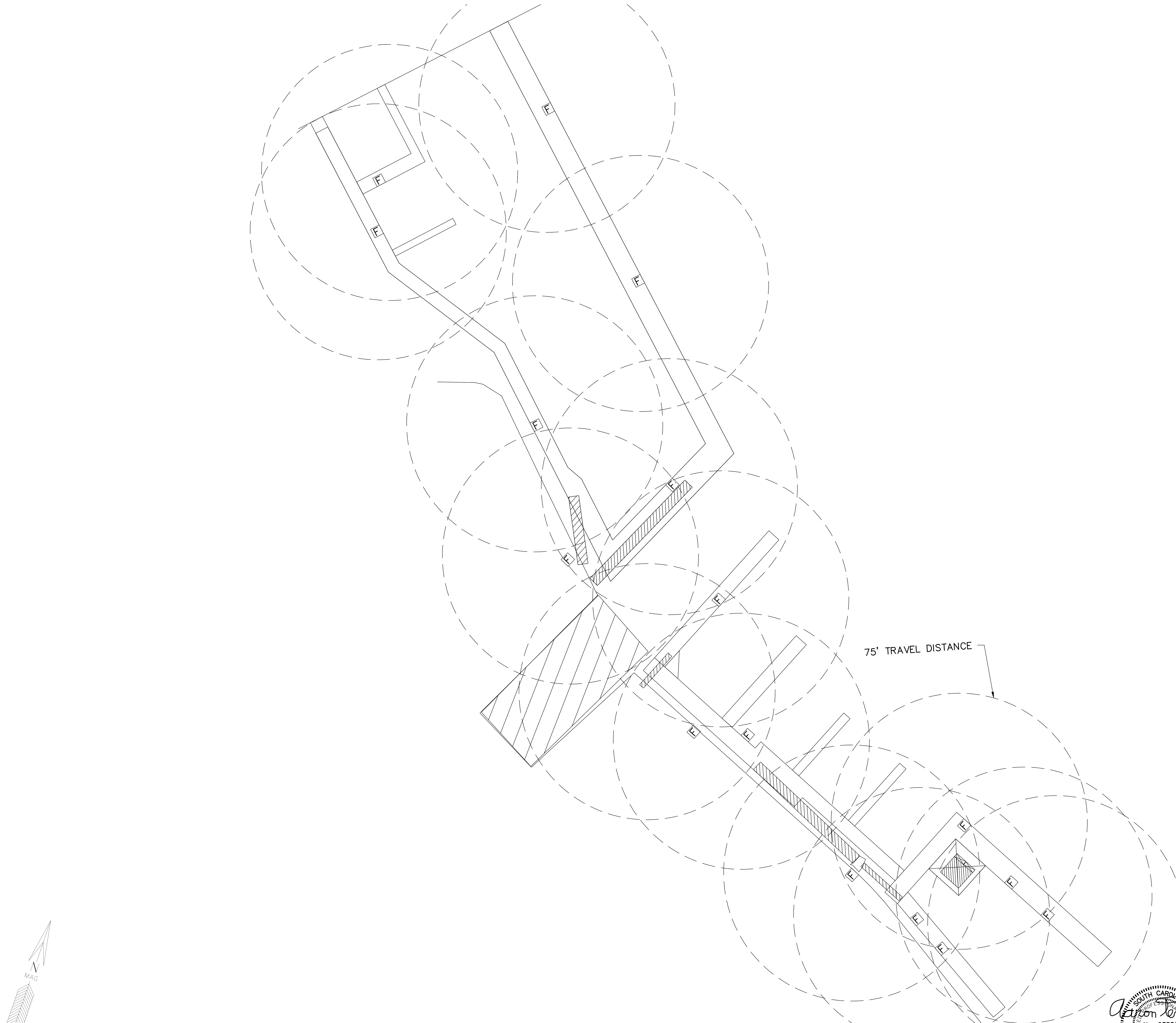
DRAWING NUMBER
FP3
SHEET: 3 OF 6



LEGEND

[F] FIRE EXTINGUISHER PEDESTAL

FIRE EXTINGUISHER COVERAGE ZONES

SCALE: 1"=30'-0"

Aaron Tempel
SOUTH CAROLINA
No. 23556
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DATE: 12/06/2019
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SCALE: 1" = 30' - 0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
FIRE PROTECTION PLAN
FIRE EXTINGUISHER COVERAGE ZONES
CITY OF ISLE OF PALMS, SC

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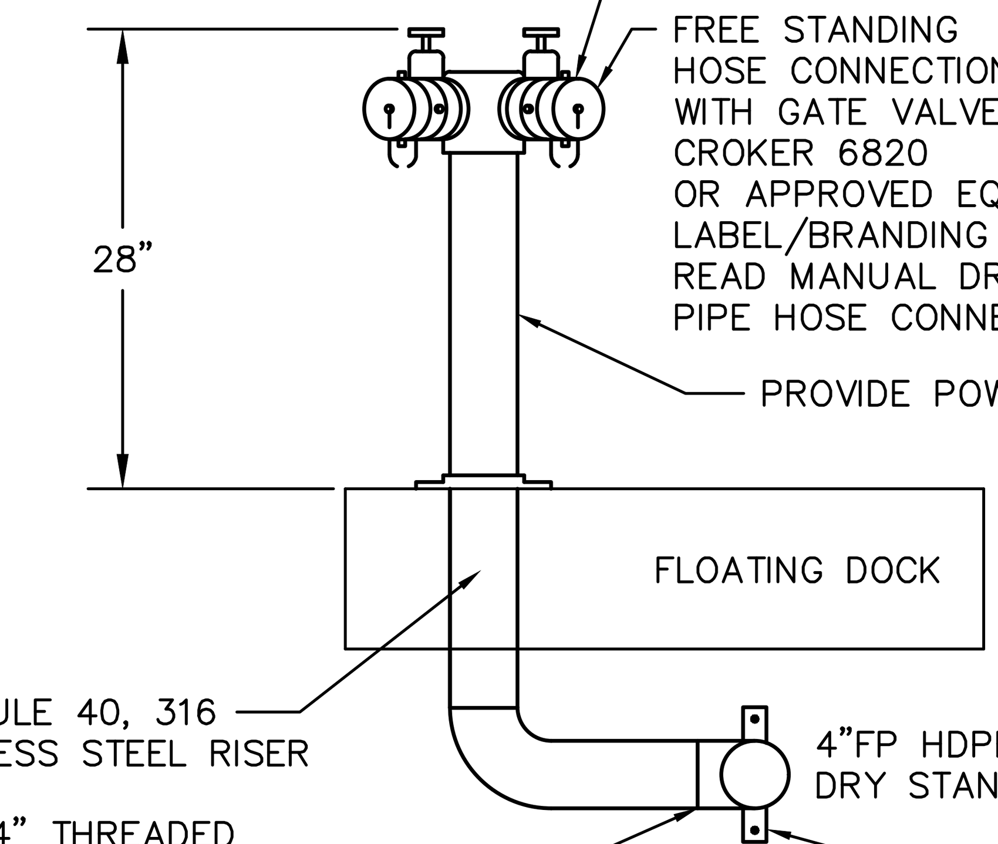
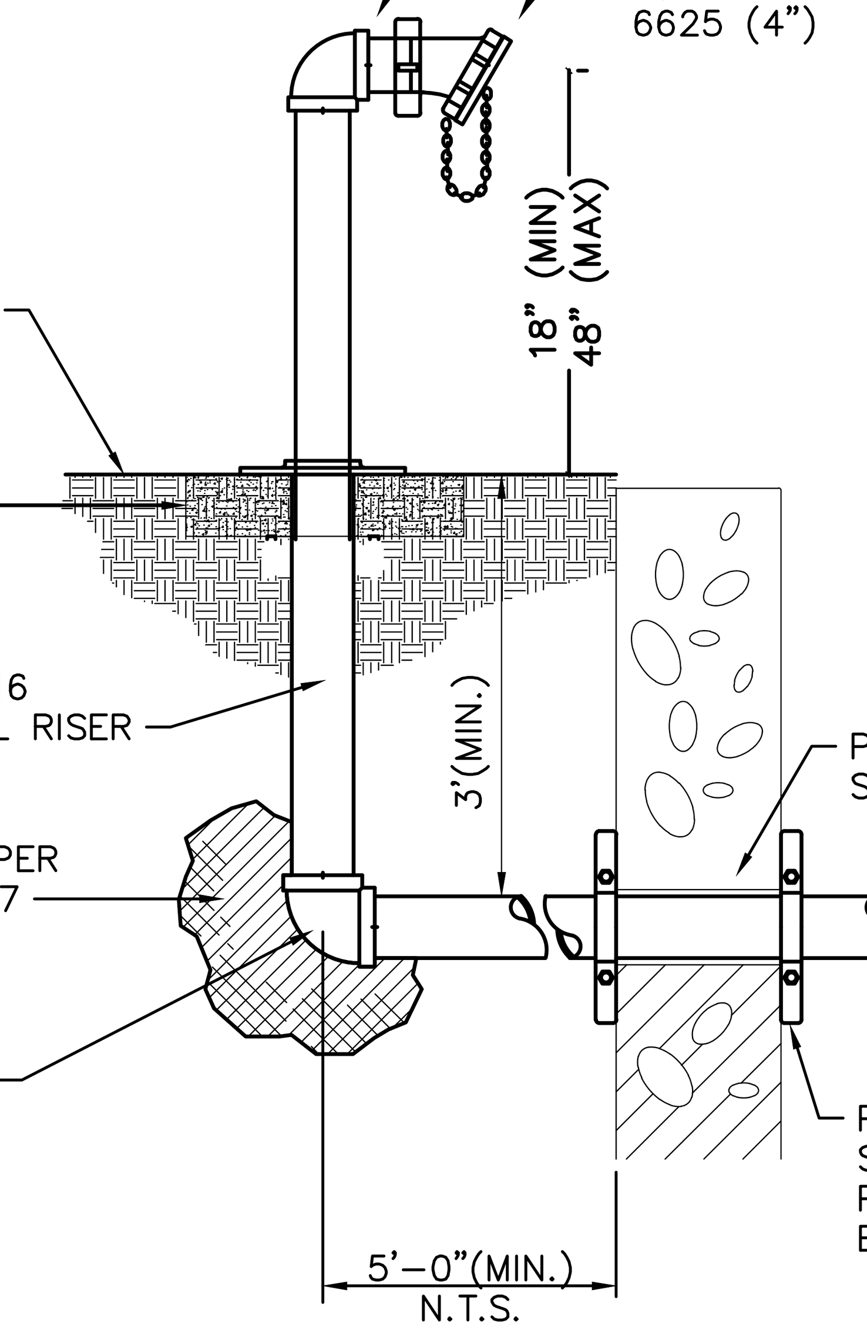
DRAWING NUMBER
FP4
SHEET: 4 OF 6



NOTE:
1. COORDINATE EXACT LOCATION WITH ACTUAL DOCK SYSTEM PROVIDED.

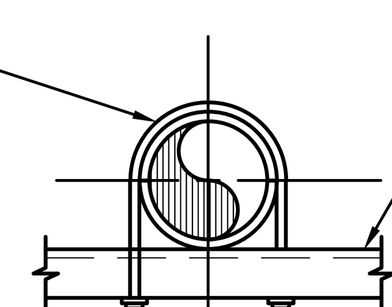
MANUAL DRY STANDPIPE SYSTEM HOSE CONNECTION DETAIL

SCALE: NONE



UPLAND FIRE DEPARTMENT CONNECTION DETAIL

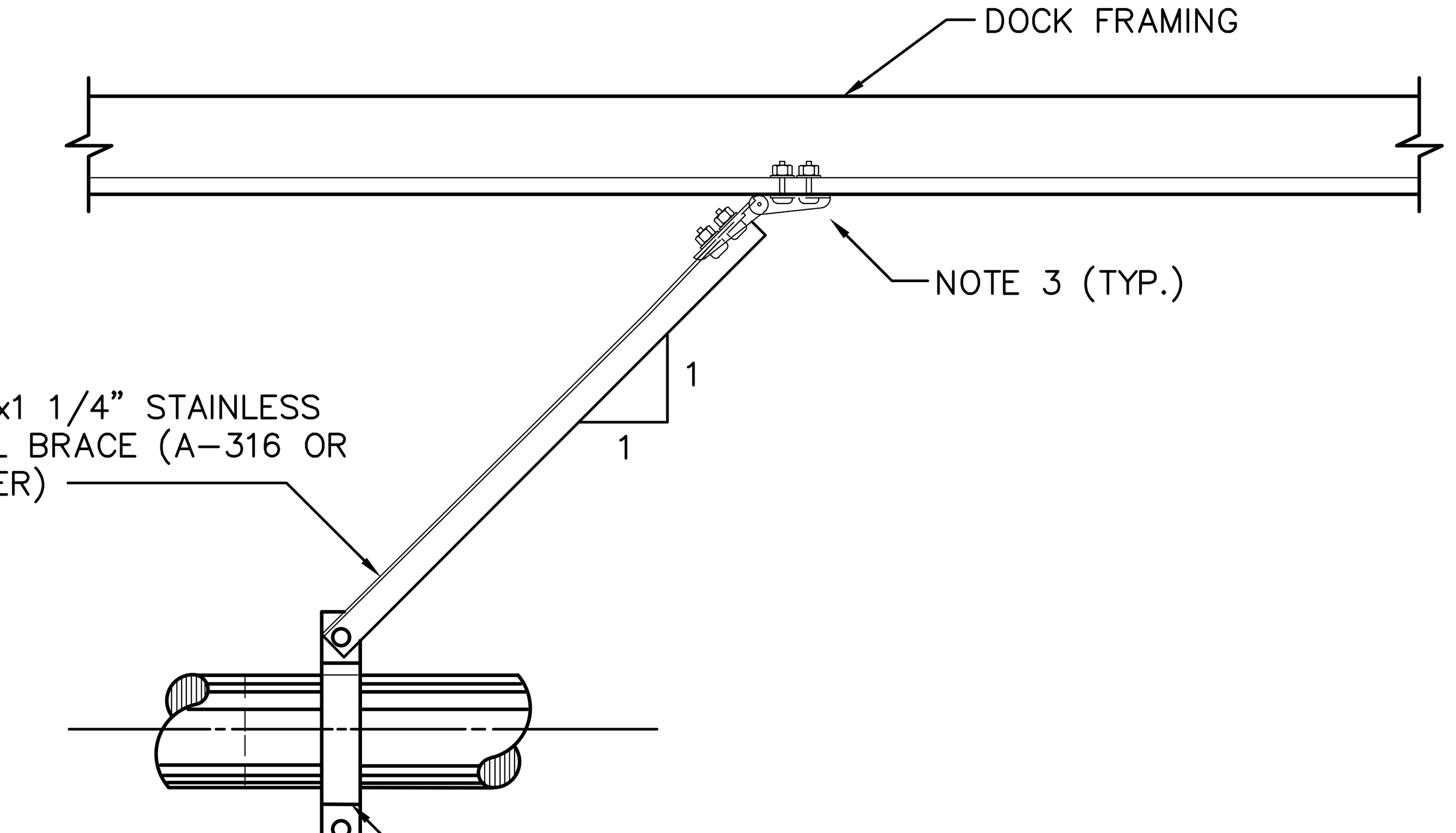
SCALE: NONE



PIPE HANGER DETAIL

SCALE: NONE

NOTE:
1. PIPE HANGERS SHALL BE PROVIDED EVERY 4' TO 8'.
2. COORDINATE EXACT LOCATION WITH OTHER PIPING AND ELECTRICAL SYSTEMS
3. SECURE TO DOCK STRUCTURE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.



PIPING LONGITUDINAL RESTRAINT DETAIL

SCALE: NONE

NOTES:
1. LONGITUDINAL RESTRAINTS SHALL BE PROVIDED EVERY 40'.
2. ALL FIRE PROTECTION PIPING SYSTEMS SHALL BE RESTRAINED (NO EXCEPTIONS).
3. SECURE TO DOCK STRUCTURE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER AARON CLEMENS TEMPEL No. 23556
07/08/2020
SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION EPIC ENGINEERING INC. No. C00259

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DATE: 12/06/2019
JOB NO. 19120
SCALE: NONE

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

FIRE PROTECTION DETAILS

CITY OF ISLE OF PALMS, SC

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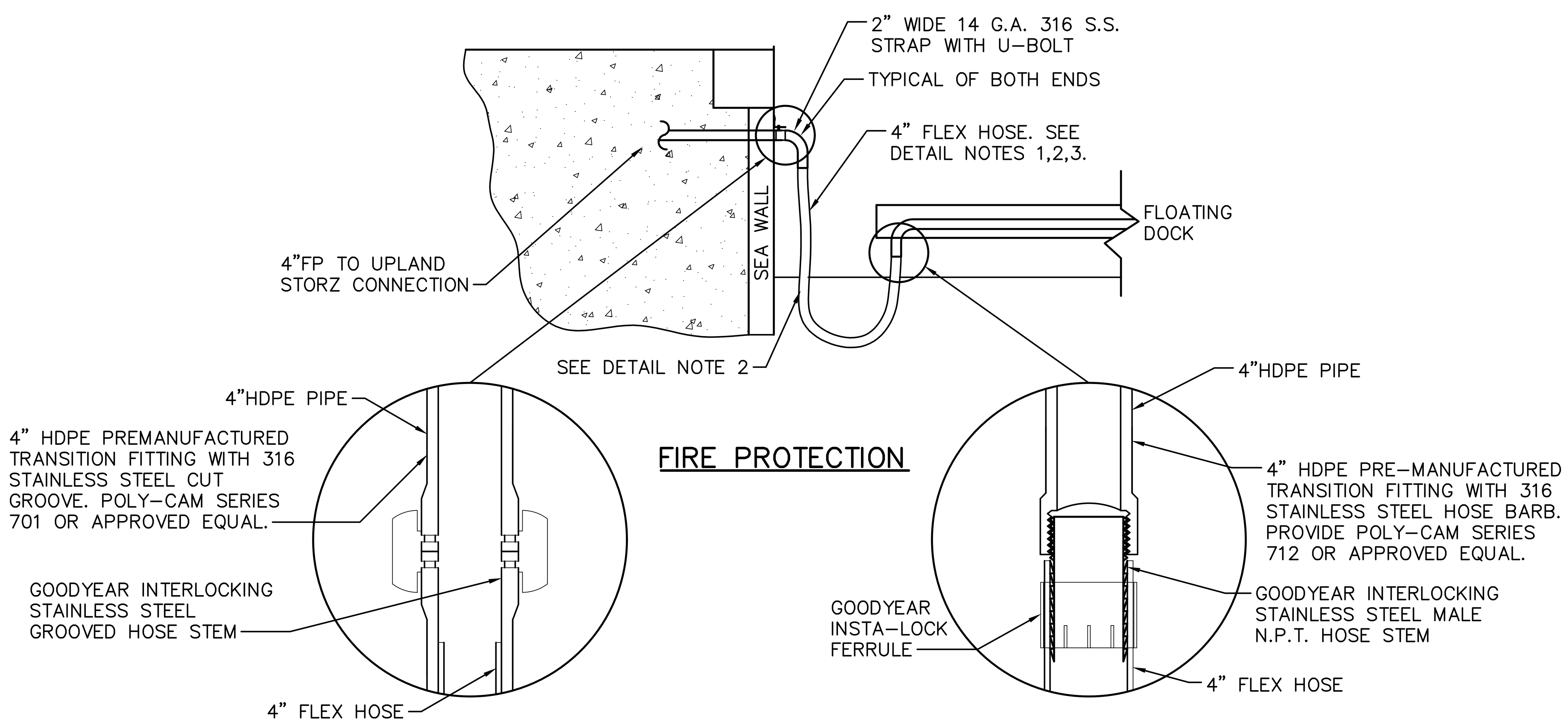
DRAWING NUMBER
FP5
SHEET: 5 OF 6



FIXED PIER TO FLOATING DOCK FIRE PROTECTION BULKHEAD CONNECTION DETAIL

SCALE: NONE

DETAIL NOTES (BOTH DETAILS THIS SHEET):

1. PROVIDE FLEXIBLE HOSE WITH REMOVABLE SACRIFICIAL CORRUGATED PLASTIC PIPING JACKET. COORDINATE EXACT SIZE WITH FLEXIBLE HOSE PROVIDED.
2. COORDINATE MOUNTING AND INSTALLATION OF THE FIRE PROTECTION PIPING WITH DOCK SYSTEM PROVIDED AND LOCAL TIDAL RISE & FALL. PROVIDE STAINLESS STEEL HANGERS AS REQUIRED. SUBMIT SHOP DRAWINGS FOR APPROVAL.
3. PROVIDE 4" FLEXIBLE HOSE WITH INTEGRAL STAINLESS STEEL TRANSITION FITTINGS AS SHOWN. PROVIDE PARKER BLUE THUNDER UHMW FLEXIBLE HOSE RATED FOR 200 PSI, OR APPROVED EQUAL. COORDINATE EXACT LENGTH WITH FIELD CONDITIONS AND ALLOW FOR RISE AND FALL OF TIDES.

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ISLE OF PALMS MARINA
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FIRE PROTECTION DETAILS

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DRAWING NUMBER
FP6
SHEET: 6 OF 6

GENERAL PLUMBING NOTES:

1. PROVIDE ALL MATERIALS AND LABOR NECESSARY FOR COMPLETE AND PROPERLY FUNCTIONING PLUMBING SYSTEMS.
2. WORK SHALL CONFORM TO OR MEET THE REQUIREMENTS OF THE MOST CURRENT EDITION OF:
   A. INTERNATIONAL PLUMBING CODE – 2018
   B. ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES WHICH APPLY TO THIS WORK.
3. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND IS NOT INTENDED TO BE SCALED FOR DIMENSIONS.
4. ALL MATERIALS SHALL MEET THE REQUIREMENTS OF UL WHERE UL STANDARDS ARE ESTABLISHED FOR THOSE ITEMS. ALL ITEMS SHALL BE CLASSIFIED BY UL AS SUITABLE FOR THE PURPOSE USED.
5. ALL ITEMS SHALL BE NEW AND ALL MATERIALS/EQUIPMENT/DEVICES SHALL BE CURRENT PRODUCTS BY MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF SUCH PRODUCTS.
6. COORDINATE LOCATION AND INSTALLATION OF PLUMBING WORK WITH DOCK SYSTEM AND POWER PEDESTALS PROVIDED, AND OTHER TRADES TO AVOID CONFLICTS, INTERFERENCES. MODIFICATIONS AND ADJUSTMENTS MAY BE REQUIRED. PROVIDE WITH CHAFE PROTECTION AS REQUIRED. SUBMIT SHOP DRAWINGS FOR APPROVAL.
7. IT IS NOT THE INTENT TO DEPICT EVERY DETAIL OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY ITEMS FOR A COMPLETE AND FUNCTIONING SYSTEM.
8. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND RECOMMENDATIONS.
9. COORDINATE AND OBTAIN PERMITS AND INSPECTIONS FROM AUTHORITY HAVING JURISDICTION.
10. PROVIDE OWNER WITH CERTIFICATE OF FINAL INSPECTION AND ACCEPTANCE FROM AUTHORITY HAVING JURISDICTION.
11. VALVES SHALL BE LINE SIZE UNLESS NOTED OTHERWISE.
12. WATER AND WASTE PIPING LOCATED WITHIN THE DOCK SHALL BE SDR 11 HIGH DENSITY POLYETHYLENE PIPING (HDPE) WITH UV PROTECTION. ALL JOINTS SHALL BE SOCKET FUSION FITTINGS. COORDINATE INSTALLATION WITH MANUFACTURER'S RECOMMENDATIONS TO ALLOW FOR THERMAL EXPANSION AND CONTRACTION. WATER & WASTE PIPING BELOW GRADE SHALL BE STANDARD WEIGHT, TYPE 1, PVC.
13. 19mm (3/4") FLEXIBLE WATER HOSE TO PEDESTALS SHALL BE GOODYEAR MODEL PLICORD. WINELINE WITH INTEGRAL UV INHIBITORS FOR USE WITH POTABLE WATER. PEX PIPING WITHIN THE PEDESTALS SHALL BE AS MANUFACTURED BY DURA-PEX WITH UV INHIBITOR OR APPROVED EQUAL.
14. POTABLE WATER PIPING SHALL BE DISINFECTED IN ACCORDANCE WITH THE INTERNATIONAL PLUMBING CODE 2018.
15. SUBMIT SHOP DRAWINGS ON ALL MATERIALS FOR APPROVAL.
16. THE PLUMBING CONTRACTOR SHALL HAVE 5 YEARS OF MARINA EXPERIENCE UTILIZING MATERIALS SPECIFIED PARTICULARLY USE OF HDPE PIPING.
17. EACH JOINT SHALL BE LEFT EXPOSED FOR INSPECTION DURING HYDROSTATIC TESTING. THE PRESSURE SHALL BE AT LEAST 1.5 TIMES THE MAXIMUM WORKING PRESSURE AND THE TIME DURATION MUST BE AT LEAST 2 HOURS.
18. ALL MATERIAL OR PRODUCTS, WHICH COME INTO CONTACT WITH DRINKING WATER, SHALL BE THIRD PARTY CERTIFIED AS MEETING THE SPECIFICATIONS OF THE AMERICAN NATIONAL INSTITUTE/NATIONAL SANITATION FOUNDATION STANDARD 61, DRINKING WATER SYSTEM COMPONENTS – HEALTH EFFECTS. THE CERTIFYING PARTY SHALL BE ACCREDITED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE.
19. NATURAL RUBBER OR OTHER MATERIAL WHICH WILL SUPPORT MICROBIAL GROWTH MAY NOT BE USED FOR ANY GASKET, O-RING, AND OTHER PRODUCTS USED FOR JOINTING PIPING, SETTING METERS OR VALVES, OF OTHER APPURTENANCES WHICH WILL EXPOSE THE MATERIAL TO THE WATER.
20. INSTALLATION OF WATER MAINS AND APPURTENANCES SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION C OF THE AWWA STANDARD'S AND/OR MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.
21. SEPARATION OF UNDERGROUND WATER MAINS AND SEWERS:
   * PARALLEL INSTALLATION: WATER MAINS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED SEWER. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE.
   * CROSSINGS: WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL SEPARATION OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER.
   * PROVIDE PIPE SLEEVES AS NECESSARY TO ALLOW CLEARANCE REDUCTION.
22. ALL STAINLESS STEEL FITTINGS, CLAMPS, HANGERS AND MISCELLANEOUS APPURTENANCES SHALL BE ASTM A-316 OR BETTER.
23. PROVIDE PIPE SLEEVES AND BULKHEAD PENETRATIONS AS NECESSARY TO FACILITATE INSTALLATION. SUBMIT PENETRATION DETAIL FOR APPROVAL. UTILIZE EXISTING PENETRATIONS TO THE GREATEST EXTENT POSSIBLE.

LEGEND

Symbol	Description
——	WASTE (W)
— - —	COLD WATER (CW)
⋈	STAINLESS STEEL BALL VALVE
	AUTO DRIP VALVE
	1"CW VALVE AND CAP
DN.	DOWN
TYP.	TYPICAL
SP-1	SEWAGE PUMP
HDPE	HIGH DENSITY POLYETHYLENE PIPING

SEWAGE PUMP SCHEDULE

MARK	SP-1	
SERVICE	DOCKSIDE PUMPOUT SYSTEM	
SEWAGE FLOW – GPM	20-45	
TOTAL DYNAMIC SUCTION HEAD – FT. W.G.	10	
TOTAL DYNAMIC DISCHARGE HEAD – FT. W.G.	500	
MOTOR – HP	3	
ELECTRICAL – V/Ø/Hz	240/1/60	
MANUFACTURER	KECO	
MODEL NO.	900_M40_3HP	
NOTES	1,2,3	

1. PROVIDE WITH LOW VOLTAGE PUSH BUTTON START/STOP SWITCH WITH TIMER, HOSE ADAPTERS AND FIBERGLASS HOUSING WITH HOSE RACK.
2. PLUMBING CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL WIRING.
3. PROVIDE WITH EXPLOSION PROOF CONSTRUCTION AND CONTROLS.

SOUTH CAROLINA AARON CLEMENS TEMPEL No. 23556 07/08/2020

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION EPIC ENGINEERING INC. No. C00259

EPIC ENGINEERING INC.
P.O. BOX 2132 ◦ MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

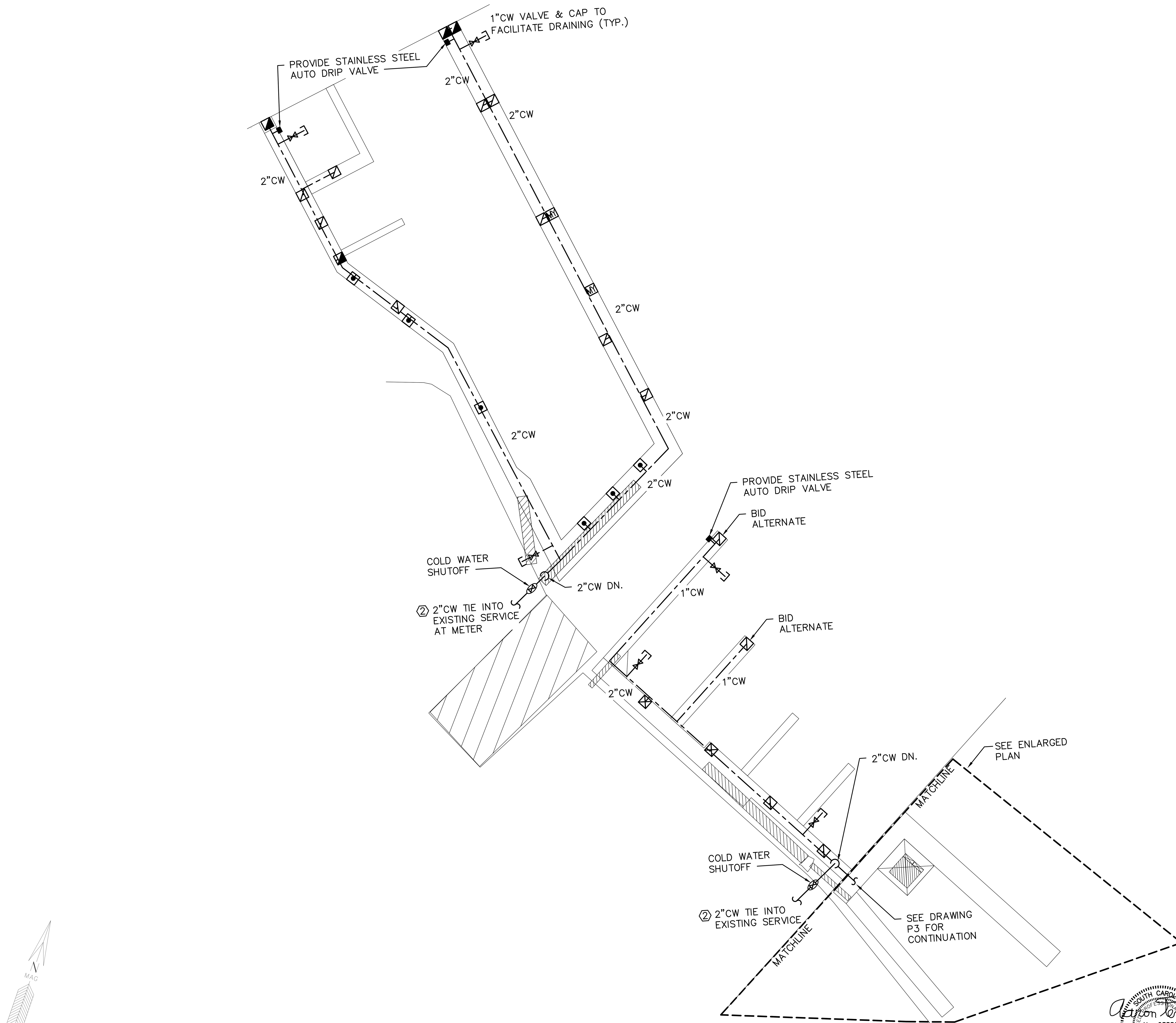
REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS

DESIGNED ACT | DRAWN RAD | CHECKED ACT
DATE: 12/06/2019
JOB NO. 19120
SCALE: NONE

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
NOTES, LEGEND AND SCHEDULE
CITY OF ISLE OF PALMS, SC

ATM
Applied Technology & Management, Inc.
941 Houston Northcutt Blvd, Suite 201
Mt Pleasant, SC 29464
(843) 414-1040
Certificate of Authorization #00395

DRAWING NUMBER
P1
SHEET: 1 OF 5



KEYED NOTES (THIS SHEET ONLY)

① COORDINATE EXACT LOCATIONS WITH OWNER AND ENGINEER PRIOR TO INSTALLATION.

② PROVIDE REDUCED PRESSURE BACKFLOW PREVENTER WITH AUTO DRIP VALVE.

PLUMBING PLAN

SCALE: 1"=30'-0"

SOUTH CAROLINA No. 23556 AARON CLEMENS TEMPEL 07/08/2020

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION EPIC ENGINEERING INC. No. C00259

EPIC ENGINEERING INC.

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Date

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ACT	RAD	ACT
DATE:	12/06/2019	
JOB NO.	19120	
SCALE:	1" = 30' - 0"	

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

PLUMBING PLAN

CITY OF ISLE OF PALMS, SC

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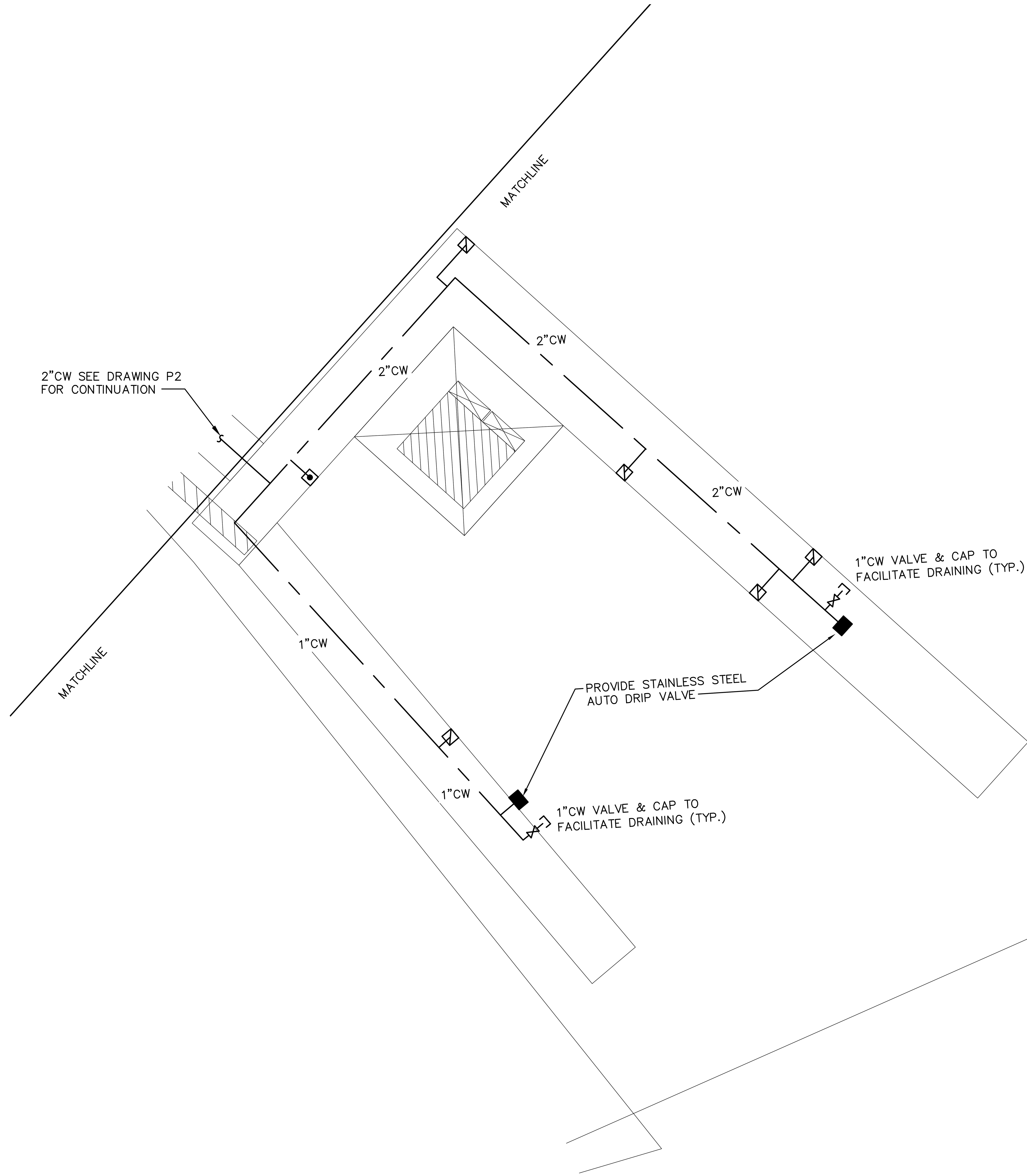
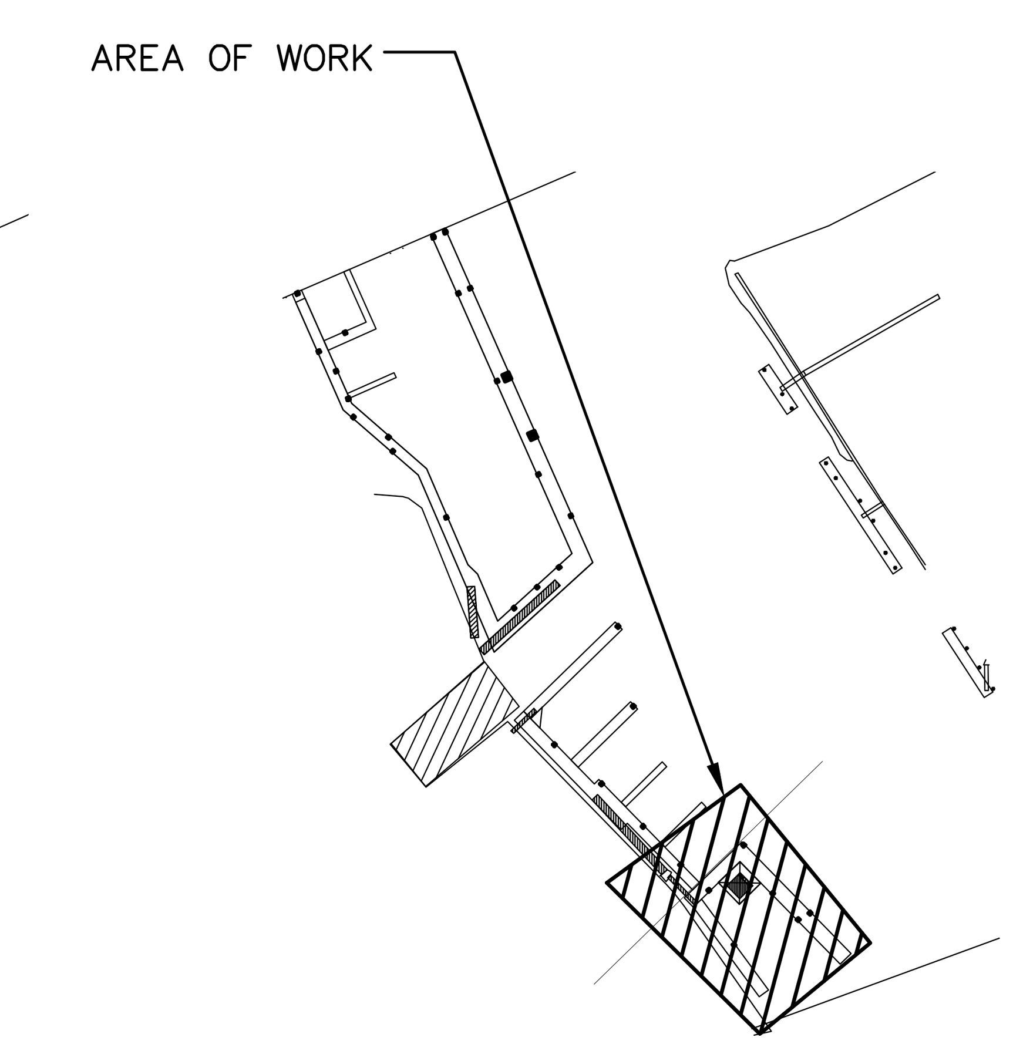
DRAWING NUMBER
P2
SHEET: 2 OF 5



ENLARGED PLUMBING PLAN
SCALE: 1"=10'-0"



KEYPLAN
SCALE: NONE

SOUTH CAROLINA No. 23556 AARON CLEMENS TEMPEL
07/08/2020

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION EPIC ENGINEERING INC. No. C00259

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS

DESIGNED	DRAWN	CHECKED
ACT	RAD	ACT

DATE: 12/06/2019
JOB NO. 19120
SCALE: 1" = 10'-0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
ENLARGED PLUMBING PLAN
CITY OF ISLE OF PALMS, SC

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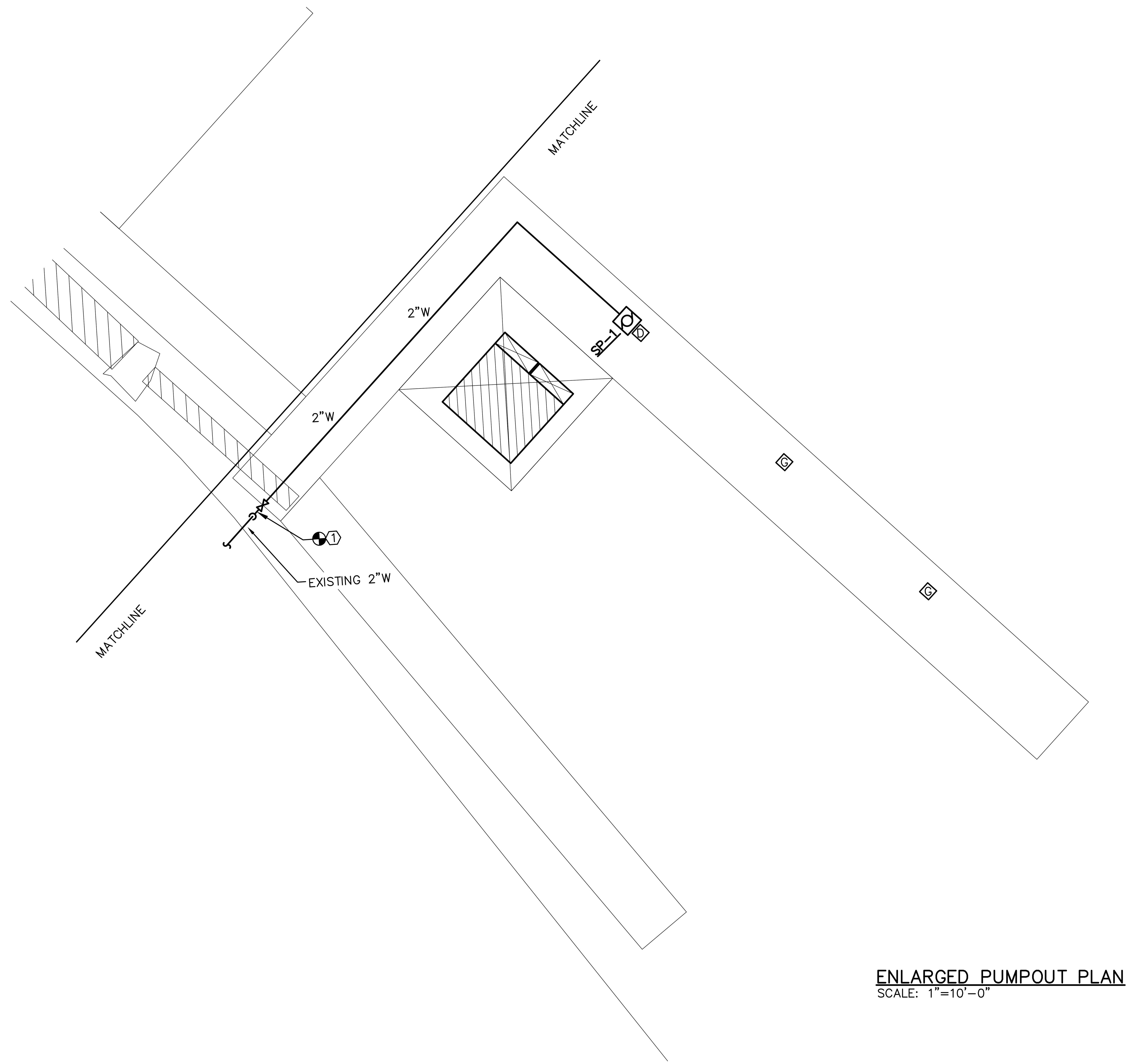
DRAWING NUMBER
P3
SHEET: 3 OF 5

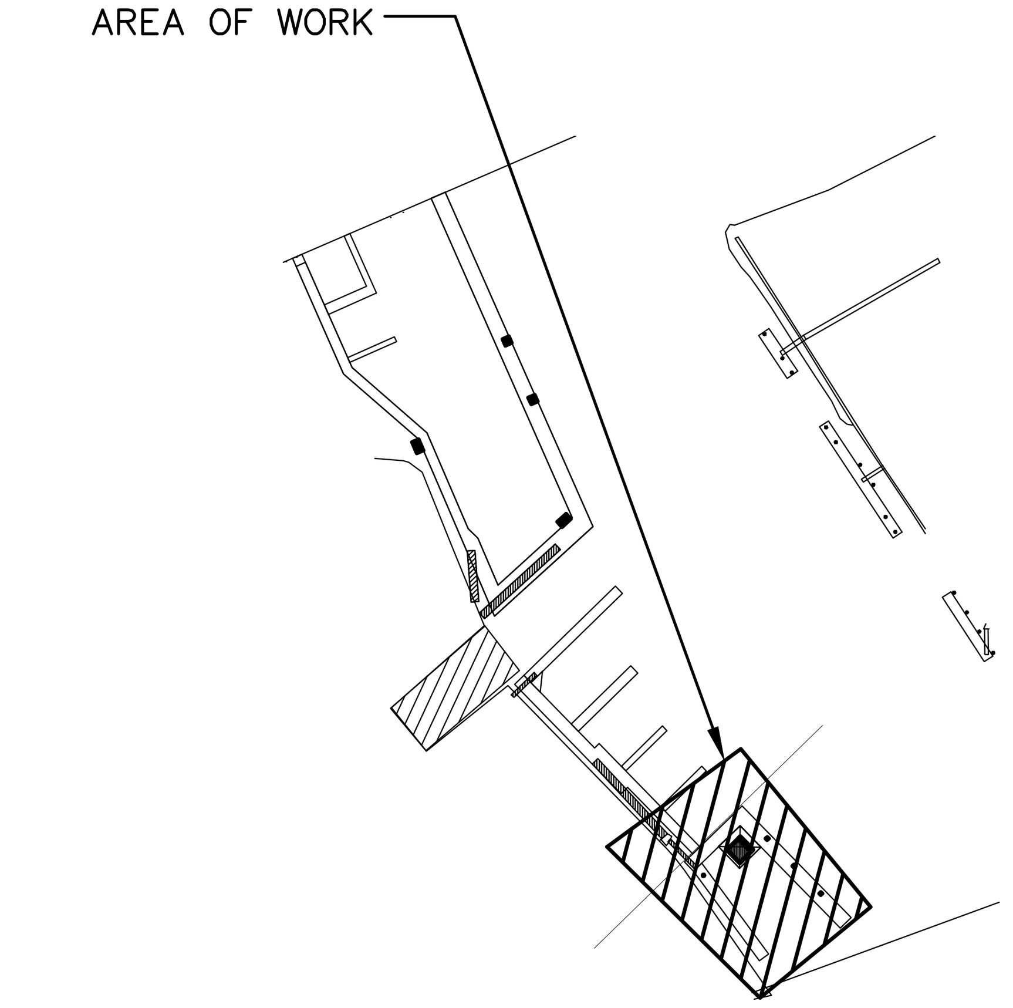
KEYED NOTES (THIS SHEET ONLY)

(1) TIE INTO EXISTING 2"W SERVICE COORDINATE EXACT LOCATION WITH FIELD CONDITIONS.



ENLARGED PUMPOUT PLAN

SCALE: 1"=10'-0"



KEYPLAN

SCALE: NONE

EPIC ENGINEERING INC.

P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

SOUTH CAROLINA AARON CLEMENS TEMPEL No. 23556 07/08/2020

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION EPIC ENGINEERING INC. No. C00259

Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

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ACT	RAD	ACT

DATE: 12/06/2019
JOB NO. 19120
SCALE: 1" = 10'-0"

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
PUMPOUT PLAN
CITY OF ISLE OF PALMS, SC

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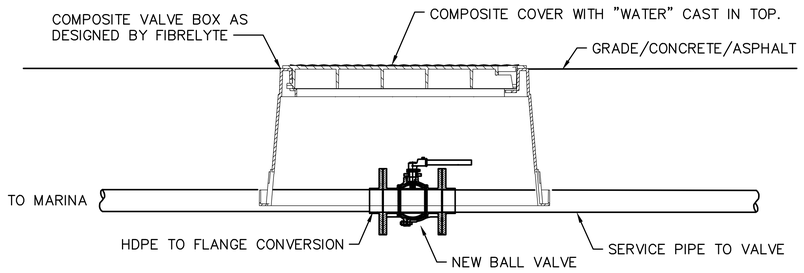
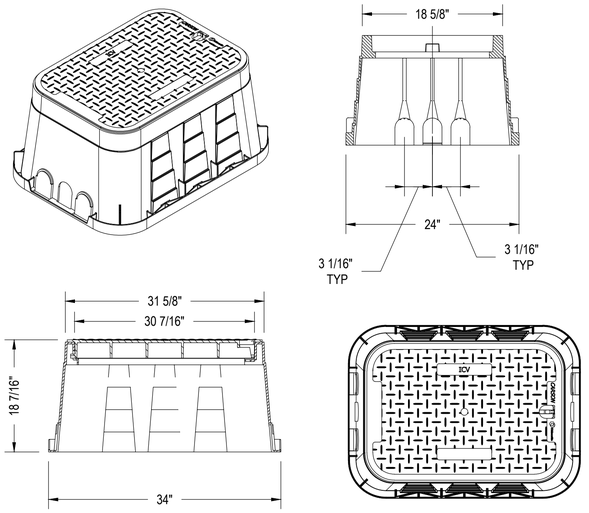
DRAWING NUMBER
P4
SHEET: 4 OF 5

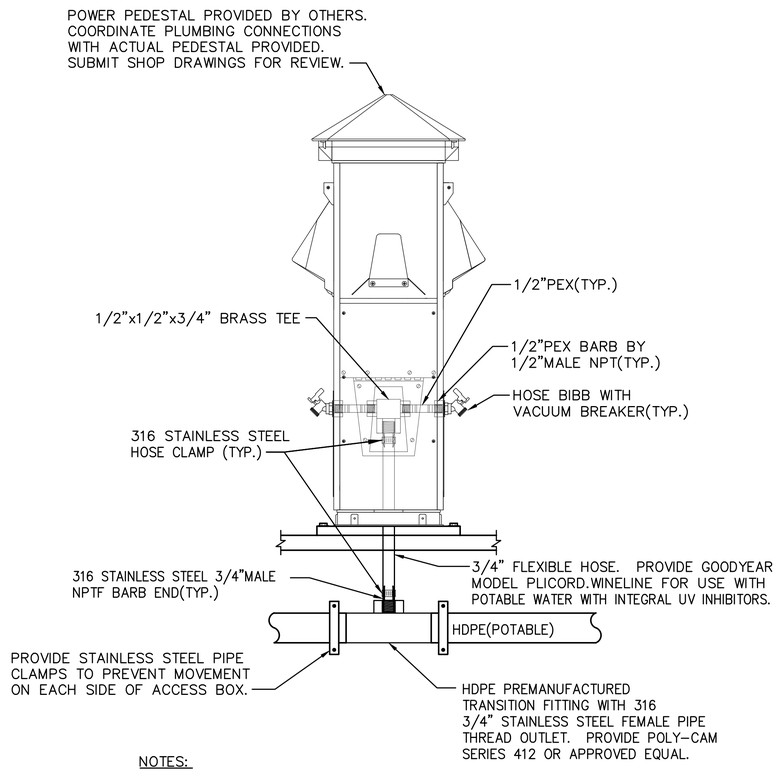


WATER VALVE DETAIL
SCALE: NONE



NOTE: EXACT SIZE TO BE DETERMINED BY CONTRACTOR.

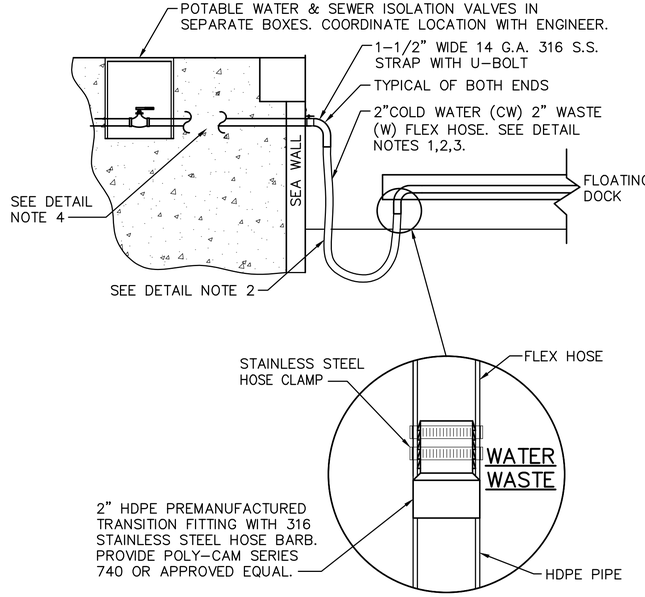
WATER VALVE BOX DETAIL(FIBRELYTE MODEL FL36)
SCALE: NONE



NOTES:

1. VERIFY THREADS WITH ACTUAL PEDESTAL PROVIDED.
2. PROVIDE ALL NECESSARY FITTINGS NECESSARY TO CONNECT PEDESTAL. SEE NOTE 22.

PEDESTAL POTABLE WATER PIPING –GENERIC DETAIL
SCALE: NONE



DETAIL NOTES:

1. PROVIDE 2" FLEXIBLE HOSE WITH INTEGRAL STAINLESS STEEL MALE PIPE THREAD ENDS. PROVIDE GOODYEAR WHITE FLEXWING HOSE MODEL 549-151-064-01000, OR APPROVED EQUAL. COORDINATE EXACT LENGTH WITH FIELD CONDITIONS AND ALLOW FOR RISE AND FALL OF TIDES.
2. PROVIDE FLEXIBLE HOSE WITH REMOVABLE SACRIFICIAL CORRUGATED PLASTIC PIPING JACKET. COORDINATE EXACT SIZE WITH FLEXIBLE HOSE PROVIDED.
3. COORDINATE MOUNTING AND INSTALLATION OF THE WATER PIPING WITH GANGWAY PROVIDED AND LOCAL TIDAL RISE & FALL. PROVIDE STAINLESS STEEL HANGERS AS REQUIRED. SUBMIT SHOP DRAWINGS FOR APPROVAL.
4. PROVIDE TRANSITIONS TO UPLAND PIPE MATERIAL AS REQUIRED.

FIXED PIER TO FLOATING DOCK WATER LINE BULKHEAD CONNECTION DETAIL
SCALE: NONE

Aaron Tempel
Signature
Aaron C. Tempel, P.E.
ME Professional Eng. PE15477
07/08/2020
Date

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DESIGNED	DRAWN	CHECKED
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DATE: 12/06/2019 JOB NO. 19120 SCALE: NONE

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

PLUMBING - DETAILS

CITY OF ISLE OF PALMS, SC

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(843) 414-1040
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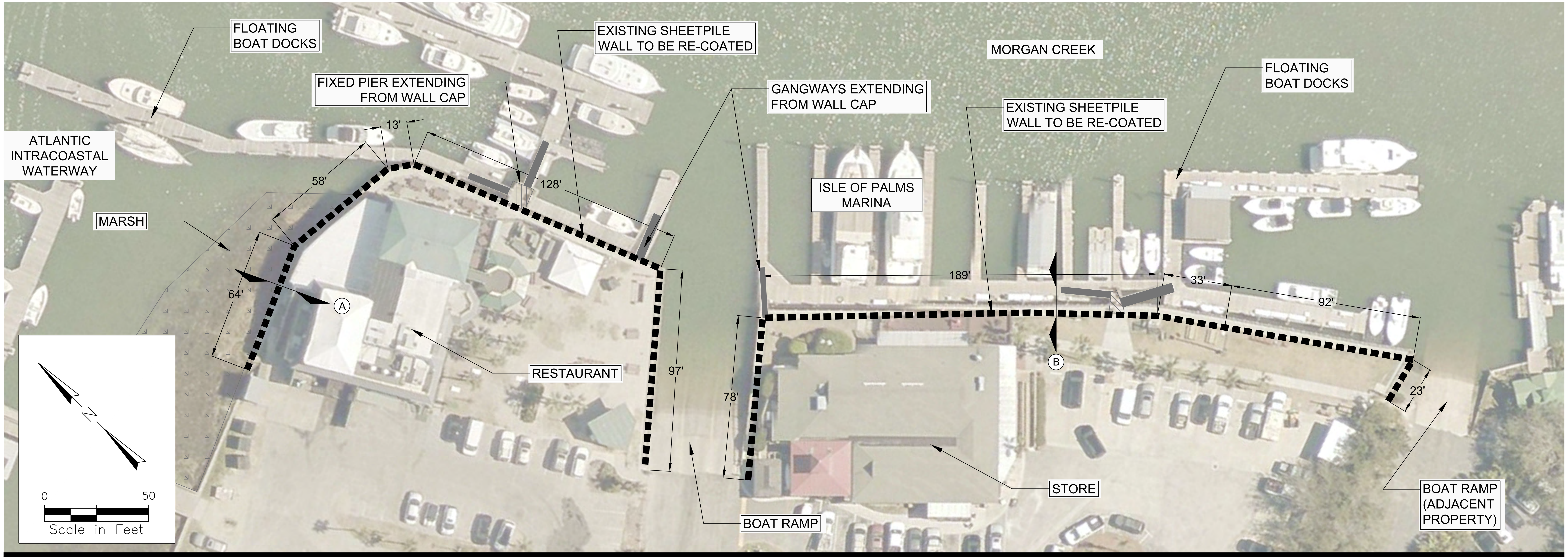
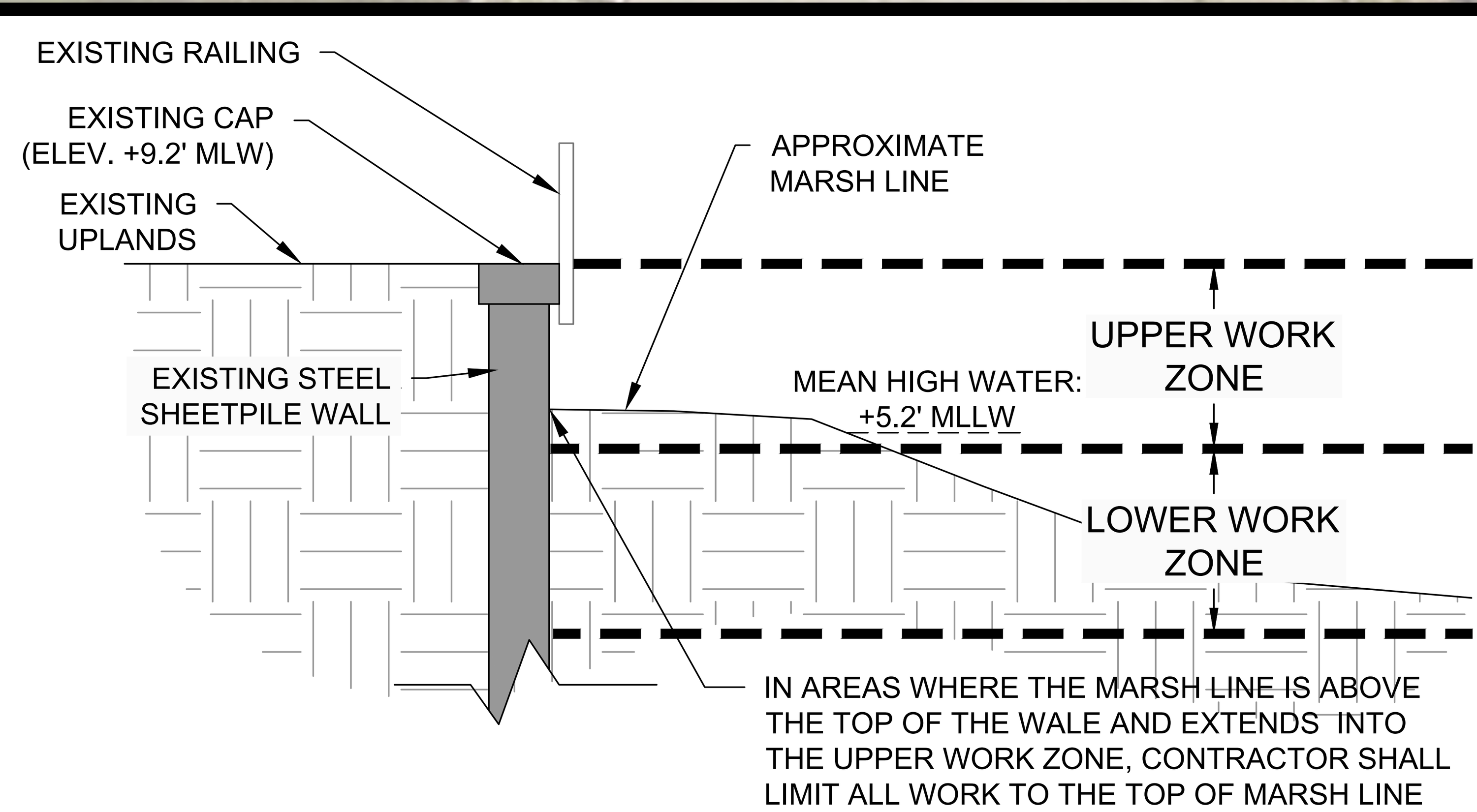
DRAWING NUMBER
P5
SHEET: 5 OF 5

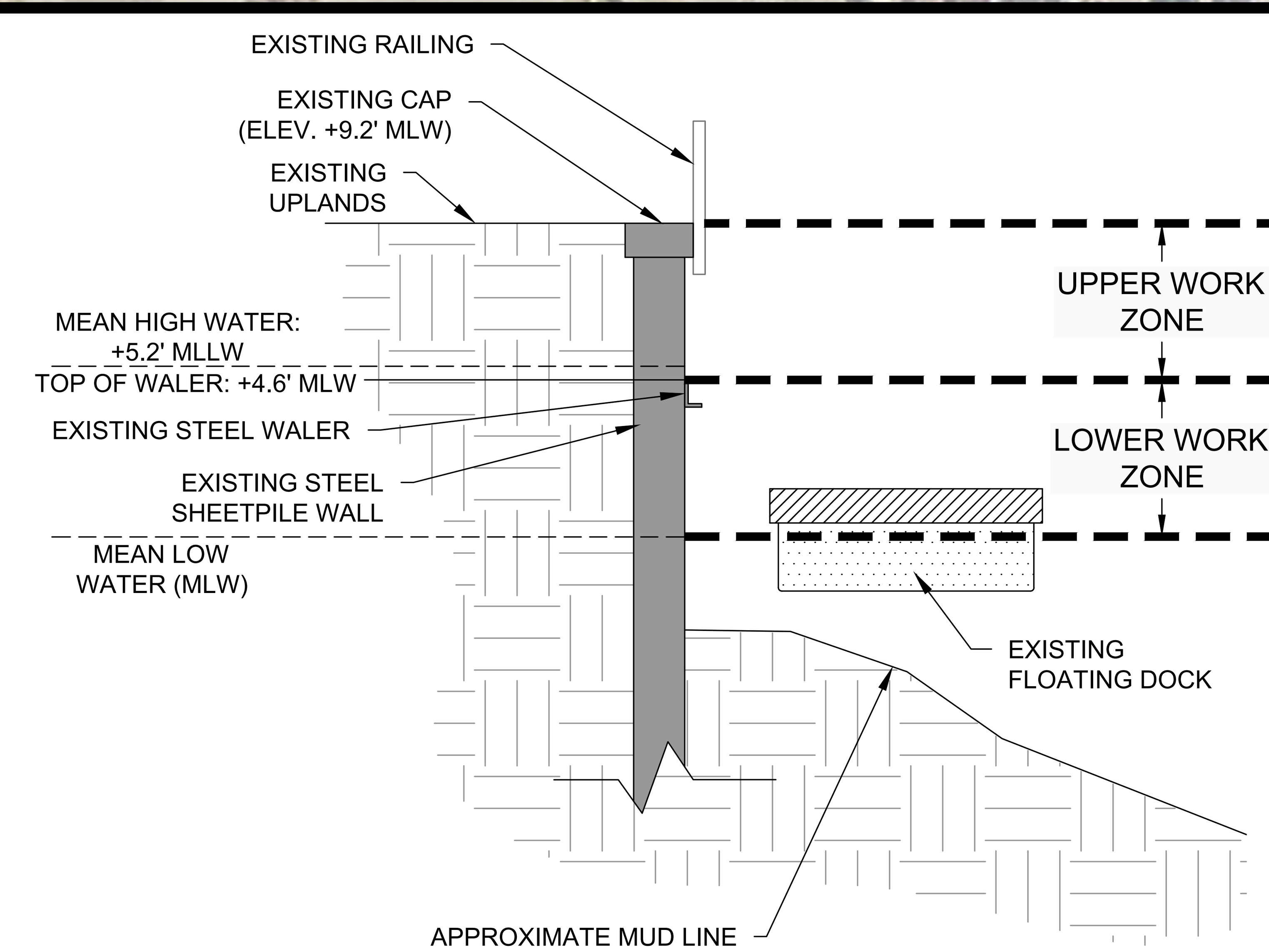
SOUTH CAROLINA PROFESSIONAL ENGINEER No. 23556 AARON CLEMENS TEMPEL
07/08/2020
EPIC ENGINEERING INC. No. C00259 CERTIFICATE OF AUTHORIZATION

EPIC ENGINEERING INC.
P.O. BOX 2132 • MT. PLEASANT, SC 29465
(843) 849-6878 EPIC JOB NO. 19120

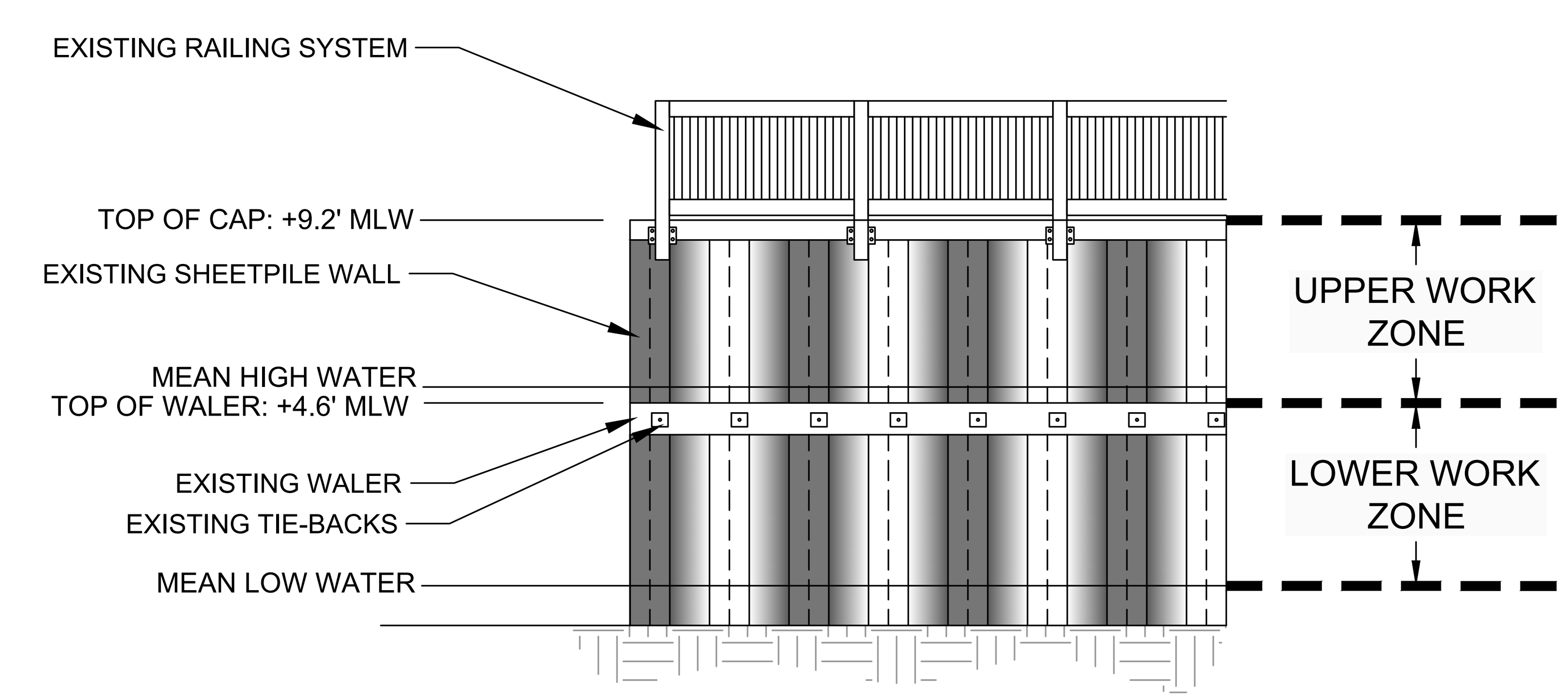




TYPICAL BULKHEAD SECTION (A)
(ALONG MARSH)



TYPICAL BULKHEAD SECTION (B)
(ALONG WATERFRONT)



TYPICAL BULKHEAD ELEVATION VIEW (C)

NOTES:
1. TYPICAL SECTIONS ARE FOR REPRESENTATIVE PURPOSES ONLY.
2. CONTRACTOR SHOULD REVIEW SITE CONDITIONS THOROUGHLY BEFORE BIDDING.
3. AERIAL DATED 2017 AND WAS SOURCED FROM CHARLESTON COUNTY.

REV No.	DATE	DRAWN BY	CHK'D BY	REMARKS
4				
3				
2				
1				

Signature / Date

DESIGNED	DRAWN	CHECKED
HH	MM	HH

DATE: 07/10/2020
JOB NO.: 19-3354
SCALE: 1"=50'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC
SITE PLAN
BULKHEAD RE-COAT
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
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Mt Pleasant SC, SC 29464
(843) 414-1040

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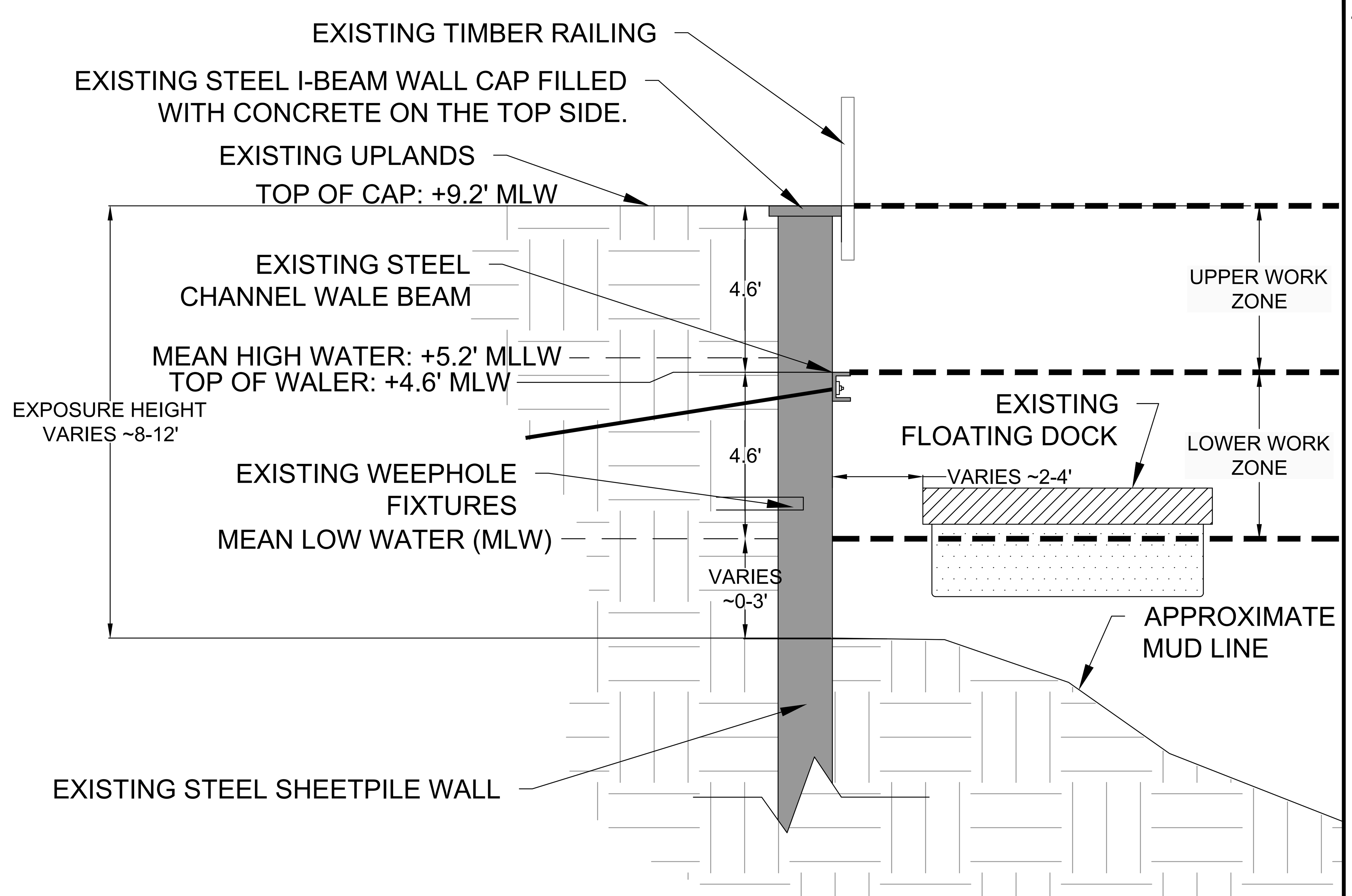
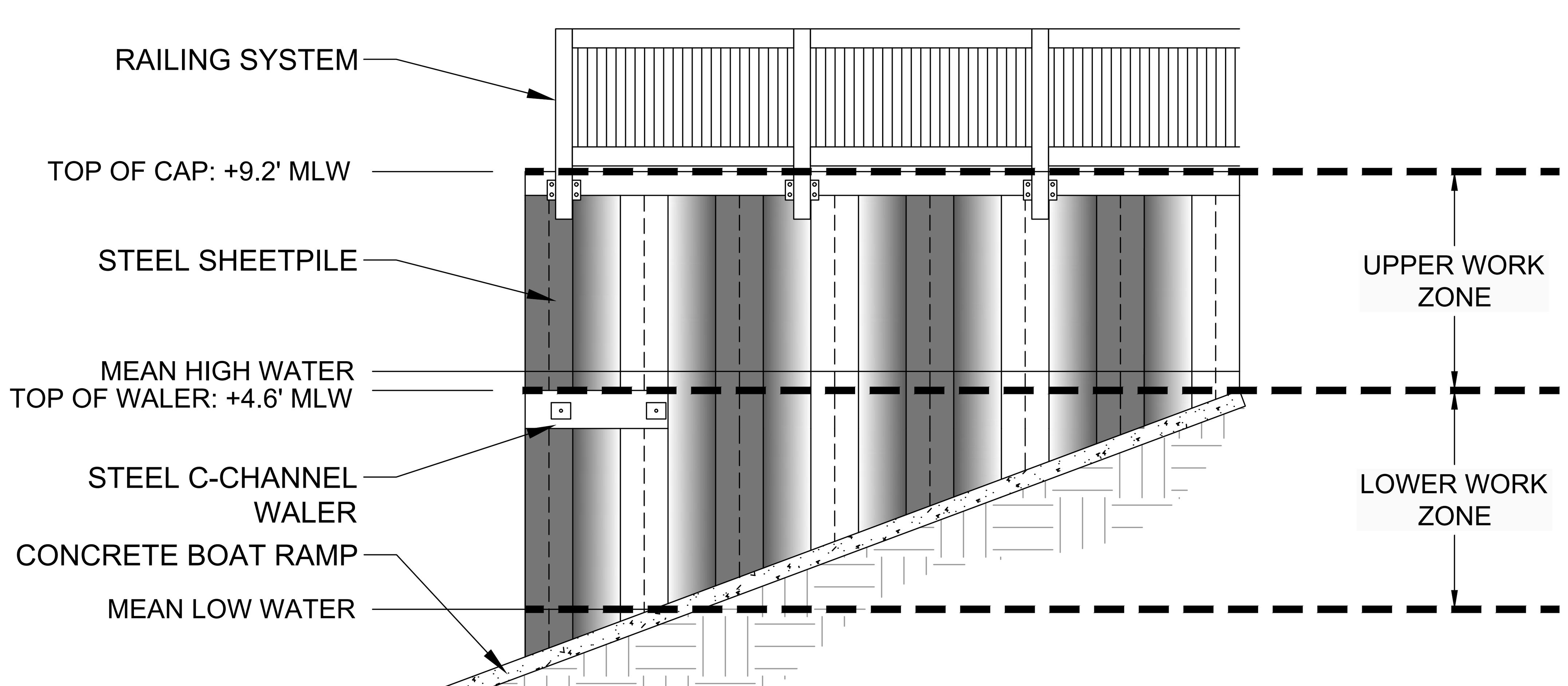
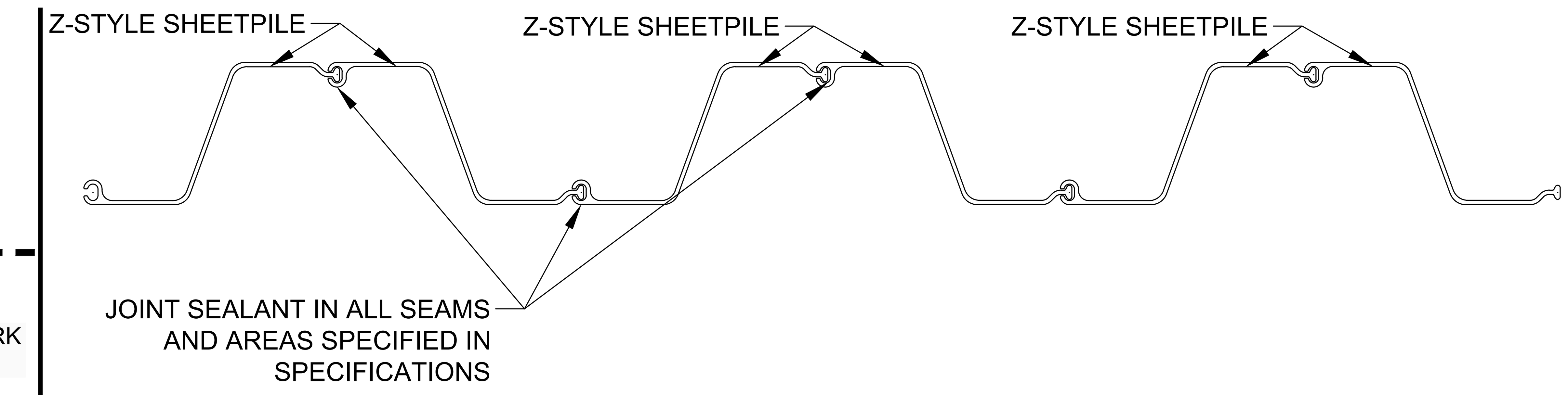
B1



TYPICAL ORIGINAL DESIGN SHEETPILE SECTION (D)



TYPICAL PROFILE AT BOAT RAMP (E)



TYPICAL PLAN VIEW OF SHEETPILES (F)

PART 1 GENERAL

1. SCOPE OF WORK
   A. WORK INCLUDES CLEANING, SURFACE PREPARATION, AND APPLICATION OF THE COATING SYSTEM TO THE EXISTING STEEL BULKHEAD STRUCTURE WHICH INCLUDES ALL STEEL FIXTURES AND ASSOCIATED ELEMENTS.
   B. WORK SHALL BE COMPLETED IN THE CONTRACTED WORK ZONE(S).
   C. THE WORK INCLUDES ALL ENVIRONMENTAL CONTROL DETAILED IN THE APPROVED ENVIRONMENTAL CONTROL PLAN.
   D. THE WORK INCLUDES ALL TESTING AND INSPECTION DETAILED IN THE APPROVED TESTING AND INSPECTION - QUALITY CONTROL AND ASSURANCE PLAN.
   E. THE "UPPER" WORK ZONE INCLUDES ALL STEEL BULKHEAD ELEMENTS FROM THE TOP OF THE STEEL STRUCTURE (ELEVATION +9.2' MLW) TO THE ELEVATION ABOVE THE EXISTING STEEL C-CHANNEL WALER (~ELEVATION +4.6' MLW), INCLUDING THE STEEL CAP AND RAILING SUPPORTS.
   F. THE "LOWER" WORK ZONE INCLUDES ALL BULKHEAD ELEMENTS BELOW THE UPPER WORK ZONE DOWN TO THE MLW LINE (0.0' MLW) ELEVATION.
2. MISCELLANEOUS
   A. TIMING OF WORK AROUND TIDES WILL BE REQUIRED.
   B. PROJECT MUST MINIMIZE THE EXTENT AND DURATION OF INTERRUPTION TO NORMAL OPERATIONS OF ADJACENT FACILITIES.
   C. REFER TO TECHNICAL SPECIFICATIONS FOR PROJECT DETAILS.

PART 2 MATERIALS

1. JOINT SEALANT MATERIALS
   A. ASTM C920, TYPE M, GRADE NS, CLASS 25, USE NT, I, M, G, A, O. MUST BE MANUFACTURED OR SUPPORTED BY THE COATING SYSTEM MANUFACTURER. OR APPROVED EQUIVALENT.
2. FILLER AND PATCH MATERIALS
   A. FILLER MATERIAL FOR SMALL VOIDS BEHIND THE BULKHEAD SHALL BE EXPANDING HYDROPHOBIC POLYURETHANE FOAM IN AEROSOL CAN. CONTRACTOR SHALL SUBMIT PROPOSED MATERIAL FOR APPROVAL BEFORE USE.
   B. PATCH MATERIAL FOR SMALL REPAIR AREAS IN THE STEEL BULKHEAD SHALL BE AN EPOXY PUTTY OR FAIRING COMPOUND APPROPRIATE FOR PROJECT USE IN THE MARINE ENVIRONMENT AND COMPATIBLE WITH ALL EXISTING AND PROPOSED MATERIALS. FLEXIBLE GRID OR MESH MATERIAL MAY BE UTILIZED TO ASSIST IN PATCH REPAIR AREAS. CONTRACTOR SHALL SUBMIT PROPOSED MATERIALS FOR APPROVAL BEFORE USE.
3. COATING MATERIALS
   A. INTERZONE 954, MANUFACTURED BY INTERNATIONAL (AN AKZONOBEL BRAND). INTERZONE 954 IS A TWO-COMPONENT, LOW VOC, HIGH SOLIDS, MODIFIED EPOXY BARRIER COATING DESIGNED FOR MAINTENANCE APPLICATIONS IN THE MARINE SPLASH ZONE ENVIRONMENT. OR APPROVED EQUIVALENT.

PART 3 EXECUTION

1. CLEANING AND SURFACE PREPARATION
   A. SURFACE PREPARATIONS SHALL BE UNDERTAKEN IN THE ORDER MOST APPROPRIATE FOR THE PROPER CLEANING AND PREPARATION OF THE SURFACE PRIOR TO COATING APPLICATION.
   B. CLEANING AND SURFACE PREPARATION MUST ACCOUNT FOR TIDAL FLUCTUATIONS, WEATHER, AND OTHER ENVIRONMENTAL AND SURFACE CONDITIONS (E.G. CHLORIDES) THAT MAY IMPACT THE COATING APPLICATION.
   C. SOLVENT CLEANING: SSPC SP 1. REMOVAL OF OIL, GREASE, DIRT, SOIL, SALTS, AND CONTAMINANTS BY CLEANING WITH SOLVENT, VAPOR, ALKALI, EMULSION OR STEAM.
   D. WATERJET CLEANING: SSPC SP/NACE WJ-#. CLEAN BULKHEAD ELEMENTS IN ACCORDANCE WITH CONTRACTED WATERJET CLEANING METHOD SPECIFICATION.
   E. HAND AND POWER TOOL CLEANING: SSPC SP 2 AND 3. CLEAN BULKHEAD ELEMENTS IN ACCORDANCE WITH SSPC SPECIFICATIONS TO ENSURE ALL AREAS OF CORROSION, COATING DAMAGE, OR ANY OTHER DETERIORATION IS PROPERLY PREPARED TO RECEIVE COATING SYSTEM APPLICATION.
   F. IF CONTINUOUS AREAS OF CORROSION AND COATING DAMAGE EXTEND FROM THE CONTRACTED WORK ZONE TO ADJACENT AREAS OUTSIDE THE WORK ZONE, THE AREAS OF CONTINUOUS CORROSION OUTSIDE THE WORK ZONE SHALL BE CLEANED, PREPARED, AND COATED IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE DRAWINGS.
   G. IF, DURING THE COURSE OF THE WORK, THE INTEGRITY OF THE EXISTING COATING IN AREAS OUTSIDE THE CONTRACTED WORK ZONE IS COMPROMISED BY THE WORK IN ANY WAY, THAT AREA SHALL BE CLEANED, PREPARED, AND COATED IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE DRAWINGS.
   H. ENSURE ALL CORNERS, EDGES, SEAMS, WELDS, BRACKETS, AND OTHER UNIQUE SURFACES AND HARD TO REACH AREAS ARE PROPERLY PREPARED AND CLEANED.
   I. ENSURE THE SEAM BETWEEN THE CONCRETE TOPPING CAP AND STEEL BULKHEAD CAP IS CLEANED AND PREPARED FOR APPROPRIATE JOINT FILLER.
   J. FEATHERING OF SURFACE PREPARATION AND CLEANING MAY BE REQUIRED ALONG THE INTERFACE OF THE WORK ZONE SURFACE AND ADJACENT AREAS OUTSIDE OF THE WORK ZONE TO PROVIDE AN APPROPRIATE TRANSITION FOR COATING APPLICATION.
   K. CLEANING AND SURFACE PREPARATION MUST ACCOUNT FOR TIDAL FLUCTUATIONS, WEATHER, AND OTHER ENVIRONMENTAL AND SURFACE CONDITIONS (E.G. CHLORIDES) THAT MAY IMPACT THE COATING APPLICATION.
   L. SAMPLE AREAS - CLEANING OF MARINE GROWTH BELOW THE UPPER WORK ZONE ELEVATIONS (IN THE EVENT ONLY THE UPPER WORK ZONE IS CONTRACTED)
      1.1.1. THREE (3) LOCATIONS OF MARINE GROWTH ALONG THE WALL SHALL BE RANDOMLY SELECTED BY THE COATING SPECIALIST(S)/INSPECTOR(S) AND 1FT X 1FT SQUARE AREAS OF SHEETPILE SHALL BE SCRAPED FREE OF THICK MARINE GROWTH TO REVEAL THE EXISTING COATING.
      1.1.2. COATING SPECIALIST(S)/INSPECTOR(S) WILL OBSERVE, DOCUMENT, AND INSPECT THE CONDITION OF THE EXISTING COATING AND PROVIDE OWNER WITH ASSESSMENT OF CONDITION AND ANY RECOMMENDATIONS REGARDING COATING OUTSIDE OF WORK ZONE ELEVATIONS.
2. APPLICATION OF COATING SYSTEM
   A. FILLER AND PATCH REPAIRS
      2.1.1. FILLER AND/OR PATCH REPAIRS ARE REQUIRED IN ANY AREA OF CORROSION OR DETERIORATION EXCEEDING THE MAXIMUM GAP LIMIT OF THE SPECIFIED JOINT SEALANT.
      2.1.2. FILLER AND PATCH REPAIRS ARE ANTICIPATED AT UTILITY CONDUIT AND SIMILAR CUTOUTS AND VOID AREAS IN THE BULKHEAD STRUCTURE WITHIN THE WORK ZONE.
      2.1.3. FILLER AND PATCH REPAIR PROCEDURE
         a. FOAM FILLER SHALL BE APPLIED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS TO FILL ANY LARGE VOIDS BEHIND THE BULKHEAD EXPOSED SURFACE.
         b. FOAM FILLER SHALL BE ALLOWED TO CURE, THEN CUT FLUSH WITH THE BULKHEAD SURFACE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS
         c. EPOXY PATCH MATERIAL SHALL BE APPLIED OVER THE FOAM FILLER AND ADJACENT SOUND STEEL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS TO PROVIDE A CONTINUOUS, SOUND, AND IMPERMEABLE REPAIR IN THE BULKHEAD STRUCTURE SUFFICIENT FOR RECEIVING THE COATING APPLICATION AND PROVIDING CORROSION PROTECTION. FLEXIBLE GRIDS OR MESH PATCHES OF APPROPRIATE MATERIAL MAY BE USED TO ASSIST IN THE EPOXY PATCH REPAIR.
   B. JOINT SEALANT
      1.1.1. JOINT SEALANT SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS TO ALL EXTERIOR JOINTS, SEAMS, AND INTERFACES IN THE WORK ZONE, INCLUDING BUT NOT LIMITED TO:
         a. CONCRETE TOPPING CAP AND STEEL BULKHEAD CAP INTERFACE
         b. PERIMETER OF FAYING AND BEARING SURFACES
         c. SEAMS/JOINTS BETWEEN STEEL SHEETPILE Z-SECTIONS, KING PILES, AND ALL OTHER SEAMS IN THE WORK ZONE
         d. JOINTS IN MEMBERS BETWEEN INTERMITTENT WELDS
         e. JOINTS BETWEEN LIFTING HOLE CUTOUTS AND WELDED BACKER-PLATES
         f. ALL OPENINGS SMALLER THAN THE MAXIMUM GAP WIDTH RECOMMENDED BY JOINT SEALER MANUFACTURER
         g. JOINTS ALONG BRACKETRY AND OTHER DEVICES
         h. PERIMETERS OF PATCH REPAIR AREAS AS NEEDED
   C. COATING
      1.1.1. COATING MATERIAL SHALL BE PROPORTIONED, MIXED, APPLIED (IN COATS, AS APPLICABLE), AND CURED IN ACCORDANCE WITH ALL MANUFACTURERS RECOMMENDATIONS UNLESS OTHERWISE INDICATED IN THESE SPECIFICATIONS OR APPROVED BY THE OWNER IN WRITING.
      1.1.2. APPLY STRIP COATING OVER JOINT SEALANT, PATCH REPAIRS, AND OTHER AREAS IN ACCORDANCE WITH COATING MATERIAL MANUFACTURER'S RECOMMENDATIONS.
      1.1.3. REPAIR OF DEFECTS: REPAIR DETECTED COATING HOLIDAYS, THIN AREAS, AND EXPOSED AREAS DAMAGED SURFACE TREATMENT AND APPLICATION OF ADDITIONAL COATING OR BY MANUFACTURER'S RECOMMENDATIONS.
3. SURFACES TO BE COATED
   A. ALL STEEL SHEET PILES, H-PILES, BULKHEAD CAPS, BRACKETS, AND MISCELLANEOUS STEEL AND FIXTURES SHALL BE CLEANED, PREPARED, AND COATED.
4. FINAL CLEANUP
   A. FOLLOWING COMPLETION OF THE WORK, REMOVE DEBRIS, EQUIPMENT, AND MATERIALS FROM THE SITE. DISPOSE OF ALL DEBRIS IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. REMOVE TEMPORARY CONNECTIONS TO WATER AND ELECTRICAL SERVICES. RESTORE EXISTING FACILITIES IN AND AROUND THE WORK AREAS TO THEIR ORIGINAL CONDITION.

DESIGNED BY	DRAWN BY	CHECKED BY
HH	MM	HH

DATE: 07/10/2020
JOB NO. 18-3354
SCALE: 1"=50'

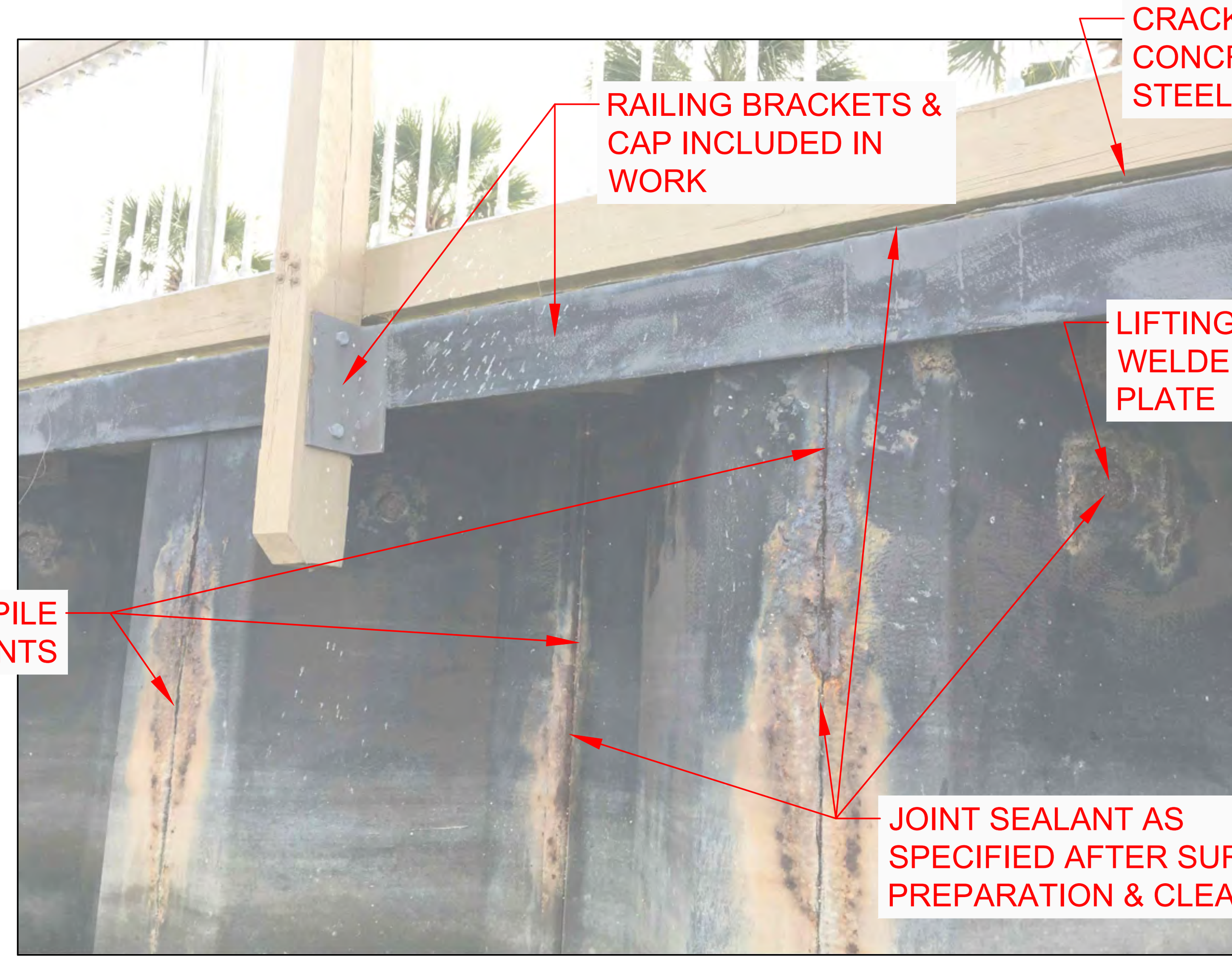
ISLE OF PALMS MARINA
ISLE OF PALMS, SC
TYPICAL DETAILS
CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
941 Houston Northcut Blvd.
Mt Pleasant SC, SC 29464
(843) 414-1040

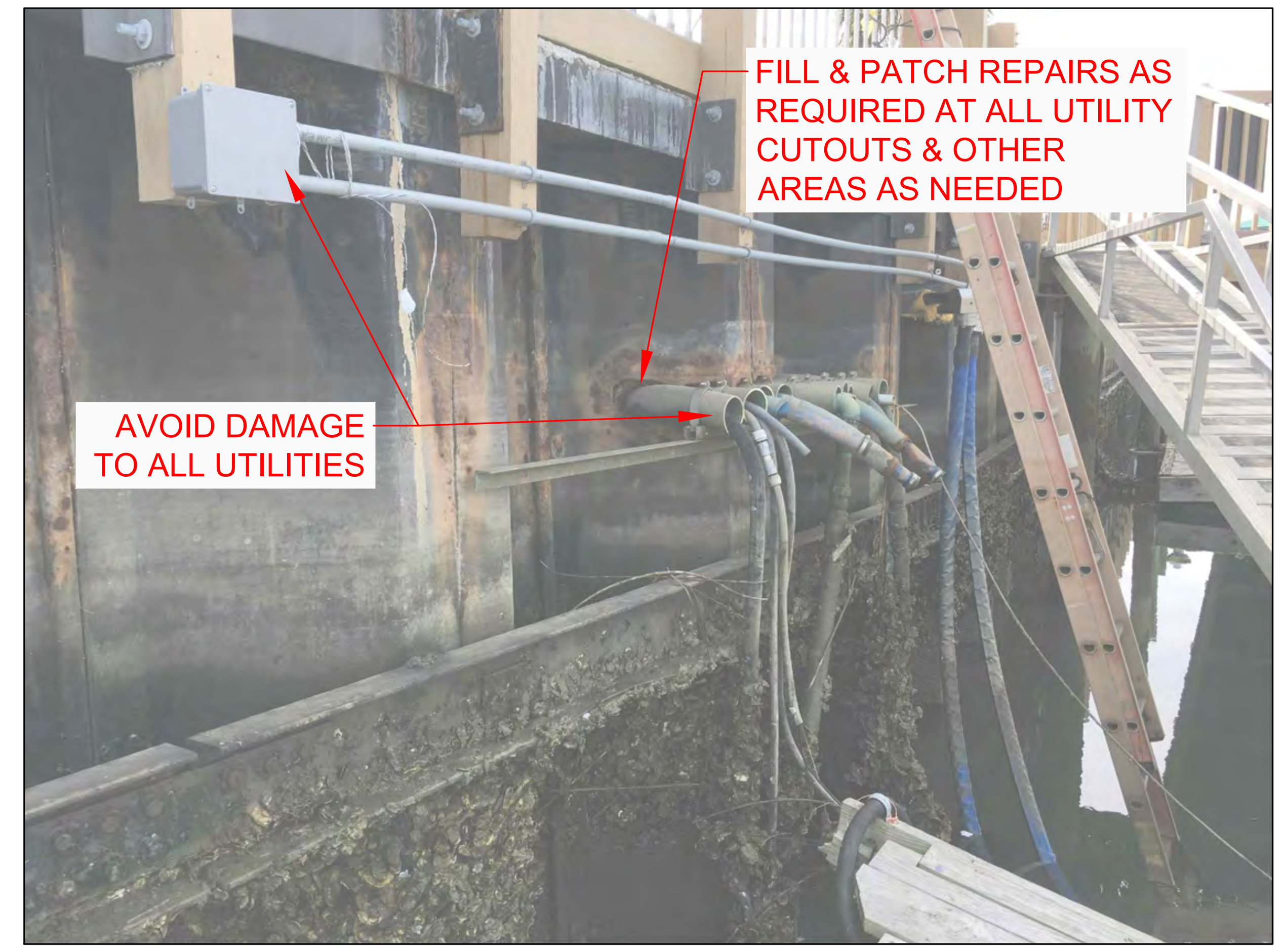
DRAWING NUMBER
B2

PHOTOGRAPH 1

PHOTOGRAPH 2



PHOTOGRAPH 3

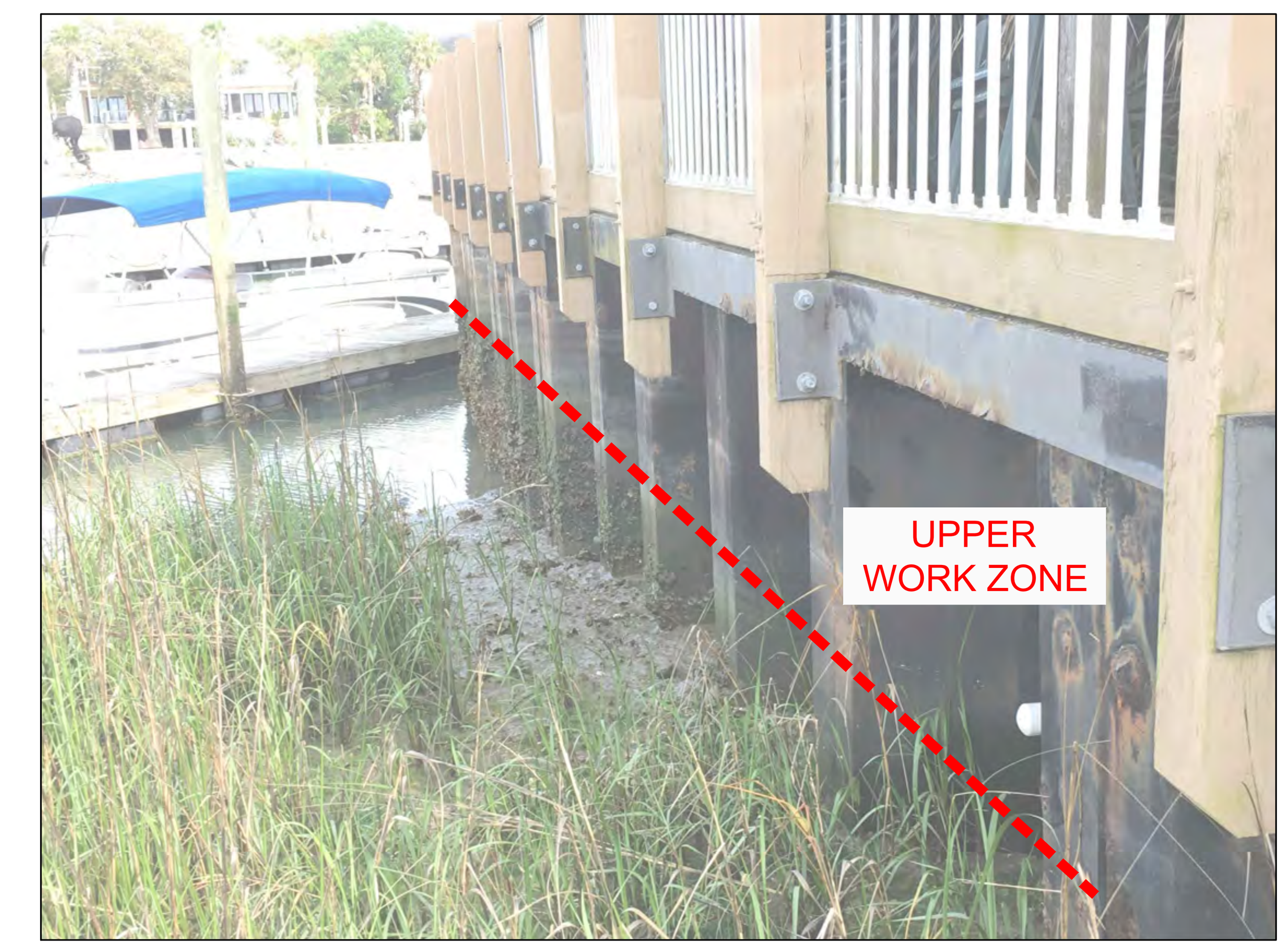


PHOTOGRAPH 4

PHOTOGRAPH 5

PHOTOGRAPH 6

PHOTOGRAPH 7



PHOTOGRAPH 8

PHOTOGRAPH 9

REV. No.	DATE	DRAWN BY	CHKD BY	REMARKS
4				
3				
2				
1				

Signature

Date

DESIGNED	DRAWN	CHECKED
HH	MM	HH

DATE: 07/10/2020
JOB NO. 19-3354
SCALE: 1"=50'

ISLE OF PALMS MARINA
ISLE OF PALMS, SC

TYPICAL SITE PHOTOGRAPHS

CITY OF ISLE OF PALMS, SC

Applied Technology & Management, Inc.
ATM
941 Houston Northcut Blvd.
Mt Pleasant SC. SC 29464
(843) 414-1040

DRAWING NUMBER
B3

Revised Bid Form
Isle of Palms Marina Rehabilitation - RFB 2020-03
27-Aug-20

BASE BID

Item	Description	Number	Unit	Unit Cost	Total Cost
1	Performance Bond	1	LS		
2	Mobilization/Demobilization	1	LS		
3	Demolition of all existing docks and water-side appurtenances	1	LS		
4	Design, Furnish and Install (2) 6'x80' aluminum gangways	2	EA		
5	Design, Furnish, and Install 6'x40' aluminum gangway	1	EA		
6	Design, Furnish, and Install 3'x30' aluminum gangway	1	EA		
7	Design, Furnish, and Install 3'x25' aluminum gangway	1	EA		
8	Design/Build 8'x8' fixed timber gangway pier	1	LS		
9	Furnish and Install electrical system	1	LS		
10	Furnish and Install potable water system	1	LS		
11	Furnish and Install marine pumpout system	1	LS		
12	Furnish and Install marine fuel dispenser modifications	1	LS		
13	Design/Furnish/Install floating dock system and anchorage (Meeco Sullivan)		SF		
14	Furnish/Install fire protection system (standpipe system)	1	LS		
15	Furnish/Install fire pedestals		EA		

Total Base Bid	

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT1	Design/Furnish/Install floating dock system and anchorage (Bellingham timber floating docks)		SF		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT2	Design/Furnish/Install floating dock system and anchorage (Structurmarine aluminum frame floating docks)		SF		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT3	Design/Furnish/Install floating dock system and anchorage (Meeco Sullivan aluminum frame floating docks)		SF		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT4	IPE decking for floating docks (Sullivan Timber Frame)	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT4a	IPE decking for floating docks (Bellingham Timber Frame)	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT4b	IPE decking for floating docks (Structurmarine Aluminum Frame)	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT4c	IPE decking for floating docks (Meeco Sullivan Aluminum Frame)	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT5	Furnish and Install additional finger-end utility pedestals in Dock Area B	2	EA		
	Include all electrical and potable water service				

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT6	Bulkhead Re-coating UPPER WORK ZONE - SSPC-SP12: WJ2				
1	Surface Preparation	1	LS		
2	Coating	1	LS		
3	Environmental Control	1	LS		
4	Testing and Inspection	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT7	Bulkhead Re-coating LOWER WORK ZONE - SSPC-SP12: WJ2				
1	Surface Preparation	1	LS		
2	Coating	1	LS		
3	Environmental Control	1	LS		
4	Testing and Inspection	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT8	Bulkhead Re-coating UPPER WORK ZONE - SSPC-SP12: WJ4				
1	Surface Preparation	1	LS		
2	Coating	1	LS		
3	Environmental Control	1	LS		
4	Testing and Inspection	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT9	Bulkhead Re-coating LOWER WORK ZONE - SSPC-SP12: WJ4				
1	Surface Preparation	1	LS		
2	Coating	1	LS		
3	Environmental Control	1	LS		
4	Testing and Inspection	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT10	Furnish Builders Risk Policy for Base Bid Only	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT11	Marina Demolition and Reconstruction Phasing	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT12	Intracoastal Dock Modifications	1	LS		

Item	Description	Number	Unit	Unit Cost	Total Cost
ALT13	Design/Build Fuel Hut	1	LS		