Addendum 4: Question and Answers, Updated Bid Forms, Updated Spec Pages and Drawings, and Wetland Permits

This addendum contains question and answers that contractors provided to Owner. These questions resulted in changes in bid forms/specs/and some contract drawing pages; as such this addendum contains new updated bid forms, updated spec pages, and updated contract drawings. Lastly, the owner received final USACE permits and State Permits which are also included in this addendum.

Delaware Division of Fish Wildlife: Little Creek Boat Ramp

Contractor Questions

Question #	*Page Index*	*Contractor's Question*	*Engineer's Response*
1	SWM409	Please refer to plan sheet SWM409. Are we to include costs for any work at this site? If so, please provide details.	No costs shall be included for the parking removal project at Bowers Beach shown on sheet SWM409.
2	C102 & SWM402	The grades shown on plan sheet C104 and plan sheet SWM402 differ. Which plan sheet is correct?	The grades shown on sheet C104 are the correct grades. Not sheet SWM402.
3	-	Are you planning on using a dispenser or a suction pump for the fuel tank? And the gallons per minute I assume would not exceed 23 gallon per minute. Please advise.	A suction pump system shall be installed. The pump will not exceed a pumping rate of 23 gallons per minute.
4	-	"... on the hose being 200' long would you want an electric rewind on the hose reel With that much hose I would assume you would want an electric rewind. Please advise."	An electric rewind shall be installed on the fuel hose reel.
5	C111-C116	Please specify the length of each test pile.	The length of test piles shall be deep enough to meet minimum embedment requirements specified on the Construction Plans. Based bid length for all 12" timber piles based on soil boring results = 1,837 LF. Based bid length for 12" steel piles = 86 LF and 16" steel piles = 219LF.
6	-	Please add unit price bid items for timber and steel piles.	Unit price items have been added for the costs of installing timber support piles and steel guide piles. See revised specification Sections Steel Piles 31 62 17, Timber Piles 31 62 19, and Unit Prices 01 22 00.
7	-	The pile specifications indicate that the Owner will be responsible for costs associated with pile tests and inspections. What will be the extent of the Owner furnished testing?	The Owner will supply all test pile inspection services except the required weld testing as noted in the Specifications.

Delaware Division of Fish Wildlife: Little Creek Boat Ramp

Contractor Questions

Question #	*Page Index*	*Contractor's Question*	*Engineer's Response*
8	-	Will test piles be dynamically monitored?	The test piles will not be dynamically monitored. Test pile inspections shall be performed by the Owner and utilize the ENR Method (see attachment on ENR Methodology).
9	-	Will test pile re-strikes be required?	No test pile re-strikes will be required.
10	C115	What is the required wall thickness of the steel guide piles?	12" steel guide pile minimum wall thickness = 0.375" / 16" steel guide pile minimum wall thickness = 0.50".
11	C112 & C116	Plan page C112 shows 16" guide piles. The detail on C116 show the guide pile to be 12" diameter. What is the correct guide pile diameter?	16" steel guide piles shall be installed at the enforcement dock as shown on sheet C112. 12" steel guide piles shall be installed at the courtesy dock as shown on sheet C116.
12	C108	"On Saturday [2/3/2018] a Scope of Supplies by Gator Dock was distributed. Are we going to receive shop drawings too? We need to know EXACTLY have much assembly will be required after delivery. Will the handrails and decking come already attached? What about the lights? What about water and electric connection details?"	Draft shop drawings were distributed on Monday, 2/5/2018. Final shop drawings will be distributed once received from the dock manufacturer. Handrails and decking will be attached. The security lights on the enforcement dock shall be secured to the guide piles by the contractor. The water and electric service conduit shall be provided by the contractor. The contractor shall be responsible for providing and installing the utility pedestals including all utility connections. Requirements and suggested manufacturers for the utility pedestals are provided on the revised sheet C108.
13	C108	"Also need details for the Owner supplied utility pedestals."	Requirements and suggested manufacturers for the utility pedestals are provided on the revised sheet C108.
14	-	What is the required well diameter?	Well diameter shall be the minimum required to meet applicable regulations and flow demands.
15	-	What is the required well depth?	Well depth shall be the minimum required to meet applicable regulations and flow demands.

Contractor Questions

Question #	*Page Index*	*Contractor's Question*	*Engineer's Response*
16	-	What is the purpose of specified steel outer casing (typically specified for large diameter & deep production wells)?	The purpose is to provide a measure of protection from vehicles.
17	-	What are the water analysis requirement testing parameters?	Water analysis testing shall be per applicable regulations.
18	-	No bladder tank is specified for proper operation of the submersible pump system - where are bladder tank & control panel to be located?	The system shall be a bladderless system. The controller/disconnect shall be located near the well head. The controller shall have a lockable "dead front" panel to prevent unauthorized access. There shall be a remote box with a manual switch and timer mounted on the enforcement dock that will shut down the pump if it is left running.
19	-	Specifications require sieve analysis to be performed on formation samples for designing the well screen. Is it the intent that a pilot hole be drilled to obtain samples for sieve analysis & the hole to be abandoned, then remobilize to construct the production well following design approval by the engineer?	The well screen is to be sized appropriately by the well driller. If this can be accomplished without drilling a pilot hole then no pilot hole is necessary. If a pilot hole is required the pilot hole may be enlarged for construction of the production well.
20	-	Specification references a 24 hour & 48 hour test - please verify the duration of the pumping test required.	Required pump testing shall include a 4-hour performance test in addition to all other tests required by applicable regulations as described in the revised specifications Section 33 21 00.
21	C108	According to NFPA and State Fire Marshal, the dispenser would have to be 50’ from the tank to be complying. The plans call for a UL 142 approved tank. However, if you were to use a UL 2085 tank it can be at the tank as per the plans. The UL 2085 is a protected tank, double wall with lightweight concrete in the interstitial space. It has a 2- hour fire pool approval rating and ballistic rating as well. The cost of a UL 2085 is substantially more than the UL 142 tank.	Sheet C108 - Utility Plan is revised to specify a UL 2085 approved tank. The contractor shall install the UL 2085 approved tank and fuel dispenser in the location shown on the plans instead of the UL 142 approved tank.

Contractor Questions

Question #	*Page Index*	*Contractor's Question*	*Engineer's Response*
22	C107 & C112	At the pre con meeting it was mentioned Gator would be supplying the lights and power pedestals for the docks. I did not see anything listed in there shop drawings about these items. Are they or someone else supplying them?	The utility pedestals and security lights on the enforcement dock shall be supplied by the contractor. The dock manufacturer will provide a baseplate for securing the utility pedestal and the security light poles shall be mounted directly to the guidepiles. See revised sheets C107 & C112 for details.
23	SWM400-408	Is the contractor to comply and install all items of the SWM drawings or is it just for reference?	The Contractor shall be responsible for all items shown on the SWM drawings excluding any work associated with the Bowers Beach Parking Removal project shown on sheet SWM409. Please note that the landscaping shall follow the schedules and notes listed on C109 - Landscaping Plan.
24	C114	Is the sheet piling shown on C114, with top elevation 4.67 on both sides of the ramp or just one?	The sheet piling shall have a top elevation on both sides of the ramp as shown on detail 7/C114.
25	C116	Is the pile cap, shown on detail 4 , C116, to be 2- L6x4x3/8 welded together or just butted up to each other. Please provide a detail for fabricator.	The pile cap detail (4/C116) shows the two angles being connected with a 2x12 board. The angles shall be secured to the board and bolted to the sheetpile on the retained earth side. No welding required.
26	C116	The steel sheet piling shown is PZ27, are any equivalent sections allowed?	Grade 50 sheet piles with a minimum section modulus of 20 psi may be used in lieu of the PZ27 piles..
27	C105	We have a question regarding the striping shown on the site plans (Pg C105-Page Attached). The detail table directs us to use alkyd thermoplastic pavement striping on all parking stalls, hashed regions, and entrance striping. While I have seen this type of specifaction, before it is not typical. There is a significant cost reduction to use striping paint for all the parking spaces, hashed lines and line striping. It also would save cost later if the parking lot ever has to be overlayed, since thermoplastic striping would have to be removed before any future improvements or changes could be implemented.	Striping within DelDOT right of way shall be per DelDOT specification. Remaining striping can be replaced with alkyd or water based paint as approved by the Owner. See revisions on sheet C105.

Field Estimates of Pile Capacities

53:139 Foundation Engineering
The University of Iowa
C.C. Swan, Instructor

A. OVERVIEW

In estimating the ultimate capacity of deep foundations (both driven and cast-in-place), we have considered a number of semi-analytical and/or empirical equations to calculate both the end bearing capacity of a deep foundations, and to calculate the frictional capacity of deep foundations. It should be noted that unless otherwise noted, the methods presented typically apply to both driven pile foundations and cast-in-place pier or drilled shaft foundations. The two alternative methods of estimating the ultimate capacity of deep pile foundations that will be briefly discussed in this handout are:

1. Full scale field load tests; and
2. Pile-driving formulas.

B. FULL SCALE LOAD TESTS

1. When to perform load tests

In any foundation project there will be at least some uncertainty as to what the subsurface soil properties are throughout the site, even when borings have been taken. In construction projects involving the driving of piles, the uncertainty of the subsurface soil properties can be magnified since the process of driving piles (in particular high displacement piles) can disturb the soils and thus change their properties. One way to deal with these uncertainties is to perform full-scale field load tests on driven piles. The principal benefit of the full-scale field test is that they provide more precise information on the capacity of piles at a specific site. This allows designers to use lower factors of safety and can translate to reduced construction costs. While there are benefits to performing full-scale field load tests on piles, the tests can be both time consuming and expensive to perform. Thus, they are typically performed only when combinations of the following factors are present:

- The project is large and many piles need to be driven.
- Soil conditions at the site are erratic with a high degree of spatial variation.
- Piles are driven into cohesive soils, whose properties can be greatly affected by the pile driving process.
- The structure supported on the piles is very sensitive to settlement.
- The piles will have to resist uplift.

Based strictly on the size of a pile driving project, Engel [1] has proposed the following guidelines for determining how many (if any) piles should be tested for a given pile driving project.

Table 1. Guidelines on number of test piles per project based on Engel (1988) suggestions.

Cumulative length of driven piles on a project (km)	Number of piles to test per project
0-1.8	0
1.8-3.0	1
3.0-6.0	2
6.0-9.0	3
9.0-12.0	4

2. Types of Tests

The equipment with which the field tests are to be performed obviously requires the capacity to push down on (load) the piles to test their ultimate downward capacity and the capacity to pull upward on the piles to test their ultimate uplift capacity. Since the capacity of an individual pile can be quite large, the required setup can be quite elaborate, involving anchor piles, crossbeams, hydraulic jacks, and test beams. Assuming that the appropriate loads can be applied to a given pile, and that the displacement of the test pile can be objectively measured, the test is, in principle, quite simple. Loads are applied to the pile and the pile's displacements under the loads are measured. Hence load versus displacement plots can be generated for each pile tested.

One of the difficulties with full-scale field load tests is that the load versus displacement behavior observed will be rate dependent. That is, if the test is performed very rapidly, comparatively small displacements of the pile will be observed. On the other hand, if the test is performed very slowly (which is often most representative of loading conditions under building loads) comparatively large displacements of the pile will be measured. This rate dependent behavior is demonstrated in Figure 1 and derives from the rate dependent shear strength behavior of most soils. Recognizing that strain rate dependence can be an issue, a number of different tests are often performed.

a. Load-controlled Tests

Load-controlled tests are performed by applying vertical loads to the pile and observing or measuring the vertical pile displacement. The load increments are typically: 25, 50, 75, 100, 125, 150, 175, and 200% of the estimated capacity $(Q_u)_{estimated}$ of the pile, until excessive pile displacement (failure) is observed. Often, these tests are performed either as "slow" maintained load (ML) tests, or "quick" maintained load (ML) tests. The procedure in the "slow" (ML) tests is to apply a load increment and to maintain that load until the incremental settlements cease, or the incremental rate of settlement becomes sufficiently small. This can take several hours per load load increment, and so the "slow" test can require over 24 hours to perform. In "quick" (ML) tests, the load increments are applied for approximately 2–15 minutes and incremented even if the settlement under the current load has not yet completed. The "slow" tests are preferable in that they are more representative of the maintained nature of static building loads. Taking the raw results of "quick" tests without correcting for rate effects can lead to overestimating the ultimate pile capacities and underestimating pile displacements (settlements) under static loads.

b. Displacement-controlled Tests

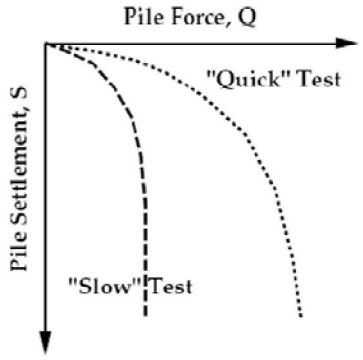
In displacement-controlled pile tests, the rate of penetration (extraction) of the pile is fixed, and the Force Q required to maintain this rate is measured. Displacement-controlled tests, like the load-controlled tests, yield load Q versus pile displacement curves. The common rates at which these tests are performed are:

- clays: 0.25 – 1.25 mm/min; and
- sands: 0.75 – 2.50 mm/min.

These rates are generally quite large, and thus results of these tests are expected to be similar to those from "quick" (ML) tests.

c. Ultimate Capacity

Interpreting "quick" (ML) tests and displacement-controlled tests that show rate behavior can be tricky, whereas interpretation of "slow" (ML) tests is quite straightforward. In principle, the ultimate capacity of a pile is the load at which the load-displacement curve shows a sharp plunge, and beyond which the pile undergoes dramatic settlement. Practically speaking, however, the allowable capacity of a pile as determined from a full-scale field test is that load Q at which the settlement S equals or exceeds the allowable settlement for the desired application.



C. PILE DRIVING ANALYSIS

1. Estimating Ultimate Resistance

The premise behind pile driving analysis and formulas is that the ultimate pile capacity can be determined by observing the soil resistance to piles during the driving process. In its most fundamental (and simplified) form, the basic idea can be expressed as:

$$H_E = Q_u \cdot \Delta S$$

where: H_E is the mechanical energy supplied to a pile by single hammer blow; Q_u is the estimated pile capacity; and ΔS is the incremental advancement of the pile for a given hammer blow. Hence the energy supplied to the pile is equal the work done by the soil to resist the pile's advancement. It is assumed that the resistance force generated by the soil during the driving process is equal to Q_u .Thus if H_E is known and ΔS can be measured for a hammer blow, Q_u can be estimated. In practice, formulas which are slightly more complicated are employed. In many cases, the complication arises from properly accounting for the actual energy that is imparted to the pile by the driver, and accounting for how much of this imparted energy is available for advancing the pile. Energy imparted to the pile that would be unavailable for advancing the pile is lost to mechanisms such as: (1) energy dissipation by irreversible yielding behavior of the pile material; (2) elastic waves propagating in the air (sound); and (3) elastic waves propagating in the soil.

Among the formulas that attempt to account for energy loss are the Engineering News Record (ENR) formula which is:

$$Q_u = \frac{W_R h}{s + c}$$

where: W_R is the weight of the ram; h is the fall height of the ram; s is the measured penetration of the pile per blow; and c is 0.1in if s and h are measured in inches. Alternatively, the Modified ENR formula is:

$$Q_u = \left(\frac{E W_R h}{s + c}\right)\left(\frac{W_R + n^2 W_p}{W_R + W_p}\right)$$

where: E is the rated efficiency of the hammer; n is the coefficient of restitution of the pile and/or the cushion material; W_P is the weight of the pile; and c is 0.1in. Standard coefficient of restitution values for various pile and cushion materials, and typical efficiencies of different pile drivers are as listed in Table 2 below:

Table 2. Parameters for usage in the modified ENR pile driving formula.

Hammer Type	Rated Efficiency	Pile/cushion material	Coefficient of restitution n
single & double acting	0.7 – 0.85	concrete or iron	0.4 – 0.5
diesel hammers	0.8 – 0.90	wood cushion/steel piles	0.3 – 0.4
drop hammers	0.7 – 0.90	wooden piles	0.25 – 0.3

Beyond the ENR formulas, numerous others also exist and are sometimes used. Among these are:

- the Michigan State modified ENR formula;
- the Danish formula;
- the Pacific Coast Uniform Building Code formula; and
- Janbu's formula.

There are numerous problems associated with using pile driving resistance to estimate the ultimate static resistance capacity of a pile. Among these are:

1. For soft clay soils, the formulas do not account for the thixotropic behavior of clay. During the actual driving, the clay is highly disturbed and resistance is very small. After recovering, however, the soil "freezes" and regains its strength. One way to account for this behavior in piles driven into clay soils is to allow the soil to recover from the driving process, and then to "retap" the piles or to perform the pile driving test at a later time.
2. Pile driving is a very dynamic process. Sands are notorious for showing higher shear strength under dynamic loading than under quasistatic loading. Thus driving analysis of piles in sand could lead to an overestimation of their capacity. Estimating the efficiencies of driving hammers can be difficult; and
3. Energy absorption properties of piles and cushions can vary significantly.

In summary then, it is possible to *estimate* Q_u from pile driving analysis, but the method does have its recognized difficulties. Due to the uncertainties and inaccuracies associated with pile driving analysis methods of estimating Q_u factors of safety of 4 to 6 are generally used with ultimate capacities determined in this manner.

2. Pile Monitoring During Driving

To avoid material failure and breakage of piles during the driving process, it is best to keep the axial stress in the pile well below the strength of the pile material:

- for wooden piles, keep $\sigma_{max} \leq f_u$ where f_u is the tensile strength of the wood comprising the pile;
- for concrete piles, keep $\sigma_{max} \leq 0.6f'_c$ where f'_c is the unconfined compressive strength of concrete;
- for steel piles, keep $\sigma_{max} \leq 0.8f_y$ where f_y is the tensile yield stress of steel;

There are many ways to estimate the maximum stresses in the pile during driving. One simple method is to say that:

$$\sigma_{max} = \frac{Q_u}{A_p}$$

where Q_u is the estimated resistance capacity of the pile as determined by one of the pile driving formulas, and A_p is the material cross-sectional area of the pile. Thus, if a given pile has been driven to "refusal" such that it barely advances for a given hammer blow, the stresses induced in the pile would tend to be much higher than if the pile were advancing freely into the soil. Piles are most likely to be damaged when they are being driven into stiff soils or rock layers that provide strong resistance.

REFERENCES

1. R.L. Engel (1988) "Discussion of procedures for the determination of pile capacity," *Transp. Res. Record* **1169** 54–61.

BID FORM

For Bids Due: February 16th, 2018 **To:** **Dept. of Natural Resources and Environmental Control**
Division of Fish & Wildlife
89 Kings Highway, Dover DE 19901

Name of Bidder: _____

Delaware Business License No.: _____ **Taxpayer ID No.:** _____
(A copy of Bidder's Delaware Business License must be attached to this form.)

(Other License Nos.): _____

Phone No.: ( ) _____ - _____ **Fax No.: ( ) _____ - _____**

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____
($)

ALTERNATES

Alternate prices conform to applicable project specification section. Refer to specifications for a complete description of the following Alternates. An "ADD" or "DEDUCT" amount is indicated by the crossed out part that does not apply.

ALTERNATE No. 1: Alternative Completion Date (Completed by October 15th, 2018)

Add/Deduct: _____
($)

BID FORM

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

		ADD	DEDUCT
UNIT PRICE No. 1:	Excavation and Removal of Unsatisfactory Soils and Furnish and Placement of Delaware No. 3 Stone (CY)	$ _____	$ _____
UNIT PRICE No. 2:	Addition/reduction in specified length of steel piles(LF)	$ _____	$ _____
UNIT PRICE No. 3:	Addition/reduction in specified length of timber piles(LF)	$ _____	$ _____

BID FORM 00 41 13-2

BID FORM

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for thirty (30) days from the date of opening of bids (60 days for School Districts and Department of Education), and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid.

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

Should I/We be awarded this contract, I/We pledge to achieve substantial completion of all the work within _____ calendar days of the Notice to Proceed.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address: _____
_____
_____
_____

Witness: _____ **By:** _____
(Authorized Signature)

(SEAL)

_____
(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Affidavit(s) of Employee Drug Testing Program
Bid Security
(Others as Required by Project Manuals)

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor **must be listed for each category** where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.** This form must be filled out completely with no additions or deletions. **Note that all subcontractors listed below must have a signed Affidavit of Employee Drug Testing Program included with this bid.**

	Subcontractor Category	Subcontractor	Address (City & State)	Subcontractors tax payer ID # or Delaware Business license #
1.	Concrete			
2.	Pile Driving			
3.	Asphalt Paving			
4.	Landscaping			
5.	Electrical			
6.	Well Drilling			
7.	Water Distribution			
8.	Fuel Tank & Pump			
9.	Sitework Not Included In Categories Above			

BID FORM

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date *(to the Office of Management and Budget, Division of Facilities Management)*.

All the terms and conditions of *(Project or Contract Number)* have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

E-MAIL: _____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for unit prices.

B. Related Sections include the following:

1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

2. Division 31 “EARTHWORK” Section 31 20 00 “EARTH MOVING” procedures for measurement and payment for excavation and disposal of unsatisfactory soils and for furnishing and placement of Delaware No 3 stone.

3. Division 31 “EARTHWORK” Section 31 62 17 “STEEL PILES” procedures for measurement and payment for installation of 12” and 16” diameter steel guide piles.

4. Division 31 “EARTHWORK” Section 31 62 19 “TIMBER PILES” procedures for measurement and payment for installation of 12” diameter timber support piles.

1.3 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A list of unit prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. Unit Price No. 1 –Unsatisfactory Materials & Delaware #3 Stone.
1. Description: Excavation and disposal of unsatisfactory soils including provision and placement of Delaware #3 stone within over-excavation areas.
2. Unit of Measurement: Tons of Delaware #3 Stone placed.

B. Unit Price No. 2 –Steel Piles.
1. Description: Addition/reduction in specified length of steel piles as defined in Section 31 62 17 “STEEL PILES”. Base bid pile distance = 86 LF (12” Dia.), 219 LF (16” Dia.).
2. Unit of Measurement: Linear Feet of Piles Installed.

C. Unit Price No. 3 –Timber Piles.
1. Description: Addition/reduction in specified length of timber piles as defined in Section 31 62 19 “TIMBER PILES”. Base bid pile distance = 1,837 LF (12” Dia.).
2. Unit of Measurement: Linear Feet of Piles Installed.

END OF SECTION 01 22 00

SECTION 31 62 16 - STEEL SHEET PILES

PART 1 GENERAL

1.01 SECTION INCLUDES

A.

A. This section covers all members to be used in the construction of steel sheet pile. This SPECIFICATION also covers the installation of steel sheet piling and trimming of the sheet pile to the lines and grades shown on the DRAWINGS or as required. This WORK also includes pre-drilling to facilitate driving sheet pile to the designated elevations.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):

a. A36, Standard Specification for Carbon Structural Steel.

b. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc- Coated, Welded and Seamless.

c. A139, Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4 and Over).

d. A252, Standard Specification for Welded and Seamless Steel Pipe Piles.

e. A572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

f. A690, Standard Specification for High-Strength Low-Alloy Nickel, Copper, Phosphorus Steel H-Piles and Sheet Piling with Atmospheric Corrosion Resistance for Use in Marine Environments.

g. ASTM A 572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

2. American Water Works Association (AWWA):

a. C200, Steel Water Pipe—6 in. (50 mm) and Larger.

3. American Welding Society (AWS):

a. D1.1, Structural Welding Code—Steel.

1.03 SUBMITTALS

A. Provide qualifications of proposed sheet pile installer.

B. CONTRACTOR shall provide information from the manufacturer that indicates the sheet piling meets or exceeds the SPECIFICATIONS listed in this section.

C. CONTRACTOR shall submit verification from the manufacturer that the hammer can deliver the required energy.

D. Splice locations, if necessary, shall be reviewed and accepted by ENGINEER prior to installation.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Sheet piling installer shall have, as a minimum, three (3) successful past installations of sheet piling of comparable overall heights and sections and comparable penetration into soils similar to those found on the PROJECT.

1.05 UNIT PRICES

A. Lump Sum: All work associated with providing and installing steel piles shall be included in the Lump Sum price submitted for the project.

B. Work of this Section is affected as follows:

1. ~~Additional payment for pile lengths in excess of that indicated, and credit for pile lengths less than that indicated, is calculated at unit prices stated in the Contract, based on net addition or deduction to total pile length as determined by Architect and measured to nearest 12 inches.~~
2. ~~Additional payment for number of piles in excess of that indicated, and credit for number of piles less than that indicated, is calculated at unit prices stated in the Contract.~~
3. ~~Unit prices include labor, materials, tools, equipment, and incidentals for furnishing, driving, cutting off, capping, and disposing of cutoffs.~~
4. Test piles that become part of permanent foundation system are considered as an integral part of the Work.
5. No payment is made for rejected piles, including piles driven out of tolerance, defective piles, or piles damaged during handling or driving.
6. No payment will be made for excess pile lengths cut-off to achieve top of pile elevations shown on the plans.

PART 2 PRODUCTS

2.01 GENERAL

A. All steel sheet piling shall be new and unspliced material throughout, unless otherwise reviewed and accepted by ENGINEER.

B. Steel sheet piles and special fabricated shapes shall be of a design that ensures continuous interlock throughout the entire length when in place.

2.02 MATERIALS

A. Steel sheet piling shall meet the requirements of ASTM 690, (Grade 50).

B. Steel corners, tees, wyes, and crosses shall meet the requirements of ASTM A690.

C. Steel sheet piles required for the PROJECT shall be the type and weight shown on the DRAWINGS. Sheet piling shall be constructed with a weathering finish.

1. Additional length beyond those indicated on the DRAWINGS may be required to provide for trimming of tops of sheet piling.

D. The interlocks between steel sheet pile sections shall be configured such that the average width of the annular space between all contact points of the interlocks shall be a maximum of one-eighth (1/8) inch, as determined by ENGINEER.

E. Steel sheet piles and interlocks shall not have excessive kinks, camber or twist that would prevent the pile from reasonably free sliding to grade.

F. All fabricated connections shall be made with the use of angles or bent plates, as necessary, and shall be adequately welded or connected with high strength bolts as accepted by ENGINEER.

G. Handling Holes:

1. If handling holes are provided, they shall be two (2) standard two and nine-sixteenth (2-9/16) inch diameter handling holes located six (6) inches from one end.

2. The holes shall be plugged by welding a piece of steel over the hole prior to installing any riprap, backfill or drop structure cap. The plated hole shall be watertight.

H. Coal Tar Epoxy:

a. Two (2) coats of black coal tar epoxy shall be applied to the sheet piles prior to installation. All work shall be in conformance with SSPC-SP 6. Provide a dry film thickness of each coat of 8 mils and 16 mils (minimum) for the two-coat system.

2.03 STORAGE AND HANDLING

1. Do not subject piles to damage by impact bending stresses in transporting to and storing piles onsite.

2. Store and handle piles such that corrosion protection coating will not be damaged.

3. Repair any damaged corrosion protection as recommended by the manufacturer, and meeting the approval of the Engineer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin sheet pile installation until the earthwork in the area where the piles are to be driven has been completed to the extent that the grade elevation is at no more than twelve (12) inches above or below the top of the piling elevation as indicated on the DRAWINGS.

B. Notify Architect/Engineer and owner 48 hours prior to installing first sheet pile. Architect/Engineer and owner will provide representatives to observe installation of first sheet pile and approve the methods utilized.

3.02 PREPARATION

A. Any fill along the alignment of the sheet pile must be in place to sub-grade elevations and compacted prior to driving the sheet pile.

B. Fill material (except riprap, boulders, bedding and grout) is not to be placed around the sheet pile after the sheet pile is in place.

C. Pile-Length Markings: Mark each pile with horizontal lines at 12-inch intervals; label the distance from pile tip at 60-inch intervals. Maintain markings on piles until driven.

3.03 INSTALLATION

A. General:

1. All welding or gas cutting shall be in accordance with the current standards of the American Welding Society.

2. Virtual Refusal:

a. Steel sheet piling shall be driven to the depths shown on the DRAWINGS or to virtual refusal.

b. Virtual refusal is defined as ten (10) blows per inch with an approved pile hammer.

c. A pile hammer shall be used to determine virtual refusal.

d. The hammer shall be operating at the manufacturer's recommended stroke and speed when virtual refusal is measured.

3. Contractor shall record driven depth of each pile and provide to owner. Sheet piles shall be left uncut, with depth markings legible, until Owner can confirm the driven depths provided by visual inspection of the increments marked on the sheet pile.

B. Sheet Piling Driving:

1. Steel sheet piling shall be assembled before driving and then driven as a continuous wall, progressively in stages to keep the piles aligned correctly and minimize the danger of breaking the interlock between the sheets.

2. Steel sheet piling shall be driven to form a tight bulkhead.

a. A driving head shall be used and any piling which is damaged in driving or which has broken interlocks between sections shall be pulled and replaced at CONTRACTOR's expense.

4. The piling shall be driven within the following tolerances:

a. Alignment:

1) Sheet pile shall be driven to form a relatively straight line between the termini points shown on the DRAWINGS.
2) Horizontal deviation of any point from a straight line connecting the two ends of the wall section shall be a maximum of six (6) inches.

b. Plumbness: Each individual sheet pile section shall be driven vertical, within a horizontal tolerance of two percent (2%) of any vertical length measured along the pile.

c. Elevation:

1) Tops of sheet pile sections shall be within a tolerance of one (1) inch from plan elevations.
2) CONTRACTOR shall not be paid for excess sheet pile trimmed off the end of the pile to meet final grade.

C. CONTRACTOR shall brace and/or provide soil grading as necessary during construction operations in order to provide lateral stability for the sheet pile wall. The sheet pile wall has been designed for the soil grades of the final configuration denoted on the DRAWINGS only. Other temporary configurations during the construction period shall not be allowed.

D. Care shall be taken during driving to keep from causing deformations of the top of the piles, splitting of section, or breaking of the interlock between sections. Care shall also be taken during driving to prevent and correct any tendency of steel sheet piles to twist or get out of plumb.

E. Steel Z piling shall be driven with the ball-end leading. Proper care and planning shall be used to allow for this construction procedure in both immediate and possible future walls.

F. Alternate Z piles shall be reversed end for end for proper interlocking in the “normal” position. Piles shall also be aligned properly to maintain a “normal” driving width.

G. For sheet piles driven into the native soils, pre-drilled soils, or excavated soils a vibratory driver may be used as long as the required depth is obtained.

H. For sheet piles being driven into bedrock, an approved hammer utilizing a minimum hammer energy of 19,000 foot-pounds per square inch of steel section shall be used to obtain the required depth or virtual refusal. The hammer shall be clearly marked so that it can be identified at the job site.

I. Steel sheet pile that is full length as shown on the DRAWINGS and is required to be driven below the specified cutoff elevation shall be spliced with additional steel sheet piling with a full penetration butt weld.

END OF SECTION 31 62 16

SECTION 31 62 17 - STEEL PILES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes steel pipe piles.

1.2 UNIT PRICES

~~A. Lump Sum: All work associated with providing and installing steel piles shall be included in the Lump Sum price submitted for the project.~~

A. Contract Sum: Determine the Contract Sum based on sum length of piles indicated from tip to cutoff, plus 12 inches of overlength for cutting piles at cutoff elevations.

B. Work of this Section is affected as follows:
   1. Additional payment for pile lengths in excess of that indicated, and credit for pile lengths less than that indicated, is calculated at unit prices stated in the Contract, based on net addition or deduction to total pile length as determined by Architect and measured to nearest 12 inches.
      a. Additional payment for splices required to extend pile lengths in excess of that indicated is calculated at unit prices stated in the Contract.
   2. Additional payment for number of piles in excess of that indicated, and credit for number of piles less than that indicated, is calculated at unit prices stated in the Contract.
   3. Unit prices include labor, materials, tools, equipment, and incidentals for furnishing, driving, cutting off, capping, and disposing of cutoffs.
   4. Test piles that become part of permanent foundation system are considered as an integral part of the Work.
   5. Rejected piles, including piles driven out of tolerance, defective piles, or piles damaged during handling or driving, shall be removed and replaced at no additional cost to the owner.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For steel pipe piles. Show fabrication and installation details for piles, including details of driving points, splices, and pile caps.

1. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Mill test reports.

C. Pile-Driving Equipment Data: Include type, make, and rated energy range; weight of striking part of hammer; weight of drive cap; and, type, size, and properties of hammer cushion.

D. Pile-driving records.

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 STEEL PIPE PILES

A. High-Strength, Low-Alloy, Columbium-Vanadium Structural Steel: ASTM A 252, Grade 3, or ASTM A 272, Grade 50.

2.2 PILE ACCESSORIES

A. Driving Points: Manufacturer's standard one-piece driving point, fabricated from steel castings as follows to provide full bearing of pipe wall.

1. All piles shall be equipped with cast steel, inside-flange, extra strong, ribbed 60 degree conical points. These conical points shall be securely fitted to the bottom of the pile shells by welding with a 30 degree beveled groove weld all around and in such a manner to minimize any extrusion beyond the outside surface of the steel casings. A maximum protrusion of ¼″ (6 mm) is permissible.

B. Splice Unit: Manufacturer's standard splice unit, of same material as steel pipe pile or material of equal strength, shaped to encase pipe pile.

2.3 FABRICATION

A. Pile-Length Markings: Mark each pile with horizontal lines at 12-inch intervals; label the distance from pile tip at 60-inch intervals. Maintain markings on piles until ~~driven~~ approved by Architect/Engineer or Owner.

B. Fabricate full-length piles to eliminate splicing during driving, with ends square.

C. Fit and weld driving points to tip of pile according to manufacturer's written instructions and AWS D1.1/D1.1M for procedures, appearance and quality of welds, and methods used in correcting welding work.

D. Piles and accessories shall be hot dipped galvanized in accordance with ASTM A123, after fabrication. Welding following hot dip galvanizing shall be touched up with two coats of cold applied high-zinc paint.

PART 3 - EXECUTION

3.1 DRIVING PILES

A. General: Continuously drive piles to minimum embedment distances or elevations indicated on drawings. Establish and maintain axial alignment of leads and piles before and during driving.

B. Notify Architect/Engineer and owner 48 hours prior to installing first steel pile. Architect/Engineer and owner will provide representatives to observe installation of first pile and approve the methods utilized.

C. Heaved Piles: Redrive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.

D. Driving Tolerances: Drive piles without exceeding the following tolerances, measured at pile heads:

1. Location: 2 inches from location indicated after initial driving, and 4 inches after pile driving is completed.
2. Plumb: Maintain 1 inch in 48 inches from vertical, or a maximum of 4 inches, measured when pile is aboveground in leads.
3. Batter Angle: Maximum 1 inch in 48 inches from required angle, measured when pile is aboveground in leads.

E. Withdraw damaged or defective piles and piles that exceed driving tolerances, and install new piles within driving tolerances.

F. Cut off tops of driven piles square with pile axis and at elevations indicated. Install guide pile cap as shown on the construction plans.

G. Pile-Driving Records: Maintain accurate driving records for each pile.

3.2 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Tests and Inspections:

1. Weld Testing: In addition to visual inspection, splice welds shall be tested and inspected according to AWS D1.1/D1.1M.

D. Steel pipe piles will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION 31 62 16

SECTION 31 62 19 - TIMBER PILES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes round timber piles.

1.2 UNIT PRICES

A. Contract Sum: ~~Base~~ Determine the Contract Sum based on ~~number and dimensions~~ sum length of piles indicated from tip to cutoff, plus ~~not less than~~ 12 inches of overlength per pile for cutting piles at cutoff elevations.

B. Work of this Section is affected as follows:

1. Additional payment for pile lengths in excess of that indicated, and credit for pile lengths less than that indicated, is calculated at unit prices stated in the Contract, based on net addition or deduction to total pile length as determined by Architect and measured to nearest 12 inches.
    a. Additional payment for splices required to extend pile lengths in excess of that indicated is calculated at unit prices stated in the Contract.
2. Additional payment for number of piles in excess of that indicated, and credit for number of piles less than that indicated, is calculated at unit prices stated in the Contract.
3. Unit prices include labor, materials, tools, equipment, and incidentals for furnishing, driving, cutting off, capping, and disposing of cutoffs.
4. Test piles that become part of permanent foundation system are considered as an integral part of the Work.
5. Rejected piles, including piles driven out of tolerance, defective piles, or piles damaged during handling or driving, shall be removed and replaced at no additional cost to the owner.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For timber piles. Show fabrication and installation details for piles, including details of driving shoes, tips or boots, and pile butt protection.

1.5 INFORMATIONAL SUBMITTALS

A. Round timber pile treatment data.

B. Pile-Driving Equipment Data: Include type, make, and rated energy range; weight of striking part of hammer; weight of drive cap; and, type, size, and properties of hammer cushion.

C. Pile-driving records.

D. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and store piles at Project site to prevent breaks, cuts, abrasions, or other physical damage and as required by AWPA M4. Do not drill holes or drive spikes or nails into pile below cutoff elevation.

PART 2 - PRODUCTS

2.1 TIMBER PILES

A. Round Timber Piles: ASTM D 25, unused, clean peeled, one piece from butt to tip; of the following species and size basis:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Long Life Treated Wood, Hebron, MD; (410) 543-0700.
   b. Culpeper Products, Culpeper, VA; (540) 825-5201.

2. Species: Southern yellow pine.
3. Size Basis: 8 inch butt diameter, Class B with natural taper.

B. Pressure-treat round timber piles according to AWPA U1 as follows:

1. Service Condition: UC5B Marine Use Central Waters
2. Treatment: Waterborne preservative, severe marine borer hazard.
   a. Chromated Copper Arsenate (CCA): 2.5 lbs/cf retention.
   b. Ammoniacal Copper Zinc Arsenate: (ACZA): 2.5 lbs/cf retention.

2.2 PILE ACCESSORIES

A. Driving Shoes: Fabricate from ASTM A 1011/A 1011M, hot-rolled carbon-steel strip to suit pile-tip diameter.

2.3 FABRICATION

A. Pile Tips: Cut and shape pile tips to accept driving shoes. Fit and fasten driving shoes to pile tips according to manufacturer's written instructions.

B. Pile Butt: Trim pile butt and cut perpendicular to longitudinal axis of pile. Chamfer and shape butt to fit tightly to driving cap of hammer.

C. Field-Applied Wood Preservative: Treat field cuts, holes, and other penetrations according to AWPA M4.

D. Pile-Length Markings: Mark each pile with horizontal lines at 12-inch intervals; label the distance from pile tip at 60-inch intervals. Maintain markings on piles until ~~driven~~ approved by Architect/Engineer or Owner.

PART 3 - EXECUTION

3.1 DRIVING PILES

A. General: Continuously drive piles to elevations, minimum embedment distances, or penetration resistance indicated. Establish and maintain axial alignment of leads and piles before and during driving.

B. Notify Architect/Engineer and owner 48 hours prior to installing first timber pile. Architect/Engineer and owner will provide representatives to observe installation of first timber pile and approve the methods utilized.

C. Heaved Piles: Redrive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.

D. Driving Tolerances: Drive piles without exceeding the following tolerances, measured at pile heads:

1. Location: 4 inches from location indicated after initial driving, and 6 inches after pile driving is completed.
2. Plumb: Maintain 1 inch in 48 inches from vertical, or a maximum of 4 inches, measured when pile is aboveground in leads.
3. Batter Angle: Maximum 1 inch in 48 inches from required angle, measured when pile is aboveground in leads.

E. Withdraw damaged or defective piles and piles that exceed driving tolerances, and install new piles within driving tolerances. Fill holes left by withdrawn piles as directed by Architect.

F. Cut off butts of driven piles square with pile axis and at elevations indicated.

1. Cover cut-off piling surfaces with minimum three coats of preservative treatment according to AWPA M4.

G. Pile-Driving Records: Maintain accurate driving records for each pile, compiled and attested to by a qualified professional engineer.

3.2 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform ~~the following special~~ inspections.~~:~~

~~1. Pile foundations.~~
~~2. Pile boardwalks and piers.~~

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

END OF SECTION 31 62 19

SECTION 33 21 00 - WATER SUPPLY WELL, NON-POTABLE WATER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 23 25 00 – Water Pumps.

C. Section Includes:

1. Water supply well connection.
2. Well casings.
3. Grout.
4. Water well screens.
5. Pack materials.
6. Plumbness/alignment testing.

1.2 DESCRIPTION OF WORK

A. It is the intent and purpose of this Specification to prescribe the drilling and the final construction and testing of a water supply well with a yield of at least 10 gallons per minute with the minimum capacity of 3,000 gallons per day and intermittent yield of up to 25 gallons per minute. The Contractor shall supply all materials, plant, labor and equipment necessary to properly install, equip and place in immediate operation the respective items of the Contract. Any apparatus, materials and labor not hereinafter specifically mentioned in the Specifications or shown on the Exhibits, which may be found necessary to complete or perfect any portion of the work in a substantial manner and in compliance with the requirements implied or intended in the Specifications, shall be furnished by the Contractor without additional compensation. This shall include all materials, devices or methods peculiar to the apparatus or system furnished and installed by the Contractor.

B. The specific work to be completed includes, but is not limited to:
1. Well drilling.
2. Casing installation.
3. Estimating well yield.
4. Grouting of casing.
5. Well development.
6. Plumbness and alignment testing.
7. Well disinfection.
8. Well performance testing.
9. Water analyses required but not performed by local health department.
10. State and local permit applications.
11. Well pump, piping, hose outlet per section 232500 – Water Pumps.

C. The Contractor shall make all excavations; furnish and place casing as directed; furnish and place screen sections and plain pipe sections of the casing; furnish all material for and mix and place the concrete sanitary seal. The installation of the pitless adapter, wiring, pump, and discharge piping are included in the Contract and are described in subsequent sections of these specifications. The Contractor shall also furnish, place, and later remove suitable temporary piping for conveying the water pumped from the well during construction to such location remote from the well as required by the Engineer; furnish the necessary pumping equipment and all power required to operate the pump for such time as may be necessary to develop the well and for the period of testing; disinfect; and remove all surplus material to a location as designated by the Engineer. Contractor shall also furnish permanent deep well submersible pump, piping, wiring, and piping connections after proving well provides the capacity of water as stated in the description of work.

D. The Contractor shall complete and make applications necessary to obtain required permits for drilling and developing the proposed well. Following completion of the development and water quality testing, Contractor shall coordinate with the local health department for inspection and water quality testing, and perform work necessary to obtain the usage of a non-potable well.

E. Applications and Construction shall comply with, or exceed, all minimum Delaware Regulations prescribed at the time of construction, governing the location, design, installation, use, disinfection, modification, repair, and abandonment of all wells and associated pumping equipment as well as certain requirements for the protection of non-potable water supply wells.

1.3 SUBMITTALS

A. The Contractor shall submit to the Engineer a description of soil sampling methods, and the proposed drilling and well construction method and materials, including type of drilling mud, if any, and method for subsequent removal of the drilling mud. This submission shall also include proposed methods for gravel pack placement, well grouting, and well development.

B. The Contractor shall submit to the Engineer copies of geologic stratum data for the production well. Data shall include well logs showing strata, depths, water table elevations, screen data and intervals. Data shall also include grain size distribution (sieve tests) of strata where well screens are proposed to be placed.

C. In areas where the screen is to be set, the Contractor shall submit sieve analysis for each stratum of different geologic material encountered. Sieve analysis to be based on 1-quart mini- mum samples of each stratum.

D. Screen slot size, screen open area and screen type/construction recommendation based on the sieve analysis shall be provided as required. In addition, the Contractor shall provide their recommended filter pack gradation.

E. Record drawing of each production well showing casing sizes and types, depths, screen sizes and types, water levels and other pertinent information shall be submitted upon completion of the work.

F. Copies of well plumbness/alignment test results shall be submitted to the owner.

G. The Contractor shall submit two copies of the pump test data to the Owner.

H. Contractor shall submit copies of the approved permits for drilling and developing the well to the owner.

I. Following completion of the well development and water quality testing, Contractor shall coordinate with the local health department as required for inspection and water quality testing, and perform work necessary to obtain the certificate needed to use the well for non-potable wash-down purposes.

J. The Contractor shall include copies of record drawings, all test results, pump test data, permits and certificates, including operation and maintenance date (OEM data package). See section 232500 – Water Pumps.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Comply with regulatory requirements of the State, County, and other local political subdivisions requirements as may exceed the requirements of codes, standards and approving bodies referenced herein.

B. Well Driller Qualifications: An experienced water supply well driller licensed in the jurisdiction where Project is located.

C. Testing Agency Qualifications: Certified by the EPA or State to analyze non-potable water for compliance monitoring.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Transport, store, and handle specified Products in accordance with manufacturer's recommendations to prevent damage and defects.

PART 2 - PRODUCTS

2.1 DRILLING FLUIDS AND ADDITIVES

A. Drilling fluids and additives shall not impart toxic substances to the water or promote bacterial contamination.

2.2 WATER SUPPLY WELL

A. A single test hole shall be drilled to obtain representative soil samples used to design the well.

B. The gravel developed well shall consist, in general, of the following major items:

1. A permanent outer casing, placed to a depth sufficient to intercept the desired aquifer and provide the required flow. The casing shall be pressure grouted to its full depth.

2. A permanent inner casing of sufficient length to reach from the cutoff height, hereinafter specified, to the top of the well screen. The inner casing shall extend 2'-0" above finished grade.
3. Well screens shall be set at levels determined by data obtained from test hole.
4. Concrete sanitary seal shall fill the annular space between the borehole wall and the outer casing and shall also fill the annular space between the outer and inner casings.

2.3 EXCAVATION AND OUTER CASING

A. Excavation for any temporary casing and the outer permanent casing shall be done with a well drilling rig and by a drilling method acceptable to the Engineer.

B. The outer casing shall be capable of withstanding the structural load imposed during its installation and removal and shall be installed plumb, and sufficient checks shall be made to assure that it is plumb upon completion.

2.4 WELL SCREEN AND INNER CASINGS

A. Each well screen shall be Type 304 stainless steel, continuous-slot type well screen, sized to match the permanent inner casing. The screen shall be constructed by winding cold-drawing wire approximately triangular in cross section, spirally around a circular array of longitudinal rods or bars. The wire shall be welded to each longitudinal rod or bar. Screen data shall be reviewed by the Engineer.

B. Other types of well screen shall require the written approval of the Engineer.

C. The screen shall have a length of screen surface and slot opening of size as required by capacity of the well. Screen shall be sized to limit entrance velocity to a maximum of 0.1 feet per second.

D. The bottom of the screen section shall be closed by a 1/4-inch stainless steel bottom plate, continuously welded to the bottom of the screen, which shall serve as a bearing plate for the inner casing and screen. A 10-foot sump shall be placed below the bottom screen.

E. The plain pipe sections of the inner casing shall extend from the top of screen to 2-feet above ground surface prior to the 48-hour pumping test and shall be of steel not less than 3/8-inch thick. The pipe shall be lined and coated as specified hereinafter.

F. The screen and plain pipe sections of the inner casing shall be fastened together by suitable couplings, by welding, or by such other method as may be acceptable to the Engineer.

2.5 CONCRETE FOR SANITARY SEAL

A. The concrete for the seal shall consist of one part high-early-strength cement, 1.5 parts sand, and 2.5 parts pea gravel.

PART 3 - EXECUTION

3.1 PLACING INNER CASINGS

A. The screen and inner casings shall be carefully lowered into the well, centered using a sufficient number of appropriately spaced centralizers, and accurately plumbed.

3.2 PLACING WELL GRAVEL

A. The filter gravel shall be selected after sieve analyses are made on wash samples from all water bearing zones considered for screening. To introduce the filter gravel, install a conductor pipe in the annular space to a point below the deepest screen and tremie or pump the gravel into place using clear water as a fluid. No other method of filter gravel placement shall be acceptable. As the gravel envelope rises about the screens, spacer pipes, and inner casing, the conductor pipe shall be gradually withdrawn. The filter gravel shall be placed to a depth meeting all Local and State requirements. being pumped reaches a level approximately 50 feet above the top screen, the filter gravel introduction will cease. The remaining annulus shall be filled to ground level with neat cement grout pumped into place under pressure.

3.3 SURFACE SEAL

A. After completion of well and its test pumping, the top of the casing shall be sealed with a watertight cap securely fastened in place. At no time during construction of the wells, shall casings be left open.

B. The cap shall comply with DNREC requirements for security, locking and access for maintenance.

3.4 DEVELOPING AND CLEARING WELLS

A. The gravel developed well shall be developed by simultaneously surging and pumping the water in the well or by other acceptable operations. Fine material removed from the surrounding soil by the developing operations shall be removed from the inner casing.

B. The Contractor shall furnish and install a suitable temporary pump and a discharge pipe across the land adjoining the well to such location, where the water may be discharged with- out causing damage.

C. The Contractor shall furnish power and labor and operate the pump at such rates of discharge until all fine sand which may be drawn into the well has been removed and the turbidity is less than 1 NTU when pumped at a minimum of 15 gpm or the maximum projected yield, whichever is higher. The volume of water discharged during development must exceed the volume of water lost during drilling.

D. The Contractor shall collect periodic water samples during development for field analysis of turbidity. Contractor shall provide and calibrate a field instrument capable of measuring turbidity to 0.1 NTU.

3.5 DISINFECTION

A. After the well has been constructed, but before the start of the pumping test, the well shall be disinfected. This shall be accomplished by pumping a sufficient quantity of a chlorine solution into the well to maintain a 50 ppm concentration throughout a 12-hour period. The solution shall remain in the well for a minimum of 12 hours, after which it shall be pumped to waste. Pumping may be done with equipment to be utilized for the 24-hour pump test.

3.6 PLUMBNESS/ALIGNMENT TESTS

A. Upon completion of well construction, the Contractor shall check the well for plumbness and alignment. The well shall be checked by lowering a cylindrical plummet into the well for the entire depth. Measurements for horizontal deflection of the plumb line and calculated drift shall be made at 10-foot intervals. Testing shall comply with AWWA Standard A-100.

B. The plummet shall consist of a rigid spindle with perforated round plates at each end. The outer diameter of the end plates shall be 1/2-inch smaller than the inside diameter of the well casing. Distance between the plates shall be approximately 1.25 times the inside diameter of the casing. The plummet shall be heavy enough to keep the plumb line taut.

C. The plummet shall be lowered into the well at a maximum of 10 feet at a time and horizontal deflection of the plumb line from the center of top of casing shall be measured. Horizontal deflection shall be measured in two planes 90 degrees from each other.

D. Drift (horizontal deviation) of the casing at each depth recorded shall be calculated by using the following formula:

$$\text{drift} = \frac{\text{Deflection} \times (\text{height} + \text{depth})}{\text{height}}$$

where:

drift	=	calculated horizontal deviation of casing from the vertical (in inches)
deflection	=	measured horizontal deflection of the plumb line from the center of the top of casing (in inches)
height	=	height of apex above top of casing (in feet)
depth	=	depth of the plummet below the top of casing (in feet)

E. Calculation of drift of the casing, based on the above formula, shall be prepared by the Contractor and submitted to the Engineer for review.

F. The maximum allowable horizontal deviation (drift) of the well from vertical shall not exceed 2/3 of the smallest inside diameter of that part of the well being tested per 100-feet.

G. The Contractor shall insert a 40-foot long section of pipe into the well to verify alignment. The pipe shall be not more than 1/2-inch smaller than the casing diameter. The pipe shall move freely throughout the tested section.

H. If the well exceeds the plumbness or alignment test allowances, the Engineer may elect to withhold payment for work performed. Acceptance of the well will be based upon successful test results.

3.7 PUMPING TEST

A. Equipment: Provide, install and remove the measuring instruments and pumping equipment necessary to perform ~~an~~ performance testing as follows and ~~8-hour step-drawdown test, 24-hour constant-rate-pumping test~~ as required by state regulations~~, and recovery test~~. The final well pump may not utilized for the pump tests.

1. Provide a pumping unit complete with prime mover of ample power, controls and attachments, and capable of being operated without interruption for a period of 48 hours.
2. Provide a pumping unit capable of pumping 150 percent of the desired yield to the required point of discharge.
3. Provide a check valve on the pump to prevent water in the discharge piping from entering the well when the pump is shut off.
4. Furnish a description of the complete pumping system, including pump curve, to the Engineer prior to its installation.
5. Provide an emergency generator or temporary electrical service from a local utility, if required.
6. Install one 1-inch-diameter PVC drop pipes for use by manual water level measuring devices.
7. Provide a manual measuring instrument accurate to ±0.1 feet for determining the water level of the well before, during and after the test.
8. Provide a flow meter or alternative flow measurement device with an instantaneous rate of flow indicator and a totalizer, and having an accuracy of ±2 percent. Provide a current calibration certificate for the flow meter from an independent agency, and traceable to the National Institute of Standards and Technology.
9. Provide piping, valves and all other equipment necessary to conduct the test.
10. Conduct discharge water from the pump to a discharge point at least 200 feet downgradient from the pumping well through approved piping to minimize recirculation of dis-charge water into the aquifer being tested. It is imperative to ensure that no damage by flooding or erosion is caused to the chosen drainage structure or disposal site, and that no waterways are fouled by sediment.

B. Preparation.

1. Notify Engineer a minimum of one week in advance of the planned start of the pumping test.
2. Set the pump intake at the level directed by Engineer.

C. Pumping Test.

1. Before operating the system or components, check for proper motor rotation and proper lubrication of pump and drive units. Vent air from the system to ensure water is in the pump. ~~Prior to starting the pump, measure and record water level measurements every 10 minutes for one hour.~~
2. Operate pump on clear water at the design point (Flow Rate = 10 GPM, TDH = 125 ft) for a continuous period of four hours, under the supervision of the manufacturer's representative and in the presence of the Engineer. Demonstrate correct alignment, smooth operation, and freedom from noise, vibration and overheating. ~~Conduct the 8-hour step-drawdown pumping test at 100 percent of the expected long-term yield.~~
3. During the performance testing, check pumps and motors for excessive vibration and check for motor overload by taking ampere readings.
4. Do not overpump the well at any time, nor continuously throttle the discharge to maintain a pumping level.

D. Records.

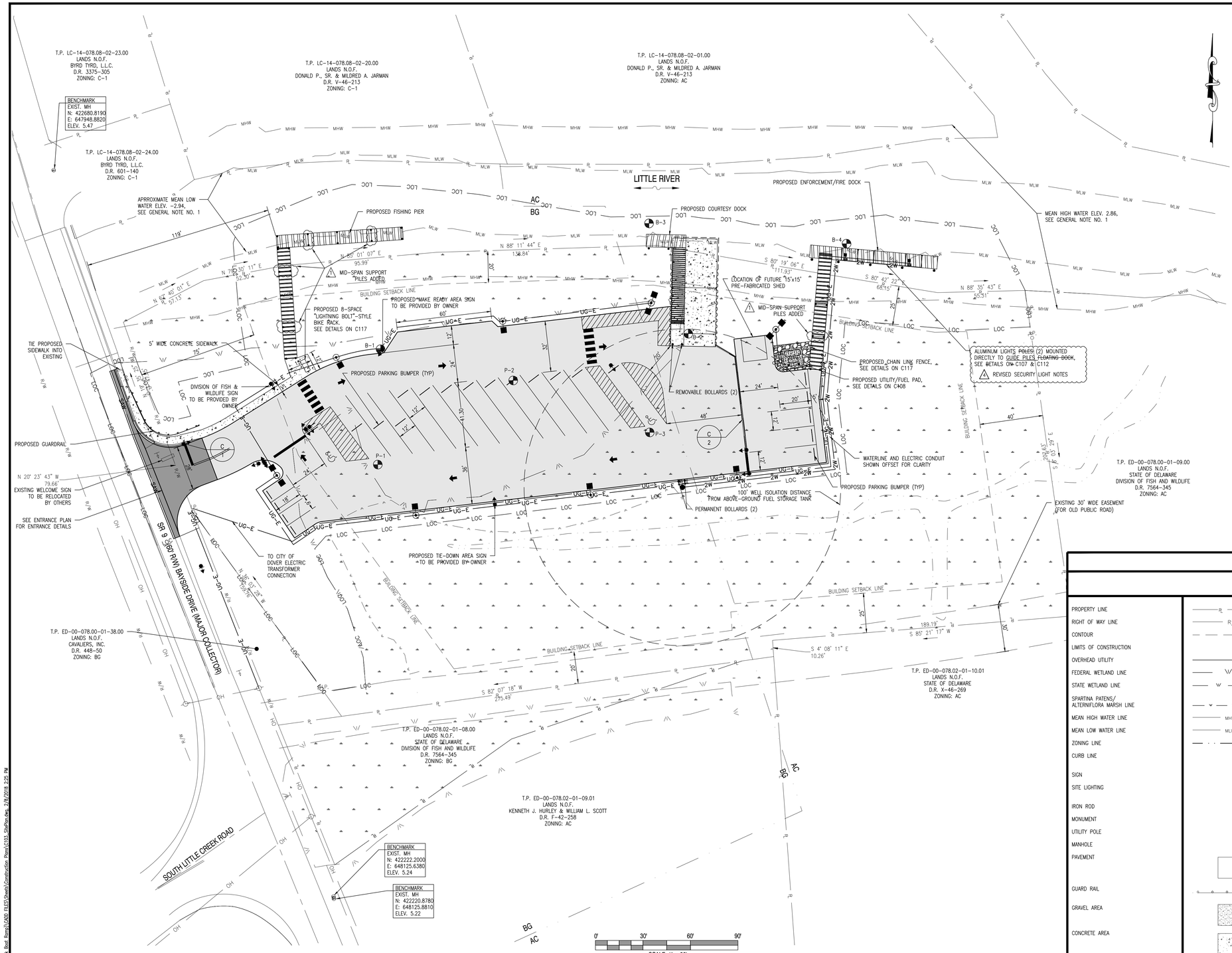
1. Measure and record yield ~~and drawdown~~ at each manual change of flow rate during the pumping test ~~and during the recovery period~~ according to the following schedule:

a.	0 to 10 minutes	every minute
b.	10 to 30 minutes	every 5 minutes
c.	30 to 60 minutes	every 10 minutes
d.	60 to 180 minutes	every 15 minutes
e.	180 to end of test	every 30 minutes or flow rate change

2. Record pumping rate at least every 2 hours.
3. Maintain accurate records of weather conditions~~,~~ and pumping rate~~, drawdown and recovery~~.
4. ~~All drawdown and recovery measurements shall be recorded at least to the nearest 0.01 feet.~~
5. Record all measurable precipitation on site to the nearest 0.1 inch, commencing 5 days prior to pump test startup and continuously until the completion of recovery.
6. ~~On completion of pumping, record recovery water level measurements with the same frequency until water levels in the pumping well have recovered 95 percent of their drawdown.~~
7. Do not remove the pump from the well until sufficient performance testing ~~recovery~~ data are collected.
8. Submit the log of the pumping test in quadruplicate to the Engineer.
9. Record static water levels of the well within one hour of test startup and verify just prior to startup.

E. Equipment Acceptance.
1. Adjust, repair, modify or replace any components which fail to perform as specified and rerun the tests. Make final adjustments to the equipment under the direction of the manufacturer's representative and to the satisfaction of the Engineer.

END OF SECTION 33 21 00



CURB SCHEDULE		
CURB NO.	TYPE	LENGTH
1	P.C.C. CURB & GUTTER, TYPE 3-8	73'
2*	P.C.C. CURB, TYPE 1-8	75'

* NOTE: CURB 2 SHALL HAVE 8" REVEAL ON EACH SIDE.

GENERAL NOTES:

1. MEAN HIGH WATER ELEVATION AND MEAN LOW WATER ELEVATION SURVEYED BY CENTURY ENGINEERING, INC. FEBRUARY 2017.
2. RIGHT OF WAY, LOCATIONS, PROPERTY LINES PROVIDED BY MILLER LEWIS, INC. LAND SURVEYING. CENTURY ENGINEERING, INC. TAKES NO RESPONSIBILITY FOR THEIR ACCURACY.
3. CENTERLINE ALIGNMENT OF BAYSIDE DRIVE BASED UPON EXISTING LOCATIONS PROVIDED BY MILLER LEWIS, INC. LAND SURVEYING. CENTURY ENGINEERING, INC. TAKES NO RESPONSIBILITY FOR THEIR ACCURACY.
4. ENTIRE SITE IS WITHIN ZONE AE FLOOD PLAIN (B.F.E. = ELEV. 11.00)
5. ALL DEMOLISHED MATERIAL NOT INTENDED FOR RECYCLING, IS TO BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE LEGALLY DISPOSED OF OFF SITE.
6. BEARING AND DISTANCES SHOWN ON PLAN TAKEN FROM A SURVEY PLAN PREPARED BY MILLER LEWIS, INC. LAND SURVEYING, DATED JUNE 13, 2016, DRAWING NO. ED-2-78-01-08.
7. CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND INSTALLING SIGN BASES AND POLES FOR SIGNS DESIGNATED AS "TO BE PROVIDED BY OWNER." CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING SIGN ONCE PROVIDED BY OWNER.

LEGEND

	EXISTING	PROPOSED
PROPERTY LINE	R ℄ R	N/A
RIGHT OF WAY LINE	R/W R/W	N/A
CONTOUR		4
LIMITS OF CONSTRUCTION	N/A	LOC LOC
OVERHEAD UTILITY	OH	N/A
FEDERAL WETLAND LINE	\/ \/	N/A
STATE WETLAND LINE	w w w	N/A
SPARTINA PATENS/ ALTERNIFLORA MARSH LINE		N/A
MEAN HIGH WATER LINE	MHW MHW	N/A
MEAN LOW WATER LINE	MLW MLW	N/A
ZONING LINE		N/A
CURB LINE	N/A	
SIGN		
SITE LIGHTING	N/A	
IRON ROD	I.P.	N/A
MONUMENT	N/A	C.M.
UTILITY POLE	∅	N/A
MANHOLE	MH	N/A
PAVEMENT		
GUARD RAIL		
GRAVEL AREA		N/A
CONCRETE AREA		
SIDEWALK	N/A	
GANGWAY	N/A	
DOCK/PIER	N/A	
WELL	N/A	WELL
UNDERGROUND ELECTRIC	N/A	UG-E
2" WATERLINE	N/A	2W 2W 2W
8" WATERLINE	N/A	8W 8W 8W
PILES	N/A	
BOLLARD	N/A	

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EMAIL: cel@centuryeng.com

REVISIONS	
3/20/17	REVISED PER KENT COUNTY COMMENTS
6/22/17	60% DFM SUBMISSION
9/4/17	REVISED PER DFW, DFM, DELDOT, & KENT COUNTY COMMENTS
12/18/17	REVISED FOR FIXED FISHING PIER
1/2/18	REVISED PER KENT COUNTY COMMENTS

ADDENDUM		
△	DESCRIPTION	DATE
1	REVISED PER GATORDOCK SHOP DRAWINGS, SEE DETAILS ON SHEETS C111-C116	02/01/2018
2	REVISED SECURITY LIGHT DETAILS	02/09/2018

PROJECT

CONSTRUCTION PLANS
FOR
DELAWARE DIVISION OF FISH & WILDLIFE
LITTLE CREEK BOAT RAMP
BAYSIDE DRIVE (SR9, KCR17)
LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

SHEET TITLE

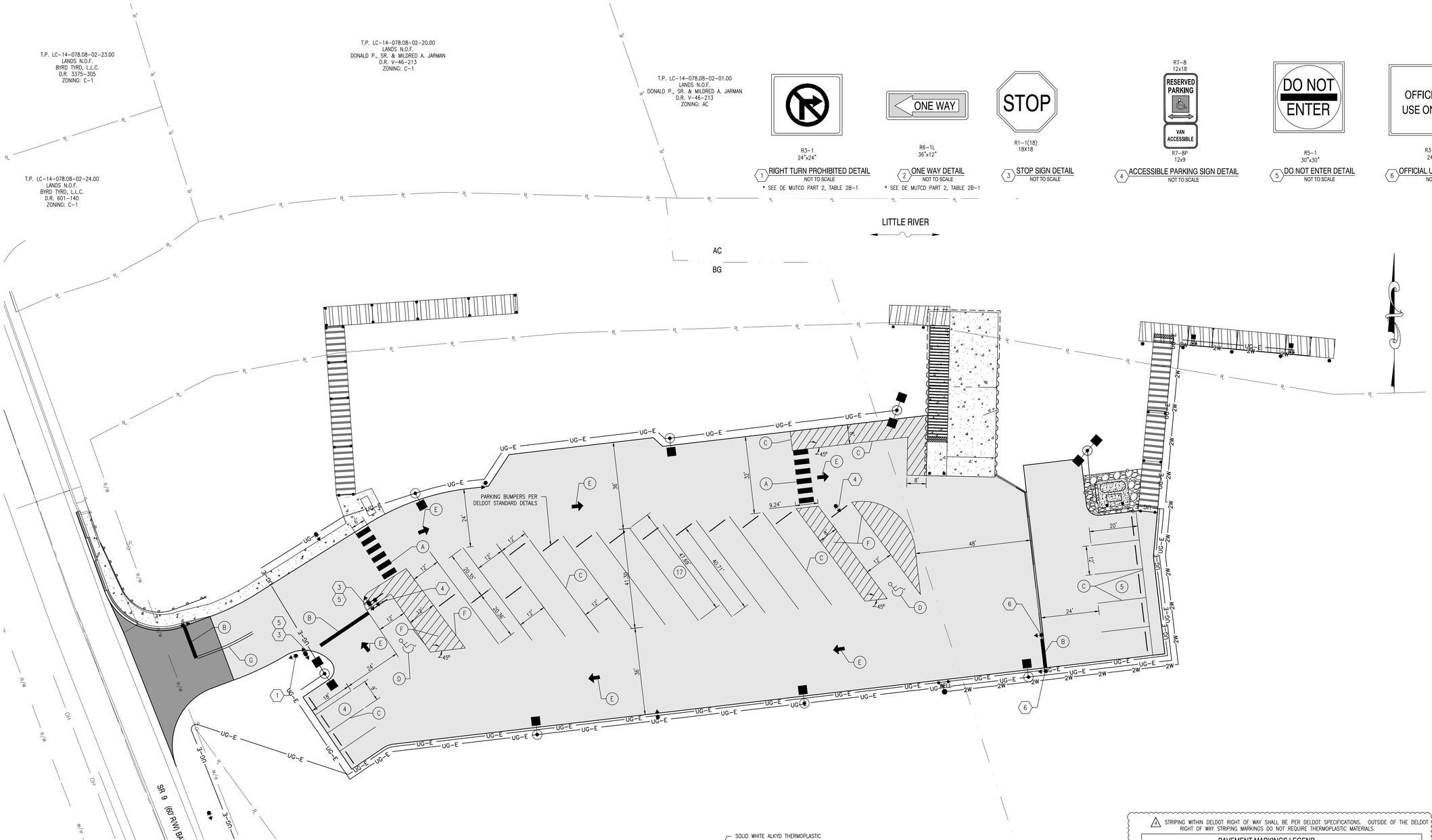
CONSTRUCTION LAYOUT PLAN

KENT COUNTY - FINAL DESIGN
JANUARY 2ND, 2018

DRAWN	CHK'D/DESIGNER
DLD / MDS	AES
SCALE	SHEET NO.
1" = 30'	C103

PROJECT NO. 155001.03

G:\PROJECTS\155001.00 DNREC Fish and Wildlife\155001.03 Design of Little Creek Boat Ramp\LC103 ELEES\Sheets\Construction Plans\LC103_SiteRev.dwg, 2/8/2018 3:25 PM



R3-1
24"x24"

1 RIGHT TURN PROHIBITED DETAIL
NOT TO SCALE
* SEE DE MUTCD PART 2, TABLE 2B-1

R6-1L
36"x12"

2 ONE WAY DETAIL
NOT TO SCALE
* SEE DE MUTCD PART 2, TABLE 2B-1

R1-1(18)
18X18

3 STOP SIGN DETAIL
NOT TO SCALE

R7-8
12x18

R7-8P
12x9

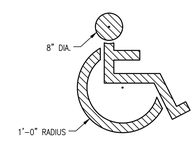
4 ACCESSIBLE PARKING SIGN DETAIL
NOT TO SCALE

R5-1
30"x30"

5 DO NOT ENTER DETAIL
NOT TO SCALE

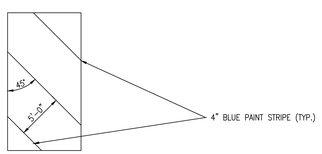
R3-3-DE
24"x24"

6 OFFICIAL USE ONLY DETAIL
NOT TO SCALE

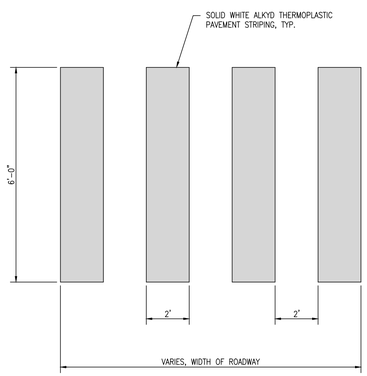


NOTES:
1. SYMBOL STRIPING SHALL BE 3" WIDE (MIN.) AND PAINTED ON EACH HANDICAPPED SPACE.
2. HANDICAPPED SPACES SHALL BE 12'-0" WIDE.

HANDICAPPED SYMBOL DETAIL
NOT TO SCALE



TYPICAL ACCESSIBLE PARKING HATCH DETAIL
NOT TO SCALE



TYPICAL CROSSWALK DETAIL
NOT TO SCALE

⚠ STRIPING WITHIN DELDOT RIGHT OF WAY SHALL BE PER DELDOT SPECIFICATIONS. OUTSIDE OF THE DELDOT RIGHT OF WAY STRIPING MARKINGS DO NOT REQUIRE THERMOPLASTIC MATERIALS.

PAVEMENT MARKINGS LEGEND	
SYMBOL	ITEM
A	24" SOLID WHITE ALKYD ~~THERMOPLASTIC~~ PAVEMENT STRIPING
B	16" SOLID WHITE ALKYD THERMOPLASTIC PAVEMENT STRIPING
C	4" WHITE ALKYD ~~THERMOPLASTIC~~ PAINT PAVEMENT STRIPING
D	BLUE ALKYD ~~RETROFLECTIVE PREFORMED PATTERNED~~ MARKINGS, SYMBOL/LEGEND
E	WHITE ALKYD ~~THERMOPLASTIC~~ SYMBOL
F	4" BLUE ALKYD ~~THERMOPLASTIC~~ PAINT PAVEMENT STRIPING
G	5" DOUBLE YELLOW ALKYD THERMOPLASTIC (5-6-5)

GENERAL NOTES:

1. RIGHT OF WAY, LOCATIONS, PROPERTY LINES PROVIDED BY MILLER LEWIS, INC. LAND SURVEYING. CENTURY ENGINEERING, INC. TAKES NO RESPONSIBILITY FOR THEIR ACCURACY.
2. CENTERLINE ALIGNMENT OF BAYSIDE DRIVE (SR 9) BASED UPON EXISTING LOCATIONS PROVIDED BY MILLER LEWIS, INC. LAND SURVEYING. CENTURY ENGINEERING, INC. TAKES NO RESPONSIBILITY FOR THEIR ACCURACY.

0' 20' 40' 60'
SCALE: 1" = 20'

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ADDENDUM

	DESCRIPTION	DATE
1	REVISED PER GATORDOCK SHOP DRAWINGS, SEE DETAILS ON SHEETS C111-C116	02/01/2018
4	REVISED STRIPING MATERIALS	02/09/2018

PROJECT
CONSTRUCTION PLANS
FOR
DELAWARE DIVISION OF FISH & WILDLIFE
LITTLE CREEK BOAT RAMP
BAYSIDE DRIVE (SR9, KCR17)
LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

SHEET TITLE
SIGNING AND STRIPING PLAN

KENT COUNTY - FINAL DESIGN
JANUARY 2ND, 2018

DRAWN	CHK'D/DESIGNER
DLD / MDS	AES
SCALE	SHEET NO.
1" = 20'	C105
PROJECT NO.	
155001.03	

GENERAL NOTES - ELECTRICAL WORK

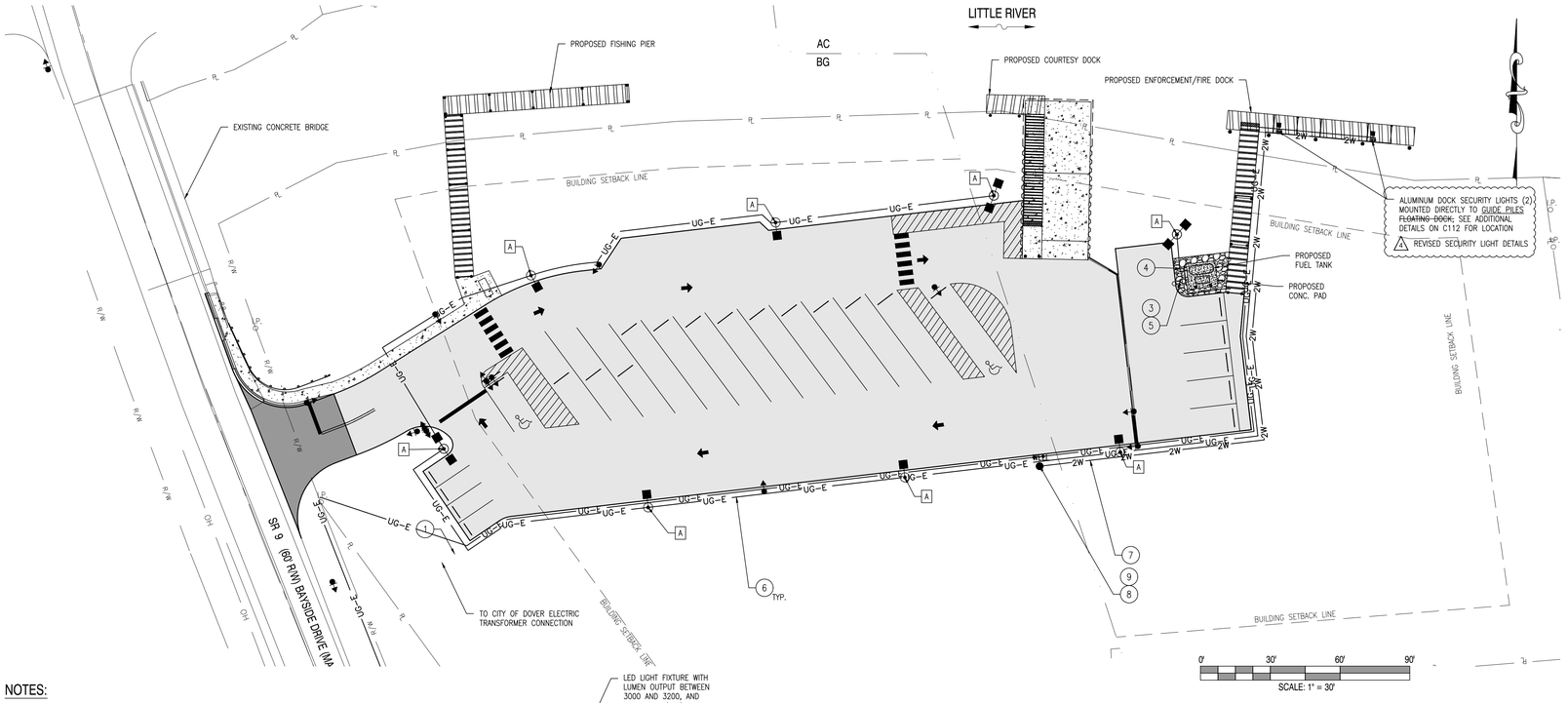
1. THE ELECTRICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH THAT OF ALL OTHER TRADES. ALL OTHER TRADE'S DRAWINGS AND SPECIFICATIONS SHALL BE CONSULTED AND COORDINATED WITH PRIOR TO ROUGH-IN.
2. WHEREVER POSSIBLE, THE CONTRACTOR SHALL OBTAIN ACTUAL ROUGH-IN DRAWINGS FOR THE ACTUAL ITEM OF EQUIPMENT TO BE INSTALLED PRIOR TO ROUGH-IN. THIS SHALL APPLY TO ALL EQUIPMENT, WHETHER IT IS TO BE INSTALLED BY THE CONTRACTOR OR BY THE OWNER.
3. PROVIDE TYPED CIRCUIT DIRECTORIES FOR ALL PANELBOARDS TO INDICATE TYPE OF LOAD SERVED AND AREA SERVED (E.G. RV POWER POST A1).
4. UNLESS NOTED OTHERWISE, EVERY CONDUIT CONTAINING 120V OR GREATER WIRING SHALL CONTAIN A SEPARATE INSULATED GROUND WIRE RATED FOR 600V.
5. PROVIDE SEPARATE UNSHARED NEUTRAL CONDUCTOR(S) FOR ALL FEEDERS REQUIRING A NEUTRAL (I.E. 1 PHASE – 3 WIRE). SHARING OF NEUTRAL CONDUCTORS BETWEEN ANY CIRCUIT (FEEDER) IS NOT PERMITTED. MULTIWIRE FEEDER CIRCUITS ARE NOT PERMITTED.
6. CONFIRM ALL EQUIPMENT LOCATIONS PRIOR TO INSTALLATION.
7. PROVIDE WARNING LABELS FOR ALL PANELBOARDS AND METER SOCKET ENCLOSURES. WARNING LABELS SHALL READ AS FOLLOWS: "CAUTION. POTENTIAL ELECTRIC ARC FLASH HAZARD. WEAR PROPER PROTECTIVE CLOTHING WHILE EXAMINING, ADJUSTING, SERVICING OR MAINTAINING ENERGIZED EQUIPMENT." INSTALL WARNING LABELS ON EXTERIOR FRONT FACE OF ALL PANELBOARDS AND METER SOCKET ENCLOSURES LOCATED IN UNFINISHED/UTILITY TYPE SPACES. INSTALL WARNING LABELS ON INTERIOR FRONT FACE OF ALL PANELBOARDS LOCATED IN FINISHED SPACES. ENTIRE INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF THE 2011 NEC, ARTICLE 110.16 (FLASH PROJECTION).
8. PROVIDE PANELBOARD AS REQUIRED. EACH SPACE SHALL BE A FULLY PREPARED SPACE (I.E. COMPLETE WITH ALL PROVISIONS INCLUDING ALL HARDWARE REQUIRED TO MOUNT A FUTURE CIRCUIT BREAKER INCLUDING BUS CONNECTIONS, CIRCUIT BREAKER MOUNTING BRACKET, CIRCUIT BREAKER COVER AND COVER KNOCKOUTS, ETC.). PANELBOARDS SHALL BE NEMA 3R, LOCKABLE WITH THE SAME KEYING.
9. COORDINATE UNDERGROUND RUNS WITH EXISTING CONDITION AND TREE LOCATIONS.
10. VERIFY ELECTRICAL SYSTEM PHASING AND ROTATION WITH UTILITY COMPANY.
11. COMPLY WITH CITY OF DOVER PUBLIC WORKS' ELECTRIC UTILITY SPECIFICATION FOR DEVELOPER DOCUMENT. COORDINATE PRIMARY, TRANSFORMER, SECONDARY, AND METERING WORKS WITH CITY OF DOVER PUBLIC WORKS.
12. COMPLY WITH CURRENT NATIONAL, STATE, AND LOCAL ADOPTED CODES.
13. SAW CUT PAVED AREAS IN ACCORDANCE WITH CONSTRUCTION DETAILS.
14. RESTORE DISTURBED PAVED AREAS IN TO THE ORIGINAL CONDITION OR IN ACCORDANCE WITH CONSTRUCTION DETAILS.
15. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY POWER (PORTABLE GENERATORS, TEMPORARY SERVICES, ETC.).
16. ALL CONDUITS SHALL BE SCHEDULE 80 PVC, UNLESS NOTED OTHERWISE.
17. UNLESS OTHERWISE INDICATED, ALL CABLES/CONDUCTORS SHALL BE COPPER TYPE. ALUMINUM CABLES/CONDUCTORS SHALL ONLY BE ALLOW FOR USE FOR PRIMARY AND SECONDARY RUNS IN ACCORDANCE WITH CITY OF DOVER PUBLIC WORKS' REQUIREMENTS.
18. UTILITY SERVICE POLE, FUSE CUTOUTS, OVERHEAD LINES UPSTREAM OF UTILITY SERVICE POLE, AND METERS TO BE PROVIDED BY CITY OF DOVER PUBLIC WORKS' ELECTRIC DEPARTMENT.
19. FURNISH AND INSTALL TREATED LUMBER BOARDS ON BACK OF EXISTING METER STANDS TO ALLOW FOR INSTALLATION OF NEW PANELBOARDS. RUN SERVICE ENTRANCE WIRING AND CONDUITS AS INDICATED FROM EXISTING METERS TO NEW PANELBOARDS. COORDINATE WITH CITY OF DOVER PUBLIC WORKS FOR INSTALLATION OF NEW METERS.
20. CONTRACTOR SHALL HAVE ALL WORK INSPECTED BY UNDERWRITERS INSPECTION AGENCY. INSPECTION CERTIFICATE SHALL BE PROVIDED.
21. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH SITE CONTRACTOR FOR PLACEMENT OF ALL UNDERGROUND CONDUITS AND WIRING. UNDERGROUND SERVICE SHALL BE PLACED AS SHOWN ON THIS SHEET. ANY REVISIONS OR ALTERATIONS TO THE CONDUIT ALIGNMENT SHALL BE APPROVED BY THE ENGINEER.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING UTILITY PERMITS FROM DELDOT IF REQUIRED.

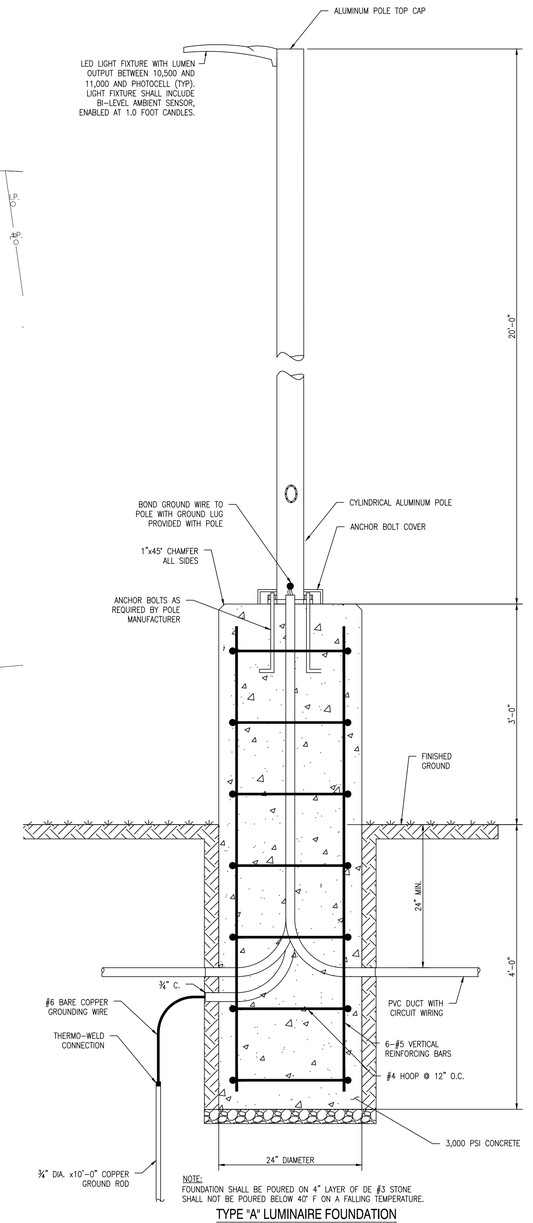
SITE LIGHTING FIXTURE SCHEDULE

QTY	TYPE	LAMPS	VOLTAGE	MOUNT	FIXTURE DESCRIPTION	MANUFACTURER CATALOG NUMBER	REMARKS
5	A	LED	UNIV. 120-277V	POLE MNT SINGLE @ 20'-0"	SINGLE MOUNT FULL CUTOFF LED PARKING LOT LUMINAIRE AND POLE WITH RECEPTACLE AND PHOTOCELL.	SEE TECHNICAL SPECIFICATIONS FOR LIGHT FIXTURE SELECTION GUIDANCE	20' ALUMINUM POLES WITH SIDE MOUNTED LUMINAIRES AND TOP CAP FOR POLE – SEE TECHNICAL SPECIFICATIONS FOR DETAILS
3	A	LED	UNIV. 120-277V	POLE MNT DOUBLE @ 20'-0"	DOUBLE MOUNT FULL CUTOFF LED PARKING LOT LUMINAIRE AND POLE WITH RECEPTACLE AND PHOTOCELL.	SEE TECHNICAL SPECIFICATIONS FOR LIGHT FIXTURE SELECTION GUIDANCE	20' ALUMINUM POLES WITH SIDE MOUNTED LUMINAIRES AND TOP CAP FOR POLE – SEE TECHNICAL SPECIFICATIONS FOR DETAILS
2	–	LED	UNIV. 120-277V	~~DOCK MNT.~~ SINGLE @ 14'-0"	SINGLE MOUNT WILDLIFE FRIENDLY LED DOCK LUMINAIRE ~~AND POLE WITH RECEPTACLE~~ AND PHOTOCELL	SEE TECHNICAL SPECIFICATIONS FOR LIGHT FIXTURE SELECTION GUIDANCE	~~14' ALUMINUM POLES WITH~~ SIDE MOUNTED LUMINAIRES SECURED TO GUIDE PILES ~~AND CAP FOR POLE~~
				⚠1 REVISED SECURITY LIGHT DETAILS			⚠1 REVISED SECURITY LIGHT DETAILS

ELECTRICAL LEGEND

- — OH — OVERHEAD ELECTRIC
- - UG-E - UNDERGROUND ELECTRIC
- ELECTRIC UTILITY METER
- ELECTRIC PANEL BOX



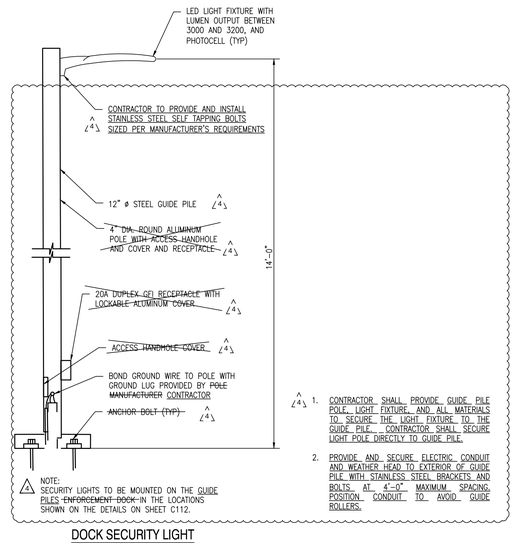


NOTE:
FOUNDATION SHALL BE POURED ON 4" LAYER OF DE #3 STONE SHALL NOT BE POURED BELOW 40° F ON A FALLING TEMPERATURE.

TYPE "A" LUMINAIRE FOUNDATION
N.T.S.

NOTES:

1. CITY OF DOVER ELECTRIC TO INSTALL TRANSFORMER ON EXISTING UTILITY POLE AND MAKE CONNECTIONS. CONTRACTOR TO PROVIDE RISER WIRING AND RISER GUARD ON POLE WITH COILED CABLE SLACK TO ALLOW FOR CITY OF DOVER TRANSFORMER CONNECTION. INSTALL IN ACCORDANCE WITH CITY OF DOVER ELECTRIC. SERVICE SHALL BE 120/240V, SINGLE-PHASE, 3-WIRE. GROUNDING AS REQUIRED BY CITY OF DOVER ELECTRIC. COORDINATE RELATED WORK AND RESPONSIBILITY WITH CITY OF DOVER ELECTRIC.
2. MINIMUM: TRIPLEX 3#4/0 CU CABLE DIRECT BURIED 36" MINIMUM UNDERGROUND. PROVIDE RISER LINE GUARD ATTACHED TO POLE TO PROTECT CABLE RISER TO POLE MOUNTED TRANSFORMER. PROVIDE 2-1/2"C RISER AT METER SOCKET. PROVIDE 3#4/0 CU IN 2"C FROM METER TO BUILDING PANEL.
3. PROVIDE CITY OF DOVER APPROVED METER SOCKET/BOX MOUNTED ON PANEL BOARD. INSTALLATION SHALL BE IN ACCORDANCE WITH CITY OF DOVER ELECTRIC REQUIREMENTS. COORDINATE METER INSTALLATION WITH CITY OF DOVER ELECTRIC.
4. LOCKABLE NEMA 3 METER PANEL INSTALLED ON TIMBER PANEL BOARD.
5. PROVIDE 5/8" DIAMETER BY 10' LONG COPPER-CLAD STEEL GROUND ROD. DRIVE TOP OF GROUND ROD TO BELOW GRADE. PROVIDE #2 GROUND WIRE IN 3/4"C FROM GROUND ROD TO BUILDING PANEL GROUND BAR. CONNECT GROUND WIRE TO GROUND ROD WITH EXOTHERMIC WELD CONNECTOR. BOND TO METAL WATER PIPE AND STRUCTURE METAL IN COMPLIANT WITH NEC. PROVIDE ADDITIONAL GROUND RODS UNTIL MEET 25 OHMS OR LESS.
6. 2#10, #10G IN 1"C UNDERGROUND AND RISERS.
7. 3#8, #8G IN EXISTING UNDERGROUND 2"C AND NEW 2"C RISERS FROM CONTROLLER TO DISCONNECT SWITCH. WIRES AND CIRCUIT BREAKER SIZED FOR 1-1/2HP PUMP AS BASIS-OF-DESIGN. IF PUMP CHANGED IN SIZE, RESIZE WIRES AND CIRCUIT BREAKER IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS.
8. PROVIDE 30A/2P NON-FUSIBLE DISCONNECT SWITCH WITH NEMA 4X STAINLESS STEEL ENCLOSURE AND PAD-LOCKABLE HANDLE. MOUNT DISCONNECT SWITCH ON 4"x4" TREATED LUMBER POST. BOTTOM OF DISCONNECT SWITCH 2-1/2' ABOVE FINISHED GRADE MINIMUM. BURY TREATED LUMBER POST 3' BELOW GRADE. PROVIDE 12" DIAMETER CONCRETE FOOTING AROUND POST.
9. 3#8, #8G IN 2"C. MAKE CONNECTIONS INSIDE WELL PUMP CONNECTION BOX IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.



NOTE:
⚠1 SECURITY LIGHTS TO BE MOUNTED ON THE GUIDE PILES ~~ENFORCEMENT DOCK~~ IN THE LOCATIONS SHOWN ON THE DETAILS ON SHEET C112.

1. CONTRACTOR SHALL PROVIDE GUIDE PILE POLE, LIGHT FIXTURE, AND ALL MATERIALS TO SECURE THE LIGHT FIXTURE TO THE GUIDE PILE. CONTRACTOR SHALL SECURE LIGHT POLE DIRECTLY TO GUIDE PILE.
2. PROVIDE AND SECURE ELECTRIC CONDUIT AND WEATHER HEAD TO EXTERIOR OF GUIDE PILE WITH STAINLESS STEEL BRACKETS AND BOLTS AT 4'-0" MAXIMUM SPACING. POSITION CONDUIT TO AVOID GUIDE ROLLERS.

DOCK SECURITY LIGHT
SCALE: 1" = 1'-0"

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ADDENDUM

	DESCRIPTION	DATE
⚠1	REVISED PER GATORDOCK SHOP DRAWINGS, SEE DETAILS ON SHEETS C111-C116	02/01/2018
⚠1	REVISED SECURITY LIGHT DETAILS	02/09/2018

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FOR
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BAYSIDE DRIVE (SR9, KCR17)
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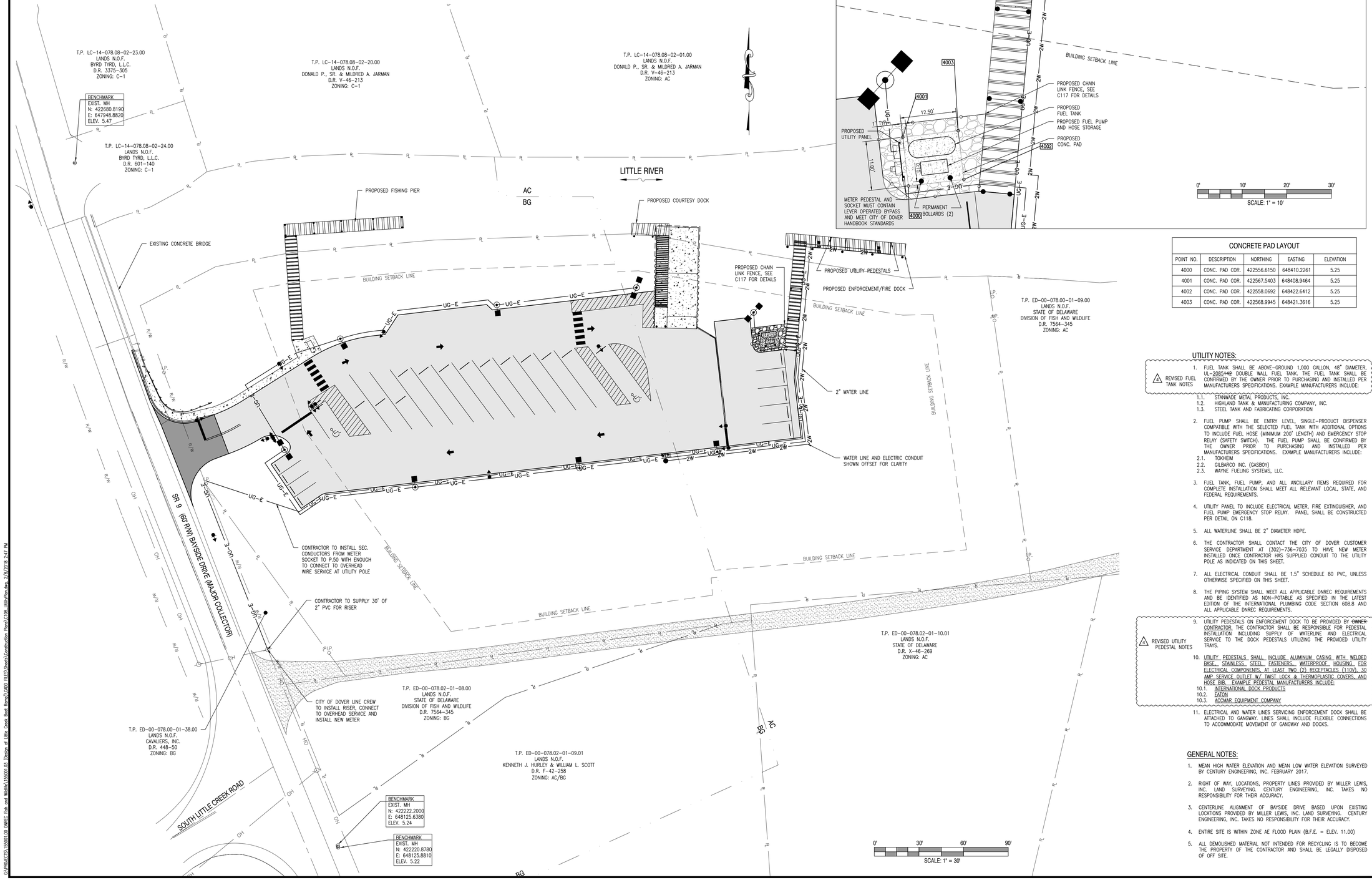
SHEET TITLE
SITE LIGHTING PLAN

KENT COUNTY - FINAL DESIGN
JANUARY 2ND, 2018

DRAWN	CHK'D/DESIGNER
DLD / MDS	AES
SCALE	SHEET NO.
1" = 30'	C107
PROJECT NO.	
155001.03	



CONCRETE PAD LAYOUT

POINT NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
4000	CONC. PAD COR.	422556.6150	648410.2261	5.25
4001	CONC. PAD COR.	422567.5403	648408.9464	5.25
4002	CONC. PAD COR.	422558.0692	648422.6412	5.25
4003	CONC. PAD COR.	422568.9945	648421.3616	5.25

UTILITY NOTES:

REVISED FUEL TANK NOTES

1. FUEL TANK SHALL BE ABOVE-GROUND 1,000 GALLON, 48" DIAMETER, UL-2085/142 DOUBLE WALL FUEL TANK. THE FUEL TANK SHALL BE CONFIRMED BY THE OWNER PRIOR TO PURCHASING AND INSTALLED PER MANUFACTURERS SPECIFICATIONS. EXAMPLE MANUFACTURERS INCLUDE:
   - 1.1. STANWADE METAL PRODUCTS, INC.
   - 1.2. HIGHLAND TANK & MANUFACTURING COMPANY, INC.
   - 1.3. STEEL TANK AND FABRICATING CORPORATION
2. FUEL PUMP SHALL BE ENTRY LEVEL, SINGLE-PRODUCT DISPENSER COMPATIBLE WITH THE SELECTED FUEL TANK WITH ADDITIONAL OPTIONS TO INCLUDE FUEL HOSE (MINIMUM 200' LENGTH) AND EMERGENCY STOP RELAY (SAFETY SWITCH). THE FUEL PUMP SHALL BE CONFIRMED BY THE OWNER PRIOR TO PURCHASING AND INSTALLED PER MANUFACTURERS SPECIFICATIONS. EXAMPLE MANUFACTURERS INCLUDE:
   - 2.1. TOKHEIM
   - 2.2. GILBARCO INC. (GASBOY)
   - 2.3. WAYNE FUELING SYSTEMS, LLC.
3. FUEL TANK, FUEL PUMP, AND ALL ANCILLARY ITEMS REQUIRED FOR COMPLETE INSTALLATION SHALL MEET ALL RELEVANT LOCAL, STATE, AND FEDERAL REQUIREMENTS.
4. UTILITY PANEL TO INCLUDE ELECTRICAL METER, FIRE EXTINGUISHER, AND FUEL PUMP EMERGENCY STOP RELAY. PANEL SHALL BE CONSTRUCTED PER DETAIL ON C118.
5. ALL WATERLINE SHALL BE 2" DIAMETER HDPE.
6. THE CONTRACTOR SHALL CONTACT THE CITY OF DOVER CUSTOMER SERVICE DEPARTMENT AT (302)-736-7035 TO HAVE NEW METER INSTALLED ONCE CONTRACTOR HAS SUPPLIED CONDUIT TO THE UTILITY POLE AS INDICATED ON THIS SHEET.
7. ALL ELECTRICAL CONDUIT SHALL BE 1.5" SCHEDULE 80 PVC, UNLESS OTHERWISE SPECIFIED ON THIS SHEET.
8. THE PIPING SYSTEM SHALL MEET ALL APPLICABLE DNREC REQUIREMENTS AND BE IDENTIFIED AS NON-POTABLE AS SPECIFIED IN THE LATEST EDITION OF THE INTERNATIONAL PLUMBING CODE SECTION 608.8 AND ALL APPLICABLE DNREC REQUIREMENTS.

REVISED UTILITY PEDESTAL NOTES

9. UTILITY PEDESTALS ON ENFORCEMENT DOCK TO BE PROVIDED BY OWNER CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PEDESTAL INSTALLATION INCLUDING SUPPLY OF WATERLINE AND ELECTRICAL SERVICE TO THE DOCK PEDESTALS UTILIZING THE PROVIDED UTILITY TRAYS.
10. UTILITY PEDESTALS SHALL INCLUDE ALUMINUM CASING WITH WELDED BASE, STAINLESS STEEL FASTENERS, WATERPROOF HOUSING FOR ELECTRICAL COMPONENTS, AT LEAST TWO (2) RECEPTACLES (110V), 30 AMP SERVICE OUTLET W/ TWIST LOCK & THERMOPLASTIC COVERS, AND HOSE BIB. EXAMPLE PEDESTAL MANUFACTURERS INCLUDE:
   - 10.1. INTERNATIONAL DOCK PRODUCTS
   - 10.2. EATON
   - 10.3. ACCMAR EQUIPMENT COMPANY
11. ELECTRICAL AND WATER LINES SERVICING ENFORCEMENT DOCK SHALL BE ATTACHED TO GANGWAY. LINES SHALL INCLUDE FLEXIBLE CONNECTIONS TO ACCOMMODATE MOVEMENT OF GANGWAY AND DOCKS.

GENERAL NOTES:

1. MEAN HIGH WATER ELEVATION AND MEAN LOW WATER ELEVATION SURVEYED BY CENTURY ENGINEERING, INC. FEBRUARY 2017.
2. RIGHT OF WAY, LOCATIONS, PROPERTY LINES PROVIDED BY MILLER LEWIS, INC. LAND SURVEYING. CENTURY ENGINEERING, INC. TAKES NO RESPONSIBILITY FOR THEIR ACCURACY.
3. CENTERLINE ALIGNMENT OF BAYSIDE DRIVE BASED UPON EXISTING LOCATIONS PROVIDED BY MILLER LEWIS, INC. LAND SURVEYING. CENTURY ENGINEERING, INC. TAKES NO RESPONSIBILITY FOR THEIR ACCURACY.
4. ENTIRE SITE IS WITHIN ZONE AE FLOOD PLAIN (B.F.E. = ELEV. 11.00)
5. ALL DEMOLISHED MATERIAL NOT INTENDED FOR RECYCLING IS TO BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE LEGALLY DISPOSED OF OFF SITE.

CENTURY ENGINEERING
CONSULTING ENGINEERS ■ SURVEYORS
ADDRESS: 4134 NORTH DUPONT HIGHWAY, DOVER, DE 19901
P: (302) 734-9188 F: (302) 734-4589
WEBSITE: www.centuryeng.com
EMAIL: cei@centuryeng.com

REVISIONS

3/20/17	REVISED PER KENT COUNTY COMMENTS
6/22/17	60% DFM SUBMISSION
9/4/17	REVISED PER DFW, DFM, DELDOT, & KENT COUNTY COMMENTS
12/18/17	REVISED FOR FIXED FISHING PIER
1/2/18	REVISED PER KENT COUNTY COMMENTS

ADDENDUM

	DESCRIPTION	DATE
1	REVISED PER GATORDOCK SHOP DRAWINGS, SEE DETAILS ON SHEETS C111-C116	02/01/2018
2	REVISED FUEL TANK & UTILITY PEDESTAL NOTES	02/09/2018

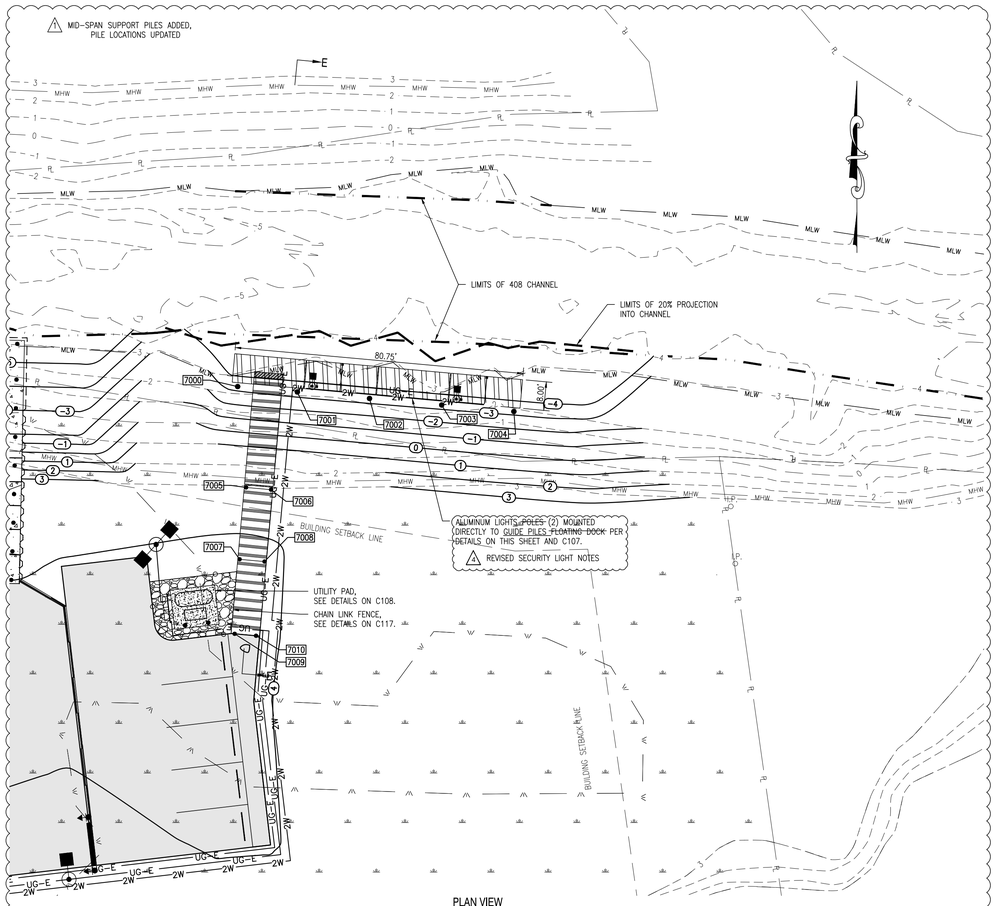
PROJECT
CONSTRUCTION PLANS
FOR
DELAWARE DIVISION OF FISH & WILDLIFE
LITTLE CREEK BOAT RAMP
BAYSIDE DRIVE (SR9, KCR17)
LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

SHEET TITLE
UTILITY PLAN

KENT COUNTY - FINAL DESIGN
JANUARY 2ND, 2018

DRAWN	CHK'D/DESIGNER
DLD / MDS	AES
SCALE	SHEET NO.
AS NOTED	C108
PROJECT NO.	
155001.03	

G:\PROJECTS\155001.00 DNREC Fish and Wildlife\155001.03 (Design of Little Creek Boat Ramp)\CADD FILES\Sheets\Construction Plans\C108_UtilityPlan.dwg, 2/8/2018 3:47 PM

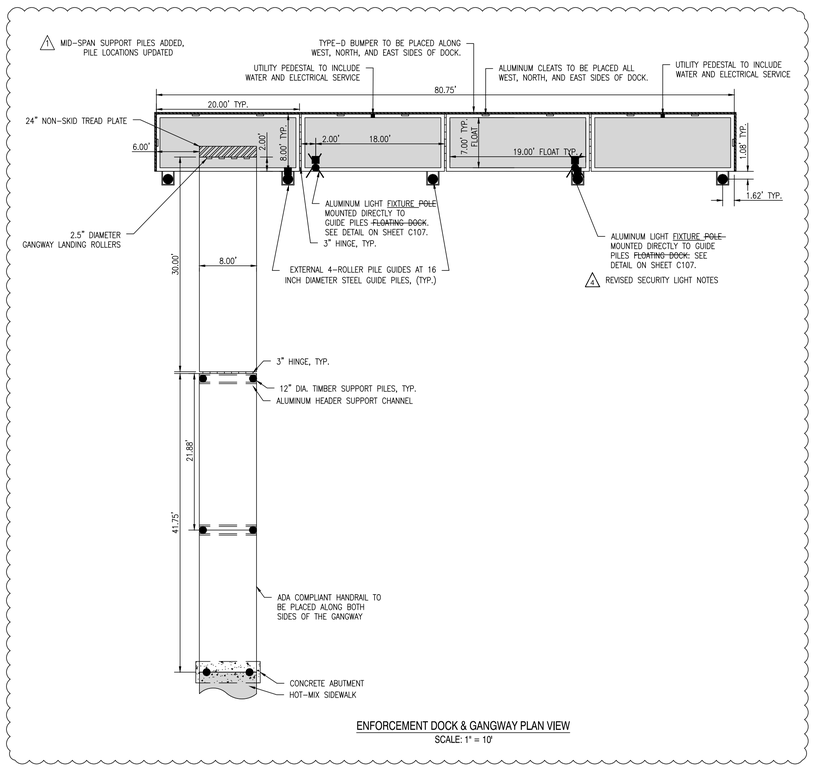


PLAN VIEW
SCALE: 1" = 20'

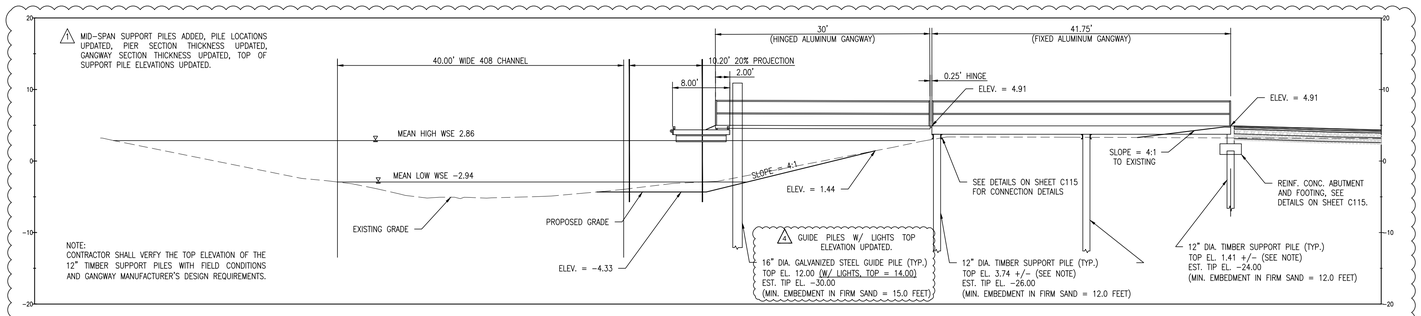
MID-SPAN SUPPORT PILES ADDED, PILE LOCATIONS UPDATED

ENFORCEMENT DOCK PILE LAYOUT

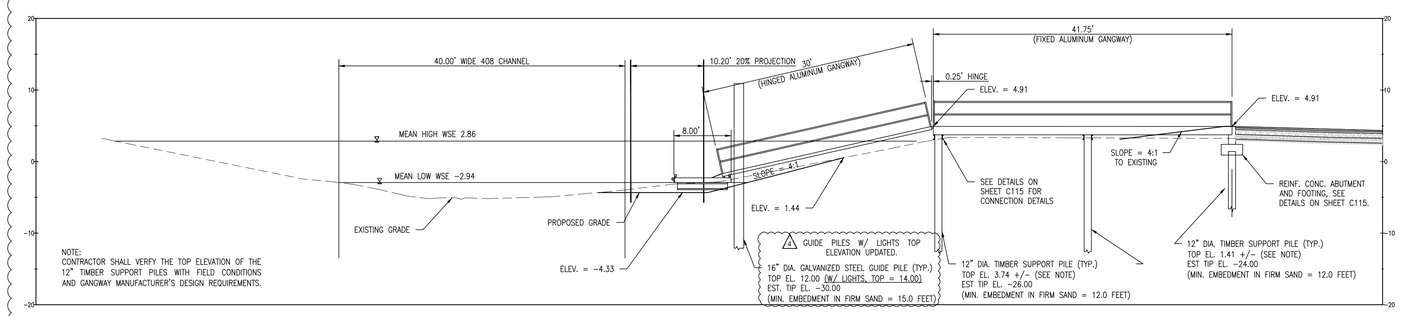
POINT NO.	DESCRIPTION	NORTHING	EASTING
7000	PILE	422624.4714	648427.8113
7001	PILE	422622.9642	648444.4929
7002	PILE	422621.1421	648464.6608
7003	PILE	422619.3199	648484.8286
7004	PILE	422617.4978	648504.9965
7005	PILE	422596.2689	648430.1593
7006	PILE	422595.6393	648437.1309
7007	PILE	422576.1840	648428.3455
7008	PILE	422575.5544	648435.3171
7009	PILE	422555.3487	648426.9658
7010	PILE	422554.8090	648432.9415



ENFORCEMENT DOCK & GANGWAY PLAN VIEW
SCALE: 1" = 10'



CROSS SECTION E-E UNLOADED AT MHW (MAXIMUM ELEVATION)
SCALE: 1" = 10'



CROSS SECTION E-E WITH 40 PSF LIVE LOAD AT MLW (MINIMUM ELEVATION)
SCALE: 1" = 10'

ENFORCEMENT DOCK NOTES:

1. FINAL DOCK CONFIGURATION TO BE CONFIRMED WITH OWNER.
2. ALL STRUCTURAL ALUMINUM IS TO BE ALLOY 6061-T6.
3. ALL DOCK HARDWARE IS TO BE STAINLESS STEEL, SERIES 304.
4. FLOATING DOCKS DESIGNED FOR AN 18" UNLOADED FREEBOARD AND AN 8" LOADED FREEBOARD (MAX. DESIGN LIVE LOAD = 40 PSF).
5. DOCK DIMENSIONS SHOWN ARE NOMINAL FROM ALUMINUM TO ALUMINUM FRAME. FINAL FINISHED DIMENSIONS WILL VARY ACCORDING TO INSTALLED FENDERS & BUMPERS.
6. 16 INCH DIAMETER GALVANIZED STEEL GUIDE PILES AND 12 INCH DIAMETER TIMBER SUPPORT PILE DEPTHS BASED UPON MINIMUM EMBEDMENT IN FIRM SAND. SEE ELEVATION VIEW ON THIS SHEET FOR ESTIMATED TIP ELEVATIONS.
7. ALL DOCKS, GANGWAYS, RAILING, AND ANCILLARY ITEMS SHALL BE PROVIDED BY THE OWNER.
8. GUIDE PILES INCLUDING LIGHT FIXTURES TOP ELEVATION = 14.0'

NOTE #8 ADDED.

0' 20' 40' 60'
SCALE: 1" = 20'

CENTURY ENGINEERING
CONSULTING ENGINEERS ■ SURVEYORS
ADDRESS: 4134 NORTH DUPONT HIGHWAY DOVER, DE 19901 P: (302) 734-9188 F: (302) 734-4589
WEBSITE: www.centuryeng.com
EMAIL: cel@centuryeng.com

REVISIONS

3/20/17	REVISED PER KENT COUNTY COMMENTS
6/22/17	60% DFM SUBMISSION
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1/2/18	REVISED PER KENT COUNTY COMMENTS

ADDENDUM

	DESCRIPTION	DATE
1	REVISED PER GATORDOCK SHOP DRAWINGS, SEE DETAILS ON SHEETS C111-C116	02/01/2018
2	REVISED SECURITY LIGHT DETAILS	02/09/2018

PROJECT
CONSTRUCTION PLANS
FOR
DELAWARE DIVISION OF FISH & WILDLIFE
LITTLE CREEK BOAT RAMP
BAYSIDE DRIVE (SR9, KCR17)
LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

SHEET TITLE
CROSS SECTION - ENFORCEMENT DOCK

KENT COUNTY - FINAL DESIGN
JANUARY 2ND, 2018

DRAWN	CHK'D/DESIGNER
DLD / MDS	AES
SCALE	SHEET NO.
AS NOTED	C112

PROJECT NO.
155001.03

G:\PROJECTS\155001.00 (NMFC Fish and Wildlife\155001.03 (Design of Little Creek Boat Ramp)\CADD FILES\Sheets\Construction Plans\C111 CrossSection EnforcementDock.dwg, 2/8/2018 1:46 PM

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

DEPARTMENT OF THE ARMY

PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

JAN 30 2018

Regulatory Branch
Applications Section I

SUBJECT: CENAP-OP-R-2017-661-23 (Final IP)
DDNREC #: FC#2017.0075
Location: 39.16N/-75.44416W

Mr. Jeremy Ashe
Delaware Department of Natural Resources and
Environmental Control
Division of Fish and Wildlife
89 Kings Highway
Dover, Delaware 19901

Dear Mr. Ashe:

Enclosed is a Department of the Army Permit (Enclosure 1) authorizing the Division of Fish and Wildlife to construct a public boating access facility on the Little River at Tax Map Parcel 2-00-07800-01-0800-00001, in the Town of Little Creek, Kent County, Delaware.

Also enclosed is a notice of authorization (ENG Form 4336-Enclosure 2) to be conspicuously displayed at the site of work.

Carefully review all the terms and conditions of the Department of the Army permit and understand them fully. Performing any work not specifically authorized by the permit or failing to comply with its conditions may subject you and/or your contractor to the enforcement provisions of our regulations. If a contractor performs the work for you, both you and the contractor are responsible for assuring the work is done in conformance with the conditions and limitations of this permit. Please be sure the person who will do the work has read and understands the conditions of the permit.

This office shall be notified of the commencement and completion of the permitted work. To assist you in meeting this requirement, enclosed with the Department of the Army Permit is a Notification/Certification of Work Commencement Form and a Notification/Certification of Work Completion/ Compliance Form (Enclosures 3 and 4) which must be signed and returned to this office. Additional information concerning this permit may be obtained by writing to John Brundage of my office at the above address or calling between the hours of 1:00 and 3:30 p.m. at 302-736-9763.

If any material changes in the location or plans of the permitted work are found necessary on account of unforeseen or altered conditions or otherwise, revised plans should be submitted promptly to this office in order that the revised plans, if found unobjectionable, may receive the approval required by law before operations on the permitted work are commenced.

Sincerely,

Edward E. Bonner
Chief, Regulatory Branch

Enclosures

PROVISIONAL PERMIT

NOT VALID

DO NOT BEGIN WORK

This PROVISIONAL PERMIT is NOT VALID until:

1. You obtain a Section 401 Water Quality Certification and/or Coastal Zone Management consistency determination concurrence from the Delaware Department of Natural Resources and Environmental Control.

2. You sign and return **BOTH** copies of the enclosed provisional permit with the State Section 401 Water Quality Certification and/or Coastal Zone Management consistency determination concurrence.

3. The Corps signs the permit and returns it to you.

Your permit is denied without prejudice, if the State denies your Section 401 Water Quality Certification and/or non-concurs with your Coastal Zone Management consistency determination.

DO NOT BEGIN WORK

DEPARTMENT OF THE ARMY PERMIT

PERMITTEE AND PERMIT NUMBER:

PERMITTEE: Delaware Division of Fish and Wildlife
CENAP-OP-R-2017-661-23

ISSUING OFFICE:

Department of the Army
U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

PROJECT DESCRIPTION: To construct a public boating access facility on the Little River at Tax Map Parcel 2-00-07800-01-0800-00001, in the Town of Little Creek, Kent County, Delaware.

All work is to be completed in accordance with the attached plans E-1 through E-12.

PROJECT LOCATION: On the Little River at Tax Map Parcel 2-00-07800-01-0800-00001, in the Town of Little Creek, Kent County, Delaware.

PERMIT CONDITIONS:

General Conditions:

1. The time limit for completing the work authorized ends on 31 December 2021. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer,

you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. All work performed in association with the above noted project shall be conducted in accordance with the project plans identified as E-1 through E-12. The project plans illustrate a proposal to construct a public boating access facility on the Little River at Tax Map Parcel 2-00-07800-01-0800-00001, in the Town of Little Creek, Kent County, Delaware. The project involves the installation of three (3) docks/piers, a single concrete boat launching ramp, parking facilities, two concrete pad sites, and above ground fuel storage tank along the southern bank of the Little River (a tidal waterway) in Little Creek, Delaware. Currently there are no boat launching facilities located on the Little River. The proposed activity would provide recreational boating access to the Little River, recreational fishing access along Little River, and will serve public safety as a docking facility for fire and law-enforcement vessels. The stated purpose of the project is to provide public, recreational and emergency fire and law enforcement access to navigable waters for navigational purposes.

2. Construction activities shall not result in the permanent alteration of greater than 0.406 acre of waters of the United States.

3. Any deviation in construction methodology or project design from that shown on the above noted drawings must be approved by this office, in writing, prior to performance of the work. All modifications to the above noted project plans shall be approved, in writing, by this office. No work shall be performed prior to written approval of this office.

4. This office shall be notified at least 10 days prior to the commencement of authorized work by completing and signing the attached *Notification/ Certification of Work Commencement*

Form. This office shall also be notified within 10 days of the completion of the authorized work by completing and signing the attached *Notification/Certification of Work Completion/Compliance Form*. All notifications required by this condition shall be in writing and shall be transmitted to this office by registered mail. Oral notifications are not acceptable. Similar notification is required each time maintenance work is to be done under the terms of this Corps of Engineers permit.

5. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration. (This special condition is applicable to Corps of Engineers permits that provide authorization under Section 10 of the Rivers and Harbors Act of 1899.)

6. The Delmarva Power Company maintains two high voltage aerial transmission lines within the vicinity of the proposed work. The Division of Fish and Wildlife and its contractors shall contact Mr. Matt Savage, Supervisor Transmission Engineering at 302-454-4475 prior to conducting any work authorized by this permit in order to make certain that proper clearances are maintained from the aerial transmission lines at all times.

7. To minimize impacts to migrating anadromous fish, in-water work within the Little River shall not occur from March 1 to June 30 of any year.

8. The permittee shall conduct the wetland creation work illustrated on the wetland creation plans prepared by the Delaware Division of Fish and Wildlife, identified as Plans E-9 through E-12, attached to this permit. The wetland creation project shall conform to the wetland creation narrative prepared by the Delaware Division of Fish and Wildlife, entitled: Little Creek Boat Ramp Mitigation Plan. Pursuant to this special condition, the permittee shall create a minimum of 0.4456 acre of estuarine emergent wetlands within the wetland creation area.

9. Grading and planting of the wetland creation site shall be completed within one year of the date of issuance of this permit.

10. The permittee shall obtain the services of a qualified environmental scientist to monitor and report the success or failure of the wetland creation site for three consecutive growing seasons following planting. Monitoring field work shall occur at least once during the period March 1 through September 30 of each monitoring year.

11. The permittee shall submit to the Corps of Engineers one wetland creation monitoring report per growing season. Each monitoring report shall be received by the Corps of Engineers no later than December 31 each year of the monitoring period. Each monitoring report shall synthesize the data collected during the field work of the preceding season. Each monitoring report shall contain the following information: a comparison of surface-water and groundwater elevations to

soil surface elevations; percent survival of planted woody vegetation stock; and representative photographs of the mitigation site.

12. The wetland creation site shall achieve a minimum emergent plant coverage rate of 85% by the end of the third growing season following planting. Plant coverage data shall be collected using standard sampling procedures. Volunteer plants may be included in the determination of plant coverage provided the volunteer plants are wetland emergent and/or shrub species native to Delaware. The acceptance of volunteer species toward the fulfillment of the coverage requirement shall be entirely at the discretion of the Corps of Engineers.

13. For the purposes of this federal authorization, the success of the wetland creation site shall be determined solely by the Corps of Engineers, and shall be based on the permittee's demonstration that the wetland creation site meets the required plant coverage rate and has adequate wetland hydrology. Should the wetland creation site fail to meet the above noted criteria, the permittee shall complete all remediation measures deemed necessary by the Corps of Engineers to correct the failure. Remediation measures may include, but are not limited to, the following actions:

- re-excavation and/or regrading of all or portions of the site
- reseeding and/or replanting wetland vegetation
- implementation of vegetation control measures
- hydrologic modifications
- additional monitoring of the site.

FURTHER INFORMATION:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

x Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

x Section 404 of the Clean Water Act (33 U.S.C. 1344).

☐ Section 103 of the Marine Protection, Research and Sanctuaries Act.

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE) (DATE) 1/11/18

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(District Engineer) (DATE) January 30, 2018
Edward E. Bonner, Chief, Regulatory Branch

for Kristen N. Dahle
Lieutenant Colonel, Corps of Engineers
District Commander

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

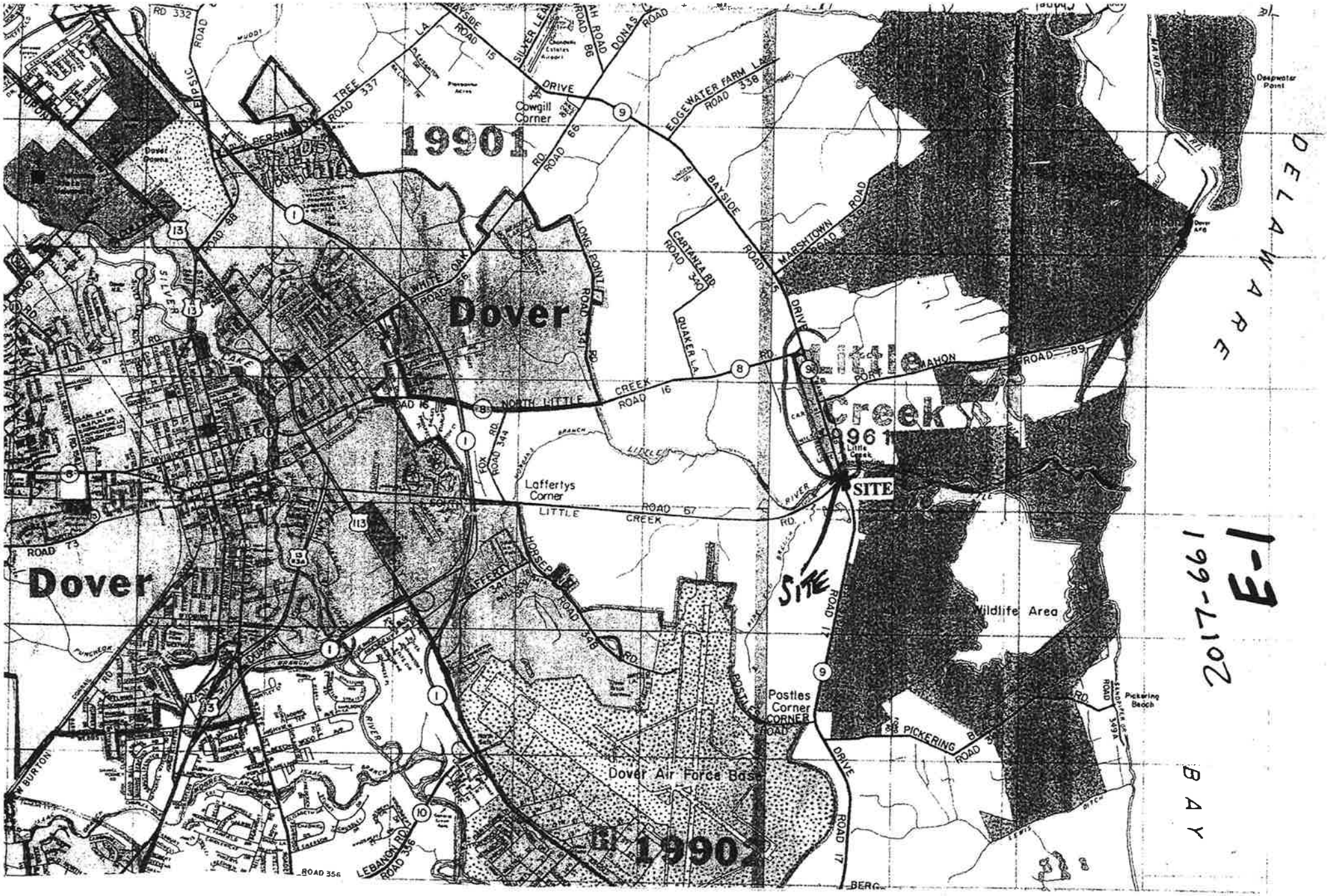
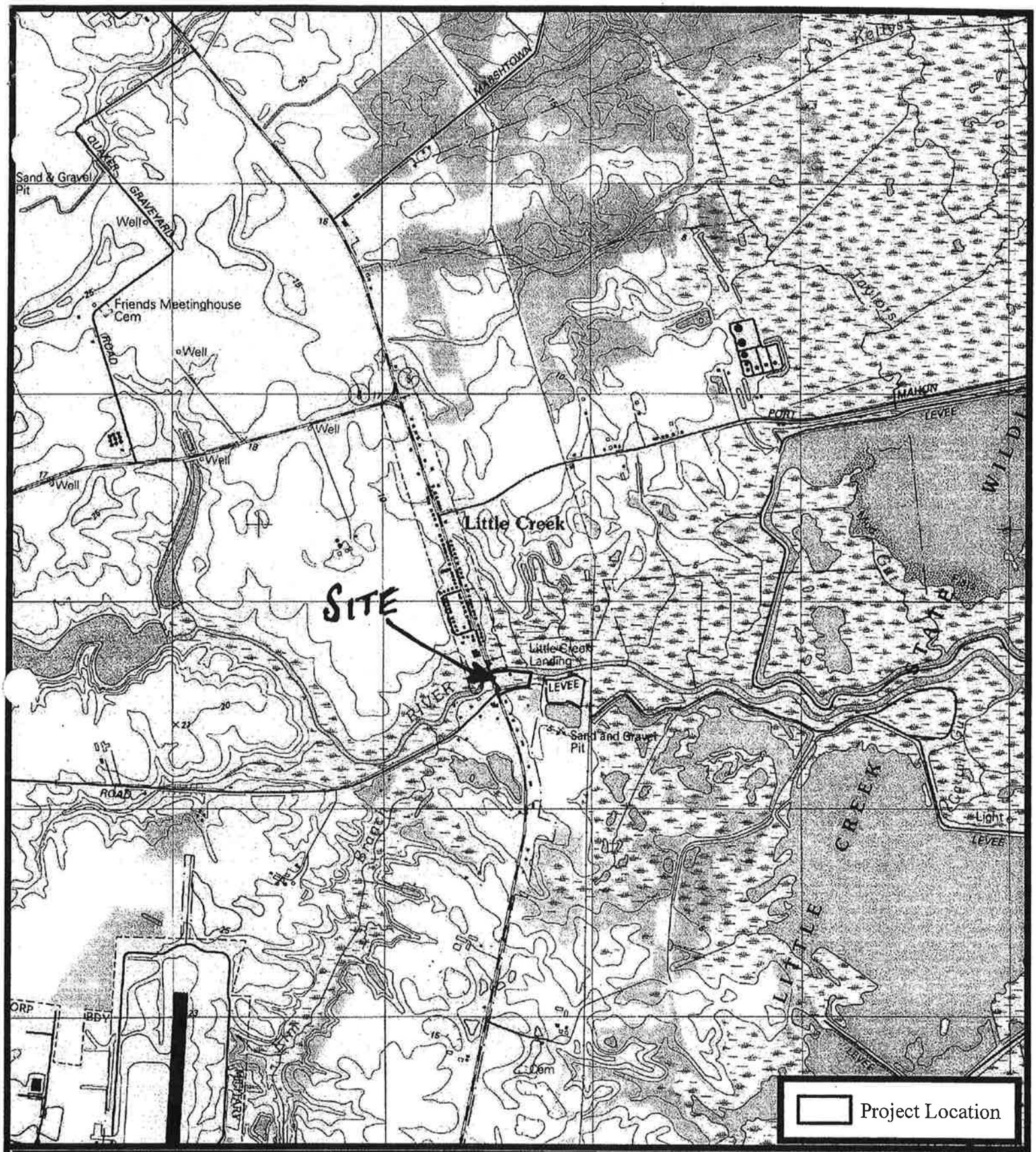


Figure 2. Map of Little Creek, Kent County, Delaware, showing site location, Bundek Property (2.7 acres), Little Creek Wildlife Area, Bayside Drive, Little Creek. Directions to site (From DNREC offices, Dover, DE): Route 8 (Division Street/North Little Creek Road) westbound to Route 9 (Bayside Drive); turn right (southbound) onto Route 9; [illegible] Little Creek.



CENTURY ENGINEERING
134 North DuPont Highway
Dover, DE 19901
P: 302.734.9188
F: 302.734.4589

2017-661
E-2

USGS TOPOGRAPHIC QUADRANGLE MAP

LITTLE CREEK BOAT RAMP

KENT COUNTY, DELAWARE

USGS Topo Quad: Little Creek (DE)
Latitude: 39° 09' 36"N
Longitude: 75° 26' 39"W
Approx. Project Area: 3.65 +/- acres
Elevation: ~0 - 5 feet
Scale: 1:24,000
Source: http://resources.arcgis.com/

2017-661

E-3

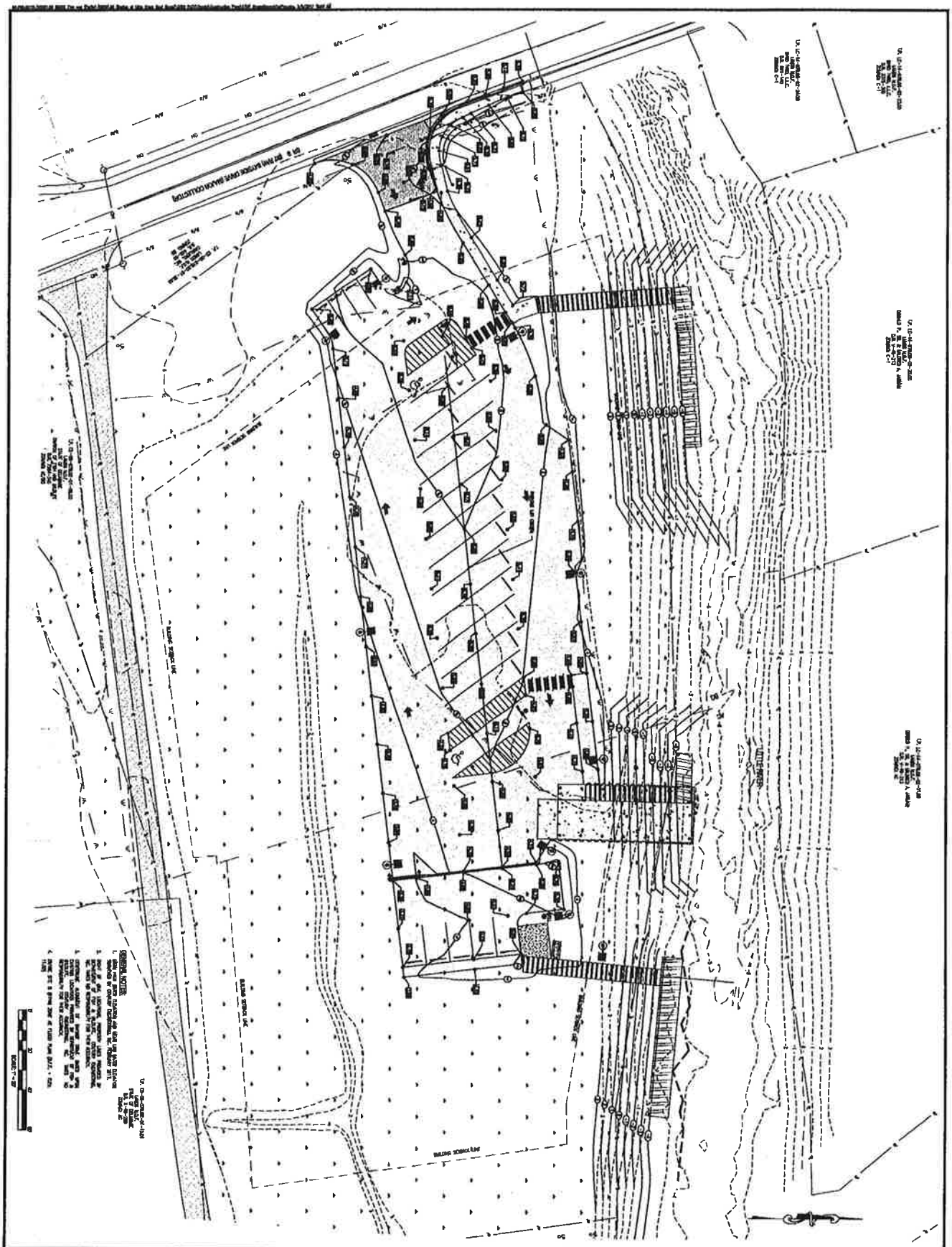
LITTLE CREEK BOATING ACCESS FACILITY

FEDERAL WETLANDS IMPACTS MAP

KENT COUNTY, DELAWARE

Project Manager: AH
Drawn: ZA
Job Number: 150703.01
Revisions: NONE

CENTURY ENGINEERING
4134 North DuPont Highway
Dover, DE 19901
P: 302.734.9188
F: 302.734.4589



CONSTRUCTION PLANS

FOR

DELAWARE DIVISION OF FISH & WILDLIFE

LITTLE CREEK BOAT RAMP

BAYSIDE DRIVE (SR9, K17), LITTLE CREEK, DELAWARE

LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

SITE GRADES AND GEOMETRICS PLAN

DIVISION OF FISH AND WILDLIFE BOX SUBMISSION

MAY 5, 2017

DJD

AES

1" = 20'

C104

E-4

CENTURY ENGINEERING

CONSULTING ENGINEERS ■ SURVEYORS

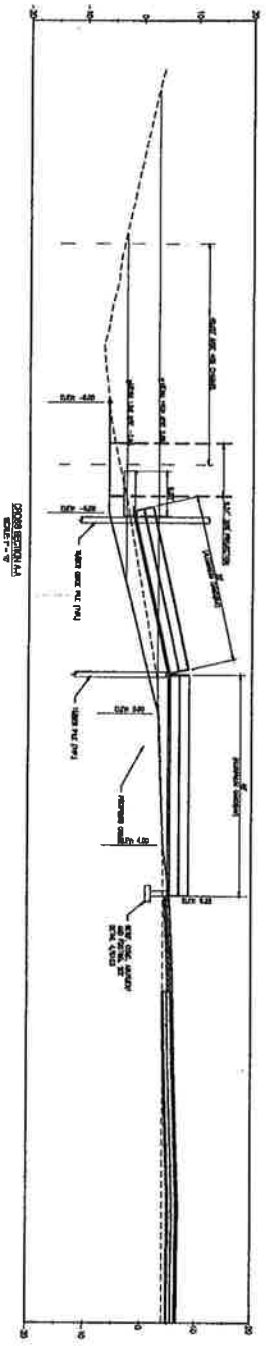
ADDRESS: 413A NORTH DUPONT HIGHWAY, DOVER, DE 19901

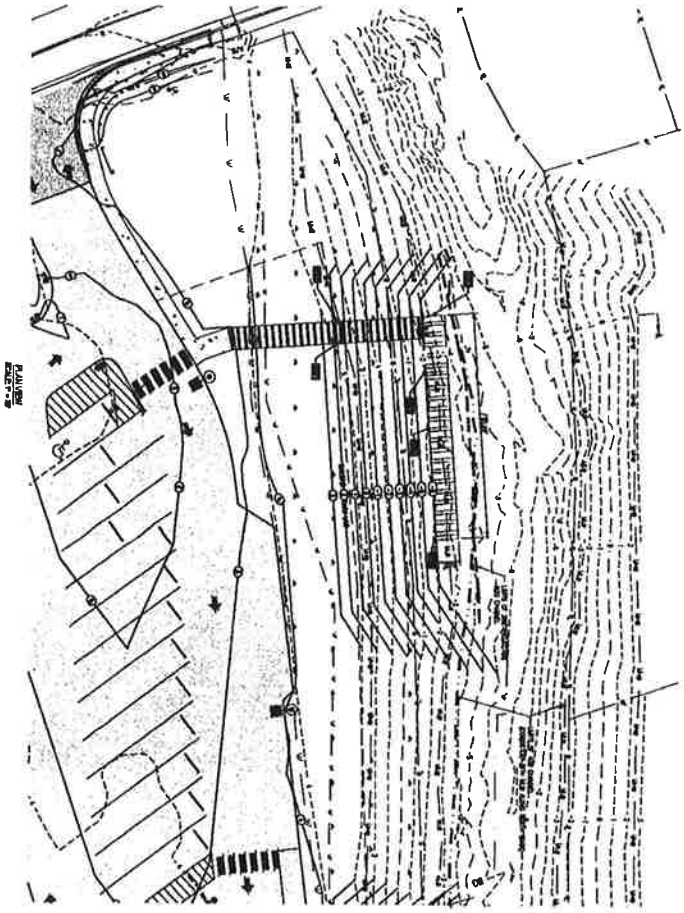
P: (302) 734-9188 F: (302) 734-9189

WEBSITE: www.centuryeng.com

EMAIL: eal@centuryeng.com

2017-661





2017-661

CONSTRUCTION PLANS

FOR

DELAWARE DIVISION OF FISH & WILDLIFE

LITTLE CREEK BOAT RAMP

BAYSIDE DRIVE (SR9, K17), LITTLE CREEK, DELAWARE

LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

E-5

CENTURY ENGINEERING

CONSULTING ENGINEERS ■ SURVEYORS

ADDRESS: 4134 NORTH DUPONT HIGHWAY DOVER, DE 19901 P: (302) 734-0188 F: (302) 734-1699

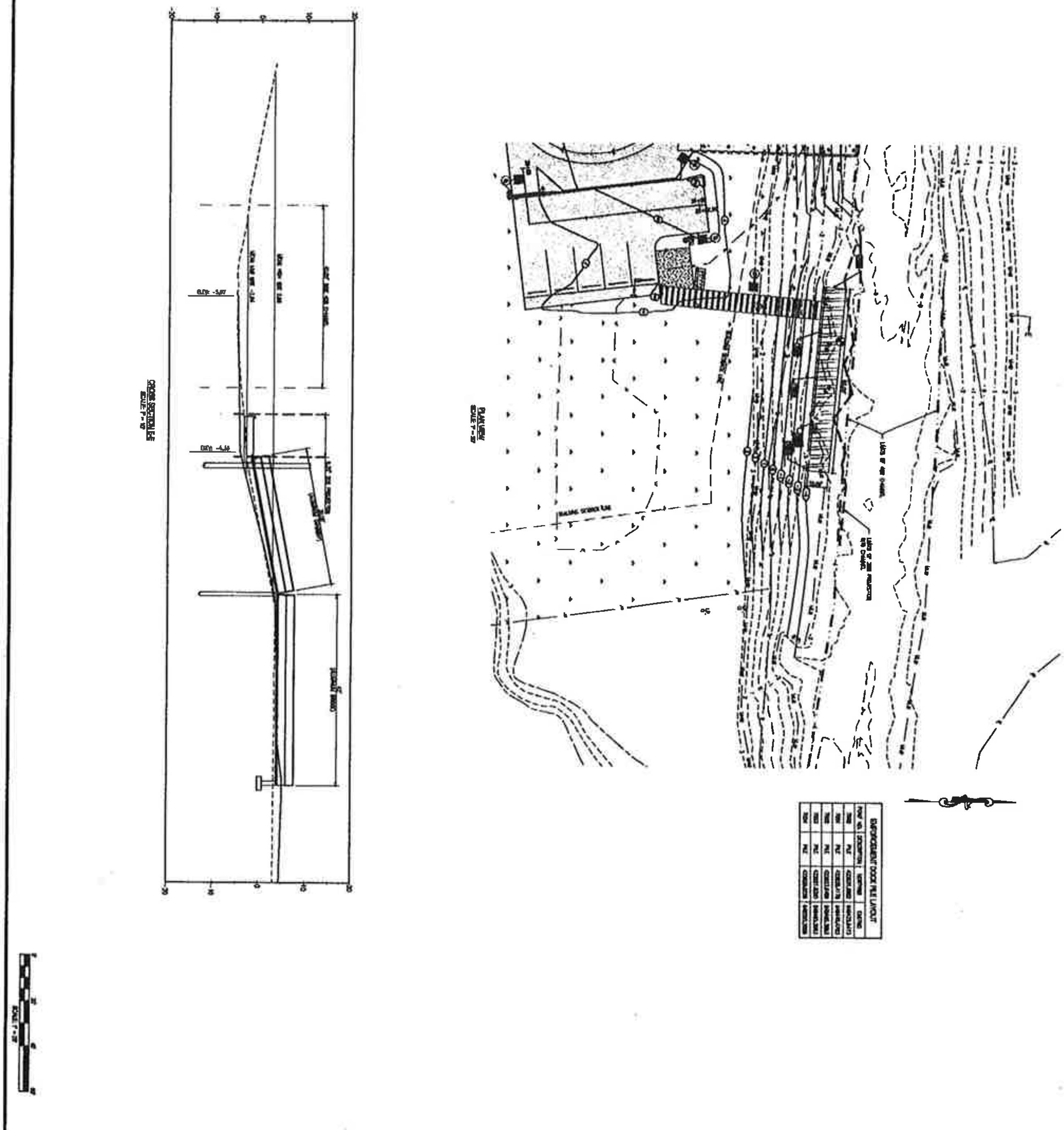
WEBSITE: www.centuryeng.com

EMAIL: cei@centuryeng.com

DIVISION OF FISH AND WILDLIFE 60% SUBMISSION

CROSS SECTION - FISHING PIER

S101



2017-661

CONSTRUCTION PLANS

FOR

DELAWARE DIVISION OF FISH & WILDLIFE

LITTLE CREEK BOAT RAMP

BAYSIDE DRIVE (SR9, K17), LITTLE CREEK, DELAWARE

LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

E-6

CENTURY ENGINEERING

CONSULTING ENGINEERS & SURVEYORS

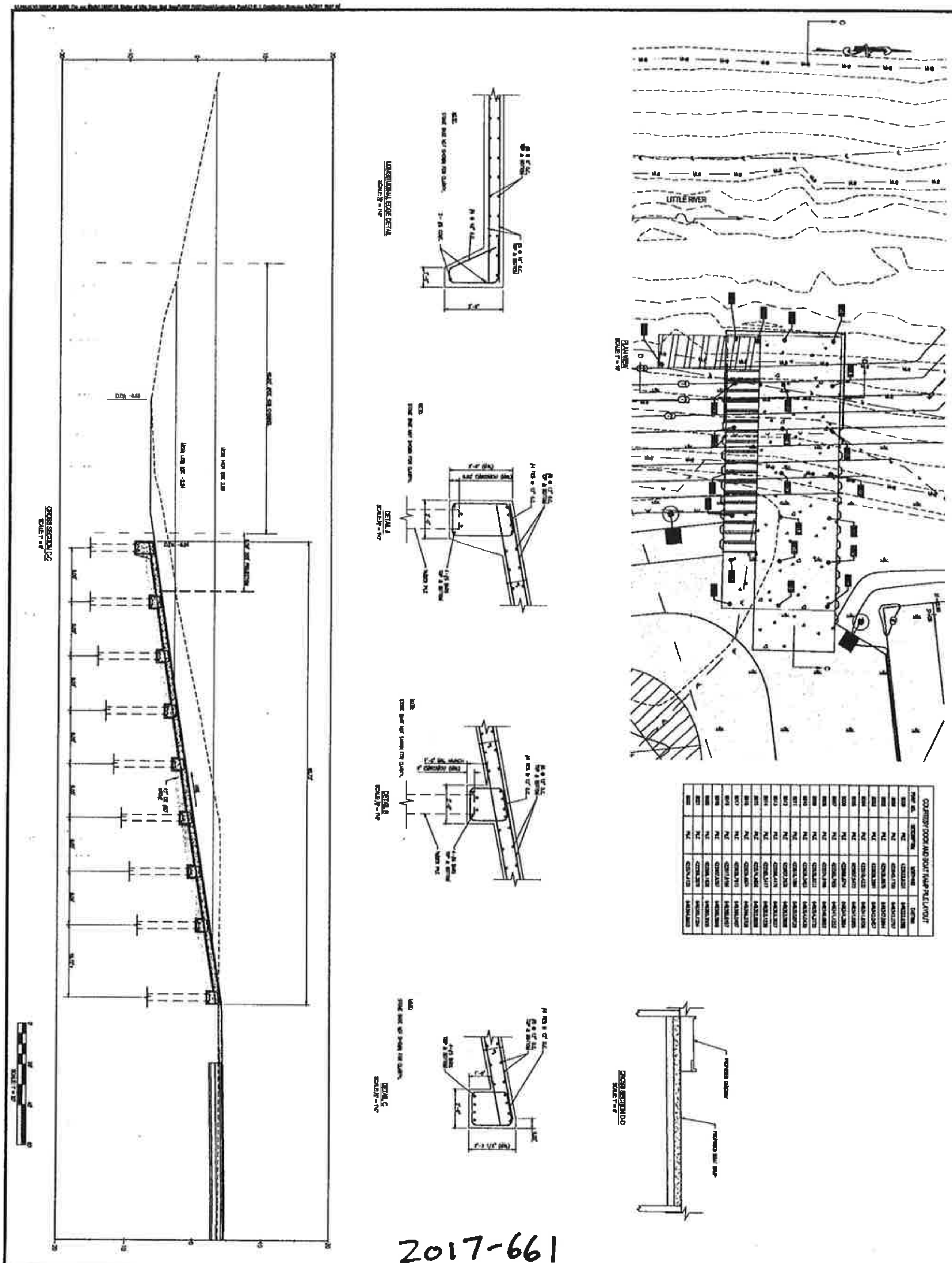
SHEET TITLE: CROSS SECTION - ENFORCEMENT DOCK

DIVISION OF FISH AND WILDLIFE 60% SUBMISSION

DLD | AES

AS NOTED

S102



2017-661

SHEET TITLE: CROSS SECTION - BOAT RAMP

DIVISION OF FISH AND WILDLIFE 60% SUBMISSION
MAY 5, 2017

DRAWN: DLD
CHECKED/DESIGNED: AES
SCALE: AS NOTED
PROJECT NO.: 15002.00
SHEET NO.: S104

PROJECT:

CONSTRUCTION PLANS

FOR

DELAWARE DIVISION OF FISH & WILDLIFE

LITTLE CREEK BOAT RAMP

BAYSIDE DRIVE (SR9, K17), LITTLE CREEK, DELAWARE

LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

E-1

CENTURY ENGINEERING
CONSULTING ENGINEERS & SURVEYORS

ADDRESS:
4134 NORTH DUPONT HIGHWAY
DOVER, DE 19901
P: (302) 734-9188 F: (302) 734-4589

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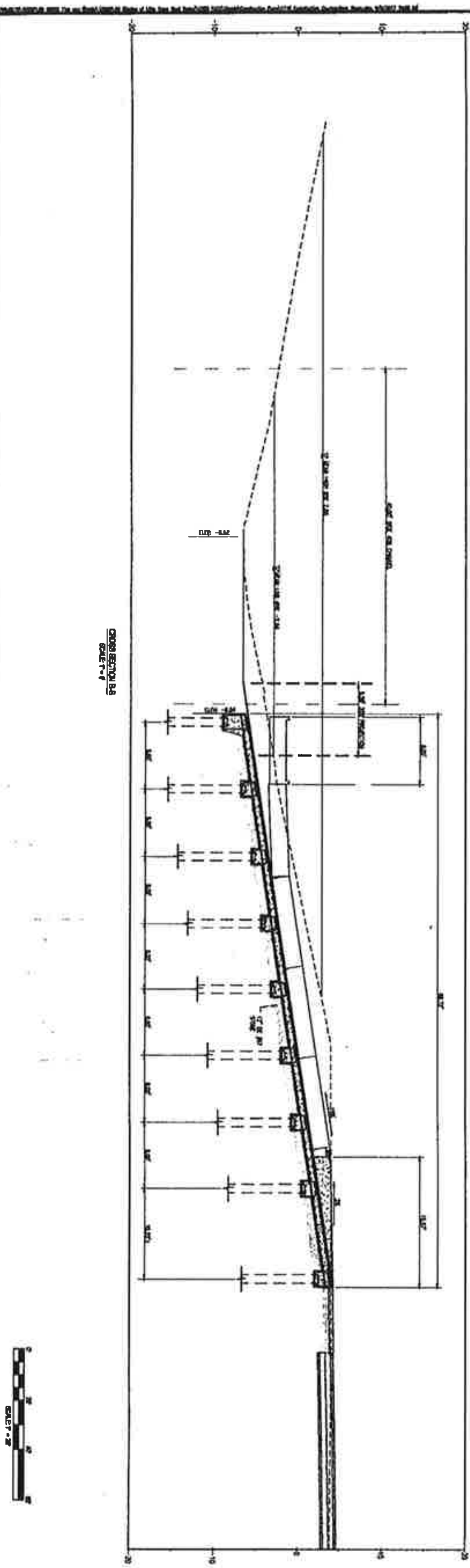
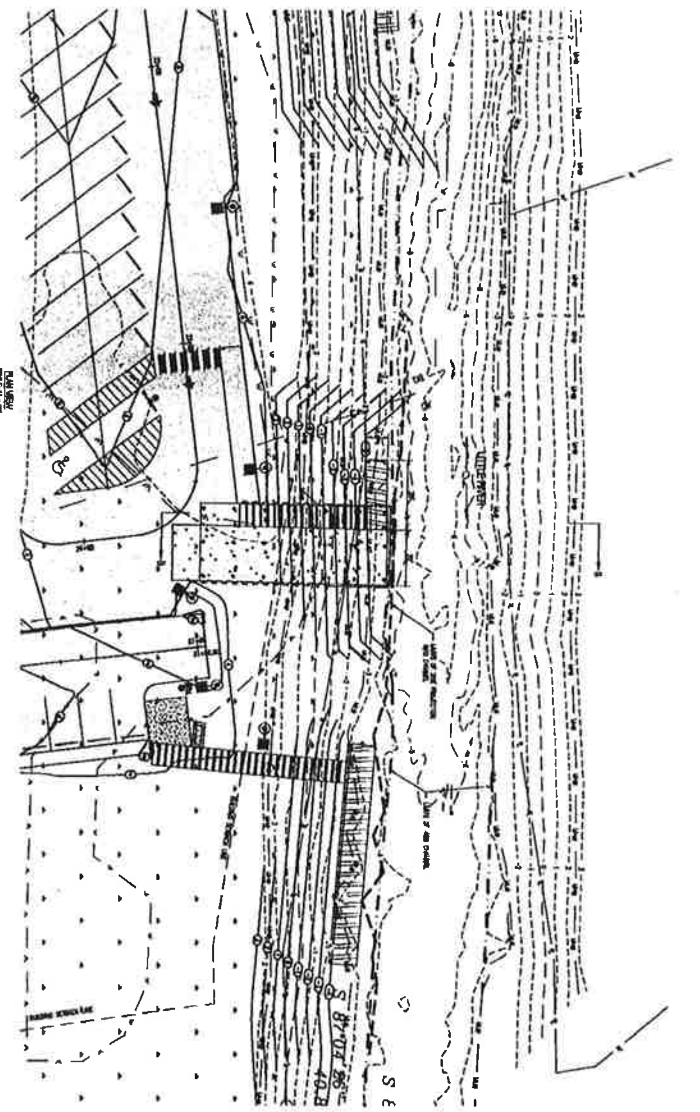




2017-661

CONSTRUCTION PLANS

FOR

DELAWARE DIVISION OF FISH & WILDLIFE

LITTLE CREEK BOAT RAMP

BAYSIDE DRIVE (SR9, K17), LITTLE CREEK, DELAWARE

LITTLE CREEK HUNDRED, KENT COUNTY, DELAWARE

SHEET TITLE: CROSS SECTION - COURTESY DOCK

DIVISION OF FISH AND WILDLIFE 60% SUBMISSION

MAY 5, 2017

DRAWN: DLD | CHECK/DESIGNER: AES

SCALE: AS NOTED | SHEET NO.: S105

PROJECT NO.: 153001.03

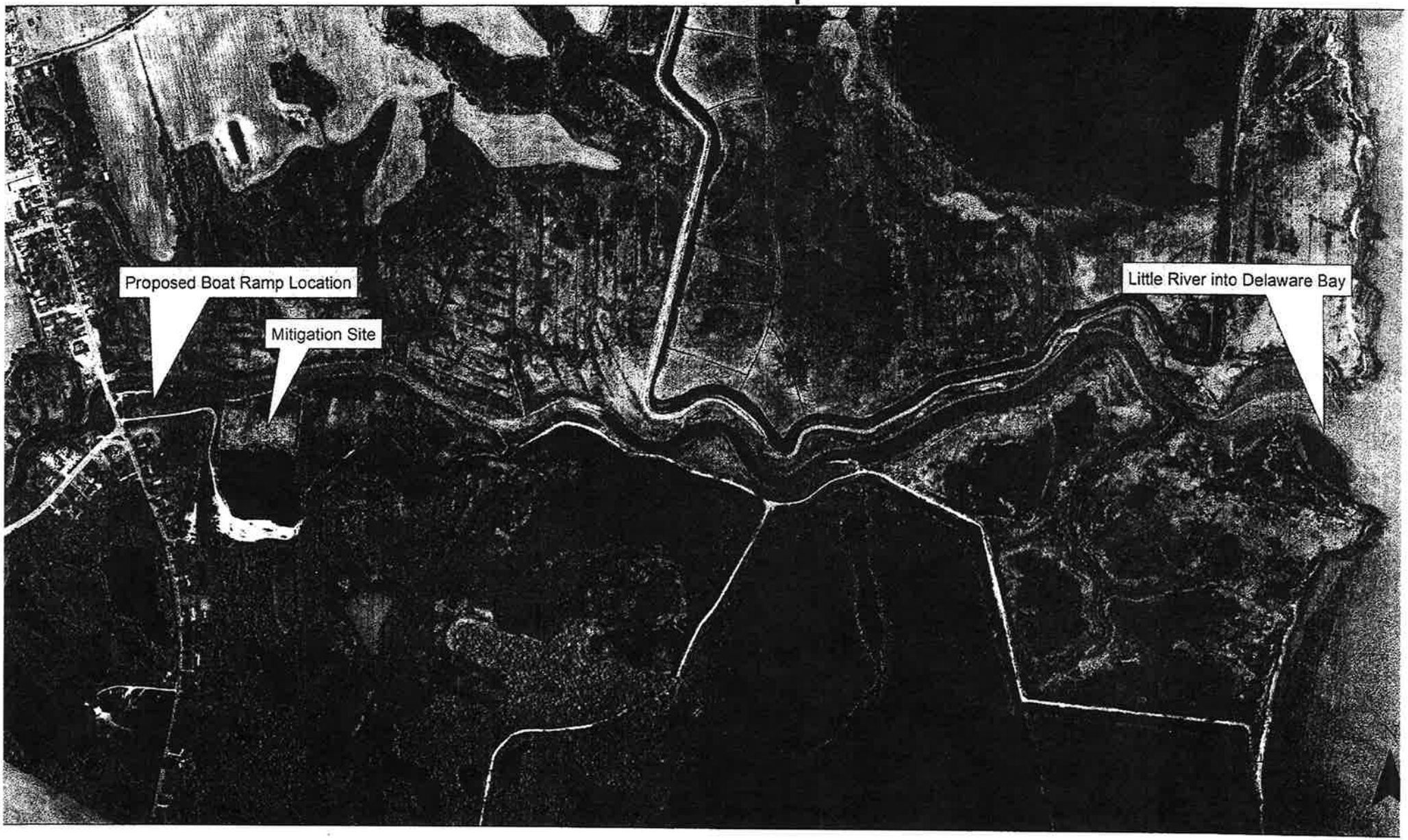
REVISIONS

E-8

CENTURY ENGINEERING
CONSULTING ENGINEERS ■ SURVEYORS
ADDRESS: 4134 NORTH DUPONT HIGHWAY, DOVER, DE 19901
P: (302) 734-9188 F: (302) 734-4569
WEBSITE: www.centuryeng.com
EMAIL: cei@centuryeng.com

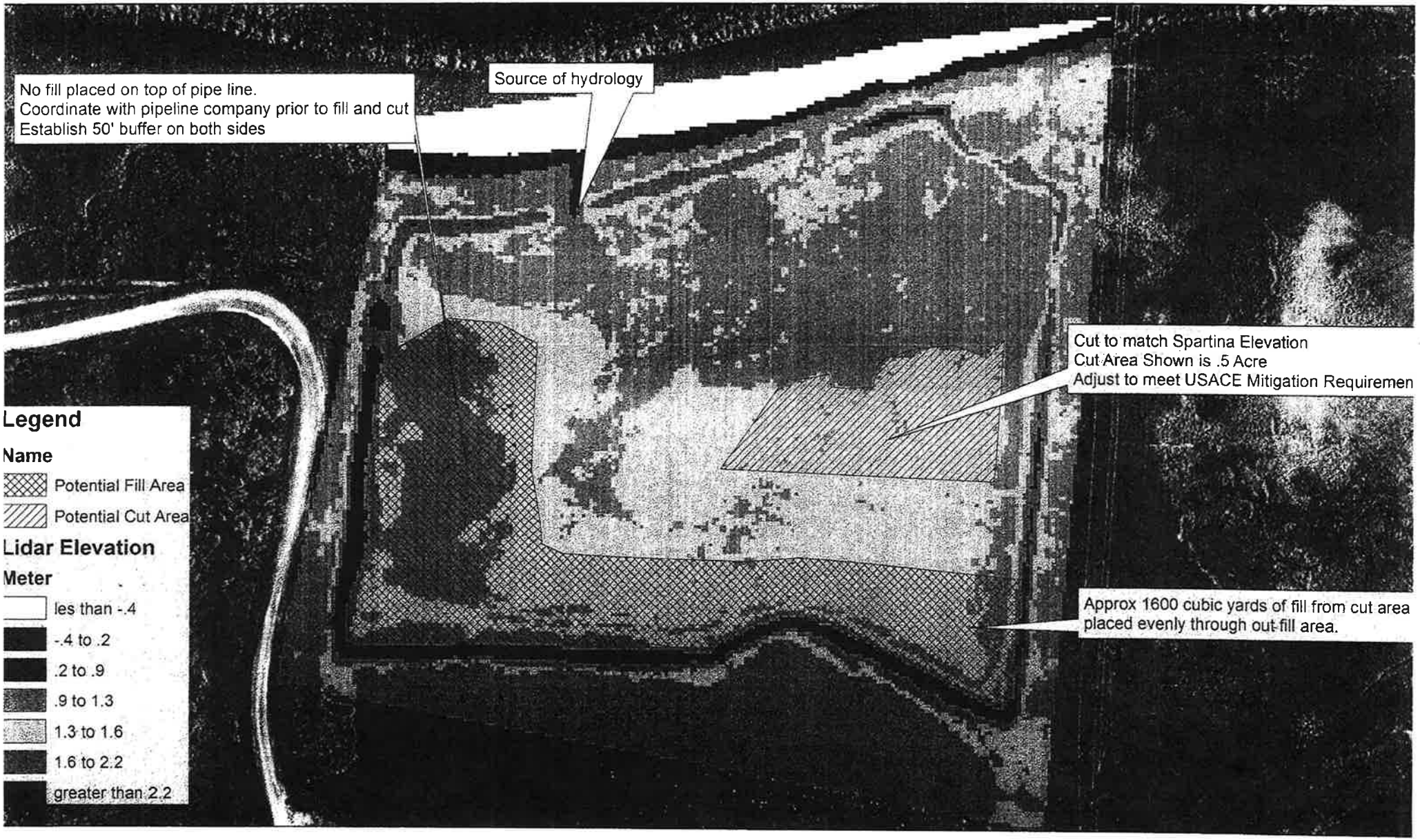
E-9
2017-661

Little Creek Boat Ramp Mitigation Plan
Location Map



2017-661
E-10

Little Creek Boat Ramp Mitigation
Construction Plan

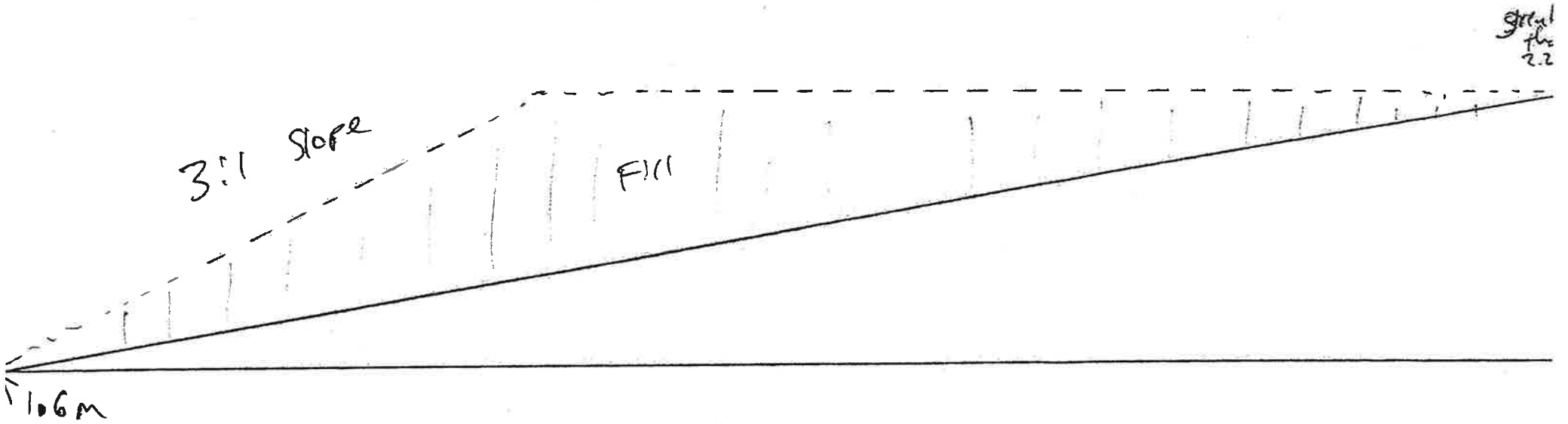


Cross-Sectional Fill Area

* Not To Scale

2017-99

E-11



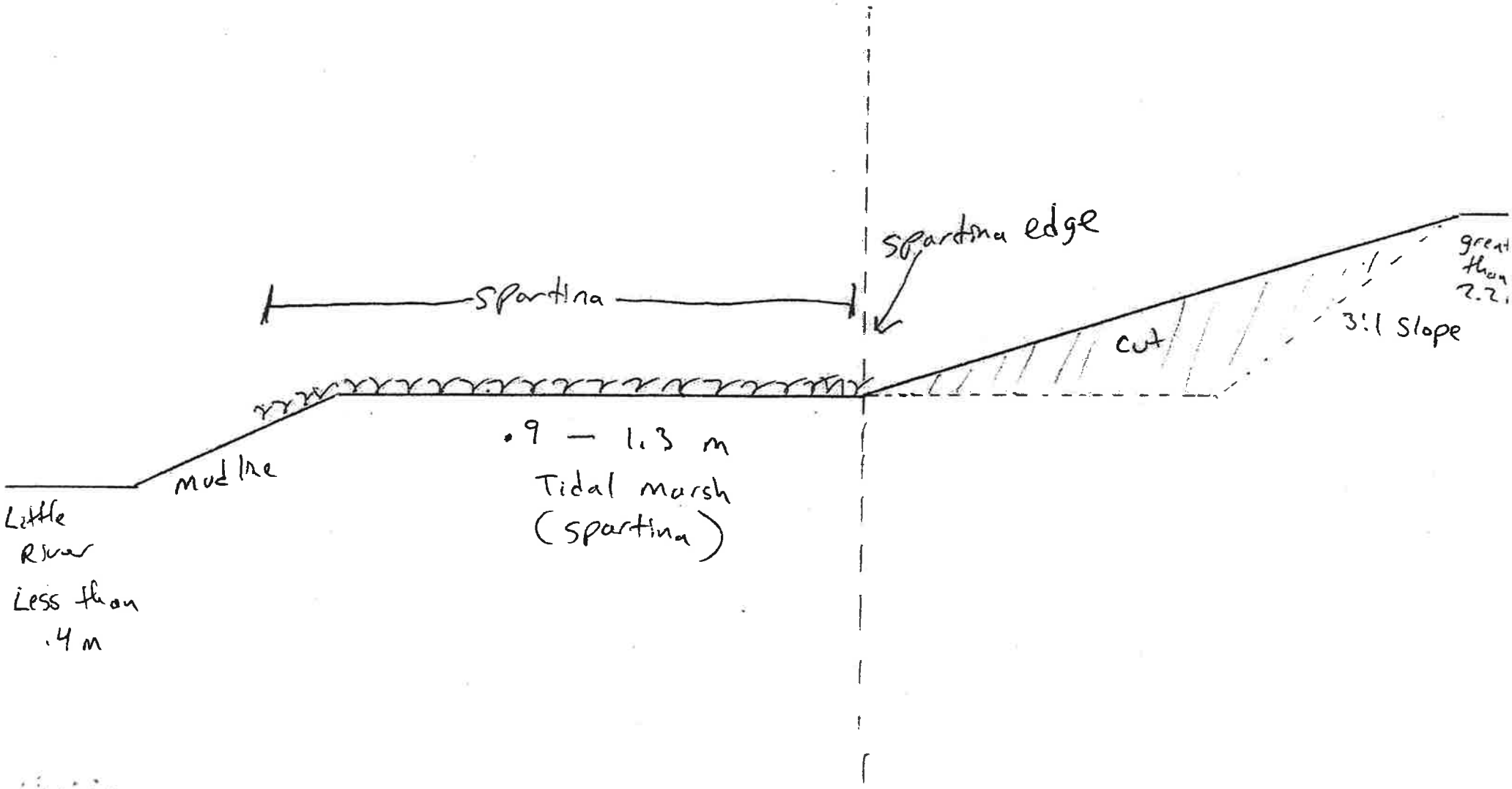
* spartina ends @ 1.3 so there is a .3m buffer

Cross Sectional Cut area

* Not to scale

2017-991

E-12



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

DNREC Divsion of Fish & Wildlife
Attention: John Clark
89 Kings Hwy
Dover, DE 19901
Tax Parcel: 2-00-07800-01-0800-00001
2-00-07900-01-0300-00001 (Disposal)

Subaqueous Lands Permit: SP-210/17
Wetlands Permit: WE-210/17
Water Quality Certification: WQ-210/17
Associated Permit(s): MP-210/17
Date of Issuance: 1/23/2018
Construction Expiration Date: 1/23/2021
Amended Date: N/A

SUBAQUEOUS LANDS PERMIT/WETLANDS PERMIT/
WATER QUALITY CERTIFICATION

GRANTED TO:

DNREC Divsion of Fish & Wildlife

TO CONSTRUCT THE LITTLE RIVER BOATING FACILITY:

This Subaqueous Permit, Wetlands Permit and Water Quality Certification (Permits/Certification) authorizes the construction of the Little River Boating Facility. The construction consist of a 8 by 40 foot long gangway, a 8 by 25 foot long courtesy dock, a 8 by 30 foot long gangway, a 10 by 80 foot long enforcement dock, a 8 by 30 foot long gangway, a 8 by 80 foot long fishing dock and a 28 foot wide by 31 foot long concrete boat ramp. Authorized activities include the following impacts to State and federally regulated wetlands and waters.

Subaqueous Lands/Water Impacts:

Permanent impacts in the Little River:

- To place 882.65 cubic yards of fill material consisting of pier pilings, installation of docks, piers, concrete boat ramp and surrounding sheet piling, in addition to grading around the docks and piers in 14,595.34 square feet of State and federally regulated waters.

Temporary impacts in the Little River:

- To temporarily install a coffer dam (sheetpile or sandbags) during the excavation.

Wetlands Impacts:

Permanent impacts to wetlands adjacent to the Little River, including:

- To impact 5,314.62 square feet (.122007 acres) of state regulated tidal wetlands
- To impact 17,697.60 square feet (.406281) of federally regulated wetlands

Temporary impacts to wetlands adjacent to the Little River, including:

- To temporarily impact 10,022.33 square feet of federal regulated wetlands
- To temporarily impact 6,247.33 square feet of state regulated tidal wetlands.

TO CONDCUT THE FOLLOWING ACTIVITIES:

- To mechanically excavate 882.25 cubic yards of material below the MHW line in the Little River, Kent County, DE.
- To dewater excavated material on site prior to hauling away

TO DISPOSE OF THE EXCAVATED MATERIAL:

- Via dump truck to an existing state-owned dredge spoil disposal location located 1,200 feet east of the intersection of South Little Creek Road and State Route 9 within the Little Creek Wildlife Management Area (Tax Parcel #: 2-00-07900-01-0300-00001)

LOCATED ON STATE AND FEDERALLY REGULATED WATERS AND WETLANDS:

In the Little River
Within the Little Creek Wildlife Management Area
Along Bayside Drive (State Route 9)
Kent County, Delaware

Pursuant to the provisions of 7 Del. C. 7205, the Department's Regulations Governing the Use of Subaqueous Lands, 7 Del. C., 6604, the Department's Wetlands Regulations.7 Del. C., Section 6003, the Department's Regulations Governing the Control of Water Pollution, the Department's "Surface Water Quality Standards" and Section 401 of the Clean Water Act, permission is hereby granted on this 23rd day of January A.D. 2018 to construct the above referenced project in accordance with the approved plans (15 sheets), as approved on January 18, 2018; and application dated May 15, 2017, and received by this Division on May 22, 2017, and with supplemental information received on June 14, 2017 and December 19, 2017.

WHEREAS, DNREC Divsion of Fish & Wildlife, owner of certain adjoining lands to the Little River, has applied for permission to install the indicated structures for public use; and;

WHEREAS, pursuant to the provisions of 7 Del. C., §7203, 7 Del. C., §6604, Section 401 of the Clean Water Act, and 7 Del. C., Chapter 60 the Secretary of the Department of Natural Resources and Environmental Control through his duly authorized representative finds that it is not contrary to the public interest if this project is approved subject to the terms and conditions herein set forth.

NOW THEREFORE, this Permit/Certification is issued subject to the attached Subaqueous Lands, Wetlands Permit, and Water Quality General Conditions and the following special conditions:

SPECIAL CONDITIONS

1. This approval is in accordance with the plans and application submitted to the Department of Natural Resources and Environmental Control, a copy of which is attached hereto and made a part hereof.
2. The permittee is responsible to ensure that all workers are informed of the provisions of the Permits/Certification. All workers shall be trained in the proper avoidance of protected environmental resources and be made aware of the limits of construction in environmentally protected areas.
3. The Permits/Certification addresses impacts to State and federally regulated wetlands and waters. Construction access into wetlands and waters is strictly prohibited unless authorized by the approved plans.
4. The Wetlands and Subaqueous Lands Section shall be notified prior to the commencement of the excavation.
5. The Wetlands and Subaqueous Lands Section shall be notified and approve any disposal locations, not specified by this permit.
6. Dredging shall be conducted in a manner so as to minimize turbidity in the water column.
7. To avoid impacts to marsh nesting birds, no activities shall take place from April 1st through July 31st. If the marsh nesting bird time of year restriction cannot be met, work should begin prior to April 1st to ensure that construction activities effectively deters marsh nesting birds from nesting on site at all, or any birds that do attempt to nest are already acclimated to construction disturbance.
8. The Little River is a migratory corridor for diadromous species. To minimize impacts to migrating diadromous fish, in-water work within the Little River shall not occur from March 1 to June 30 of any year.
9. Temporary impacts in wetlands and waters shall be performed in a manner that minimizes the impact on these natural resources. All temporarily impacted waters and wetlands shall be returned to pre-construction or improved conditions, as practicable. If there is a discharge of spoils into the Little River, the permittee shall contact the Wetlands and Subaqueous Lands Section (302) 739-9943 and the DNREC Enforcement Section (800) 662-8802 within 24 hours of the event.
10. Permanent impacts to wetlands and waters shall be performed in a manner that minimizes impacts to the greatest extent possible.
11. No unauthorized impacts in wetlands or waters shall occur.
12. Construction shall be performed so that the associated debris is contained and disposed of properly. If any debris is discharged into the wetlands and the Little River or adjacent lands, it shall be collected, contained and disposed of properly.

13. Upon project completion, no construction materials or debris shall be left on-site.

14. No stockpiling of materials or construction equipment in State and federally regulated wetlands or waters is authorized by this Permits/Certification.

15. Mitigation Requirements:

    a. Mitigation for the loss of federal and State wetlands, which overlap at locations in the field, shall be offset by the enhancement of 0.4456 acres of wetlands at the Little Creek Wildlife Management Area in Little Creek, Delaware. The 0.4456 acre mitigation site shall be solely devoted to mitigation for the Little River boat launch facility.

    b. The mitigation site shall be graded to achieve a tidal channel and a restored marsh plain with twice daily flooding across the restored marsh plain. The design shall be intended to enhance the marsh, improve drainage, increase native wetland vegetation, and to prevent the growth of *Phragmites australis*.

    c. The mitigation shall be constructed in accordance with the approved plans. All temporarily disturbed wetlands shall be restored to previous conditions or to lower elevations that enhance the tidal waters.

    d. Monitoring shall occur annually for a period of at least three (3) years. A monitoring report shall be submitted to the Wetlands and Subaqueous Lands Section annually after the first growing season. The mitigation planting plan will initially rely on the seeding of native plants by the surrounding seed banks. If the vegetation is not at or near 85% of coverage within 3 years of native emergent wetland plants shall be seeded or planted. The planting shall occur either during the following fall or spring season.

16. All fill materials associated with the proposed project shall be clean and free from oils, grease, asphalt and other contaminants.

17. The permittee shall employ measures during construction to prevent spills of fuels or lubricants. In the event of a spill, efforts shall be taken to prevent its entry into wetlands and aquatic areas. Any spills entering wetlands and aquatic areas shall be removed immediately. This office shall be notified of any spill(s) within six hours of occurrence. This office will determine the effectiveness of spill and contamination removal and specify remediation as necessary.

18. All equipment and machinery utilized in construction shall arrive on-site in a clean condition and shall be maintained free of fluid leaks. An emergency spill kit shall be available on-site to handle any fluid leaks or spills from machinery.

19. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook, so as to minimize entry and dispersal of sediment and other contaminants in surface waters.

20. The on-site disposal area shall have silt fence properly installed so as to contain the excavated material and prevent its entrance into any surface water. The excavated area shall be inspected prior to use and regularly during disposal operations. The silt fence shall be maintained so that dredged material is safely contained at all times. The WSLS shall be notified of any changes in the location of the disposal area prior to the commencement of excavating operations.
21. The disposal area shall be managed such that a minimum freeboard of two (2) feet, measured vertically between the retained materials and water and the top of the adjacent confining embankment, shall be maintained at all times.
22. After dewatering, the excavated material shall be placed in dump trucks and transported to an existing state-owned spoil disposal location located 1,200 feet east of the intersection of South Little Creek Road and State Route 9 within the Little Creek Wildlife Management Area (Tax Parcel #: 2-00-07900-01-0300-00001)
23. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
24. The work authorized by this permit is subject to the terms and conditions of the appropriate Department of the Army Individual Permit-CENAP-OP-R-2017-661-23.

IN WITNESS WHEREOF, I, Steven M. Smailer, the duly authorized representative of Shawn M. Garvin, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 23rd day of January, 2018.

By Steven M. Smailer, Environmental Program Administrator
the duly authorized representative of the Secretary of the
Department of Natural Resources and Environmental Control

Matthew Jones, Environmental Scientist
Wetlands and Subaqueous Lands Section

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

SUBAQUEOUS LANDS PERMIT
CONTRACTOR'S COMPLETION REPORT
POST-CONSTRUCTION

Subaqueous Lands Permit Number: SP-210/17, WE-210/17, WQ-210/17

Name: DNREC Divsion of Fish & Wildlife

Address: 89 Kings Hwy
Dover, DE 19901
Parcel #: 2-00-07800-01-0800-00001
2-00-07900-01-0300-00001 (Disposal)

I hereby certify that I have constructed the project authorized by the above-referenced Subaqueous Lands Permit in accordance with the approved plans for the project.

_____ _____
Printed Name of Contractor **Name of Company**

_____ _____
Contractor's Signature **Date**

_____
Telephone Number

Upon completion of construction, this form shall be completed, signed by the contractor, and mailed to the Wetlands and Subaqueous Lands Section at:

DNREC
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901

Or faxed to the Wetlands and Subaqueous Lands Section at: **302-739-6304**

This form must be received by the Department within ten days of the date that construction is completed.

For official use only

*Compliance inspection date*_____ *Built in accordance with plans* ☐ *Yes* ☐ *No*

Scientist: _____

Delaware's good nature depends on you!

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

GENERAL CONDITIONS

1. The permittee and contractor shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.
2. The activities authorized herein shall be undertaken in accordance with the Permit conditions, the final stamped and approved plans, and with the information provided in the Permit application.
3. A copy of this Permit and the stamped approved plans shall be available on-site during all phases of construction activity.
4. The conditions contained herein shall be incorporated into any and all construction contracts associated with the construction authorized herein. The permittee and contractor are responsible to ensure that the workers executing the activities authorized by this Permit have full knowledge of, and abide by, the terms and conditions of this Permit.
5. No portion of the structure shall be constructed using creosote treated lumber.
6. No portion of the structure(s) authorized by this Permit shall exceed the dimensions for that structure identified on Page One of this Permit.
7. The activities authorized herein shall be conducted so as not to violate the State of Delaware's Surface Water Quality Standards in effect at the date of Permit authorization.
8. The issuance of this Permit does not constitute approval for any activities that may be required by any other local, state or federal government agency.
9. The issuance of this Permit does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.
10. This Permit authorizes only the activities described herein. Modifications to the project may require a supplemental approval from this office prior to the initiation of construction. A determination of the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes. Failure to contact the Department prior to executing changes to the project shall constitute reason for this Permit being revoked.
11. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
12. The permittee shall protect and hold the State of Delaware harmless from any loss, cost or damage resulting from the activities authorized herein.
13. Representatives of the Department of Natural Resources and Environmental Control shall be allowed to access the property to inspect all work during any phase of the construction and may conduct pre and post-construction inspections, collect any samples or conduct any tests that are deemed necessary.
14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

GENERAL CONDITIONS

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2. The activities authorized herein shall be undertaken in accordance with the permit conditions, the final stamped and approved plans, and with the information provided in the permit application.
3. A copy of this Permit and the stamped approved plans shall be available on-site during all phases of construction activity.
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6. No portion of the structure(s) authorized by this Permit shall exceed the width dimension for that structure identified on Page One of this Permit.
7. The activities authorized herein shall be conducted so as not to violate the State of Delaware's Surface Water Quality Standards in effect at the date of Permit authorization.
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11. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
12. The permittee will protect and hold the State of Delaware harmless from any loss, cost or damage resulting from the construction or use of said structures.
13. Representatives of the Department of Natural Resources and Environmental Control shall be allowed to access the property to inspect all work during any phases of the construction and may conduct post-construction compliance inspections, collect any samples or conduct any tests that are deemed necessary.
14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

GENERAL CONDITIONS

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2. The activities authorized herein shall be undertaken in accordance with the all conditions, the final stamped and approved plans, and with the information provided in the application.
3. A copy of this Certification and the stamped approved plans shall be available on-site during all phases of construction activity.
4. The conditions contained herein shall be incorporated into any and all construction contracts associated with the construction authorized herein. The permittee and contractor are responsible to ensure that the workers executing the activities authorized by this Certification have full knowledge of, and abide by, the terms and conditions of this Certification.
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14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

WETLANDS AND SUBAQUEOUS LANDS SECTION

PERMIT NO.: SP-210/17, WE-210/17, WQ-210/17 **CONSTRUCTION EXPIRATION DATE:** 1/23/2021

TO CONSTRUCT THE LITTLE RIVER BOATING FACILITY:

This Subaqueous Permit, Wetlands Permit and Water Quality Certification (Permits/Certification) authorizes the construction of the Little River Boating Facility. The construction consist of a 8 by 40 foot long gangway, a 8 by 25 foot long courtesy dock, a 8 by 30 foot long gangway, a 10 by 80 foot long enforcement dock, a 8 by 30 foot long gangway, a 8 by 80 foot long fishing dock and a 28 foot wide by 31 foot long concrete boat ramp. Authorized activities include the following impacts to State and federally regulated wetlands and waters.

SUBAQUEOUS LANDS/WATER IMPACTS:

PERMANENT IMPACTS IN THE LITTLE RIVER:

- TO PLACE 882.65 CUBIC YARDS OF FILL MATERIAL CONSISTING OF PIER PILINGS, INSTALLATION OF DOCKS, PIERS, CONCRETE BOAT RAMP AND SURROUNDING SHEET PILING, IN ADDITION TO GRADING AROUND THE DOCKS AND PIERS IN 14,595.34 SQUARE FEET OF STATE AND FEDERALLY REGULATED WATERS.

TEMPORARY IMPACTS IN THE LITTLE RIVER:

- TO TEMPORARILY INSTALL A COFFER DAM (SHEETPILE OR SANDBAGS) DURING THE EXCAVATION.

DISPLAY THIS CERTIFICATE IN A HIGHLY VISIBLE LOCATION ON THE JOB SITE.

Authorized by:

WETLANDS IMPACTS:

PERMANENT IMPACTS TO WETLANDS ADJACENT TO THE LITTLE RIVER, INCLUDING:

- TO IMPACT 5,314.62 SQUARE FEET (.122007 ACRES) OF STATE REGULATED TIDAL WETLANDS.
- TO IMPACT 17,697.60 SQUARE FEET (.406281) OF FEDERALLY REGULATED WETLANDS.

TEMPORARY IMPACTS TO WETLANDS ADJACENT TO THE LITTLE RIVER, INCLUDING:

- TO TEMPORARILY IMPACT 10,022.33 SQUARE FEET OF FEDERAL REGULATED WETLANDS
- TO TEMPORARILY IMPACT 6,247.33 SQUARE FEET OF STATE REGULATED TIDAL WETLANDS.

TO CONDCUT THE FOLLOWING ACTIVITIES:

- TO MECHANICALLY EXCAVATE 882.25 CUBIC YARDS OF MATERIAL BELOW THE MHW LINE IN THE LITTLE RIVER, KENT COUNTY, DE.
- TO DEWATER EXCAVATED MATERIAL ON SITE PRIOR TO HAULING AWAY

TO DISPOSE OF THE EXCAVATED MATERIAL:

- VIA DUMP TRUCK TO AN EXISTING STATE-OWNED DREDGE SPOIL DISPOSAL LOCATION LOCATED 1,200 FEET EAST OF THE INTERSECTION OF SOUTH LITTLE CREEK ROAD AND STATE ROUTE 9 WITHIN THE LITTLE CREEK WILDLIFE MANAGEMENT AREA (TAX PARCEL #: 2-00-07900-01-0300-00001)

LOCATED ON STATE AND FEDERALLY REGULATED WATERS AND WETLANDS:

In the Little River
Within the Little Creek Wildlife Management Area
Along Bayside Drive (State Route 9)
Kent County, Delaware

ISSUED TO: DNREC Divsion Of Fish & Wildlife

LOCATION OF WORK: Same as above

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY

DELAWARE COASTAL MANAGEMENT PROGRAM

100 W. WATER STREET, SUITE 7B
DOVER, DELAWARE 19904

Phone: (302) 739- 9283
Fax: (302) 739-2048

July 3, 2017

TJ Austin
Century Engineering, Inc.
4134 N. DuPont Highway
Dover, DE 19901

RE: Delaware Coastal Management Federal Consistency Certification
Little Creek Boating Access Facility FC#2017.0075

Dear Mr. Austin,

The Delaware Coastal Management Program (DCMP) has received and reviewed the above referenced project for the Delaware Division of Fish and Wildlife's request to create a new public boating access area in Little Creek, Kent Co. (Map #2-00-07800-01-0800-00001). Work associated with this project includes the creation of a concrete boat launch with associated courtesy dock, a recreational fishing pier, a fire/enforcement boat docking facility, a paved parking area, and an above ground fuel storage tank.

Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP conditionally concurs with your consistency determination for the above referenced project. Our concurrence is based on the following conditions:

Policies 5.112.1 and 5.11.3.2 specific to fish and wildlife as well as nongame and endangered species:

- Little River supports habitat for anadromous fish species including blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), and white perch (*Morone americana*). Alewife and blueback herring, often collectively referred to as 'river herring', are listed by the National Marine Fisheries Service as a Species of Concern. These species are also important to both commercial and recreational fisheries and form an important forage base for other animal species. Additionally, Little River is used by large numbers of American eel (*Anguilla rostrate*). In order to protect these important species, **in-water work shall be conducted outside of the March 1 to June 30 time of year restriction**.
- Marsh nesting birds such as clapper rail (*Rallus crepitans*), seaside sparrow (*Ammodramus maritimus*), and American black duck (*Anas rubripes*) have been documented nesting near this site. These species likely nest in the marsh area within the project parcel. Based on the occurrence of these species on or near the project area and to reduce significant adverse impacts to their breeding periods, all work in wetlands shall be conducted outside of the **April 1 to July 31 time of year restriction.**

Failure to comply with the conditions above will result in this conditional concurrence henceforth being considered an objection. Under this scenario, the applicant is advised that pursuant to 15 CFR part 930, subpart H, and within 30 days from receipt of this letter, you may request that the Secretary of Commerce override the objection. In order to grant an override request, the Secretary must find that the activity is consistent with the objectives or purposes of the Coastal Management Act, or is necessary in the interest of national security. A copy of the request and supporting information must be sent to the Delaware Coastal Management Program and the federal permitting or licensing agency. The Secretary may collect fees for administering and processing your request.

If you have any questions or would like to discuss the conditions or comments included in this letter, please contact me or Molly Ellwood of my staff at (302) 739-9283.

Sincerely,

Kimberly B. Cole, Administrator
Delaware Coastal Management Program

KC/mme
cc: File 2017.0075
John Clark, DFW
Kate Fleming, DFW
Matt Jones, WSLS
John Brundage, USACE

NOTIFICATION/CERTIFICATION OF WORK COMMENCEMENT FORM

Permit Number: CENAP-OP-R-2017-661-23 (IP)
State Permit #:
Name of Permittee: DDNREC, Fish and Wildlife
Project Name: Little Creek Boat Ramp
Waterway: Little River
County: Kent State: Delaware
Compensation/Mitigation Work Required: Yes X No ☐

TO: U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

I have received authorization to construct a public boating access facility on the Little River at Tax Map Parcel 2-00-07800-01-0800-00001, in the Town of Little Creek, Kent County, Delaware.

The work will be performed by:

Name of Person or Firm_____

Address: _____

_____

I hereby certify that I have reviewed the approved plans, have read the terms and conditions of the above referenced permit, and shall perform the authorized work in strict accordance with the permit document. The authorized work will begin on or about _____ and should be completed on or about _____.

Please note that the permitted activity is subject to compliance inspections by the Army Corps of Engineers. If you fail to return this notification form or fail to comply with the terms or conditions of the permit, you are subject to permit suspension, modification, revocation, and/or penalties.

_____ _____
Permittee (Signature and Date) Telephone Number

_____ _____
Contractor (Signature and Date) Telephone Number

NOTE: This form shall be completed/signed and returned to the Philadelphia District Office a minimum of 10 days prior to commencing work.

Enclosure 3

NOTIFICATION/CERTIFICATION OF WORK COMPLETION/COMPLIANCE FORM

Permit Number:	CENAP-OP-R-2017-661-23 (IP)
Name of Permittee:	DDREC Fish and Wildlife
Name of Contractor:	
Project Name:	Little Creek Boat Ramp
County:	Kent
State:	Delaware
Waterway	Little River

Within 10 days of completion of the activity authorized by this permit, please sign this certification and return it to the following address:

Department of the Army
U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

Please note that the permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to return this notification form or fail to perform work in compliance with the permit, you are subject to administrative, civil and/or criminal penalties. Further, the subject permit may be suspended or revoked.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the above noted permit.

The authorized work was commenced on _____.

The authorized work was completed on _____.

Dredging authorized: Yes ☐ No ☐ If yes, see ***NOTE*** below.

The volume of dredged material was_____ cubic yards.

The dredged material was placed at_____.

_____ _____
Signature of Contractor Signature of Permittee

Address: _____ Address: _____

_____ _____

Telephone Number: _____ Telephone Number: _____

SPECIAL NOTE FOR MAINTENANCE DREDGING:

If the above referenced permit authorizes maintenance dredging, the permittee/contractor shall notify this office of the completion of the work by submitting this form for each dredging occurrence. This form may be reproduced for this purpose

Enclosure 4

This notice of authorization must be conspicuously displayed at the site of work.

United States Army Corps of Engineers

JAN 30 2018

A permit to construct a public boating access facility on the Little River at Tax Map Parcel 2-00-07800-01-0800-00001

at Town of Little Creek, Kent County, Delaware

has been issued to Mr. T.J. Austin **on** JAN 30 2018

Address of Permittee 4134 North DuPont Highway, Dover, Delaware 19901

Permit Number

CENAP-OP-R-2017-0661-23

Edward E. Bonner
Chief, Regulatory Branch

District Commander
for: Kristen N. Dahle
Lieutenant Colonel, US Army
District Commander

ENG FORM 4336 , Jul 81 (ER 1145-2-303) EDITION OF JUL 70 MAY BE USED

(Proponent: DAEN-CWO)