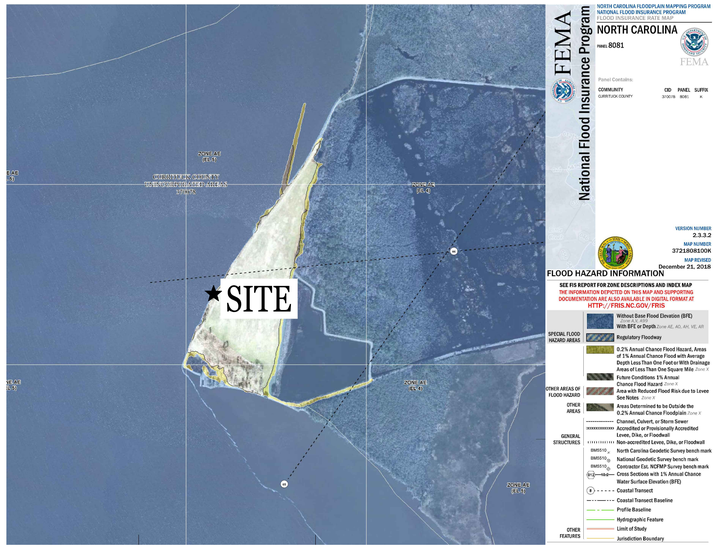
CONSTRUCT LIVE OAK POINT SHORE PROTECTION

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND, NORTH CAROLINA

VICINITY MAP
N.T.S.

SITE LOCATION
N.T.S.



THIS SITE LIES IN A FLOOD ZONE, PER F.I.R.M. PANEL 3721808100K, DATED DECEMBER 21, 2018.

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G-003	GENERAL NOTES
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SURVEY SHEETS SHOW ARE PART OF A SEPARATE PACKAGE. AS A RESULT SHEET NUMBERS WILL NOT COINCIDE WITH THE CURRENT SET.

ASSET SCHEDULE	
DESCRIPTION	NUMBER
LIVE OAK POINT SHORE PROTECTION	10015360

SAMMS W.O. NO. F2019329479

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

1875 CENTURY BOULEVARD
ATLANTA, GEORGIA 30345

PREPARED BY:

FKA WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. (WOOD)
1075 BIG SHANTY ROAD, NW., SUITE 100
KENNESAW, GEORGIA 30144
(770) 421-3400
LICENSE: F-1253 (CURRENT)

NORTH CAROLINA PROFESSIONAL SEAL 050030 ENGINEER JOSEPH SCOTT KURE
04-13-2024

SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE
KNOTTS ISLAND **NORTH CAROLINA**

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN:** SEK	**DATE:**04/13/2023	**CHECKED:** MSL
CADD: COVER SHEET	**DRAWING NO:** G-001		

PLOT DATE: Apr 13, 2023 - 8:24am
DWG NAME: J:\6166232351 mackay island re design\07-CAD\Civil\400 Caddi+PLANS\ G-000 COVER SHEET.dwg
Drawing Status: DESIGN

MARSH CAUSEWAY (615)

MARSH CAUSEWAY

KNOTTS ISLAND ROAD

US FISH & WILDLIFE SERVICE
316 MARSH CAUSEWAY
KNOTTS ISLAND, NC 27950

EXISTING GATED ENTRY TO MACKAY ISLAND SHORE PROTECTION PROJECT

MACKAY ISLAND ROAD

CURRITUCK SOUND

EXISTING GRAVEL ACCESS ROAD TO BE REPAIRED/REPLACED

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
BEGIN PROJECT STATION: 00+00.00

PROJECT LOCATION

MACKAY ISLAND

END PROJECT STATION: 45+15.00

N

0 1000' 2000'
Scale: 1" = 1000'

LEGEND

EXISTING ACCESS ROAD TO REMAIN

EXISTING GRAVEL ACCESS ROAD TO BE REPLACED
SEE DETAIL E8 SHEET C-501

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KURZ
04-13-2024

wsp

SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
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MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: LOCATION MAP	DRAWING NO: G-002		

PROJECT NOTES:

1. THE CONTRACTOR IS EXPECTED TO CAREFULLY EXAMINE THE PLANS, SPECIFICATIONS, AND SITE OF THE WORK. THEREFORE, IT WILL BE ASSUMED THAT THE BIDDER HAS SATISFIED HIMSELF AS TO THE CONDITIONS TO BE ENCOUNTERED IN REGARDS TO THE CHARACTER, QUALITY, AND QUANTITIES OF WORK TO BE PERFORMED AND MATERIALS TO BE FURNISHED, AND AS TO THE REQUIREMENTS OF THE PLANS, SPECIFICATIONS, AND CONTRACT. THE SUBMISSION OF A PROPOSAL BY A BIDDER WILL BE CONSIDERED PRIMAFACIE EVIDENCE THAT THE BIDDER HAS MADE SUCH AN EXAMINATION.
2. SITE SECURITY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY DIVERSION OF RUNOFF WATER, AS REQUIRED TO FACILITATE CONSTRUCTION OR AS DIRECTED ON-SITE BY THE CONTRACTING OFFICER. THIS TEMPORARY DRAINAGE OF RUNOFF IS CONSIDERED INCIDENTAL TO THE BID.
4. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL PERMITS HAVE BEEN OBTAINED AND FOR NOTIFYING THE APPLICABLE GOVERNMENTAL AGENCIES AND DEPARTMENTS OF THE BEGINNING OF CONSTRUCTION.
5. NO DEVIATION FROM THE PLANS IS ALLOWED WITHOUT PRIOR APPROVAL FROM THE CONTRACTING OFFICER. SAID APPROVAL SHALL BE GIVEN IN WRITING.
6. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR TO PUBLIC AND PRIVATE ROADS CAUSED BY HIS ACTIVITIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MEET WITH PRIVATE, STATE, CITY AND COUNTY OFFICIALS TO AGREE UPON AND RECORD THE CONDITIONS OF THE ROADS BEFORE CONSTRUCTION COMMENCES.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SATISFY HIMSELF OF THE ACCURACY OF THE SURVEY INFORMATION PRIOR TO COMMENCING CONSTRUCTION.
8. THE CONTRACTOR SHALL PROVIDE THE OWNER AND CONTRACTING OFFICER WITH AN AS-BUILT SURVEY OF ALL DISTURBED AREAS AT THE END OF THE PROJECT. THIS SURVEY SHALL BE PREPARED ON A 50-FOOT GRID. ALL HIGH AND LOW SPOTS SHALL BE INCLUDED IN THE SURVEY. THE SURVEY SHALL BE PERFORMED ON THE SAME DATUM AND COORDINATE SYSTEM AS THESE PLANS. THE SURVEY SHALL BE PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE OF THE STATE OF NORTH CAROLINA AND STAMPED BY A SURVEYOR LICENSED IN THE STATE OF NORTH CAROLINA. THE COST OF THIS SURVEY SHALL BE INCLUDED IN THE CONTRACTOR'S BID.
9. THE RIP RAP REVETMENT AND SILL HAVE BEEN DESIGNED AND SHALL BE BUILT IN ACCORDANCE WITH THE US ARMY CORPS OF ENGINEERS COASTAL ENGINEERING MANUAL (CEM).
10. TIE-BACKS ATTACHED TO THE EXISTING SEAWALLS SHALL BE CUT AS NECESSARY DURING CONSTRUCTION TO ADJUST EXISTING SEAWALLS TO FINISH ELEVATIONS AS SHOWN ON C-201, C-202, AND C-203. THE CUTTING OF TIE-BACKS SHALL BE CONSIDERED INCIDENTAL TO THE OTHER ITEMS OF WORK.

DEMOLITION NOTES:

1. THIS PLAN IS NOT INTENDED TO SHOW EACH AND EVERY ITEM TO BE REMOVED OR DEMOLISHED BY THE CONTRACTOR. THERE ARE OTHER ITEMS NOT SHOWN THAT THE CONTRACTOR MUST REMOVE AND/OR REPLACE TO CONSTRUCT THE IMPROVEMENTS SHOWN IN THESE PLANS. THE CONTRACTOR SHALL THOROUGHLY INVESTIGATE THE PLANS AND INVESTIGATE THE SITE PRIOR TO SUBMITTING A BID. HE/SHE SHALL INCLUDE IN HIS/HER BID WHATEVER MEANS HE/SHE FEELS IT WILL TAKE TO CONSTRUCT THE IMPROVEMENTS. THE CONTRACTOR SHALL NOT RECEIVE ADDITIONAL COMPENSATION FOR REMOVING ITEMS NOT NOTED AS SUCH ON THIS PLAN.
2. THE CONTRACTOR SHALL DISPOSE OF ALL DEMOLITION DEBRIS IN ACCORDANCE WITH FEDERAL, LOCAL, AND STATE REGULATIONS OFF REFUGE PROPERTY IN A LEGAL MANNER.
3. ALL EXISTING LOOSE CONSTRUCTION AND VEGETATIVE DEBRIS SHALL BE REMOVED PRIOR TO THE START OF BACKFILL. BURYING OF CONSTRUCTION AND VEGETATIVE DEBRIS SHALL NOT BE ALLOWED.
4. THE EXISTING SEAWALL SHALL REMAIN IN PLACE AND **SHALL NOT** BE REPAIRED OR REPLACED IF DAMAGED DURING CONSTRUCTION.

GRADING NOTES:

1. ALL DEMOLITION DEBRIS AND EXCESS MATERIAL GENERATED FROM GRADING OPERATIONS ARE TO BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF OFF-SITE AT THE CONTRACTOR'S EXPENSE.
2. GRADING OPERATIONS SHALL BE MONITORED BY A QUALIFIED GEOTECHNICAL CONSULTANT TO ENSURE PROPER EXECUTION OF THE WORK AND COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS. THE QUALIFIED GEOTECHNICAL CONSULTANT SHALL BE CHOSEN AND PAID FOR BY THE CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE THE GEOTECHNICAL CONSULTANT ONSITE DURING INITIAL GRADING OPERATIONS AND DURING CRITICAL ACTIVITIES SUCH AS COMMENCEMENT OR COMPLETION OF GRADING ACTIVITIES IN AN AREA.
3. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE GEOTECHNICAL INVESTIGATION REPORT ATTACHED TO THE BID DOCUMENTS. SAID REPORT IS PROVIDED FOR THE CONTRACTOR'S CONVENIENCE. NEITHER THE CONTRACTING OFFICER NOR THE REPORT PREPARER WARRANTS THE COMPLETE AND TOTAL ACCURACY OF THE REPORT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SATISFY HIMSELF AS TO THE EXISTING SOIL CONDITIONS.
4. BURNING WILL NOT BE ALLOWED ON-SITE. DEBRIS SHALL BE HAULED OFFSITE AND DISPOSED OF IN A LEGAL MANNER.
5. GRADING OPERATIONS SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS STATED IN PROJECT GEOTECHNICAL REPORT.
6. IF ANY PREVIOUSLY UNKNOWN HISTORIC OR ARCHEOLOGICAL REMAINS ARE FOUND DURING CONSTRUCTION, THE CONTRACTOR MUST IMMEDIATELY STOP ALL OPERATIONS AND NOTIFY THE CONTRACTING OFFICER.
7. EQUIPMENT STAGING AREAS AND STOCKPILING SITES SHALL BE APPROVED OF BY THE CONTRACTING OFFICER PRIOR TO START OF CONSTRUCTION.
8. CONSTRUCTION DEBRIS OR OTHER WASTE MATERIALS SHALL NOT BE DISCHARGED INTO OPEN WATERS OR PLACED NEAR SUCH AREAS WHERE MIGRATION INTO OPEN WATERS IS ANTICIPATED.
9. IF ANY FEDERALLY LISTED, THREATENED, OR ENDANGERED SPECIES AND/OR THEIR HABITAT ARE DISCOVERED DURING CONSTRUCTION, THE CONTRACTOR MUST IMMEDIATELY STOP ALL OPERATIONS AND NOTIFY THE CONTRACTING OFFICER.
10. ALL EXCAVATION IS CONSIDERED UNCLASSIFIED. NO ADDITIONAL PAYMENT SHALL BE MADE FOR DIFFICULT EXCAVATION.
11. CROSS-SECTIONS ARE PROVIDED AS GENERAL REPRESENTATIONS OF WORK TO BE PERFORMED.
12. IN AREAS WHERE HEAVY SILTATION OR POOR SOILS ARE ENCOUNTERED, GEOSYNTHETICS WILL BE REQUIRED. CONTRACTOR SHALL NOTIFY CONTRACTING OFFICER IMMEDIATELY IF THESE CONDITIONS ARE ENCOUNTERED. ASSUME 25% PLACEMENT OF BEDDING STONE FOR ENTIRE LENGTH OF PROJECT.
13. GRADING AND RIPRAP PLACEMENT SHALL BE MONITORED BY A QUALIFIED GEOTECHNICAL CONSULTANT TO ENSURE PROPER EXECUTION OF THE WORK AND COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS. THE QUALIFIED GEOTECHNICAL CONSULTANT SHALL BE CHOSEN AND PAID FOR BY THE CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE THE GEOTECHNICAL CONSULTANT ONSITE DURING INITIAL GRADING OPERATIONS, INITIAL RIPRAP REPLACEMENT, AND DURING CRITICAL ACTIVITIES SUCH AS COMMENCEMENT OR COMPLETION OF GRADING AND RIPRAP PLACEMENT IN THE SILL, REVETMENT, AREAS WITH EXISTING RIPRAP TO REMAIN, AND OTHER AREAS CRITICAL TO SUCCESSFUL EXECUTION OF THE WORK.
14. HORIZONTAL ALIGNMENT OF THE SILL SHALL HAVE A TOLERANCE NO GREATER THAN ±2.0' FROM NORTHING AND EASTINGS AS SHOWN ON THE SITE PLANS.
15. SILL SIDE SLOPES SHALL NOT EXCEED 2:1 AS SHOWN IN THE CROSS SECTIONS.
16. SEE CROSS SECTIONS, SHEET C-201 - C-203, FOR LIMITS OF SILL AND REVETMENT.
17. WHERE EXTENTS OF VEGETATION, PER CROSS SECTIONS, EXTENDS OVER EXISTING RIP RAP, THAT IS TO BE LEFT IN PLACE, THE VEGETATION SHALL BE PLANTED OVER THE RIP RAP.

RECOMMENDED UNDERWATER STABILIZATION GEOTEXTILE INSTALLATION GUIDE NOTES:
(WHEN NEEDED OR REQUIRED. IT IS CONTRACTOR'S RESPONSIBILITY TO DETERMINE ACTUAL INSTALLATION TECHNIQUE)

SHALLOW SLOPE INSTALLATION

1. WHEN A MACHINE CAN REACH THE FULL EXTENT OF THE GEOTEXTILE PLACEMENT:
   - 1.1. PLACE A STEEL POLE WITH A BUOY ATTACHED AT ONE END THROUGH THE GEOTEXTILE ROLL CORE
   - 1.2. ANCHOR THE GEOTEXTILE AT THE TOP OF THE SLOPE BY UNROLLING A PORTION AND CAREFULLY DRIVING THE EXCAVATOR ONTO IT
   - 1.3. LOWER THE GEOTEXTILE INTO PLACE
   - 1.4. IMMEDIATELY PLACE A LAYER OF ROCK ON THE GEOTEXTILE TO BALLAST IT
   - 1.5. RETRIEVE THE POLE BY PULLING ON BUOY ROPES

OVERLAPPING

1. PANEL OVERLAP WIDTHS SHALL BE A MINIMUM OF 3 FEET
2. MARKING THE ENDS OF THE GEOTEXTILE:
   - 2.1. SPRAYING WHITE LINES ON THE FABRIC WHERE THE OVERLAP OCCURS MAY BE USEFUL, OR ATTACHING FLOATS TO THE EDGES OF THE ROLLED GEOTEXTILE PANEL.

GEOTEXTILE STORAGE

1. GEOTEXTILE ROLLS SHALL BE WRAPPED IN A UV PROTECTIVE COVER.
2. IF GEOTEXTILE ROLLS ARE STORED OUTDOORS FOR A PROLONGED PERIOD, THE GEOTEXTILE SHOULD BE ELEVATED FROM THE GROUND AND COVERED WITH A TARPAULIN OR OPAQUE PLASTIC.
3. THE CONTRACTOR SHALL INSURE ROLLS ARE ADEQUATELY PROTECTED FROM:
   - 3.1. MOISTURE
   - 3.2. ULTRAVIOLET RADIATION
   - 3.3. CHEMICALS THAT ARE STRONG ACIDS OR BASES
   - 3.4. TEMPERATURES IN EXCESS OF 140° F
   - 3.5. ANIMAL DESTRUCTION

CONSTRUCTION NARRATIVE:

UPLAND CONSTRUCTION;

- ERODED AREA AND WHERE GROUND IS BELOW WALL SHALL BE FILLED WITH SUITABLE BACKFILL AS DEFINED IN THE SPECIFICATIONS TO A HEIGHT OF 6 INCHES BELOW TOP OF WALL AND TYING TO EXISTING GRADE APPROXIMATELY 20 FEET BEHIND THE WALL.
- EXISTING RIP-RAP SHALL BE LEFT IN PLACE WHERE PRACTICABLE, ALL OTHER ORGANIC MATERIALS AND DEBRIS SHALL BE REMOVED PRIOR TO BACKFILLING AND SHALL NOT BE UTILIZED IN THE FILL MATERIAL. GRASS AND TOPSOIL SHALL BE STRIPPED A MINIMUM OF 4 INCHES.
- ALL DISTURBED AREAS BEHIND THE EXISTING SEAWALL ARE TO BE RE-VEGETATED WITH GRASS PER THE DETAILS AND SPECIFICATIONS.
- AREAS BEHIND THE SLOPE REVETMENT SHALL RECEIVE NATIVE SHRUBS AND GRASS INSTALLED IN DISTURBED AREAS AS INDICATED IN THE CROSS SECTIONS.

WATER CONSTRUCTION:

- ALL WORK WITHIN CURRITUCK SOUND TO BE PROTECTED BY A CONTAINED TURBIDITY CURTAIN AT ALL TIMES.
- FOR SILL CONSTRUCTION, THE CONTRACTOR IS TO INSTALL THE SILL TO LOCATION AND DIMENSIONS AS SHOWN IN THE CROSS SECTIONS.
- FOR REVETMENT CONSTRUCTION, THE CONTRACTOR IS TO ARMOR THE SLOPES WITH RIP-RAP STONE FROM APPROXIMATELY THE EXISTING SEAWALL TO CURRITUCK SOUND FLOOR AT SLOPES SHOWN ON THE PLANS..
- TURBIDITY CURTAIN SHALL BE DREDGED AS REQUIRED BY REGULATORY AGENCIES AND SILT SHALL BE RELOCATED AS INDICATED BY REGULATORS.

Common Name	Sci Name	Zone	Stock	Spacing
Black needletip rush	Juncus roemerianus	Marsh	Plugs	1.5′
Soft rush	Juncus effusus	Marsh	Plugs	1.5′
Leathery rush	Juncus coriaceus	Marsh	Plugs	1.5′
Fox sedge	Carex vulinoidea	Marsh	Plugs	1.5′
Shallow sedge	Carex lurida	Marsh	Plugs	1.5′
Big cordgrass	Spartina cynosuroides	Marsh	Plugs	1.5′
Groundsel tree	Baccharis halimifolia	Riparian shrubs/grasses	Bareroot/ container	4′
Wax myrtle	Myrica cerifera	Riparian shrubs/grasses	Bareroot/ container	4′
Gallberry	Ilex glabra	Riparian shrubs/grasses	Bareroot/ container	4′
Big bluestem (warm season)	Andropogon gerardii	Riparian shrubs/grasses	Plugs or seeding	1.5′
Switchgrass (warm season)	Panicum virgatum	Riparian shrubs/grasses	Plugs or seeding	1.5′
Indian woodoats (cool season)	*Chasmanthium latifolium*	Riparian shrubs/grasses	Plugs or seeding	1.5′
Virginia wildrye (cool season)	Elymus virginiacus	Riparian shrubs/grasses	Plugs or seeding	1.5′

NOTE: MARSH PLANTING NO LONGER PART OF THIS PROJECT.

PLANTING GUIDE

CONTRACTOR TO PROVIDE BASE LINE SCHEDULE DURING BIDDING. SCHEDULE BELOW IS PROVIDED AS GUIDANCE.

YEAR 1 CONSTRUCTION SCHEDULE

ACTIVITY	MONTHS 1	2	3	4	5	6	7
MOBILIZATION YEAR 1–ARMORED REVETMENT STA 28+00 THRU STA 45+15	■	■	■	■	■	■	■
STOCKPILE AREA (REVETMENT MATERIALS)	■						
TEMPORARY WORKS	■	■	■	■	■	■	
DEMOLITION		■	■	■	■	■	
ARMORED REVETMENT		■	■	■	■	■	
PROJECT PLANTING							■
DEMOBILIZATION YEAR 1							■
TEMPORARY WORKS	■	■					
IMPORTED FILL		■	■	■	■	■	
PROJECT PLANTING							■
DEMOBILIZATION YEAR 1							■

YEAR 2 CONSTRUCTION SCHEDULE

ACTIVITY	MONTHS 1	2	3	4	5	6	7
MOBILIZATION YEAR 2–STONE SILL AND ARMORED REVETMENT CONSTRUCTION STA 0+00 THRU STA 28+00	■	■	■	■	■	■	■
STOCKPILE AREA (STONE SILL & REVETMENT MATERIALS)	■						
TEMPORARY WORKS	■	■	■	■	■	■	
DEMOLITION		■	■	■	■	■	
STONE SILL & REVETMENT		■	■	■	■	■	
EROSION CONTROL MEASURES							■
DEMOBILIZATION YEAR 2							■

NORTH CAROLINA PROFESSIONAL SEAL 050239 ENGINEER JOSEPH SCOTT HUNT
04-13-2024

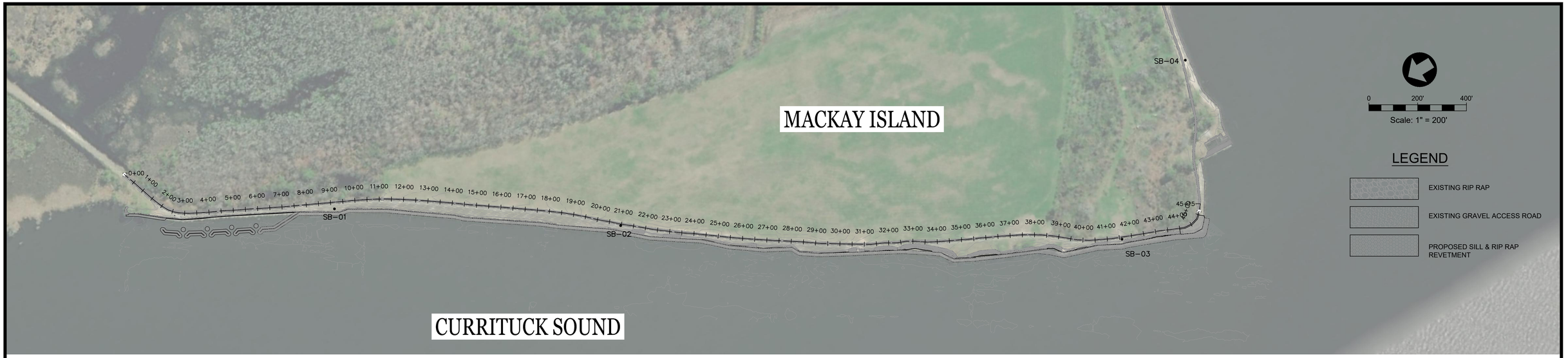
wsp

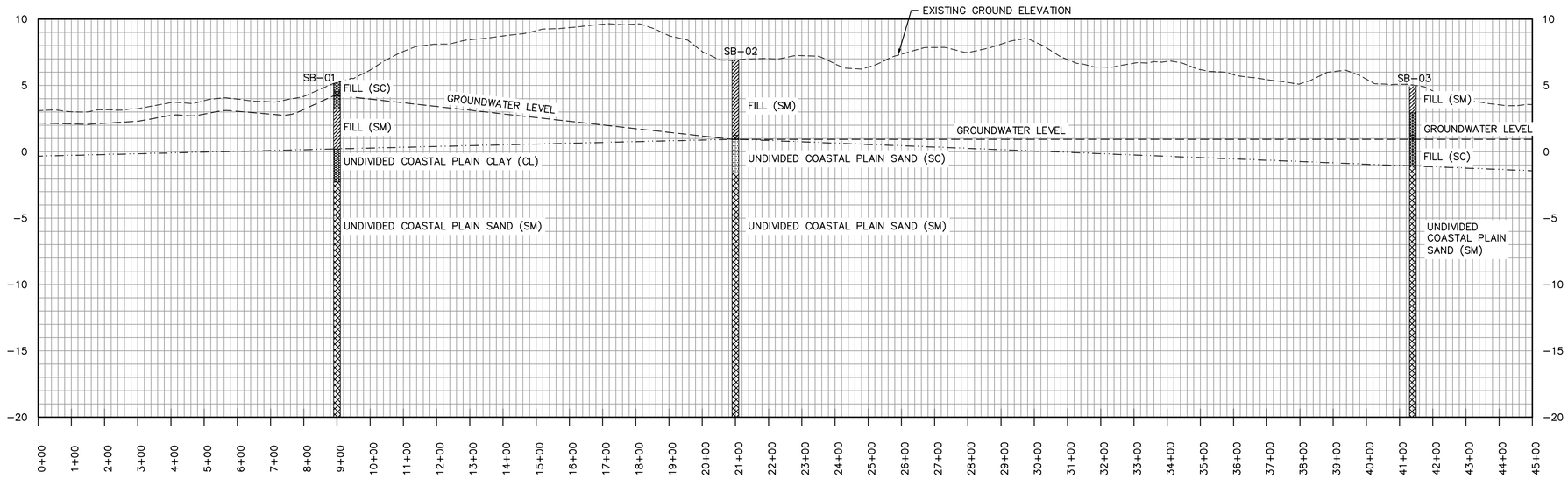
SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE
KNOTTS ISLAND **NORTH CAROLINA**

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN: SEK**	**DATE:04/13/2023**	**CHECKED: MSL**
CADD: GENERAL NOTES	**DRAWING NO:** G-003		





SCALE:
VERTICAL: 1"=40'
HORIZONTAL: 1"=200'

LEGEND

GROUNDWATER LEVEL

BREAK BETWEEN FILL LAYER AND UNDIVIDED COASTAL PLAIN LAYER

NOTE:
BORE PROFILE IS SHOWN FOR REFERENCE ONLY. THE CONTRACTOR SHALL UTILIZE THE "REPORT OF GEOTECHNICAL EVALUATION AND PRELIMINARY RECOMMENDATIONS" DATED DECEMBER 12, 2019 FOR GEOTECHNICAL FINDINGS AND RECOMMENDATIONS.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KUHRE
04-13-2024

wsp

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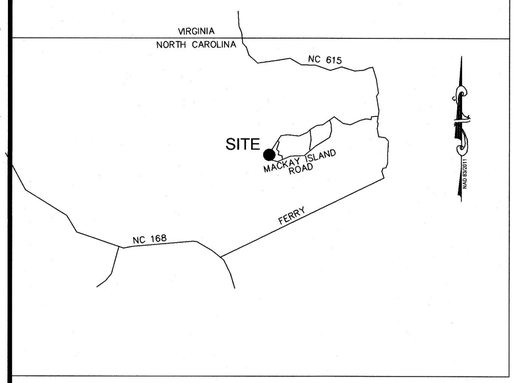
KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: BORE PROFILE	DRAWING NO: G-004		

PLOT DATE: Apr 13, 2023 - 8:25am
DWG NAME: J:\6166232351 mackay island re design\07-CAD\Civil\400 Cadd\+PLANS\ C-100 Site Plan.dwg
Drawing Status: DESIGN



NOTE:

1) UNLESS STATED OTHERWISE, ALL DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET.

2) AT TIME OF SURVEY, THERE WAS NO NC GRID MONUMENT FOUND WITHIN 2000' OF SURVEYED AREA.

3) ALL BEARINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (NAD 1983/11).

4) THIS SURVEY PERFORMED AND MAP PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT. THIS SURVEY IS SUBJECT TO ANY FACTS AND EASEMENTS WHICH MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.

5) TO THE BEST OF THE SURVEYOR'S KNOWLEDGE, THERE ARE NO BURIAL GROUNDS OR CEMETERIES WITHIN SURVEYED AREA EXCEPT AS SHOWN.

6) THIS SITE IS LOCATED IN FEMA FLOOD HAZARD ZONE X (MINIMAL FLOOD RISK) ACCORDING TO FLOOD INSURANCE RATE MAP 3721808100K WITH AN EFFECTIVE DATE OF DECEMBER 21, 2018.

7) CONTOURS SHOWN ARE AT 1/2 FOOT INTERVALS.

8) ALL ELEVATIONS ARE BASED ON CONTROL POINT #3 WITH A GIVEN ELEVATION OF 2.75 FEET (NAVD88/GEOID 12B).

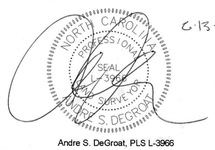
9) BENCH MARK SET IN 5 INCH CEDAR TREE ON SOUTH EAST SIDE OF ACCESS ROAD, ACROSS FROM CONTROL POINT #103

10) HYDROGRAPHIC SURVEY WAS PERFORMED BY GEODYNAMICS, AND IS NOT COVERED BY WOOD'S SIGN AND SEAL

I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME. THE FOLLOWING INFORMATION WAS USED TO PERFORM THE SURVEY:

(1) CLASS OF SURVEY: "AA"
(2) POSITIONAL ACCURACY: HORZ. = 0.04' / VERT. = 0.08'
(3) TYPE OF GPS FIELD PROCEDURE: NC VRS
(4) DATES OF SURVEY: 11/05/2019 - 11/06/2019
(5) DATUM/EPOCH: NAD83/ 2011
(6) PUBLISHED/FIXED-CONTROL USE: FIXED
(7) GEOID MODEL: 2012(B)
(8) COMBINED GRID FACTOR(S): 1.000115683
(9) UNITS: US SURVEY FEET

WITNESS MY ORIGINAL SIGNATURE AND SEAL THIS 13th DAY OF FEBRUARY, 2020.



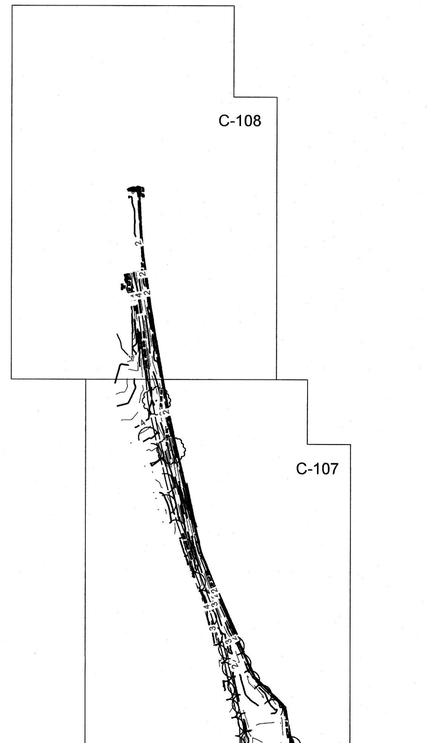
6.13.20

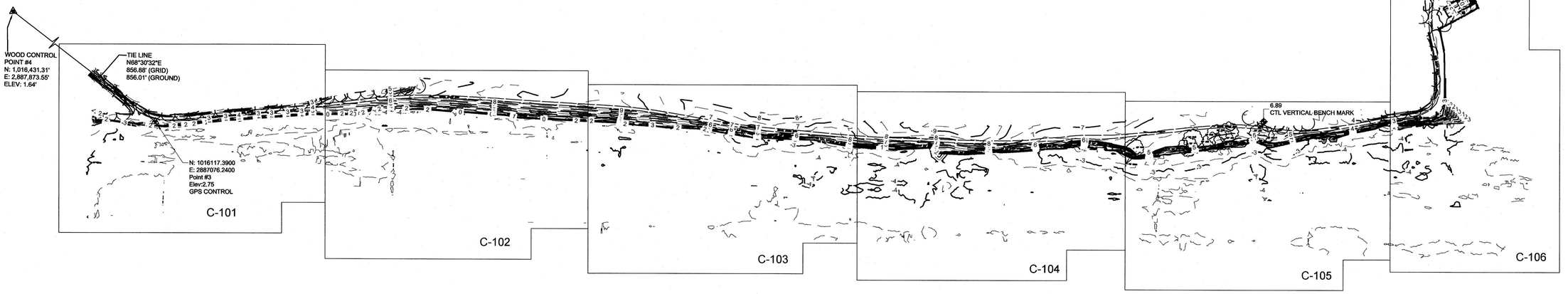
Andre S. DeGroat, PLS L-3966

LEGEND

- CONTROL POINT
- BENCHMARK
- HW HEADWALL
- WOODSLINE

SITE DATA:
PROPERTY OWNER(S):
UNITED STATES GOVERNMENT
GREAT MARSH/MACKAY ISLAND NWR
PROPERTY DATA: DEED BOOK G PAGE 297
NC PIN# 8093-60-6527
TOTAL TRACT AREA:
+/- 4851.17 ACRES (VIA GIS RECORDS)
+/- 211,316,965 SQUARE FEET (VIA GIS RECORDS)





REVISION	DATE	DESCRIPTION	BY

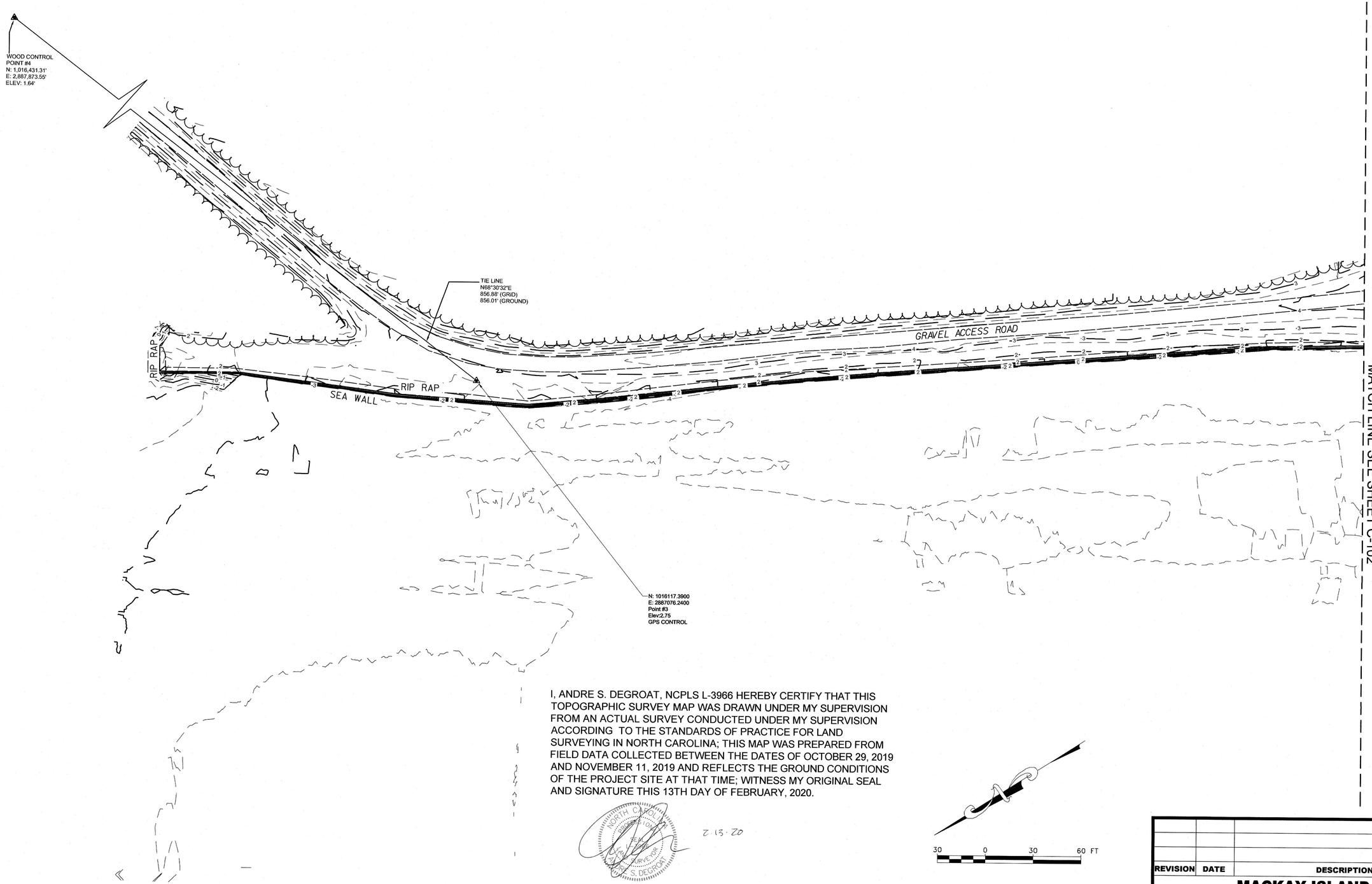
MACKAY ISLAND NWR

KNOTTS ISLAND — NORTH CAROLINA

MACKAY ISLAND SHORE PROTECTION

DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-100	SHEET 1 OF 9	

PLOT DATE: Feb 13, 2020 - 2:39pm
DWG NAME: C:\Users\todd.adams\Desktop\Mackay_Overview_Sheet-final.dwg
Drawing Status: DESIGN



I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA PROFESSIONAL LAND SURVEYOR SEAL ANDRE S. DEGROAT

2.13.20

Andre S. DeGroat, PLS L-3966

30 0 30 60 FT

REVISION	DATE	DESCRIPTION	BY

MACKAY ISLAND NWR

KNOTTS ISLAND NORTH CAROLINA

MACKAY ISLAND SHORE PROTECTION

DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-101	SHEET 2 OF 9	

I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA PROFESSIONAL SEAL L-3966 LAND SURVEYOR ANDRE S. DEGROAT

2.13.20

Andre S. DeGroat, PLS L-3966

30 0 30 60 FT

REVISION	DATE	DESCRIPTION	BY

MACKAY ISLAND NWR

KNOTTS ISLAND — NORTH CAROLINA

MACKAY ISLAND SHORE PROTECTION

DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-102	SHEET 3 OF 9	

Drawing Status: DESIGN

PLOT DATE: Feb 13, 2020 - 2:39pm

DWG NAME: C:\Users\todd.adams\Desktop\ Mackay_Overview_Sheet-final.dwg

Drawing Status: DESIGN

MATCH LINE SEE SHEET C-102

RIP RAP

RIP RAP

RIP RAP

GRAVEL ACCESS ROAD

SEA WALL OLD

SEA WALL

RIP RAP

MATCH LINE SEE SHEET C-104

I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA PROFESSIONAL L-3966 LAND SURVEYOR ANDRE S. DEGROAT

2.13.20

Andre S. DeGroat, PLS L-3966

30 0 30 60 FT

REVISION	DATE	DESCRIPTION	BY

MACKAY ISLAND NWR

KNOTTS ISLAND — NORTH CAROLINA

MACKAY ISLAND SHORE PROTECTION

DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-103	SHEET 4 OF 9	

PLOT DATE: Feb 13, 2020 - 2:39pm

DWG NAME: C:\Users\todd.adams\Desktop\ Mackay_Overview_Sheet-final.dwg

Drawing Status: DESIGN

MATCH LINE SEE SHEET C-103

MATCH LINE SEE SHEET C-105

RIP RAP

RIP RAP

RIP RAP

RIP RAP

RIP RAP

RIP RAP

I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA PROFESSIONAL SEAL L-3966 SURVEYOR ANDRE S. DEGROAT

2.15.20

Andre S. DeGroat, PLS L-3966

30 0 30 60 FT

REVISION	DATE	DESCRIPTION	BY

MACKAY ISLAND NWR

KNOTTS ISLAND — NORTH CAROLINA

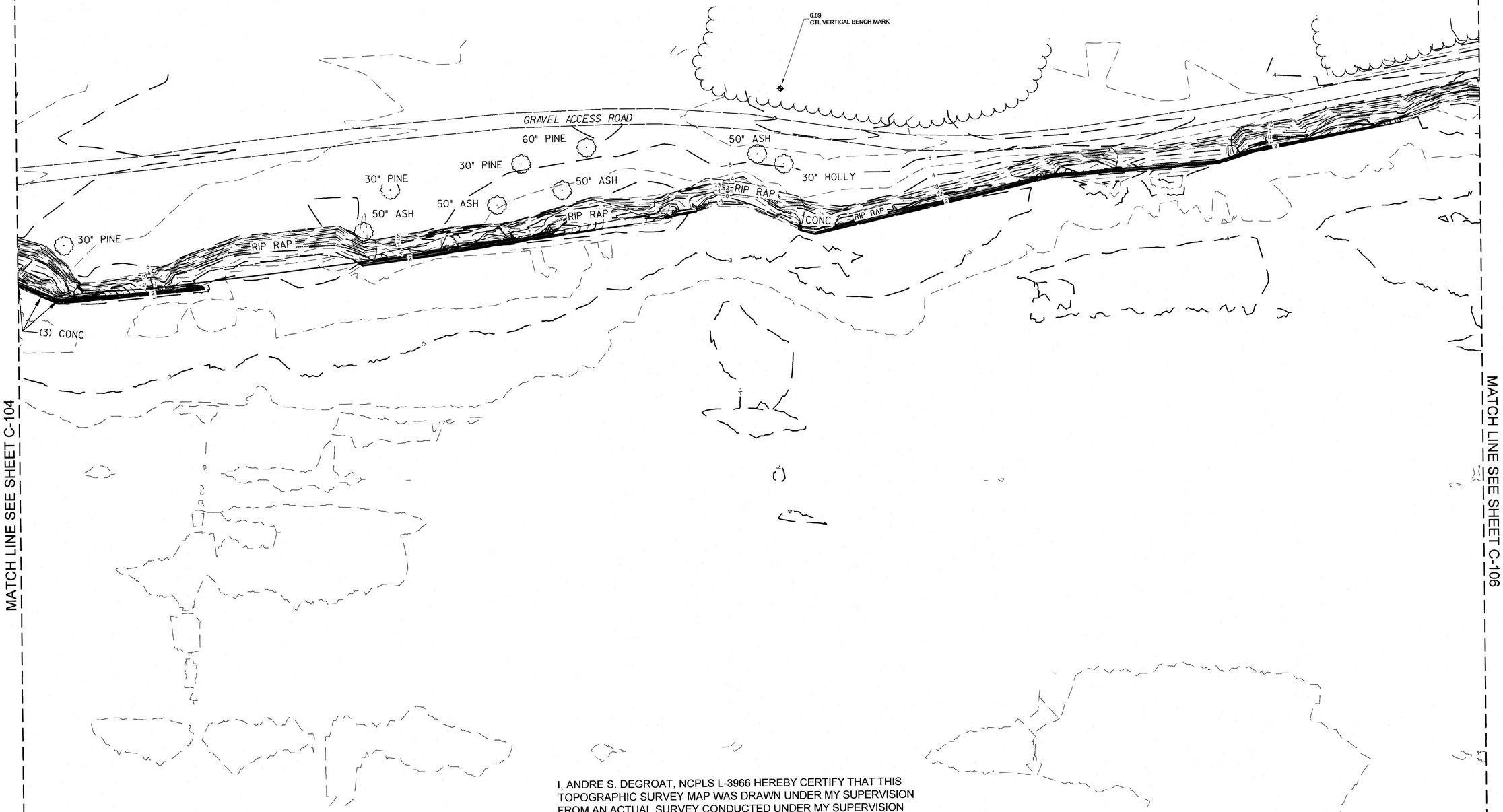
MACKAY ISLAND SHORE PROTECTION

DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-104	SHEET 5 OF 9	

PLOT DATE: Feb 13, 2020 - 2:40pm

DWG NAME: C:\Users\todd.adams\Desktop\ Mackay_Overview_Sheet-final.dwg

Drawing Status: DESIGN



I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA PROFESSIONAL L-3966 LAND SURVEYOR ANDRE S. DEGROAT

2.13.20

Andre S. DeGroat, PLS L-3966

30 0 30 60 FT

REVISION	DATE	DESCRIPTION	BY

MACKAY ISLAND NWR

KNOTTS ISLAND — NORTH CAROLINA

MACKAY ISLAND SHORE PROTECTION

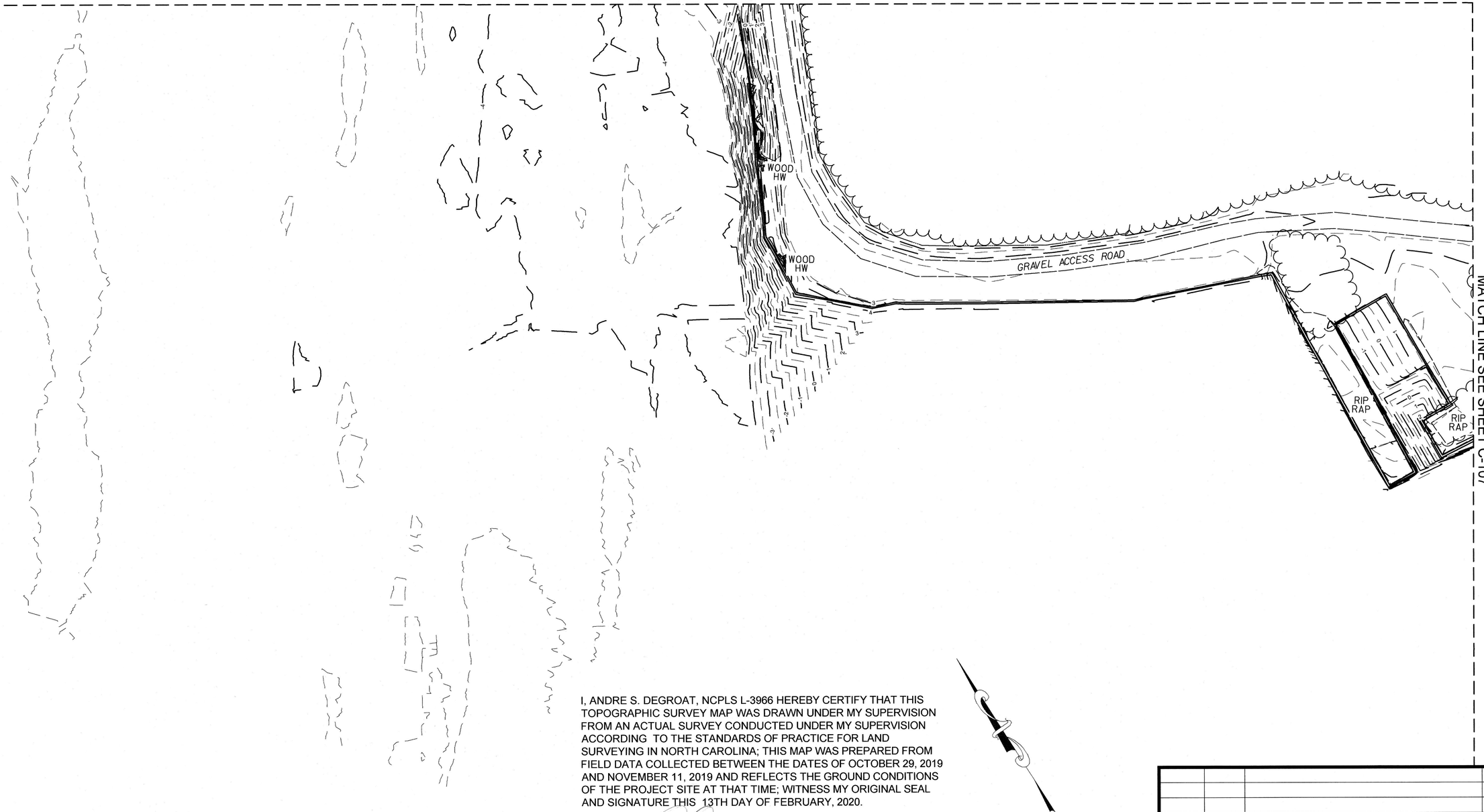
DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-105	SHEET 6 OF 9	

PLOT DATE: Feb 13, 2020 - 2:40pm

DWG NAME: C:\Users\todd.adams\Desktop\ Mackay_Overview_Sheet-final.dwg

Drawing Status: DESIGN

MATCH LINE SEE SHEET C-105



MATCH LINE SEE SHEET C-107

I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA PROFESSIONAL SEAL L-3966 LAND SURVEYOR ANDRE S. DEGROAT

02.13.20

Andre S. DeGroat, PLS L-3966

30 0 30 60 FT

REVISION	DATE	DESCRIPTION	BY

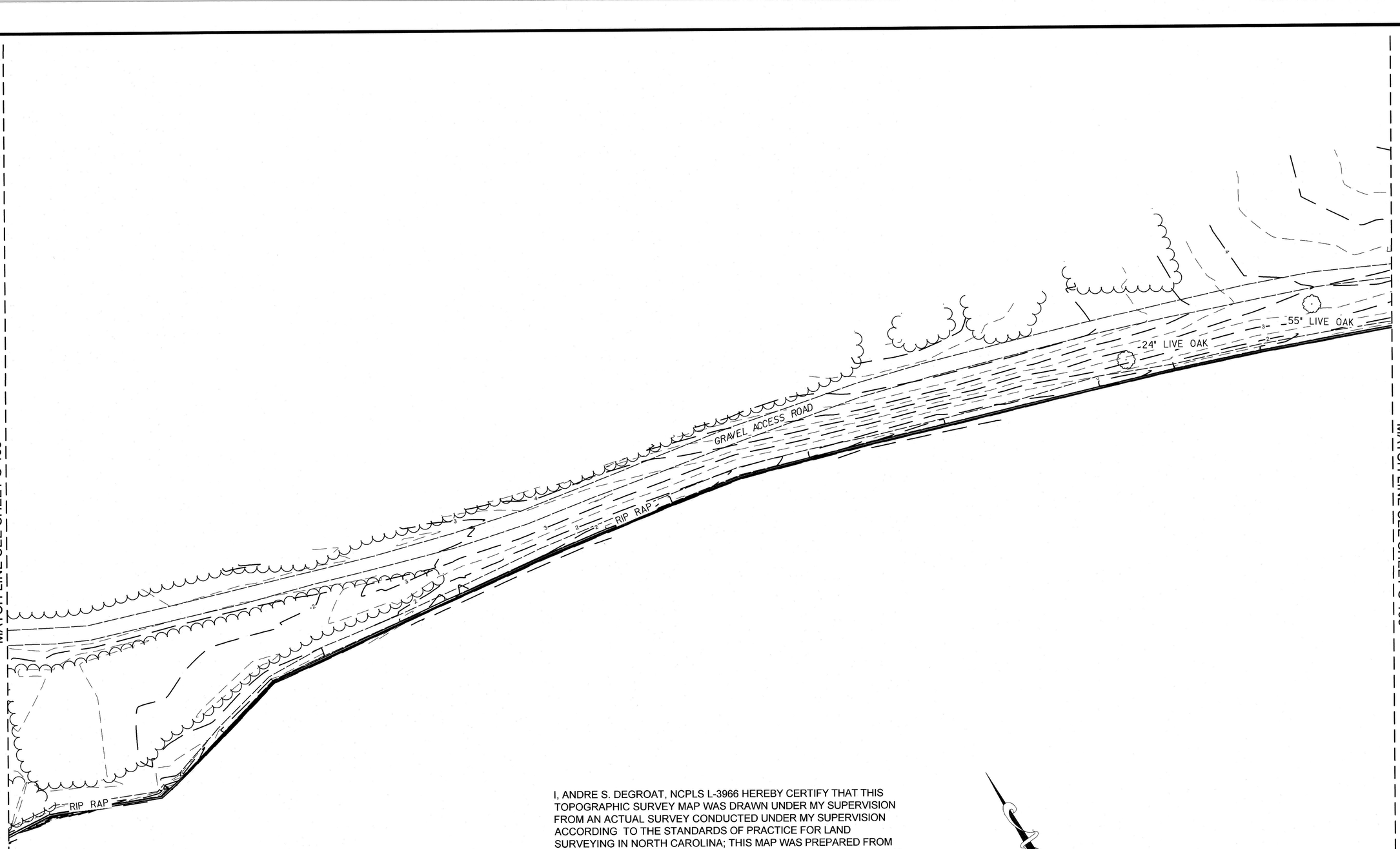
MACKAY ISLAND NWR

KNOTTS ISLAND — NORTH CAROLINA

MACKAY ISLAND SHORE PROTECTION

DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-106	SHEET 7 OF 9	

MATCH LINE SEE SHEET C-106



MATCH LINE SEE SHEET C-108

I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA PROFESSIONAL L-3966 LAND SURVEYOR ANDRE S. DEGROAT

2-13-20

Andre S. DeGroat, PLS L-3966

30 0 30 60 FT

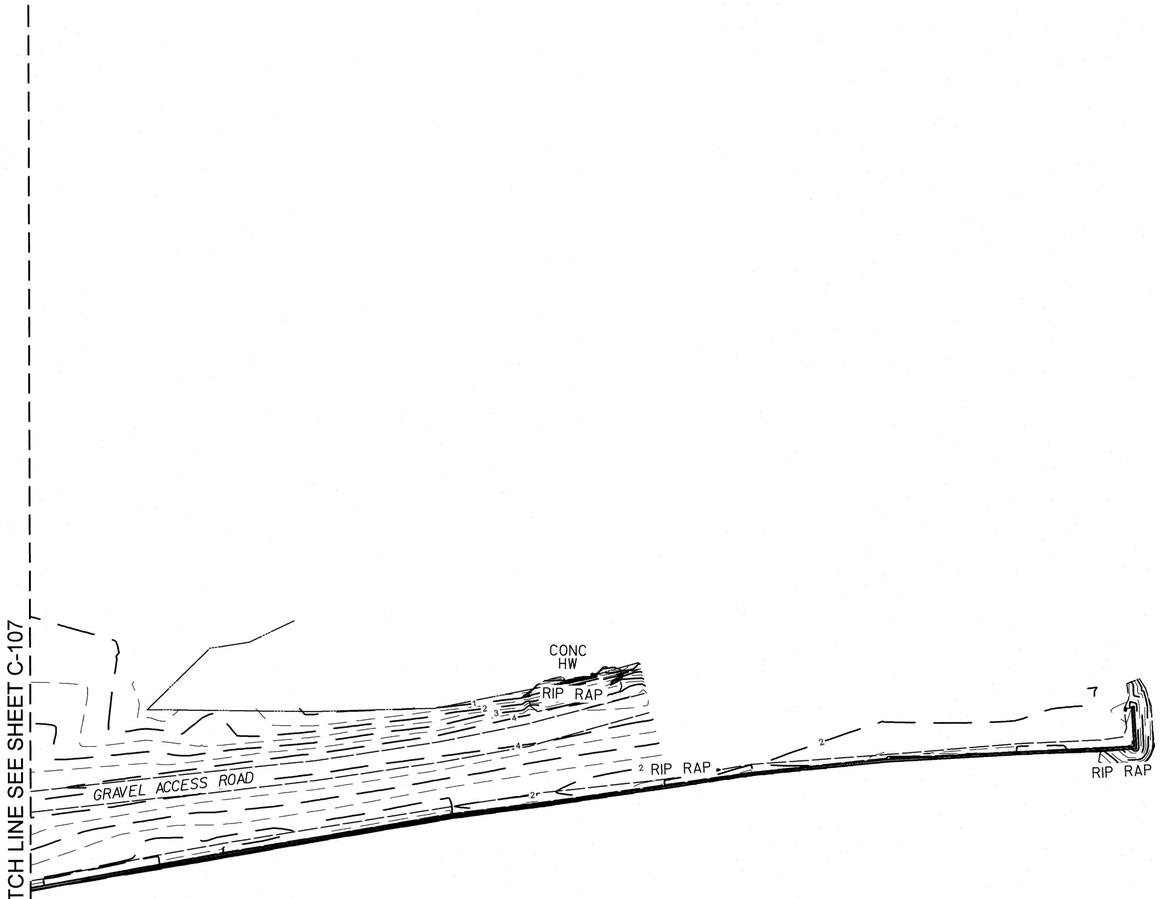
REVISION	DATE	DESCRIPTION	BY

MACKAY ISLAND NWR

KNOTTS ISLAND **NORTH CAROLINA**

MACKAY ISLAND SHORE PROTECTION

DESIGNED:	**DRAWN: JMS**	**DATE: 02/20**	**CHECKED: TA**
CADD: EXIST COND	**DRAWING NO:** C-107	**SHEET** 8 **OF** 9	

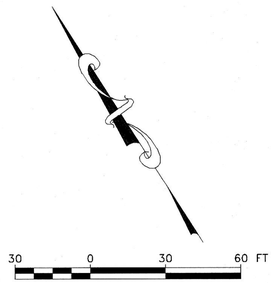


I, ANDRE S. DEGROAT, NCPLS L-3966 HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY CONDUCTED UNDER MY SUPERVISION ACCORDING TO THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA; THIS MAP WAS PREPARED FROM FIELD DATA COLLECTED BETWEEN THE DATES OF OCTOBER 29, 2019 AND NOVEMBER 11, 2019 AND REFLECTS THE GROUND CONDITIONS OF THE PROJECT SITE AT THAT TIME; WITNESS MY ORIGINAL SEAL AND SIGNATURE THIS 13TH DAY OF FEBRUARY, 2020.

NORTH CAROLINA
SEAL
L-3966
LICENSED SURVEYOR
ANDRE S. DEGROAT

02.13.20

Andre S. DeGroat, PLS L-3966



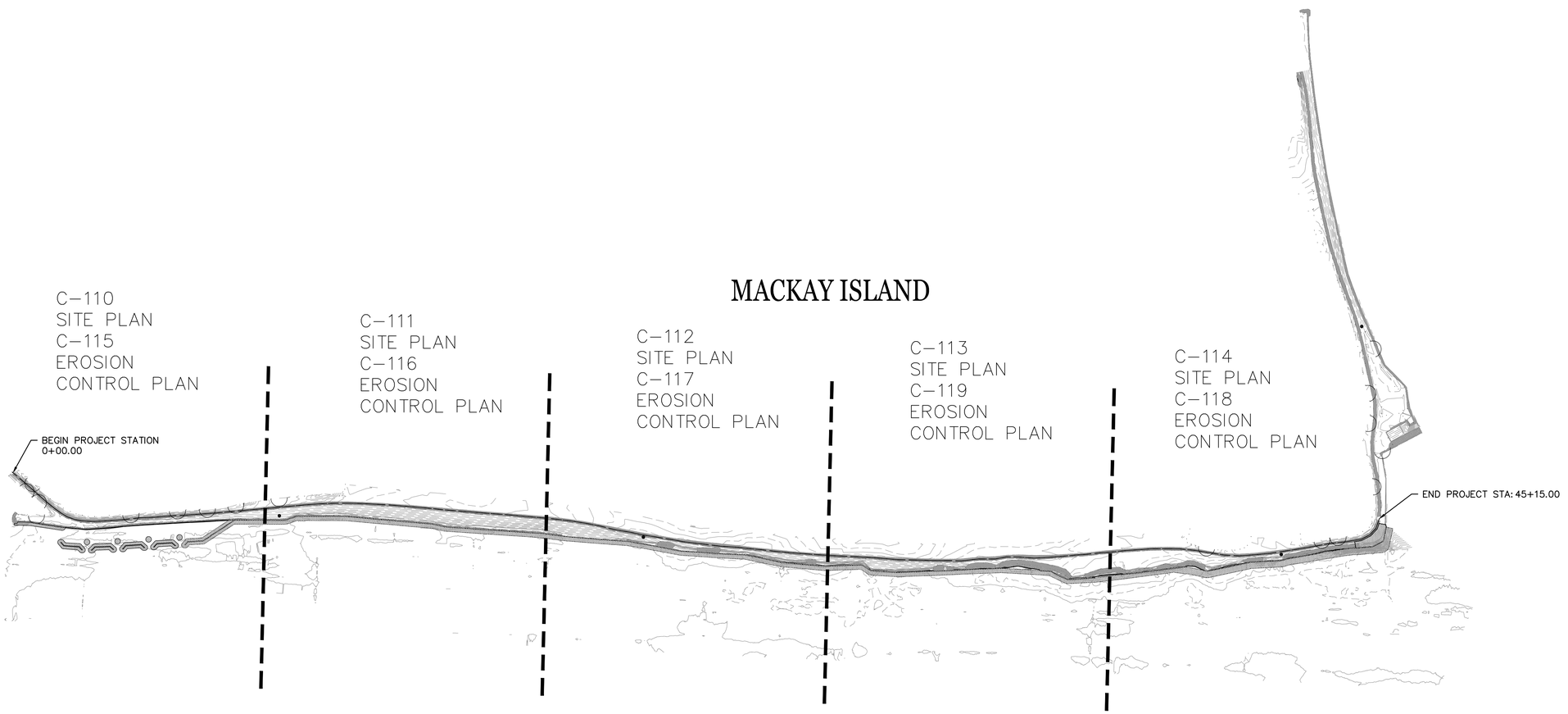
REVISION	DATE	DESCRIPTION	BY

MACKAY ISLAND NWR

KNOTTS ISLAND — NORTH CAROLINA

MACKAY ISLAND SHORE PROTECTION

DESIGNED:	DRAWN: JMS	DATE: 02/20	CHECKED: TA
CADD: EXIST COND	DRAWING NO: C-108	SHEET 9 OF 9	



0 200' 400'

Scale: 1" = 200'

LEGEND

- EXISTING CONTOURS (3.00)
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- PROPOSED SILL & RIP RAP REVETMENT
- SOIL BORING

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT HURE 04-13-2024

wsp

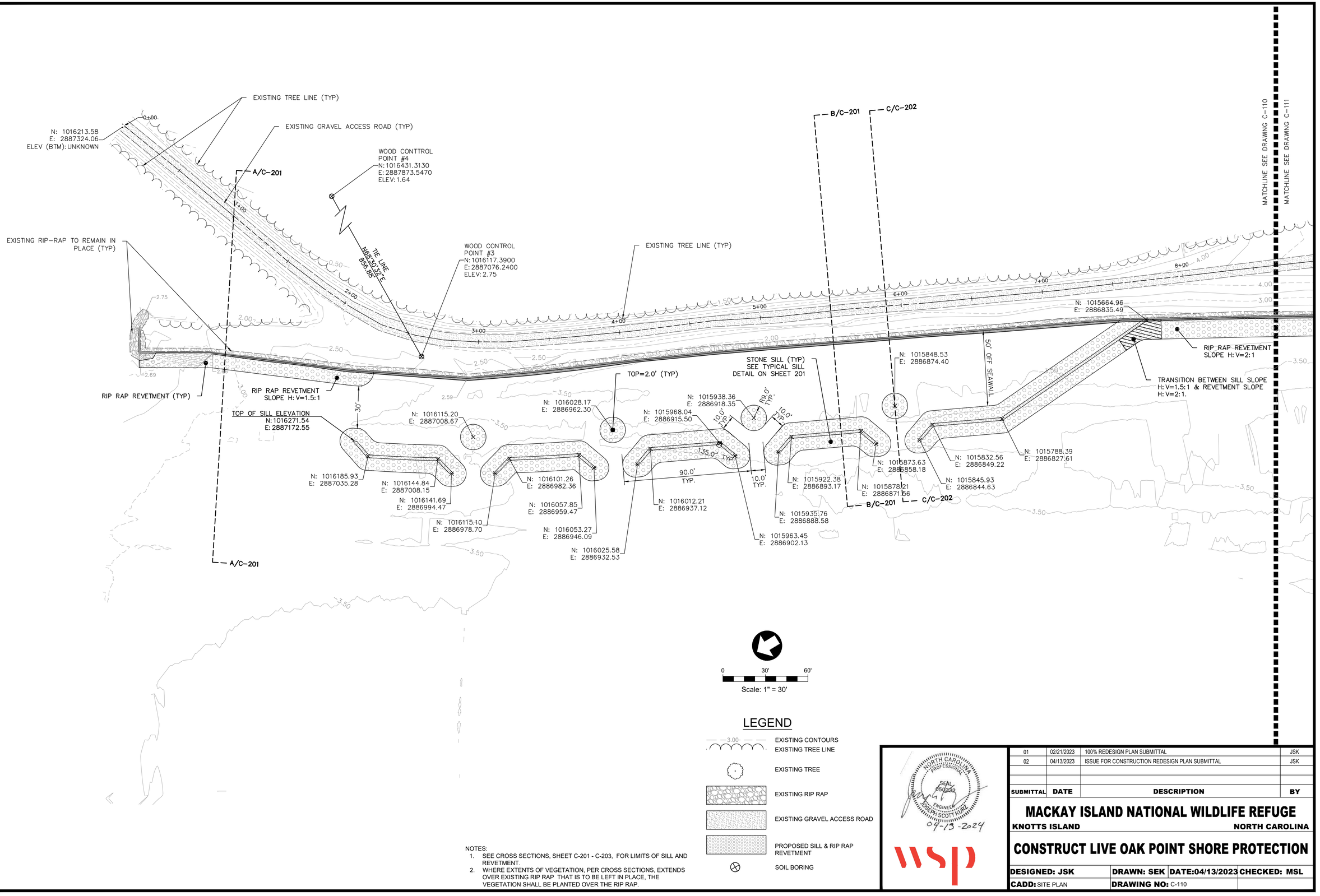
SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND **NORTH CAROLINA**

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN: SEK**	**DATE:04/13/2023**	**CHECKED: MSL**
CADD: OVERALL SITE PLAN	**DRAWING NO:** C-109		



0 30' 60'

Scale: 1" = 30'

LEGEND

- EXISTING CONTOURS (3.00)
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- PROPOSED SILL & RIP RAP REVETMENT
- SOIL BORING

NOTES:
1. SEE CROSS SECTIONS, SHEET C-201 - C-203, FOR LIMITS OF SILL AND REVETMENT.
2. WHERE EXTENTS OF VEGETATION, PER CROSS SECTIONS, EXTENDS OVER EXISTING RIP RAP THAT IS TO BE LEFT IN PLACE, THE VEGETATION SHALL BE PLANTED OVER THE RIP RAP.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT HURE
04-13-2024

wsp

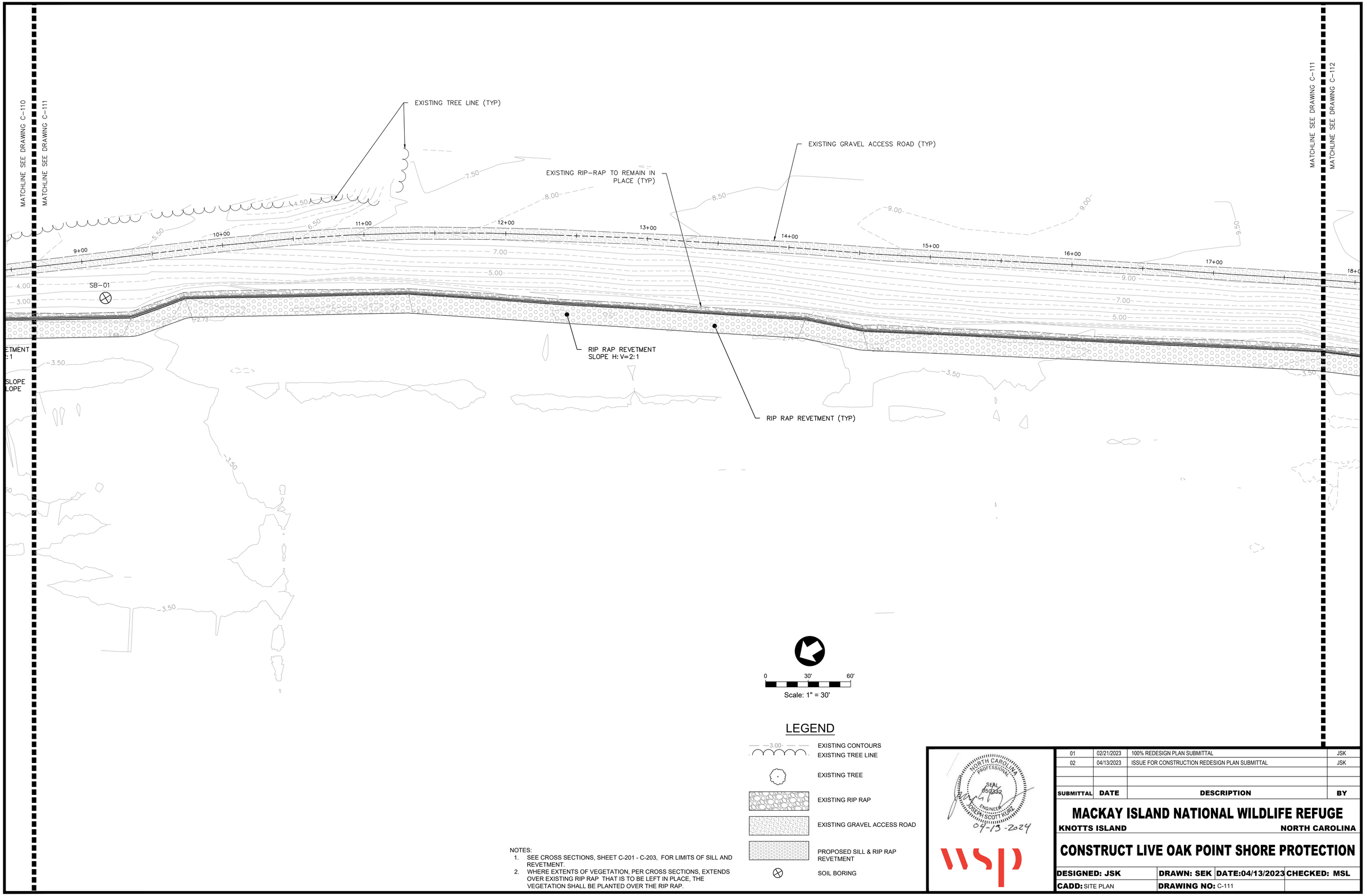
SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: SITE PLAN	DRAWING NO: C-110		



LEGEND

- EXISTING CONTOURS (3.00)
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- PROPOSED SILL & RIP RAP REVETMENT
- SOIL BORING

NOTES:
1. SEE CROSS SECTIONS, SHEET C-201 - C-203, FOR LIMITS OF SILL AND REVETMENT.
2. WHERE EXTENTS OF VEGETATION, PER CROSS SECTIONS, EXTENDS OVER EXISTING RIP RAP THAT IS TO BE LEFT IN PLACE, THE VEGETATION SHALL BE PLANTED OVER THE RIP RAP.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KURZ
04-13-2024

wsp

SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — **NORTH CAROLINA**

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN: SEK**	**DATE:04/13/2023**	**CHECKED: MSL**
CADD: SITE PLAN	**DRAWING NO:** C-111		

MATCHLINE SEE DRAWING C-111
MATCHLINE SEE DRAWING C-112

MATCHLINE SEE DRAWING C-112
MATCHLINE SEE DRAWING C-113

EXISTING GRAVEL ACCESS ROAD (TYP)

EXISTING RIP-RAP TO REMAIN IN PLACE (TYP)

EXISTING GRAVEL ACCESS ROAD (TYP)

18+00
19+00
20+00
21+00
22+00
23+00
24+00
25+00
26+00
27+00

SB-02

RIP RAP REVETMENT SLOPE H: V=2: 1

RIP RAP REVETMENT (TYP)

9.00
8.50
6.50
7.50
3.50
3.41
3.45
3.00
3.25
3.26
3.27
4.00

0 30' 60'
Scale: 1" = 30'

LEGEND

- EXISTING CONTOURS (3.00)
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- PROPOSED SILL & RIP RAP REVETMENT
- SOIL BORING

NOTES:
1. SEE CROSS SECTIONS, SHEET C-201 - C-203, FOR LIMITS OF SILL AND REVETMENT.
2. WHERE EXTENTS OF VEGETATION, PER CROSS SECTIONS, EXTENDS OVER EXISTING RIP RAP THAT IS TO BE LEFT IN PLACE, THE VEGETATION SHALL BE PLANTED OVER THE RIP RAP.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KURZ
04-13-2024

wsp

SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN:** SEK	**DATE:** 04/13/2023	**CHECKED:** MSL
CADD: SITE PLAN	**DRAWING NO:** C-112		

MATCHLINE SEE DRAWING C-112

MATCHLINE SEE DRAWING C-113

CONSTRUCTION PHASE 2

CONSTRUCTION PHASE 1

D/C-202

EXISTING RIP-RAP TO REMAIN IN PLACE (TYP)

EXISTING 30" PINE TREE

E/C-203

N: 1013270.75
E: 2885355.85

MATCHLINE SEE DRAWING C-113

MATCHLINE SEE DRAWING C-114

RIP RAP REVETMENT (TYP)

27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00

9.50 9.00 8.50 8.00 7.00 6.50 6.00 5.50 5.00 4.00 3.50 3.00 2.50

3.26 3.21 3.26 3.20 3.23 3.31 3.18 3.31 2.64 2.53 3.18 3.29 3.23 3.30

0 30' 60'

Scale: 1" = 30'

LEGEND

- EXISTING CONTOURS
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- PROPOSED SILL & RIP RAP REVETMENT
- SOIL BORING

NOTES:
1. SEE CROSS SECTIONS, SHEET C-201 - C-203, FOR LIMITS OF SILL AND REVETMENT.
2. WHERE EXTENTS OF VEGETATION, PER CROSS SECTIONS, EXTENDS OVER EXISTING RIP RAP THAT IS TO BE LEFT IN PLACE, THE VEGETATION SHALL BE PLANTED OVER THE RIP RAP.

NORTH CAROLINA PROFESSIONAL SEAL 050330 ENGINEER JOSEPH SCOTT KURZ
04-13-2024

wsp

SUBMITTAL	DATE	DESCRIPTION	BY
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MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: SITE PLAN	DRAWING NO: C-113		

MATCHLINE SEE DRAWING C-113

MATCHLINE SEE DRAWING C-114

C-203

EXISTING 50" ASH TREE

EXISTING 30" PINE TREE

EXISTING 50" ASH TREE

EXISTING 50" ASH TREE

EXISTING 30" PINE TREE

EXISTING 60" PINE TREE

EXISTING 30" HOLLY TREE

EXISTING TREE LINE (TYP)

EXISTING GRAVEL ACCESS ROAD (TYP)

EXISTING GRAVEL ACCESS ROAD (TYP)

SLOPE RIP RAP TO MEET EXISTING GRADE IN FROM OF EXISTING SHEETPILE

F/C-203

EXISTING RIP-RAP TO REMAIN IN PLACE (TYP)

N: 1012607.60
E: 2885015.43

N: 1012448.85
E: 2884991.44

N: 1012450.94
E: 2884983.13

N: 1012465.33
E: 2885005.34

N: 1012570.06
E: 2884973.32

N: 1012520.01
E: 2884949.85

N: 1012481.54
E: 2884948.43

N: 1012562.81
E: 2884993.11

SB-03

TRANSITION BETWEEN REVETMENT SLOPE H: V=2:1 & REVETMENT SLOPE H: V=3:1.

RIP RAP REVETMENT (TYP)

F/C-203

3,420 SF AREA BEHIND EXISTING SHEET PILE WALL TO RECEIVE 18" ø D50 RIP RAP WITH FILTER FABRIC.
RIP RAP AREA TO EXTEND TO THE TOP OF EXISTING SHEET PILE WALL AND EXISTING GRAVEL ROAD ELEVATIONS.

0 30' 60'

Scale: 1" = 30'

LEGEND

- EXISTING CONTOURS
- EXISTING TREE LINE
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- PROPOSED SILL & RIP RAP REVETMENT
- SOIL BORING

NOTES:
1. SEE CROSS SECTIONS, SHEET C-201 - C-203, FOR LIMITS OF VEGETATION BEHIND SILL AND REVETMENT.
2. WHERE EXTENTS OF VEGETATION, PER CROSS SECTIONS, EXTENDS OVER EXISTING RIP RAP THAT IS TO BE LEFT IN PLACE, THE VEGETATION SHALL BE PLANTED OVER THE RIP RAP.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KUHRE
04-13-2024

wsp

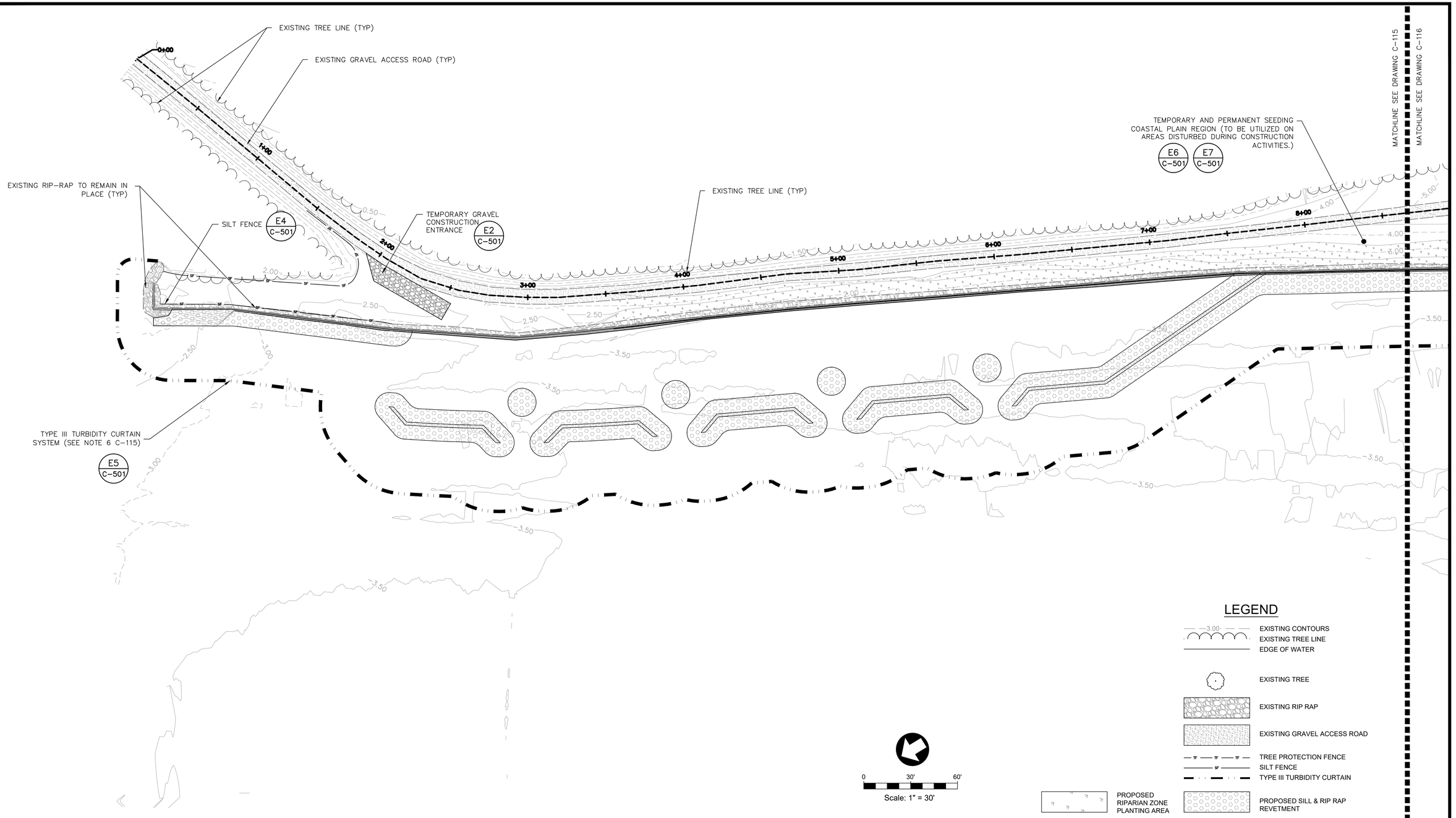
SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: SITE PLAN	DRAWING NO: C-114		



0 30' 60'

Scale: 1" = 30'

LEGEND

- EXISTING CONTOURS (3.00)
- EXISTING TREE LINE
- EDGE OF WATER
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- TREE PROTECTION FENCE (TF)
- SILT FENCE (SF)
- TYPE III TURBIDITY CURTAIN
- PROPOSED RIPARIAN ZONE PLANTING AREA
- PROPOSED SILL & RIP RAP REVETMENT

TURBIDITY CURTAIN NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT THE ENTIRE CONSTRUCTION AREA IS CONTAINED WITHIN THE TURBIDITY CURTAIN. IF THE SILL OR REVETMENT HAS BEEN INSTALLED ON EITHER SIDE OF THE CURRENT/ACTIVE CONSTRUCTION AREA AN ADDITIONAL SEGMENT OF TURBIDITY CURTAIN SHALL BE INSTALLED BETWEEN THE EXISTING SILL OR REVETMENT AND THE SHORELINE TO ENSURE A COMPLETELY CONTAINED CONSTRUCTION AREA.
2. THE LOCATION OF THE TURBIDITY CURTAIN SHALL BE ADJUSTED AS WORK PROGRESSES.
3. THE CONTRACTOR SHALL PURCHASE SUFFICIENT LENGTH OF CURTAIN TO ALIGN WITH THE LARGEST PROPOSED SHORELINE WORK AREA TO BE DISTURBED AT ANY GIVEN TIME.

NOTES:

1. THE CONTRACTOR SHALL COORDINATE WITH THE MACKAY ISLAND NATIONAL WILDLIFE REFUGE MANAGER FOR LOCATION OF ALL STOCKPILE AREAS. STOCKPILES SHALL BE CONSTRUCTED PER DETAIL E1 ON SHEET C-501.
2. AFTER THE END OF YEAR 2 SHORE PROTECTION OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL REPAIR/REPLACED THE EXISTING GRAVEL ROAD PER SHEET G-002 AND DETAIL E8/C-501.
3. THE COST OF REBUILDING THE GRAVEL ROAD SHALL BE INCLUDED IN THE CONTRACTOR'S BID FOR YEAR 2 CONSTRUCTION.
4. THE CONTRACTOR SHALL ADDRESS ANY EROSION OF CONSTRUCTED IMPROVEMENTS PRIOR TO FINAL STABILIZATION OF THE SITE.
5. EXISTING TREES SHALL BE RETAINED TO THE MAXIMUM EXTENT POSSIBLE. THE MACKAY ISLAND NATIONAL WILDLIFE REFUGE MANAGER SHALL BE NOTIFIED IF TREE REMOVAL IS NECESSARY PRIOR TO THE REMOVAL OF ANY TREES. THE COST OF TREE REMOVAL SHALL BE INCLUDED IN THE CONTRACTOR'S BID.
6. THE TURBIDITY CURTAIN IS REQUIRED TO EXTEND A MINIMUM OF 35' EACH SIDE OF WORK AREA. AFTER WORK IS COMPLETE IN A SECTION, AND THE AREA IS STABILIZED, THE CURTAIN CAN BE MOVED TO THE NEXT AREA OF WORK. NO WORK SHALL OCCUR IN A LOCATION WITHOUT A TURBIDITY CURTAIN.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KUCZ
04-13-2024

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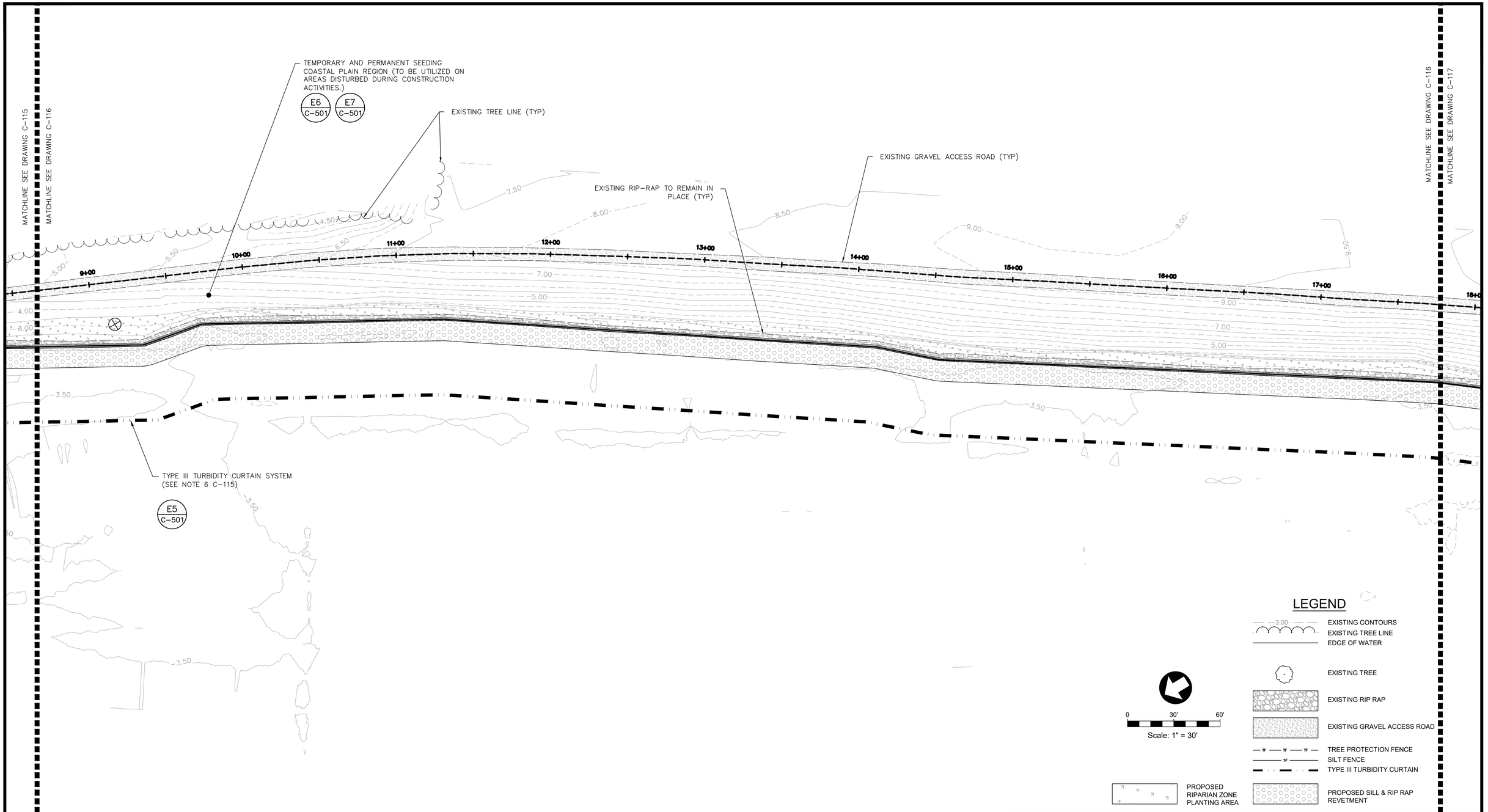
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: EROSION CONTROL PLAN	DRAWING NO: C-115		



LEGEND

- EXISTING CONTOURS
- EXISTING TREE LINE
- EDGE OF WATER
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- TREE PROTECTION FENCE
- SILT FENCE
- TYPE III TURBIDITY CURTAIN
- PROPOSED RIPARIAN ZONE PLANTING AREA
- PROPOSED SILL & RIP RAP REVETMENT

0 30' 60'

Scale: 1" = 30'

NOTES:
1. SEE C-115 FOR NOTES.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KURZ
04-13-2024

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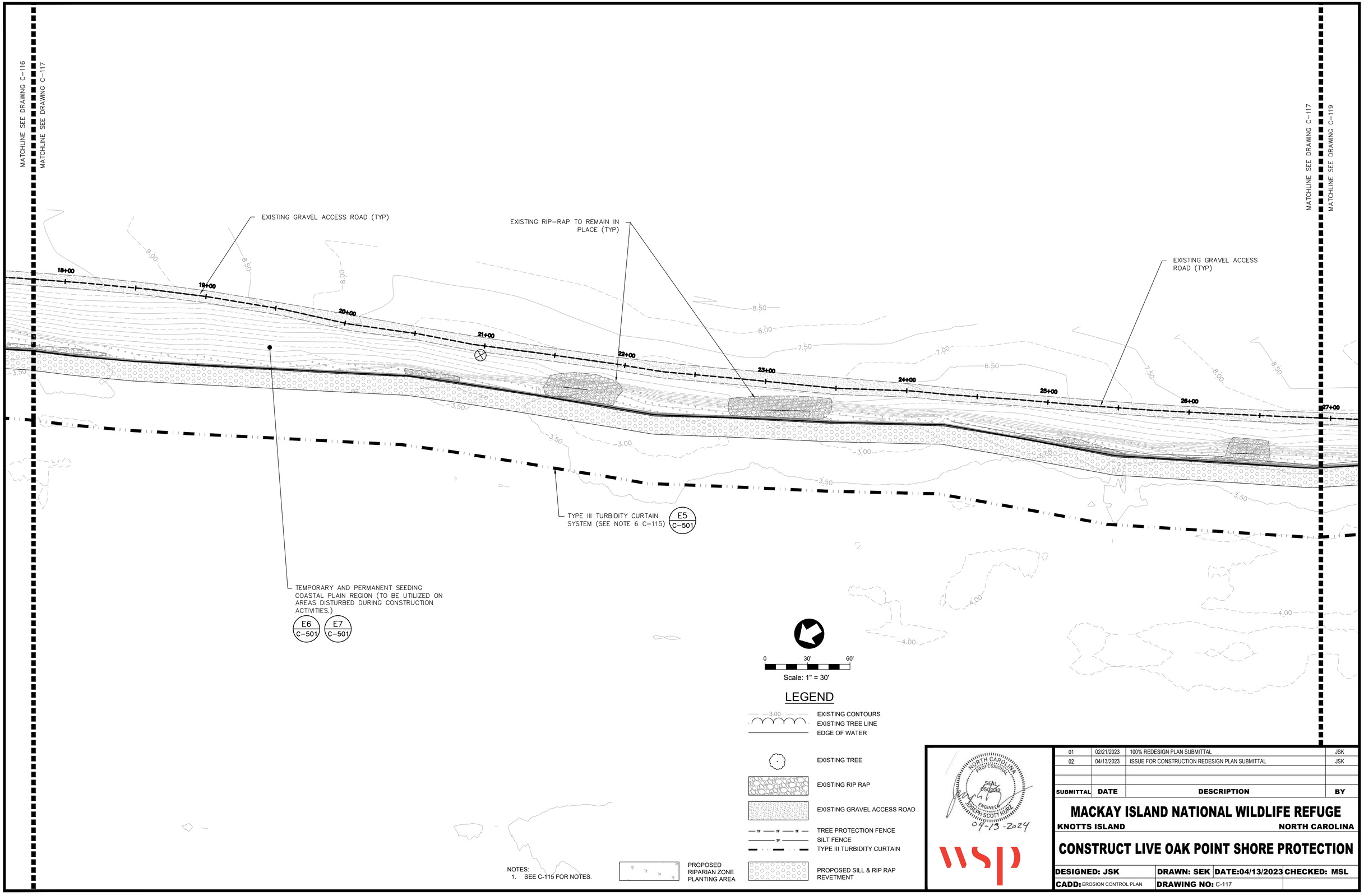
MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN: SEK**	**DATE:04/13/2023**	**CHECKED: MSL**
CADD: EROSION CONTROL PLAN	**DRAWING NO:** C-116		



LEGEND

- EXISTING CONTOURS (3.00)
- EXISTING TREE LINE
- EDGE OF WATER
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- TREE PROTECTION FENCE
- SILT FENCE
- TYPE III TURBIDITY CURTAIN
- PROPOSED RIPARIAN ZONE PLANTING AREA
- PROPOSED SILL & RIP RAP REVETMENT

NOTES:
1. SEE C-115 FOR NOTES.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KUHL
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MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: EROSION CONTROL PLAN	DRAWING NO: C-117		

MATCHLINE SEE DRAWING C-117

MATCHLINE SEE DRAWING C-119

MATCHLINE SEE DRAWING C-119

MATCHLINE SEE DRAWING C-118

EXISTING 30" PINE TREE

TREE PROTECTION FENCING (SEE NOTE 5 C-115)

E3 C-501

EXISTING RIP-RAP TO REMAIN IN PLACE (TYP)

27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00

9.50 9.00 8.50 8.00 7.50 7.00 6.50 6.00 5.50 5.00 4.00 3.50 3.00 2.50

TEMPORARY AND PERMANENT SEEDING COASTAL PLAIN REGION (TO BE UTILIZED ON AREAS DISTURBED DURING CONSTRUCTION ACTIVITIES.)

E6 C-501 E7 C-501

TYPE III TURBIDITY CURTAIN SYSTEM (SEE NOTE 6 C-115) E5 C-501

0 30' 60'

Scale: 1" = 30'

LEGEND

- EXISTING CONTOURS
- EXISTING TREE LINE
- EDGE OF WATER
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- TREE PROTECTION FENCE
- SILT FENCE
- TYPE III TURBIDITY CURTAIN
- PROPOSED SILL & RIP RAP REVETMENT
- PROPOSED RIPARIAN ZONE PLANTING AREA

NOTES:
1. SEE C-115 FOR NOTES.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT HURT 04-13-2024

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MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: EROSION CONTROL PLAN	DRAWING NO: C-118		

MATCHLINE SEE DRAWING C-119

MATCHLINE SEE DRAWING C-118

EXISTING 50" ASH TREE

EXISTING 30" PINE TREE

EXISTING 50" ASH TREE

EXISTING TREE LINE (TYP)

EXISTING 50" ASH TREE

EXISTING 50" ASH TREE

EXISTING 30" PINE TREE

EXISTING 30" HOLLY TREE

EXISTING 60" PINE TREE

EXISTING GRAVEL ACCESS ROAD (TYP)

EXISTING GRAVEL ACCESS ROAD (TYP)

EXISTING RIP-RAP TO REMAIN IN PLACE (TYP)

SILT FENCE

E4 C-501

TYPE III TURBIDITY CURTAIN SYSTEM (SEE NOTE 6 C-115)

E5 C-501

TEMPORARY AND PERMANENT SEEDING COASTAL PLAIN REGION (TO BE UTILIZED ON AREAS DISTURBED DURING CONSTRUCTION ACTIVITIES.)

E6 C-501 E7 C-501

TREE PROTECTION FENCING (SEE NOTE 5 C-115)

E3 C-501

36+00 37+00 38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 45+15

5.50 5.00 4.50 4.00 3.50 3.00 2.50

0 30' 60'

Scale: 1" = 30'

LEGEND

- EXISTING CONTOURS (3.00)
- EXISTING TREE LINE
- EDGE OF WATER
- EXISTING TREE
- EXISTING RIP RAP
- EXISTING GRAVEL ACCESS ROAD
- TREE PROTECTION FENCE
- SILT FENCE
- TYPE III TURBIDITY CURTAIN
- PROPOSED RIPARIAN ZONE PLANTING AREA
- PROPOSED SILL & RIP RAP REVETMENT

NOTES:
1. SEE C-115 FOR NOTES.

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KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

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GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes

Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

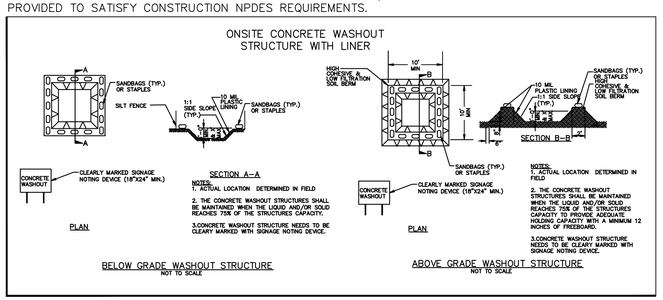
PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

NOTE:
THE USE OF CONCRETE IS NOT CALLED OUT ON THESE PLANS, HOWEVER THESE INSTRUCTIONS ARE PROVIDED TO SATISFY CONSTRUCTION NPDES REQUIREMENTS.



CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NORTH CAROLINA PROFESSIONAL SEAL 050332 ENGINEER JOSEPH SCOTT KUHL
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MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: EROSION CONTROL NOTES	DRAWING NO: C-120		

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This General Permit as well as the Certificate of Coverage, after it is received.

(b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(d) Anticipated bypasses and unanticipated bypasses.

(e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	• ***Within 24 hours***, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• ***A report at least ten days before the date of the bypass, if possible***. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days,*** a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment[40 CFR 122.41(l)(7)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

(a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,
(b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit,
(c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems,
(d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item (c) above,
(e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
(f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KUHL
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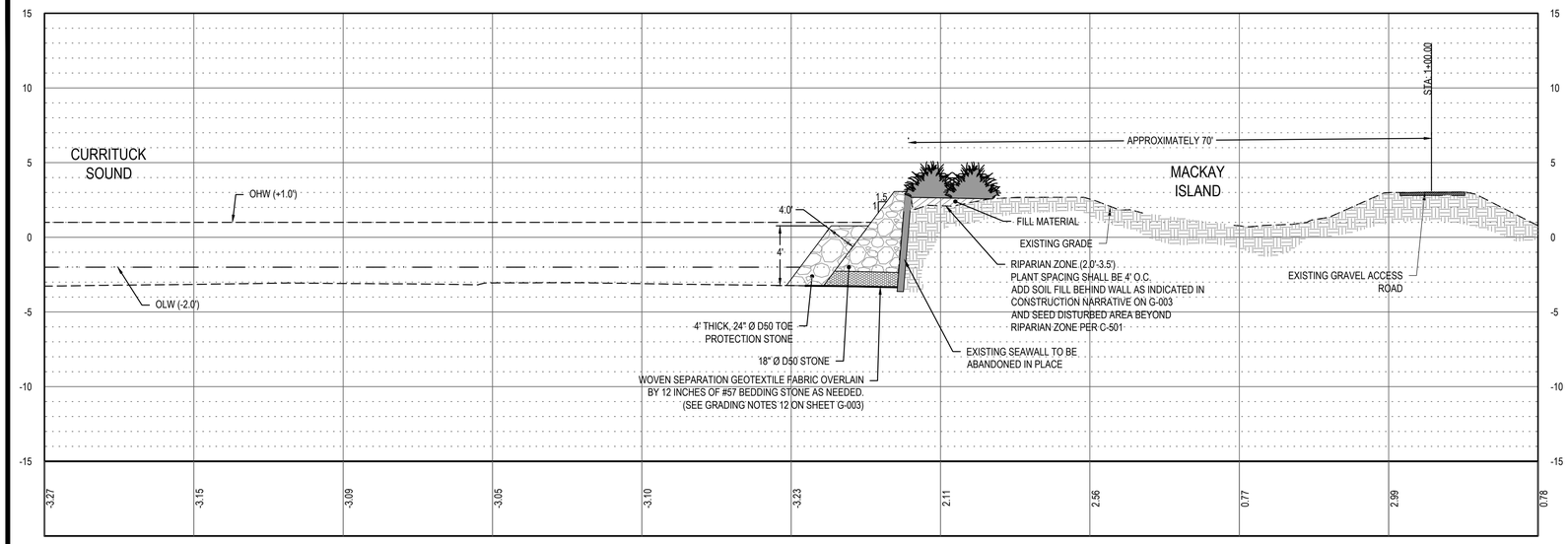
MACKAY ISLAND NATIONAL WILDLIFE REFUGE
KNOTTS ISLAND **NORTH CAROLINA**

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

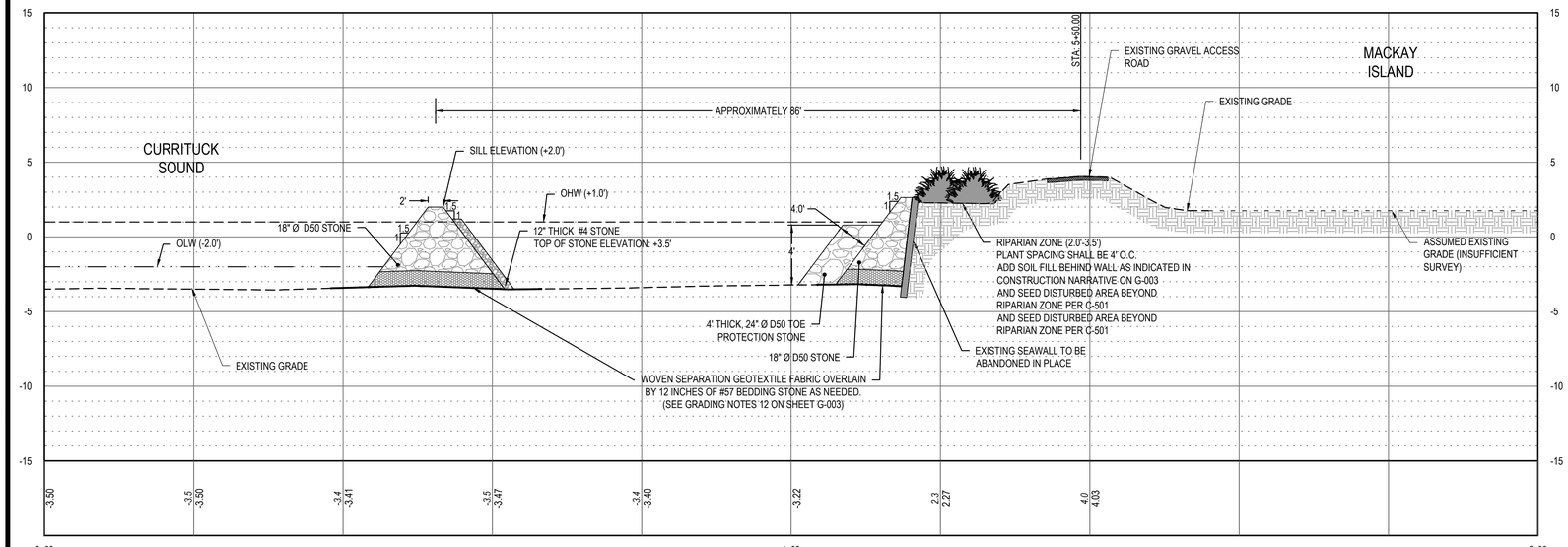
DESIGNED: JSK	**DRAWN: SEK**	**DATE:04/13/2023**	**CHECKED: MSL**
CADD: EROSION CONTROL NOTES	**DRAWING NO:** C-121		



A
C-201

SECTION A (STATION 1+00.00)

SCALE: HORIZONTAL:1"=10' VERTICAL: 1"=5'



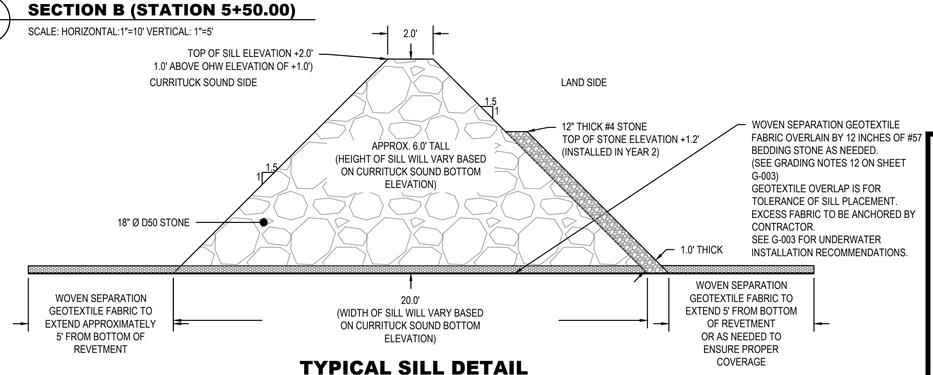
B
C-201

SECTION B (STATION 5+50.00)

SCALE: HORIZONTAL:1"=10' VERTICAL: 1"=5'

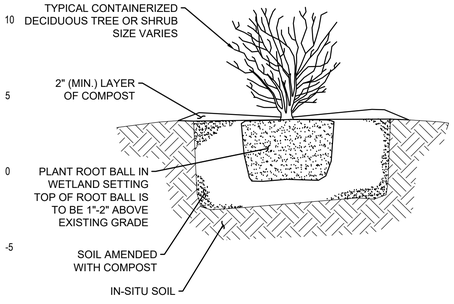
LEGEND

- OHW (ORDINARY HIGH WATER ELEVATION/NORMAL HIGH WATER)
- OLW (ORDINARY LOW WATER ELEVATION)
- EXISTING GRADE
- ASSUMED EXISTING GRADE (INSUFFICIENT SURVEY)
- PROPOSED RIPARIAN ZONE VEGETATION
- WOVEN SEPARATION GEOTEXTILE FABRIC
- 18" ø D50 STONE
- 4' THICK 24" ø D50 TOE PROTECTION STONE
- 12" THICK #57 BEDDING STONE AS NEEDED (SEE GRADING NOTES 12 ON SHEET G-003)
- 12" THICK #4 STONE
- EXISTING GRAVEL ACCESS ROAD
- EXISTING COMPACTED EARTH



TYPICAL SILL DETAIL

N.T.S.



P2

RIPARIAN CONTAINER STOCK PLANTING DETAIL

N.T.S.

NOTES:

1. SHRUB PIT CONFORMS WITH DEPTHS AND WIDTHS IN SPECIFICATIONS.
2. PRUNE SHRUBS ONLY AFTER INSTALLED AND AFTER THE PLANT HAS BEEN SUFFICIENTLY WATERED.
3. MULCH DIAMETER OF PLANTING HOLE, MINIMUM 2" DEPTH, WITH COMPOST.

NORTH CAROLINA PROFESSIONAL SEAL 050232 ENGINEER JOSEPH SCOTT KIRK 04-13-2024

wsp

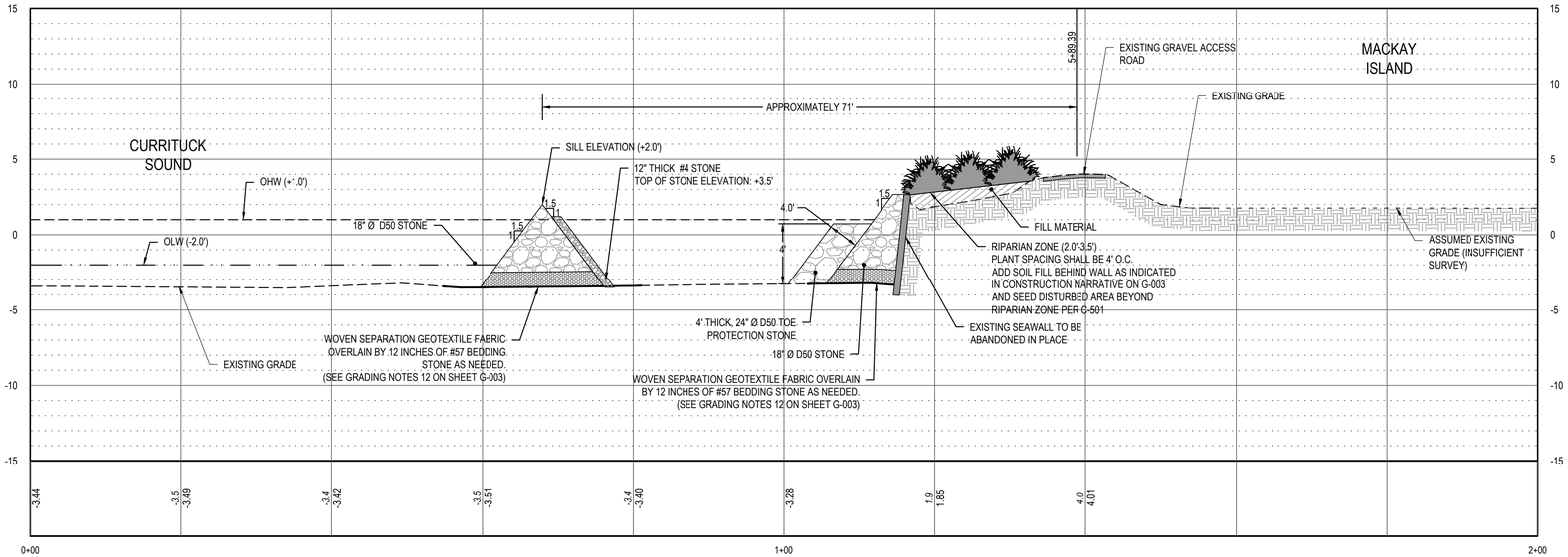
SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — NORTH CAROLINA

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

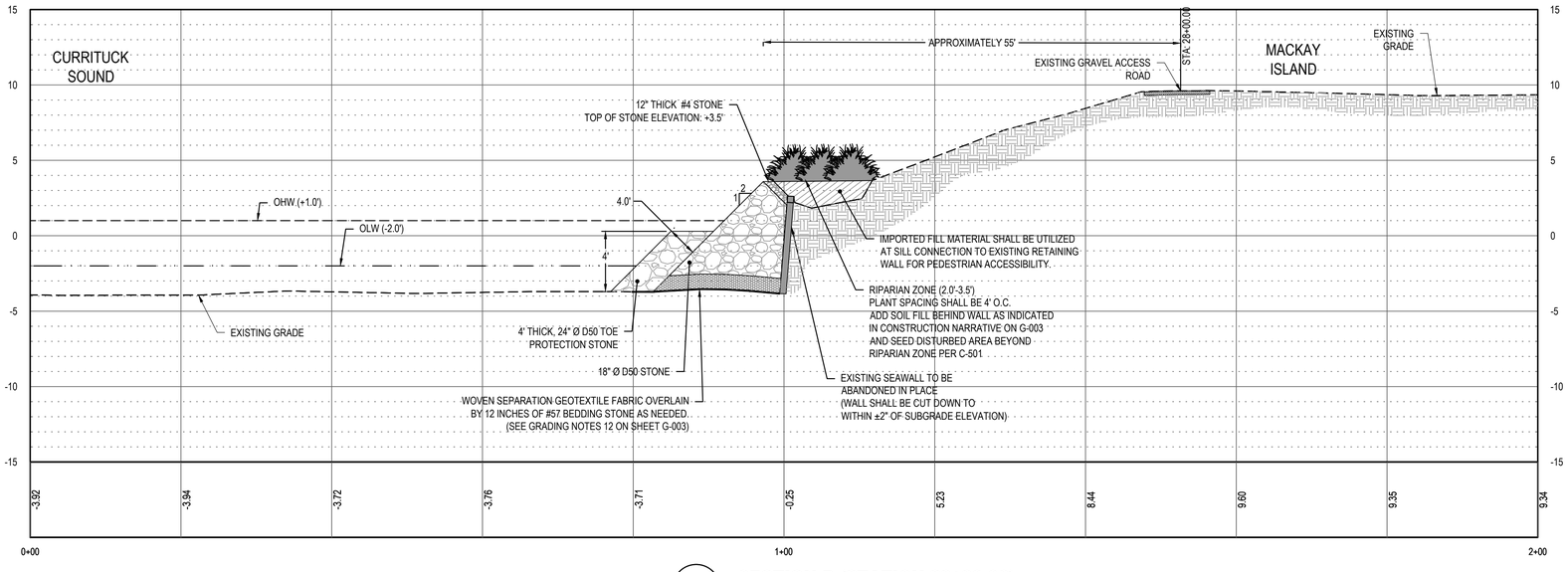
DESIGNED: JSK	DRAWN: SEK	DATE:04/13/2023	CHECKED: MSL
CADD: CROSS SECTIONS	DRAWING NO: C-201		



C / C-202

SECTION C (STATION 5+89.39)

SCALE: HORIZONTAL:1"=10' VERTICAL: 1"=5'



D / C-202

SECTION D (STATION 28+00.00)

SCALE: HORIZONTAL:1"=10' VERTICAL: 1"=5'

LEGEND

- OHW (ORDINARY HIGH WATER ELEVATION/NORMAL HIGH WATER)
- OLW (ORDINARY LOW WATER ELEVATION)
- EXISTING GRADE
- ASSUMED EXISTING GRADE (INSUFFICIENT SURVEY)
- PROPOSED RIPARIAN ZONE VEGETATION
- WOVEN SEPARATION GEOTEXTILE FABRIC
- IMPORTED FILL MATERIAL
- 4' THICK 24" ø D50 TOE PROTECTION STONE
- 18" ø D50 STONE
- 12" THICK #57 BEDDING STONE AS NEEDED (SEE GRADING NOTES 12 ON SHEET G-003)
- 12" THICK #4 STONE
- EXISTING GRAVEL ACCESS ROAD
- EXISTING COMPACTED EARTH

NORTH CAROLINA PROFESSIONAL SEAL 050039 ENGINEER JOSEPH SCOTT HURLEY
04-13-2024

wsp

SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — **NORTH CAROLINA**

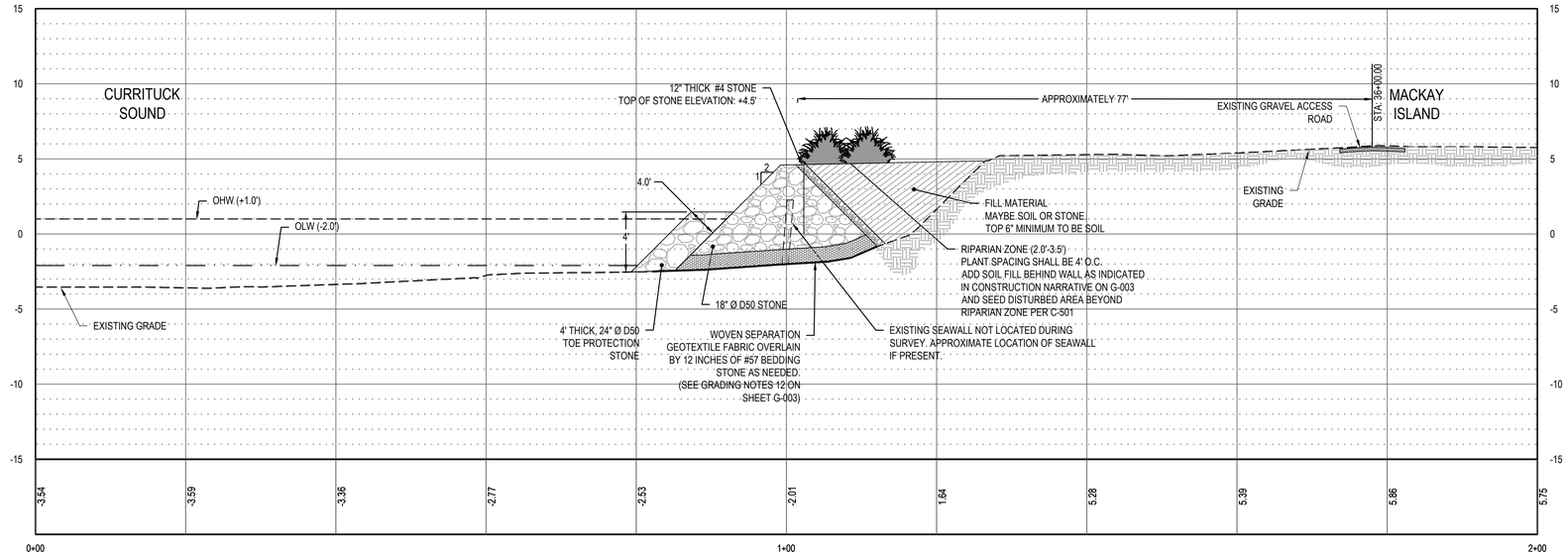
CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN:** SEK	**DATE:** 04/13/2023	**CHECKED:** MSL
CADD: CROSS SECTIONS	**DRAWING NO:** C-202		

PLOT DATE: Apr 13, 2023 - 8:29am

DWG NAME: J:\6166232351 mackay island re design\07-CAD\Civil\400 Cadd\+PLANS\ C-200 Cross Sections.dwg

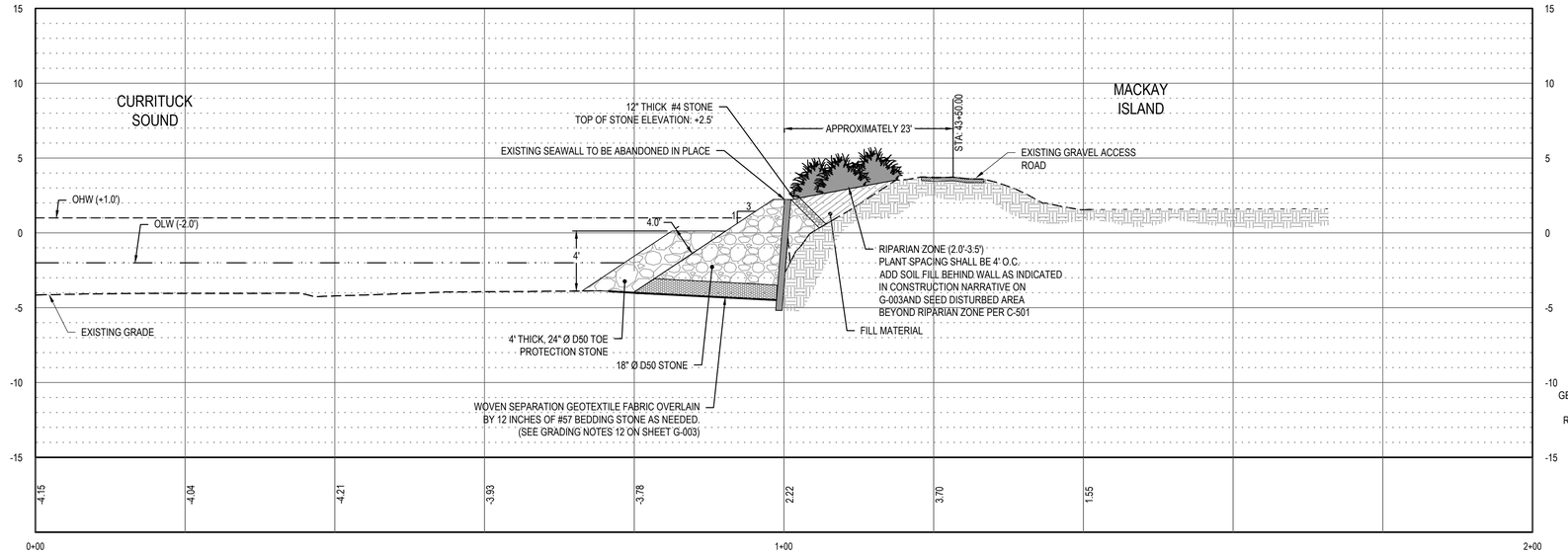
Drawing Status: DESIGN



E
C-203

SECTION E (STATION 36+00.00)

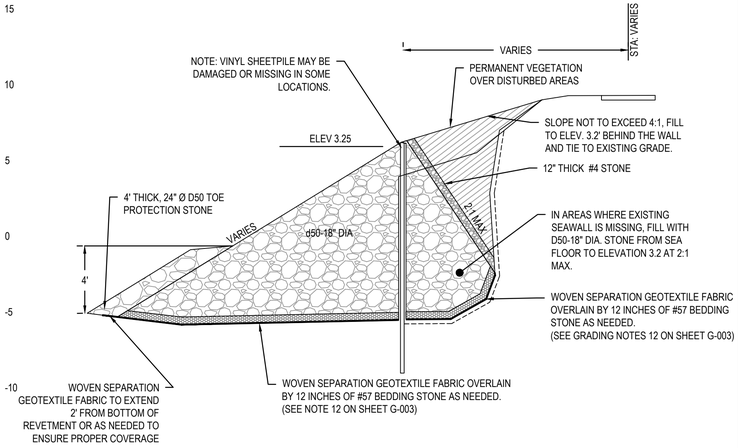
SCALE: HORIZONTAL:1"=10' VERTICAL: 1"=5'



F
C-203

SECTION F (43+50.00)

SCALE: HORIZONTAL:1"=10' VERTICAL: 1"=5'



TYPICAL REVETMENT DETAIL

N.T.S.

LEGEND

- OHW (ORDINARY HIGH WATER ELEVATION/NORMAL HIGH WATER)
- OLW (ORDINARY LOW WATER ELEVATION)
- EXISTING GRADE
- ASSUMED EXISTING GRADE (INSUFFICIENT SURVEY)
- PROPOSED RIPARIAN ZONE VEGETATION
- WOVEN SEPARATION GEOTEXTILE FABRIC
- 18" ø D50 STONE
- 4' THICK 24" ø D50 TOE PROTECTION STONE
- 12" THICK #57 BEDDING STONE AS NEEDED (SEE GRADING NOTES 12 ON SHEET G–003)
- EXISTING GRAVEL ACCESS ROAD
- EXISTING COMPACTED EARTH
- 12" THICK #4 STONE

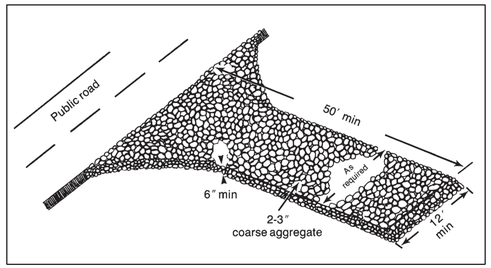
SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — **NORTH CAROLINA**

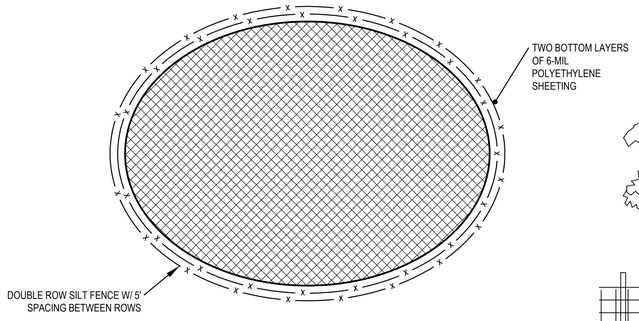
CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN: SEK**	**DATE:04/13/2023**	**CHECKED: MSL**
CADD: CROSS SECTIONS	**DRAWING NO:** C-203		

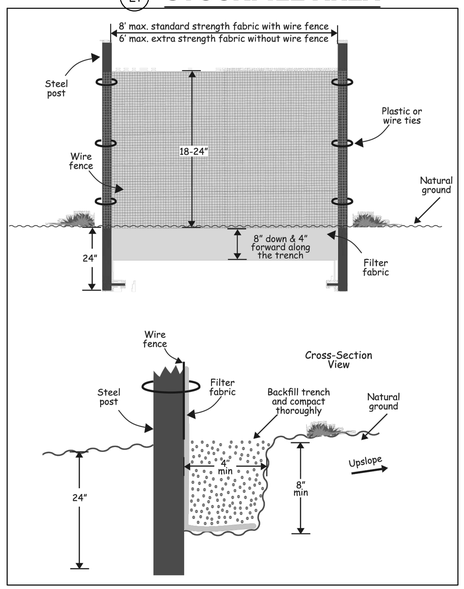


NOTES:
1. TEMPORARY GRAVEL CONSTRUCTION ENTRANCE SHALL BE PLACED WHEREVER TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY ONTO A PUBLIC ROAD OR OTHER PAVED OFF-SITE AREA.
2. AGGREGATE SIZE SHALL BE 2-3 INCH WASHED STONE.
3. GRAVEL PAD SHALL BE A MINIMUM OF 6-INCHES THICK, 12-FEET WIDE, AND 50-FEET IN LENGTH.
4. IF CONDITIONS AT THE SITE ARE SUCH THAT MOST OF THE MUD AND SEDIMENT ARE NOT REMOVED BY VEHICLES TRAVELING OVER THE GRAVEL, THE TIRES SHOULD BE WASHED. WASHING SHOULD BE DONE ON AN AREAS STABILIZED WITH CRUSHED STONE THAT DRAINS INTO A SUITABLE DISPOSAL AREA. A WASH RACK MAY ALSO BE USED TO MAKE WASHING MORE CONVENIENT AND EFFECTIVE.
5. MAINTAIN THE GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. THIS MAY REQUIRE PERIODIC TOPDRESSING WITH 2-INCH STONE.
6. AFTER EACH RAINFALL, INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT AND CLEAN IT OUT AS NECESSARY.
7. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS.

E2 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

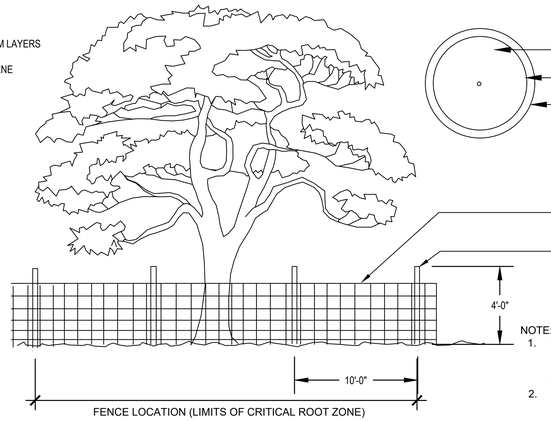


E1 STOCKPILE AREA



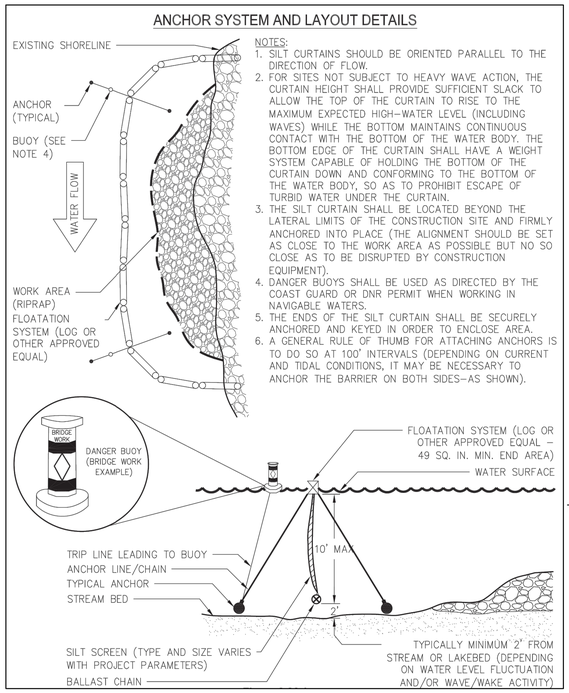
NOTES:
1. THE SILT FENCE INSTALLATION AND MATERIALS SHALL CONFORM TO THE NC DEQ EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
2. INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. ANY REPAIRS NEEDED SHALL BE MADE IMMEDIATELY.
3. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE OR BECOME INEFFECTIVE, IT SHALL BE REPLACED PROMPTLY.
4. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEAN-OUT.
5. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING THE AREA TO GRADE AND STABILIZED IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

E4 SILT FENCE



NOTE:
1. WHEN PLACING FENCE AROUND FREE STANDING SPECIMEN TREES INSTALL HOGWIRE BACKING ON THE BACK OF FENCE.
2. POST "KEEP OUT" SIGNS ON ALL SIDES OF FENCING. DO NOT STORE CONSTRUCTION EQUIPMENT OR MATERIALS WITHIN FENCING.

E3 TREE PROTECTION FENCING



E5 TYPE III TURBIDITY CURTAIN SYSTEM

TURBIDITY CURTAIN NOTES:
1. THE CONTRACTOR SHALL ENSURE THAT THE ENTIRE CONSTRUCTION AREA IS CONTAINED WITHIN THE TURBIDITY CURTAIN. IF THE SILL OR REVETMENT HAS BEEN INSTALLED ON EITHER SIDE OF THE CURRENT/ACTIVE CONSTRUCTION AREA AN ADDITIONAL SEGMENT OF TURBIDITY CURTAIN SHALL BE INSTALLED BETWEEN THE EXISTING SILL OR REVETMENT AND THE SHORELINE TO ENSURE A COMPLETELY CONTAINED CONSTRUCTION AREA.
2. THE LOCATION OF THE TURBIDITY CURTAIN SHALL BE ADJUSTED AS WORK PROGRESSES.
3. THE CONTRACTOR SHALL PURCHASE SUFFICIENT LENGTH OF CURTAIN TO ALIGN WITH THE LARGEST PROPOSED SHORELINE WORK AREA TO BE DISTURBED AT ANY GIVEN TIME.

Seeding mixture

Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding dates
Mountains—Above 2500 feet: Feb. 15 - May 15
Below 2500 feet: Feb. 1- May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

Soil amendments
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

Seeding mixture

Species	Rate (lb/acre)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding dates
Mountains—May 15 - Aug. 15
Piedmont—May 1 - Aug. 15
Coastal Plain—Apr. 15 - Aug. 15

Soil amendments
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR SUMMER

Seeding mixture

Species	Rate (lb/acre)
Rye (grain)	120

Seeding dates
Mountains—Aug. 15 - Dec. 15
Coastal Plain and Piedmont—Aug. 15 - Dec. 30

Soil amendments
Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extent temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

TEMPORARY SEEDING RECOMMENDATIONS FOR FALL

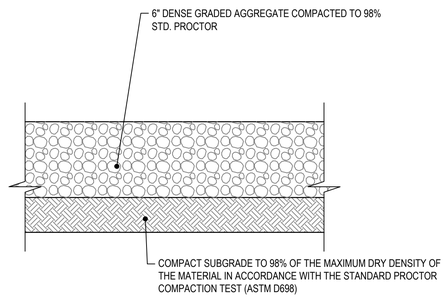
E6 TEMPORARY SEEDING COASTAL PLAIN REGION

Common Name	Scientific Name	Cultivars	Type*	Percentage of Mix	Optimal Planting Dates	Soil Drainage Adaptation	Shade Tolerance	Height
Switchgrass	Panicum virgatum	**Blackwell** – well drained **Shelter** – well drained **Kanlow** – poorly drained **Carthage** – well drained	Warm Season	10-15%	Dec. 1 - Apr. 1	Cultivar Dependent	Poor	6
Switchgrass	Panicum virgatum	**Alamo** – poorly-drained	Warm Season	10-15%	Dec. 1 - May 1	Cultivar Dependent	Poor	6
Indiangrass*	Sorghastrum nutans*	**Rumsey, Osage, Cheyenne**	Warm Season	10-30%	Dec. 1 - Apr. 1	Well-drained to Droughty	Poor	6
Indiangrass*	Sorghastrum nutans*	**Lometa**	Warm Season	10-30%	Dec. 1 - May 1	Well-drained to Droughty	Poor	6
Big Bluestem	Andropogon gerardii	**Earl**	Warm Season	10-30%	Dec. 1 - Apr. 1	Well-drained to Droughty	Poor	6
Little Bluestem	Schizachyrium scoparium	**Cimarron**	Warm Season	10-30%	Dec. 1 - Apr. 1	Well-drained to Droughty	Poor	4
Sweet Woodreed	Cinna arundinacea		Warm Season	1-10%	Dec. 1 - Apr. 1	Poorly-drained to Well-drained	Moderate	5
Rice Cutgrass	Leersia oryzoides		Warm Season	5-25%	Dec. 1 - Apr. 1	Poorly-drained	Poor	5
Redtop Panicgrass	Panicum rigidulum		Warm Season	10-20%	Dec. 1 - Apr. 1	Well-drained	Poor	3.5
Beaked Panicgrass	Panicum anceps		Warm Season	10-20%	Dec. 1 - Apr. 1	Poorly-drained	Moderate	3.5
Eastern Gammagrass	Tripsacum dabyoides		Warm Season	5-10%	Dec. 1 - Apr. 1	Well-drained to Poorly-drained	Poor	4.5
Purple top	Tridens flavus		Warm Season	5-10%	Dec. 1 - Apr. 1	Well-drained to Droughty	Poor	2.5
Indian Woodoats	Chasmanthium latifolium		Cold Season	1-10%	Feb. 15 - Mar. 20, Sep. 1 - Nov. 1	Well-drained to Droughty	Moderate	4
Virginia Wildrye	Elymus virginicus		Cold Season	5-25%	Feb. 15 - Mar. 20, Sep. 1 - Nov. 1	Well-drained to Droughty	Moderate	3
Rough Bentgrass	Agrostis scabra		Cold Season	10-20%	Feb. 15 - Mar. 20, Sep. 1 - Nov. 1	Poorly-drained	Poor	2.5
Soft Rush	Juncus effusus		Wetland	1-10%	Dec. 1 - Apr. 15	Poorly-drained	Poor	4
Shallow Sedge	Carex lurida		Wetland	1-10%	Dec. 1 - Apr. 15	Poorly-drained	Poor	3
Fox Sedge	Carex vulpinoidea		Wetland	1-10%	Dec. 1 - Apr. 15	Poorly-drained	Poor	3
Leathery Rush	Juncus coriaceus		Wetland	2-5%	Dec. 1 - Apr. 15	Poorly-drained	Poor	2

* Only Lometa in eastern coastal plain (Plant Hardiness Zone 8).
* Pick at least four species, including one from each type.

NOTES:
1. PERMANENT SEEDING SHALL BE INSTALLED AND MAINTAINED PER NC DEQ STANDARDS.
2. THE CONTRACTOR IS RESPONSIBLE FOR WHATEVER MEASURES ARE NECESSARY TO PRODUCE AND MAINTAIN AN ACCEPTABLE STAND OF GRASS. SAID MEASURES TO INCLUDE (BUT ARE NOT LIMITED TO) WATERING, RE-SEEDING, RE-GRADING ERODED AREAS, RE-FERTILIZING ETC.
3. THE REFUGE SHALL APPROVE ALL SEED TYPES PRIOR TO USE BY CONTRACTOR.

E7 PERMANENT SEEDING COASTAL PLAIN REGION



NOTES:
1. ALL MATERIALS UTILIZED FOR REPAIR/REPLACEMENT OF GRAVEL ROAD SHALL COMPLY WITH ALL NCDOT STANDARDS AND SPECIFICAIONS.
2. SEE SHEET G-002 LOCATION MAP FOR EXTENTS OF GRAVEL ROAD REPAIR/REPLACEMENT.

E8 15' WIDE GRAVEL ROAD REPAIR/REPLACEMENT DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 050332 ENGINEER JOSEPH SCOTT KUHL
04-13-2024
wsp

SUBMITTAL	DATE	DESCRIPTION	BY
01	02/21/2023	100% REDESIGN PLAN SUBMITTAL	JSK
02	04/13/2023	ISSUE FOR CONSTRUCTION REDESIGN PLAN SUBMITTAL	JSK

MACKAY ISLAND NATIONAL WILDLIFE REFUGE

KNOTTS ISLAND — **NORTH CAROLINA**

CONSTRUCT LIVE OAK POINT SHORE PROTECTION

DESIGNED: JSK	**DRAWN:** SEK	**DATE:**04/13/2023	**CHECKED:** MSL
CADD: DETAILS	**DRAWING NO:** C-501		