CONSTRUCTION PLANS

FOR

BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS AND BATTIN ROAD BOAT RAMP REPLACEMENT

BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY, NEW JERSEY

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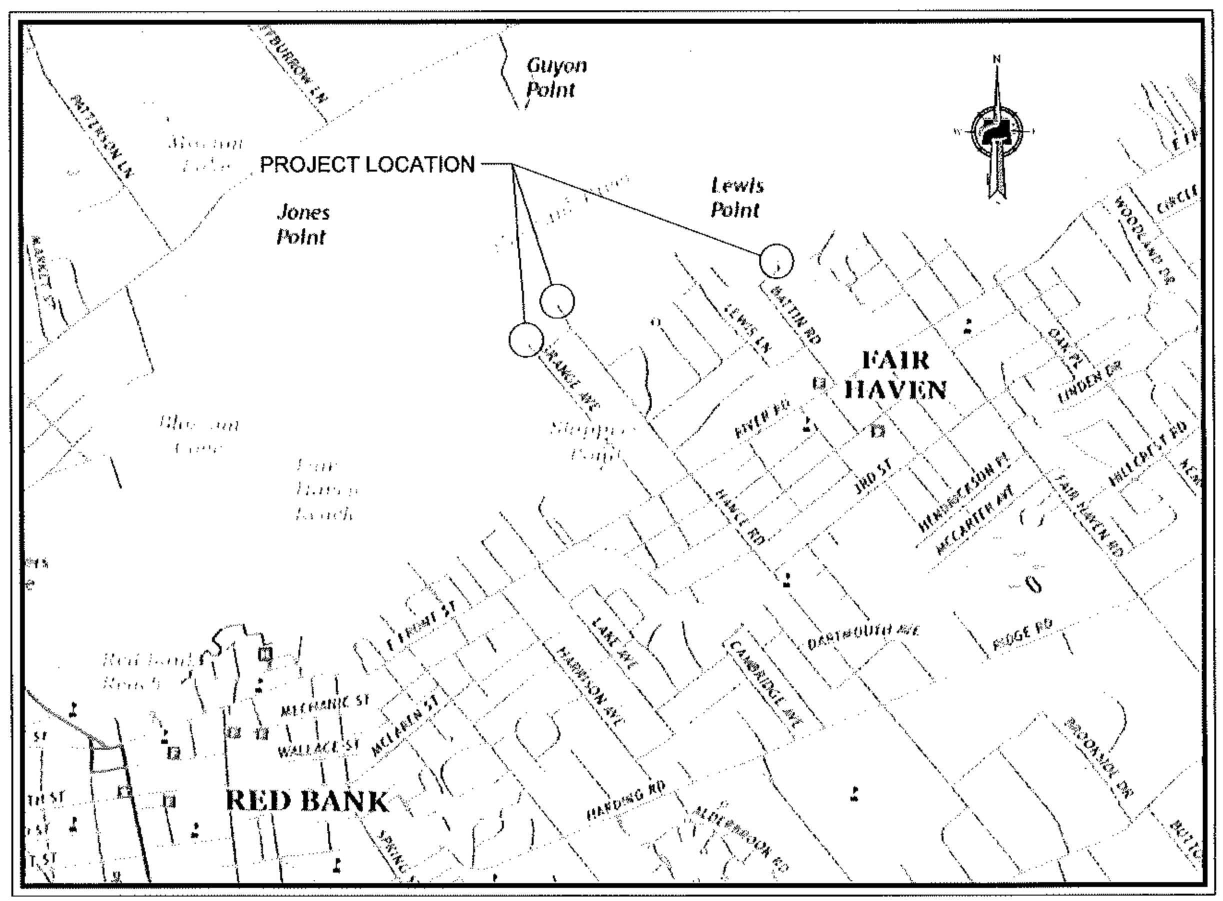
PUBLIC UTILITIES

ELECTRIC	JCP & L 101 CRAWFORDS CORNER ROAD HOLMDEL, N.J. 07733 TEL: (800) 662-3115
GAS	NEW JERSEY NATURAL GAS 10 WEST LINCOLN AVENUE ATLANTIC HIGHLANDS, N.J. 07716 TEL: (800) 221-0051
WATER	NEW JERSEY AMERICAN WATER COMPANY 661 SHREWSBURY AVENUE SHREWSBURY, N.J. 07702 TEL: (800) 987-5325
TELEPHONE	VERIZON, INC. 180 BROAD STREET RED BANK, NJ, 07701 TEL: (800) 922-0204
CABLE	COMCAST CABLE OF NEW JERSEY 403 SOUTH STREET EATONTOWN, N.J. 07724 TEL: (800) 266-2278
SEWER	TWO RIVER WATER RECLAMATION AUTHORITY 1 HIGHLAND AVENUE MONMOUTH BEACH, NJ 07750 TEL: (732) 229-8578
FIBER OPTIC	VERIZON, INC. 180 BROAD STREET RED BANK, N.J. 07701 TEL: (800) 266-2278

LOCATION OF UTILITIES SHOWN ON THE PLANS ARE PLOTTED FROM AVAILABLE DATA ON FILE WITH THE UTILITY COMPANIES AND ARE NOT WARRANTED AS TO EXACTNESS. CONTRACTOR IS TO DETERMINE EXACT LOCATION AND DEPTH OF UTILITIES AT ALL CROSSINGS PRIOR TO CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

INDEX OF SHEETS



LOCATION MAP

1000 0 1000

SCALE : 1" = 1000'

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REV	DATE	DRAWN BY	DESCRIPTION
1	07/23/19	TEK	FINAL PLAN SUBMITTAL
2	01/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	05/15/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP

BOROUGH OF FAIR HAVEN MONMOUTH COUNTY NEW JERSEY

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SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004982B	C-CVER

SHEET TITLE: COVER SHEET

SHEET NUMBER: T-1

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE NEW JERSEY UNIFORM CONSTRUCTION CODE (NJUCC), BASED ON IBC 2015, WHICH IS THE ADOPTED BUILDING CODE FOR THE PROJECT SITE, AND ITS REFERENCE DOCUMENT, ASCE 7–10, "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES".

2. THE WORK ON THIS PROJECT SHALL BE DESIGNATED AS THE RECONSTRUCTION REHABILITATION CATEGORY PER THE NJUCC, CHAPTER 6 REHABILITATION CODE.

3. ALL ASPECTS OF THE WORK ALSO SHALL BE IN COMPLETE ACCORDANCE WITH THE REQUIREMENTS AND DIRECTIVES OF THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF ENGINEERING & CONSTRUCTION.

4. CONTRACTOR SHALL PROVIDE TEMPORARY BRACING AS REQUIRED TO SUPPORT LOADS WHICH NEW AND EXISTING STRUCTURES MAY BE SUBJECTED TO DURING CONSTRUCTION.

5. <u>CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL EXISTING CONDITIONS, ELEVATIONS, ANGLES, AND DIMENSIONS IN FIELD.</u> ANY UNUSUAL CONDITIONS OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE PURCHASE, FABRICATION, OR ERECTION OF ANY MATERIALS.

6. CONTRACTOR SHALL SUBMIT FOR ENGINEER'S REVIEW, ERECTION DRAWINGS AND DETAILED SHOP DRAWINGS FOR ALL STRUCTURAL MATERIALS INCLUDING:

   A. STEEL SHEET PILE SECTIONS
   B. STEEL SECTIONS AND FABRICATIONS
   C. HELICAL ANCHOR SYSTEM
   D. PRE–ENGINEERED TIMBER CONNECTORS
   E. DATA SHEETS ON ALL STRUCTURAL MATERIALS.

EXCAVATION, FOUNDATION AND BACKFILLING

1. ALL FOUNDATION DESIGNS ARE BASED ON THE GEOTECHNICAL REPORT FOR THE PROJECT. ~~REPORT IS AS PREPARED BY MASER CONSULTING, P.A., DATED MARCH 20, 2018.~~ IF ANY DISCREPANCIES OR INCONSISTENCIES EXIST BETWEEN THESE SPECIFICATIONS AND THE GEOTECHNICAL REPORT, THE MORE STRINGENT REQUIREMENTS SHALL APPLY.

2. ALL FOUNDATION DESIGNS ARE BASED ON AN ALLOWABLE SOIL BEARING CAPACITY OF 2000 PSF MINIMUM.

3. ALL ASPECTS OF SITE PREPARATION AND FOUNDATION CONSTRUCTION SHALL BE IN COMPLETE ACCORDANCE WITH THE RECOMMENDATIONS OF THE REFERENCED GEOTECHNICAL REPORT.

4. ALL FOUNDATIONS SHALL BE FOUNDED ON FIRM, UNDISTURBED SOIL. ALL SOFT SPOTS OR OVER–EXCAVATION OF FOOTINGS SHALL BE FILLED WITH ACCEPTABLE FILL MATERIAL AND COMPACTED TO 95% MODIFIED PROCTOR DENSITY. ALL FOOTING EXCAVATIONS SHALL BE FINISHED BY HAND.

5. BACKFILL SHALL BE PLACED IN 8–INCH MAXIMUM LIFTS AND COMPACTED TO A MINIMUM DENSITY OF 95% (UNDER SLABS–ON–GRADE AND FOOTINGS) AND 90% ELSEWHERE OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D1557 MODIFIED PROCTOR.

6. BACKFILL SHALL CONSIST OF NON–EXPANSIVE, FREE–DRAINING, WELL GRADED SAND AND GRAVEL, FREE OF DEBRIS AND ORGANIC MATERIAL.

7. BACKFILL SHALL NOT BE PLACED AGAINST WALLS UNTIL CONCRETE HAS CURED 7 DAYS TO SUPPORT THE BACKFILL AND THE SUPERIMPOSED LOADS OF THE PLACING AND COMPACTING EQUIPMENT. HEAVY CONSTRUCTION EQUIPMENT SHALL NOT APPROACH CLOSER TO THE WALL THAN A DISTANCE EQUAL TO THE HEIGHT OF THE WALL. USE HAND COMPACTION EQUIPMENT WITHIN A DISTANCE EQUAL TO THE HEIGHT OF THE FILL ABOVE THE FOOTINGS.

8. CONTRACTOR WILL BE RESPONSIBLE FOR, AND SHALL SAFEGUARD AND PROTECT, ALL EXCAVATIONS AND EXISTING STRUCTURES DURING CONSTRUCTION OF FOUNDATIONS BY PROPER SAFEGUARDS WHICH MAY INCLUDE BRACING.

9. ALL EXCAVATIONS SHALL CONFORM WITH CURRENT OSHA REQUIREMENTS AND STANDARDS.

10. THE DESIGN AND OPERATION OF THE GROUNDWATER CONTROLS DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

STEEL SHEET PILES & ANCHORS

1. ALL SHEET PILES SHALL BE FABRICATED FROM ASTM A572 GRADE 50 STEEL (Fy = 50 KSI MINIMUM).

2. SECTIONS FOR STEEL SHEET PILING SHALL BE AS SHOWN ON THE DRAWINGS, AND SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:
   A. TYPICAL BULKHEAD SHEETS:

(1) SHEET WIDTH =	28.50 IN.
(2) SHEET HEIGHT (CORRUGATION DEPTH) =	10.00 IN.
(3) SHEET THICKNESS =	0.25 IN.
(4) CROSS–SECTIONAL AREA =	4.18 IN. /FT.
(5) SECTION MODULUS =	14.36 IN. /FT.
(6) MOMENT OF INERTIA =	71.82 IN. /FT.
(7) SHEET PILE WEIGHT =	33.81 LBS/FT.
(8) WALL WEIGHT =	14.23 PSF

3. ALL STEEL SHEET PILES SHALL BE SHOP COATED WITH THE FOLLOWING COATING SYSTEM:
   A. FIRST COAT SHALL BE A CYCLOALIPHATIC AMINE EPOXY MATERIAL.
      (1) SURFACE PREPARATION: SSPC–SP–10
      (2) MATERIAL SHALL BE SELF–PRIMING
      (3) DRY FILM THICKNESS: 4.0 TO 6.0 mils PER COAT
      (4) SOLIDS CONTENT: 75% ±2% BY VOLUME
      (5) FINISH: GLOSS

   B. SECOND COAT SHALL BE AN ALIPHATIC ACRYLIC POLYURETHANE MATERIAL.
      (1) DRY FILM THICKNESS: 2.0 TO 2.5 mils
      (2) SOLIDS CONTENT: 70% ±2% BY VOLUME
      (3) FINISH: GLOSS
      (4) ABRASION RESISTANCE: 2562 psi (ASTM D4541)

   C. ALL ASPECTS OF SURFACE PREPARATION, COATING STORAGE, MIXING & HANDLING, COATING APPLICATION, AND CURING SHALL BE IN COMPLETE ACCORDANCE WITH THE COATING MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

   D. COLOR OF FINAL COATING SHALL BE AS SELECTED BY OWNER FROM MANUFACTURER'S STANDARD COLOR SELECTION.

   E. COAL–TAR EPOXY COATING <u>MAY NOT</u> BE SUBSTITUTED ON SHEET PILES.

4. CONTRACTOR SHALL USE A DRIVING TEMPLATE FOR DRIVING STEEL SHEET PILING.

5. DRIVING OF PILES IN PAIRS IS RECOMMENDED TO FACILITATE DRIVING AND HELP MAINTAIN VERTICALITY OF PILES.

6. PILING SHOULD BE DRIVEN WITH THE BALL EDGE LEADING WHERE POSSIBLE, TO AVOID CLOGGING OF SOCKET END DURING DRIVING. WHEN CONDITIONS REQUIRE THAT SOCKET END LEAD, OR IF SELECTED SHEET PILES DO NOT INCLUDE A BALL END, A BOLT OR SIMILAR OBJECT SHOULD BE PLACED IN BOTTOM OF LEADING SOCKET TO MINIMIZE CLOGGING.

7. SHEET PILE ANCHORAGE SYSTEMS:

   A. SHEET PILE ANCHORAGE SYSTEM SHALL INCLUDE STEEL CHANNEL WALER SECTIONS LOCATED <u>BEHIND</u> THE SHEET PILES (LANDWARD SIDE) TO REDUCE POSSIBILITY OF BOAT DAMAGE DUE TO WALER IMPACTS. ANCHOR TIE RODS AND HELICAL ANCHORS SHALL BE LOCATED TO OCCUR WITHIN THE CORRUGATIONS OF THE SELECTED SHEET PILE PROFILE. <u>SPACING OF ANCHOR TIE RODS AND HELICAL ANCHORS SHALL BE 9'–6" O.C. MAXIMUM</u>, SEE DESIGN DRAWINGS FOR ADDITIONAL INFORMATION AND CONNECTION DETAILS.

   B. TIE RODS FROM SHEET PILE WALERS TO HELICALS:
      (1) TYPICAL BULKHEAD TIE RODS SHALL BE 1¾"ø THREADED RODS, ASTM A572, GRADE 50 STEEL (Fy = 50 KSI MIN).
      (2) EACH ROD (TYPICAL RODS OR DIAGONALS) SHALL INCLUDE A TURNBUCKLE FOR TENSIONING AND ADJUSTMENT OF ROD AFTER INSTALLATION. TURNBUCKLE, AND INNER AND OUTER ROD SECTIONS, SHALL BE PROVIDED WITH OPPOSITE–HAND THREADS TO PERMIT TENSIONING AND ADJUSTMENT USING TURNBUCKLES.
      (3) ALL ELEMENTS OF TIE ROD SYSTEM, INCLUDING BUT NOT LIMITED TO RODS, TURNBUCKLES, WASHERS, HEX NUTS, SHIMS AND OTHER HARDWARE SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 & A153 AS APPLICABLE, WITH 20 OUNCES OF ZINC PER SQUARE FOOT, MINIMUM. AFTER GALVANIZING, ALL ELEMENTS AS NOTED ABOVE SHALL ALSO BE FULLY COATED WITH COAL–TAR EPOXY. THREADED ELEMENTS SHALL BE COATED WITH COAL–TAR EPOXY IN FIELD ONLY AFTER FINAL ADJUSTMENT AND TIGHTENING OF PARTS IS COMPLETED. SEE NOTES THIS SHEET FOR DETAILS OF COAL–TAR EPOXY COATING.

   C. DRILLED–IN HELICAL SOIL ANCHORS
      (1) DESIGN LENGTH OF HELICAL ANCHORS FROM FACE OF BULKHEAD SHEET PILES SHALL BE 45'–0" MINIMUM, AS SHOWN IN THE DESIGN DRAWINGS.
      (2) HELICAL ANCHOR INSTALLATION ANGLE SHALL BE 20° FROM HORIZONTAL (APPROX. 4 9⁄16" PER 1'–0"). ANCHORS SHALL BE PERPENDICULAR TO THE LINE OF THE BULKHEAD IN PLAN.
      (3) ENTIRE HELICAL ANCHOR SYSTEM SHALL BE SUPPLIED FROM THE SAME MANUFACTURER, INCLUDING SHAFTS, HELICES, AND ALL HARDWARE.
      (4) ALL DETAILS OF HELICAL ANCHOR INSTALLATION SHALL BE IN COMPLETE ACCORDANCE WITH THE DESIGN DRAWINGS, AND WITH THE MANUFACTURER'S RECOMMENDATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
         a. ANCHOR LENGTH, LOCATION, INSTALLATION ANGLE AND SPACING ON BULKHEAD.
         b. ANCHOR HELIX MATERIAL, DIAMETERS, THICKNESSES, AND SPACING ALONG SHAFT. NOMINAL SPACING BETWEEN HELIX PLATES SHALL BE THREE TIMES THE DIAMETER OF THE LARGER HELIX. HELIX MATERIAL SHALL BE IN ACCORDANCE WITH ASTM A936 HOT–ROLLED HIGH STRENGTH LOW ALLOW STEEL SHEET, ASTM A656 HOT–ROLLED STRUCTURAL STEEL PLATE, OR MANUFACTURER'S STANDARD AS REQUIRED TO OBTAIN THE DESIGN LOAD CAPACITY. HELICES SHALL BE FORMED BY MATCHING METAL DIES.
         c. ANCHOR SHAFT SIZE, CONNECTIONS, AND MATERIAL. SHAFT MATERIAL SHALL BE IN ACCORDANCE WITH ASTM A29, OR MANUFACTURER'S STANDARD AS REQUIRED TO OBTAIN THE DESIGN LOAD CAPACITY.
         d. ANCHOR LOAD TESTING.
      (5) ALL HELICAL ANCHOR HELICES, DRIVE SHAFTS, ADAPTERS, RODS, NUTS, BOLTS, WASHERS, PLATE WASHERS, PIPE SPACERS, AND OTHER HARDWARE SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 & A153 AS APPLICABLE, WITH 20 OUNCES OF ZINC PER SQUARE FOOT, MINIMUM. AFTER GALVANIZING, ALL EXPOSED ELEMENTS AT TURNBUCKLE CONNECTION SHALL ALSO BE FULLY COATED WITH COAL–TAR EPOXY. SEE NOTES THIS SHEET FOR DETAILS OF COAL–TAR EPOXY COATING.

STEEL SHEET PILES & ANCHORS

(6) HELICAL ANCHORS SHALL HAVE THE FOLLOWING CAPACITIES:
   a. ANCHOR DESIGN LOAD: 36.25 KIPS
   b. ANCHOR ULTIMATE CAPACITY: 72.50 KIPS
   c. INSTALLATION TORQUE: 7785 FT–LBS
(7) INSTALLATION OF HELICAL ANCHORS SHALL BE PERFORMED BY A CONTRACTOR EXPERIENCED IN DRILLED HELICAL SOIL ANCHOR INSTALLATION, AND AS APPROVED BY THE ANCHOR MANUFACTURER.
(8) HELICAL ANCHORS SHALL BE LOAD TESTED IN ACCORDANCE WITH THE ANCHOR MANUFACTURER'S RECOMMENDATIONS. ALL ASPECTS OF ANCHOR TESTING SHALL BE IN COMPLETE ACCORDANCE WITH THE MFGR'S RECOMMENDATIONS, INCLUDING NUMBER/FREQUENCY OF ANCHOR TESTS, TEST PROCEDURES, MAGNITUDE OF TEST LOADS, METHOD OF TEST LOAD APPLICATION, AND DURATION OF TEST LOAD APPLICATION. CONTRACTOR SHALL WAIT MINIMUM OF TWO DAYS AFTER INSTALLATION TO CONDUCT LOAD TESTING ON ANY ANCHOR.
(9) HELICAL ANCHOR DESIGN & SHOP DRAWINGS SHALL BE SUBMITTED FOR ENGINEER APPROVAL. DESIGN AND SHOP DRAWINGS SHALL BE NEW JERSEY SIGNED AND SEALED BY

THE CONTRACTORS ENGINEER.

DESIGN SURCHARGE LOAD

1. BULKHEAD IS DESIGNED FOR A SURCHARGE LOAD OF 200 PSF ON RETAINED SOIL.

TIDAL ELEVATIONS

ALL ELEVATIONS REFER TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88), AS FOLLOWS:

MEAN HIGHER HIGH WATER (MHHW) =	2.09'
NAVD 88 REFERENCE =	0.00'
MEAN HIGH WATER (MHW) =	1.79'
MEAN TIDE LEVEL (MTL) =	0.09'
MEAN LOW WATER (MLW) =	–1.62'
MEAN LOWER LOW WATER (MLLW) =	–1.74'

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL FABRICATION AND ERECTION SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION – ALLOWABLE STRESS DESIGN", LATEST EDITION.

2. ALL STRUCTURAL STEEL "W" SHAPES SHALL CONFORM TO ASTM A992 OR A572, GRADE 50. ALL STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE "E" OR "S", GRADE B. HOLLOW STRUCTURAL SECTIONS (HSS) SHALL COMPLY WITH ASTM A500 GR. B. ALL OTHER SHAPES AND PLATES SHALL CONFORM TO ASTM A36 OR A572, GRADE 50, AS NOTED. ALL PIPE SIZES ARE NOMINAL DIAMETER.

3. ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING WELDS OR STANDARD, UNFINISHED BOLTS. CONNECTION MATERIALS SHALL BE AS FOLLOWS:
   A. UNFINISHED BOLTS SHALL CONFORM TO ASTM A325.

   B. WELDS SHALL BE IN ACCORDANCE WITH THE LATEST AMERICAN WELDING SOCIETY (AWS) SPECIFICATIONS. ALL WELDING ELECTRODES SHALL BE E70 SERIES, UNLESS OTHERWISE NOTED.

4. SHOP AND FIELD WELDING SHALL BE PERFORMED BY WELDERS WHO ARE CERTIFIED (AWS "STANDARD CERTIFICATION PROCEDURE") TO PERFORM THE TYPE OF WORK REQUIRED. WELDS SHALL CONFORM TO AWS D1.1, "STRUCTURAL WELDING CODE – STEEL", LATEST EDITION. PROVIDE MINIMUM WELD SIZES PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9th EDITION, WHEN WELD SIZES ARE NOT SHOWN.

5. STEEL SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

6. THE DRAWINGS REPRESENT THE PERMANENT FRAMING AND FINAL DETAILS WHERE SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING PROPER DESIGN AND CONSTRUCTION OF FALSEWORK, TEMPORARY BRACING, SHORING, AND RECOMMENDED ERECTION PROCEDURES.

7. PAINTING & FINISHING:
   A. U.O.N. STEEL SHAPES, PLATES, AND FABRICATIONS SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH ASTM A123. ALL STEEL SHALL <u>ALSO</u> BE COATED WITH COAL–TAR EPOXY AS DESCRIBED BELOW, AND AS APPROVED BY THE ENGINEER.

   B. U.O.N. ALL HARDWARE (NUTS, BOLTS, WASHERS, ETC.) SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH ASTM A153. ALL HARDWARE SHALL <u>ALSO</u> BE COATED WITH COAL–TAR EPOXY AS DESCRIBED BELOW, AND AS APPROVED BY THE ENGINEER. FIELD–INSTALLED AFTER INSTALLATION, TIGHTENING, AND ADJUSTMENT OF HARDWARE.

   C. ALL STEEL FRAMING, GRATING, STAIR COMPONENTS, HANDRAILS, GUARDRAILS, AND THEIR ASSOCIATED FASTENERS TO BE PAINTED PER THE FOLLOWING SYSTEM BY TNEMEC OR APPROVED EQUAL:

   SURFACE PREP: SSPC–SP2 HAND TOOL CLEAN
   PRIME: V10–99 OR 4 VERSARE, 2–3 MILS DFT
   INTERMEDIATE: 2H OR 23 ENDURATONE, 2–3 MILS DFT
   FINISH: 2H OR 23 ENDURATONE, 2–3 MILS DFT

8. STAIR STRINGERS SHALL HAVE FULL PENETRATION WELDED CONNECTIONS ALL AROUND AT CRANKED SEGMENTS AND GROUND SMOOTH UNLESS OTHERWISE NOTED.

COAL–TAR EPOXY COATING

1. ALL STEEL PARTS OF BULKHEAD ANCHORAGE SYSTEM SHALL BE COATED WITH COAL–TAR EPOXY COATING. (SHEET PILES SHALL NOT RECEIVE COAL–TAR EPOXY COATING. SEE NOTES THIS SHEET FOR STEEL SHEET PILE COATING SYSTEM.)

2. THREADED PORTIONS OF TIE RODS, TURNBUCKLES, AND SIMILAR ELEMENTS SHALL BE COATED WITH COAL–TAR EPOXY IN FIELD, AFTER FINAL TIGHTENING AND ADJUSTMENT OF ANCHORAGE SYSTEM. ALL OTHER PORTIONS OF BULKHEAD ANCHORAGE SYSTEM SHALL BE SHOP–COATED.

3. COAL–TAR EPOXY SHALL BE IN COMPLETE ACCORDANCE WITH THE REQUIREMENTS OF THE US ARMY CORPS OF ENGINEERS FORMULA C–200, AND STEEL STRUCTURES PAINTING COUNCIL (SSPC) STANDARD "PAINT 16".

4. MINIMUM (NOT AVERAGE) DRY FILM THICKNESS (DFT) OF 16 mils IS REQUIRED ON ALL COATED ELEMENTS.

5. COAL–TAR EPOXY COATING MATERIAL SHALL BE A HIGH–BUILD, BLACK, GLOSS–FINISH SELF–PRIMING PRODUCT, WITH SOLIDS CONTENT OF 74% ±2% BY VOLUME.

6. COAL–TAR EPOXY MATERIAL SHALL MEET OR EXCEED THE FOLLOWING PERFORMANCE REQUIREMENTS:
   A. ASTM D4060 (ABRASION): 130mg MAX LOSS AFTER 1000 CYCLES
   B. ASTM D4541 (ADHESION): 1443 psi MINIMUM
   C. ASTM D2794 (IMPACT): 100 in–lbs
   D. ASTM B117 (SALT FOG): NO BLISTERING, RUSTING OR DELAMINATION AFTER 2000 HRS.

7. ALL ASPECTS OF COATING APPLICATION, INCLUDING PRODUCT STORAGE & HANDLING, SURFACE PREPARATION, MIXING, PRODUCT APPLICATION, CURING AND PROTECTION SHALL BE IN COMPLETE ACCORDANCE WITH THE COATING MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

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NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39033

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SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM
PROJECT NUMBER: 17004983A	DRAWING NAME: C-CVER		

SHEET TITLE: STRUCTURAL NOTES

SHEET NUMBER: T-2

CONCRETE AND REINFORCING

1. ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF ACI 318 AND "SPECIFICATIONS FOR CONCRETE BUILDINGS" ACI 301, LATEST EDITIONS.
2. ALL CONCRETE SHALL HAVE MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,500 PSI, UNLESS OTHERWISE NOTED. CONCRETE SHALL BE AIR-ENTRAINED IN ACCORDANCE WITH ACI STANDARDS. MAXIMUM SLUMP SHALL BE 4 INCHES. ALL CONCRETE SHALL BE NORMAL WEIGHT, U.N.O.
3. ALL REINFORCING STEEL FOR CONCRETE AND MASONRY CONSTRUCTION SHALL CONFORM WITH ASTM A615, GRADE 60. <u>ALL REINFORCING STEEL SHALL BE EPOXY-COATED IN ACCORDANCE WITH ASTM A775.</u>
4. ALL REINFORCING BARS SHALL BE SPLICED A MINIMUM OF 40 BAR DIAMETERS. ALL REINFORCING BARS SHALL BE CONTINUOUS AROUND CORNERS.
5. WELDED WIRE FABRIC (WWF) SHALL CONFORM WITH ASTM A185. WIRE FABRIC SHALL BE TIED WITH WIRE AND OVERLAPPED TWO SQUARES AT EDGES. <u>ALL WWF SHALL BE EPOXY-COATED IN ACCORDANCE WITH ASTM A884.</u>
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED OVER REINFORCEMENT, UNLESS OTHERWISE NOTED ON THE DRAWINGS:
   - A. CONCRETE CAST AGAINST EARTH: 3 INCHES
   - B. CONCRETE EXPOSED TO EARTH OR WEATHER: 2 INCHES
   - C. CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
     - SLABS AND WALLS: 1 INCH
     - BEAMS AND COLUMNS: 1½ INCHES
7. ALL REINFORCING SHALL BE DETAILED, FABRICATED, AND SUPPORTED IN FORMS AND SPACED WITH ACCESSORIES FOLLOWING THE REQUIREMENTS OF THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315. PLACING OF BARS SHALL CONFORM TO THE LATEST CRSI RECOMMENDED PRACTICES FOR PLACING REINFORCING BARS.
8. NO ADMIXTURE SHALL BE ALLOWED WITHOUT PRIOR APPROVAL OF THE ENGINEER. THE USE OF CALCIUM CHLORIDE IS PROHIBITED.
9. AFTER CONCRETING HAS STARTED, IT SHALL BE CARRIED ON AS A CONTINUOUS OPERATION UNTIL PLACING OF A PANEL OR SECTION, AS DEFINED BY ITS BOUNDARIES OR PREDETERMINED JOINTS, IS COMPLETED.
10. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY SUITABLE MEANS SUCH AS MECHANICAL VIBRATION DURING PLACEMENT AND THOROUGHLY WORKED AROUND REINFORCEMENT.
11. FINISH CONCRETE IN ACCORDANCE WITH "FINISHING OF FORMED SURFACES", OF ACI 301. FOUNDATION WALL SHALL BE SMOOTH-FORMED FINISH, UNLESS OTHERWISE NOTED.
12. GROUT SHALL BE A NON-SHRINK, NON-METALLIC, CEMENTITIOUS GROUT, AS APPROVED BY THE ENGINEER.
13. ALL BOLTS, SLEEVES, AND OTHER EMBEDDED ITEMS SHALL BE SET BEFORE CONCRETE IS PLACED. SEE MECHANICAL, ELECTRICAL, AND VENDORS' DRAWINGS FOR SIZES AND LOCATIONS.

FILTER FABRIC FOR BULKHEAD CONSTRUCTION

1. FILTER FABRIC SHALL BE PROVIDED FOR CONSTRUCTION OF BULKHEAD AT AREAS AS SHOWN ON THE DESIGN DRAWINGS, INCLUDING BUT NOT LIMITED TO:
   - A. ISOLATION AND CONTROL OF GRANULAR FILL MATERIALS BEHIND NEW BULKHEAD SHEET PILES.
   - B. CLOSURE AT INTERFACES BETWEEN NEW SHEET PILE BULKHEAD CONSTRUCTION AND EXISTING BULKHEADS.
   - C. CLOSURE AT STORM DRAIN PENETRATIONS OF NEW SHEET PILE BULKHEAD.
2. FILTER FABRIC SHALL BE A NON-WOVEN CIVIL ENGINEERING FABRIC MATERIAL (GEOTEXTILE) WITH THE FOLLOWING MINIMUM MATERIAL PROPERTIES:
   - A. GRAB TENSILE STRENGTH (ASTM D4632): 80 LB.
   - B. GRAB TENSILE ELONGATION (ASTM D4632): 50%
   - C. MULLEN BURST (ASTM D3786): 150 PSI
   - D. PUNCTURE (ASTM D4833): 45 LB.
   - E. TRAPEZOID TEAR (ASTM D4533): 35 LB.
   - F. UV RESISTANCE @ 500 hr (ASTM D4355): 70%
   - G. APPARENT OPENING SIZE (US SIEVE) (ASTM D4751): 70
3. COMPLETE MANUFACTURER'S DATA ON FILTER FABRIC (GEOTEXTILE) MATERIAL SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO PROCUREMENT OR INSTALLATION OF MATERIAL.
4. ALL ASPECTS OF MATERIAL STORAGE, HANDLING, AND INSTALLATION SHALL BE IN COMPLETE ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.

CONCRETE CURING

1. PROPER CURING OF CONCRETE IS OF THE UTMOST IMPORTANCE. BEGINNING IMMEDIATELY AFTER PLACEMENT, CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY AND SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT A RELATIVELY CONSTANT TEMPERATURE FOR AT LEAST 7 DAYS. THE MATERIALS AND METHODS OF CURING SHALL BE SUBJECT TO ACCEPTANCE BY THE ENGINEER. UNSATISFACTORY FINISHED CONCRETE THAT RESULTS FROM FAILURE TO FOLLOW THE SPECIFIED CURING PROCEDURES MAY BE REQUESTED BY THE OWNER OR ENGINEER TO BE REMOVED AND REPLACED. ALL COSTS ASSOCIATED WITH REMOVAL AND REPLACEMENT OF CONCRETE WORK SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SLABS –
   IT IS MANDATORY THAT 7 DAYS OF WET CURING ON ALL MAT SLABS AND FORMED SLABS BE PERFORMED. USE SOAKER HOSE, WET BURLAP AND PLASTIC SHEETS OVER BURLAP ON ALL EXPOSED SURFACES FOR 7 DAYS MINIMUM.
3. COLD WEATHER –
   WHEN THE MEAN DAILY OUTDOOR TEMPERATURE IS LESS THAN 40°F, THE TEMPERATURE OF THE CONCRETE SHALL BE MAINTAINED BETWEEN 50°F AND 70°F FOR THE REQUIRED CURING PERIOD. WHEN NECESSARY, ARRANGEMENTS FOR HEATING, COVERING, INSULATING, OR HOUSING THE CONCRETE WORK SHALL BE MADE IN ADVANCE OF PLACEMENT AND SHALL BE ADEQUATE TO MAINTAIN THE REQUIRED TEMPERATURE WITHOUT INJURY TO THE CONCRETE DUE TO CONCENTRATION OF HEAT.
4. HOT WEATHER –
   WHEN NECESSARY, PROVISION FOR WINDBREAKS, SHADING, AND/OR COVERING WITH A LIGHT-COLORED MATERIAL SHALL BE MADE IN ADVANCE OF CONCRETE PLACEMENT. SUCH PROTECTIVE MEASURES SHALL BE TAKEN AS QUICKLY AS CONCRETE HARDENING AND FINISHING OPERATIONS WILL ALLOW. TEMPERATURE OF CONCRETE AT PLACEMENT SHALL NOT EXCEED 85°F.

EPOXY MATERIALS FOR CONCRETE CONSTRUCTION

1. EPOXY MATERIAL FOR ANCHORAGE OF REINFORCING DOWELS INTO EXISTING CONCRETE, FILLING OF CONNECTION SLEEVES AT LIGHT POLE INSTALLATION, AND SIMILAR APPLICATIONS, SHALL BE A HIGH-MODULUS, HIGH STRENGTH EPOXY BONDING/GROUTING ADHESIVE.
2. EPOXY MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-881 AND AASHTO M-235 STANDARDS.
3. EPOXY MATERIAL SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:
   - A. 7-DAY COMPRESSIVE MODULUS: 2.1x10 PSI
   - B. TENSILE PROPERTIES PER ASTM D-638:
     - (1) 7-DAY TENSILE STRENGTH: 6,900 PSI
     - (2) 7-DAY ELONGATION AT BREAK: 1.9%
     - (3) 14-DAY MODULUS OF ELASTICITY: 5.4x10 PSI
   - C. FLEXURAL PROPERTIES PER ASTM D-790:
     - (1) 14-DAY FLEXURAL STRENGTH: 7,000 PSI
     - (2) 14-DAY TANGENT M.O.E. IN BENDING: 6.9x10 PSI
   - D. SHEAR STRENGTH PER ASTM D-732:
     - (1) 14-DAY SHEAR STRENGTH: 6,200 PSI
   - E. WATER ABSORPTION PER ASTM D-570:
     - (1) 7-DAY (24 hr IMMERSION): 0.21%
   - F. COMPRESSIVE STRENGTH PER ASTM D-695 (@ 73°F):
     - (1) 8-hr: 140 PSI
     - (2) 16-hr: 4,800 PSI
     - (3) 1-DAY: 5,700 PSI
     - (4) 3-DAY: 11,300 PSI
     - (5) 7-DAY: 11,800 PSI
     - (6) 14-DAY: 12,200 PSI
     - (7) 28-DAY: 12,200 PSI
4. WHERE INDICATED IN THE STRUCTURAL DETAILS, EPOXY GROUTING ADHESIVE SHALL HAVE CLEAN, OVEN-DRIED SAND ADDED IN ACCORDANCE WITH THE EPOXY MANUFACTURER'S RECOMMENDATIONS.
5. ALL DETAILS OF EPOXY INSTALLATION, INCLUDING PREPARATION OF SURFACES, DRILLING FOR EMBEDDED REINFORCING BARS, AND HANDLING, MIXING, & APPLICATION OF EPOXY MATERIALS SHALL BE IN COMPLETE ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL SUBMIT DATA SHEETS FOR ENGINEER'S REVIEW FOR ALL EPOXY MATERIAL(S) TO BE USED.

TIMBER FRAMING:

1. ALL ASPECTS OF TIMBER CONSTRUCTION SHALL BE IN COMPLETE ACCORDANCE WITH THE REQUIREMENTS OF THE "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" (NDS), LATEST EDITION, AS PUBLISHED BY THE AMERICAN FOREST & PAPER ASSOCIATION AND THE AMERICAN WOOD COUNCIL.
2. MATERIALS:
   - A. TIMBER – SOUTHERN YELLOW PINE, No.2 GRADE OR BETTER FOR ALL TIMBER FRAMING, INCLUDING PIERS, BOAT RAMP WALKWAYS, AND BULKHEAD CAP. ALL TIMBER FRAMING SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH NOTE #3, BELOW.
   - B. HARDWARE – ALL STUDS, BOLTS, NUTS, AND WASHERS FOR TIMBER FRAMING SHALL BE ASTM A307, HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A153, UNLESS OTHERWISE NOTED. PLATES, STRAPS, AND ANGLES SHALL BE ASTM A36 STEEL, HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123, UNLESS OTHERWISE NOTED.
3. ALL TIMBER FRAMING SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH "AMERICAN WOOD PRESERVERS ASS'N. (AWPA) STANDARDS 2005", STANDARD U1-05, AS FOLLOWS:
   - A. ALL TIMBER FRAMING AT BULKHEAD CAPS, PIERS, AND WALKWAYS EXCEPT AS SPECIFICALLY NOTED IN "B", BELOW:
     - (1) AWPA USE CATEGORY: UC-5B (SALT WATER EXPOSURE)
     - (2) COMMODITY (U1-05, TABLE 3-1): LUMBER / TIMBERS
     - (3) CCA PRESERVATIVE TREATMENT WITH A RETENTION OF 2.5 LBS./CuFt SHALL BE PROVIDED PER U1-05, TABLE 3.0
     - (4) NO SUBSTITUTIONS OF OTHER TREATMENTS SHALL BE PERMITTED.
   - B. TIMBER CAP TOP PLANK SECTIONS AT BULKHEAD, ALL WALKING SURFACE PLANKS AT PIERS, AND CURB SECTIONS AT MAIN PIERS:
     - (1) AWPA USE CATEGORY: UC-4B (SALT WATER SPRAY)
     - (2) COMMODITY (U1-05, TABLE 3-1): LUMBER / TIMBERS
     - (3) ACQ PRESERVATIVE TREATMENT WITH A RETENTION OF 0.6 LBS./CuFt SHALL BE PROVIDED PER U1-05, TABLE 3.0
     - (4) NO SUBSTITUTIONS OF OTHER TREATMENTS SHALL BE PERMITTED.
4. ALL FIELD CUTS SHALL BE FIELD-TREATED WITH PRESERVATIVE TREATMENT IN ACCORDANCE WITH APPLICABLE AWPA STANDARDS AND PROCEDURES.
5. ALL STEEL HARDWARE, NAILS AND BOLTS SHALL BE OF SUFFICIENT LENGTH FOR THEIR INTENDED USE. ALL BOLTS SHALL INCLUDE FLAT WASHERS AND HEAVY HEX NUTS.
6. ALL STEEL FASTENERS, BOLTS, WASHERS, NUTS, LAG BOLTS, PLATES, ANGLES AND OTHER CONNECTION HARDWARE SHALL BE HOT-DIP GALVANIZED PER ASTM STANDARDS A123 OR A153, WITH 20 OZ. OF ZINC PER SQUARE FOOT, UNLESS OTHERWISE SPECIFIED TO BE STAINLESS STEEL.
7. ALL LAG BOLTS SHALL BE INSTALLED USING PILOT AND CLEARANCE HOLES IN CONNECTED TIMBER ELEMENTS IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF NDS SECTION 11.1.3. (G = 0.55)
8. ALL NAILS SHALL BE <u>STAINLESS STEEL</u> RINGSHANKED OR SPIRALLY-WOUND NAILS OF SIZES AS SHOWN, OR SUITABLE FOR THE CONNECTED ELEMENTS. DECK PLANKS SHALL BE ATTACHED TO JOISTS USING (3) NAILS AT EACH JOIST FOR 2x6 PLANKS OR (2) NAILS AT EACH JOIST FOR 2x4 PLANKS.
9. PREFABRICATED TIMBER CONNECTORS:
   - A. CONTRACTOR SHALL SUBMIT COMPLETE DATA ON ALL PREFABRICATED TIMBER CONNECTORS FOR REVIEW BY THE ENGINEER. SUBMITTED DATA SHALL INCLUDE LOAD CAPACITIES FOR ALL CONNECTORS.
   - B. CONNECTOR SIZES AND TYPES SHALL BE AS SHOWN ON THE DESIGN DRAWINGS AND DETAILS.
   - C. CONNECTORS SHALL BE INSTALLED USING ALL FASTENERS AS RECOMMENDED BY THE MANUFACTURER FOR THE PUBLISHED LOAD CAPACITIES.
   - D. TWIST STRAPS FOR CONNECTION OF PIER JOISTS TO GIRDERS SHALL BE 14 ga. STAINLESS STEEL, TYPE 304. MANUFACTURER'S STANDARD ELECTRO-GALVANIZED OR HOT-DIP GALVANIZED CONNECTORS WILL NOT BE ACCEPTED.
     - (1) AT CONTRACTOR'S OPTION, AND WITH SPECIFIC APPROVAL OF THE ENGINEER, ¼" THICK x 1¼" WIDE HOT-DIP GALVANIZED STEEL TWIST STRAPS MAY BE SUBSTITUTED FOR PREFABRICATED STAINLESS STEEL STRAPS.
       - (a) STRAPS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM STANDARD A123.
       - (b) HOT-DIP GALVANIZED TWIST STRAPS SHALL BE SECURED WITH A TOTAL OF (4) ⅜"ø x 2" LAG BOLTS, (2) INTO EACH WOOD MEMBER. LAG BOLTS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM STANDARD A153.
10. BOLTS LOCATED TOWARDS THE WATER SHALL BE RECESSED OR OTHERWISE PROTECTED AND SHALL NOT BE EXPOSED OR EXTEND PAST THE FACES OF THE TIMBER FRAMING TO REDUCE THE POSSIBILITY OF DAMAGE TO BOATS. SEE STRUCTURAL DETAILS FOR RECESSES AND BOLT PROTECTION.

TIMBER PILES:

1. TIMBER PILES SHALL BE SOUTHERN YELLOW PINE MATERIAL, IN ACCORDANCE WITH ASTM D25, CLASS B.
2. TIMBER PILES SHALL BE AIR-SEASONED PRIOR TO KILN DRYING.
3. TIMBER PILES SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH AWPA STANDARD U1-05, AS FOLLOWS:
   - A. AWPA USE CATEGORY: UC5B (SALT WATER EXPOSURE)
   - B. COMMODITY (U1-05, TABLE 3-1): PILES, ROUND
   - C. TREATMENT CHEMICAL: CCA
   - D. MINIMUM RETENTION: 2.5 PCF (TABLE 3.0)
   - E. TREATMENT WITH CCA SHALL INCLUDE POST-TREATMENT FIXATION PROCESS.
4. TIMBER PILES SHALL HAVE MINIMUM TIP DIAMETER OF 8" AND BUTT DIAMETER OF 12" IN ALL LOCATIONS UNLESS OTHERWISE NOTED.
5. LENGTH OF PILES SHALL BE AS REQUIRED TO ATTAIN TOP ELEVATIONS AS SHOWN ON THE DRAWINGS. EXPECTED PILE LENGTH IS APPROXIMATELY 30'-0"±.
6. TIMBER PILES SHALL HAVE THE FOLLOWING MINIMUM LOAD CAPACITIES:
   - A. VERTICAL: 2-TON (4000 LBS)
   - B. LATERAL: 1-TON (2000 LBS)
7. TIMBER PILES SHALL BE DRIVEN TO THE DEPTHS REQUIRED TO ACHIEVE THE MINIMUM REQUIRED LOAD CAPACITIES AS NOTED ABOVE. EXPECTED EMBEDMENT BELOW THE MUD LINE IS APPROXIMATELY 14 FT.

   IF A DRIVING RESISTANCE EQUAL TO OR GREATER THAN 2 TONS IS ENCOUNTERED AT A MINIMUM EMBEDMENT OF 14' BELOW MUD LINE, PILE DRIVING MAY BE STOPPED.
8. FOR DRIVING RESISTANCE DETERMINATION, THE "ENGINEERING NEWS FORMULA" SHALL BE USED. DYNAMIC PILE ANALYSIS MAY BE USED IN LIEU OF PILE LOAD TEST.
9. ALL PILES SHALL BE DRIVEN BY AN APPROVED GRAVITY, STEAM, OR DIESEL HAMMER. PILE DRIVING HAMMER SHALL HAVE RATED ENERGY OF 15,000 FOOT-POUNDS PER BLOW (MINIMUM). JETTING OF PILES IS NOT PERMITTED. IF EXTREMELY HARD DRIVING MATERIALS EXIST AND CONDITIONS PERSIST, CONTRACTOR SHALL CONTACT THE ENGINEER TO DETERMINE POSSIBLE LIMITED USE OF JETTING.
10. APPROPRIATE PILE CUSHIONING SHALL BE PROVIDED DURING PILE DRIVING, IN ACCORDANCE WITH THE PILE SUPPLIER'S RECOMMENDATIONS, AND AS APPROVED BY THE ENGINEER.
11. PILES SHALL BE DRIVEN VERTICALLY (PLUMB). CONTRACTOR SHALL USE PILING GUIDE AS NECESSARY TO ENSURE PILING IS INSTALLED PLUMB.
12. TOLERANCE FOR PILE SETTING AND HORIZONTAL LOCATION SHALL BE ±2" IN ANY DIRECTION. TOLERANCE FOR PLUMBNESS OF PILES SHALL BE 1" PER 10' OF PILE LENGTH.

DESIGN LOADS –

A. LIVE LOADS: (NJUCC 1607.1, ITEM #40)
   1. MAIN PIER RECONSTRUCTION & RAMP WALKWAYS, PEDESTRIAN LOAD = 60 PSF
   2. SNOW LOAD
      - GROUND SNOW LOAD, PG: 20 PSF
      - EXPOSURE CATEGORY: C
      - EXPOSURE FACTOR, CE: 0.9
      - THERMAL FACTOR, CT: 1.2
      - IMPORTANCE FACTOR: 1.0

B. DEAD LOADS:
   1. PIERS & WALKWAYS:
      2" NOMINAL THICKNESS COMPOSITE DECK = 7 PSF ±
      (ALLOWANCE FOR POSSIBLE FUTURE USE OF COMPOSITE DECK – ACTUAL 2X TIMBER DECK = 4 PSF ±)
      PLUS ACTUAL FRAMING WEIGHT @ 35 PCF ±, TYPICAL

C. LATERAL LOADS:
   1. WIND LOAD (NJUCC 1609/ASCE 7-10 CHAPTER 6)
      - a. BASIC WIND SPEED, V3 (FIG 1609) = 115 MPH
      - b. EXPOSURE = "C"
      - c. IMPORTANCE FACTOR, Iw = 1.00
      - d. GUST FACTOR, G = 0.85
   2. SEISMIC LOAD (NJUCC 1613/ASCE 7-10 CHAPTERS 11 & 12)
      - a. OCCUPANCY CATEGORY/USE GROUP = II
      - b. SITE CLASS = "D"
      - c. IMPORTANCE FACTOR, Ie = 1.00
      - d. Ss = 30%
      - e. S1 = 6%
      - f. SEISMIC DESIGN CATEGORY = "B"
      - g. ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE
      - h. BASIC SEISMIC FORCE RESISTING SYSTEM: ASCE 7-05, TABLE 12.2-1, ITEM #G.7, "TIMBER INVERTED PENDULUM STRUCTURES", R = 1.50
      - i. RESULTING LATERAL FORCE COEFFICIENT = 0.208 x W, WHERE "W" INCLUDES DEAD LOAD ONLY, PER 12.7.2

D. DESIGN LOAD COMBINATIONS:
   1. LOAD COMBINATIONS ARE IN ACCORDANCE WITH NJUCC 1605.3 AND ASCE 7-10 2.4.1

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REV	DATE	DRAWN BY	DESCRIPTION
1	07/23/19	TEK	FINAL PLAN SUBMITTAL
2	01/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	05/15/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39033

CONSTRUCTION PLANS FOR
BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP
BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

RED BANK OFFICE
Corporate Headquarters
331 Newman Springs Road
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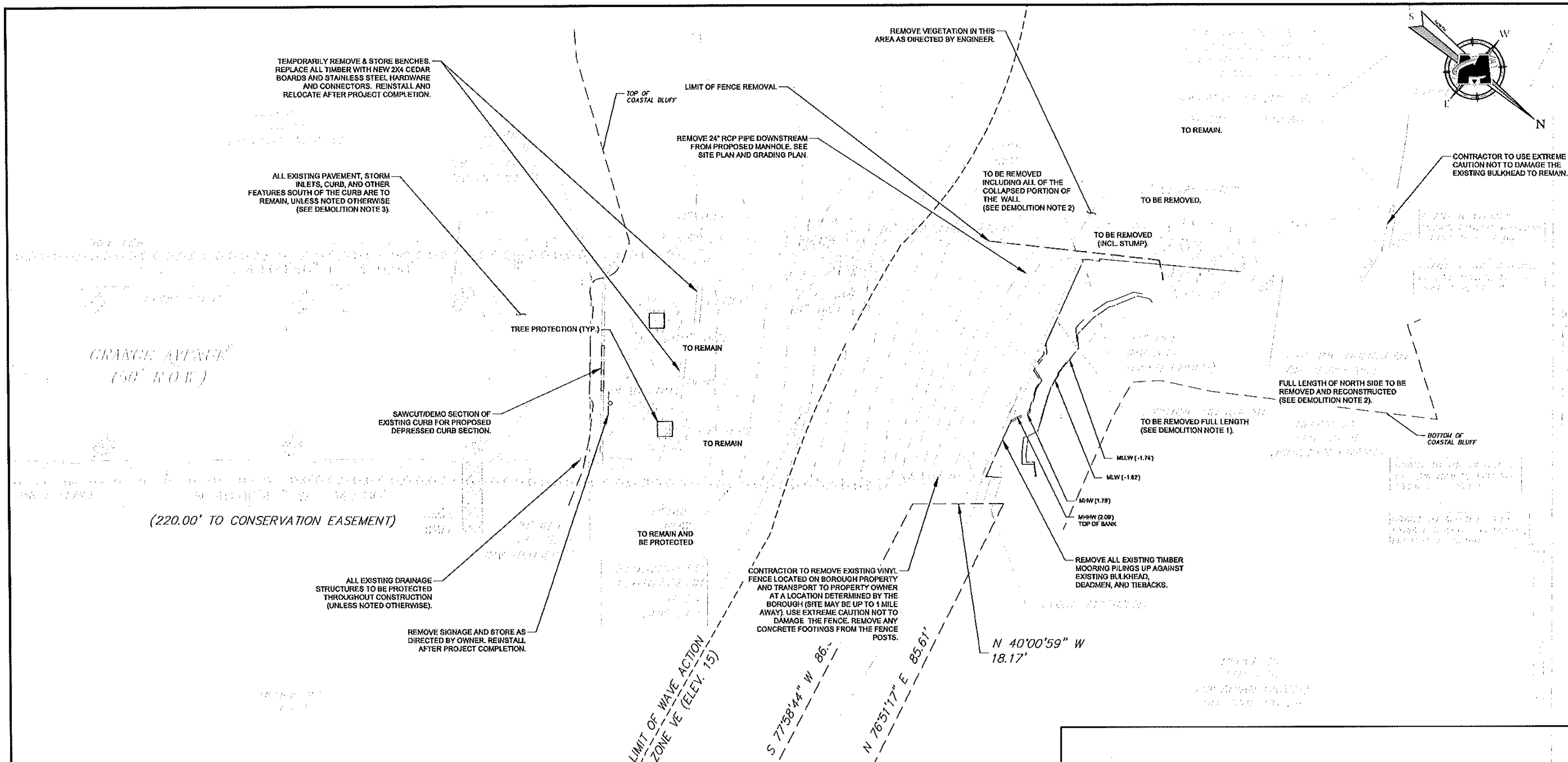
SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004933B	C-CVTA

SHEET TITLE: STRUCTURAL NOTES

SHEET NUMBER: T-3



GRANGE AVENUE EXISTING CONDITIONS & DEMOLITION PLAN

SCALE: 1" = 10"

GENERAL NOTES:

1. THE ENTIRE SITE IS WITHIN 300' RIPARIAN ZONE.
2. HORIZONTAL DATUM BASED UPON THE NEW JERSEY STATE PLANE COORDINATED SYSTEM, NAD 83 (NEAR SURFACE DERIVED COORDINATES UTILIZING KEYNET GPS).
3. EXISTING SITE TOPOGRAPHIC INFORMATION AS SHOWN HEREON IS BASED UPON NAVD 88 (NORTH AMERICAN VERTICAL DATUM OF 1988) PER GPS OBSERVATION BY MASER CONSULTING P.A., UTILIZING KEYNET GPS.
4. TIDAL INFORMATION OBTAINED FROM NOAA OCEANIC, NAVESINK RIVER, NJ, STATION ID 8531753.
5. AE, VE, AND WAVE ACTION ZONES ARE BASED ON PRELIMINARY FEMA FLOOD INSURANCE RATE MAP REVISED JANUARY 30, 2015, MAP NUMBER 34025C0181G.
6. ALL AREAS THAT ARE NOT DESIGNATED FOR REMOVAL SHALL BE MAINTAINED IN PRE-CONSTRUCTION CONDITION.
7. THE LOCATION OF ALL UNDERGROUND UTILITIES AS SHOWN HEREON ARE APPROXIMATE AND ARE BASED ON VISIBLE SURFACE STRUCTURES AND ANY UTILITY MAPS PROVIDED BY UTILITY COMPANIES REFERENCED HEREON. NO EXCAVATIONS WERE MADE DURING THE PROGRESS OF THIS SURVEY TO LOCATE BURIED UTILITIES/STRUCTURES. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. THE CONTRACTOR SHALL HAVE ALL UNDERGROUND UTILITIES FIELD-VERIFIED BY THE PROPER UTILITY COMPANIES BEFORE ANY CONSTRUCTION BEGINS.

DEMOLITION NOTES:

1. STONE WALL AND BULKHEAD REMOVAL SHALL INCLUDE ALL BULKHEAD AND WALL MATERIALS. FULL DEPTH OF BULKHEAD AND WALL SHALL BE REMOVED. IT IS CONTRACTOR'S RESPONSIBILITY TO STABILIZE UPWARD SLOPE DURING CONSTRUCTION.
2. STONE WALL AND BULKHEAD REMOVAL SHALL ALSO INCLUDE ALL FILL AND OTHER DEBRIS THAT HAS COLLAPSED AND WHICH NEEDS TO BE REMOVED TO ALLOW PROPER CONSTRUCTION OF NEW UNIFORM AND STRAIGHT BULKHEAD.
3. ALL AREAS THAT ARE NOT DESIGNATED FOR REMOVAL, OR ARE LISTED TO REMAIN, SHALL BE MAINTAINED IN PRECONSTRUCTION CONDITIONS. CONTRACTOR SHALL SUBMIT PHOTOS AND VIDEO OF ENTIRE PROJECT AREA AND SURROUNDING AREA. ANY DAMAGE SHALL BE REPAIRED AT NO COST TO OWNER.
4. ALL VEGETATION AND TREES NOT DESIGNATED FOR REMOVAL SHALL BE PROTECTED PER INCLUDED DETAILS.
5. ALL COSTS FOR DEMOLITION SHALL BE INCLUDED IN BID PAY ITEM "CLEARING SITE".

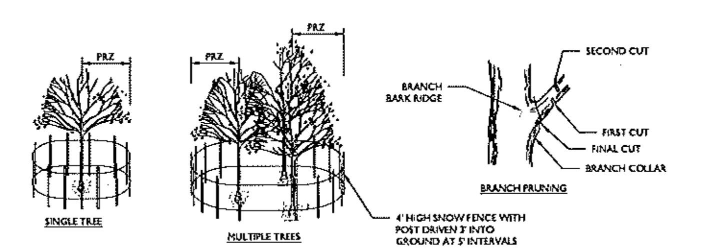
LEGEND

MEAN HIGHER HIGH WATER LINE	— — — —
MEAN HIGH WATER LINE	—·—·—·—
MEAN LOW WATER LINE	— — · — — ·
MEAN LOWER LOW WATER LINE	————
PROPERTY/GRANT BOUNDARY LINE	—— — - ——

TIDAL RANGE

	NAVD	MLW
MHHW	2.09'	3.71'
MHW	1.79'	3.41'
MTL	0.9'	1.71'
NAVD88	0.00'	1.62'
MLW	-1.62'	0.00'
MLLW	-1.74'	-0.12'

10 0 10 20
SCALE : 1" = 10'



NOTES:

1. PROTECTIVE FENCING IS TO BE ERECTED PRIOR TO CONSTRUCTION AND MAINTAINED DURING CONSTRUCTION AS DIRECTED BY THE LANDSCAPE ARCHITECT, SOIL CONSERVATION DISTRICT AND/OR MUNICIPAL ENGINEER.
2. NO CONSTRUCTION ACTIVITY IS PERMITTED WITHIN THE PROTECTIVE FENCING.
3. AS CONSTRUCTION NEARS COMPLETION THE FENCING WILL BE REMOVED AS DIRECTED.
4. AT THE COMPLETION OF CONSTRUCTION, ALL TREES WILL BE PRUNED AS NECESSARY TO CORRECT ANY DAMAGE RESULTING FROM CONSTRUCTION ACTIVITY.
5. GENERAL MECHANICAL DAMAGE - SEE CRITICAL ROOT ZONE CALCULATION (CRZ) FOR CORRECT PLACEMENT OF TREE PROTECTION.
6. BOX TREES WITHIN 25 FEET OF A BUILDING SITE TO PREVENT MECHANICAL INJURY. FENCING OR OTHER BARRIER SHOULD BE INSTALLED BEYOND THE CRITICAL ROOT ZONE.
7. BOARDS WILL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS.
8. FEEDER ROOTS SHOULD NOT BE CUT IN AN AREA INSIDE THE PROTECTED ROOT ZONE (PRZ) OR CRITICAL ROOT ZONE (CRZ). TREE ROOT SYSTEM COMMONLY EXTEND BEYOND THE DRIP LINE.
9. DAMAGED TRUNKS OR EXPOSED ROOTS SHOULD HAVE DAMAGED BARK REMOVED IMMEDIATELY AND NO PAINT SHALL BE APPLIED. EXPOSED ROOTS SHOULD BE COVERED WITH TOPSOIL IMMEDIATELY AFTER EXCAVATION IS COMPLETE. ROOTS SHALL BE PRUNED TO GIVE A CLEAN, SHARP SURFACE AMENABLE TO HEALING. ROOTS EXPOSED DURING HOT WEATHER SHOULD BE IRRIGATED TO PREVENT PERMANENT TREE INJURY. CARE FOR SERIOUS INJURY SHOULD BE PRESCRIBED BY A PROFESSIONAL FORESTER OR CERTIFIED TREE EXPERT.
10. TREE LIMB REMOVAL WHERE NECESSARY, WILL BE DONE AS NATURAL TARGET PRUNING TO REMOVE THE DESIRED BRANCH COLLAR. THERE SHOULD BE NO FLUSH CUTS. FLUSH CUTS DESTROY A MAJOR DEFENSE SYSTEM OF THE TREE. NO TREE PAINT SHALL BE APPLIED. ALL CUTS SHALL BE MADE AT THE OUTSIDE EDGE OF THE BRANCH COLLAR. CUTS MADE TOO FAR BEYOND THE BRANCH COLLAR MAY LEAD TO EXCESS SPROUTING, CRACKS AND ROT. REMOVAL OF A "V" CROTCH SHOULD BE CONSIDERED FOR FREE STANDING SPECIMEN TREES TO AVOID FUTURE SPLITTING DAMAGE.
11. CRITICAL ROOT ZONE (CRZ) OR PROTECTED ROOT ZONE (PRZ) CALCULATION.
MEASURE DHB OF THE TREE (DIAMETER OF TREE IN BREAST HEIGHT OR 4.5' ABOVE GROUND ON THE UPHILL SIDE) IN INCHES.
CRZ OR PRZ = DHB TIMES 1.5 (FOR OLD/UNHEALTHY/SENSITIVE TREES) OR DHB X 1.0 (FOR YOUNG/HEALTHY/TOLERANT TREES). EXPRESS IN FEET.

TEMPORARY TREE PROTECTION DETAIL

NOT TO SCALE HCNJ-SOIL-EROS-2100 05/01/17

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RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP

BOROUGH OF FAIR HAVEN MONMOUTH COUNTY NEW JERSEY

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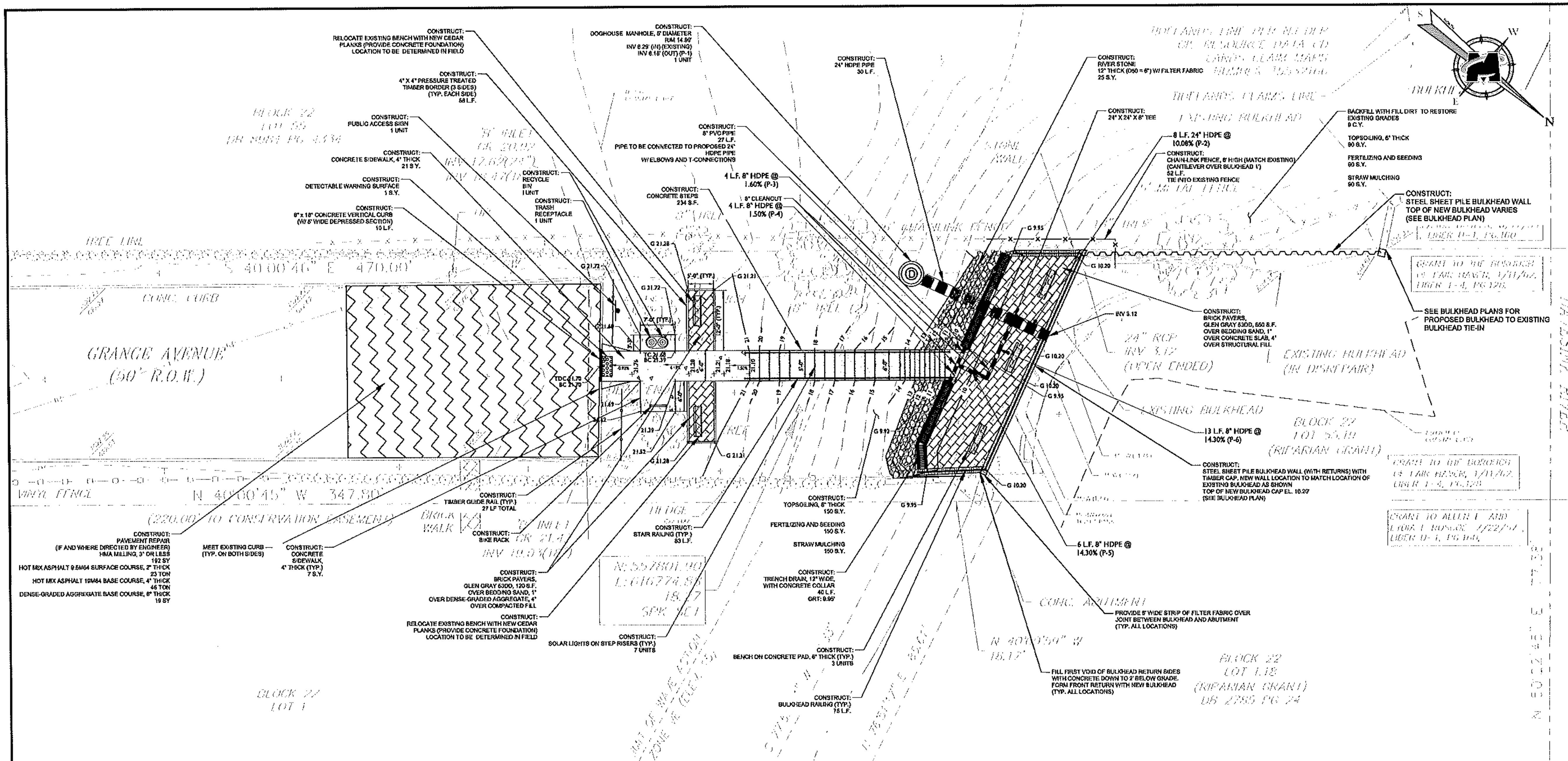
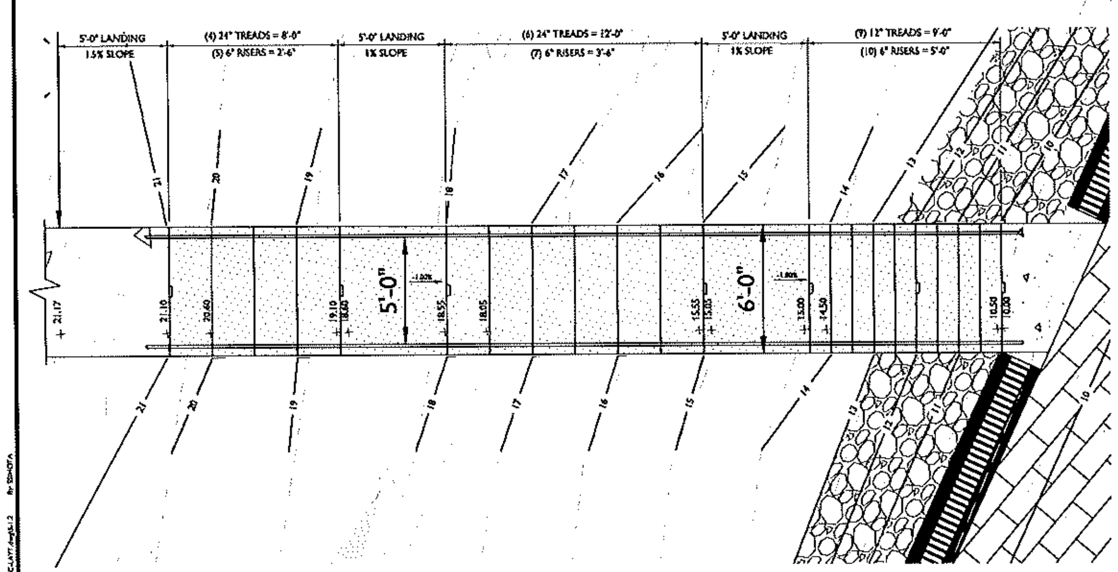
PROJECT NUMBER	DRAWING NAME
17004302B	C-DEMO

SHEET TITLE: GRANGE AVENUE EXISTING CONDITIONS & DEMOLITION PLAN

SHEET NUMBER: S-1.1





CONCRETE STEP INSET

SCALE: 1" = 4'

SITE & GRADING PLAN
GRANGE AVENUE

SCALE: 1" = 10'

NOTES:

1. THE ENTIRE SITE IS WITHIN 300' RIPARIAN ZONE.
2. HORIZONTAL DATUM BASED UPON THE NEW JERSEY STATE PLANE COORDINATED SYSTEM, NAD 83 (NEAR SURFACE DERIVED COORDINATES UTILIZING KEYNET GPS).
3. EXISTING SITE TOPOGRAPHIC INFORMATION AS SHOWN HEREON IS BASED UPON NAVD 88 (NORTH AMERICAN VERTICAL DATUM OF 1988).
4. TIDAL INFORMATION OBTAINED FROM NOAA OCEANIC, NAVESINK RIVER, NJ, STATION ID 8531753.
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8. MEAN LOW WATER LINE AND MEAN LOWER LOW WATER LINE ARE OUTSIDE THE LIMITS OF THIS PROJECT.

LEGEND

RIVER STONE (D_{50} = 6") FROM EL. 10.0 UP TO EL. 13.0 AT 1½ H : 1 V SLOPE. 12" THICK LAYER OVER FILTER FABRIC.

10 0 10 20
SCALE : 1" = 10'

LEGEND

EXISTING / PROPOSED

- RIGHT OF WAY LINE
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB (FACE / BACK)
- DEPRESSED CURB
- SIDEWALK
- FENCES
- TREELINE
- ROADWAY SIGNS
- 'B' INLET
- STORM MANHOLE
- SANITARY MANHOLE
- HEADWALL
- STORM PIPE
- CONTOURS (75.0 / 74.0; 75 / 74)
- SPOT ELEVATION (× G 29.0)
- TOP OF CURB ELEVATION (× TC 29.0)
- BOTTOM OF CURB ELEVATION (× BC 29.0)
- TOP OF DEPRESSED CURB ELEVATION (× TDC 29.0)
- MEAN HIGHER HIGH WATER LINE
- MEAN HIGH WATER LINE
- MEAN LOW WATER LINE
- MEAN LOWER LOW WATER LINE

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Columbia, MD	Charlotte, NC

State of NJ Certificate of Authorization: 24GA27986500

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REV	DATE	DRAWN BY	DESCRIPTION
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2	01/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	05/15/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR
BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP
BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

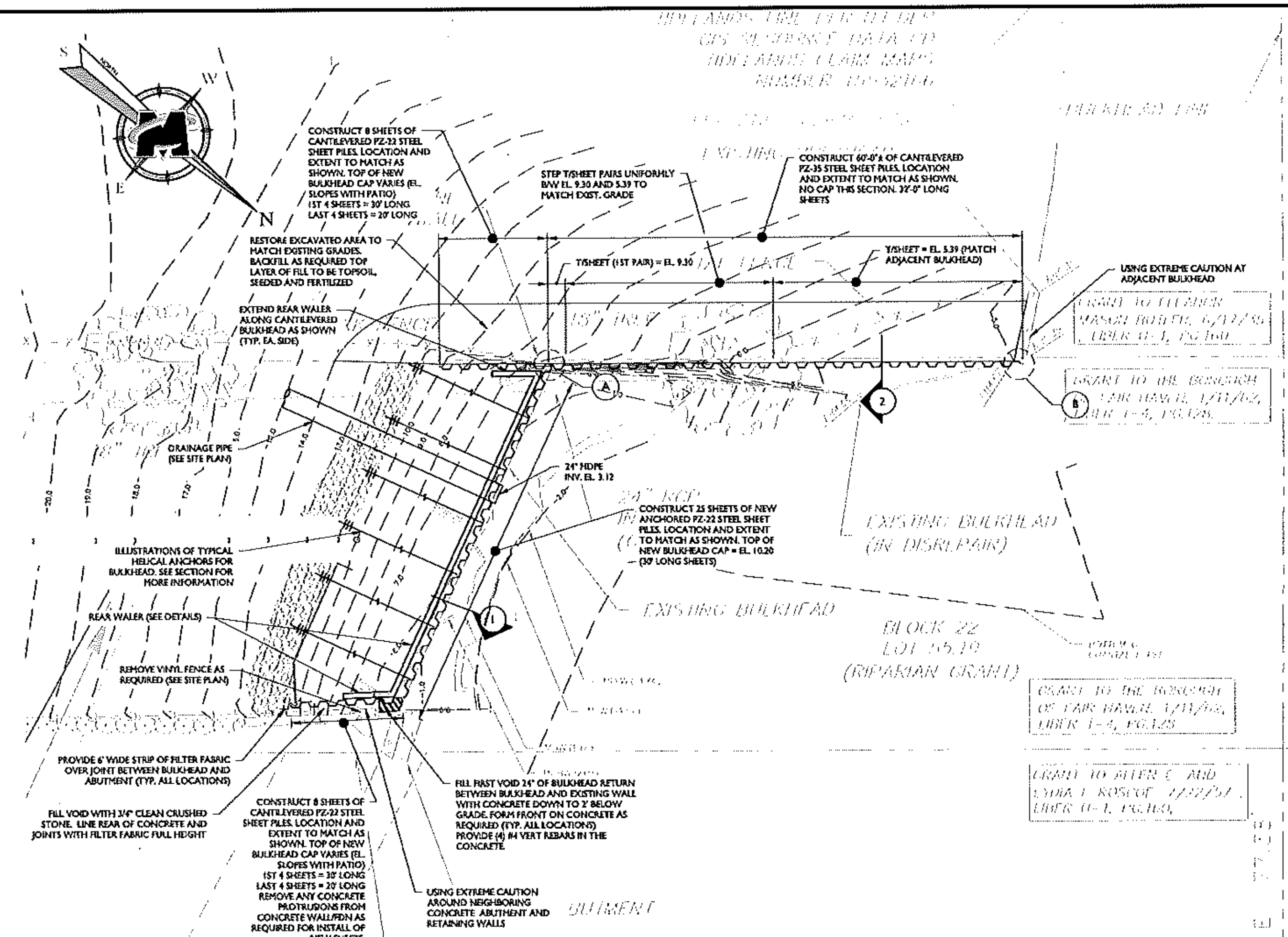
RED BANK OFFICE
Corporate Headquarters
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701
Phone: 732.383.1950
Fax: 732.383.1984

SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM

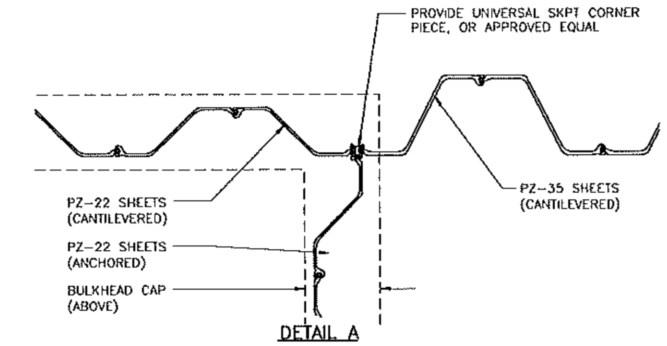
PROJECT NUMBER	DRAWING NAME
17004185B	C-LAYT

SHEET TITLE: SITE & GRADING PLAN GRANGE AVENUE

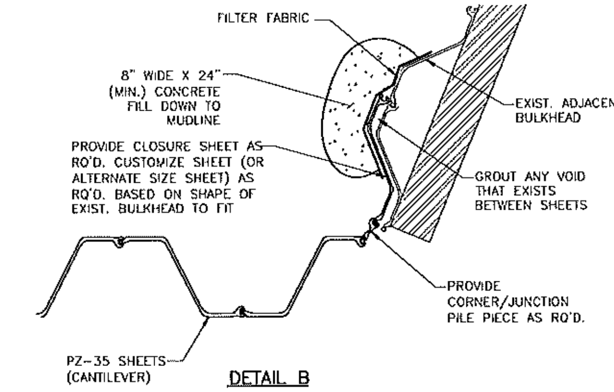
SHEET NUMBER: S-1.2



BULKHEAD PLAN
GRANGE AVENUE
SCALE: 1" = 10'

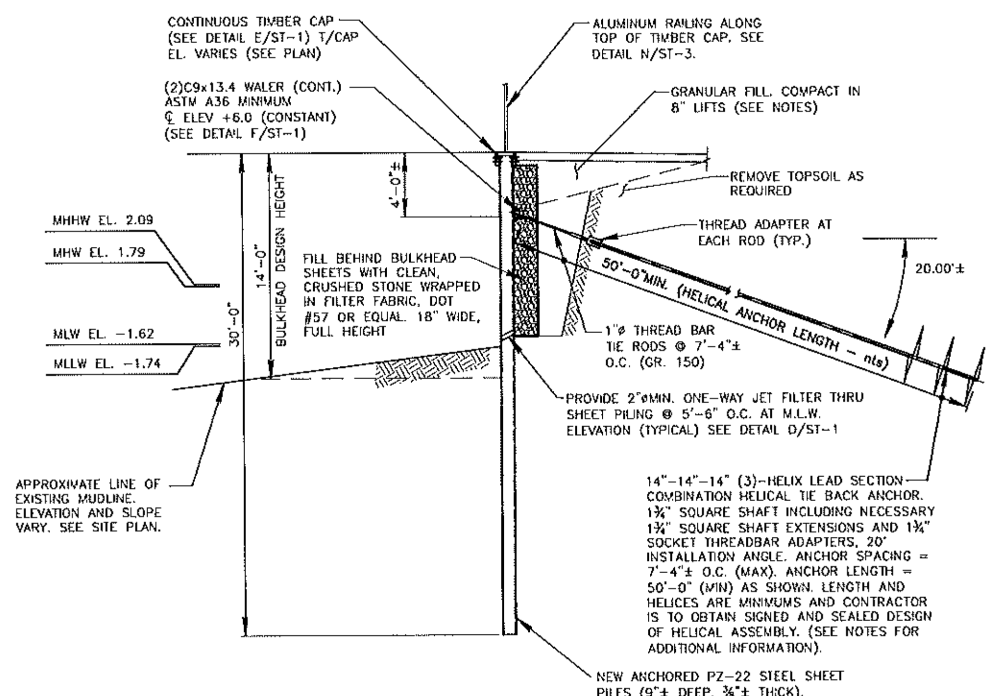


DETAIL A
TIE-IN AT NEW BULKHEAD
(SCALE: 3/4" = 1'-0")



DETAIL B
TIE-IN TO ADJACENT BULKHEAD
(SCALE: 3/4" = 1'-0")

NOTE:
TIE IN/CLOSURE DETAIL IS SCHEMATIC BASED ON VISIBLE FIELD CONDITIONS. CONTRACTOR TO FIELD MEASURE AFTER DEMOLITION AND PROVIDE TO SCALE SHOP DRAWINGS OF ACTUAL DIMENSIONS OF EXISTING AND PROPOSED MATERIALS FOR APPROVAL BY THE ENGINEER. CONTRACTOR COSTS TO INCLUDE CUSTOMIZED LAST SHEET AS REQUIRED FOR TIGHT FIT.

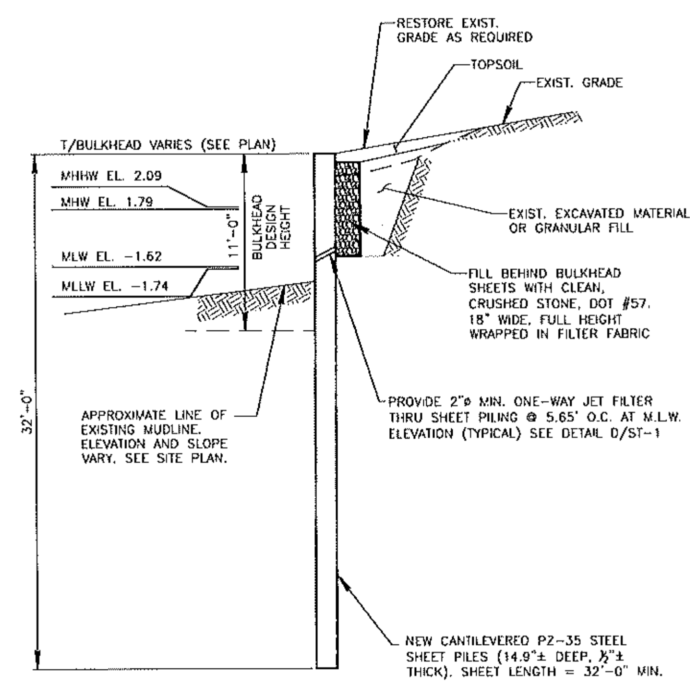


SECTION 1
TYPICAL BULKHEAD SECTION WITH HELICAL ANCHORS AT GRANGE AVENUE
(SCALE: 3/16" = 1'-0")

NOTES:

1. STEEL SHEET PILING SHALL BE AS SHOWN ON PLANS. ALL STEEL SHEET PILING SHALL BE ASTM A572 GRADE 50 STEEL (MINIMUM).
   A. CONTRACTOR SHALL USE A DRIVING TEMPLATE FOR DRIVING STEEL SHEET PILING.
   B. DRIVING OF PILES IN PAIRS IS RECOMMENDED TO FACILITATE DRIVING AND HELP MAINTAIN VERTICALITY OF PILES.
   C. PILING SHOULD BE DRIVEN WITH THE BALL EDGE (IF ANY) LEADING WHERE POSSIBLE, TO AVOID CLOGGING OF SOCKET END DURING DRIVING. WHEN CONDITIONS REQUIRE THAT SOCKET END LEAD, OR IF SPECIFIED SECTION DOES NOT INCLUDE BALL END, A BOLT OR SIMILAR OBJECT SHOULD BE PLACED IN BOTTOM OF SOCKET TO MINIMIZE CLOGGING.
   D. PROVIDE CORNER PIECES FOR BULKHEAD AS REQUIRED.
2. ALL STEEL ELEMENTS OF THE BULKHEAD SYSTEM SHALL BE COATED FOR PROTECTION AS FOLLOWS:
   A. STEEL SHEET PILES SHALL RECEIVE A THREE-COAT SYSTEM CONSISTING OF A TWO COAT-FIRST COAT OF AMERCOAT 240 BY PPG (MIN. 10-12mils PER COAT) AND A THIRD COAT OF AMERCOAT 450H BY PPG OR APPROVED EQUAL. COLOR PER OWNER. ALL COATS SHALL BE THE SAME COLOR. COAL-TAR EPOXY MAY NOT BE SUBSTITUTED.
   B. REMAINDER OF STEEL ELEMENTS, INCLUDING (BUT NOT LIMITED TO) WALERS, HARDWARE, HELICAL ANCHORS, AND TIE RODS (EXCEPT THREADED PORTIONS) SHALL RECEIVE A COAL-TAR EPOXY COATING OF 16 MILS MIN. DFT.
   C. SURFACE PREPARATION, APPLICATION OF COATINGS, AND CURING SHALL BE IN STRICT ACCORDANCE WITH THE COATING MANUFACTURERS' WRITTEN INSTRUCTIONS AND RECOMMENDATIONS.
   D. THREADED PARTS SHALL BE HOT-DIP GALVANIZED IN SHOP AND FIELD-COATED WITH COAL-TAR EPOXY AFTER INSTALLATION AND FINAL ADJUSTMENT.
3. ALL NEW FILL, BACKFILL, & DISTURBED SOIL SHALL BE COMPACTED IN 8" LIFTS TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST IN ACCORDANCE WITH ASTM D-1557. COMPLIANCE MUST BE SHOWN THROUGH TESTING PERFORMED BY A CERTIFIED COMPACTION TESTING PROVIDER. A MINIMUM OF 2 TESTS MUST BE PERFORMED AT EACH LIFT. ALL TESTING MUST BE PROVIDED TO AND APPROVED OF BY ENGINEER PRIOR TO FURTHER LIFTS BEING INSTALLED. ALL TESTING IS AT CONTRACTORS EXPENSE.
4. INNER AND OUTER THREADED TIE ROD SECTIONS AND ADAPTERS SHALL BE SUPPLIED WITH OPPOSITE-HAND THREADS TO PERMIT TENSIONING OF TIE RODS AFTER INSTALLATION OF BULKHEAD, WALER AND HELICAL ANCHORS.
5. PROVIDE TIE RODS/HELICAL ANCHORS IN 1ST CORRUGATION AT EACH END OF PROJECT. HELICAL LENGTH AND HELICES ASSEMBLY ARE MINIMUM REQUIRED. CONTRACTOR SHALL PROVIDE SIGNED AND SEALED DESIGN OF HELICAL ANCHORAGE SYSTEM. ALL HELICALS MUST BE LOAD TESTED IN ACCORDANCE WITH THE ANCHOR MANUFACTURER'S RECOMMENDATION. ALL ASPECTS OF ANCHOR TESTING, INCLUDING NUMBER/FREQUENCY OF ANCHOR TESTS, TEST PROCEDURES, MAGNITUDE OF TEST LOADS, AND METHOD OF TEST LOAD APPLICATION SHALL BE IN COMPLETE ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR SHALL WAIT A MINIMUM OF TWO (2) DAYS AFTER INSTALLATION BEFORE CONDUCTING LOAD TESTING ON ANY HELICAL ANCHOR. ALL TESTING MUST BE PROVIDED TO THE ENGINEER WITHIN 48 HOURS OF COMPLETION OF TESTING. NO BACKFILL OPERATIONS MAY BEGIN UNTIL HELICAL TEST RESULTS ARE APPROVED BY THE ENGINEER.
6. STEEL SHEET PILING LINE SYMBOL SHOWN ON BULKHEAD PLAN IS SCHEMATIC ONLY AND NOT NECESSARILY TO SCALE.

TIDAL RANGE		
	NAVD	MLW
MHHW	2.09'	3.71'
MHW	1.79'	3.41'
MTL	0.9'	1.71'
NAVD88	0.00'	1.62'
MLW	-1.62'	0.00'
MLLW	-1.74'	-0.12'



SECTION 2
TYPICAL CANTILEVERED BULKHEAD SECTION AT GRANGE AVENUE
(SCALE: 3/16" = 1'-0")
NOTES:
1. NO BULKHEAD CAP THIS SECTION.
2. RECOAT TOP 6" MINIMUM OF STEEL SHEET AFTER DRIVING (REFERENCE STRUCTURAL NOTES).

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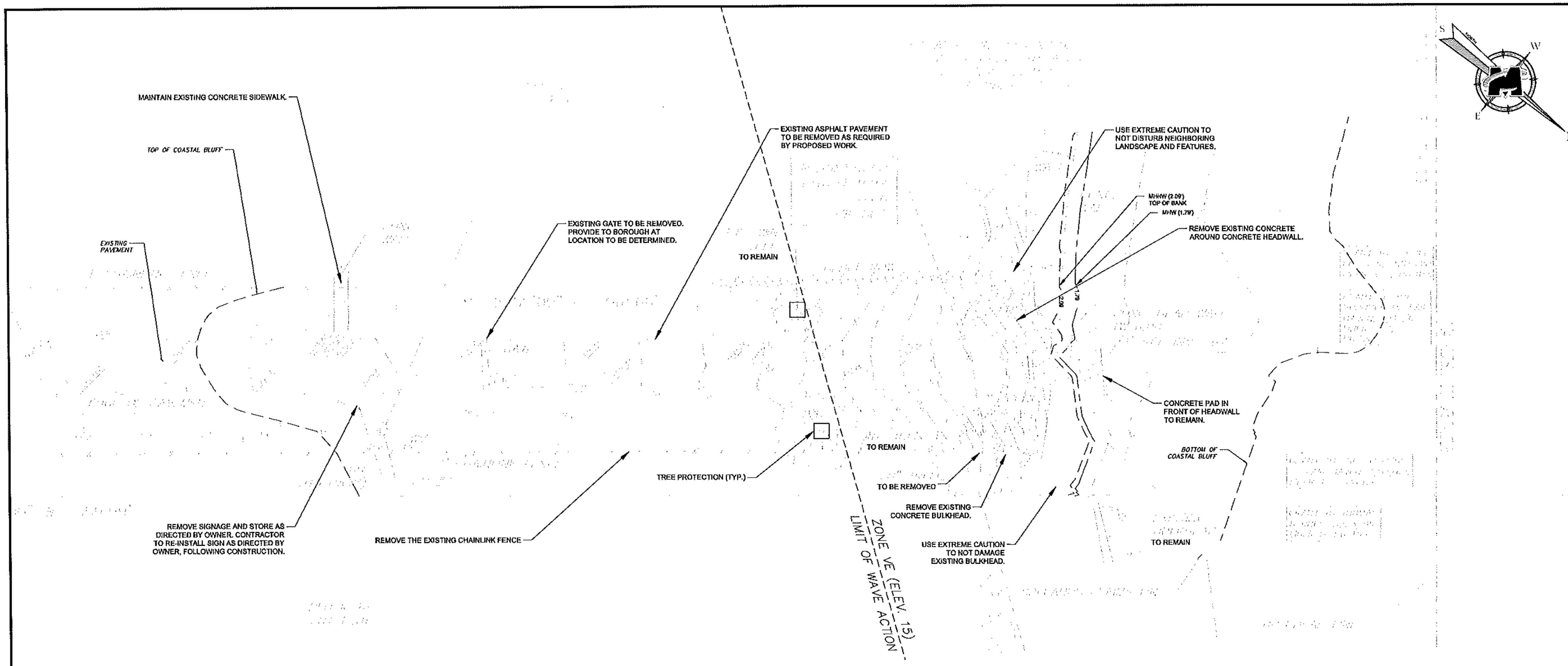
SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004193B	S-BULK-GRNG

SHEET TITLE
BULKHEAD PLAN
GRANGE AVENUE

SHEET NUMBER
S-1.3



HANCE ROAD EXISTING CONDITIONS & DEMOLITION PLAN

SCALE: 1" = 10"

GENERAL NOTES:

1. THE ENTIRE SITE IS WITHIN 300' RIPARIAN ZONE.
2. HORIZONTAL DATUM BASED UPON THE NEW JERSEY STATE PLANE COORDINATED SYSTEM, NAD 83 (NEAR SURFACE DERIVED COORDINATES UTILIZING KEYNET GPS).
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8. MEAN LOW WATER LINE AND MEAN LOWER LOW WATER LINE ARE OUTSIDE THE LIMITS OF THIS PROJECT.

DEMOLITION NOTES:

1. BULKHEAD REMOVAL SHALL INCLUDE ALL BULKHEAD MATERIALS. FULL DEPTH OF BULKHEAD SHALL BE REMOVED. IT IS CONTRACTOR'S RESPONSIBILITY TO STABILIZE UPWARD SLOPE DURING CONSTRUCTION.
2. STONE WALL AND BULKHEAD REMOVAL SHALL ALSO INCLUDE ALL FILL AND OTHER DEBRIS THAT HAS COLLAPSED AND WHICH NEEDS TO BE REMOVED TO ALLOW PROPER CONSTRUCTION OF NEW UNIFORM AND STRAIGHT BULKHEAD.
3. ALL AREAS THAT ARE NOT DESIGNATED FOR REMOVAL, OR ARE LISTED TO REMAIN, SHALL BE MAINTAINED IN PRECONSTRUCTION CONDITIONS. CONTRACTOR SHALL SUBMIT PHOTOS AND VIDEO OF ENTIRE PROJECT AREA AND SURROUNDING AREA. ANY DAMAGE SHALL BE REPAIRED AT NO COST TO OWNER.
4. ALL VEGETATION AND TREES NOT DESIGNATED FOR REMOVAL SHALL BE PROTECTED PER INCLUDED DETAILS.
5. ALL COSTS FOR DEMOLITION SHALL BE INCLUDED IN BID PAY ITEM "CLEARING SITE".

LEGEND

- MEAN HIGHER HIGH WATER LINE
- MEAN HIGH WATER LINE
- MEAN LOW WATER LINE
- MEAN LOWER LOW WATER LINE
- PROPERTY/GRANT BOUNDARY LINE

TIDAL RANGE		
	NAVD	MLW
MHHW	2.09'	3.71'
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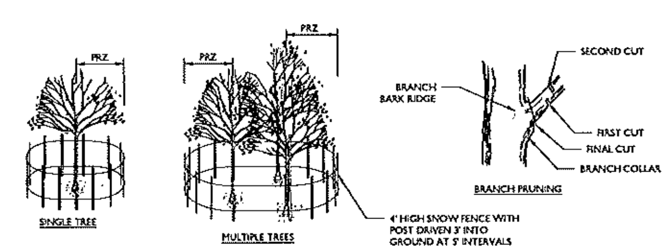
10 0 10 20
SCALE : 1" = 10'



NOTES:

1. PROTECTIVE FENCING IS TO BE ERECTED PRIOR TO CONSTRUCTION AND MAINTAINED DURING CONSTRUCTION AS DIRECTED BY THE LANDSCAPE ARCHITECT, SOIL CONSERVATION DISTRICT AND/OR MUNICIPAL ENGINEER.
2. NO CONSTRUCTION ACTIVITY IS PERMITTED WITHIN THE PROTECTIVE FENCING.
3. AS CONSTRUCTION NEARS COMPLETION THE FENCING WILL BE REMOVED AS DIRECTED.
4. AT THE COMPLETION OF CONSTRUCTION, ALL TREES WILL BE PRUNED AS NECESSARY TO CORRECT ANY DAMAGE RESULTING FROM CONSTRUCTION ACTIVITY.
5. GENERAL MECHANICAL DAMAGE - SEE CRITICAL ROOT ZONE CALCULATION (CRZ) FOR CORRECT PLACEMENT OF TREE PROTECTION.
6. BOX TREES WITHIN 25 FEET OF A BUILDING SITE TO PREVENT MECHANICAL INJURY. FENCING OR OTHER BARRIER SHOULD BE INSTALLED BEYOND THE CRITICAL ROOT ZONE.
7. BOARDS WILL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS.
8. FEEDER ROOTS SHOULD NOT BE CUT IN AN AREA INSIDE THE PROTECTED ROOT ZONE (PRZ) OR CRITICAL ROOT ZONE (CRZ) TREE ROOT SYSTEM COMMONLY EXTEND BEYOND THE DRIP LINE.
9. DAMAGED TRUNKS OR EXPOSED ROOTS SHOULD HAVE DAMAGED BARK REMOVED IMMEDIATELY AND NO PAINT SHALL BE APPLIED. EXPOSED ROOTS SHOULD BE COVERED WITH TOPSOIL IMMEDIATELY AFTER EXCAVATION IS COMPLETE. ROOTS SHALL BE PRUNED TO GIVE A CLEAN, SHARP SURFACE AMENABLE TO HEALING. ROOTS EXPOSED DURING HOT WEATHER SHOULD BE IRRIGATED TO PREVENT PERMANENT TREE INJURY. CARE FOR SERIOUS INJURY SHOULD BE PRESCRIBED BY A PROFESSIONAL FORESTER OR CERTIFIED TREE EXPERT.
10. TREE LIMB REMOVAL WHERE NECESSARY, WILL BE DONE AS NATURAL TARGET PRUNING TO REMOVE THE DESIRED BRANCH COLLAR. THERE SHOULD BE NO FLUSH CUTS. FLUSH CUTS DESTROY A MAJOR DEFENSE SYSTEM OF THE TREE. NO TREE PAINT SHALL BE APPLIED. ALL CUTS SHALL BE MADE AT THE OUTSIDE EDGE OF THE BRANCH COLLAR. CUTS MADE TOO FAR BEYOND THE BRANCH COLLAR MAY LEAD TO EXCESS SPROUTING, CRACKS AND ROT. REMOVAL OF A "V" CROTCH SHOULD BE CONSIDERED FOR FREE STANDING SPECIMEN TREES TO AVOID FUTURE SPLITTING DAMAGE.
11. CRITICAL ROOT ZONE (CRZ) OR PROTECTED ROOT ZONE (PRZ) CALCULATION.
MEASURE DHB OF THE TREE (DIAMETER OF TREE IN BREAST HEIGHT OR 4.5' ABOVE GROUND ON THE UPHILL SIDE) IN INCHES.
CRZ OR PRZ = DHB TIMES 1.5 (FOR OLD/UNHEALTHY/SENSITIVE TREES) OR DHB X 1.0 (FOR YOUNG/HEALTHY/TOLERANT TREES). EXPRESS IN FEET.

TEMPORARY TREE PROTECTION DETAIL

NOT TO SCALE MCNJ-SOIL-EROS-2100 05/01/17

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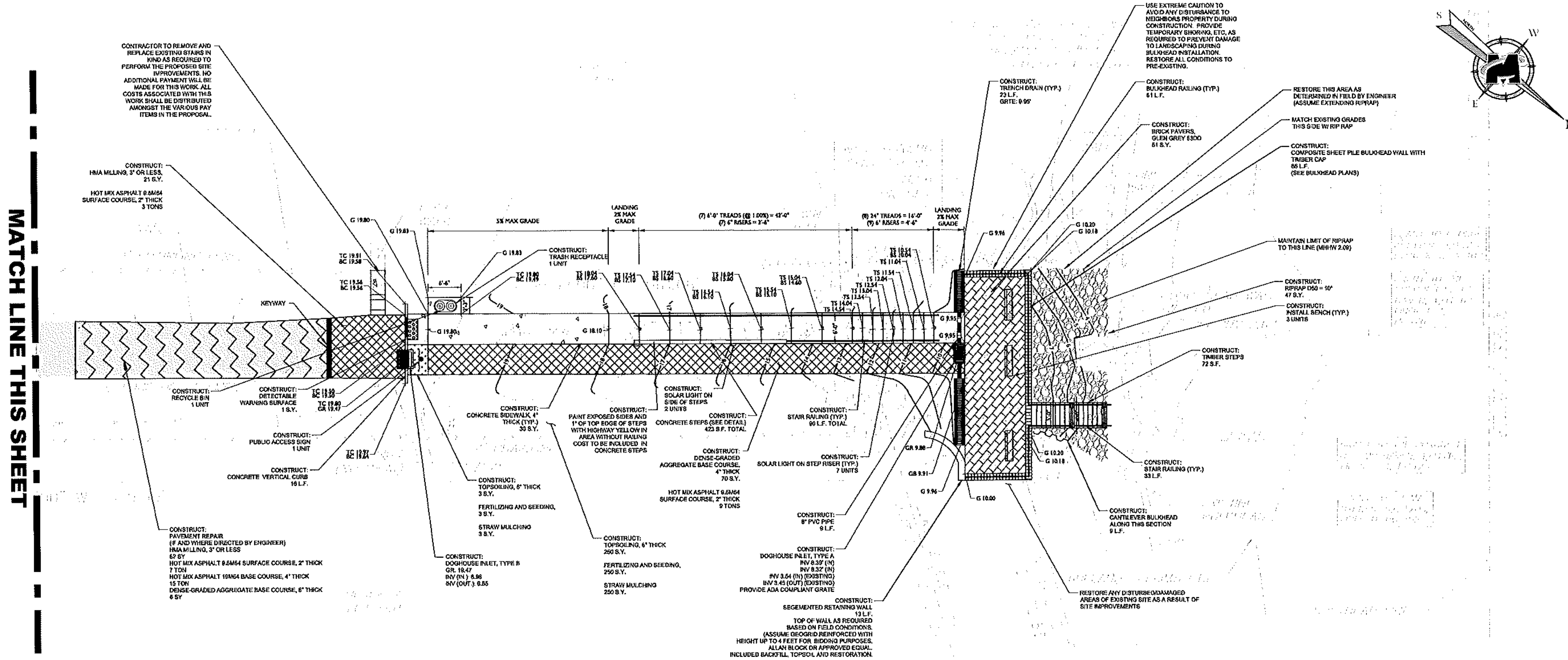
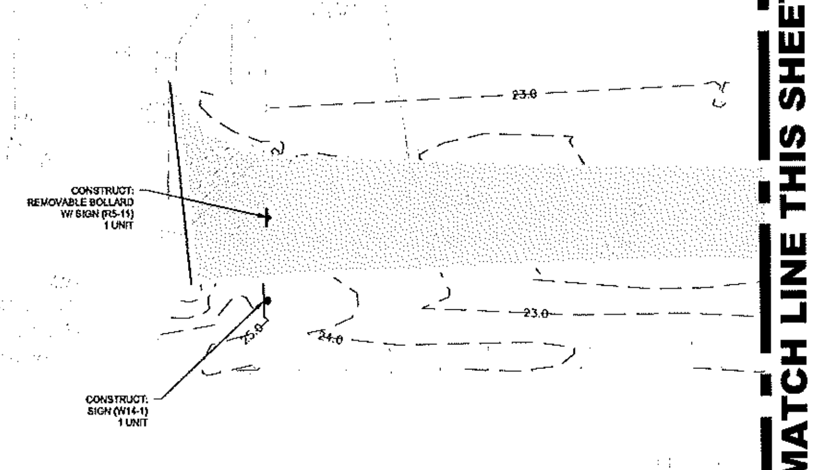
PROJECT NUMBER	DRAWING NAME		
17004182A	C-DEMO		

SHEET TITLE: HANCE ROAD EXISTING CONDITIONS & DEMOLITION PLAN

SHEET NUMBER: S-2.1



SITE & GRADING PLAN
HANCE ROAD
SCALE: 1" = 10'



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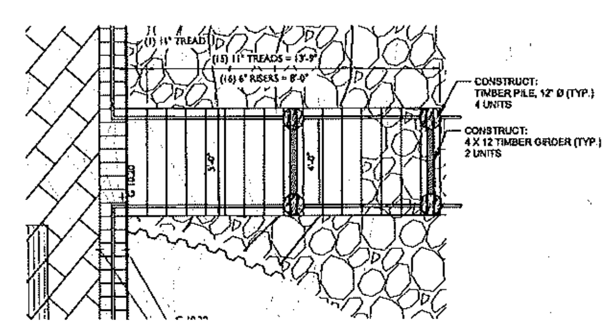

TIMBER STEP INSET
SCALE: 1" = 4'

LEGEND

EXISTING		PROPOSED
	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE BACK	CURB	FACE BACK
	DEPRESSED CURB	
	SIDEWALK	
—X—X—	FENCES	—X—X—
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'B' INLET	
	'E' INLET	
	STORM MANHOLE	
	SANITARY MANHOLE	
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
75 74	CONTOURS	75 74
x G 29.0	SPOT ELEVATION	x G 29.0
	DIRECTION OF OVERLAND FLOW	
x TC 29.0	TOP OF CURB ELEVATION	x TC 29.0
x BC 29.0	BOTTOM OF CURB ELEVATION	x BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	x TDC 29.0
	MEAN HIGHER HIGH WATER LINE	
	MEAN HIGH WATER LINE	
	MEAN LOW WATER LINE	
	MEAN LOWER LOW WATER LINE	

10 0 10 20
SCALE: 1" = 10'

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1	07/22/19	TEK	FINAL PLAN SUBMITTAL
2	01/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	05/15/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR
BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP
BOROUGH OF FAIR HAVEN MONMOUTH COUNTY NEW JERSEY

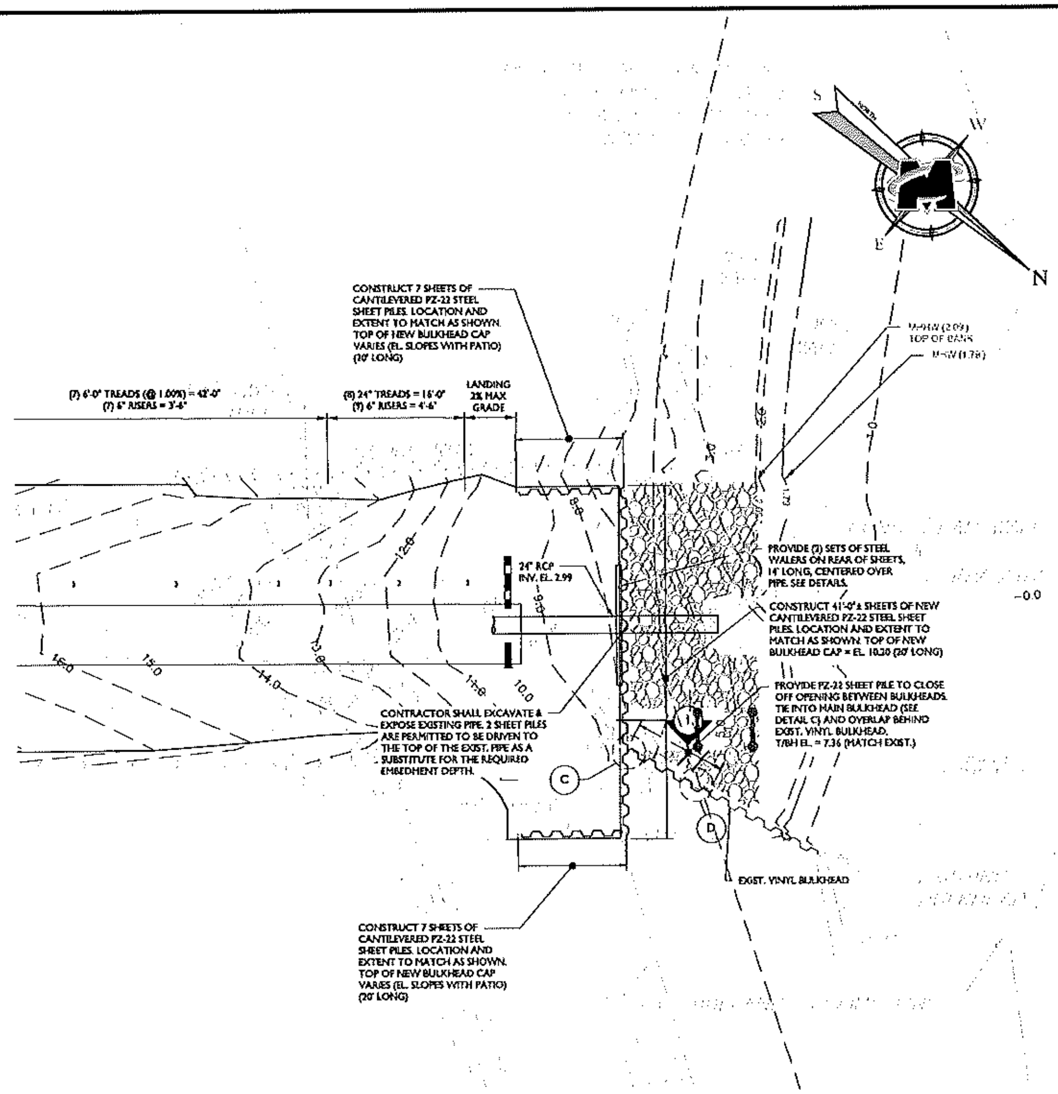
RED BANK OFFICE
Corporate Headquarters
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701
Phone: 732.383.1950
Fax: 732.383.1984

SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004982B	C-LAYT-HANC-CCPT-3

SHEET TITLE: SITE & GRADING PLAN HANCE ROAD

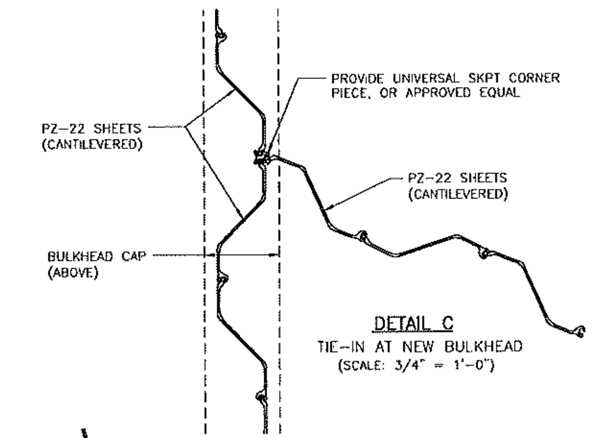
SHEET NUMBER: S-2.2



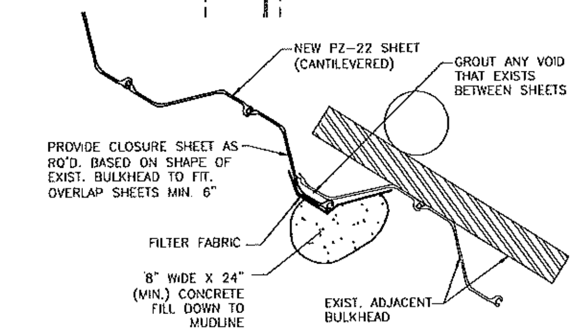
BULKHEAD PLAN

HANCE ROAD

SCALE: 1" = 10'



DETAIL C
TIE-IN AT NEW BULKHEAD
(SCALE: 3/4" = 1'-0")



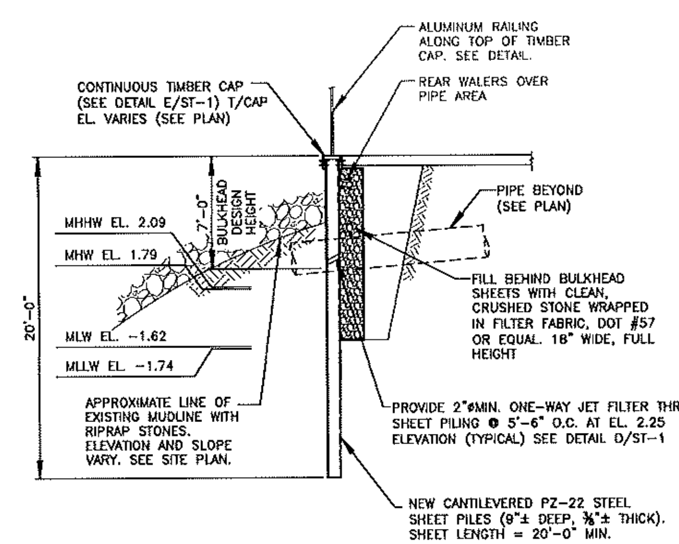
DETAIL D
TIE-IN TO ADJACENT BULKHEAD
(SCALE: 3/4" = 1'-0")

NOTE:
TIE IN/CLOSURE DETAIL IS SCHEMATIC BASED ON VISIBLE FIELD CONDITIONS. CONTRACTOR TO FIELD MEASURE AFTER DEMOLITION AND PROVIDE TO SCALE SHOP DRAWINGS OF ACTUAL DIMENSIONS OF EXISTING AND PROPOSED MATERIALS FOR APPROVAL BY THE ENGINEER. CONTRACTOR COSTS TO INCLUDE ALL REQUIRED ITEMS TO PROVIDE A TIGHT FIT.

NOTES:

1. STEEL SHEET PILING SHALL BE AS SHOWN ON PLANS. ALL STEEL SHEET PILING SHALL BE ASTM A572 GRADE 50 STEEL (MINIMUM).
   A. CONTRACTOR SHALL USE A DRIVING TEMPLATE FOR DRIVING STEEL SHEET PILINGS.
   B. DRIVING OF PILES IN PAIRS IS RECOMMENDED TO FACILITATE DRIVING AND HELP MAINTAIN VERTICALITY OF PILES.
   C. PILING SHOULD BE DRIVEN WITH THE BALL EDGE (IF ANY) LEADING WHERE POSSIBLE, TO AVOID CLOGGING OF SOCKET END DURING DRIVING. WHEN CONDITIONS REQUIRE THAT SOCKET END LEAD, OR IF SPECIFIED SECTION DOES NOT INCLUDE BALL END, A BOLT OR SIMILAR OBJECT SHOULD BE PLACED IN BOTTOM OF SOCKET TO MINIMIZE CLOGGING.
   D. PROVIDE CORNER PIECES IN BULKHEAD AS REQUIRED.
2. ALL STEEL ELEMENTS OF THE BULKHEAD SYSTEM SHALL BE COATED FOR PROTECTION AS FOLLOWS:
   A. STEEL SHEET PILES SHALL RECEIVE A THREE-COAT SYSTEM CONSISTING OF A TWO COAT-FIRST COAT OF AMERCOAT 240 BY PPG (MIN. 10-12mils PER COAT) AND A THIRD COAT OF AMERCOAT 450H BY PPG OR APPROVED EQUAL. COLOR PER OWNER. ALL COATS SHALL BE THE SAME COLOR. COAL-TAR EPOXY <u>MAY NOT</u> BE SUBSTITUTED.
   B. REMAINDER OF STEEL ELEMENTS, INCLUDING (BUT NOT LIMITED TO) HARDWARE, SHALL RECEIVE A COAL-TAR EPOXY COATING OF 16 MILS MINIMUM, DFT.
   C. SURFACE PREPARATION, APPLICATION OF COATINGS, AND CURING SHALL BE IN STRICT ACCORDANCE WITH THE COATING MANUFACTURERS' WRITTEN INSTRUCTIONS AND RECOMMENDATIONS.
   D. THREADED PARTS SHALL BE HOT-DIP GALVANIZED IN SHOP AND FIELD-COATED WITH COAL-TAR EPOXY AFTER INSTALLATION AND FINAL ADJUSTMENT.
3. ALL NEW FILL, BACKFILL, & DISTURBED SOIL SHALL BE COMPACTED IN 8" LIFTS TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST IN ACCORDANCE WITH ASTM D-1557. COMPLIANCE MUST BE SHOWN THROUGH TESTING PERFORMED BY A CERTIFIED COMPACTION TESTING PROVIDER. A MINIMUM OF 2 TESTS MUST BE PERFORMED AT EACH LIFT. ALL TESTING MUST BE PROVIDED TO AND APPROVED OF BY ENGINEER PRIOR TO FURTHER LIFTS BEING INSTALLED. ALL TESTING IS AT CONTRACTORS EXPENSE.
4. STEEL SHEET PILING LINE SYMBOL SHOWN ON BULKHEAD PLAN IS SCHEMATIC ONLY AND NOT NECESSARILY TO SCALE.

TIDAL RANGE		
	NAVD	MLW
MHHW	2.09'	3.71'
MHW	1.79'	3.41'
MTL	0.9'	1.71'
NAVD88	0.00'	1.62'
MLW	-1.62'	0.00'
MLLW	-1.74'	-0.12'



SECTION 1
TYPICAL CANTILEVERED BULKHEAD SECTION AT HANCE ROAD
(SCALE: 3/16" = 1'-0")

10 0 10 20
SCALE : 1" = 10'

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RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS
FOR
BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP
BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

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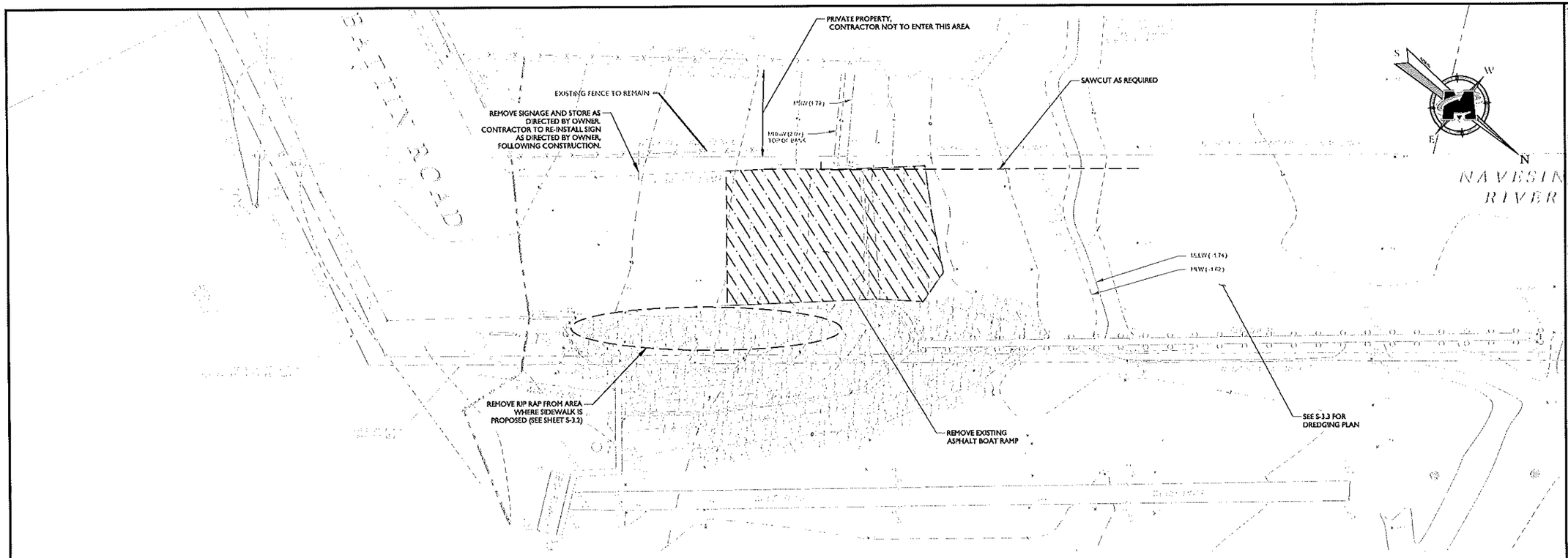
SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/03/19	TEK	RCM
PROJECT NUMBER	DRAWING NAME		
17001982B	S-BULK-HANC		

SHEET TITLE
BULKHEAD PLAN
HANCE ROAD

SHEET NUMBER
S-2.3



NOTES:

1. ALL UPLAND PROJECT ACTIVITIES WITHIN 300 RIPARIAN ZONE.
2. ALL EXISTING TOPOGRAPHIC INFORMATION SHOWN REFERS TO NAD 1983/NGVD1988 DATUMS.
3. TIDAL INFORMATION OBTAINED FROM NOAA OCEANIC, NAVESINK RIVER, NJ. STATION ID 8531753.
4. AE, VE, AND WAVE ACTION ZONES ARE BASED ON PRELIMINARY FEMA FLOOD INSURACE RATE MAP REVISED JANUARY 30, 2015, MAP NUMBER 34025C0181G.

EXISTING CONDITIONS & DEMOLITION PLAN BATTIN ROAD

SCALE: 1" = 10"

10 0 10 20

SCALE: 1" = 10'

LEGEND

EXISTING		PROPOSED
12+00 13+00	TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH)	12+00 13+00
	RIGHT OF WAY LINE	
	PROPERTY LINE	
	EDGE OF PAVEMENT	
FACE BACK	CURB	FACE BACK
	DEPRESSED CURB	
	SIDEWALK	
-X-X-	FENCES	-X-X-
	TREELINE	
	ROADWAY SIGNS	
	WETLAND LINE	
	MUNICIPAL BOUNDARY LINE	
	'S' INLET	
	'I' INLET	
(P)	STORM MANHOLE	(D)
(S)	SANITARY MANHOLE	(S)
	FLARED END SECTION	
	HEADWALL	
	HYDRANT	
	POLE MOUNTED LIGHT	
73 74	CONTOURS	73 74
× G 29.0	SPOT ELEVATION	× G 29.0
	DIRECTION OF OVERLAND FLOW	
× TC 29.0	TOP OF CURB ELEVATION	× TC 29.0
× BC 29.0	BOTTOM OF CURB ELEVATION	× BC 29.0
	TOP OF DEPRESSED CURB ELEVATION	× TDC 29.0
	MEAN HIGHER HIGH WATER LINE	
	MEAN HIGH WATER LINE	
	MEAN LOW WATER LINE	
	MEAN LOWER LOW WATER LINE	

TIDAL RANGE	
REFERENCED TO NAVD88	
MHHW	2.09'
MHW	1.79'
MTL	0.9'
MLW	-1.62'
MLLW	-1.74'

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1	6/27/19	TEK	FINAL PLAN SUBMITTAL
2	9/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	10/1/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39033

CONSTRUCTION PLANS
FOR
BULKHEAD REPLACEMENT
GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP
BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

RED BANK OFFICE
Corporate Headquarters
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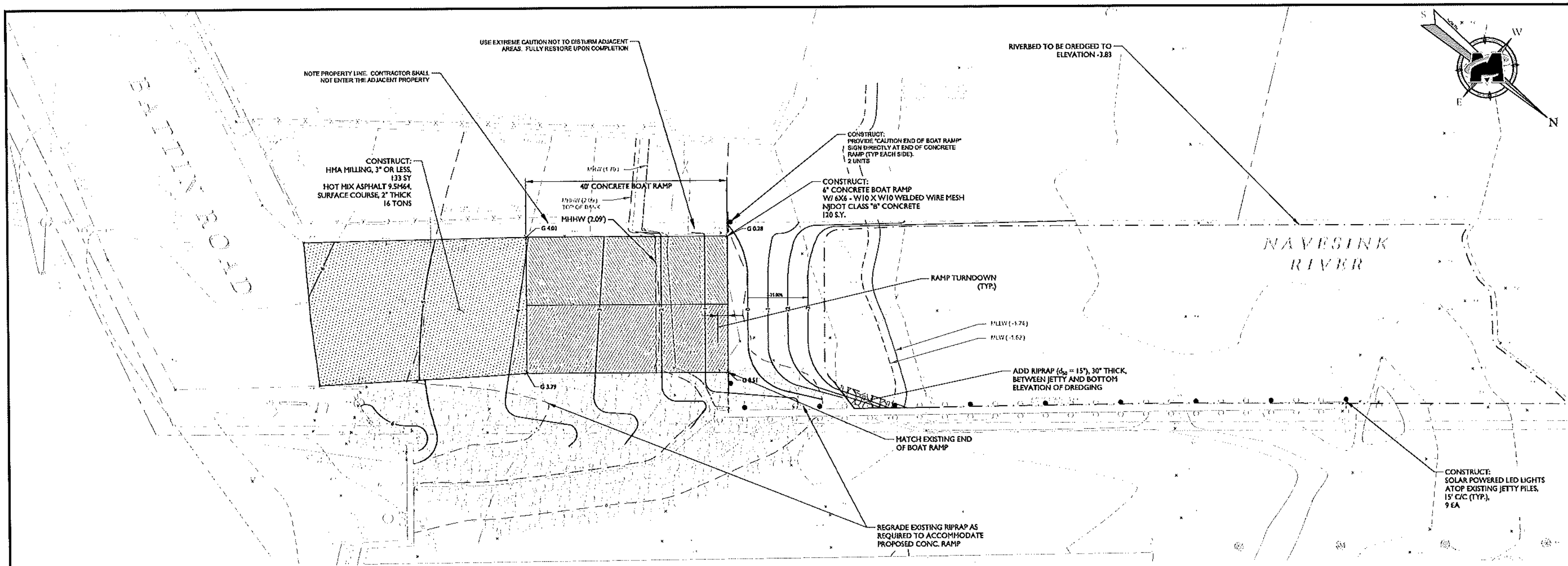
Phone: 732.383.1950
Fax: 732.383.1984

SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	6/2019	TEK	RCM
PROJECT NUMBER	DRAWING NAME		
170069026	C-DEMO-BATT		

SHEET TITLE
EXISTING CONDITIONS & DEMOLITION PLAN BATTIN ROAD

SHEET NUMBER
S-3.1



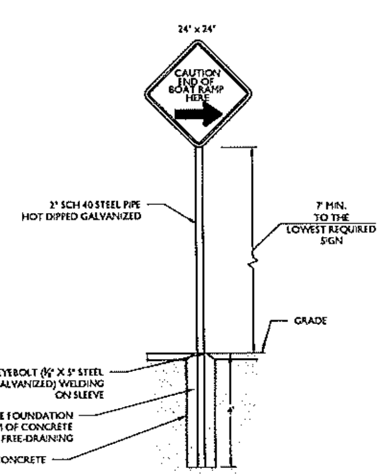
BATTIN ROAD BOAT RAMP
SITE AND GRADING PLAN

SCALE: 1" = 10"

10 0 10 20
SCALE : 1" = 10'

NOTES:

1. ALL UPLAND PROJECT ACTIVITIES WITHIN 300' RIPARIAN ZONE.
2. ALL EXISTING TOPOGRAPHIC INFORMATION SHOWN REFERS TO NAD 1983/NGVD1988 DATUMS.
3. TIDAL INFORMATION OBTAINED FROM NOAA OCEANIC, NAVESINK RIVER, NJ, STATION ID 8531753.
4. AE, VE, AND WAVE ACTION ZONES ARE BASED ON PRELIMINARY FEMA FLOOD INSURACE RATE MAP REVISED SEPTEMBER 25, 2009, MAP NUMBER 34025C0181F.
5. THE SITE IS LOCATED IN THE AE FLOOD ZONE EL. 9'.



CAUTION SIGN DETAIL
NOT TO SCALE

LEGEND

EXISTING / PROPOSED

- TRAVERSE LINE, CENTER LINE OR BASELINE (LABEL AS SUCH) — 12+00, 13+00
- RIGHT OF WAY LINE
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB (FACE / BACK)
- DEPRESSED CURB
- SIDEWALK
- FENCES
- TREELINE
- ROADWAY SIGNS
- WETLAND LINE
- MUNICIPAL BOUNDARY LINE
- 'B' INLET
- 'E' INLET
- STORM MANHOLE
- SANITARY MANHOLE
- FLARED END SECTION
- HEADWALL
- HYDRANT
- POLE MOUNTED LIGHT
- CONTOURS — 75, 74
- SPOT ELEVATION — × G 29.0 / × G 29.0
- DIRECTION OF OVERLAND FLOW
- TOP OF CURB ELEVATION — × TC 29.0 / × TC 29.0
- BOTTOM OF CURB ELEVATION — × BC 29.0 / × BC 29.0
- TOP OF DEPRESSED CURB ELEVATION — × TDC 29.0
- MEAN HIGHER HIGH WATER LINE
- MEAN HIGH WATER LINE
- MEAN LOW WATER LINE
- MEAN LOWER LOW WATER LINE

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RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR

BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP

BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

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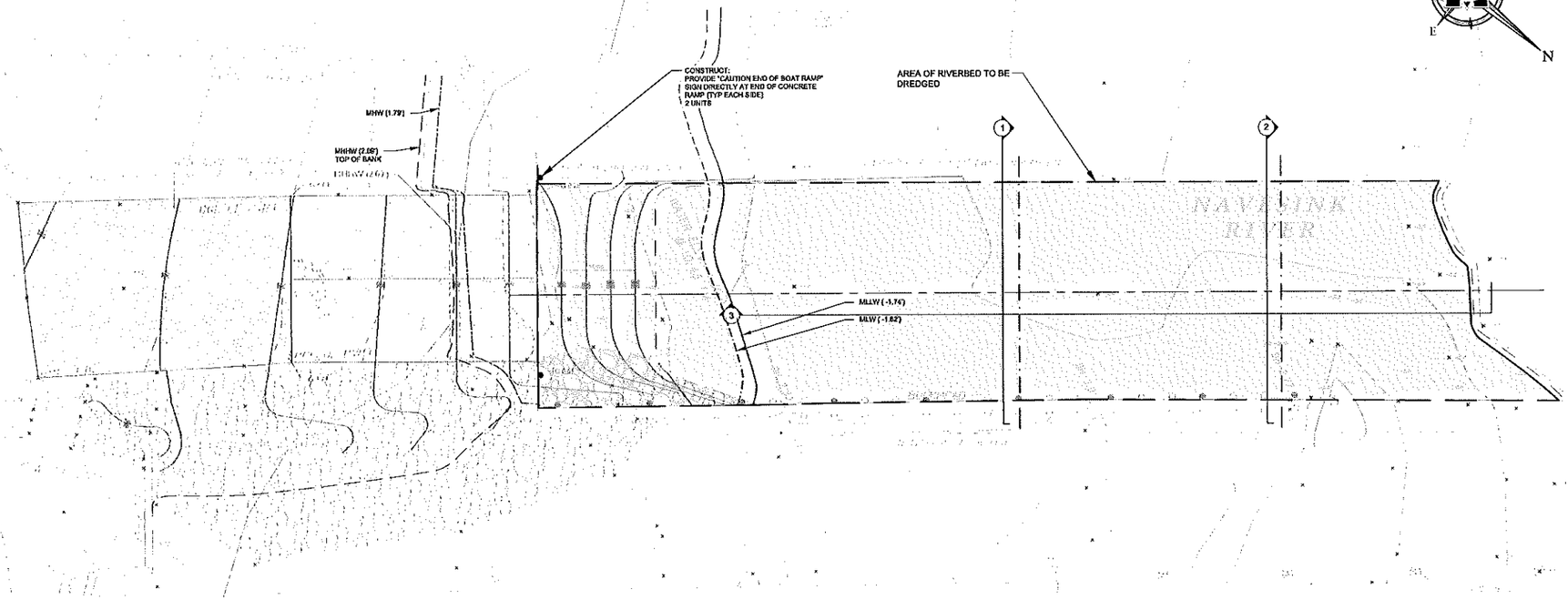
SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004578	C-LAYT-BATT

SHEET TITLE
SITE & GRADING PLAN: BATTIN ROAD

SHEET NUMBER
S-3.2



NOTES:

1. ALL UPLAND PROJECT ACTIVITIES WITHIN 300' RIPARIAN ZONE.
2. ALL EXISTING TOPOGRAPHIC/HYDROGRAPHIC INFORMATION SHOWN REFERS TO NAD 1983 NGVD1988 DATUMS.
3. TIDAL INFORMATION OBTAINED FROM NOAA OCEANIC, NAVESINK RIVER, NJ. STATION ID 8531753.
4. AE, VE, AND WAVE ACTION ZONES ARE BASED ON PRELIMINARY FEMA FLOOD INSURANCE RATE MAP REVISED SEPTEMBER 25, 2009, MAP NUMBER 34025C0181F.
5. THE SITE IS LOCATED IN THE AE FLOOD ZONE EL. 9'.

TIDAL RANGE		
	NAVD	MLW
MHHW	2.09'	3.71'
MHW	1.79'	3.41'
MTL	0.9'	1.71'
NAVD88	0.00'	1.62'
MLW	-1.62'	0.00'
MLLW	-1.74'	-0.12'

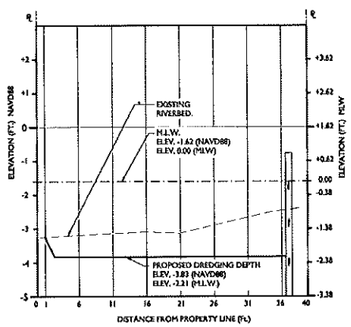
BATTIN ROAD BOAT RAMP
DREDGING PLAN

SCALE: 1" = 10"

10 0 10 20
SCALE : 1" = 10'

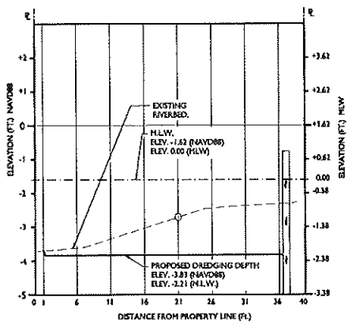
TOTAL DREDGING VOLUME = 300 CY*

***DREDGE VOLUME BASED ON HYDRO SURVEY WITH CONSIDERATION FOR SEASONAL VARIATION. RIVERBED IN DREDGE AREAS VARIES SEASONALLY. CONTRACTOR SHALL INSPECT AREA PRIOR TO BID TO CONFIRM ACTUAL QUANTITIES AT TIME OF BID. PAYMENT FOR THIS ITEM WILL BE LUMP SUM FOR DREDGING DOWN TO ELEVATION -3.83 AS SHOWN ON PLAN.**



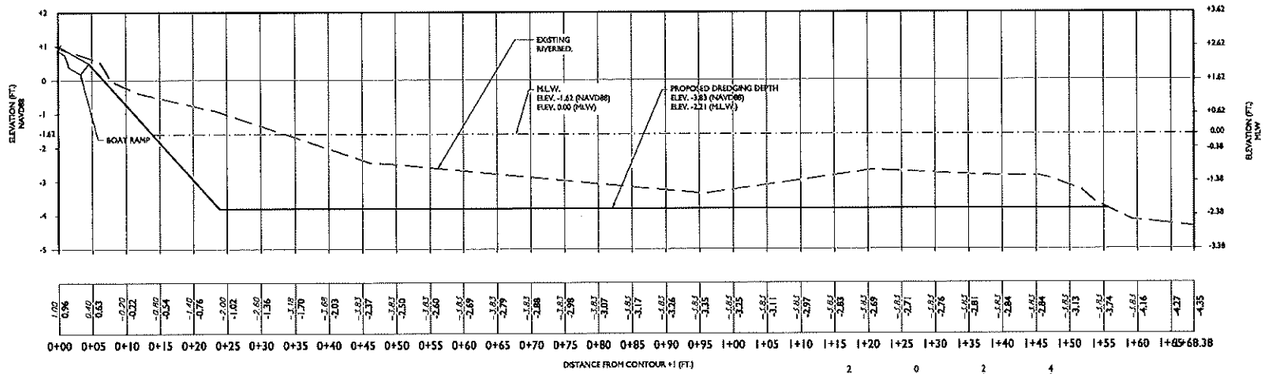
CROSS SECTION 1
HORIZONTAL : 1" = 10'
VERTICAL : 1" = 2'

2 0 2 4
SCALE : 1" = 2'
10 0 10 20
SCALE : 1" = 10'



CROSS SECTION 2
HORIZONTAL : 1" = 10'
VERTICAL : 1" = 2'

2 0 2 4
SCALE : 1" = 2'
10 0 10 20
SCALE : 1" = 10'



LONGITUDINAL SECTION 3
HORIZONTAL : 1" = 10'
VERTICAL : 1" = 2'

2 0 2 4
SCALE : 1" = 2'
10 0 10 20
SCALE : 1" = 10'

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2	01/2020	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	06/2020	SS	ADDED TO SET

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39033

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FOR
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BOROUGH OF FAIR HAVEN
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NEW JERSEY

RED BANK OFFICE
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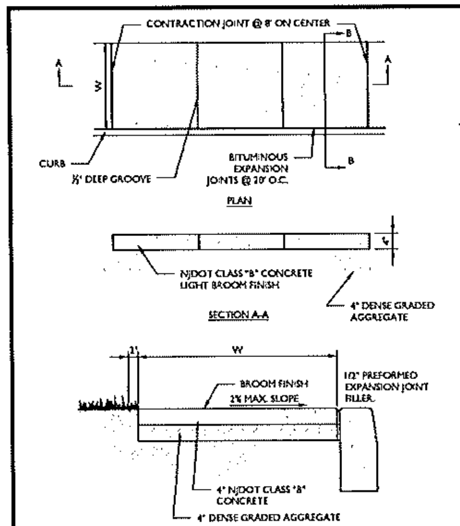
SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/2019	TEK	RCM
PROJECT NUMBER	DRAWING NAME		
170049128	C-DRGE-BATT		

SHEET TITLE
DREDGE PLAN: BATTIN ROAD

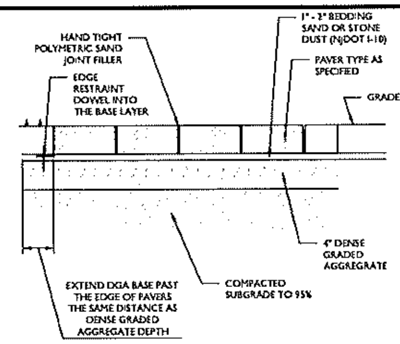
SHEET NUMBER
S-3.3



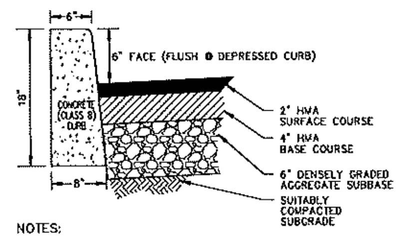
NOTES:

1. ½" EXPANSION JOINT FILLER INSTALLED BETWEEN THE CURB AND CONCRETE SIDEWALK AT 10' MAXIMUM SPACING, RECESS TO ¼" FROM THE TOP OF SIDEWALK.
2. ⅛" CONTRACTION JOINTS INSTALLED AT AN INTERVAL 24 TO 30 TIMES THE THICKNESS OF THE SLAB, TO A DEPTH OF ¼ OF THE THICKNESS OF THE SLAB, RECESS TO ¼" FROM THE TOP OF SIDEWALK, FOR THE FULL WIDTH OF THE SIDEWALK. SCORE A ¼" GROOVED JOINT HALF WAY BETWEEN THE CONTRACTION JOINTS.
3. JOINT FILLER SHALL CONFORM TO AASHTO M-33. SURFACE OF CONCRETE SHALL BE BROOM FINISH. ROUND EDGES USING AN EDGING TOOL WITH A ¼" RADIUS.
4. CONCRETE SIDEWALK SHALL BE CONSTRUCTED PER THE LATEST ADA REQUIREMENTS.

CONCRETE SIDEWALK (NEXT TO CURB) DETAIL
NOT TO SCALE



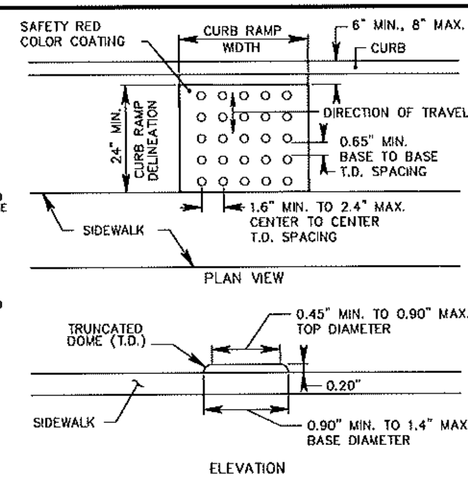
TYPICAL STANDARD PAVER SECTION DETAIL
NOT TO SCALE



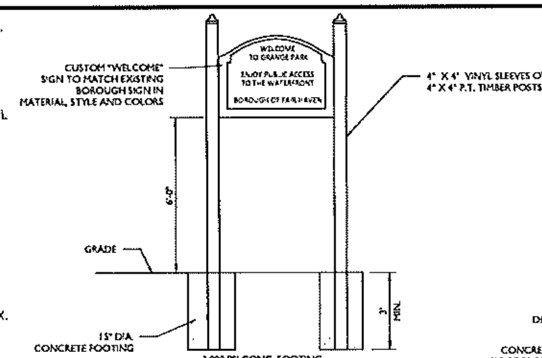
NOTES:

1. CONCRETE FOR CURB CONSTRUCTION TO BE A.E. CLASS B PORTLAND CEMENT CONCRETE HAVING A 28-DAY STRENGTH OF 4,500 P.S.I.
2. 1/2" THICK PREFORMED BITUMINOUS JOINT FILLER SHALL BE USED TO CONSTRUCT EXPANSION JOINTS AT 20' O.C.
3. CONSTRUCTION JOINTS SHALL BE CONSTRUCTED AT 20' O.C. AND OFFSET 10' O.C. FROM EXPANSION JOINTS
4. 2' WIDE PAVEMENT REPAIR STRIP REQUIRED AT LOCATIONS OF PROPOSED CONCRETE CURB. PAYMENT SHALL BE INCLUDED UNDER CONCRETE CURB PAY ITEM.

PAVEMENT REPAIR
NOT TO SCALE



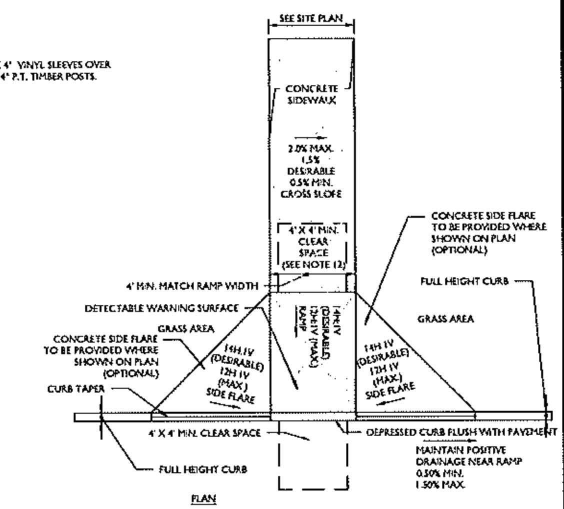
DETECTABLE WARNING SURFACE
MATERIALS SHALL BE IN ACCORDANCE WITH SECTION 606



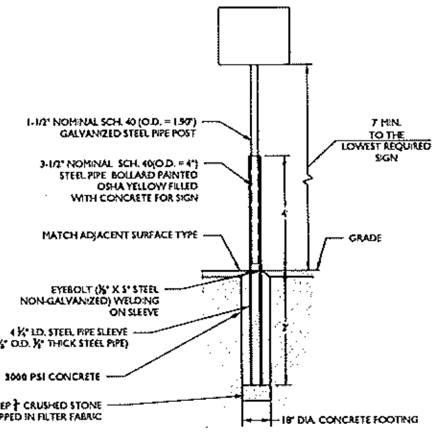
NOTE

1. ALL SIGNS SHALL CONFORM TO THE CURRENT MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES" FOR STREETS AND HIGHWAYS AND CURRENT MUNICIPAL SPECIFICATIONS FOR COLOR, DESIGN AND EXACT WORDING.
2. CUSTOM PUBLIC ACCESS SIGN SHALL READ, "WELCOME TO GRANGE PARK/HANCE PARK, ENJOY PUBLIC ACCESS TO THE RIVERFRONT, BOROUGH OF FAIR HAVEN"
3. CONTRACTO SHALL SUBMIT SAMPLE SIGN GRAPHIC AND DETAILS TO BOROUGH (INCLUDING COLORS, FONT, STYLE, MATERIALS) FOR APPROVAL PRIOR TO PRODUCTION.

PUBLIC ACCESS SIGN DETAIL
NOT TO SCALE

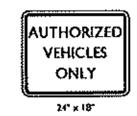


CURB RAMP TYPE 2 DETAIL
NOT TO SCALE

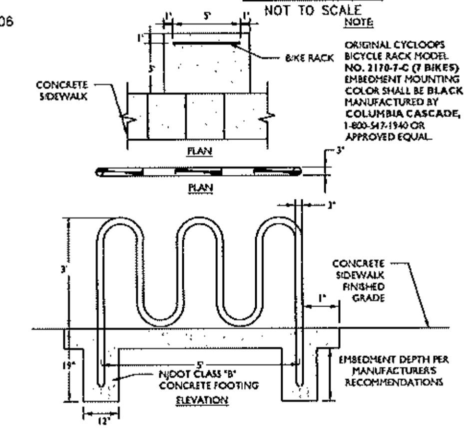


BOLLARD MOUNTED SIGN DETAIL
NOT TO SCALE

W14-1 SIGN DETAIL
NOT TO SCALE



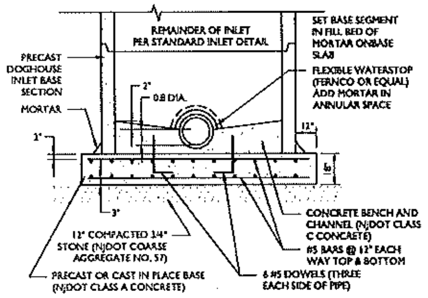
R5-11 SIGN DETAIL
NOT TO SCALE



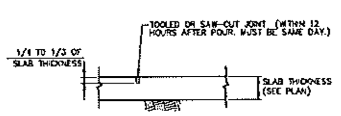
NOTE:

ORIGINAL CYCLOOPS BICYCLE RACK MODEL NO. 2170-7-C (7 BIKES) EMBEDMENT MOUNTING COLOR SHALL BE BLACK MANUFACTURED BY COLUMBIA CASCADE, 1-800-547-1940 OR APPROVED EQUAL.

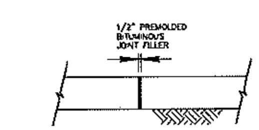
BICYCLE RACK DETAIL
NOT TO SCALE



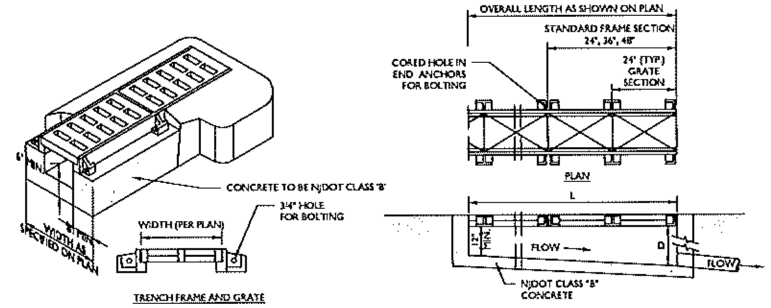
DOGHOUSE INLET
NOT TO SCALE



TYPICAL CONTROL JOINT DETAIL (SAWCUT)
NOT TO SCALE



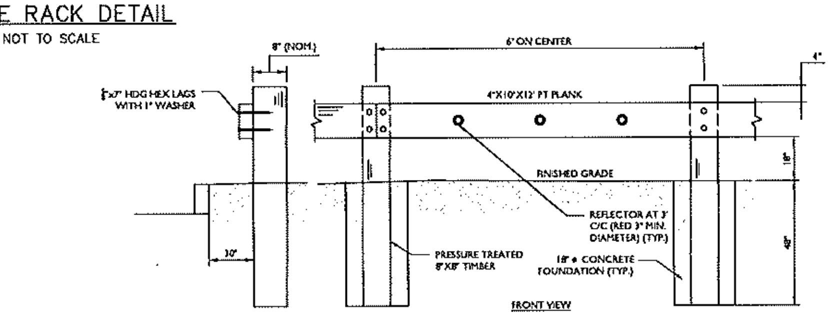
TYPICAL EXPANSION JOINT DETAIL
NOT TO SCALE



NOTES:

1. TRENCH DRAINS TO BE HEAVY DUTY CAST IRON TYPE AS MANUFACTURED BY CAMPBELL CORPORATION, PATTERN # 4504 (COVER) & # 4529 (GRATE) FOR H-20 LOADING OR APPROVED EQUAL.
2. WIDTH, DEPTH AND BOTTOM SLOPE OF TRENCH AS SPECIFIED ON THE PLANS.
3. MINIMUM BOTTOM SLOPE = 0.50%

HEAVY DUTY TRENCH DRAIN DETAIL
NOT TO SCALE



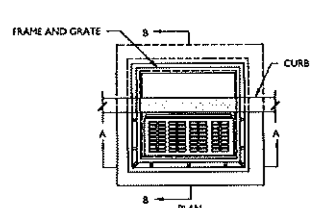
NOTE:

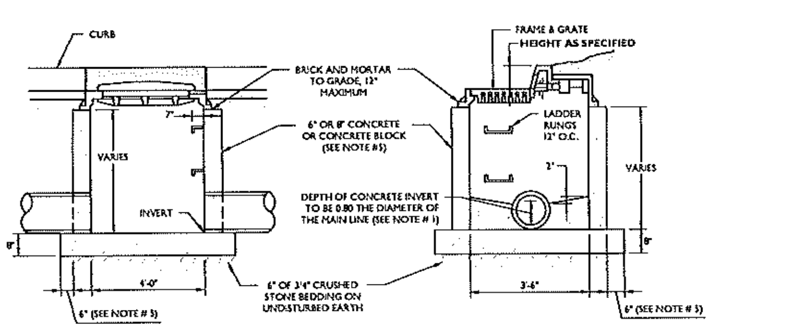
1. ALL WOOD SHALL BE PRESSURE TREATED ACQ 0.60.

TIMBER GUIDE RAIL DETAIL
NOT TO SCALE

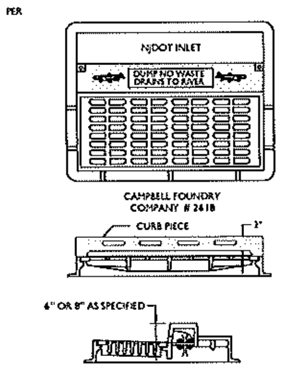
NOTES:

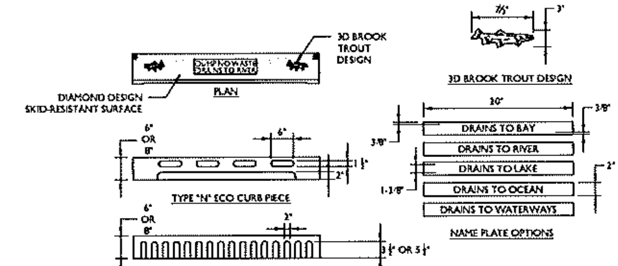
1. INVERTS TO BE ELIMINATED IN BOTTOM OF TERMINAL INLETS, BOTTOMS SHALL BE DISHED AND SLOPED TOWARDS THE OUTLET PIPE AT A RATE OF GRADE OF 2 INCHES PER FOOT.
2. THIS INLET MAY BE CONSTRUCTED OF CONCRETE, PRECAST CONCRETE OR SOLID CONCRETE BLOCK. IF CONCRETE BLOCK IS USED, THE BOTTOM SHALL BE AS SHOWN FOR CONCRETE & THE OUTSIDE OF THE WALLS SHALL BE PLASTERED WITH 1/2" COAT OF 1:2 CEMENT SAND MORTAR. THE INSIDE WALL JOINTS SHALL BE STRUCK AND POINTED.
3. PROVIDE 7/8" DIA. X 7" X 12" ALUMINUM LADDER RUNGS, 12" O.C. OR COPOLYMER POLYPROPYLENE PLASTIC STEPS WITH 1/2" DIA. GRADE 60 STEEL REINFORCEMENT BY M.A. INDUSTRIES, PS1-PF OR PS2-B WITH PRECAST PRESS FIT INSERTS, 12" O.C. OR APPROVED EQUIVALENT.
4. INLET FRAME AND GRATES TO BE CAMPBELL FOUNDRY # 2618 WITH 6" OR 8" TYPE N ECO CURB PIECE, OR APPROVED EQUAL.
5. WHEN DEPTH IS GREATER THAN 12' THE WALLS SHOULD BE 8" THICK CONCRETE OR SOLID CONCRETE BLOCK AND THE FOOTING SHALL BE EXTENDED TO 12" BEYOND THE OUTSIDE WALLS.
6. ALL CONCRETE TO BE NJDOT CLASS "B".
7. IN ACID SOILS, TWO COATS OF BITUMASTIC WATER PROOFING SHALL BE APPLIED PER MANUFACTURER'S SPECIFICATION.
8. INLETS SHALL BE CONSTRUCTED IN ACCORDANCE WITH H-20 LOADING REQUIREMENTS.





TYPE 'B' INLET DETAIL
NOT TO SCALE

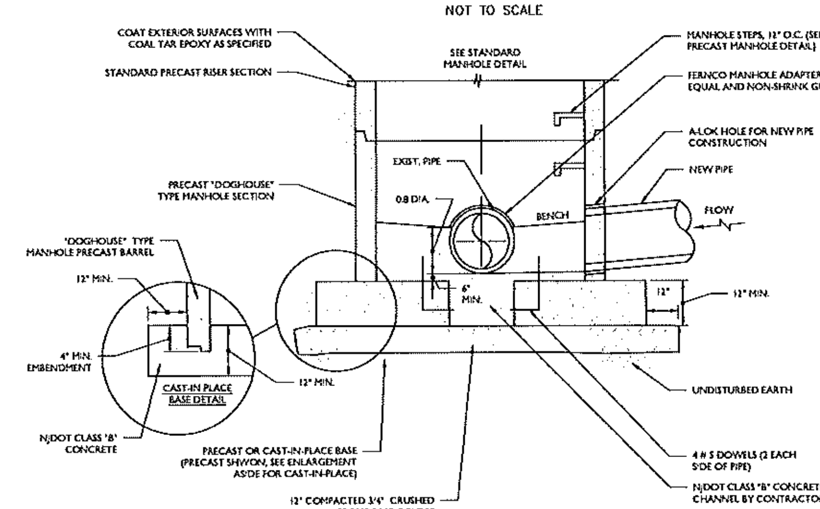




NOTES:

1. MATERIALS: GREY CAST IRON ASTM A48-83, CLASS 30B
2. IN RETROFIT SITUATIONS THIS CURB PIECE (HEAD) WILL FIT EXISTING CAMPBELL FOUNDARY CO. MANUFACTURED CURB INLETS FOR NJDOT TYPES B, B-1, B-2, D, D-1, AND D-2.
3. NAMEPLATE MESSAGE CAN BE MODIFIED TO PROJECT SPECIFIC NEEDS WITHIN AREA SHOWN.
4. CASTING SUPPLIED WITHOUT SURFACE COATING.
5. TYPE "N" OR "J" ECO CURB PIECE PER LOCAL REQUIREMENTS.

ECO CURB PIECE DETAIL
NOT TO SCALE



DOGHOUSE MANHOLE DETAIL
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1	07/23/19	TEK	FINAL PLAN SUBMITTAL
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RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR

BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP

BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

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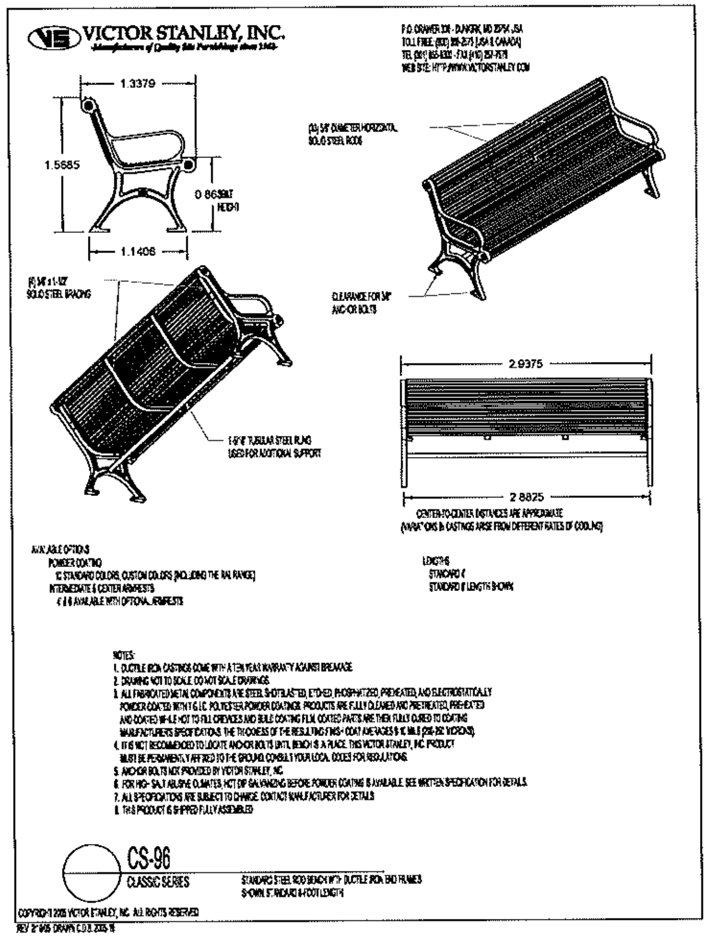
AS SHOWN	4/01/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004982B	C-DTLS

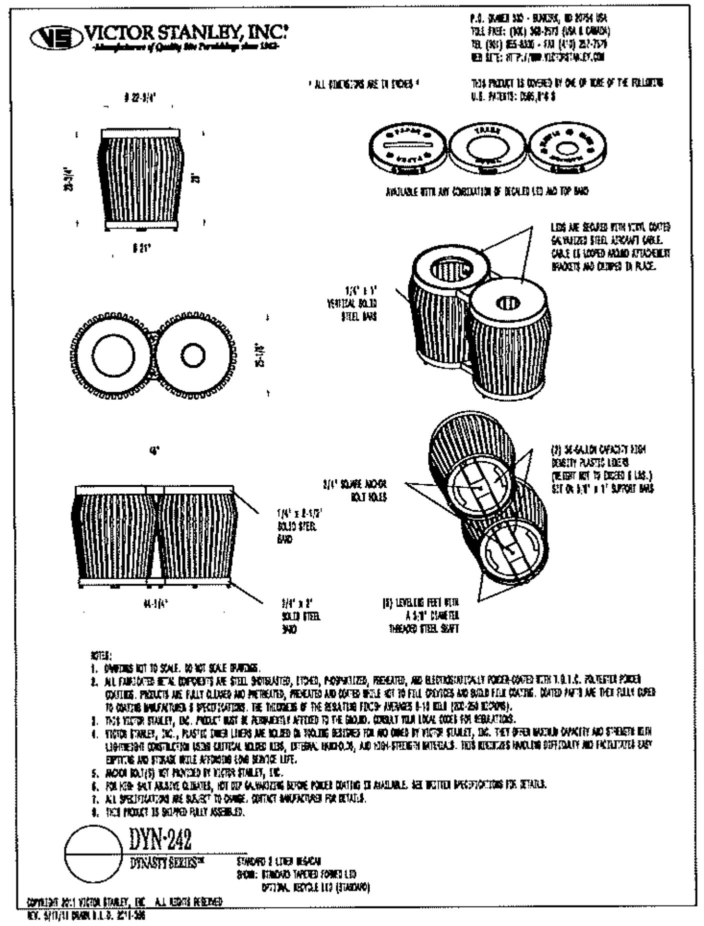
SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: C-1



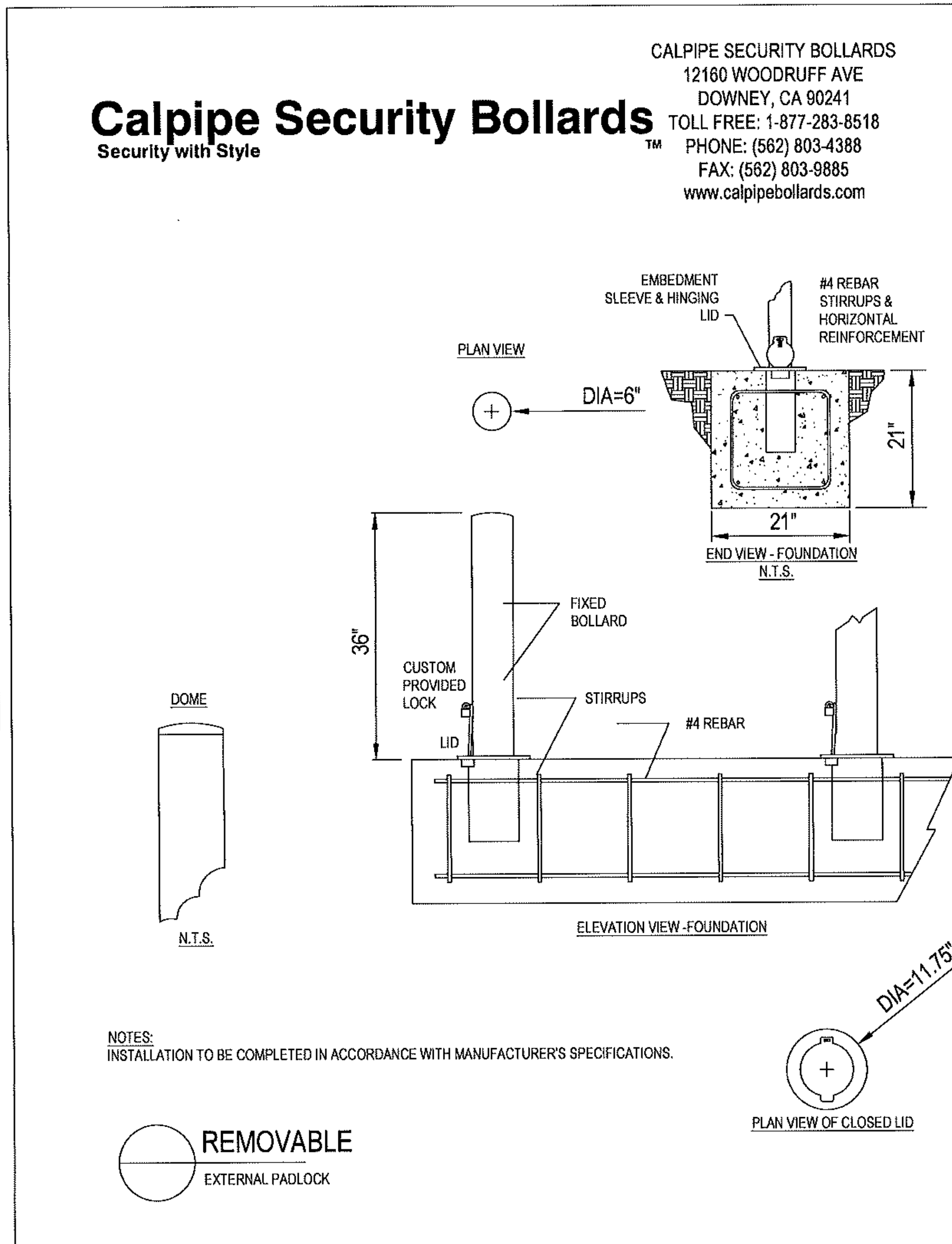
BENCH DETAIL

NOT TO SCALE



TRASH RECEPTACLE AND RECYCLE BIN DETAIL

NOT TO SCALE



6" REMOVABLE BOLLARD DETAIL

NOT TO SCALE

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RICHARD C. MALONEY
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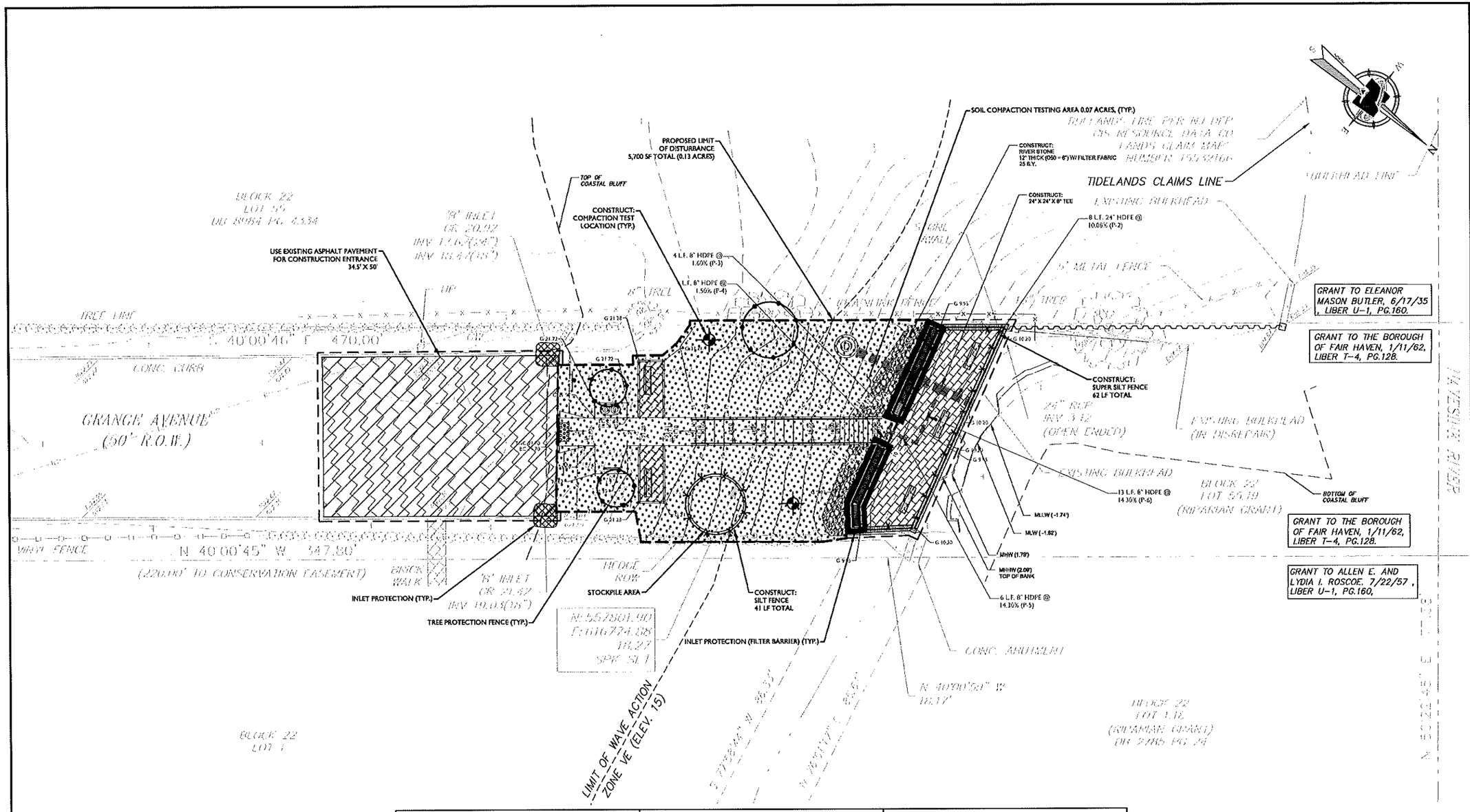
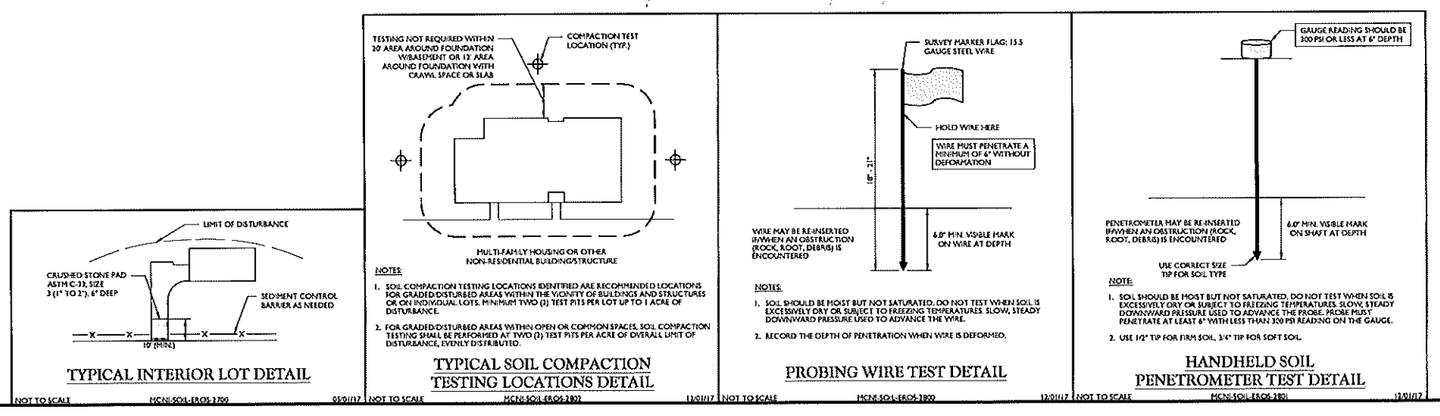
PROJECT NUMBER	DRAWING NAME
17004182B	C-DTLS

SHEET TITLE: CONSTRUCTION DETAILS

SHEET NUMBER: C-2





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RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39013

CONSTRUCTION PLANS FOR
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BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
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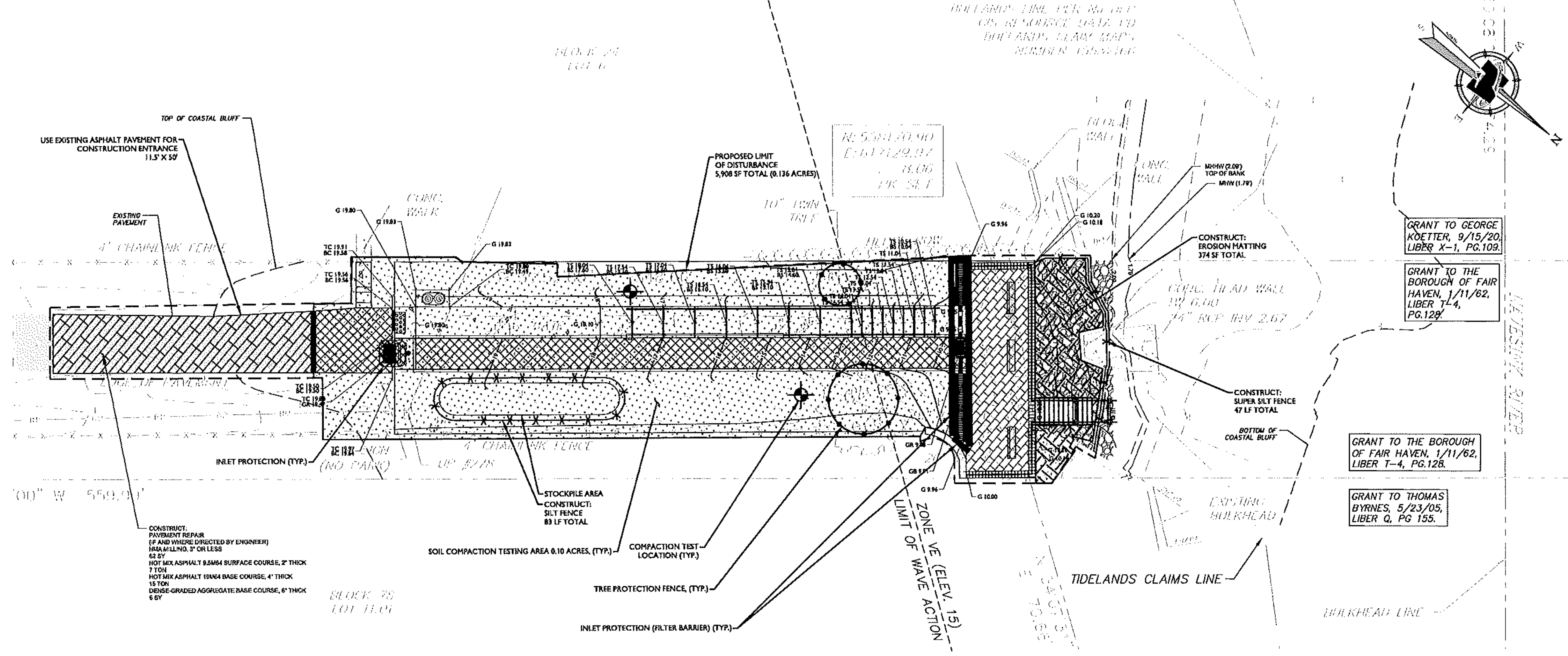
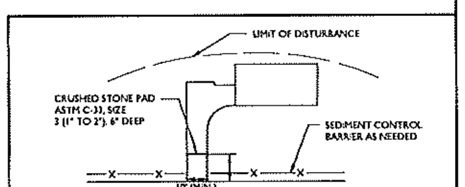
PROJECT NUMBER	DRAWING NAME		
170069828	C-SESC		

SHEET TITLE
SOIL EROSION & SEDIMENT CONTROL PLAN GRANGE AVENUE

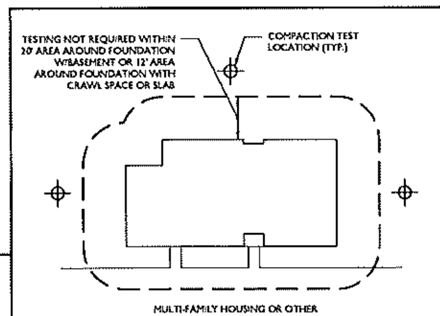
SHEET NUMBER
SE-1





TYPICAL INTERIOR LOT DETAIL

NOT TO SCALE | MCNJ-SOIL-EROS-2700 | 05/01/17

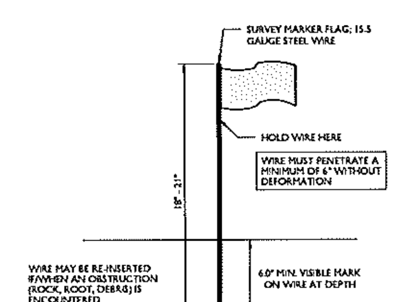


NOTES:

1. SOIL COMPACTION TESTING LOCATIONS IDENTIFIED ARE RECOMMENDED LOCATIONS FOR GRADED/DISTURBED AREAS WITHIN THE VICINITY OF BUILDINGS AND STRUCTURES OR ON INDIVIDUAL LOTS. MINIMUM TWO (2) TEST PITS PER LOT UP TO 1 ACRE OF DISTURBANCE.
2. FOR GRADED/DISTURBED AREAS WITHIN OPEN OR COMMON SPACES, SOIL COMPACTION TESTING SHALL BE PERFORMED AT TWO (2) TEST PITS PER ACRE OF OVERALL LIMIT OF DISTURBANCE, EVENLY DISTRIBUTED.

TYPICAL SOIL COMPACTION TESTING LOCATIONS DETAIL

NOT TO SCALE | MCNJ-SOIL-EROS-2802 | 12/01/17

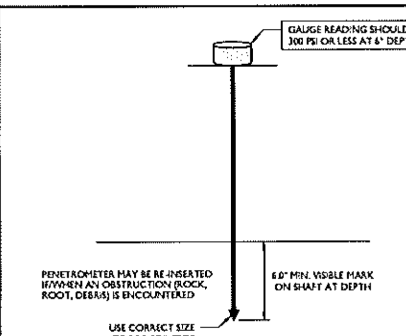


NOTES:

1. SOIL SHOULD BE MOIST BUT NOT SATURATED. DO NOT TEST WHEN SOIL IS EXCESSIVELY DRY OR SUBJECT TO FREEZING TEMPERATURES. SLOW, STEADY DOWNWARD PRESSURE USED TO ADVANCE THE WIRE.
2. RECORD THE DEPTH OF PENETRATION WHEN WIRE IS DEFORMED.

PROBING WIRE TEST DETAIL

NOT TO SCALE | MCNJ-SOIL-EROS-2800 | 12/01/17



NOTE:

1. SOIL SHOULD BE MOIST BUT NOT SATURATED. DO NOT TEST WHEN SOIL IS EXCESSIVELY DRY OR SUBJECT TO FREEZING TEMPERATURES. SLOW, STEADY DOWNWARD PRESSURE USED TO ADVANCE THE PROBE. PROBE MUST PENETRATE AT LEAST 6" WITH LESS THAN 300 PSI READING ON THE GAUGE.
2. USE 1/2" TIP FOR FIRM SOIL, 3/4" TIP FOR SOFT SOIL.

HANDHELD SOIL PENETROMETER TEST DETAIL

NOT TO SCALE | MCNJ-SOIL-EROS-2801 | 12/01/17

20 0 20 40

SCALE: 1" = 20'

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NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39013

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PROJECT NUMBER	DRAWING NAME
17004912B	C-SESC-HANC

SHEET TITLE
SOIL EROSION & SEDIMENT CONTROL PLAN HANCE ROAD

SHEET NUMBER
SE - 2

FREEHOLD SOIL CONSERVATION DISTRICT NOTES

1. THE FREEHOLD SOIL CONSERVATION DISTRICT SHALL BE NOTIFIED FORTY-EIGHT (48) HOURS IN ADVANCE OF ANY SOIL DISTURBING ACTIVITY.
2. ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES ARE TO BE INSTALLED PRIOR TO SOIL DISTURBANCE, OR IN THEIR PROPER SEQUENCE AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
3. ANY CHANGES TO THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLANS WILL REQUIRE THE SUBMISSION OF REVISED SOIL EROSION AND SEDIMENT CONTROL PLANS TO THE DISTRICT FOR RE-CERTIFICATION. THE REVISED PLANS MUST MEET ALL CURRENT STATE SOIL EROSION AND SEDIMENT CONTROL STANDARDS.
4. N.J.S.A. 4:24-39 ET. SEQ. REQUIRES THAT NO CERTIFICATES OF OCCUPANCY BE ISSUED BEFORE THE DISTRICT DETERMINES THAT A PROJECT OR PORTION THEREOF IS IN FULL COMPLIANCE WITH THE CERTIFIED PLAN AND STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY AND A REPORT OF COMPLIANCE HAS BEEN ISSUED. UPON WRITTEN REQUEST FROM THE APPLICANT, THE DISTRICT MAY ISSUE A REPORT OF COMPLIANCE WITH CONDITIONS ON A LOT-BY-LOT OR SECTION-BY-SECTION BASIS, PROVIDED THAT THE PROJECT OR PORTION THEREOF IS IN SATISFACTORY COMPLIANCE WITH THE SEQUENCE OF DEVELOPMENT AND TEMPORARY MEASURES FOR SOIL EROSION AND SEDIMENT CONTROL HAVE BEEN IMPLEMENTED, INCLUDING PROVISIONS FOR STABILIZATION AND SITE WORK.
5. ANY DISTURBED AREAS THAT WILL BE LEFT EXPOSED MORE THAN FOURTEEN (14) DAYS, AND NOT SUBJECT TO CONSTRUCTION TRAFFIC, WILL IMMEDIATELY RECEIVE A TEMPORARY SEEDING. IF THE SEASON PREVENTS THE ESTABLISHMENT OF TEMPORARY COVER, THE DISTURBED AREAS WILL BE MULCHED WITH STRAW, OR EQUIVALENT MATERIAL, AT A RATE OF 2 TO 2½ TONS PER ACRE, ACCORDING TO THE STANDARD FOR STABILIZATION WITH MULCH ONLY.
6. IMMEDIATELY FOLLOWING INITIAL DISTURBANCE OR ROUGH GRADING, ALL CRITICAL AREAS SUBJECT TO EROSION (I.E. SOIL STOCKPILES, STEEP SLOPES AND ROADWAY EMBANKMENTS) WILL RECEIVE TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH OR A SUITABLE EQUIVALENT, AND A MULCH ANCHOR, IN ACCORDANCE WITH STATE STANDARDS.
7. A SUBBASE COURSE WILL BE APPLIED IMMEDIATELY FOLLOWING ROUGH GRADING AND INSTALLATION OF IMPROVEMENTS TO STABILIZE STREETS, ROADS, DRIVEWAYS AND PARKING AREAS. IN AREAS WHERE NO UTILITIES ARE PRESENT, THE SUBBASE SHALL BE INSTALLED WITHIN FIFTEEN (15) DAYS OF THE PRELIMINARY GRADING.
8. THE STANDARD FOR STABILIZED CONSTRUCTION ACCESS REQUIRES THE INSTALLATION OF A PAD OF CLEAN CRUSHED STONE AT POINTS WHERE TRAFFIC WILL BE ACCESSING THE CONSTRUCTION SITE. AFTER INTERIOR ROADWAYS ARE PAVED, INDIVIDUAL LOTS REQUIRE A STABILIZED CONSTRUCTION ACCESS CONSISTING OF ONE INCH TO TWO INCH (1" - 2") STONE FOR A MINIMUM LENGTH OF TEN FEET (10') EQUAL TO THE LOT ENTRANCE WIDTH. ALL OTHER ACCESS POINTS SHALL BE BLOCKED OFF.
9. ALL SOIL WASHED, DROPPED, SPILLED, OR TRACKED OUTSIDE THE LIMIT OF DISTURBANCE OR ONTO PUBLIC RIGHT-OF-WAYS WILL BE REMOVED IMMEDIATELY.
10. PERMANENT VEGETATION IS TO BE SEEDED OR SODDED ON ALL EXPOSED AREAS WITHIN TEN (10) DAYS AFTER FINAL GRADING.
11. AT THE TIME THAT SITE PREPARATION FOR PERMANENT VEGETATIVE STABILIZATION IS GOING TO BE ACCOMPLISHED, ANY SOIL THAT WILL NOT PROVIDE A SUITABLE ENVIRONMENT TO SUPPORT ADEQUATE VEGETATIVE GROUND COVER SHALL BE REMOVED OR TREATED IN SUCH A WAY THAT IT WILL PERMANENTLY ADJUST THE SOIL CONDITIONS AND RENDER IT SUITABLE FOR VEGETATIVE GROUND COVER. IF THE REMOVAL OR TREATMENT OF THE SOIL WILL NOT PROVIDE SUITABLE CONDITIONS, NON-VEGETATIVE MEANS OF PERMANENT GROUND STABILIZATION WILL HAVE TO BE EMPLOYED.
12. IN ACCORDANCE WITH THE STANDARD FOR MANAGEMENT OF HIGH ACID PRODUCING SOILS, ANY SOIL HAVING A PH OF 4 OR LESS OR CONTAINING IRON SULFIDES SHALL BE ULTIMATELY PLACED OR BURIED WITH LIMESTONE APPLIED AT THE RATE OF 10 TONS/ACRE (OR 450 LBS/1,000 SQ. FT. OF SURFACE AREA) AND COVERED WITH A MINIMUM OF 12" OF SETTLED SOIL WITH A PH OF 5 OR MORE, OR 24" WHERE TREES OR SHRUBS ARE TO BE PLANTED.
13. CONDUIT OUTLET PROTECTION MUST BE INSTALLED AT ALL REQUIRED OUTFALLS PRIOR TO THE DRAINAGE SYSTEM BECOMING OPERATIONAL.
14. UNFILTERED DEWATERING IS NOT PERMITTED. NECESSARY PRECAUTIONS MUST BE TAKEN DURING ALL DEWATERING OPERATIONS TO MINIMIZE SEDIMENT TRANSFER. ANY DEWATERING METHODS USED MUST BE IN ACCORDANCE WITH THE STANDARD FOR DEWATERING.
15. SHOULD THE CONTROL OF DUST AT THE SITE BE NECESSARY, THE SITE WILL BE SPRINKLED UNTIL THE SURFACE IS WET, TEMPORARY VEGETATIVE COVER SHALL BE ESTABLISHED OR MULCH SHALL BE APPLIED AS REQUIRED BY THE STANDARD FOR DUST CONTROL.
16. STOCKPILE AND STAGING LOCATIONS ESTABLISHED IN THE FIELD SHALL BE PLACED WITHIN THE LIMIT OF DISTURBANCE ACCORDING TO THE CERTIFIED PLAN. STAGING AND STOCKPILES NOT LOCATED WITHIN THE LIMIT OF DISTURBANCE WILL REQUIRE CERTIFICATION OF A REVISED SOIL EROSION AND SEDIMENT CONTROL PLAN. CERTIFICATION OF A NEW SOIL EROSION AND SEDIMENT CONTROL PLAN MAY BE REQUIRED FOR THESE ACTIVITIES IF AN AREA GREATER THAN 5,000 SQUARE FEET IS DISTURBED.
17. ALL SOIL STOCKPILES ARE TO BE TEMPORARILY STABILIZED IN ACCORDANCE WITH SOIL EROSION AND SEDIMENT CONTROL NOTE #5.
18. THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR ANY EROSION OR SEDIMENTATION THAT MAY OCCUR BELOW STORMWATER OUTFALLS OR OFFSITE AS A RESULT OF CONSTRUCTION OF THE PROJECT.

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STANDARD FOR STABILIZATION FOR MULCH ONLY

1. SITE PREPARATION
   A. INSTALL EROSION CONTROL MEASURES AND FACILITIES SUCH AS SILT FENCE, DIVERSIONS, SEDIMENT BASINS, CHANNEL STABILIZATION, ETC. SEE STANDARDS 11 THROUGH 43.
   B. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR MULCH APPLICATION, MULCH ANCHORING AND MAINTENANCE. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH THE STANDARD FOR LAND GRADING.
2. MULCHING
   A. MULCHING IS REQUIRED ON ALL SEEDING.
   B. STRAW OR HAY - UNROTTED SMALL GRAIN STRAW, HAY FREE OF SEEDS, OR SALT HAY TO BE APPLIED AT THE RATE OF 2 TO 2-1/2 TONS PER ACRE (90 TO 115 POUNDS PER 1,000 SQUARE FEET), EXCEPT THAT WHERE A CRIMPER IS USED INSTEAD OF A LIQUID MULCH-BINDER TACKIFYING OR ADHESIVE AGENT. THE RATE OF APPLICATION IS 3 TONS PER ACRE. MULCH CHOPPER-BLOWERS MUST NOT GRIND THE MULCH. HAY MULCH IS NOT RECOMMENDED FOR ESTABLISHING FINE TURF OR LAWNS DUE TO THE PRESENCE OF WEED SEED. STRAW OR HAY MULCH MUST BE ANCHORED IMMEDIATELY AFTER PLACEMENT USING PEG AND TWINE, MULCH NETTING, MECHANICAL CRIMPER OR LIQUID MULCH BINDERS IN ACCORDANCE WITH THE STANDARD.
   C. WOOD-FIBER OR PAPER-FIBER MULCH - SHALL BE MADE FROM WOOD, PLANT FIBERS OR PAPER CONTAINING NO GROWTH OR GERMINATION INHIBITING MATERIALS, USED AT THE RATE OF 1,500 POUNDS PER ACRE (OR AS RECOMMENDED BY THE PRODUCT MANUFACTURER) AND MAY BE APPLIED BY A HYDROSEEDER. THIS MULCH SHALL NOT BE MIXED IN THE TANK WITH SEED. USE IS LIMITED TO FLATTER SLOPES AND DURING OPTIMUM SEEDING PERIODS IN SPRING AND FALL.

ACID PRODUCING SOILS

1. LIMIT THE EXCAVATION AREA AND EXPOSURE TIME WHEN HIGH ACID PRODUCING SOILS ARE ENCOUNTERED.
2. TOPSOIL STRIPPED FROM THE SITE SHALL BE STORED SEPARATELY FROM TEMPORARILY STOCKPILED HIGH ACID PRODUCING SOILS.
3. STOCKPILES OF HIGH ACID PRODUCING SOIL SHOULD BE LOCATED ON LEVEL LAND TO MINIMIZE ITS MOVEMENT, ESPECIALLY WHEN THIS MATERIAL HAS A HIGH CLAY CONTENT.
4. TEMPORARILY STOCKPILED HIGH ACID PRODUCING SOIL MATERIAL TO BE EXPOSED MORE THAN 30 DAYS SHOULD BE COVERED WITH PROPERLY ANCHORED, HEAVY GRADE SHEETS OF POLYETHYLENE WHERE POSSIBLE. IF NOT POSSIBLE, STOCKPILES SHALL BE COVERED WITH A MINIMUM OF 3 TO 6 INCHES OF WOOD CHIPS TO MINIMIZE EROSION OF THE STOCKPILE. SILT FENCE SHALL BE INSTALLED AT THE TOE OF SLOPE TO CONTAIN MOVEMENT OF THE STOCKPILED MATERIAL. TOPSOIL SHALL NOT BE APPLIED TO THE STOCKPILES TO PREVENT TOPSOIL CONTAMINATION WITH HIGH ACID PRODUCING SOIL.
5. HIGH ACID PRODUCING SOILS WITH A pH OF 4 OR LESS, OR CONTAINING IRON SULFIDE (INCLUDING BORROW FROM CUTS) SHALL BE ULTIMATELY PLACED OR BURIED WITH LIMESTONE APPLIED AT A RATE OF 6 TONS PER ACRE (OR 275 POUNDS PER 1,000 SQUARE FEET OF SURFACE AREA) AND COVERED WITH A MINIMUM OF 12 INCHES OF SETTLED SOIL WITH A pH OF 5 OR MORE EXCEPT AS FOLLOWS:
   A. AREAS WHERE TREES OR SHRUBS ARE TO BE PLANTED SHALL BE COVERED WITH A MINIMUM OF 24 INCHES OF SOIL WITH A pH OF 5 OR MORE.
   B. DISPOSAL AREAS SHALL NOT BE LOCATED WITHIN 24 INCHES OF ANY SURFACE OF A SLOPE OR BANK, SUCH AS BERMS, STREAM BANKS, DITCHES AND OTHERS TO PREVENT POTENTIAL LATERAL LEACHING DAMAGES.
6. EQUIPMENT USED FOR MOVEMENT OF HIGH ACID PRODUCING SOILS SHOULD BE CLEANED AT THE END OF EACH DAY TO PREVENT SPREADING OF HIGH ACID SOIL MATERIALS TO OTHER PARTS OF THE SITE, INTO STREAMS OR STORMWATER CONVEYANCES AND TO PROTECT MACHINERY FROM ACCELERATED RUSTING.
7. NON VEGETATIVE EROSION CONTROL PRACTICES (STONE TRACKING PADS, STRATEGICALLY PLACED LIMESTONE CHECK DAMS, SILT FENCE, WOOD CHIPS) SHOULD BE INSTALLED TO LIMIT THE MOVEMENT OF HIGH ACID PRODUCING SOILS FROM, AROUND OR OFF THE SITE.
8. FOLLOWING BURIAL OR REMOVAL OF HIGH ACID PRODUCING SOIL, TOPSOILING AND SEEDING OF THE SITE (SEE TEMPORARY VEGETATIVE COVER FOR SOIL STABILIZATION, PG. 7-1, PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION, PG. 4-1 AND TOPSOILING, PG. 8-1) MONITORING SHOULD CONTINUE FOR APPROXIMATELY 6 TO 12 MONTHS TO ASSURE THERE IS ADEQUATE STABILIZATION AND THAT NO HIGH ACID SOIL PROBLEMS EMERGE. IF PROBLEMS STILL EXIST THE AFFECTED AREA MUST BE TREATED AS INDICATED ABOVE TO CORRECT THE PROBLEM.
9. MONITORING OF AREAS WHERE HIGH ACID PRODUCING SOIL HAS BEEN PLACED OR BURIED SHOULD BE PERFORMED FOR AT LEAST 2 YEARS OR LONGER IF PROBLEMS OCCUR, TO ASSURE THERE IS NO MIGRATION OF POTENTIAL ACID LEACHATE.

DUST CONTROL NOTE

DUST GENERATION SHALL BE CONTROLLED ON A CONSTANT BASIS BY WETTING THE SURFACE AND/OR APPLICATION OF CALCIUM CHLORIDE.

MATERIAL	WATER DILUTION	TYPE OF NOZZLE	APPLY GAL/ACRE
ANIONIC ASPHALT EMULSION	7:1	COARSE SPRAY	1200
LATEX EMULSION	12.5:1	FINE SPRAY	235
RESIN IN WATER	4:1	FINE SPRAY	300
POLYACRYLAMIDE (PAM) – SPRAY ON POLYACRYLAMIDE (PAM) – DRY SPREAD	Apply according to manufacturer's instructions. May also be used as an additive to sediment basins to flocculate and precipitate suspended colloids. See Sediment Basin standard, p. 26-1		
ACIDULATED SOY BEAN SOAP STICK	NONE	COARSE SPRAY	1200

TILLAGE - TO ROUGHEN SURFACE AND BRING CLODS TO THE SURFACE. THIS IS A TEMPORARY EMERGENCY MEASURE WHICH SHOULD BE USED BEFORE SOIL BLOWING STARTS. BEGIN PLOWING ON WINDWARD SIDE OF SITE. CHISEL-TYPE PLOWS SPACED ABOUT 12 INCHES APART AND SPRING-TOOTHED HARROWS ARE EXAMPLES OF EQUIPMENT WHICH MAY PRODUCE THE DESIRED EFFECT.

SPRINKLING - SITE IS SPRINKLED UNTIL THE SURFACE IS WET.

BARRIERS - SOLID BOARD FENCES, SNOW FENCES, BURLAP FENCES, CRATE WALLS, BALES OF HAY AND SIMILAR MATERIAL CAN BE USED TO CONTROL AIR CURRENTS AND SOIL BLOWING.

CALCIUM CHLORIDE - SHALL BE IN THE FORM OF LOOSE DRY GRANULES OR FLAKES FINE ENOUGH TO FEED THROUGH COMMONLY USED SPREADERS AT A RATE THAT WILL KEEP SURFACE MOIST BUT NOT CAUSE POLLUTION OR PLANT DAMAGE. IF USED ON STEEPER SLOPES, THEN USE OTHER PRACTICES TO PREVENT WASHING INTO STREAMS OR ACCUMULATION AROUND PLANTS.

STONE - COVER SURFACE WITH CRUSHED STONE OR COARSE GRAVEL.

STANDARD FOR TEMPORARY VEGETATIVE COVER FOR SOIL STABILIZATION

DEFINITION

ESTABLISHMENT OF TEMPORARY VEGETATIVE COVER ON SOILS EXPOSED FOR PERIODS OF TWO TO 6 MONTHS WHICH ARE NOT BEING GRADED, NOT UNDER ACTIVE CONSTRUCTION OR NOT SCHEDULED FOR PERMANENT SEEDING WITHIN 60 DAYS.

PURPOSE

TO TEMPORARILY STABILIZE THE SOIL AND REDUCE DAMAGE FROM WIND AND WATER EROSION UNTIL PERMANENT STABILIZATION IS ACCOMPLISHED.

WATER QUALITY ENHANCEMENT

PROVIDES TEMPORARY PROTECTION AGAINST THE IMPACTS OF WIND AND RAIN, SLOWS THE OVERLAND MOVEMENT OF STORMWATER RUNOFF, INCREASES INFILTRATION AND RETAINS SOIL AND NUTRIENTS ON SITE, PROTECTING STREAMS OR OTHER STORMWATER CONVEYANCES.

WHERE APPLICABLE

ON EXPOSED SOILS THAT HAVE THE POTENTIAL FOR CAUSING OFF SITE ENVIRONMENTAL DAMAGE.

METHODS AND MATERIALS

1. SITE PREPARATION
   - A. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION, AND MULCH ANCHORING. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARDS FOR LAND GRADING, PG. 19-1.
   - B. INSTALL NEEDED EROSION CONTROL PRACTICES OR FACILITIES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, CHANNEL STABILIZATION MEASURES, SEDIMENT BASINS, AND WATERWAYS. SEE STANDARDS 11 THROUGH 42.
   - C. IMMEDIATELY PRIOR TO SEEDING, THE SURFACE SHOULD BE SCARIFIED 6" TO 12" WHERE THERE HAS BEEN SOIL COMPACTION. THIS PRACTICE IS PERMISSIBLE ONLY WHERE THERE IS NO DANGER TO UNDERGROUND UTILITIES (CABLES, IRRIGATION SYSTEMS, ETC.).
2. SEEDBED PREPARATION
   - A. APPLY GROUND LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS SUCH AS OFFERED BY RUTGERS CO-OPERATIVE EXTENSION. SOIL SAMPLE MAILERS ARE AVAILABLE FROM THE LOCAL RUTGERS COOPERATIVE EXTENSION OFFICES. FERTILIZER SHALL BE APPLIED AT THE RATE OF 500 POUNDS PER ACRE OR 11 POUNDS PER 1,000 SQUARE FEET OF 10-20-10 OR EQUIVALENT WITH 50% WATER INSOLUBLE NITROGEN UNLESS A SOIL TEST INDICATES OTHERWISE. APPLY LIMESTONE AT THE RATE OF 2 TONS/ACRE UNLESS SOIL TESTING INDICATES OTHERWISE. CALCIUM CARBONATE IS THE EQUIVALENT AND STANDARD FOR MEASURING THE ABILITY OF LIMING MATERIALS TO NEUTRALIZE SOIL ACIDITY AND SUPPLY CALCIUM AND MAGNESIUM TO GRASSES AND LEGUMES.
   - B. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC, SPRINGTOOTH HARROW, OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OR DISKING OPERATION SHOULD BE ON THE GENERAL CONTOUR. CONTINUE TILLAGE UNTIL A REASONABLE UNIFORM SEEDBED IS PREPARED.
   - C. INSPECT SEEDBED JUST BEFORE SEEDING. IF TRAFFIC HAS LEFT THE SOIL COMPACTED, THE AREA MUST BE RETILLED IN ACCORDANCE WITH THE ABOVE.
   - D. SOILS HIGH IN SULFIDES OR HAVING A PH OF 4 OR LESS REFER TO STANDARD FOR MANAGEMENT OF HIGH ACID PRODUCING SOILS, PG. 1-1.
3. SEEDING
   - A. SELECT SEED FROM RECOMMENDATIONS IN TABLE 7-2.

SEED SELECTIONS	SEEDING RATE¹ (POUNDS) PER ACRE	SEEDING RATE¹ (POUNDS) PER 1000 SQ. FT	OPTIMUM SEEDING DATE² BASED ON PLANT HARDINESS ZONE³ ZONE 5B, 6A	ZONE 6B	ZONE 7A, B	OPTIMUM SEED DEPTH⁴ (INCHES)
COOL SEASON GRASSES						
1. PERENNIAL RYEGRASS	100	1.0	3/15 - 6/1 8/1 - 9/15	3/1 - 5/15 8/15 - 10/1	2/15 - 5/1 8/15 - 10/15	0.5
2. SPRING OATS	88	2.0	3/15 - 6/1 8/1 - 9/15	3/1 - 5/15 8/15 - 10/1	2/15 - 5/1 8/15 - 10/15	1.0
3. WINTER BARLEY	96	2.2	8/1 - 9/15	8/15 - 10/1	8/15 - 10/15	1.0
4. ANNUAL RYEGRASS	100	1.0000	3/15 - 6/1 8/1 - 9/15	3/15 - 6/1 8/1 - 9/15	2/15 - 5/1 8/15 - 10/15	0.5
5. WINTER CEREAL RYE	112	2.8	8/1 - 11/1	8/1 - 11/15	8/1 - 12/15	1.0
WARM SEASON GRASSES						
6. PEARL MILLET	20	0.5	6/1 - 8/1	5/15 - 8/15	5/1 - 9/1	1.0
7. MILLET (GERMAN OR HUNGARIAN)	30	0.5	6/1 - 8/1	5/15 - 8/15	5/1 - 9/1	1.0

1. SEEDING RATE FOR WARM SEASON GRASS, SELECTIONS 5 - 7 SHALL BE ADJUSTED TO REFLECT THE AMOUNT OF PURE LIVE SEED (PLS) AS DETERMINED BY A GERMINATION TEST RESULT. NO ADJUSTMENT IS REQUIRED FOR COOL SEASON GRASSES.
2. MAY BE PLANTED THROUGHOUT SUMMER IF SOIL MOISTURE IS ADEQUATE OR SEEDED AREA CAN BE IRRIGATED.
3. PLANT HARDINESS ZONE (SEE FIGURE 7-1, PG. 7-4)
4. TWICE THE DEPTH FOR SANDY SOILS.

   - B. CONVENTIONAL SEEDING. APPLY SEED UNIFORMLY BY HAND, CYCLONE (CENTRIFUGAL) SEEDER, DROP SEEDER, DRILL OR CULTIPACKER SEEDER. EXCEPT FOR DRILLED, HYDROSEEDED OR CULTIPACKED SEEDINGS, SEED SHALL BE INCORPORATED INTO THE SOIL TO A DEPTH OF 1/4 TO 1/2 INCH, BY RAKING OR DRAGGING. DEPTH OF SEED PLACEMENT MAY BE 1/4 INCH DEEPER ON COARSE TEXTURED SOIL.
   - C. HYDROSEEDING IS A BROADCAST SEEDING METHOD USUALLY INVOLVING A TRUCK OR TRAILER MOUNTED TANK, WITH AN AGITATION SYSTEM AND HYDRAULIC PUMP FOR MIXING SEED, WATER AND FERTILIZER AND SPRAYING THE MIX ONTO THE PREPARED SEEDBED. MULCH SHALL NOT BE INCLUDED IN THE TANK WITH SEED. SHORT FIBERED MULCH MAY BE APPLIED WITH A HYDROSEEDER FOLLOWING SEEDING. (ALSO SEE SECTION IV MULCHING) HYDROSEEDING IS NOT A PREFERRED SEEDING METHOD BECAUSE SEED AND FERTILIZER ARE APPLIED TO THE SURFACE AND NOT INCORPORATED INTO THE SOIL. POOR SEED TO SOIL CONTACT OCCURS REDUCING SEED GERMINATION AND GROWTH. HYDROSEEDING MAY BE USED FOR AREAS TOO STEEP FOR CONVENTIONAL EQUIPMENT TO TRAVERSE OR TOO OBSTRUCTED WITH ROCKS, STUMPS, ETC.
   - D. AFTER SEEDING, FIRMING THE SOIL WITH A CORRUGATED ROLLER WILL ASSURE GOOD SEED-TO-SOIL CONTACT, RESTORE CAPILLARITY, AND IMPROVE SEEDLING EMERGENCE. THIS IS THE PREFERRED METHOD WHEN PERFORMED ON THE CONTOUR, SHEET EROSION WILL BE MINIMIZED AND WATER CONSERVATION ON SITE WILL BE MAXIMIZED.
4. MULCHING

MULCHING IS REQUIRED ON ALL SEEDING. MULCH WILL INSURE AGAINST EROSION BEFORE GRASS IS ESTABLISHED AND WILL PROMOTE FASTER AND EARLIER ESTABLISHMENT. THE EXISTENCE OF VEGETATION SUFFICIENT TO CONTROL SOIL EROSION SHALL BE DEEMED COMPLIANCE WITH THIS MULCHING REQUIREMENT.

   - A. STRAW OR HAY. UNROTTED SMALL GRAIN STRAW, HAY FREE OF SEEDS, APPLIED AT THE RATE OF 1-1/2 TO 2 TONS PER ACRE (70 TO 90 POUNDS PER 1,000 SQUARE FEET), EXCEPT THAT WHERE A CRIMPER IS USED INSTEAD OF A LIQUID MULCH-BINDER (TACKIFYING OR ADHESIVE AGENT). THE RATE OF APPLICATION IS 3 TONS PER ACRE. MULCH CHOPPER-BLOWERS MUST NOT GRIND THE MULCH. HAY MULCH IS NOT RECOMMENDED FOR ESTABLISHING FINE TURF OR LAWNS DUE TO THE PRESENCE OF WEED SEED.

     APPLICATION: SPREAD MULCH UNIFORMLY BY HAND OR MECHANICALLY SO THAT APPROXIMATELY 95% OF THE SOIL SURFACE WILL BE COVERED. FOR UNIFORM DISTRIBUTION OF HAND-SPREAD MULCH, DIVIDE AREA INTO APPROXIMATELY 1,000 SQUARE FEET SECTIONS AND DISTRIBUTE 70 TO 90 POUNDS WITHIN EACH SECTION.

     ANCHORING SHALL BE ACCOMPLISHED IMMEDIATELY AFTER PLACEMENT TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS, DEPENDING UPON THE SIZE OF THE AREA, STEEPNESS OF SLOPES AND COSTS.

     1. PEG AND TWINE. DRIVE 8 TO 10 INCH WOODEN PEGS TO WITHIN 2 TO 3 INCHES OF THE SOIL SURFACE EVERY 4 FEET IN ALL DIRECTIONS. STAKES MAY BE DRIVEN BEFORE OR AFTER APPLYING MULCH. SECURE MULCH TO SOIL SURFACE BY STRETCHING TWINE BETWEEN PEGS IN A CRISS-CROSS AND A SQUARE PATTERN. SECURE TWINE AROUND EACH PEG WITH TWO OR MORE ROUND TURNS.
     2. MULCH NETTINGS. STAPLE PAPER, JUTE, COTTON, OR PLASTIC NETTINGS TO THE SOIL SURFACE. USE A DEGRADABLE NETTING IN AREAS TO BE MOWED.
     3. CRIMPER (MULCH ANCHORING TOOL). A TRACTOR-DRAWN IMPLEMENT, SOMEWHAT LIKE A DISC HARROW, ESPECIALLY DESIGNED TO PUSH OR CUT SOME OF THE BROADCAST LONG FIBER MULCH 3 TO 4 INCHES INTO THE SOIL SO AS TO ANCHOR IT AND LEAVE PART STANDING UPRIGHT. THIS TECHNIQUE IS LIMITED TO AREAS TRAVERSABLE BY A TRACTOR, WHICH MUST OPERATE ON THE CONTOUR OF SLOPES. STRAW MULCH RATE MUST BE 3 TONS PER ACRE. NO TACKIFYING OR ADHESIVE AGENT IS REQUIRED.
     4. LIQUID MULCH-BINDERS – MAY BE USED TO ANCHOR HAY OR STRAW MULCH.
        - a. APPLICATIONS SHOULD BE HEAVIER AT EDGES WHERE WIND MAY CATCH THE MULCH, IN VALLEYS, AND AT CRESTS OF BANKS. THE REMAINDER OF THE AREA SHOULD BE UNIFORM IN APPEARANCE.
        - b. USE ONE OF THE FOLLOWING:

          (1) ORGANIC AND VEGETABLE BASED BINDERS – NATURALLY OCCURRING, POWDER BASED, HYDROPHILIC MATERIALS WHEN MIXED WITH WATER FORMULATES A GEL AND WHEN APPLIED TO MULCH UNDER SATISFACTORY CURING CONDITIONS WILL FORM MEMBRANED NETWORKS OF INSOLUBLE POLYMERS. THE VEGETABLE GEL SHALL BE PHYSIOLOGICALLY HARMLESS AND NOT RESULT IN A PHYTOTOXIC EFFECT OR IMPEDE GROWTH OF TURFGRASS. USE AT RATES AND WEATHER CONDITIONS AS RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH MATERIALS. MANY NEW PRODUCTS ARE AVAILABLE, SOME OF WHICH MAY NEED FURTHER EVALUATION FOR USE IN THIS STATE.

          (2) SYNTHETIC BINDERS – HIGH POLYMER SYNTHETIC EMULSION, MISCIBLE WITH WATER WHEN DILUTED AND FOLLOWING APPLICATION TO MULCH, DRYING AND CURING SHALL NO LONGER BE SOLUBLE OR DISPERSIBLE IN WATER. IT SHALL BE APPLIED AT RATES RECOMMENDED BY THE MANUFACTURER AND REMAIN TACKY UNTIL GERMINATION OF GRASS.

          NOTE: ALL NAMES GIVEN ABOVE ARE REGISTERED TRADE NAMES. THIS DOES NOT CONSTITUTE A RECOMMENDATION OF THESE PRODUCTS TO THE EXCLUSION OF OTHER PRODUCTS.
   - B. WOOD-FIBER OR PAPER-FIBER MULCH SHALL BE MADE FROM WOOD, PLANT FIBERS OR PAPER CONTAINING NO GROWTH OR GERMINATION INHIBITING MATERIALS, USED AT THE RATE OF 1,500 POUNDS PER ACRE (OR AS RECOMMENDED BY THE PRODUCT MANUFACTURER) AND MAY BE APPLIED BY A HYDROSEEDER. THIS MULCH SHALL NOT BE MIXED IN THE TANK WITH SEED. USE IS LIMITED TO FLATTER SLOPES AND DURING OPTIMUM SEEDING PERIODS IN SPRING AND FALL.
   - C. PELLETIZED MULCH. COMPRESSED AND EXTRUDED PAPER AND/OR WOOD FIBER PRODUCT, WHICH MAY CONTAIN CO-POLYMERS, TACKIFIERS, FERTILIZERS AND COLORING AGENTS. THE DRY PELLETS, WHEN APPLIED TO A SEEDED AREA AND WATERED, FORM A MULCH MAT. PELLETIZED MULCH SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. MULCH MAY BE APPLIED BY HAND OR MECHANICAL SPREADER AT THE RATE OF 60-75 LBS/1,000 SQUARE FEET AND ACTIVATED WITH 0.2 TO 0.4 INCHES OF WATER. THIS MATERIAL HAS BEEN FOUND TO BE BENEFICIAL FOR USE ON SMALL LAWN OR RENOVATION AREAS, SEEDED AREAS WHERE WEED-SEED FREE MULCH IS DESIRED OR ON SITES WHERE STRAW MULCH AND TACKIFIER AGENT ARE NOT PRACTICAL OR DESIRABLE.

     APPLYING THE FULL 0.2 TO 0.4 INCHES OF WATER AFTER SPREADING PELLETIZED MULCH ON THE SEED BED IS EXTREMELY IMPORTANT FOR SUFFICIENT ACTIVATION AND EXPANSION OF THE MULCH TO PROVIDE SOIL COVERAGE.

STANDARD FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION

METHODS AND MATERIALS

1. SITE PREPARATION
   - A. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION, AND MULCH ANCHORING. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARDS FOR LAND GRADING.
   - B. IMMEDIATELY PRIOR TO SEEDING AND TOPSOIL APPLICATION, THE SUBSOIL SHALL BE EVALUATED FOR COMPACTION IN ACCORDANCE WITH THE STANDARD FOR LAND GRADING.
   - C. TOPSOIL SHOULD BE HANDLED ONLY WHEN IT IS DRY ENOUGH TO WORK WITHOUT DAMAGING THE SOIL STRUCTURE. A UNIFORM APPLICATION TO A DEPTH OF 5 INCHES (UNSETTLED) IS REQUIRED ON ALL SITES. TOPSOIL SHALL BE AMENDED WITH ORGANIC MATTER, AS NEEDED, IN ACCORDANCE WITH THE STANDARD FOR TOPSOILING.
   - D. INSTALL NEEDED EROSION CONTROL PRACTICES OR FACILITIES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, CHANNEL STABILIZATION MEASURES, SEDIMENT BASINS AND WATERWAYS.
2. SEEDBED PREPARATION
   - A. UNIFORMLY APPLY GROUND LIMESTONE AND FERTILIZER TO TOPSOIL WHICH HAS BEEN SPREAD AND FIRMED, ACCORDING TO SOIL TEST RECOMMENDATIONS SUCH AS OFFERED BY RUTGERS CO-OPERATIVE EXTENSION. SOIL SAMPLE MAILERS ARE AVAILABLE FROM THE LOCAL RUTGERS COOPERATIVE EXTENSION OFFICES (HTTP://NJAES.RUTGERS.EDU/COUNTY/). FERTILIZER SHALL BE APPLIED AT THE RATE OF 500 POUNDS PER ACRE OR 11 POUNDS PER 1,000 SQUARE FEET OF 10-10-10 OR EQUIVALENT WITH 50% WATER INSOLUBLE NITROGEN UNLESS A SOIL TEST INDICATES OTHERWISE AND INCORPORATED INTO THE SURFACE 4 INCHES. IF FERTILIZER IS NOT INCORPORATED, APPLY ONE HALF THE RATE DESCRIBED ABOVE DURING SEEDBED PREPARATION AND REPEAT ANOTHER ONE HALF RATE APPLICATION OF THE SAME FERTILIZER WITHIN 3 TO 5 WEEKS AFTER SEEDING.
   - B. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC, SPRINGTOOTH HARROW, OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OR DISKING OPERATION SHOULD BE ON THE GENERAL CONTOUR. CONTINUE TILLAGE UNTIL A REASONABLE UNIFORM SEEDBED IS PREPARED.
   - C. HIGH ACID PRODUCING SOIL. SOILS HAVING A PH OF 4 OR LESS OR CONTAINING IRON SULFIDE SHALL BE COVERED WITH A MINIMUM OF 12 INCHES OF SOIL HAVING A PH OF 5 OR MORE BEFORE INITIATING SEEDBED PREPARATION. SEE STANDARD FOR MANAGEMENT OF HIGH ACID-PRODUCING SOILS FOR SPECIFIC REQUIREMENTS.
3. SEEDING
   - A. SELECT A MIXTURE FROM TABLE 4-3 OR USE A MIXTURE RECOMMENDED BY RUTGERS COOPERATIVE EXTENSION OR NATURAL RESOURCES CONSERVATION SERVICE WHICH IS APPROVED BY THE SOIL CONSERVATION DISTRICT. SEED GERMINATION SHALL HAVE BEEN TESTED WITHIN 12 MONTHS OF THE PLANTING DATE. NO SEED SHALL BE ACCEPTED WITH A GERMINATION TEST DATE MORE THAN 12 MONTHS OLD UNLESS RETESTED.
     1. SEEDING RATES SPECIFIED ARE REQUIRED WHEN A REPORT OF COMPLIANCE IS REQUESTED PRIOR TO ACTUAL ESTABLISHMENT OF PERMANENT VEGETATION. UP TO 50% REDUCTION IN RATES MAY BE USED WHEN PERMANENT VEGETATION IS ESTABLISHED PRIOR TO A REPORT OF COMPLIANCE INSPECTION. THESE RATES APPLY TO ALL METHODS OF SEEDING. ESTABLISHING PERMANENT VEGETATION MEANS 80% VEGETATIVE COVERAGE WITH THE SPECIFIED SEED MIXTURE FOR THE SEEDED AREA AND MOWED ONCE.
     2. WARM-SEASON MIXTURES ARE GRASSES AND LEGUMES WHICH MAXIMIZE GROWTH AT HIGH TEMPERATURES, GENERALLY 85° F AND ABOVE. SEE TABLE 4-3 MIXTURES 1 TO 7. PLANTING RATES FOR WARM SEASON GRASSES SHALL BE THE AMOUNT OF PURE LIVE SEED (PLS) AS DETERMINED BY GERMINATION TESTING RESULTS.
     3. COOL SEASON MIXTURES ARE GRASSES AND LEGUMES WHICH MAXIMIZE GROWTH AT TEMPERATURES BELOW 85°F. MANY GRASSES BECOME ACTIVE AT 65°F. SEE TABLE 4-3, MIXTURES 8-20. ADJUSTMENT OF PLANTING RATES TO COMPENSATE FOR THE AMOUNT OF PLS IS NOT REQUIRED FOR COOL SEASON GRASSES.
   - B. CONVENTIONAL SEEDING IS PERFORMED BY APPLYING SEED UNIFORMLY BY HAND, CYCLONE (CENTRIFUGAL) SEEDER, DROP SEEDER, DRILL OR CULTIPACKER SEEDER. EXCEPT FOR DRILLED, HYDROSEEDED OR CULTIPACKED SEEDINGS, SEED SHALL BE INCORPORATED INTO THE SOIL WITHIN 24 HOURS OF SEEDBED PREPARATION TO A DEPTH OF 1/4 TO 1/2 INCH, BY RAKING OR DRAGGING. DEPTH OF SEED PLACEMENT MAY BE 1/4 INCH DEEPER ON COARSE TEXTURED SOIL.
   - C. AFTER SEEDING, FIRMING THE SOIL WITH A CORRUGATED ROLLER WILL ASSURE GOOD SEED-TO-SOIL CONTACT, RESTORE CAPILLARITY, AND IMPROVE SEEDLING EMERGENCE. THIS IS THE PREFERRED METHOD. WHEN PERFORMED ON THE CONTOUR, SHEET EROSION WILL BE MINIMIZED AND WATER CONSERVATION ON SITE WILL BE MAXIMIZED.
   - D. HYDROSEEDING IS A BROADCAST SEEDING METHOD USUALLY INVOLVING A TRUCK OR TRAILER-MOUNTED TANK, WITH AN AGITATION SYSTEM AND HYDRAULIC PUMP FOR MIXING SEED, WATER AND FERTILIZER AND SPRAYING THE MIX ONTO THE PREPARED SEEDBED. MULCH SHALL NOT BE INCLUDED IN THE TANK WITH SEED. SHORT-FIBERED MULCH MAY BE APPLIED WITH A HYDROSEEDER FOLLOWING SEEDING. (ALSO SEE SECTION 4 MULCHING BELOW). HYDROSEEDING IS NOT A PREFERRED SEEDING METHOD BECAUSE SEED AND FERTILIZER ARE APPLIED TO THE SURFACE AND NOT INCORPORATED INTO THE SOIL. WHEN POOR SEED TO SOIL CONTACT OCCURS, THERE IS A REDUCED SEED GERMINATION AND GROWTH.
4. MULCHING

MULCHING IS REQUIRED ON ALL SEEDING. MULCH WILL PROTECT AGAINST EROSION BEFORE GRASS IS ESTABLISHED AND WILL PROMOTE FASTER AND EARLIER ESTABLISHMENT. THE EXISTENCE OF VEGETATION SUFFICIENT TO CONTROL SOIL EROSION SHALL BE DEEMED COMPLIANCE WITH THIS MULCHING REQUIREMENT.

   - A. STRAW OR HAY. UNROTTED SMALL GRAIN STRAW, HAY FREE OF SEEDS, TO BE APPLIED AT THE RATE OF 1-1/2 TO 2 TONS PER ACRE (70 TO 90 POUNDS PER 1,000 SQUARE FEET), EXCEPT THAT WHERE A CRIMPER IS USED INSTEAD OF A LIQUID MULCH-BINDER (TACKIFYING OR ADHESIVE AGENT). THE RATE OF APPLICATION IS 3 TONS PER ACRE. MULCH CHOPPER-BLOWERS MUST NOT GRIND THE MULCH. HAY MULCH IS NOT RECOMMENDED FOR ESTABLISHING FINE TURF OR LAWNS DUE TO THE PRESENCE OF WEED SEED.

     APPLICATION - SPREAD MULCH UNIFORMLY BY HAND OR MECHANICALLY SO THAT AT LEAST 85% OF THE SOIL SURFACE IS COVERED. FOR UNIFORM DISTRIBUTION OF HAND-SPREAD MULCH, DIVIDE AREA INTO APPROXIMATELY 1,000 SQUARE FEET SECTIONS AND DISTRIBUTE 70 TO 90 POUNDS WITHIN EACH SECTION.

     ANCHORING SHALL BE ACCOMPLISHED IMMEDIATELY AFTER PLACEMENT TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS, DEPENDING UPON THE SIZE OF THE AREA, STEEPNESS OF SLOPES, AND COSTS.

     1. PEG AND TWINE. DRIVE 8 TO 10 INCH WOODEN PEGS TO WITHIN 2 TO 3 INCHES OF THE SOIL SURFACE EVERY 4 FEET IN ALL DIRECTIONS. STAKES MAY BE DRIVEN BEFORE OR AFTER APPLYING MULCH. SECURE MULCH TO SOIL SURFACE BY STRETCHING TWINE BETWEEN PEGS IN A CRISS-CROSS AND A SQUARE PATTERN. SECURE TWINE AROUND EACH PEG WITH TWO OR MORE ROUND TURNS.
     2. MULCH NETTINGS - STAPLE PAPER, JUTE, COTTON, OR PLASTIC NETTINGS TO THE SOIL SURFACE. USE A DEGRADABLE NETTING IN AREAS TO BE MOWED.
     3. CRIMPER (MULCH ANCHORING COULTER TOOL) - A TRACTOR-DRAWN IMPLEMENT, SOMEWHAT LIKE A DISC HARROW, ESPECIALLY DESIGNED TO PUSH OR CUT SOME OF THE BROADCAST LONG FIBER MULCH 3 TO 4 INCHES INTO THE SOIL SO AS TO ANCHOR IT AND LEAVE PART STANDING UPRIGHT. THIS TECHNIQUE IS LIMITED TO AREAS TRAVERSABLE BY A TRACTOR, WHICH MUST OPERATE ON THE CONTOUR OF SLOPES. STRAW MULCH RATE MUST BE 3 TONS PER ACRE. NO TACKIFYING OR ADHESIVE AGENT IS REQUIRED.
     4. LIQUID MULCH-BINDERS - MAY BE USED TO ANCHOR SALT HAY, HAY OR STRAW MULCH.
        - a. APPLICATIONS SHOULD BE HEAVIER AT EDGES WHERE WIND MAY CATCH THE MULCH, IN VALLEYS, AND AT CRESTS OF BANKS. THE REMAINDER OF THE AREA SHOULD BE UNIFORM IN APPEARANCE.
        - b. USE ONE OF THE FOLLOWING:

          (1) ORGANIC AND VEGETABLE BASED BINDERS - NATURALLY OCCURRING, POWDER-BASED, HYDROPHILIC MATERIALS WHEN MIXED WITH WATER FORMULATES A GEL AND WHEN APPLIED TO MULCH UNDER SATISFACTORY CURING CONDITIONS WILL FORM MEMBRANED NETWORKS OF INSOLUBLE POLYMERS. THE VEGETABLE GEL SHALL BE PHYSIOLOGICALLY HARMLESS AND NOT RESULT IN A PHYTOTOXIC EFFECT OR IMPEDE GROWTH OF TURF GRASS. USE AT RATES AND WEATHER CONDITIONS AS RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH MATERIALS. MANY NEW PRODUCTS ARE AVAILABLE, SOME OF WHICH MAY NEED FURTHER EVALUATION FOR USE IN THIS STATE.

          (2) SYNTHETIC BINDERS - HIGH POLYMER SYNTHETIC EMULSION, MISCIBLE WITH WATER WHEN DILUTED AND, FOLLOWING APPLICATION OF MULCH, DRYING AND CURING SHALL NO LONGER BE SOLUBLE OR DISPERSIBLE IN WATER. BINDER SHALL BE APPLIED AT RATES RECOMMENDED BY THE MANUFACTURER AND REMAIN TACKY UNTIL GERMINATION OF GRASS.

          NOTE: ALL NAMES GIVEN ABOVE ARE REGISTERED TRADE NAMES. THIS DOES NOT CONSTITUTE A RECOMMENDATION OF THESE PRODUCTS TO THE EXCLUSION OF OTHER PRODUCTS.
   - B. WOOD-FIBER OR PAPER-FIBER MULCH - SHALL BE MADE FROM WOOD, PLANT FIBERS OR PAPER CONTAINING NO GROWTH OR GERMINATION INHIBITING MATERIALS, USED AT THE RATE OF 1,500 POUNDS PER ACRE (OR AS RECOMMENDED BY THE PRODUCT MANUFACTURER) AND MAY BE APPLIED BY A HYDROSEEDER. MULCH SHALL NOT BE MIXED IN THE TANK WITH SEED. USE IS LIMITED TO FLATTER SLOPES AND DURING OPTIMUM SEEDING PERIODS IN SPRING AND FALL.
   - C. PELLETIZED MULCH - COMPRESSED AND EXTRUDED PAPER AND/OR WOOD FIBER PRODUCT, WHICH MAY CONTAIN CO-POLYMERS, TACKIFIERS, FERTILIZERS, AND COLORING AGENTS. THE DRY PELLETS, WHEN APPLIED TO A SEEDED AREA AND WATERED, FORM A MULCH MAT. PELLETIZED MULCH SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. MULCH MAY BE APPLIED BY HAND OR MECHANICAL SPREADER AT THE RATE OF 60-75 LBS/1,000 SQUARE FEET AND ACTIVATED WITH 0.2 TO 0.4 INCHES OF WATER. THIS MATERIAL HAS BEEN FOUND TO BE BENEFICIAL FOR USE ON SMALL LAWN OR RENOVATION AREAS, SEEDED AREAS WHERE WEED-SEED FREE MULCH IS DESIRED, OR ON SITES WHERE STRAW MULCH AND TACKIFIER AGENT ARE NOT PRACTICAL OR DESIRABLE. APPLYING THE FULL 0.2 TO 0.4 INCHES OF WATER AFTER SPREADING PELLETIZED MULCH ON THE SEED BED IS EXTREMELY IMPORTANT FOR SUFFICIENT ACTIVATION AND EXPANSION OF THE MULCH TO PROVIDE SOIL COVERAGE.
5. IRRIGATION (WHERE FEASIBLE)

IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDING WITH ADEQUATE WATER (A MINIMUM OF 1/4 INCH APPLIED UP TO TWICE A DAY UNTIL VEGETATION IS WELL ESTABLISHED). THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE IN ABNORMALLY DRY OR HOT WEATHER OR ON DROUGHTY SITES.

6. TOPDRESSING

SINCE SOIL ORGANIC MATTER CONTENT AND SLOW RELEASE NITROGEN FERTILIZER (WATER INSOLUBLE) ARE PRESCRIBED IN SECTION 2A - SEEDBED PREPARATION IN THIS STANDARD, NO FOLLOW-UP OF TOPDRESSING IS MANDATORY. AN EXCEPTION MAY BE MADE WHERE GROSS NITROGEN DEFICIENCY EXISTS IN THE SOIL TO THE EXTENT THAT TURF FAILURE MAY DEVELOP. IN THAT INSTANCE, TOPDRESS WITH 10-10-10 OR EQUIVALENT AT 300 POUNDS PER ACRE OR 7 POUNDS PER 1,000 SQUARE FEET EVERY 3 TO 5 WEEKS UNTIL THE GROSS NITROGEN DEFICIENCY IN THE TURF IS AMELIORATED.

7. ESTABLISHING PERMANENT VEGETATIVE STABILIZATION

THE QUALITY OF PERMANENT VEGETATION RESTS WITH THE CONTRACTOR. THE TIMING OF SEEDING, PREPARING THE SEEDBED, APPLYING NUTRIENTS, MULCH AND OTHER MANAGEMENT ARE ESSENTIAL. THE SEED APPLICATION RATES IN TABLE 4-3 ARE REQUIRED WHEN A REPORT OF COMPLIANCE IS REQUESTED PRIOR TO ACTUAL ESTABLISHMENT OF PERMANENT VEGETATION. UP TO 50% REDUCTION IN APPLICATION RATES MAY BE USED WHEN PERMANENT VEGETATION IS ESTABLISHED PRIOR TO REQUESTING A REPORT OF COMPLIANCE FROM THE DISTRICT. THESE RATES APPLY TO ALL METHODS OF SEEDING. ESTABLISHING PERMANENT VEGETATION MEANS 80% VEGETATIVE COVER (OF THE SEEDED SPECIES) AND MOWED ONCE. NOTE THIS DESIGNATION OF MOWED ONCE DOES NOT GUARANTEE THE PERMANENCY OF THE TURF SHOULD OTHER MAINTENANCE FACTORS BE NEGLECTED OR OTHERWISE MISMANAGED.

CONSTRUCTION SITE WASTE CONTROL

1. THE CONSTRUCTION SITE WASTE CONTROL COMPONENT OF THE SPPP CONSISTS OF THE REQUIREMENTS IN 2, 3, AND 4 BELOW. THESE REQUIREMENTS BECAME OPERATIVE ON MARCH 3, 2004 AND APPLY TO CONSTRUCTION ACTIVITIES THAT COMMENCE ON OR AFTER MARCH 3, 2004. ANY NEW CONSTRUCTION ACTIVITY FOR WHICH AN RFA IS SUBMITTED ON OR AFTER MARCH 3, 2004 OR WHICH RECEIVE AUTOMATIC RENEWAL OF AUTHORIZATION UNDER THIS PERMIT AFTER MARCH 3, 2004 ALSO SHALL COMPLY WITH THESE REQUIREMENTS.
2. MATERIAL MANAGEMENT TO PREVENT OR REDUCE WASTE - ANY PESTICIDES, FERTILIZERS, FUELS, LUBRICANTS, PETROLEUM PRODUCTS, ANTI-FREEZE, PAINTS AND PAINT THINNERS, CLEANING SOLVENTS AND ACIDS, DETERGENTS, CHEMICAL ADDITIVES, AND CONCRETE CURING COMPOUNDS SHALL BE STORED IN CONTAINERS IN A DRY COVERED AREA. MANUFACTURERS' RECOMMENDED APPLICATION RATES, USES, AND METHODS SHALL BE STRICTLY FOLLOWED TO THE EXTENT NECESSARY TO PREVENT OR MINIMIZE THE PRESENCE OF WASTE FROM SUCH MATERIALS IN THE STORMWATER DISCHARGE AUTHORIZED BY THIS PERMIT. (THE PRECEDING SENTENCE DOES NOT APPLY TO ANY MANUFACTURERS' RECOMMENDATIONS ABOUT FERTILIZER OR OTHER MATERIAL THAT CONFLICT WITH THE EROSION AND SEDIMENT CONTROL COMPONENT OF THE FACILITY'S SPPP.)
3. WASTE HANDLING - THE FOLLOWING REQUIREMENTS APPLY ONLY TO CONSTRUCTION SITE WASTE THAT HAS THE POTENTIAL TO BE TRANSPORTED BY THE STORMWATER DISCHARGE AUTHORIZED BY THIS PERMIT. THE HANDLING AT THE CONSTRUCTION SITE OF WASTE BUILDING MATERIAL AND RUBBLE AND OTHER CONSTRUCTION SITE WASTES, INCLUDING LITTER AND HAZARDOUS AND SANITARY WASTES, SHALL CONFORM WITH THE STATE SOLID WASTE MANAGEMENT ACT, N.J.S.A. 13:1E-1 ET SEQ., AND ITS IMPLEMENTING RULES AT N.J.A.C. 7:26, 7:26A, AND 7:26G; THE NEW JERSEY PESTICIDE CONTROL CODE AT N.J.A.C. 7:30, THE STATE LITTER STATUTE (N.J.S.A. 13:1E-99.3); AND OSHA REQUIREMENTS FOR SANITATION AT 29 C.F.R. 1926 (EXCEPT WHERE SUCH CONFORMANCE IS NOT RELEVANT TO THE STORMWATER DISCHARGE AUTHORIZED BY THIS PERMIT). CONSTRUCTION SITES SHALL HAVE ONE OR MORE DESIGNATED WASTE COLLECTION AREAS ONSITE OR ADJACENT TO THE SITE, AND AN ADEQUATE NUMBER OF CONTAINERS (WITH LIDS OR COVERS) FOR WASTE. WASTE SHALL BE COLLECTED FROM SUCH CONTAINERS BEFORE THEY OVERFLOW, AND SPILLS AT SUCH CONTAINERS SHALL BE CLEANED UP IMMEDIATELY.
   - a. CONSTRUCTION SITE WASTES INCLUDE BUT ARE NOT LIMITED TO:
   - i. "CONSTRUCTION AND DEMOLITION WASTE," AS DEFINED IN N.J.A.C. 7:26-1.4 AS FOLLOWS: "WASTE BUILDING MATERIAL AND RUBBLE RESULTING FROM CONSTRUCTION, REMODELING, REPAIR, AND DEMOLITION OPERATIONS ON HOUSES, COMMERCIAL BUILDINGS, PAVEMENTS AND OTHER STRUCTURES. THE FOLLOWING MATERIALS MAY BE FOUND IN CONSTRUCTION AND DEMOLITION WASTE: TREATED AND UNTREATED WOOD SCRAP; TREE PARTS, TREE STUMPS AND BRUSH; CONCRETE, ASPHALT, BRICKS, BLOCKS AND OTHER MASONRY; PLASTER AND WALLBOARD; ROOFING MATERIALS; CORRUGATED CARDBOARD AND MISCELLANEOUS PAPER; FERROUS AND NON-FERROUS METAL; NON-ASBESTOS BUILDING INSULATION; PLASTIC SCRAP; DIRT; CARPETS AND PADDING; GLASS (WINDOW AND DOOR); AND OTHER MISCELLANEOUS MATERIALS; BUT SHALL NOT INCLUDE OTHER SOLID WASTE TYPES."
   - ii. ANY WASTE BUILDING MATERIAL AND RUBBLE RESULTING FROM SUCH OPERATIONS THAT IS HAZARDOUS FOR PURPOSES OF N.J.A.C. 7:26G (THE HAZARDOUS WASTE RULES).
   - iii. DISCARDED (INCLUDING SPILLED) PESTICIDES, FERTILIZERS, FUELS, LUBRICANTS, PETROLEUM PRODUCTS, ANTI-FREEZE, PAINTS AND PAINT THINNERS, PAINT CHIPS AND SANDBLASTING GRITS, CLEANING SOLVENTS, ACIDS FOR CLEANING MASONRY SURFACES, DETERGENTS, CHEMICAL ADDITIVES USED FOR SOIL STABILIZATION (E.G., CALCIUM CHLORIDE), AND CONCRETE CURING COMPOUNDS.
   - iv. OTHER "LITTER," AS DEFINED AT N.J.S.A. 13:1E-215.D AS FOLLOWS: "ANY USED OR UNCONSUMED SUBSTANCE OR WASTE MATERIAL WHICH HAS BEEN DISCARDED WHETHER MADE OF ALUMINUM, GLASS, PLASTIC, RUBBER, PAPER, OR OTHER NATURAL OR SYNTHETIC MATERIAL, OR ANY COMBINATION THEREOF, INCLUDING, BUT NOT LIMITED TO, ANY BOTTLE, JAR OR CAN, OR ANY TOP, CAP OR DETACHABLE TAB OF ANY BOTTLE, JAR OR CAN, ANY UNLIGHTED CIGARETTE, CIGAR, MATCH OR ANY FLAMING OR GLOWING MATERIAL OR ANY GARBAGE, TRASH, REFUSE, DEBRIS, RUBBISH, GRASS CLIPPINGS OR OTHER LAWN OR GARDEN WASTE, NEWSPAPERS, MAGAZINES, GLASS, METAL, PLASTIC OR PAPER CONTAINERS OR OTHER PACKAGING OR CONSTRUCTION MATERIAL, BUT DOES NOT INCLUDE THE WASTE OF THE PRIMARY PROCESSES OF MINING OR OTHER EXTRACTION PROCESSES, LOGGING, SAWMILLING, FARMING OR MANUFACTURING."
   - v. SANITARY SEWAGE AND SEPTAGE.
   - vi. CONTAMINATED SOILS ENCOUNTERED OR DISCOVERED DURING EARTHMOVING ACTIVITIES OR DURING THE CLEANUP OF A LEAK OR DISCHARGE OF A HAZARDOUS SUBSTANCE.
   - b. CONCRETE TRUCK WASHOUT - CONCRETE TRUCK WASHOUT ONSITE IS PROHIBITED OUTSIDE DESIGNATED AREAS. DESIGNATED WASHOUT AREAS SHALL BE LINED AND BERMED TO PREVENT DISCHARGES TO SURFACE AND GROUND WATER. HARDENED CONCRETE FROM CONCRETE TRUCK WASHOUT SHALL BE REMOVED AND PROPERLY DISPOSED OF.
   - c. SANITARY SEWAGE/SEPTAGE DISPOSAL - DISCHARGES OF RAW SANITARY SEWAGE OR SEPTAGE ONSITE ARE STRICTLY PROHIBITED. ADEQUATE FACILITIES WITH PROPER DISPOSAL SHALL BE PROVIDED AND MAINTAINED ONSITE OR ADJACENT TO THE SITE FOR ALL WORKERS AND OTHER SANITARY NEEDS.
4. SPILLS; DISCHARGES OF HAZARDOUS SUBSTANCES; FEDERALLY REPORTABLE RELEASES.
   - a. SPILL KITS SHALL BE AVAILABLE ONSITE OR ADJACENT TO THE SITE FOR ANY MATERIALS THAT ARE LISTED IN 2. ABOVE AND USED OR APPLIED ONSITE. ALL SPILLS OF SUCH MATERIAL SHALL BE CONTAINED AND CLEANED UP IMMEDIATELY. CLEANED UP MATERIALS SHALL BE PROPERLY DISPOSED OF.
   - b. DISCHARGES OF HAZARDOUS SUBSTANCES (AS DEFINED IN N.J.A.C. 7:1E-1.6) IN CONSTRUCTION SITE WASTES ARE SUBJECT TO THE PROVISIONS OF THE SPILL COMPENSATION AND CONTROL ACT, N.J.S.A. 58:10-23.11 ET SEQ., AND OF DEPARTMENT RULES FOR DISCHARGES OF PETROLEUM AND OTHER HAZARDOUS SUBSTANCES AT N.J.A.C. 7:1E. NO DISCHARGE OF HAZARDOUS SUBSTANCES RESULTING FROM AN ONSITE SPILL SHALL BE DEEMED TO BE "PURSUANT TO AND IN COMPLIANCE WITH [THIS] PERMIT" WITHIN THE MEANING OF THE SPILL COMPENSATION AND CONTROL ACT AT N.J.S.A. 58:10-23.11C.
   - c. RELEASES IN EXCESS OF REPORTABLE QUANTITIES (RQ) ESTABLISHED UNDER 40 C.F.R. 110, 117, AND 302 THAT OCCUR WITHIN A 24-HR PERIOD MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER (800 424-8802).

STANDARD FOR LAND GRADING

DEFINITION

RESHAPING THE GROUND SURFACE BY GRADING TO PLANNED ELEVATIONS WHICH ARE DETERMINED BY TOPOGRAPHIC SURVEY AND LAYOUT.

PURPOSE

THE PRACTICE IS FOR ONE OR MORE OF THE FOLLOWING: PROVIDE MORE SUITABLE SITES FOR LAND DEVELOPMENT; IMPROVE SURFACE DRAINAGE AND CONTROL EROSION.

CONDITIONS WHERE PRACTICE APPLIES

THIS PRACTICE IS APPLICABLE WHERE GRADING TO PLANNED ELEVATIONS IS PRACTICAL AND IT IS DETERMINED THAT GRADING IS NEEDED. GRADING THAT INVOLVES THE DISTURBANCE OF VEGETATION OVER LARGE AREAS SHALL BE AVOIDED. IT MAY BE NECESSARY TO PROVIDE FOR TEMPORARY STABILIZATION OF LARGE AREAS.

WATER QUALITY ENHANCEMENT

PROPER GRADING OF DISTURBED SITES WILL PROTECT AGAINST SOIL LOSS FROM EROSION, ENHANCE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER AND HELP TO PROPERLY MANAGE STORMWATER RUNOFF, ALL OF WHICH WILL REDUCE OFF SITE DISCHARGE OF POLLUTANTS.

PLANNING CRITERIA

THE GRADING PLAN AND INSTALLATION SHALL BE BASED UPON ADEQUATE TOPOGRAPHIC SURVEYS AND INVESTIGATIONS. THE PLAN IS TO SHOW THE LOCATION, SLOPE, CUT, FILL AND FINISH ELEVATION OF THE SURFACES TO BE GRADED. THE PLAN SHOULD ALSO INCLUDE AUXILIARY PRACTICES FOR SAFE DISPOSAL OF RUNOFF WATER, SLOPE STABILIZATION, EROSION CONTROL AND DRAINAGE. FACILITIES SUCH AS WATERWAYS, DITCHES, DIVERSIONS, GRADE STABILIZATION STRUCTURES, RETAINING WALLS AND SUBSURFACE DRAINS SHOULD BE INCLUDED WHERE NECESSARY.

EROSION CONTROL MEASURES SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE APPLICABLE STANDARD CONTAINED HEREIN.

THE DEVELOPMENT AND ESTABLISHMENT OF THE PLAN SHALL INCLUDE THE FOLLOWING:

1. THE CUT FACE OF EARTH EXCAVATIONS AND FILLS SHALL BE NO STEEPER THAN THE SAFE ANGLE OF REPOSE FOR THE MATERIALS ENCOUNTERED AND FLAT ENOUGH FOR PROPER MAINTENANCE.
2. THE PERMANENTLY EXPOSED FACES OF EARTH CUTS AND FILLS SHALL BE VEGETATED OR OTHERWISE PROTECTED FROM EROSION.
3. PROVISIONS SHALL BE MADE TO SAFELY CONDUCT SURFACE WATER TO STORM DRAINS OR SUITABLE WATER COURSES AND TO PREVENT SURFACE RUNOFF FROM DAMAGING CUT FACES AND FILL SLOPES.
4. SUBSURFACE DRAINAGE IS TO BE PROVIDED IN AREAS HAVING A HIGH WATER TABLE, TO INTERCEPT SEEPAGE THAT WOULD ADVERSELY AFFECT SLOPE STABILITY, BUILDING FOUNDATIONS OR CREATE UNDESIRABLE WETNESS. SEE STANDARD FOR SUBSURFACE DRAINAGE, PG. 33-1.
5. ADJOINING PROPERTY SHALL BE PROTECTED FROM EXCAVATION AND FILLING OPERATIONS.
6. FILL SHALL NOT BE PLACED ADJACENT TO THE BANK OF A STREAM OR CHANNEL, UNLESS PROVISIONS ARE MADE TO PROTECT THE HYDRAULIC, BIOLOGICAL, AESTHETIC AND OTHER ENVIRONMENTAL FUNCTIONS OF THE STREAM.

SOIL MANAGEMENT AND PREPARATION

SUBGRADE SOILS PRIOR TO THE APPLICATION OF TOPSOIL SHALL BE FREE OF EXCESSIVE COMPACTION TO A DEPTH OF 6.0 INCHES TO ENHANCE THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER.

THIS SECTION OF THIS STANDARD ADDRESSES THE POTENTIAL FOR EXCESSIVE SOIL COMPACTION IN LIGHT OF THE INTENDED LAND USE, TESTING FOR EXCESSIVE SOIL COMPACTION WHERE PERMANENT VEGETATION IS TO BE ESTABLISHED AND MITIGATION OF EXCESSIVE SOIL COMPACTION WHEN APPROPRIATE.

DUE TO USE OR SETTING, CERTAIN DISTURBED AREAS WILL NOT REQUIRE COMPACTION REMEDIATION INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. WITHIN 20 FEET OF BUILDING FOUNDATIONS WITH BASEMENTS, 10 FEET FROM SLAB OR CRAWL SPACE CONSTRUCTION
2. WHERE SOILS OR GRAVEL SURFACES WILL BE REQUIRED TO SUPPORT POST-CONSTRUCTION VEHICULAR TRAFFIC LOADS SUCH AS ROADS, PARKING LOTS AND DRIVEWAYS (INCLUDING GRAVEL SURFACES), BICYCLE PATHS OR PEDESTRIAN WALKWAYS (SIDEWALKS ETC)
3. AIRPORTS, RAILWAYS OR OTHER TRANSPORTATION FACILITIES
4. AREAS REQUIRING INDUSTRY OR GOVERNMENT SPECIFIED SOIL DESIGNS INCLUDING GOLF COURSES, LANDFILLS, WETLAND RESTORATION, SEPTIC DISPOSAL FIELDS, WET/DRY PONDS, ETC.
5. AREAS GOVERNED OR REGULATED BY OTHER LOCAL, STATE OR FEDERAL REGULATIONS WHICH DICTATE SOIL CONDITIONS
6. BROWNFIELDS (CAPPED USES), URBAN REDEVELOPMENT AREAS, IN-FILL AREAS, RECYCLING YARDS, JUNK YARDS AND QUARRIES
7. SLOPES DETERMINED TO BE INAPPROPRIATE FOR SAFE OPERATION OF EQUIPMENT
8. PORTIONS OF A SITE WHERE NO HEAVY EQUIPMENT TRAVEL OR OTHER DISTURBANCE HAS TAKEN PLACE
9. AREAS RECEIVING TEMPORARY VEGETATIVE STABILIZATION IN ACCORDANCE WITH THE STANDARD
10. WHERE THE AREA AVAILABLE FOR REMEDIATION PRACTICES IS 500 SQUARE FEET OR LESS IN SIZE
11. LOCATIONS CONTAINING SHALLOW (CLOSE TO THE SURFACE) BEDROCK CONDITIONS

AREAS OF THE SITE WHICH ARE SUBJECT TO COMPACTION TESTING AND/OR MITIGATION SHALL BE GRAPHICALLY DENOTED ON THE CERTIFIED SOIL EROSION CONTROL PLAN.

SOIL COMPACTION REMEDIATION OR TESTING TO PROVE REMEDIATION IS NOT NECESSARY WILL BE REQUIRED IN AREAS WHERE PERMANENT VEGETATION IS TO BE ESTABLISHED THAT ARE NOT OTHERWISE EXEMPTED ABOVE. TESTING METHOD SHALL BE SELECTED, AND SOIL COMPACTION TESTING SHALL BE PERFORMED BY, THE CONTRACTOR OR OTHER PROJECT OWNER'S REPRESENTATIVE (E.G. ENGINEER). A MINIMUM OF TWO (2) TESTS SHALL BE PERFORMED FOR PROJECTS WITH AN OVERALL LIMIT OF DISTURBANCE OF UP TO ONE (1) ACRE AND AT A RATE OF TWO (2) TESTS PER ACRE OF THE OVERALL LIMIT OF DISTURBANCE FOR LARGER AREAS WHICH SHALL BE EVENLY DISTRIBUTED OVER THE AREA OF DISTURBANCE SUBJECT TO TESTING. TESTS SHALL BE PERFORMED IN AREAS REPRESENTATIVE OF THE CONSTRUCTION ACTIVITY PREVAILING IN THE AREA. IN THE EVENT THIS TESTING INDICATES COMPACTION IN EXCESS OF THE MAXIMUM THRESHOLDS INDICATED FOR THE TESTING METHOD, THE CONTRACTOR/OWNER SHALL HAVE THE OPTION TO PERFORM COMPACTION MITIGATION OVER THE ENTIRE DISTURBED AREA (EXCLUDING EXEMPT AREAS) OR TO PERFORM ADDITIONAL TESTING TO ESTABLISH THE LIMITS OF EXCESSIVE COMPACTION WHEREUPON ONLY THE EXCESSIVELY COMPACTED AREAS WOULD REQUIRE COMPACTION MITIGATION.

SOIL COMPACTION TESTING IS NOT REQUIRED IF/WHEN SUBSOIL COMPACTION REMEDIATION (SCARIFICATION/TILLAGE (6" MINIMUM OR SIMILAR)) IS PROPOSED AS PART OF THE SEQUENCE OF CONSTRUCTION.

SOIL TEST METHOD OPTIONS

1. PROBING WIRE TEST METHOD

THIS TEST SHALL BE CONDUCTED WITH A FIRM WIRE (15-1/2 GAUGE STEEL WIRE - E.G. SURVEY MARKER FLAG, STRAIGHT WIRE STOCK, ETC.) 18 TO 21 INCHES IN LENGTH, WITH 6" INCHES FROM ONE END VISIBLY MARKED ON THE WIRE. CONDUCT WIRE FLAG TEST BY HOLDING THE WIRE FLAG NEAR THE FLAG END AND PUSH IT VERTICALLY INTO THE SOIL AT SEVERAL DIFFERENT LOCATIONS IN THE FIELD TO THE LESSER OF A 6 INCH DEPTH OR THE DEPTH AT WHICH IT BENDS DUE TO RESISTANCE IN THE SOIL. RECORD THE DEPTH AT WHICH IT BENDS DUE TO RESISTANCE IN THE SOIL. THE WIRE SHOULD PENETRATE WITHOUT BENDING OR DEFORMING AT LEAST 6" INTO THE GROUND BY HAND, WITHOUT THE USE OF TOOLS. IF PENETRATION FAILS AND AN OBSTRUCTION IS SUSPECTED (ROCKS, ROOT, DEBRIS, ETC.) THE TEST CAN BE REPEATED IN THE SAME GENERAL AREA. IF THE TEST IS SUCCESSFUL THE SOIL IS NOT EXCESSIVELY COMPACTED. IF THE WIRE IS DIFFICULT TO INSERT (WIRE BENDS OR DEFORMS PRIOR TO REACHING 6 INCHES IN DEPTH) THE SOIL MAY BE EXCESSIVELY COMPACTED AND COMPACTION MITIGATION OR FURTHER TESTING VIA METHOD 3 OR 4 BELOW IS REQUIRED, THE CHOICE OF WHICH IS AT THE CONTRACTOR/OWNER'S DISCRETION.

2. HAND-HELD SOIL PENETROMETER TEST METHOD

THIS TEST SHALL BE CONDUCTED BASED ON THE STANDARD OPERATION PROCEDURE (SOP) #RCE20-0-001, PREPARED BY THE RUTGERS COOPERATIVE EXTENSION, IMPLEMENTED JUNE 1, 2018, LAST REVISED FEBRUARY 28, 2011. A RESULT OF LESS THAN OR EQUAL TO 300 PSI SHALL BE CONSIDERED PASSING. IF THE RESULT IS GREATER THAN 300 PSI THE SOIL MAY BE EXCESSIVELY COMPACTED AND COMPACTION MITIGATION OR FURTHER TESTING VIA METHOD 3 OR 4 BELOW IS REQUIRED, THE CHOICE OF WHICH IS AT THE CONTRACTOR/OWNER'S DISCRETION.

3. TUBE BULK DENSITY TEST METHOD

THIS TEST SHALL BE CERTIFIED BY A NEW JERSEY LICENSED PROFESSIONAL ENGINEER UTILIZING ONLY UNDISTURBED SAMPLES (RECONSTITUTION OF THE SAMPLE NOT PERMITTED) COLLECTED UTILIZING THE PROCEDURE FOR SOIL BULK DENSITY TESTS AS DESCRIBED IN THE USDA NRCS SOIL QUALITY TEST KIT GUIDE, SECTION I-4, JULY 2001. WHEN THE TEXTURE OF THE SOIL TO BE TESTED IS A SAND OR LOAMY SAND AND LACK OF SOIL COHESION OR THE PRESENCE OF LARGE AMOUNTS OF COARSE FRAGMENTS, ROOTS OR WORM CHANNELS PREVENT THE TAKING OF UNDISTURBED SAMPLES, THIS TEST SHALL NOT BE USED.

WHERE THE RESULTS OF REPLICATE TESTS DIFFER BY MORE THAN TEN PERCENT (10%) THE SAMPLES SHALL BE EXAMINED FOR THE FOLLOWING DEFECTS:

- CRACKS, WORM CHANNELS, LARGE ROOT CHANNELS OR POOR SOIL TUBE CONTACT WITHIN THE SAMPLES,
- LARGE PIECES OF GRAVEL, ROOTS OR OTHER FOREIGN OBJECTS
- SMEARING OR COMPACTION OF THE UPPER OR LOWER SURFACE OF THE SAMPLES

IF ANY OF THE DEFECTS DESCRIBED IN 3 (I-III) ABOVE ARE FOUND, THE DEFECTIVE CORE(S) SHALL BE DISCARDED AND THE TEST REPEATED USING A NEW REPLICATE SAMPLE FOR EACH DEFECTIVE REPLICATE SAMPLE. THE BULK DENSITY (DEFINED AS THE WEIGHT OF DRY SOIL PER VOLUME) RESULTS SHALL BE COMPARED WITH THE MAXIMUM DRY BULK DENSITIES IN TABLE 19-1. A RESULT OF LESS THAN OR EQUAL TO THE APPLICABLE MAXIMUM BULK DENSITY SHALL BE CONSIDERED PASSING. IF THE RESULT IS GREATER THAN THE MAXIMUM BULK DENSITY THE SOIL SHALL BE CONSIDERED EXCESSIVELY COMPACTED AND COMPACTION MITIGATION IS REQUIRED.

4. NUCLEAR DENSITY TEST METHOD

THIS TEST SHALL BE CERTIFIED BY A NEW JERSEY LICENSED PROFESSIONAL ENGINEER AND CONDUCTED BY A NUCLEAR GAUGE CERTIFIED INSPECTOR PURSUANT TO ASTM D6938. THE BULK DENSITY MEASUREMENT RESULTS SHALL BE COMPARED WITH THE MAXIMUM DRY BULK DENSITIES IN TABLE 19-1. A RESULT OF LESS THAN OR EQUAL TO THE APPLICABLE MAXIMUM BULK DENSITY SHALL BE CONSIDERED PASSING. IF THE RESULT IS GREATER THAN THE MAXIMUM BULK DENSITY THE SOIL SHALL BE CONSIDERED EXCESSIVELY COMPACTED AND COMPACTION MITIGATION IS REQUIRED.

TABLE 19-1 - MAXIMUM DRY BULK DENSITIES (GRAMS/CUBIC CENTIMETER) BY SOIL TYPE

SOIL TYPE/TEXTURE	BULK DENSITY (G/CC)
COARSE, MEDIUM AND FINE SANDS AND LOAMY SANDS	1.80
VERY FINE SAND AND LOAMY VERY FINE SAND	1.77
SANDY LOAM	1.75
LOAM, SANDY CLAY LOAM	1.70
CLAY LOAM	1.65
SANDY CLAY	1.60
SILT, SILT LOAM	1.55
SILTY CLAY LOAM	1.50
SILTY CLAY	1.45
CLAY	1.40

SOURCE: USDA NATURAL RESOURCE CONSERVATION SERVICE. SOIL QUALITY INFORMATION SHEET, SOIL QUALITY RESOURCE CONCERNS: COMPACTION. APRIL 1996.

5. ADDITIONAL TESTING METHODS WHICH CONFORM TO ASTM STANDARDS AND SPECIFICATIONS, AND WHICH PRODUCE A DRY WEIGHT, SOIL BULK DENSITY MEASUREMENT MAY BE ALLOWED SUBJECT TO DISTRICT APPROVAL.

PROCEDURES FOR SOIL COMPACTION MITIGATION

IF SUBGRADE SOILS ARE DETERMINED TO BE EXCESSIVELY COMPACTED BY TESTING, AS IDENTIFIED ABOVE, PROCEDURES SHALL BE USED TO MITIGATE EXCESSIVE SOIL COMPACTION PRIOR TO PLACEMENT OF TOPSOIL AND ESTABLISHMENT OF PERMANENT VEGETATIVE COVER. RESTORATION OF COMPACTED SOILS SHALL BE THROUGH DEEP SCARIFICATION/TILLAGE (6" MINIMUM DEPTH) WHERE THERE IS NO DANGER TO UNDERGROUND UTILITIES (CABLES, IRRIGATION SYSTEMS, ETC.) OR IN THE ALTERNATIVE, ANOTHER METHOD AS SPECIFIED BY A NEW JERSEY LICENSED PROFESSIONAL ENGINEER.

INSTALLATION REQUIREMENTS

TIMBER, LOGS, BRUSH, RUBBISH, ROCKS, STUMPS AND VEGETATIVE MATTER WHICH WILL INTERFERE WITH THE GRADING OPERATION OR AFFECT THE PLANNED STABILITY OR FILL AREAS SHALL BE REMOVED AND DISPOSED OF ACCORDING TO THE PLAN.

TOPSOIL IS TO BE STRIPPED AND STOCKPILED IN AMOUNTS NECESSARY TO COMPLETE FINISH GRADING OF ALL EXPOSED AREAS REQUIRING TOPSOIL. SEE STANDARD FOR TOPSOILING, PG. 8-1.

FILL MATERIAL IS TO BE FREE OF BRUSH, RUBBISH, TIMBER, LOGS, VEGETATIVE MATTER AND STUMPS IN AMOUNTS THAT WILL BE DETRIMENTAL TO CONSTRUCTING STABLE FILLS.

ALL STRUCTURAL FILLS SHALL BE COMPACTED AS DETERMINED BY STRUCTURAL ENGINEERING REQUIREMENTS FOR THEIR INTENDED PURPOSE AND AS REQUIRED TO REDUCE SLIPPING, EROSION OR EXCESSIVE SATURATION.

ALL DISTURBED AREAS SHALL BE LEFT WITH A NEAT AND FINISHED APPEARANCE AND SHALL BE PROTECTED FROM EROSION. SEE STANDARDS FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION, PG. 4-1.

TREES TO BE RETAINED SHALL BE PROTECTED IF NECESSARY IN ACCORDANCE WITH THE STANDARD FOR TREE PROTECTION DURING CONSTRUCTION, PG. 9-1.

SEQUENCE OF CONSTRUCTION

1. CLEARING OF ENTRANCE AND LIMIT OF DISTURBANCE FOR INSTALLATION OF SILT FENCE, TREE PROTECTION, INLET PROTECTION, CONSTRUCTION ENTRANCE PAD, AND OTHER SOIL EROSION MEASURES (1 WEEK)
2. CLEARING AND ROUGH GRADING AS NECESSARY. ALL EXPOSED SURFACES SHALL BE STABILIZED AS DEFINED IN SOIL EROSION AND SEDIMENT CONTROL NOTES (1 WEEK)
3. INSTALL BULKHEAD/RETAINING WALL (2 WEEKS)
4. INSTALL STORM DRAINAGE MODIFICATIONS, CONDUIT OUTLET PROTECTION, AND ALL OTHER UTILITIES. INSTALL INLET PROTECTION (1 WEEK)
5. BACKFILL AS REQUIRED. ESTABLISH FINISH GRADES. CONDUCT SOIL COMPACTION TESTING AS REQUIRED, OR SCARIFY/TILL 6" MINIMUM DEPTH OF SUBSOIL IN THE LANDSCAPED AND LAWN AREA (1 WEEK)
6. CONSTRUCT SIDEWALKS, ASPHALT WALKS, PAVERS, ETC. (1 WEEK)
7. ALL SURFACES HAVING LAWN OR LANDSCAPING AS FINAL COVER ARE TO BE PROVIDED 5" OF TOPSOIL, FIRM IN PLACE, PRIOR TO SEEDING, SODDING OR PLANTING. PLACE PERMANENT VEGETATIVE COVER (1 WEEK)
8. REMOVE TEMPORARY ACCESS PROTECTION, SILT FENCE, AND INLET PROTECTION AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED (1 WEEK)
9. PERFORM ANY ROADWAY PAVEMENT REPAIRS AND COMPLETE FINAL LANDSCAPING (1 WEEK)

CONSTRUCTION SITE WASTE CONTROL

1. THE CONSTRUCTION SITE WASTE CONTROL COMPONENT OF THE SPPP CONSISTS OF THE REQUIREMENTS IN 2., 3., AND 4. BELOW. THESE REQUIREMENTS BECAME OPERATIVE ON MARCH 3, 2004 AND APPLY TO CONSTRUCTION ACTIVITIES THAT COMMENCE ON OR AFTER MARCH 3, 2004. ANY NEW CONSTRUCTION ACTIVITY FOR WHICH AN RFA IS SUBMITTED ON OR AFTER MARCH 3, 2004 OR WHICH RECEIVE AUTOMATIC RENEWAL OF AUTHORIZATION UNDER THIS PERMIT AFTER MARCH 3, 2004 ALSO SHALL COMPLY WITH THESE REQUIREMENTS.
2. MATERIAL MANAGEMENT TO PREVENT OR REDUCE WASTE - ANY PESTICIDES, FERTILIZERS, FUELS, LUBRICANTS, PETROLEUM PRODUCTS, ANTI-FREEZE, PAINTS AND PAINT THINNERS, CLEANING SOLVENTS AND ACIDS, DETERGENTS, CHEMICAL ADDITIVES, AND CONCRETE CURING COMPOUNDS SHALL BE STORED IN CONTAINERS IN A DRY COVERED AREA. MANUFACTURERS' RECOMMENDED APPLICATION RATES, USES, AND METHODS SHALL BE STRICTLY FOLLOWED TO THE EXTENT NECESSARY TO PREVENT OR MINIMIZE THE PRESENCE OF WASTE FROM SUCH MATERIALS IN THE STORMWATER DISCHARGE AUTHORIZED BY THIS PERMIT. (THE PRECEDING SENTENCE DOES NOT APPLY TO ANY MANUFACTURERS' RECOMMENDATIONS ABOUT FERTILIZER OR OTHER MATERIAL THAT CONFLICT WITH THE EROSION AND SEDIMENT CONTROL COMPONENT OF THE FACILITY'S SPPP.)
3. WASTE HANDLING - THE FOLLOWING REQUIREMENTS APPLY ONLY TO CONSTRUCTION SITE WASTE THAT HAS THE POTENTIAL TO BE TRANSPORTED BY THE STORMWATER DISCHARGE AUTHORIZED BY THIS PERMIT. THE HANDLING AT THE CONSTRUCTION SITE OF WASTE BUILDING MATERIAL AND RUBBLE AND OTHER CONSTRUCTION SITE WASTES, INCLUDING LITTER AND HAZARDOUS AND SANITARY WASTES, SHALL CONFORM WITH THE STATE SOLID WASTE MANAGEMENT ACT, N.J.S.A. 13:1E-1 ET SEQ., AND ITS IMPLEMENTING RULES AT N.J.A.C. 7:26, 7:26A, AND 7:26G; THE NEW JERSEY PESTICIDE CONTROL CODE AT N.J.A.C. 7:30, THE STATE LITTER STATUTE (N.J.S.A. 13:1E-99.3); AND OSHA REQUIREMENTS FOR SANITATION AT 29 C.F.R. 1926 (EXCEPT WHERE SUCH CONFORMANCE IS NOT RELEVANT TO THE STORMWATER DISCHARGE AUTHORIZED BY THIS PERMIT). CONSTRUCTION SITES SHALL HAVE ONE OR MORE DESIGNATED WASTE COLLECTION AREAS ONSITE OR ADJACENT TO THE SITE, AND AN ADEQUATE NUMBER OF CONTAINERS (WITH LIDS OR COVERS) FOR WASTE. WASTE SHALL BE COLLECTED FROM SUCH CONTAINERS BEFORE THEY OVERFLOW, AND SPILLS AT SUCH CONTAINERS SHALL BE CLEANED UP IMMEDIATELY.
   - a. CONSTRUCTION SITE WASTES INCLUDE BUT ARE NOT LIMITED TO:
   - i. "CONSTRUCTION AND DEMOLITION WASTE," AS DEFINED IN N.J.A.C. 7:26-1.4 AS FOLLOWS: "WASTE BUILDING MATERIAL AND RUBBLE RESULTING FROM CONSTRUCTION, REMODELING, REPAIR, AND DEMOLITION OPERATIONS ON HOUSES, COMMERCIAL BUILDINGS, PAVEMENTS AND OTHER STRUCTURES. THE FOLLOWING MATERIALS MAY BE FOUND IN CONSTRUCTION AND DEMOLITION WASTE: TREATED AND UNTREATED WOOD SCRAP; TREE PARTS, TREE STUMPS AND BRUSH; CONCRETE, ASPHALT, BRICKS, BLOCKS AND OTHER MASONRY; PLASTER AND WALLBOARD; ROOFING MATERIALS; CORRUGATED CARDBOARD AND MISCELLANEOUS PAPER; FERROUS AND NON-FERROUS METAL; NON-ASBESTOS BUILDING INSULATION; PLASTIC SCRAP; DIRT; CARPETS AND PADDING; GLASS (WINDOW AND DOOR); AND OTHER MISCELLANEOUS MATERIALS; BUT SHALL NOT INCLUDE OTHER SOLID WASTE TYPES."
   - ii. ANY WASTE BUILDING MATERIAL AND RUBBLE RESULTING FROM SUCH OPERATIONS THAT IS HAZARDOUS FOR PURPOSES OF N.J.A.C. 7:26G (THE HAZARDOUS WASTE RULES).
   - iii. DISCARDED (INCLUDING SPILLED) PESTICIDES, FERTILIZERS, FUELS, LUBRICANTS, PETROLEUM PRODUCTS, ANTI-FREEZE, PAINTS AND PAINT THINNERS, PAINT CHIPS AND SANDBLASTING GRITS, CLEANING SOLVENTS, ACIDS FOR CLEANING MASONRY SURFACES, DETERGENTS, CHEMICAL ADDITIVES USED FOR SOIL STABILIZATION (E.G., CALCIUM CHLORIDE), AND CONCRETE CURING COMPOUNDS.
   - iv. OTHER "LITTER," AS DEFINED AT N.J.S.A. 13:1E-215.D AS FOLLOWS: "ANY USED OR UNCONSUMED SUBSTANCE OR WASTE MATERIAL WHICH HAS BEEN DISCARDED WHETHER MADE OF ALUMINUM, GLASS, PLASTIC, RUBBER, PAPER, OR OTHER NATURAL OR SYNTHETIC MATERIAL, OR ANY COMBINATION THEREOF, INCLUDING, BUT NOT LIMITED TO, ANY BOTTLE, JAR OR CAN, OR ANY TOP, CAP OR DETACHABLE TAB OF ANY BOTTLE, JAR OR CAN, ANY UNLIGHTED CIGARETTE, CIGAR, MATCH OR ANY FLAMING OR GLOWING MATERIAL OR ANY GARBAGE, TRASH, REFUSE, DEBRIS, RUBBISH, GRASS CLIPPINGS OR OTHER LAWN OR GARDEN WASTE, NEWSPAPERS, MAGAZINES, GLASS, METAL, PLASTIC OR PAPER CONTAINERS OR OTHER PACKAGING OR CONSTRUCTION MATERIAL, BUT DOES NOT INCLUDE THE WASTE OF THE PRIMARY PROCESSES OF MINING OR OTHER EXTRACTION PROCESSES, LOGGING, SAWMILLING, FARMING OR MANUFACTURING."
   - v. SANITARY SEWAGE AND SEPTAGE.
   - vi. CONTAMINATED SOILS ENCOUNTERED OR DISCOVERED DURING EARTHMOVING ACTIVITIES OR DURING THE CLEANUP OF A LEAK OR DISCHARGE OF A HAZARDOUS SUBSTANCE.
   - b. CONCRETE TRUCK WASHOUT - CONCRETE TRUCK WASHOUT ONSITE IS PROHIBITED OUTSIDE DESIGNATED AREAS. DESIGNATED WASHOUT AREAS SHALL BE LINED AND BERMED TO PREVENT DISCHARGES TO SURFACE AND GROUND WATER. HARDENED CONCRETE FROM CONCRETE TRUCK WASHOUT SHALL BE REMOVED AND PROPERLY DISPOSED OF.
   - c. SANITARY SEWAGE/SEPTAGE DISPOSAL - DISCHARGES OF RAW SANITARY SEWAGE OR SEPTAGE ONSITE ARE STRICTLY PROHIBITED. ADEQUATE FACILITIES WITH PROPER DISPOSAL SHALL BE PROVIDED AND MAINTAINED ONSITE OR ADJACENT TO THE SITE FOR ALL WORKERS AND OTHER SANITARY NEEDS.
4. SPILLS; DISCHARGES OF HAZARDOUS SUBSTANCES; FEDERALLY REPORTABLE RELEASES.
   - a. SPILL KITS SHALL BE AVAILABLE ONSITE OR ADJACENT TO THE SITE FOR ANY MATERIALS THAT ARE LISTED IN 2. ABOVE AND USED OR APPLIED ONSITE. ALL SPILLS OF SUCH MATERIAL SHALL BE CONTAINED AND CLEANED UP IMMEDIATELY. CLEANED UP MATERIALS SHALL BE PROPERLY DISPOSED OF.
   - b. DISCHARGES OF HAZARDOUS SUBSTANCES (AS DEFINED IN N.J.A.C. 7:1E-1.6) IN CONSTRUCTION SITE WASTES ARE SUBJECT TO THE PROVISIONS OF THE SPILL COMPENSATION AND CONTROL ACT, N.J.S.A. 58:10-23.11 ET SEQ., AND OF DEPARTMENT RULES FOR DISCHARGES OF PETROLEUM AND OTHER HAZARDOUS SUBSTANCES AT N.J.A.C. 7:1E. NO DISCHARGE OF HAZARDOUS SUBSTANCES RESULTING FROM AN ONSITE SPILL SHALL BE DEEMED TO BE "PURSUANT TO AND IN COMPLIANCE WITH [THIS] PERMIT" WITHIN THE MEANING OF THE SPILL COMPENSATION AND CONTROL ACT AT N.J.S.A. 58:10-23.11C.
   - c. RELEASES IN EXCESS OF REPORTABLE QUANTITIES (RQ) ESTABLISHED UNDER 40 C.F.R. 110, 117, AND 302 THAT OCCUR WITHIN A 24-HR PERIOD MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER (800 424-8802).

DEFINITION

A TEMPORARY BARRIER AND SETTLING FACILITY INSTALLED AT A STORM SEWER INLET.

PURPOSE

THE PURPOSE OF STORM SEWER INLET PROTECTION IS TO INTERCEPT AND RETAIN SEDIMENT, THUS PREVENTING THE ENTRANCE OF SEDIMENT INTO THE STORM SEWER SYSTEM.

CONDITIONS WHERE PRACTICE APPLIES

GROWTH AND ESTABLISHMENT OF A VIGOROUS VEGETATIVE COVER IS FACILITATED BY TOPSOIL, PREVENTING SOIL LOSS BY WIND AND RAIN OFFSITE AND INTO STREAMS AND OTHER STORMWATER CONVEYANCES.

1. CONTRIBUTING DRAINAGE AREA 0.1 ACRES OR LESS.
2. A STORM SEWER OR THE OUTLET CHANNEL OF A STORM SEWER NEEDS PROTECTION FROM SEDIMENT.
3. TRAFFIC WILL NOT DESTROY OR CAUSE CONSTANT MAINTENANCE OF THE STORM SEWER INLET PROTECTION.
4. A TRAFFIC HAZARD WILL NOT BE CREATED.
5. A FLOODING PROBLEM WILL NOT BE CREATED.

WATER QUALITY ENHANCEMENT

THE PRIMARY BENEFIT TO WATER QUALITY IS THE REMOVAL OF SEDIMENT FROM STORMWATER RUNOFF PRIOR TO ENTERING THE STORMSEWER SYSTEM. AS AN ADDED BENEFIT, OTHER FLOATABLE DEBRIS, SUCH AS VEGETATIVE MATTER AND LITTER MAY ALSO BE FILTERED OUT OF THE RUNOFF.

DESIGN CRITERIA

THE FOLLOWING APPLIES TO ALL METHODS OF STORM SEWER INLET PROTECTION:

1. MUST SLOW THE STORM WATER, PROVIDE THE COARSE SEDIMENT PARTICLES A CHANCE TO SETTLE, AND PROVIDE AN AREA TO RETAIN THE PARTICLES THAT HAVE SETTLED.
2. IN ALL CASES, INLET PROTECTION SHOULD NOT COMPLETELY CLOSE OFF THE INLET. PROVISION MUST BE MADE TO ALLOW STORMWATER TO OVERFLOW OR BYPASS FILTER.
3. THE PROTECTION DEVICE WILL BE DESIGNED TO CAPTURE OR FILTER RUNOFF FROM THE 1 YEAR, 24 HOUR STORM EVENT AND SHALL SAFELY CONVEY HIGHER FLOWS DIRECTLY INTO THE STORM SEWER SYSTEM.

OTHER METHODS THAT ACCOMPLISH THE PURPOSE OF STORM SEWER INLET PROTECTION MAY BE USED IF APPROVED BY THE SOIL CONSERVATION DISTRICT.

INSPECTIONS SHALL BE FREQUENT. MAINTENANCE, REPAIR, AND REPLACEMENT SHALL BE MADE PROMPTLY, AS NEEDED. THE BARRIER SHALL BE REMOVED WHEN THE AREA DRAINING TOWARD THE INLET HAS BEEN STABILIZED.

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REV	DATE	DRAWN BY	DESCRIPTION
1	07/22/19	TEK	FINAL PLAN SUBMITTAL
2	01/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	05/15/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS
FOR
BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP
BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

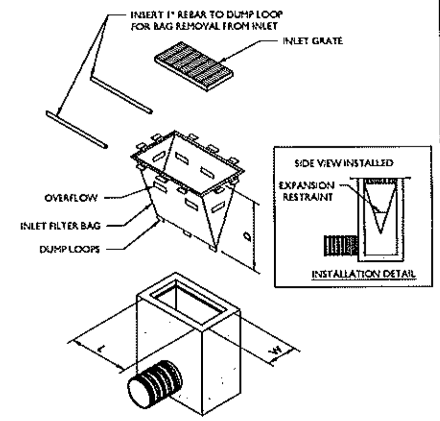
RED BANK OFFICE
Corporate Headquarters
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701
Phone: 732.383.1950
Fax: 732.383.1984

SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004982B	C-SESC-HANC

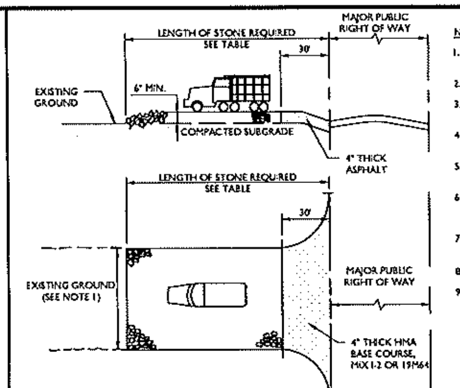
SHEET TITLE: SOIL EROSION & SEDIMENT CONTROL DETAILS & NOTES

SHEET NUMBER: SE - 3



INLET PROTECTION (FILTER BAG) DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-1500 — 09/01/17



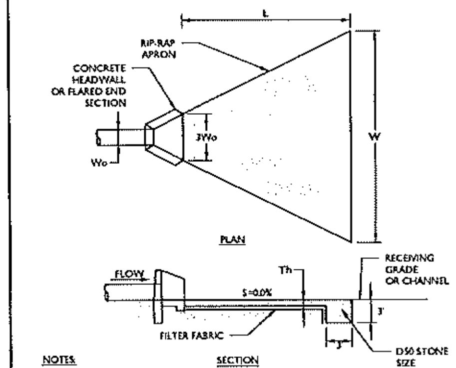
NOTES:

1. THE WIDTH OF CONSTRUCTION ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF POINTS OF INGRESS OR EGRESS, OR AS SHOWN ON THE PLAN.
2. THICKNESS SHOWN IS FOR STONE CONSTRUCTION ENTRANCE ONLY.
3. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO ROADWAYS.
4. THE ENTRANCE SHALL BE PERIODICALLY TOP DRESSED WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS ON-SITE CONDITIONS REQUIRE.
5. SPILLED, DROPPED, WASHED, OR TRACKED SEDIMENT ONTO ROADWAYS OR OTHER IMPERVIOUS SURFACES SHALL BE REMOVED IMMEDIATELY.
6. WHERE ACCUMULATION OF DUST AND SEDIMENT IS INADEQUATELY CLEANED OR REMOVED BY CONVENTIONAL METHODS, A POWER BROOM OR STREET SWEEPER SHALL BE USED TO CLEAN PAVED AREAS.
7. ALL OTHER ACCESS POINTS TO THE SITE WHICH DO NOT CONTAIN A CONSTRUCTION ACCESS PAD SHALL BE BLOCKED OFF.
8. STONE SIZE PER ASTM C-33, SIZE #2 (2 ½" TO 1 ½") OR #3 (2" TO 1") STONE.
9. INDIVIDUAL INTERIOR LOT INGRESS/EGRESS CONSTRUCTION ACCESS SHALL HAVE # 3 (1" TO 2") STONE, MINIMUM 10' (L) X 10' (W) AND 6" THICK.

PERCENT SLOPE OF ROADWAY	LENGTH OF STONE REQUIRED	
	COARSE GRAINED SOILS	FINE GRAINED SOILS
0% TO 2%	50 FT	100 FT
2% TO 5%	100 FT	200 FT
> 5%	ENTIRE SURFACE STABILIZED WITH HOT MIX ASPHALT BASE COURSE, MIX I-2	

STABILIZED CONSTRUCTION ACCESS (WITH PAVEMENT) DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-1001 — 05/01/17

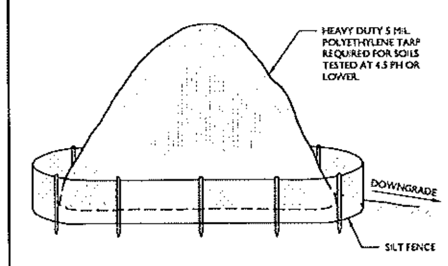


NOTES:

1. SEE PLAN FOR APRON DIMENSIONS.
2. SIDE SLOPE SHALL BE 2:1 OR FLATTER. THE BOTTOM GRADE SHALL BE LEVEL (0% SLOPE). THERE SHALL BE NO FALL AT THE END OF APRON TO THE RECEIVING SURFACE.

CONDUIT OUTLET PROTECTION DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-1600 — 05/01/17

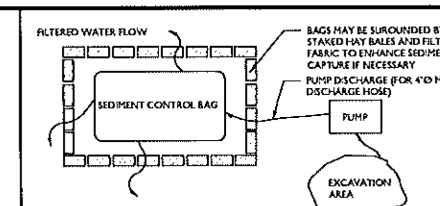


NOTES:

1. ALL STOCKPILES SHALL NOT TO BE LOCATED WITHIN 50 FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY.

TOPSOIL STOCKPILE DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-2500 — 05/01/17

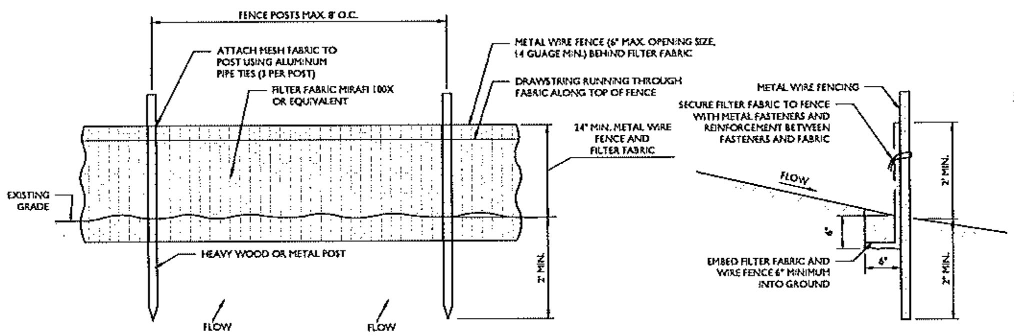


NOTES:

1. THE GEOTEXTILE SEDIMENT CONTROL BAG SHALL BE LOCATED TO MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES AND PEDESTRIAN TRAFFIC, AND PROVIDES FOR EASE OF ACCESS BY HEAVY EQUIPMENT, CLEANOUT, DISPOSAL OF TRAPPED SEDIMENT, AND PROPER RELEASE OF FILTER WATER.
2. THE FILTER BAG SHALL BE LOCATED MINIMUM 50 FEET AWAY FROM ALL WETLANDS, STREAM AND SURFACE WATERS.
3. THE BAG SHALL BE PLACED IN A LOCATION THAT IS VEGETATED THAT IS RELATIVELY LEVEL, OR ON A 2" THICK GRAVEL PAD, OR ON A 4" THICK STRAW MAT, TO ALLOW WATER TO FLOW OUT OF BAG IN ALL DIRECTIONS. AND PROPER RELEASE OF FILTER WATER.
4. BAG SHALL BE SIZED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS BASED ON THE PUMP DISCHARGE RATE. WHEN THE REMAINING BAG FLOW AREA HAS BEEN REDUCED BY 75%, REPLACE WITH A NEW BAG.
5. DISPOSE THE SEDIMENT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. SPREAD THE SEDIMENT IN THE APPROPRIATE UPLAND AREA.

SEDIMENT CONTROL BAG FOR DEWATERING DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-1800 — 05/01/17

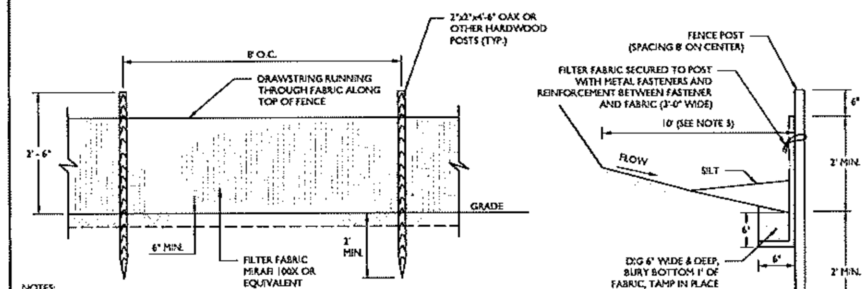


NOTES:

1. GEOTEXTILE TO BE FASTENED SECURELY TO FENCE POST BY USING WIRE TIES OR HOG RINGS. USE 4 TO 6 FASTENERS PER POST.
2. SPLICING OF INDIVIDUAL ROLLS SHALL NOT OCCUR AT LOW POINTS.
3. ALL SILT FENCE TO BE INSPECTED AND REMEDIAL MAINTENANCE PERFORMED BY THE CONTRACTOR WITHIN 24 HOURS AFTER EACH RAINFALL. REMOVE THE SILT ACCUMULATION WHEN IT REACHES 1/3 OF THE FENCE FABRIC HEIGHT.
4. FOR EVERY 100 FEET OF SILT FENCE, OR 1/4 ACRE OF DRAINAGE AREA, PROVIDE AN OVERFLOW POINT TO REDUCE PONDING IN FRONT OF THE FENCE.
5. IF SPACE PERMITTED, LOCATE SILT FENCE 10' AWAY FROM TOE OF SLOPE IF THE SLOPE IS STEEPER THAN 1:1.

SUPER SILT FENCE (WITH WIRE FENCE) DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-1101 — 11/01/18

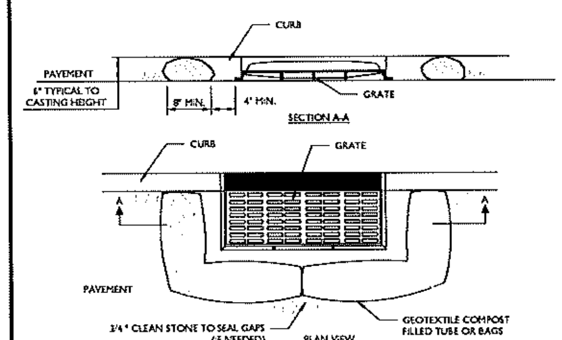


NOTES:

1. GEOTEXTILE TO BE FASTENED SECURELY TO FENCE POST BY USING WIRE TIES OR HOG RINGS. USE 4 TO 6 FASTENERS PER POST.
2. SPLICING OF INDIVIDUAL ROLLS SHALL NOT OCCUR AT LOW POINTS.
3. ALL SILT FENCE TO BE INSPECTED AND REMEDIAL MAINTENANCE PERFORMED BY THE CONTRACTOR WITHIN 24 HOURS AFTER EACH RAINFALL. REMOVE THE SILT ACCUMULATION WHEN IT REACHES 1/3 OF THE FENCE FABRIC HEIGHT.
4. FOR EVERY 100 FEET OF SILT FENCE, OR 1/4 ACRE OF DRAINAGE AREA, PROVIDE AN OVERFLOW POINT TO REDUCE PONDING IN FRONT OF THE FENCE.
5. IF SPACE PERMITTED, LOCATE SILT FENCE 10' AWAY FROM TOE OF SLOPE IF THE SLOPE IS STEEPER THAN 1:1.

SILT FENCE DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-1100 — 11/01/18

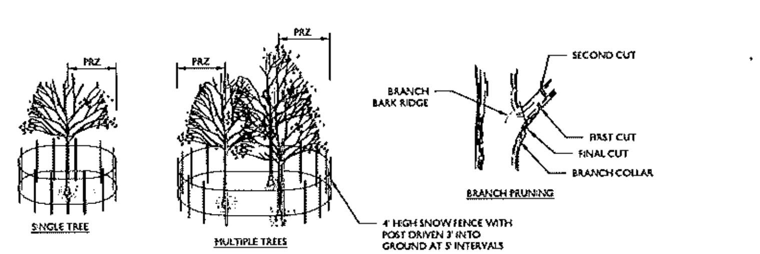


NOTES:

1. GEOTEXTILE TO BE WOVEN POLYPROPYLENE PRODUCT, OR APPROVED EQUAL.
2. FILLER CORE MAY BE SAND, COMPOST, OR PEA GRAVEL COMPLETELY CONTAINED WITHIN GEOTEXTILE. SEAMS, CLOSED BY SUITABLE MECHANICAL MEANS TO PREVENT LEAKAGE OF FILLER.
3. WHERE NO CURB IS PRESENT, BARRIER SHALL COMPLETELY ENCIRCLE THE DRAIN INLET.
4. INLET GRATE OPENING IS TO BE KEPT CLEAR OF OBSTRUCTIONS AT ALL TIMES.
5. THE PROTECTION DEVICE WILL BE DESIGNED TO CAPTURE OR FILTER RUNOFF FROM THE 1 YEAR/ 24 HOUR STORM EVENT AND SHALL SAFELY CONVEY HIGHER FLOWS DIRECTLY INTO THE STORM SEWER SYSTEM.
6. OTHER METHODS THAT ACCOMPLISH THE PURPOSE OF STORM SEWER INLET PROTECTION MAY BE USED IF APPROVED BY THE SOIL CONSERVATION DISTRICT.
7. INSPECTIONS SHALL BE FREQUENT. MAINTENANCE, REPAIR, AND REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED. THE BARRIER SHALL BE REMOVED WHEN THE AREA DRAINING TOWARDS THE INLET HAS BEEN STABILIZED.

INLET PROTECTION (FILTER BARRIER) DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-1502 — 05/01/17

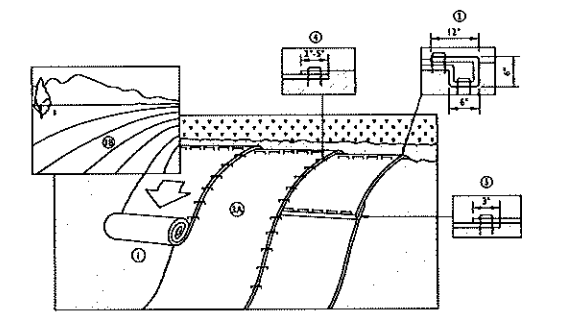


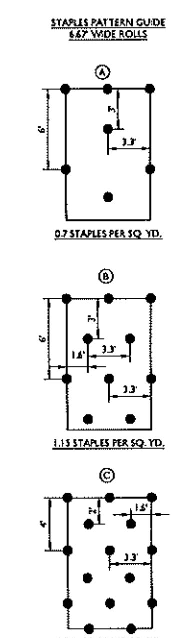
NOTES:

1. PROTECTIVE FENCING IS TO BE ERECTED PRIOR TO CONSTRUCTION AND MAINTAINED DURING CONSTRUCTION AS DIRECTED BY THE LANDSCAPE ARCHITECT, SOIL CONSERVATION DISTRICT AND/OR MUNICIPAL ENGINEER.
2. NO CONSTRUCTION ACTIVITY IS PERMITTED WITHIN THE PROTECTIVE FENCING.
3. AS CONSTRUCTION NEARS COMPLETION THE FENCING WILL BE REMOVED AS DIRECTED.
4. AT THE COMPLETION OF CONSTRUCTION, ALL TREES WILL BE PRUNED AS NECESSARY TO CORRECT ANY DAMAGE RESULTING FROM CONSTRUCTION ACTIVITY.
5. GENERAL MECHANICAL DAMAGE - SEE CRITICAL ROOT ZONE CALCULATION (CRZ) FOR CORRECT PLACEMENT OF TREE PROTECTION.
6. BOX TREES WITHIN 25 FEET OF A BUILDING SITE TO PREVENT MECHANICAL INJURY. FENCING OR OTHER BARRIER SHOULD BE INSTALLED BEYOND THE CRITICAL ROOT ZONE.
7. BOARDS WILL NOT BE NAILED TO TREES DURING BUILDING OPERATIONS.
8. FEEDER ROOTS SHOULD NOT BE CUT IN AN AREA INSIDE THE PROTECTED ROOT ZONE (PRZ) OR CRITICAL ROOT ZONE (CRZ). TREE ROOT SYSTEM COMMONLY EXTEND BEYOND THE DRIP LINE.
9. DAMAGED TRUNKS OR EXPOSED ROOTS SHOULD HAVE DAMAGED BARK REMOVED IMMEDIATELY AND NO PAINT SHALL BE APPLIED. EXPOSED ROOTS SHOULD BE COVERED WITH TOPSOIL IMMEDIATELY AFTER EXCAVATION IS COMPLETE. ROOTS SHALL BE PRUNED TO GIVE A CLEAN, SHARP SURFACE AMENABLE TO HEALING. ROOTS EXPOSED DURING HOT WEATHER SHOULD BE IRRIGATED TO PREVENT PERMANENT TREE INJURY. CARE FOR SERIOUS INJURY SHOULD BE PRESCRIBED BY A PROFESSIONAL FORESTER OR CERTIFIED TREE EXPERT.
10. TREE LIMB REMOVAL WHERE NECESSARY, WILL BE DONE AS NATURAL TARGET PRUNING TO REMOVE THE DESIRED BRANCH COLLAR. THERE SHOULD BE NO FLUSH CUTS. FLUSH CUTS DESTROY A MAJOR DEFENSE SYSTEM OF THE TREE. NO TREE PAINT SHALL BE APPLIED. ALL CUTS SHALL BE MADE AT THE OUTSIDE EDGE OF THE BRANCH COLLAR. CUTS MADE TOO FAR BEYOND THE BRANCH COLLAR MAY LEAD TO EXCESS SPROUTING, CRACKS AND ROT. REMOVAL OF A "V" CROTCH SHOULD BE CONSIDERED FOR FREE STANDING SPECIMEN TREES TO AVOID FUTURE SPLITTING DAMAGE.
11. CRITICAL ROOT ZONE (CRZ) OR PROTECTED ROOT ZONE (PRZ) CALCULATION:
MEASURE DHB OF THE TREE (DIAMETER OF TREE IN BREAST HEIGHT OR 4.5' ABOVE GROUND ON THE UPHILL SIDE) IN INCHES.
CRZ OR PRZ = DHB TIMES 1.5 (FOR OLD/UNHEALTHY/SENSITIVE TREES) OR DHB X 1.0 (FOR YOUNG/HEALTHY/TOLERANT TREES), EXPRESS IN FEET.

TEMPORARY TREE PROTECTION DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-2100 — 05/01/17





NOTES:

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECPS), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER AND SEED.
   - WHEN USING MATTING WITH SEED, DO NOT SEED THE AREA. FOLLOW MANUFACTURER'S RECOMMENDATIONS.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECPS IN A 6" DEEP x 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECPS EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECPS WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECPS BACK OVER SEED AND COMPACTED SOIL. SECURE RECPS OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECPS.
3. ROLL THE RECPS (A.) DOWN OR (B.) HORIZONTALLY STEP BY STEP ACROSS THE SLOPE TAMPERING IT DOWN ALONG THE WAY. RECPS SHALL UNROLL WITH APPROPRIATE SIDE TIGHTLY AGAINST THE SOIL SURFACE. RECPS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKESSHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECPS MUST BE STAKED WITH APPROXIMATELY 2" TO 5" OVERLAP DEPENDING ON RECPS TYPE.
5. CONSECUTIVE RECPS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECPS WIDTH.
   - IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE RECPS.

EROSION MATTING (CURLEX ENFORCER I) DETAIL

NOT TO SCALE — MCNJ-SOIL-EROS-2300 — 05/01/17

20 0 20 40

SCALE : 1" = 20'

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1	07/22/19	TEK	FINAL PLAN SUBMITTAL
2	01/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	05/15/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR

BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP

BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

RED BANK OFFICE
Corporate Headquarters
331 Newman Springs Road
Suite 203
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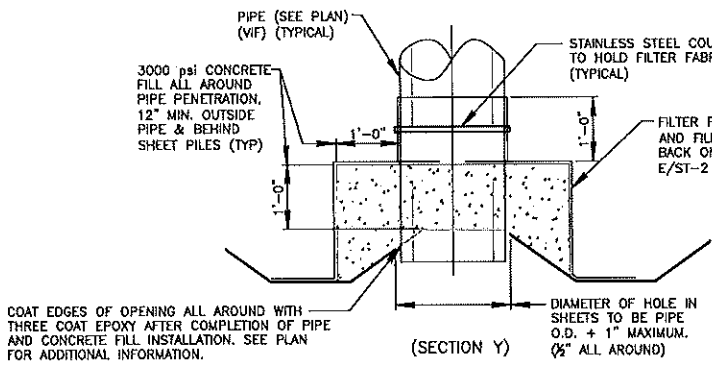
Phone: 732.383.1950
Fax: 732.383.1984

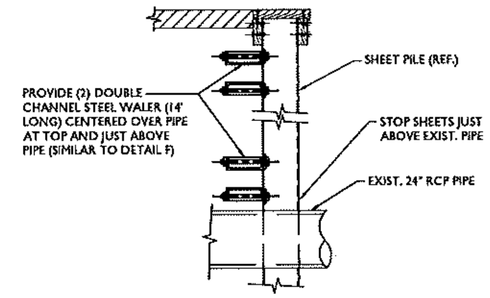
SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/02/19	TEK	RCM
PROJECT NUMBER	DRAWING NAME		
17004182B	C-SESC-HANC		

SHEET TITLE: SOIL EROSION & SEDIMENT CONTROL DETAILS & NOTES

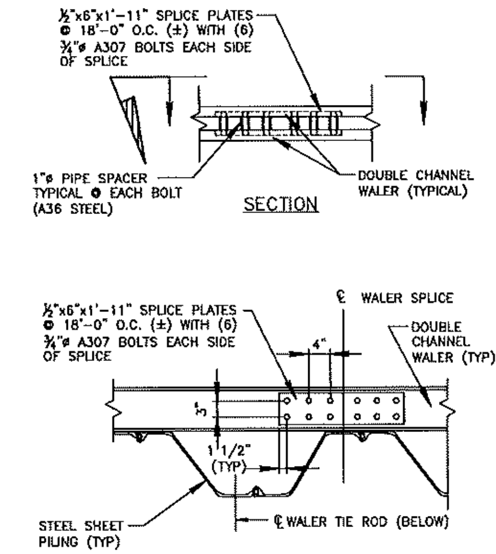
SHEET NUMBER: SE - 4



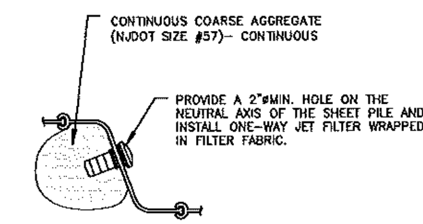
DETAIL A
TYPICAL STORM DRAIN PENETRATION DETAIL
NOT TO SCALE



DETAIL B
WALER DETAIL AT HANCE
(SCALE: N.T.S.)

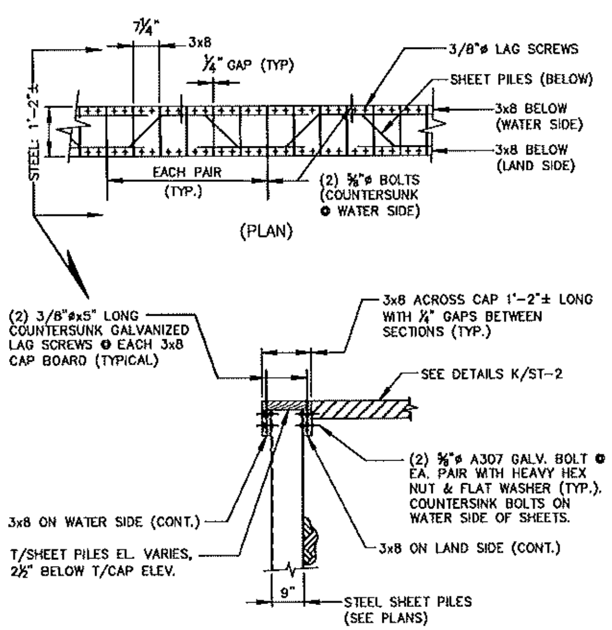


DETAIL C
TYPICAL WALER SPLICE PLATE DETAIL
(SCALE: 3/4" = 1'-0")

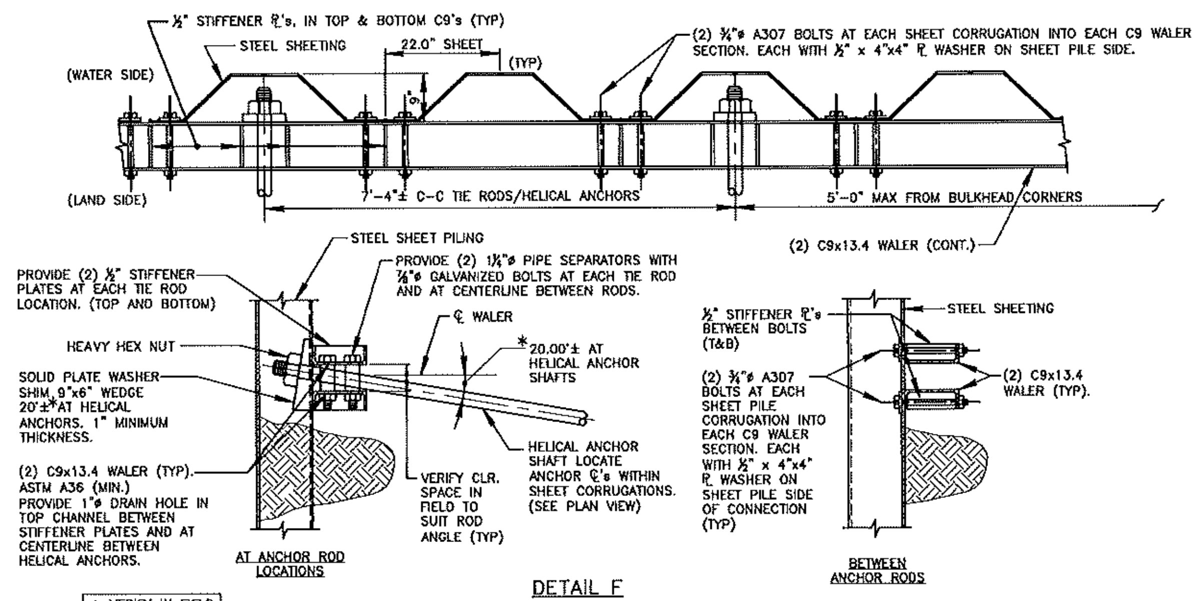


DETAIL D
TYPICAL SHEET PILE JET FILTER DETAIL
(NOT TO SCALE)

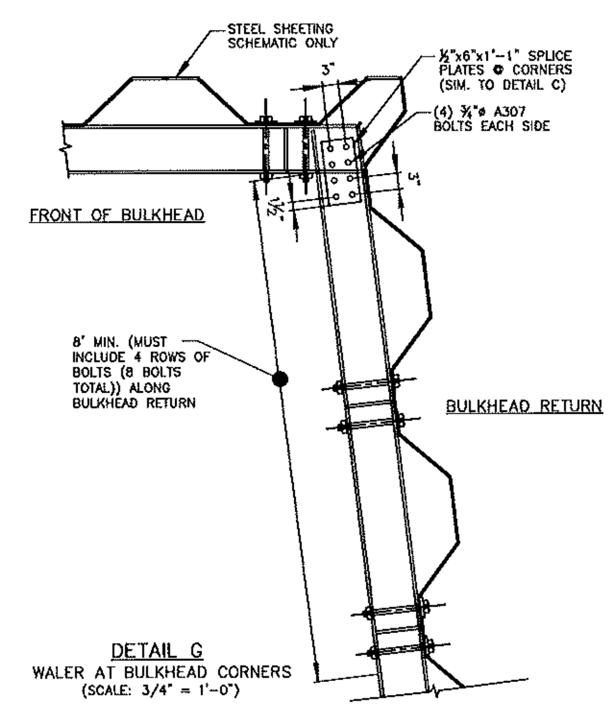
TIDAL RANGE		
	NAVD	MLW
MHHW	2.09'	3.71'
MHW	1.79'	3.41'
MTL	0.9'	1.71'
NAVD88	0.00'	1.62'
MLW	-1.62'	0.00'
MLLW	-1.74'	-0.12'



DETAIL E
TYPICAL TIMBER CAP AT BULKHEAD
(SCALE: 1/2" = 1'-0")



DETAIL F
WALER & ANCHOR ROD DETAIL
(SCALE: 3/4" = 1'-0")



DETAIL G
WALER AT BULKHEAD CORNERS
(SCALE: 3/4" = 1'-0")

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NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS
FOR
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BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

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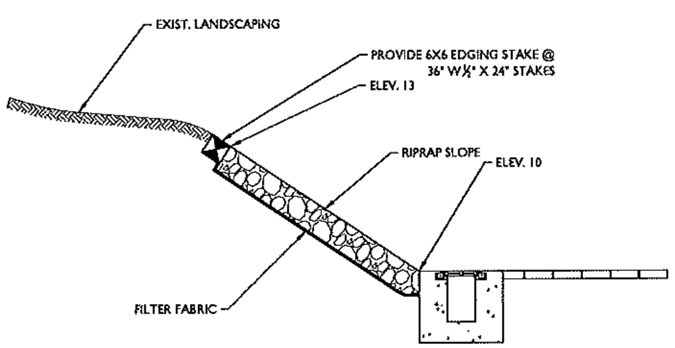
PROJECT NUMBER	DRAWING NAME
17004982B	C-DTLS

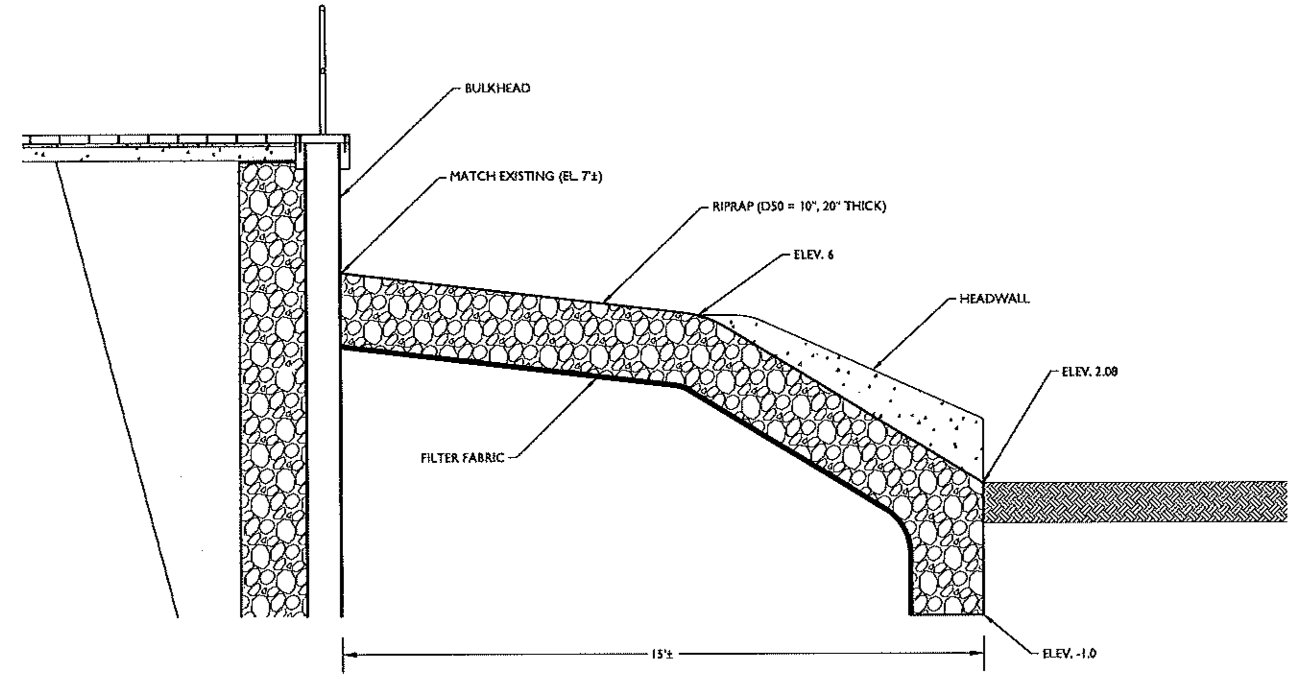
SHEET TITLE: BULKHEAD DETAILS

SHEET NUMBER: ST-1



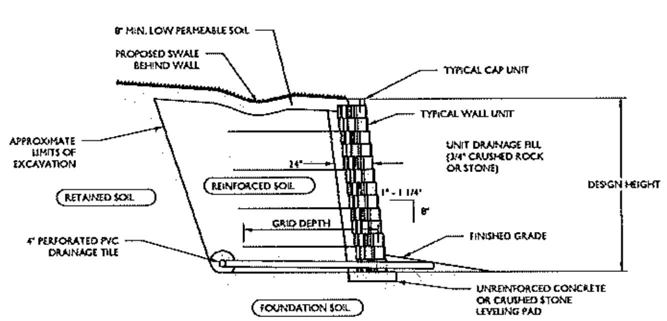
DETAIL H

GRANGE AVENUE RIPRAP SLOPE TO DRAIN
NOT TO SCALE



DETAIL I

HANCE ROAD RIPRAP SECTION

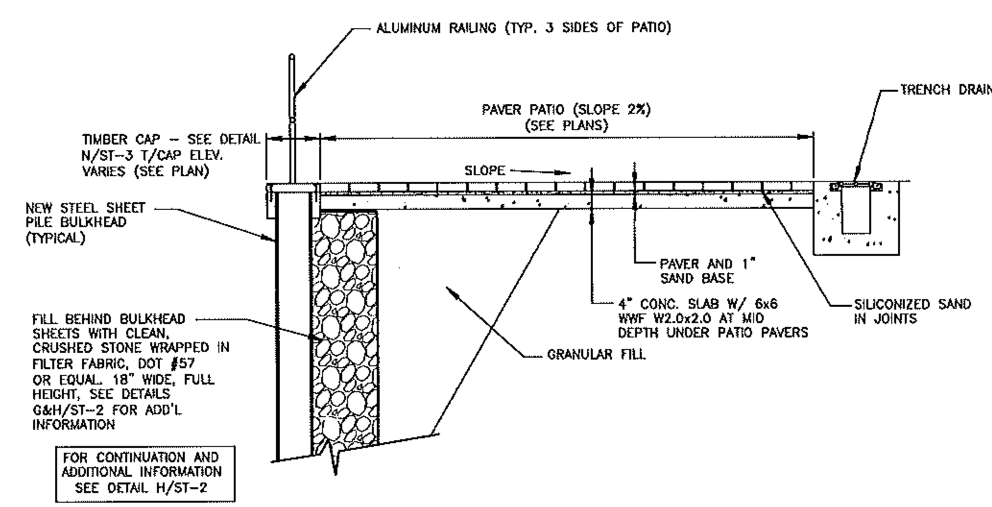


NOTES:

1. WHEN SITE CONDITIONS REQUIRE, WRAP DRAINAGE TILE IN 3/4" AGGREGATE AND FILTER FABRIC WITH DRAINAGE COMPOSITE OR AGGREGATE BACK DRAIN SYSTEM.
2. MODULAR CONCRETE BLOCK WALL TO BE INSTALLED IN FIELD IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. CONTRACTOR TO PROVIDE SITE SPECIFIC SHOP DRAWINGS AND STRUCTURAL DESIGN CALCULATIONS FOR EACH RETAINING WALL PREPARED BY A STATE LICENSED PROFESSIONAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

DETAIL J

TYPICAL SEGMENTED WALL SECTION
NOT TO SCALE



DETAIL K

TOP OF BULKHEAD & PATIO SECTION
(SCALE: 1/2" = 1'-0")

NOTES:

1. ALL NEW FILL, BACKFILL, & DISTURBED SOIL SHALL BE COMPACTED IN 8" LIFTS TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST IN ACCORDANCE WITH ASTM D-1557. COMPLIANCE MUST BE SHOWN THROUGH TESTING PERFORMED BY A CERTIFIED COMPACTION TESTING PROVIDER. MINIMUM OF 2 TESTS MUST BE PERFORMED AT EACH LIFT. ALL TESTING MUST BE PROVIDED TO AND APPROVED OF BY ENGINEER PRIOR TO FURTHER LIFTS BEING INSTALLED. ALL TESTING IS AT CONTRACTORS EXPENSE.

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RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

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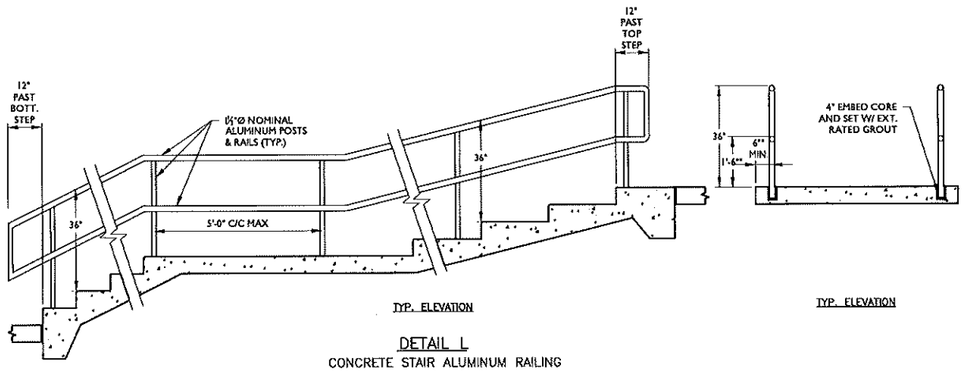
PROJECT NUMBER	DRAWING NAME
17004102B	C-DTLS

SHEET TITLE: BULKHEAD SECTION & DETAILS

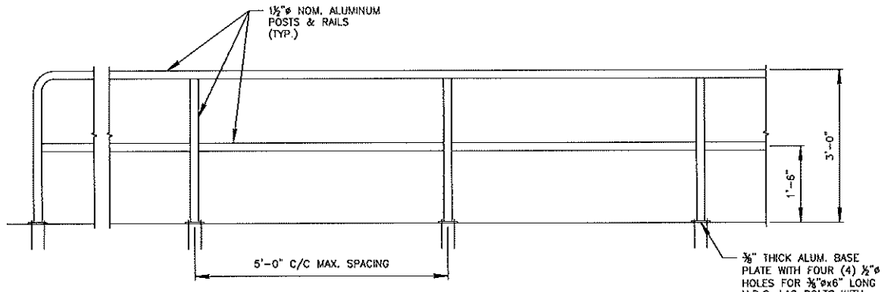
SHEET NUMBER: ST-2



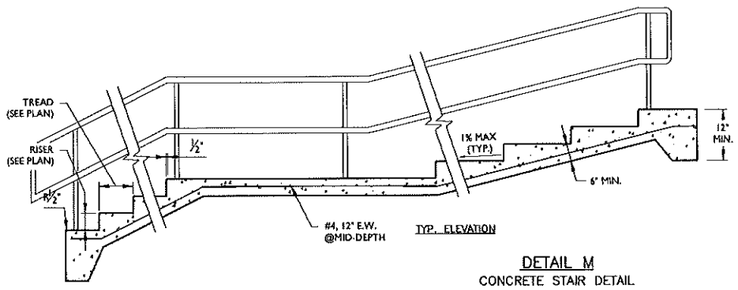
TYP. ELEVATION

TYP. ELEVATION

DETAIL L
CONCRETE STAIR ALUMINUM RAILING
SCALE: ½"=1'-0"
NOTE: REFERENCE PLANS FOR LOCATIONS



DETAIL N
BULKHEAD ALUMINUM RAILING
SCALE: 3/4" = 1'-0"
NOTE:
SEE STRUCTURAL NOTES FOR ADDITIONAL INFORMATION



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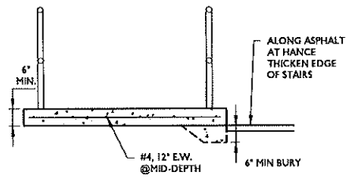
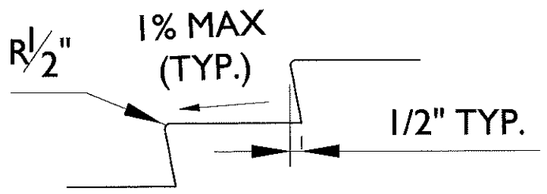


TYP. ELEVATION

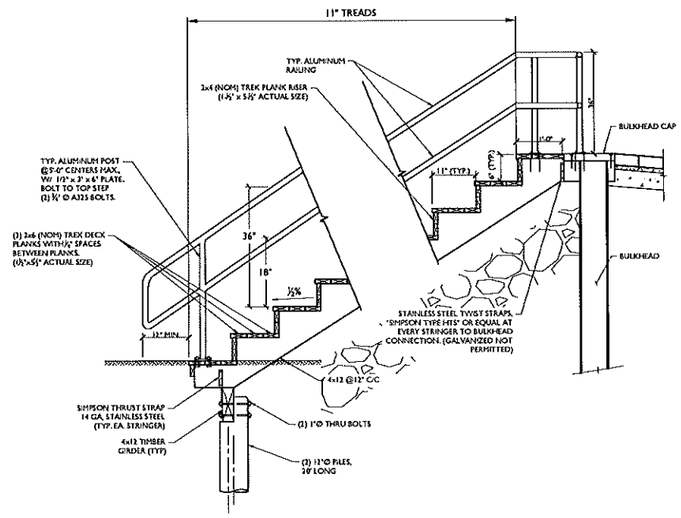
DETAIL M
CONCRETE STAIR DETAIL
SCALE: ½"=1'-0"

NOTE:

PROVIDE CONTRACTION JOINT AT 6' ON CENTER AND EXPANSION JOINT AT 18' ON CENTER.



CONCRETE STAIR TREAD
SCALE: NOT TO SCALE



DETAIL O
TIMBER STAIR DETAIL
(NOT TO SCALE)

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RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39033

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BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP
BOROUGH OF FAIR HAVEN
MONMOUTH COUNTY
NEW JERSEY

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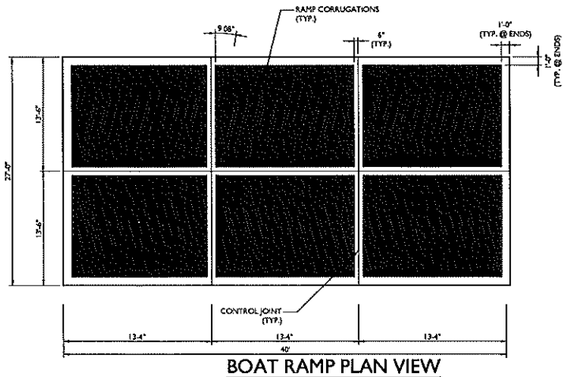
SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/2019	TEK	RCM
PROJECT NUMBER	DRAWING NAME		
17004103	C-DTLS		

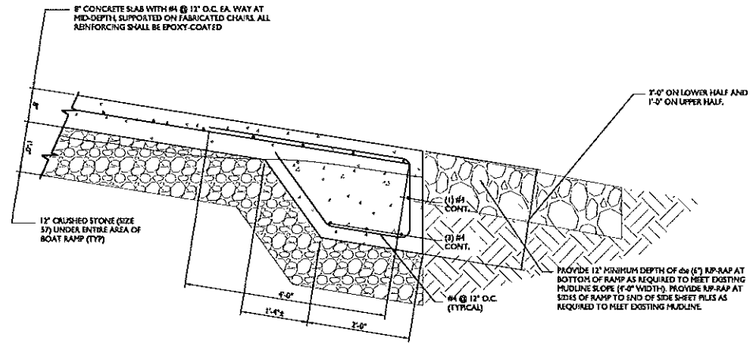
SHEET TITLE
STAIR DETAILS

SHEET NUMBER
ST-3



BOAT RAMP PLAN VIEW

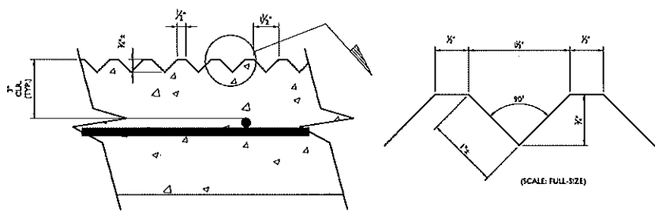
SCALE: N.T.S.



RAMP TURNDOWN DETAIL

SCALE: ¾" = 1'-0"

NOTE: TOP OF RAMP AND SIDES BEYOND BULKHEAD SIMILAR.

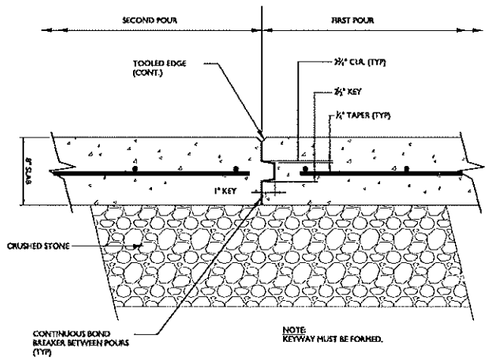


TYPICAL RAMP CORRUGATION DETAIL

SCALE: 3" = 1'-0"

NOTE:

PRIOR TO START OF RAMP CONSTRUCTION, CONTRACTOR SHALL SUBMIT TO ENGINEER FOR APPROVAL A SAMPLE OF THE SCREED PROPOSED FOR USE TO CREATE RAMP CORRUGATED SURFACE. CONTRACTOR SHALL PREPARE AT SITE A 6'-0"x6'-0" MIN. SAMPLE MOCK-UP OF CONCRETE SURFACE AS FORMED WITH SCREED FOR ENGINEER'S ACCEPTANCE AND APPROVAL PRIOR TO POURING RAMP.



RAMP CONTROL JOINT DETAIL

SCALE: 1½" = 1'-0"

NOTE:
ALL RAMP JOINTS ARE COLD JOINTS FROM 2 SEPARATE POURS. CONCRETE BOAT RAMP MAY BE POURED IN A CHECKER BOARD POUR SEQUENCE.

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REV	DATE	DRAWN BY	DESCRIPTION
1	07/2019	TEK	FINAL PLAN SUBMITTAL
2	01/2020	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	08/2020	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS
FOR
BULKHEAD REPLACEMENT
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SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	4/2019	TEK	RCM

PROJECT NUMBER: 170041028
DRAWING NAME: C-DTLS

SHEET TITLE:
BOAT RAMP DETAILS

SHEET NUMBER:
ST-4

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE NEW JERSEY UNIFORM CONSTRUCTION CODE (NJUCC), BASED ON IBC 2018, WHICH IS THE ADOPTED BUILDING CODE FOR THE PROJECT SITE, AND ITS REFERENCE DOCUMENT, ASCE 7-16, "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES".
2. ALL ASPECTS OF THE WORK ALSO SHALL BE IN COMPLETE ACCORDANCE WITH THE REQUIREMENTS AND DIRECTIVES OF THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, AND ALL GRANTED PERMITS (SEE SPECIFICATIONS).
3. CONTRACTOR SHALL PROVIDE TEMPORARY BRACING AS REQUIRED TO SUPPORT LOADS WHICH NEW AND EXISTING STRUCTURES MAY BE SUBJECTED TO DURING CONSTRUCTION.
4. CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL EXISTING CONDITIONS, ELEVATIONS, ANGLES, AND DIMENSIONS IN FIELD. ANY UNUSUAL CONDITIONS OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE PURCHASE, FABRICATION, OR ERECTION OF ANY MATERIALS.
5. CONTRACTOR SHALL SUBMIT FOR ENGINEER'S REVIEW, ERECTION DRAWINGS AND DETAILED SHOP DRAWINGS FOR ALL STRUCTURAL MATERIALS INCLUDING:

   A. SHEET PILE SECTIONS
   B. SECTIONS AND FABRICATIONS
   C. DATA SHEETS ON ALL STRUCTURAL MATERIALS, COATINGS, TREATMENTS, AND ADHESIVES
   D. ALL SITE IMPROVEMENT ITEMS

EXCAVATION, FOUNDATION AND BACKFILLING

1. ALL FOUNDATIONS SHALL BE FOUNDED ON FIRM, UNDISTURBED SOIL. ALL SOFT SPOTS OR OVER-EXCAVATION OF FOOTINGS SHALL BE FILLED WITH ACCEPTABLE FILL MATERIAL AND COMPACTED TO 95% MODIFIED PROCTOR DENSITY. ALL FOOTING EXCAVATIONS SHALL BE FINISHED BY HAND.
2. BACKFILL SHALL BE PLACED IN 8-INCH MAXIMUM LIFTS AND COMPACTED TO A MINIMUM DENSITY OF 95% (UNDER SLABS-ON-GRADE NEW PAVEMENT AND FOOTINGS) AND 90% ELSEWHERE OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D1557 MODIFIED PROCTOR. UNLESS NOTED OTHERWISE.
3. COMPLIANCE MUST BE SHOWN THROUGH TESTING PERFORMED BY A CERTIFIED COMPACTION TESTING PROVIDER. A MINIMUM OF 2 TESTS PER LIFT MUST BE PERFORMED. ALL TEST RESULTS MUST BE PROVIDED TO AND APPROVED OF BY THE ENGINEER PRIOR TO FURTHER INSTALLATION OF LIFTS.
4. THE COMPACTION AND TESTING OF THE BACKFILL DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. BACKFILL SHALL CONSIST OF NON-EXPANSIVE, FREE-DRAINING, WELL GRADED SAND AND GRAVEL, FREE OF DEBRIS AND ORGANIC MATERIAL. EXCAVATED SITE MATERIALS MAY BE REUSED IF AT PROPER MOISTURE CONTENT AND FREE OF DEBRIS.
6. CONTRACTOR WILL BE RESPONSIBLE FOR, AND SHALL SAFEGUARD AND PROTECT, ALL EXCAVATIONS AND EXISTING STRUCTURES DURING CONSTRUCTION OF FOUNDATIONS BY PROPER SAFEGUARDS WHICH MAY INCLUDE BRACING.
7. ALL EXCAVATIONS SHALL CONFORM WITH CURRENT OSHA REQUIREMENTS AND STANDARDS.
8. THE DESIGN AND OPERATION OF THE GROUNDWATER CONTROLS DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
9. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

FILTER FABRIC FOR BULKHEAD CONSTRUCTION

1. FILTER FABRIC SHALL BE PROVIDED FOR CONSTRUCTION OF BULKHEAD AT AREAS AS SHOWN ON THE DESIGN DRAWINGS, INCLUDING BUT NOT LIMITED TO:
   - 1.1. ISOLATION AND CONTROL OF GRANULAR FILL MATERIALS BEHIND NEW BULKHEAD SHEET PILES.
   - 1.2. CLOSURE AT INTERFACES BETWEEN NEW SHEET PILE BULKHEAD CONSTRUCTION AND EXISTING BULKHEADS.
2. FILTER FABRIC SHALL BE A NON-WOVEN CIVIL ENGINEERING FABRIC MATERIAL (GEOTEXTILE) WITH THE FOLLOWING MINIMUM MATERIAL PROPERTIES:

2.1.	GRAB TENSILE STRENGTH (ASTM D4632):	80LB
2.2.	GRAB TENSILE ELONGATION (ASTM D4632):	50%
2.3.	MULLEN BURST (ASTM D3786):	150 PSI
2.4.	PUNCTURE (ASTM D4833):	45 LB
2.5.	TRAPEZOID TEAR (ASTM D4533):	35 LB
2.6.	UV RESISTANCE @ 500hr (ASTM D4355):	70%
2.7.	APPARENT OPENING SIZE (US SIEVE) (ASTM D4751):	70

3. COMPLETE MANUFACTURER'S DATA ON FILTER FABRIC (GEOTEXTILE) MATERIAL SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO PROCUREMENT OR INSTALLATION OF MATERIAL.
4. ALL ASPECTS OF MATERIAL STORAGE, HANDLING, AND INSTALLATION SHALL BE IN COMPLETE ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.

SOLAR STAIR LIGHTS

1. LIGHT FIXTURE ALONG STAIRS SHALL BE SOLAR-POWERED STAINLESS STEEL DECK LIGHTS.
2. FIXTURE SHALL BE "SOLAR POWER 5 3/4"W STAINLESS STEEL DECK LIGHTS" STYLE #6V956" BY LAPS PLUS, (www.lampsplus.com), OR EQUAL AS APPROVED BY THE ENGINEER.
3. LIGHTS SHALL BE AFFIXED TO THE STEPS USING STAINLESS STEEL MOUNTING SCREWS AS DIRECTED BY THE MANUFACTURER.

NOTE:

REFER TO THE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION ON ALL STRUCTURAL MATERIALS. IF ANY CONFLICTS EXIST BETWEEN PLANS AND SPECIFICATIONS, THE MORE STRINGENT SHALL GOVERN.

TIMBER PILES:

1. TIMBER PILES SHALL BE SOUTHERN YELLOW PINE MATERIAL, IN ACCORDANCE WITH ASTM D25, CLASS B.
2. TIMBER PILES SHALL BE AIR-SEASONED PRIOR TO KILN DRYING.
3. TIMBER PILES SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH AWPA STANDARD U1-05, AS FOLLOWS:
   - A. AWPA USE CATEGORY: UC5B (SALT WATER EXPOSURE)
   - B. COMMODITY (U1-05, TABLE 3-1): PILES, ROUND
   - C. TREATMENT CHEMICAL: CCA
   - D. MINIMUM RETENTION: 2.5 PCF (TABLE 3.0)
   - E. TREATMENT WITH CCA SHALL INCLUDE POST-TREATMENT FIXATION PROCESS.
4. TIMBER PILES SHALL HAVE MINIMUM TIP DIAMETER OF 8" AND BUTT DIAMETER OF 12" IN ALL LOCATIONS UNLESS OTHERWISE NOTED.
5. LENGTH OF PILES SHALL BE AS REQUIRED TO ATTAIN TOP ELEVATIONS AS SHOWN ON THE DRAWINGS.
6. TIMBER PILES SHALL HAVE THE FOLLOWING MINIMUM LOAD CAPACITIES:
   - A. VERTICAL: 4-TON (8000 LBS)
7. TIMBER PILES SHALL BE DRIVEN TO THE DEPTHS NOTED ON THE PLANS.
8. ALL PILES SHALL BE DRIVEN BY AN APPROVED GRAVITY, STEAM, OR DIESEL HAMMER. PILE DRIVING HAMMER SHALL HAVE RATED ENERGY OF 15,000 FOOT-POUNDS PER BLOW (MINIMUM). JETTING OF PILES IS NOT PERMITTED. IF EXTREMELY HARD DRIVING MATERIALS EXIST AND CONDITIONS PERSIST, CONTRACTOR SHALL CONTACT THE ENGINEER TO DETERMINE POSSIBLE LIMITED USE OF JETTING.
9. APPROPRIATE PILE CUSHIONING SHALL BE PROVIDED DURING PILE DRIVING, IN ACCORDANCE WITH THE PILE SUPPLIER'S RECOMMENDATIONS, AND AS APPROVED BY THE ENGINEER.
10. PILES SHALL BE DRIVEN VERTICALLY (PLUMB). CONTRACTOR SHALL USE PILING GUIDE AS NECESSARY TO ENSURE PILING IS INSTALLED PLUMB.
11. TOLERANCE FOR PILE SETTING AND HORIZONTAL LOCATION SHALL BE ±2" IN ANY DIRECTION. TOLERANCE FOR PLUMBNESS OF PILES SHALL BE 1" PER 10' OF PILE LENGTH.
12. PILE DRIVING LOGS SHALL BE MAINTAINED BY QUALIFIED PERSONNEL AND SUBMITTED TO THE ENGINEER.

TIMBER FRAMING:

1. ALL ASPECTS OF TIMBER CONSTRUCTION SHALL BE IN COMPLETE ACCORDANCE WITH THE REQUIREMENTS OF THE "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" (NDS), LATEST EDITION, AS PUBLISHED BY THE AMERICAN FOREST & PAPER ASSOCIATION AND THE AMERICAN WOOD COUNCIL.
2. MATERIALS:
   - A. TIMBER - SOUTHERN YELLOW PINE, No.2 GRADE OR BETTER FOR ALL TIMBER FRAMING, INCLUDING STAIRS, AND BULKHEAD CAP. ALL TIMBER FRAMING SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH NOTE #3, BELOW.
   - B. HARDWARE - ALL STUDS, BOLTS, NUTS, AND WASHERS FOR TIMBER FRAMING SHALL BE ASTM A307, HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A153, UNLESS OTHERWISE NOTED. PLATES, STRAPS, AND ANGLES SHALL BE ASTM A36 STEEL, HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123, UNLESS OTHERWISE NOTED.
3. ALL TIMBER FRAMING SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH "AMERICAN WOOD PRESERVERS ASS'N. (AWPA) STANDARDS 2005", STANDARD U1-05, AS FOLLOWS:
   - A. ALL TIMBER FRAMING AT BULKHEAD CAPS, AND STAIRS EXCEPT AS SPECIFICALLY NOTED IN "B", BELOW:
     - (1) AWPA USE CATEGORY: UC-5B (SALT WATER EXPOSURE)
     - (2) COMMODITY (U1-05, TABLE 3-1): LUMBER / TIMBERS
     - (3) CCA PRESERVATIVE TREATMENT WITH A RETENTION OF 2.5 LBS/CuFt SHALL BE PROVIDED PER U1-05, TABLE 3.0
     - (4) NO SUBSTITUTIONS OF OTHER TREATMENTS SHALL BE PERMITTED.
   - B. TIMBER CAP TOP PLANK SECTIONS AT BULKHEAD:
     - (1) AWPA USE CATEGORY: UC-4B (SALT WATER SPRAY)
     - (2) COMMODITY (U1-05, TABLE 3-1): LUMBER / TIMBERS
     - (3) ACQ PRESERVATIVE TREATMENT WITH A RETENTION OF 0.6 LBS/CuFt SHALL BE PROVIDED PER U1-05, TABLE 3.0
     - (4) NO SUBSTITUTIONS OF OTHER TREATMENTS SHALL BE PERMITTED.
4. ALL FIELD CUTS SHALL BE FIELD-TREATED WITH PRESERVATIVE TREATMENT IN ACCORDANCE WITH APPLICABLE AWPA STANDARDS AND PROCEDURES.
5. ALL STEEL HARDWARE, NAILS, SCREWS AND BOLTS SHALL BE OF SUFFICIENT LENGTH FOR THEIR INTENDED USE. ALL BOLTS SHALL INCLUDE FLAT WASHERS AND HEAVY HEX NUTS.
6. ALL STEEL FASTENERS, BOLTS, WASHERS, NUTS, LAG BOLTS, PLATES, ANGLES AND OTHER CONNECTION HARDWARE SHALL BE HOT-DIP GALVANIZED PER ASTM STANDARDS A123 OR A153, WITH 20 OZ. OF ZINC PER SQUARE FOOT, UNLESS OTHERWISE SPECIFIED TO BE STAINLESS STEEL.
7. ALL LAG BOLTS SHALL BE INSTALLED USING PILOT AND CLEARANCE HOLES IN CONNECTED TIMBER ELEMENTS IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF NDS SECTION 11.1.3. (G = 0.55)
8. ALL SCREWS SHALL BE STAINLESS STEEL SIZES AS SHOWN, OR SUITABLE FOR THE CONNECTED ELEMENTS.
9. PREFABRICATED TIMBER CONNECTORS:
   - A. CONTRACTOR SHALL SUBMIT COMPLETE DATA ON ALL PREFABRICATED TIMBER CONNECTORS FOR REVIEW BY THE ENGINEER. SUBMITTED DATA SHALL INCLUDE LOAD CAPACITIES FOR ALL CONNECTORS.
   - B. CONNECTOR SIZES AND TYPES SHALL BE AS SHOWN ON THE DESIGN DRAWINGS AND DETAILS.
   - C. CONNECTORS SHALL BE INSTALLED USING ALL FASTENERS AS RECOMMENDED BY THE MANUFACTURER FOR THE PUBLISHED LOAD CAPACITIES.
   - D. TWIST STRAPS FOR CONNECTION OF PIER JOISTS TO GIRDERS SHALL BE 14 ga. STAINLESS STEEL, TYPE 304. MANUFACTURER'S STANDARD ELECTRO-GALVANIZED OR HOT-DIP GALVANIZED CONNECTORS WILL NOT BE ACCEPTED.
     - (1) AT CONTRACTOR'S OPTION, AND WITH SPECIFIC APPROVAL OF THE ENGINEER, 1/4" THICK x 1 1/4" WIDE HOT-DIP GALVANIZED STEEL TWIST STRAPS MAY BE SUBSTITUTED FOR PREFABRICATED STAINLESS STEEL STRAPS.
       - (a) STRAPS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM STANDARD A123.
       - (b) HOT-DIP GALVANIZED TWIST STRAPS SHALL BE SECURED WITH A TOTAL OF (4) 3/4"Ø x 2" LAG BOLTS, (2) INTO EACH WOOD MEMBER. LAG BOLTS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM STANDARD A153.
10. BOLTS LOCATED TOWARDS THE WATER SHALL BE RECESSED OR OTHERWISE PROTECTED AND SHALL NOT BE EXPOSED OR EXTEND PAST THE FACES OF THE TIMBER FRAMING TO REDUCE THE POSSIBILITY OF DAMAGE TO BOATS. SEE STRUCTURAL DETAILS FOR RECESSES AND BOLT PROTECTION.

CONCRETE AND REINFORCING

1. ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF ACI 318 AND "SPECIFICATIONS FOR CONCRETE BUILDINGS" ACI 301, LATEST EDITIONS.
2. ALL CONCRETE SHALL HAVE MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI, UNLESS OTHERWISE NOTED. CONCRETE BOAT RAMP TO BE 5,000 PSI. CONCRETE SHALL BE AIR-ENTRAINED IN ACCORDANCE WITH ACI STANDARDS. MAXIMUM SLUMP SHALL BE 4 INCHES. ALL CONCRETE SHALL BE NORMAL WEIGHT, U.N.O.
3. ALL REINFORCING STEEL FOR CONCRETE AND MASONRY CONSTRUCTION SHALL CONFORM WITH ASTM A615, GRADE 60. ALL REINFORCING STEEL SHALL BE HOT DIPPED GALVANIZED OR EPOXY-COATED IN ACCORDANCE WITH ASTM A775.
4. ALL REINFORCING BARS SHALL BE SPLICED A MINIMUM OF 40 BAR DIAMETERS. ALL REINFORCING BARS SHALL BE CONTINUOUS AROUND CORNERS.
5. WELDED WIRE FABRIC (WWF) SHALL CONFORM WITH ASTM A185. WIRE FABRIC SHALL BE TIED WITH WIRE AND OVERLAPPED TWO SQUARES AT EDGES. ALL WWF SHALL BE HOT DIPPED GALVANIZED OR EPOXY-COATED IN ACCORDANCE WITH ASTM A884.
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED OVER REINFORCEMENT, UNLESS OTHERWISE NOTED ON THE DRAWINGS:
   - A. CONCRETE CAST AGAINST EARTH: 3 INCHES
   - B. CONCRETE EXPOSED TO EARTH OR WEATHER: 2 INCHES
   - C. CONCRETE NOT EXPOSED TO EARTH OR WEATHER: 1 INCH
7. ALL REINFORCING SHALL BE DETAILED, FABRICATED, AND SUPPORTED IN FORMS AND SPACED WITH ACCESSORIES FOLLOWING THE REQUIREMENTS OF THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315. PLACING OF BARS SHALL CONFORM TO THE LATEST CRSI RECOMMENDED PRACTICES FOR PLACING REINFORCING BARS.
8. NO ADMIXTURE SHALL BE ALLOWED WITHOUT PRIOR APPROVAL OF THE ENGINEER. THE USE OF CALCIUM CHLORIDE IS PROHIBITED.
9. AFTER CONCRETING HAS STARTED, IT SHALL BE CARRIED ON AS A CONTINUOUS OPERATION UNTIL PLACING OF A PANEL OR SECTION, AS DEFINED BY ITS BOUNDARIES OR PREDETERMINED JOINTS, IS COMPLETED.
10. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY SUITABLE MEANS SUCH AS MECHANICAL VIBRATION DURING PLACEMENT AND THOROUGHLY WORKED AROUND REINFORCEMENT.
11. FINISH CONCRETE IN ACCORDANCE WITH "FINISHING OF FORMED SURFACES", OF ACI 301. FOUNDATION WALL SHALL BE SMOOTH-FORMED FINISH, UNLESS OTHERWISE NOTED. SEE NOTE #14, BELOW.
12. GROUT SHALL BE A NON-SHRINK, NON-METALLIC, CEMENTITIOUS GROUT, AS APPROVED BY THE ENGINEER.
13. ALL BOLTS, SLEEVES, AND OTHER EMBEDDED ITEMS SHALL BE SET BEFORE CONCRETE IS PLACED. SEE MECHANICAL, ELECTRICAL, AND VENDORS' DRAWINGS FOR SIZES AND LOCATIONS.

CONCRETE CURING

1. PROPER CURING OF CONCRETE IS OF THE UTMOST IMPORTANCE. BEGINNING IMMEDIATELY AFTER PLACEMENT, CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY AND SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT A RELATIVELY CONSTANT TEMPERATURE FOR AT LEAST 7 DAYS. THE MATERIALS AND METHODS OF CURING SHALL BE SUBJECT TO ACCEPTANCE BY THE ENGINEER. UNSATISFACTORY FINISHED CONCRETE THAT RESULTS FROM FAILURE TO FOLLOW THE SPECIFIED CURING PROCEDURES MAY BE REQUESTED BY THE OWNER OR ENGINEER TO BE REMOVED AND REPLACED. ALL COSTS ASSOCIATED WITH REMOVAL AND REPLACEMENT OF CONCRETE WORK SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. SLABS - IT IS MANDATORY THAT 7 DAYS OF WET CURING ON ALL MAT SLABS AND FORMED SLABS BE PERFORMED. USE SOAKER HOSE, WET BURLAP AND PLASTIC SHEETS OVER BURLAP ON ALL EXPOSED SURFACES FOR 7 DAYS MINIMUM.
3. COLD WEATHER - WHEN THE MEAN DAILY OUTDOOR TEMPERATURE IS LESS THAN 40°F, THE TEMPERATURE OF THE CONCRETE SHALL BE MAINTAINED BETWEEN 50°F AND 70°F FOR THE REQUIRED CURING PERIOD. WHEN NECESSARY, ARRANGEMENTS FOR HEATING, COVERING, INSULATING, OR HOUSING THE CONCRETE WORK SHALL BE MADE IN ADVANCE OF PLACEMENT AND SHALL BE ADEQUATE TO MAINTAIN THE REQUIRED TEMPERATURE WITHOUT INJURY TO THE CONCRETE DUE TO CONCENTRATION OF HEAT.
4. HOT WEATHER - WHEN NECESSARY, PROVISION FOR WINDBREAKS, SHADING, AND/OR COVERING WITH A LIGHT-COLORED MATERIAL SHALL BE MADE IN ADVANCE OF CONCRETE PLACEMENT. SUCH PROTECTIVE MEASURES SHALL BE TAKEN AS QUICKLY AS CONCRETE HARDENING AND FINISHING OPERATIONS WILL ALLOW. TEMPERATURE OF CONCRETE AT PLACEMENT SHALL NOT EXCEED 85°F.

STEEL SHEET PILES

1. STEEL SHEET PILING FROM NUCOR COMPANY SKYLINE STEEL OR EQUAL SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

   PZ-22:

SHEET WIDTH (SINGLE) =	22.0 IN.
SHEET CORRUGATION HEIGHT =	9.0 IN.
SHEET THICKNESS =	0.375 IN.

   PZ-35:

SHEET WIDTH (SINGLE) =	22.6 IN.
SHEET CORRUGATION HEIGHT =	14.9 IN.
SHEET THICKNESS =	0.500 IN.

2. ALL STEEL SHEET PILES SHALL BE SHOP COATED WITH THE FOLLOWING COATING SYSTEM BY PPG OR EQUAL:
   - 2.1. THE FIRST/SECOND COAT SHALL BE TWO COATS OF AMERCOAT 240 (MINIMUM 10-12mils PER COAT.
   - 2.2. THE THIRD COAT SHALL BE ONE COAT OF AMERCOAT 450H (MINIMUM 3mils PER COAT).
3. AFTER BULKHEAD INSTALLATION, COAT TOP 6" OF ALL SHEETS (FRONT, TOP & REAR) WITH MINIMUM OF 16MIL BITUMINOUS COATING OVER EXISTING COATING. EXCEPT OF SECTION 2 BULKHEAD, WHERE TOP SHOULD BE REPAIRED PER NOTE BELOW.
4. REPAIR ALL OTHER AREAS OF COATING THAT WERE DAMAGED DURING DELIVERY AND INSTALLATION AT ALL PENETRATIONS AND BOLT HOLES IN SHEETING WITH ORIGINAL COATING SYSTEM (3 COATS).
5. ALL STEEL SHEET PILING SHALL BE ASTM A572 GRADE 50 STEEL (Fy = 50 KSI MINIMUM). ALL STEEL SHEET PILING SHALL BE HOT ROLLED.
6. CONTRACTOR SHALL USE A DRIVING TEMPLATE FOR DRIVING STEEL SHEET PILING.
7. DRIVING OF PILES IN PAIRS IS RECOMMENDED TO FACILITATE DRIVING AND HELP MAINTAIN VERTICALITY OF PILES.
8. PILING SHOULD BE DRIVEN WITH THE BALL EDGE LEADING WHERE POSSIBLE, TO AVOID CLOGGING OF SOCKET END DURING DRIVING. WHEN CONDITIONS REQUIRE THAT SOCKET END LEAD, A BOLT OR SIMILAR OBJECT SHOULD BE PLACED IN BOTTOM OF SOCKET TO MINIMIZE CLOGGING.
9. CUT OFF EXCESS MATERIAL ALONG TOP OF DRIVEN SHEET PILE AFTER INSTALLATION. HANDLING HOLES MUST BE IN THE TOP 8" OF SHEET IN AREAS WHERE A CAP IS SPECIFIED. IN AREAS WITHOUT A CAP, HOLES SHALL BE COVERED WITH A WELDED 1/4" THICK PLATE. COAT W/ 16mils BITUMINOUS COATING.
10. SHEET PILE ANCHORAGE SYSTEMS:
    - A. SHEET PILE ANCHORAGE SYSTEM SHALL INCLUDE STEEL CHANNEL WALER SECTIONS LOCATED BEHIND THE SHEET PILES (LANDWARD SIDE). ANCHOR TIE RODS AND HELICAL ANCHORS SHALL BE LOCATED TO OCCUR WITHIN THE CORRUGATIONS OF THE SELECTED SHEET PILE PROFILE. SEE DESIGN DRAWINGS FOR ADDITIONAL INFORMATION AND CONNECTION DETAILS.
    - B. TIE RODS FROM SHEET PILE WALERS TO HELICALS:
      - a. TYPICAL BULKHEAD TIE RODS SHALL BE 1"Ø THREAD BAR TIE-RODS, GRADE 150 STEEL.
      - b. EACH ROD (TYPICAL RODS OR DIAGONALS) SHALL INCLUDE A THREAD ADAPTER FOR TENSIONING AND ADJUSTMENT OF ROD AFTER INSTALLATION. ADAPTER AND INNER AND OUTER ROD SECTIONS, SHALL BE PROVIDED WITH OPPOSITE-HAND THREADS TO PERMIT TENSIONING AND ADJUSTMENT USING ADAPTER.
      - c. ALL ELEMENTS OF TIE ROD SYSTEM, INCLUDING BUT NOT LIMITED TO RODS, ADAPTERS, WASHERS, HEX NUTS, SHIMS AND OTHER HARDWARE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 & A153 AS APPLICABLE, WITH 20 OUNCES OF ZINC PER SQUARE FOOT, MINIMUM. AFTER GALVANIZING, ALL ELEMENTS AS NOTED ABOVE SHALL ALSO BE FULLY COATED WITH COAL-TAR
    - C. THREADED ELEMENTS SHALL BE COATED WITH COAL-TAR EPOXY IN FIELD ONLY AFTER FINAL ADJUSTMENT AND TIGHTENING OF PARTS IS COMPLETED. SEE NOTES THIS SHEET FOR DETAILS OF COAL-TAR EPOXY COATING.
12. DRILLED-IN HELICAL SOIL ANCHORS
    - A. DESIGN LENGTH OF HELICAL ANCHORS FROM FACE OF BULKHEAD SHEET PILES SHALL BE 50'-0" MINIMUM, AS SHOWN IN THE DESIGN DRAWINGS.
    - B. HELICAL ANCHOR INSTALLATION ANGLE SHALL BE 20° FROM HORIZONTAL. ANCHORS SHALL BE PERPENDICULAR TO THE LINE OF THE BULKHEAD IN PLAN.
    - C. ENTIRE HELICAL ANCHOR SYSTEM SHALL BE SUPPLIED FROM THE SAME MANUFACTURER, INCLUDING SHAFTS, HELICES, AND ALL HARDWARE.
    - D. ALL DETAILS OF HELICAL ANCHOR INSTALLATION SHALL BE IN COMPLETE ACCORDANCE WITH THE DESIGN DRAWINGS, AND WITH THE MANUFACTURER'S RECOMMENDATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
      - a. ANCHOR LENGTH, LOCATION, INSTALLATION ANGLE AND SPACING ON BULKHEAD.
      - b. ANCHOR HELIX MATERIAL, DIAMETERS, THICKNESSES, AND SPACING ALONG SHAFT. NOMINAL SPACING BETWEEN HELIX PLATES SHALL BE FIVE TIMES THE DIAMETER OF THE LARGER HELIX. HELIX MATERIAL SHALL BE IN ACCORDANCE WITH ASTM A936 HOT-ROLLED HIGH STRENGTH LOW ALLOW STEEL SHEET, ASTM A656 HOT-ROLLED STRUCTURAL STEEL PLATE, OR MANUFACTURER'S STANDARD AS REQUIRED TO OBTAIN THE DESIGN LOAD CAPACITY. HELICES SHALL BE FORMED BY MATCHING METAL DIES.
      - c. ANCHOR SHAFT SIZE, CONNECTIONS, AND MATERIAL. SHAFT MATERIAL SHALL BE IN ACCORDANCE WITH ASTM A29, OR MANUFACTURER'S STANDARD AS REQUIRED TO OBTAIN THE DESIGN LOAD CAPACITY.
    - E. ALL HELICAL ANCHOR HELICES, DRIVE SHAFTS, ADAPTERS, RODS, NUTS, BOLTS, WASHERS, PLATE WASHERS, PIPE SPACERS, AND OTHER HARDWARE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 & A153 AS APPLICABLE, WITH 20 OUNCES OF ZINC PER SQUARE FOOT, MINIMUM. AFTER GALVANIZING, ALL EXPOSED ELEMENTS AT ADAPTER CONNECTION SHALL ALSO BE FULLY COATED WITH COAL-TAR EPOXY. SEE NOTES THIS SHEET FOR DETAILS OF COAL-TAR EPOXY COATING.
    - F. HELICAL ANCHORS SHALL HAVE THE FOLLOWING CAPACITIES:
      - a. ANCHOR DESIGN LOAD: 33.5 KIPS
      - b. ANCHOR ULTIMATE CAPACITY: 67.0 KIPS
    - G. INSTALLATION OF HELICAL ANCHORS SHALL BE PERFORMED BY A CONTRACTOR EXPERIENCED IN DRILLED HELICAL SOIL ANCHOR INSTALLATION, AND AS APPROVED BY THE ANCHOR MANUFACTURER.
    - H. HELICAL ANCHORS SHALL BE LOAD TESTED IN ACCORDANCE WITH THE ANCHOR MANUFACTURER'S RECOMMENDATIONS. ALL ASPECTS OF ANCHOR TESTING SHALL BE IN COMPLETE ACCORDANCE WITH THE MFGR'S RECOMMENDATIONS, INCLUDING NUMBER/FREQUENCY OF ANCHOR TESTS, TEST PROCEDURES, MAGNITUDE OF TEST LOADS, METHOD OF TEST LOAD APPLICATION, AND DURATION OF TEST LOAD APPLICATION. CONTRACTOR SHALL WAIT MINIMUM OF TWO DAYS AFTER INSTALLATION TO CONDUCT LOAD TESTING ON ANY ANCHOR.
    - I. HELICAL ANCHOR DESIGN & SHOP DRAWINGS SHALL BE SUBMITTED FOR ENGINEER APPROVAL. DESIGN AND SHOP DRAWINGS SHALL BE NEW JERSEY SIGNED AND SEALED BY THE CONTRACTORS ENGINEER.
13. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL FABRICATION AND ERECTION SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION - ALLOWABLE STRESS DESIGN", LATEST EDITION.
2. ALL STRUCTURAL STEEL "W" SHAPES SHALL CONFORM TO ASTM A992 OR A572, GRADE 50. ALL STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE "E" OR "S", GRADE B. ALL OTHER SHAPES AND PLATES SHALL CONFORM TO ASTM A36 OR A572, GRADE 50, AS NOTED. ALL PIPE SIZES ARE NOMINAL DIAMETER.
3. ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING WELDS OR STANDARD, UNFINISHED BOLTS. CONNECTION MATERIALS SHALL BE AS FOLLOWS:
   A. BOLTS SHALL CONFORM TO ASTM A325 OR EQUIVALENT.

   B. WELDS SHALL BE IN ACCORDANCE WITH THE LATEST AMERICAN WELDING SOCIETY (AWS) SPECIFICTIONS. ALL WELDING ELECTORDES SHALL BE E70 SERIES, UNLESS OTHERWISE NOTED.
4. SHOP AND FIELD WELDING SHALL BE PERFORMED BY WELDERS WHO ARE CERTIFIED(AWS "STANDARD CERTIFICATION PROCEDURE") TO PERFORM THE TYPE OF WORK REQUIRED. WELDS SHALL CONFORM TO AWS D1.1, "STRUCTURAL WELDING CODE - STEEL", LATEST EDITION. PROVIDE MINIMUM WELD SIZES PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9th EDITION, WHEN WELD SIZES ARE NOT SHOWN.
5. STEEL SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
6. THE DRAWINGS REPRESENT THE PERMANENT FRAMING AND FINAL DETAILS WHERE SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING PROPER DESIGN AND CONSTRUCTION OF FALSEWORK, TEMPORARY BRACING, SHORING, AND RECOMMENDED ERECTION PROCEDURES.
7. PAINTING:
   A. STEEL SHAPES, PLATES, AND FABRICTIONS SHALL BE COATED WITH COAL-TAR EPOXY IN ACCORDANCE WITH SSPC PAINT-16 AND THE U.S. ARMY CORPS OF ENGINEERS FORMULA C-200. ALL DETAILS OF SURFACE PREPARATION AND COATING APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.

   B. ALL HARDWARE (NUTS, BOLTS, WASHERS, ANCHOR PLATES, TIERODS, TURNBUCKLES, ETC.) SHALL BE HOT-DIP GALVANIZED AND THEN COATED WITH COAL-TAR EPOXY AS NOTED ABOVE, FIELD-INSTALLED AFTER INSTALLATION, TIGHTENING, AND ADJUSTMENT OF HARDWARE. EXPOSED TIE ROD END, NUT & PLATE SHALL NOT BE COATED WITH COAL-TAR; THESE ITEMS SHALL BE COATED WITH A PRIME & 2 COAT MARINE PRIME PAINT COATING (PPG OR SIMILAR) DESIGNED TO BE APPLIED OVER GALVANIZED STEEL. COLOR TO MATCH BULKHEAD COATING.
8. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

COAL-TAR EPOXY COATING

1. ALL STEEL PARTS OF BULKHEAD ANCHORAGE SYSTEM SHALL BE COATED WITH COAL-TAR EPOXY COATING. (SHEET PILES SHALL NOT RECEIVE COAL-TAR EPOXY COATING. SEE NOTES THIS SHEET FOR STEEL SHEET PILE COATING SYSTEM.)
2. THREADED PORTIONS OF TIE RODS, TURNBUCKLES, AND SIMILAR ELEMENTS SHALL BE COATED WITH COAL-TAR EPOXY IN FIELD, AFTER FINAL TIGHTENING AND ADJUSTMENT OF ANCHORAGE SYSTEM. ALL OTHER PORTIONS OF BULKHEAD ANCHORAGE SYSTEM SHALL BE SHOP-COATED.
3. COAL-TAR EPOXY SHALL BE IN COMPLETE ACCORDANCE WITH THE REQUIREMENTS OF THE US ARMY CORPS OF ENGINEERS FORMULA C-200, AND STEEL STRUCTURES PAINTING COUNCIL (SSPC) STANDARD "PAINT 16".
4. MINIMUM (NOT AVERAGE) DRY FILM THICKNESS (DFT) OF 16 mils IS REQUIRED ON ALL COATED ELEMENTS.
5. COAL-TAR EPOXY COATING MATERIAL SHALL BE A HIGH-BUILD, BLACK, GLOSS-FINISH SELF-PRIMING PRODUCT, WITH SOLIDS CONTENT OF 74% ±2% BY VOLUME.
6. COAL-TAR EPOXY MATERIAL SHALL MEET OR EXCEED THE FOLLOWING PERFORMANCE REQUIREMENTS:

A. ASTM D4060 (ABRASION):	130mg MAX LOSS AFTER 1000 CYCLES
B. ASTM D4541 (ADHESION):	1443 psi MINIMUM
C. ASTM D2794 (IMPACT):	100 in-lbs
D. ASTM B117 (SALT FOG):	NO BLISTERING, RUSTING OR DELAMINATION AFTER 2000 HRS.

7. ALL ASPECTS OF COATING APPLICATION, INCLUDING PRODUCT STORAGE & HANDLING, SURFACE PREPARATION, MIXING, PRODUCT APPLICATION, CURING AND PROTECTION SHALL BE IN COMPLETE ACCORDANCE WITH THE COATING MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

ALUMINUM RAILING

1. ALL ALUMINUM MATERIALS AND FABRICATION SHALL COMPLY WITH THE REQUIREMENTS OF THE ALUMINUM DESIGN MANUAL 2005, AND WITH THE ALUMINUM ASSOCIATION, INC.
2. ALUMINUM MATERIALS SHALL BE TYPE 6063-T6, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ASTM B 221 AND B 308, AS APPLICABLE.
3. WELDING OF ALUMINUM SHALL COMPLY WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY (AWS) STANDARD D1.2, "STRUCTURAL WELDING CODE - ALUMINUM". WELDING ELECTRODES FOR 6061 ALUMINUM SHALL BE ER4043, U.N.O.
4. ALL RAILING SHALL BE WELDED AND SHALL CONSIST OF ANODIZED ALUMINUM SCHEDULE 40 PIPE, 1 1/2" NOMINAL (1.90" O.D.) IN ACCORDANCE WITH ASTM B 241, TYPE 6063-T6. ALL PICKETS SHALL BE ANODIZED ALUMINUM SCHEDULE 40 PIPE, 1/2" NOMINAL (0.84" O.D.) IN ACCORDANCE WITH ASTM B 241, TYPE 6063-T6.
5. WELDING IS TO BE CONDUCTED PRIOR TO ANODIZING.
6. HANDRAILS SHALL BE DESIGNED TO WITHSTAND THE LOADS AS SPECIFIED IN NJUCC SECTION 1607.7.1.
7. HANDRAILS SHALL BE FABRICATED IN THE LARGEST SECTIONS PRACTICAL FOR SHIPPING AND HANDLING IN FIELD FOR INSTALLATION.
8. HANDRAIL EXTENSIONS AT TOP, BOTTOM, TURNS AND SWITCHBACKS SHALL BE IN ACCORDANCE WITH THE HANDRAIL REQUIREMENTS OF ANSI A117.1.
9. POST TO BE MOUNTED TO 4 1/2"x4 1/2"x3/4" THICK ALUMINUM BASE PLATE. UTILIZE FOUR (4) 3/4"Ø HOT-DIPPED GALVANIZED LAG SCREWS (6" LONG) AND RE-DRILL ALL HOLES.
10. RAILING CONTRACTOR SHALL ADD TWO (2) 3x10 BLOCKING BETWEEN OUTER JOISTS AT ALL POST LOCATIONS. PROVIDE FOUR (4) 16d TOE NAILS EACH SIDE AT EACH END OF BLOCKING (16 TOTAL PER BLOCKING)

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REV	DATE	DRAWN BY	DESCRIPTION
1	07/23/19	TEK	FINAL PLAN SUBMITTAL
2	01/17/20	TEK	REVISED PER BOROUGH & NJDEP COMMENTS
3	05/15/20	SS	ISSUED TO BID

RICHARD C. MALONEY
NEW JERSEY PROFESSIONAL ENGINEER - LICENSE NUMBER: GE39023

CONSTRUCTION PLANS FOR

BULKHEAD REPLACEMENT GRANGE AVENUE & HANCE ROAD POCKET PARKS & BATTIN ROAD BOAT RAMP

BOROUGH OF FAIR HAVEN
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SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN	6/02/19	TEK	RCM

PROJECT NUMBER	DRAWING NAME
17004982B	C-DTLS

SHEET TITLE: STRUCTURAL NOTES

SHEET NUMBER: ST-5