DOCUMENTS AND SPECIFICATIONS
CONTRACT NO. NAT201301-HYD.DREDGE

MURDERKILL RIVER
MAINTENANCE DREDGING AND BEACH NOURISHMENT

FOR

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL (DNREC)

Division of Watershed Stewardship
89 Kings Highway
Dover, Delaware, 19901
(302) 739-9921

Date: OCTOBER 4, 2013

Job No. 1945B001

Andrews Miller and Associates
A Division of Davis, Bowen & Friedel, Inc.
106 North Washington Street
Easton, Maryland 21601
(410) 770-4744

BIDS WILL BE RECEIVED AT THE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL **UNTIL 2:00 P.M., NOVEMBER 14, 2013** AND WILL BE PUBLICLY OPENED AND READ ALOUD AT THAT TIME. PROPOSALS RECEIVED AFTER THE DATE AND TIME SET FOR THE OPENING WILL BE RETURNED UNOPENED.

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NEAR
BOWERS BEACH, DE
CONTRACT NO. NAT201301 – HYD.DREDGE
ADVERTISEMENT DATES: October 15, 2013 & October 22, 2013
BID OPENING DATE: November 14, 2013

INVITATION TO BID

The Department of Natural Resources and Environmental Control, Division of Watershed Stewardship will receive sealed bids in Room B172, Richardson & Robbins Building, 89 Kings Highway, Dover, Delaware 19901, until **2:00 p.m., November 14, 2013** at which time they will be publicly opened for the following project **Murderkill River Maintenance Dredging and Beach Nourishment** near Bowers Beach, Delaware **Contract No. NAT201301 – HYD.DREDGE.**

The project includes maintenance dredging of the federal authorized channel at Murderkill River including beach nourishment of a portion of South Bowers beach using medium to coarse sand obtained from the dredging operation. Fine sands and silt will be disposed at the adjacent, historically used Overboard Disposal Area.

A pre-bid meeting will be held at **10:00 A.M., October 29, 2013** at the project's site being at the southerly jetty on South Bowers' beach. Attendance at this meeting is **mandatory** for all prospective bidders and will be pre-requisite for submitting a bid.

Proposals shall be placed in a sealed envelope clearly marked **"BID ENCLOSED", Murderkill River Maintenance Dredging and Beach Nourishment; Contract No. NAT201301 – HYD.DREDGE** and be addressed to:

Department of Natural Resources and Environmental Control
Division of Watershed Stewardship
89 Kings Highway
Dover, Delaware 19901
Attn: Mr. Charles E. Williams, II Phone: 302-739-9921

Prospective Bidders may obtain contract documents upon payment of $50.00 for each set at The Department of Natural Resources And Environmental Control, Division of Watershed Stewardship, 89 Kings Highway, Dover, DE 19901. This payment is non-refundable and the documents need not be returned.

Each bid must be accompanied by a bid guarantee equivalent to ten percent (10%) of the amount of the base bid. The bid guarantee may be a certified check or a bid bond secured by a surety authorized to do business in Delaware. The bid guarantee shall be made payable to the Department of Natural Resources and Environmental Control, Division of Watershed Stewardship. Further, the successful bidder shall provide payment and performance bonds, each in an amount equal to the total contract amount.

The Department of Natural Resources and Environmental Control, Division of Watershed Stewardship reserves the right to reject any or all bids and to waive any informality therein. The Department also reserves the right to extend the time and place of the bid opening from that described in this advertisement of not less than five calendar days notice by Certified mail to those bidders who have obtained copies of the plans and specifications.

The Department of Natural Resources prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political belief and marital or family status.

CONTRACT NO. NAT201301- HYD.DREDGE

SECTION 1
GENERAL PROVISIONS

SECTION 1A

DEFINITION OF TERMS

DEFINITIONS Wherever used in these Administrative Specifications or in the other Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof.

Application for Payment - The invoice sent to the Department by the Contractor, imprinted with the name and address of the firm in requesting progress payments.

Bid - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the work to be performed.

Bidder - Any persons, firm or corporation submitting a bid for the work.

Bonds - Bid, performance and payment bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents.

By Others - Refers to all persons or firms other than the contractor to whom this contract is awarded.

Change Order - A written order to the Contractor, issued after execution of the Contract, signed by the Director and Engineer, authorizing an addition, deletion or revision in the work, and if required, adjustment in the Contract Price or Contract Time.

Contract - The written agreement between the Department and the Contractor covering the work to be performed, including the Contractor's bid and the Bonds.

Contract Documents - The Contract, Specifications, Drawings, Addenda (whether issued prior to opening of bids or execution of the Contract) and Modifications.

Contract Price - The total moneys payable to the Contractor under the Contract Documents.

Contract Time - The total number of calendar or working days, and any completion dates for phases or segments of the contract work shown on the Construction Schedule or stated in the specifications or Contract.

Contractor - The person, firm or corporation with whom the Department has executed the Contract.

Department - The legally appointed body known as the Department of Natural Resources and Environmental Control.

Drawings - The drawings and plans which show the character and scope of the work to be performed and which have been prepared or approved by the Engineer and/or Architect and are referred to in the Contract Documents.

Engineer and/or Architect - Refer to Special Provisions, Section 1J.

Field Work Order - A written order to the Contractor, authorized by the Engineer or Inspector, for minor changes or alterations in the work, not involving extra cost and not inconsistent with the overall intent of the Contract Documents.

Furnish - To obtain and deliver on the job for installation by other trades.

Inspector - An authorized representative of the Department assigned to on-site inspection of any feature of materials or work entering into the Contract.

Installation - In addition to actual installation, includes all unloading, handling, rigging and hoisting, and the furnishing of all tools, equipment and materials required to handle and install the work, except as otherwise specified in the Contract Documents.

Job Site - The site upon which the Contract work is to be performed.

Modification - Any written amendments of any of the Contract Documents (including Change Orders and Field Work Orders) duly executed and delivered after execution of the Contract.

Owner - Same as Department.

Property - The metes and bounds of lands administered by the Department, and containing the project to be constructed.

Project - The entire construction to be performed as provided in the Contract Documents.

Provide - Furnish and install.

Secretary - The Secretary of the Department acting either directly or through authorized Agents.

Shop Drawings - All drawings, diagrams, illustrations, brochures, schedules and other data which illustrate the equipment, material and work to be furnished by the Contractor.

Specifications - The Administrative Specifications and the Technical Specifications.

State - State of Delaware.

Subcontractor - An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the work at the site.

Superintendent - The Contractor's representative at the site, and shall have authority to act on behalf of the Contractor.

Testing Laboratory - A materials testing laboratory approved by the Secretary.

Work - Any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by the Contractor under the Contract Documents, including the furnishing of all labor, materials, equipment and other incidentals.

SECTION 1B

INSTRUCTIONS TO BIDDERS

1B.01 PROPOSALS

(a) Refer to Special Provisions, Section 1J, for instructions for submitting proposal and bid opening date and time, Section 1J.05.

(b) Shall be on the furnished proposal forms. All blank spaces in the form shall be filled, signed in ink in longhand where designated, and all numbers shall be stated in words and in figures. The completed forms shall be without interlineations, alterations, or erasures. All attachments to the specifications and proposal are a necessary part thereof, and shall not be detached or altered.

(c) Shall not contain any recapitulation of the work to be done. No changes shall be made in the phraseology of the form. Nor partial bids nor any alternative bids not provided for in the form will be considered. Where proposal provides for quoting either addition or deduction for an "Alternate" item, indicate whether the sum named is an addition or deduction by ruling out the words not wanted.

1B.02 DRAWINGS AND SPECIFICATIONS

(a) Will be issued by the Department. Refer to Special Provisions, Section 1J.

(b) Prospective Bidders may obtain contract documents upon payment of $50.00 for each set at the Department of Natural Resources and Environmental Control, Division of Watershed Stewardship, 89 Kings Highway, Dover, DE 19901. This payment is non-refundable and the documents need not to be returned.

1B.03 THE BIDDER

(a) Shall carefully examine the documents, the drawings and the specifications, shall visit the site and fully inform himself as to all existing and controlling conditions and limitations including availability of materials and labor. The submission of a bid shall be a representation that he has inspected the site and has familiarized himself with all of the controlling conditions. Failure to conduct these thorough examinations shall in no way relieve the successful bidder of his responsibility for the complete and satisfactory performance of all required work.

(b) Shall notify the Project Manager and/or Engineer in writing within seven working days following the pre-bid meeting if he finds discrepancies in, or omissions from, the drawings and/or specifications, or is in doubt as to their meanings. If explanation is necessary, a reply will be made by an addendum issued to all bidders. No oral statement shall change the requirements of the specifications or drawings unless confirmed in writing.

Addenda will be mailed or delivered to all who are known by the Agency to have received a complete set of the Bidding Documents.

Copies of the Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

No Addenda will be issued later than 5 calendar days prior to the date for receipt of bids.

Each bidder shall ascertain prior to submitting his bid that he has received all Addenda issued, and shall acknowledge their receipt in his bid in the appropriate space. Not acknowledging an issued Addendum could be grounds for determining a bid to be non-responsive.

(c) Shall state the lump sum price for which he will execute and complete base bid item and the alternate items in accordance with the drawings, specifications, and the requirements of the Contract. Prices quoted shall include federal or state taxes, if such are applicable.

(d) For Public Works Contracts, the contractor shall not subcontract, sublet, sell, transfer, assign, purchase work or materials from an organization other than his/her own, or otherwise dispose of the contract or contracts or any portion thereof, or of his/her right, title or interest therein, without written permission form the State. In case such permission is given, the contractor will be permitted to subcontract or sublet a portion thereof but shall perform with his/her own organization, work amounting to not less than fifty percent (50%) of the total contract bid price, exclusive of General Condition Items, Overhead, and Profit.

(e) Shall submit with his proposal a guarantee in accordance with Section 1B.06 below.

(f) Shall submit with his proposal a properly executed Non-Collusion statement in accordance with Section 1B.07 below.

(g) Shall sign his name in the space provided therefore. If the proposal is made by a partnership or corporation, the name and address of the partnership or corporation shall be shown, together with the names of the partners or the officers. A proposal made by a corporation shall be signed by one of the authorized officers thereof.

(h) If awarded the contract, the bidder will be required to furnish copies of Insurance Certificates endorsed to meet the requirements of the contract.

1B.04 THE SECRETARY OF THE DEPARTMENT OR HIS REPRESENTATIVE

(a) May, during the bidding period, advise the bidders by addenda, of additions, omissions or alterations in the specifications and drawings. All such changes shall be included in the work covered by the proposal and shall become part of the specifications as if originally included therein.

(b) Reserves the right to waive technicalities, to reject any and all bids, to advertise for new proposals, to proceed to do the work otherwise, or to abandon the work, if, in the judgment of the Secretary, the best interest of the State will be promoted thereby.

(c) Reserves the right to adjust, delete, increase or reduce any or all items contained in the technical specifications by amounts which will not exceed twenty-five percent (25%) of the total bid price.

(d) Reserves the right to reject bids if any unit or alternate bid prices are obviously unbalanced, either above or below reasonable cost analysis values.

1B.05 CONTRACT FORM

Successful bidder will be notified of the Award of the Contract in writing within thirty (30) days from the date of opening proposals. If the successful bidder fails to execute the required contract within twenty (20) days after receiving the Contract Award notice, his proposal guarantee shall immediately become forfeited as liquidated damages.

Upon the execution of a formal contract and bond, the security shall be returned to the successful bidder. The security of the unsuccessful bidders shall be returned to them immediately upon the awarding of the contract or the rejection of all bids, but in no event later than 30 days after the opening of bids.

1B.06 PROPOSAL GUARANTEE

Each bidder shall submit with proposal a guarantee in sum equal to ten percent (10%) of the total value of his bid. This guarantee shall be submitted in the form of a good and sufficient bond (sample copy attached) to the State of Delaware for the benefit of the Department; or, a certified check drawn on a reputable banking institution, or payable to the order of the Department of Natural Resources and Environmental Control. Certified check and bond guarantees of all bidders will be returned after the contract has been executed.

1B.07 NON-COLLUSION STATEMENT

The Department requires, as a condition precedent to acceptance of bids, a sworn statement executed by, or on behalf of the persons, firm association or corporation to whom such Contract is to be awarded, certifying that such person, firm, association or corporation has not, either directly or indirectly, entered into an agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with such contract. The form for this sworn statement is included in the proposal and must be properly executed in order to have the bid considered. Failure to execute the Non-Collusion Statement will automatically disqualify the bid.

1B.08 PREFERENCE FOR DELAWARE LABOR

As referenced in 29DELC 6962 (d) (4) (b). "In the construction of all public works for the State or any political subdivision thereof or by firms contracting with the State or any political subdivision thereof, preference in employment of labors, workers or mechanics shall be given to bona-fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State.

1B.09 LICENSE AND TAX REQUIREMENTS

(a) Each Contractor and Subcontractor shall be licensed to do business in the State of Delaware and shall pay all fees and taxes due under State laws. In conformance with Section 2503, Chapter 25, Title 30, Delaware Code, the Contractor shall furnish the State Tax Department, within 10 days after award of contract, a statement of the total values of each contract and subcontract, together with the names and addresses of the contracting parties. The Contractor, before the payment of any award or amount payable to any contractor or subcontractor not a resident of Delaware, shall ascertain from said non-resident contractor or Subcontractor and/or State Tax Department, whether they have obtained a license and satisfied their liability paid by the non-resident Contractor or Subcontractor, the Contractor shall deduct from the award the amount payable to said non-resident Contractor or Subcontractor the amount of said license liability and shall pay the same to the State Tax Department within 10 days after final payment and settlement within the non-resident Contractor or Subcontractor.

(b) Taxes: The Contractor shall pay all sales, consumer, use and other taxes required by law.

1B.10 PAYMENTS

The Department may, at the discretion of the Secretary, make partial payments based upon the Contractor's continuous and conscientious performance. The partial payments shall not exceed 95% of the cost of materials and labor incorporated in the work. See Section 1D General Conditions Part II Sections 1D.21; 1D.22; and 1D.23 for additional information and clarification.

1B.11 MINIMUM WAGES

(a) The Contractor and each of his Subcontractors, or any other person employing laborers and/or mechanics at the site in the performance of this Contract, shall pay the various classes of laborers and mechanics no less than the hourly rate set forth in the attached prevailing wage rate scale determined by the Department of Labor of the State of Delaware, (Section 1F).

(b) The Contractor and each of his Subcontractors shall pay all mechanics and laborers employed directly on the site of the work, unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the attached wage rate scale,

regardless of any contractual relationship which may be alleged to exist between the Contractor or Subcontractor and such laborers and mechanics.

(c) The scale of wages attached hereto shall be posted by the Contractor in a prominent and accessible place at the project site.

(d) The owner may withhold from the Contractor so much of the accrued payment as he may consider necessary to pay to laborers and mechanics employed by the Contractor or any Subcontractor the difference between the rates of wages required by the Contractor to be paid to laborers and mechanics employed in the work and the rates of wages received by such laborers and mechanics and not refunded to the Contractor, Subcontractor, or their agents.

(e) The Contractor shall furnish sworn payroll information to the Department of Labor weekly. Sample copies enclosed.

1B.12 NON-DISCRIMINATION

The Department prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political belief, and marital or family status.

1B.13 LUMP SUM BID

Notwithstanding any other provision of this contract to the contrary, this is a Lump Sum Bid contract and the State shall not be responsible for any cost escalations whatsoever, under any circumstances. In the event that this provision conflicts with any other provision of this contract, this provision shall control.

SECTION 1C

GENERAL CONDITIONS - PART 1

AWARD AND EXECUTION OF CONTRACT

1C.01 AWARD OF CONTRACT

If the contract is awarded, it will be awarded to the eligible bidder who's Base Bid Price Bid selected by the Department produces the lowest net bid. If the contract is awarded, the Department will give the successful bidder written notice of the award within thirty (30) days after the opening of the bids. The contract award shall not be final until an approved Delaware State Purchase Order has been received by the Contractor.

1C.02 FAILURE TO EXECUTE DOCUMENTS

If the successful bidder fails to **execute the required contract in triplicate** within twenty (20) days after the date of official notice of the award of the contract, his proposal guarantee shall immediately become forfeited as liquidated damages. (A sample copy of the required contract is attached).

1C.03 DELIVERY OF BOND

The successful bidder must furnish the State of Delaware for the benefit of the Department of Natural Resources and Environmental Control a **performance bond and a payment bond,** each in an amount equal to the total contract price (sample copy attached). Delaware Code requires that all bonds for this bid and the ensuing contract be signed by a bona-fide agent duly empowered to represent the bonding/surety company, (also duly authorized to do business in the State of Delaware) that will furnish said bonds.

SECTION 1D

GENERAL CONDITIONS PART II

1D.01 NOTICE TO PROCEED

The work shall be started at the job site promptly upon receipt of the State of Delaware Purchase Order and shall be performed with such progress as may be necessary to prevent any delay to other contractors, or to the general completion of the project. The work shall be prosecuted at such times and with such forces, materials, and equipment as may be necessary to assure the substantial completion of the work in accordance with the Contract Time. If the work falls behind the Progress Schedule submitted by the Contractor, the Contractor shall employ additional labor and equipment as necessary to bring the work up to schedule.

1D.02 PRECONSTRUCTION CONFERENCE

Before starting the work, a conference will be held to review schedules to establish procedures for handling shop drawings and other submissions and for processing Applications for payment, and to establish a working understanding between the parties as to the project. Present at the conference will be the Secretary or his authorized representative, the Contractor and the superintendent.

1D.03 SCHEDULES

(a) Delivery Schedule - The Contractor shall, within ten (10) calendar days after the award of the contract for the work prepare and submit to the Department, in triplicate, a Delivery Schedule in a form acceptable to the Department. The Delivery Schedule shall list the principal and critical equipment and materials required for the contract work, both of the Contractor's own production and those parts to be procured from others, with dates and time period of deliveries at the site. The Delivery Schedule shall be submitted each month on or before the 10th day of the month, corrected to reflect the current status of orders and deliveries until the completion of the deliveries.

(b) Progress Schedule - Prior to the starting date of erection of the work, the Contractor shall prepare and submit to the Department, in triplicate, a Progress Schedule in a form acceptable to the Department, listing the principal component parts of the work, and showing the proposed starting dates and duration of time allotted for the erection and installation of each component part. The Progress Schedule shall be submitted each month with the Application for Payment to show percentage of each component part of the work completed as of that date.

(c) Schedule of Values - At least ten days prior to submitting the first application for a progress payment, the Contractor will submit a schedule of values of the work including quantities and unit prices, aggregating the Contract Price. This schedule shall be satisfactory in form and substance to the Owner and shall subdivide the work into component parts in sufficient detail to serve as the basis for progress payments during construction. Upon approval of the Schedule of Values by the Owner, it shall be incorporated into the form of application for payment.

(d) The Contractor's Delivery Schedule and Progress Schedule shall be designed to meet the completion dates and sequences of construction required by the Contract Documents.

(e) It shall be the Contractor's responsibility to check with the Department concerning actual delivery dates, actual progress of the construction and other work being carried on by the Department and to schedule the arrival of his materials, equipment and labor at the site so as to properly coordinate his work with the Owner's work and the work of other contractors. There will be no extra compensation for work resulting from extra work which the Contractor must perform due to failure to coordinate this work with the Owner's work and the work of other contractors.

(f) In no case shall the contractor, except as instructed by the Department, delay the progress of the work, or any part thereof, on account of changes in the work or disputes of any nature, without limitation, caused by proposed or ordered changes in the work, or any disputes or disagreements as to the equitable value of the changes.

1D.04 INTENT OF CONTRACT DOCUMENTS

It is the intent of the contract documents, specifications and drawings, to describe a complete project to be performed under the Contract.

The Contract Documents comprise the entire agreement between the Department and the Contractor. They may only be altered by a modification or as provided in Section 1D.17, 1D.18, 1D.19 and 1D.20.

1D.05 CORRELATION AND INTERPRETATION OF CONTRACT DOCUMENTS

The Contract Documents are complementary; what is called for by one is as binding as if called for by all; if the Contractor finds a conflict, error or discrepancy in the Contract Documents, he will call it to the Owner's attention in writing before proceeding with the Work affected thereby. In resolving such conflicts, errors or discrepancies, the documents shall be given precedence in the following order: Contract, Specifications, Drawings. Within the specifications the order of the precedence shall be as follows: Special Conditions, Instructions to Bidders, General Conditions, Technical Provisions. Figures dimensions on Drawings shall govern over scale dimensions, and detailed drawings shall govern over general drawings. Any work that may be reasonably inferred from the specifications or drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials or equipment described in words which so applied have a well-known technical or trade meaning shall be deemed to refer to such recognized standards. The Contractor assumes full responsibility for having familiarized himself with the nature and extent of the Contract Documents, work locality, conditions that may in any manner affect the work to be done.

1D.06 WORK BY OTHERS

(a) The Owner may perform work related to the project by himself, or he may let other direct contracts therefore which shall contain General Conditions similar to these. The Contractor will afford the other contractors who are parties to such direct contracts (or the Owner, if he is performing the additional work himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of work, and shall properly connect and coordinate his work with theirs.

(b) If any part of the Contractor's work depends for proper execution or results upon the work of any such other contractor (or the Owner), the Contractor will inspect and promptly report to the Owner in writing any defects or deficiencies in such work that render it unsuitable for such proper execution and results. His failure so to report shall constitute an acceptance of the other work as fit and proper for the relationship of his work except as to defects and deficiencies which may appear in the other work after the execution of his work.

(c) The Contractor will do all cutting, fitting and patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by such other work. The Contractor will not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the Owner.

(d) If the performance of additional work by other contractors or the Owner is not noted in the Contract Documents prior to the award of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional work. The contractor will afford the Owner and the other contractors who are parties to such direct contract reasonable opportunity for the introduction and storage of materials and equipment and the execution of their work. If the Contractor believes that the performance of such additional expense entitles him to an extension of the Contract Time, he may make a claim therefore as provided in Section 1D.18 and 1D.19.

1D.07 SUBCONTRACTORS

The following is in compliance with Title 29, Chapter 69 of the Delaware Code:

(a) "Subcontractor" means any person, partnership, firm, corporation, or other business association which enters into a contract directly with a contractor to perform actual construction labor on the site, or to perform actual construction labor and provide material in connection with such labor on the site. Labor performed in the delivery and unloading of material at the project site is not to be construed to mean actual construction labor.

(b) In the case of any public works contract for the construction, reconstruction, alteration or repair of any public building (not a road, street or highway) of the State, of any county in the State, of any public school district, or of any political subdivision of the State, there shall be a meeting of all prospective bidders and of the Agency called by the agency upon reasonable notice and at a place and time stated in such notice which meeting shall be at least fifteen (15) days before the date for the submission of bids; at the meeting all the participants, including the agency, shall attempt to agree upon a listing of all subcontractor categories to be included in the bids for performing the work as required, and any such agreed listing shall be final and binding upon all bidders and upon the agency. If all of the participants do not agree on such a listing at the meeting then the agency itself at least ten (10) days before the due date for the submission of bids shall determine the subcontractor categories to be included in the listing. The listing, whether agreed to by all of the participants at the meeting or determined by the agency itself in the absence of the unanimous agreement of the participants at the meeting, shall be published by the agency at least ten (10) days before the due date for the submission of bids by mailing and listing to all of the participants at the meeting. The listing

as so published shall be final and binding upon all bidders and the agency and it shall be filled out completely in full without any abbreviations (Section 3C).

(c) Such contract shall be awarded only to a bidder whose bid is accompanied by a statement containing for each subcontractor category set forth in the listing as provided in S6962, the name and address and State of Delaware Business License number of the subcontractor whose services he intends to use in performing the work and providing the material, for such subcontractor category. No bidder for such a contract shall list himself in any accompanying statement as the subcontractor of any part of the public building unless the bidder, in addition to being licensed as a contractor of the State, shall also be recognized in the industry not only as a prime contractor, but also as a subcontractor or contractor in and for any such part or parts of such work so listed in such accompanying statement.

(d) Neither the State nor County nor public school district not any political subdivision of the State, nor any agency of any of them, shall accept any bid for such a contract or award any such contract to any bidder, as the prime contractor, if the bidder has listed himself as the subcontractor for any subcontractor category set forth on the listing as provided in Section 6962, unless it has been established to the satisfaction of the awarding agency that the bidder has customarily performed the specialty work of such subcontractor category by artisans regularly employed by the bidder is duly licensed by the State to engage in such specialty work, if the State requires such licenses, and that the bidder is recognized in the industry as a bona fide subcontractor or contractor in such specialty work and subcontractor category. Illustrative only (and not intended to be exhaustive) of typical subcontractor categories involving their own respective types of specialty work, are plumbing, electrical wiring, heating, roofing, insulating, weather stripping, masonry, bricklaying and plastering. The decision of the awarding agency as to whether a bidder who lists himself as the subcontractor for a subcontractor category set forth in the listing as provided in Section 6962(b2) for such subcontractor category, shall be final and binding upon all bidders, and no action of any nature shall lie against any awarding agency because of its decision in this regard.

1D.08 SUBCONTRACTS

(a) The Contractor shall not make any substitution of subcontractors or suppliers who have been submitted with the Contractor's proposal without the written authorization of the Owner. The Contractor will not make any substitution for any subcontractor or supplier who has been accepted by the Owner unless the Owner determines that there is good cause for doing so.

(b) The Contractor will be fully responsible for all acts and omissions of his subcontractors and of persons directly or indirectly employed by them and of persons whose acts may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between any subcontractor and the Owner or any obligation on the part of the Owner to pay or to see to the payment of any moneys due any subcontractor. The Owner may furnish to any subcontractor, to the extent practical, evidence of amounts paid to the Contractor on account of specific work done in accordance with the schedule of values.

(c) The divisions or sections of the specifications or the identifications of any drawings shall not control the Contractor in dividing the work among subcontractors or delineating the work to be performed by any trade.

(d) The Contractor agrees to specifically bind every subcontractor to all of the applicable terms and conditions of the Contract Documents. Every subcontractor, by undertaking to perform any of the work, will thereby automatically be deemed to be bound by such terms and conditions.

1D.09 MATERIALS, EQUIPMENT AND LABOR

(a) Unless otherwise specified the Contractor will provide and pay for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of the work.

(b) Unless otherwise specified all materials and equipment will be new. If required by the Owner, the Contractor will furnish satisfactory evidence as to the kind and quality of materials and equipment.

(c) All manufactured materials and equipment shall be applied, installed, connected, erected, used, cleansed and conditioned as directed by the manufacturer.

(1) General - All materials, fittings and equipment shall be new, unless otherwise specified, of the best quality obtainable within the class or type specified, and in strict compliance with the requirements of the specifications.

(2) Substitutions - Where materials or equipment are specified by description or by brand or manufacturer's names, they are so named in the specifications to denote the kind and quality required, whether or not the words "or approved equal" are used, and bids shall be based on the products described or named. The Contractor's having submitted a bid shall be a representation that he is prepared to furnish the products described or named or substitutes acceptable and approved by the Department. Regardless of whether or not the phrase "or approved equal" or similar notation appears in the specifications or on the drawings, no substitutions for any materials or equipment will be allowed except upon written request of the Contractor and written approval of the Department and subject to the conditions specified below:

a. All requests for substitutions shall be made in a consolidated request submitted with the Contractor's Delivery Schedule within ten (10) days after the award of the contract. Requests shall give complete description of the proposed alternate material, the reason for substitution, and comparison of the price of the substitution with the price of the material specified. No requests for substitution will be considered unless accompanied by technical information sufficient for comparison with the quality and suitability of the specified products. Samples shall be provided by the Contractor if requested by the Department.

b. No request for substitution will be considered thereafter except for emergency requests made because of non- availability of the specified material, danger of schedule delay, or to adjust unforeseen field conditions. All emergency requests shall be made through the Inspector. If in

connection with such emergency requests the Contractor's proposed substitute is declined, the Department shall have the privilege of specifying a substitute material or equipment, provided that, if the Contract is performed on a lump sum, unit price or maximum sum basis, the current market price of the Substitute specified by the Department does not exceed the current market price of the product named in the specifications.

c. The Contractor shall not be entitled to additional compensation for additional cost or extra work resulting from any substitutions requested by him. If the cost of the material substituted is less than the cost of the material specified, such savings in cost shall be credited to the Department and deducted from the Contract Price.

d. The Department may decline substitutions and require that products specified be furnished.

(3) Warranties - In addition to and not in limitation of the provisions of Section 1D.24, the Contractor shall fulfill any special warranties of material or equipment he is furnishing. The Contractor's having submitted a bid shall be a representation that he is able and prepared to obtain manufacturer's warranty bonds, where required for the products named in the specifications.

(4) Samples - The Contractor shall furnish, for approval, samples of the items he is to supply, as required by the Contract Documents or requested by the Department. The work shall be in accordance with the approved samples.

(5) Department Furnished Materials & Equipment - If any materials or equipment are to be furnished by the Department for the work, they will be so specified in the Contract Documents. Unless otherwise specified, it shall be the Contractor's responsibility to locate, receive, handle and store, if necessary, any item of Department furnished material or equipment which he is required by the Contract to install, erect or handle in any way, from the time it is received by the Contractor at the job site or other Department approved location until completion of the work in accordance with the Contract Documents. Damaged or lost Department furnished items shall be repaired or replaced by the Contractor without additional cost to the Department.

1D.10 PATENT FEES AND ROYALTIES

The Contractor will pay all license fees and royalties and assume all costs incidental to the use of any invention, design, process or device which is the subject of patent rights or copyrights held by others. He will indemnify and hold harmless the Department and the Engineer and/or Architect and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorney's fees) arising out of any infringement of such rights during or after completion of the work, and shall defend all such claims in connection with any alleged infringement of such right.

1D.11 USE OF PREMISES

(a) The Contractor will confine his equipment, the storage of materials and equipment and the operation of his workmen to limits indicated by law, ordinances, permits or the requirements of the Contract Documents and shall not unreasonably encumber the premises with materials or equipment.

(b) The Contractor will not load nor permit any part of the structure to be loaded with weight that will endanger the structure.

(c) Storage areas will be provided for the storage of the Contractor's materials and equipment and he shall confine his materials, equipment and operations of his workmen to such limits as indicated by the Department and shall not encumber the premises. Unless otherwise indicted in the specifications, the storage areas will be outdoors, and the Contractor shall provide whatever shelter is necessary for his storage and fabricating needs. No workmen shall trespass within areas or buildings of the Department other than those related to the work of the contract. The Contractor shall rigidly enforce this regulation. Any materials, equipment or temporary structures belonging to the Contractor shall be moved when so directed by the Department to permit the execution of the work of others in connection with the project.

1D.12 TESTS

(a) If the Contract Documents, the Owner's instructions, laws, ordinance or any public authority requires any work to be tested specifically or approved by another authority, the Contractor will give the Inspector timely notice of readiness therefore. The Contractor will furnish the Department the required certificates of testing or approval. All such tests will be in accordance with the methods prescribed by the American Society for Testing and Materials, or as otherwise required by the Department or by applicable codes or ordinances. If any such work required to be tested is covered up without written approval or consent of the Inspector, it must, if directed by the Inspector be uncovered for examination at the Contractor's expense. The cost of all such tests shall be borne by the Contractor; provided that, if such test is called for only by the Department's instructions (and not required by the Contract Documents or otherwise) and if the test reveals that the work involved meets the requirements of the Contract Documents, the Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time directly attributable to making the test if he makes claim therefore as provided in Section 1D.18, 1D.19, or 1D.20.

(b) Any work which fails to meet the requirements of any such test or approval and any work which meets the requirements of any such test or approval but does not meet the requirements of the Contract Documents shall be considered defective or may be rejected. Rejected work shall be removed promptly from the site by the Contractor unless the deficiencies are corrected promptly by him. If, instead of requiring correction or removal of any such defective work, the Department prefers to accept it, they may do so, in which case a Change Order shall be issued incorporating the necessary revisions in the Contract Documents including an appropriate reduction in the Contract Price.

1D.13 CONTRACTOR'S SUPERVISION AND SUPERINTENDENCE

(a) The Contractor will supervise and direct the work efficiently and with his best skill and attention. He will be solely responsible for techniques and sequences of construction. Before undertaking the work he will carefully study and compare the Contract Documents and check and verify all figures shown thereon and all field measurements. He will at once report in writing to the Department any conflict, error or discrepancy which may be discovered. The Contractor will be responsible to see that the finished work complies accurately with the Contract Documents.

(b) He shall keep on the work site at all times during its progress a competent resident superintendent and supervisory staff. The superintendent will be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All instructions and notices given to the superintendent will be as binding as if given to the Contractor.

(c) The Contractor will provide competent, suitably qualified personnel to survey and lay out the work and perform construction as required by the Contract Documents. He will at all times maintain good discipline and order among his employees at the site.

(d) The Department will not be responsible for the acts or omissions of the Contractor, or any subcontractors, or any of his or their superintendents, supervisory staffs, agents or employees.

1D.14 SAFETY AND PROTECTION: EMERGENCIES

(a) The Contractor will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to:

1. All employees and other persons who may be affected thereby.

2. All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site.

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor will comply with all applicable safety and building laws and codes of federal, state, municipal and other governmental bodies for the safety of persons or property to protect them from damage, injury or loss. He will maintain and erect, as required by the conditions and progress of the work, all necessary safeguards for their safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners of adjacent utilities. When the use or storage of explosives or other hazardous materials is necessary for the prosecution of the work, the Contractor will exercise the utmost care and will carry on such activities under the supervision of licensed specially qualified personnel. All damage injury or loss to any such property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, will be remedied by the Contractor.

(b) In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special instructions or authorization from the Owner, is obligated to act, at his discretion, to prevent threatened damage, injury or losses. He will give the Owner prompt written notice of any significant changes in the work or deviations from the Contract Documents caused thereby, and a Change Order will thereupon be issued covering the changes and deviations involved. If the Contractor believes that additional work done by him in an emergency which arose from causes beyond his control entitles him to an increase in the Contract Price or and extension of the Contract Time, he may make a claim therefore as provided in Section 1D.18 or 1D.19 or 1D.20.

(c) The Contractor shall at all times protect all work, materials, equipment and fixtures against dirt, water, chemical and mechanical injury. The Contractor shall make good at his own expense any and all damage to his work, to the work of others, or to any materials or equipment in place or stored in the structure, whether such damage is caused directly in or indirectly by his work or by his failure to take adequate protective measures. During the progress of the work the Contractor shall handle the materials and equipment with care and good judgment to avoid the accumulation of unnecessary dirt, and shall use special care to prevent foreign materials from entering the interior parts of the equipment.

(d) The Contractor shall be responsible for maintaining the proper fire prevention safeguards and discipline necessary for the type of work he is performing, and shall institute procedures for giving alarm and protecting adjacent work and materials in case of fire, so as to minimize loss or damage.

(e) The Contractor shall use established roadways except as otherwise authorized and shall be responsible for the coordination of his work activities with those of others so as to minimize traffic congestion on roads, streets and highways and shall cooperate with officials who have jurisdiction over those facilities.

(f) All construction must be done in compliance with the Occupational Safety and Health Act of 1970 and all rules and regulations thereto appurtenant.

1D.15 CLEANING UP

The Contractor will keep State property free from accumulations of waste materials, rubbish and other debris from and about the site clean and ready for occupancy by the Department. The Contractor will restore to their original condition those portions of the site not designated for alteration by the Contract Documents.

It shall be understood that the cost of regular or continuous cleanup as required to keep the worksite clean has been included in the Contract Price.

1D.16 ACCESS TO THE WORK: UNCOVERING FINISHED WORK

(a) The Department will at all times have access to the work. The Contractor will provide proper facilities for such access and observation of the work or for any examination or testing thereof.

(b) Should it be considered necessary or advisable by the Department to reexamine any part of work already fabricated, installed, or completed, the Contractor, at the Department's request, will uncover, expose or otherwise make available for examination or testing that portion of the work in question, furnishing all necessary labor, material and equipment. If it is found that such work, does not meet the requirements of the Contract Documents, the Contractor will defray all the expense of such examination, and testing of satisfactory reconstruction.

If, however, such work is found to meet the requirements of the Contract Documents, the Contractor will be allowed an increase in the Contract Price or extension of the Contract Time directly attributable to such uncovering, exposure, examination and testing, if he makes a claim therefore as provided in Section 1D.18, 1D.19 and 1D.20.

1D.17 DEFECTIVE OR NEGLECTED WORK

(a) All work not conforming to the requirements of the Documents shall be considered defective, and all defective work, whether in place or not, may be rejected. Rejected work shall be removed promptly from the site by the Contractor unless the deficiencies are corrected promptly by him. The Contractor will also bear the expense of making good all work of other contractors destroyed or damaged by removal or replacement of his defective work. If the Contractor does not correct such deficiencies within a reasonable time, fixed by written notice from the Department, the Department may correct the deficiency or remove the rejected work. All direct or indirect costs of such correction or removal will be charged against the Contractor. If, instead of requiring correction or removal of any such defective work, the Department prefers to accept it, they may do so in which case a Change Order shall be issued incorporating the necessary revisions in the Contract Documents including an appropriate reduction in the Contract Price.

(b) If the Contractor should neglect to prosecute the work in accordance with the Contract Documents, including any requirements of the Progress Schedule, the Department, after three days written notice to the contractor may, without prejudice to any other remedy he may have, make good such deficiencies and the cost thereof shall be charged against the Contractor, in which case a Change Order shall be issued incorporating the necessary revisions in the Contract Documents, including an appropriate reduction in the Contract Price.

1D.18 CHANGES IN WORK

(a) Without invalidating the Contract, the Department may, at any time or from time to time, order additions, deletions or revisions in the work; these will be authorized by Change Orders. Upon receipt of a Change Order, the Contractor will proceed with the work involved. All such work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension/shortening of the Contract Time, the change in the Contract Price/Time, will be noted in the Change Order. Any equitable adjustment will be made as provided in Sect. 1D.19 and 1D.20.

(b) The Inspector may authorize minor changes and/or alterations in the work not involving extra cost and not inconsistent with the over-all intent of the Contract Documents by means of a Field Work Order. If the Contractor believes that any minor change or alteration authorized by the Inspector entitles him to an increase in the Contract Price or Contract Time, he shall not proceed with the work until after receipt of a Change Order.

(c) The Contractor shall submit a written lump sum quotation within forty-eight (48) hours after receipt of a Field Work Order from the Inspector at the jobsite, or within five (5) days after receipt of a change notice from the Department for changes or alterations which the Contractor believes entitles him to an increase in the Contract Price. These time limits may be extended only with the written consent of the Department.

(d) Additional work performed by the Contractor without authorization of a Change Order will not entitle him to an increase in the Contract Price or an extension of the Contract Time, except in

case of an emergency as provided in Section 1D.14b and except as provided in Section 1D.06b, 1D.12a and 1D.16b.

(e) The Department will execute any appropriate Change Order for work performed in an emergency as provided in Section 1D.19b and any other valid claim of the Contractor accompanied by a lump sum quotation agreeable to the Department for a change in the Contract Time or the Contract Price approved by the Department.

(f) It is the Contractor's responsibility to notify his Surety for any changes affecting the general scope of the work or change in the Contract Price and the amount of the applicable Bonds shall be adjusted accordingly. The Contractor will furnish proof of such adjustment to the Department.

1D.19 CHANGE OF CONTRACT PRICE

(a) The Contract Price constitutes the total compensation payable to the Contractor for performing the work. All duties, responsibilities and obligations assigned to or undertaken by the Department shall be at his expense without change in the Contract Price.

(b) The Contract Price may only be changed by a Change Order. If the Contractor is entitled by the Contract Documents (Section 1D.06, 1D.12b, 1D.18a and 1D.18b) to make a claim for an increase in the Contract Price, his claim shall be in writing delivered to the Department within fifteen (15) days of the occurrence of the event giving rise to the claim. Any change in the Contract Price resulting from any such claim shall be incorporated in a Change Order.

(c) The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantity of the times involved.
2. By mutual acceptance of a lump sum.
3. By payment of Reimbursable Costs and mutually acceptable fixed amount for overhead and profit.
4. Reimbursable Costs and overhead shall be as defined in Section 1D.31 of these General Conditions, and shall apply only to costs incurred solely for the work covered by the Change Order, claim or allowance.

(d) The amount of credit to be allowed by the Contractor to the Owner for any such change which results in a net decrease in cost, will be the amount of the actual net decrease agreed by the Owner.

(e) The additional cost, or credit to the Owner resulting from a change in the work shall be by mutual agreement of the Owner, Contractor and the Architect. In all cases, this cost or credit shall be based on the "DPE" wages required and the "invoice price" of the materials/equipment needed.

"DPE" shall be defined to mean "direct personnel expense". Direct payroll expense includes direct salary (prevailing wage rates) plus customary fringe benefits and documented statutory costs such as workman's compensation insurance, Social Security/Medicare, and unemployment insurance (a maximum of the prevailing wage rate times 1.35.)

"Invoice price" of materials/equipment shall be defined to mean the actual cost of materials and /or equipment that is paid by the Contractor, (or subcontractor), to a material distributor, direct factory vendor, store, material provider, or equipment leasing entity. Rates for equipment that is leased and/or owned by the Contractor or subcontractor(s) shall not exceed those listed in the latest version of the "Means Building Construction Cost Data" publication.

In addition to the above, the General Contractor is allowed a fifteen percent, 15%, overhead and profit for additional work performed by the General Contractor's own forces. For additional subcontractor work, the Subcontractor is allowed a fifteen percent overhead and profit on change order work above and beyond the direct costs stated previously. To this amount, the General Contractor will be allowed a mark-up not exceeding five percent, 7.5%, on the subcontractors work. These mark-ups shall include all costs including, but not limited to: overhead, profit, bonds, insurance, etc. There will be no other costs associated with the change order.

1D.20 CHANGE OF THE CONTRACT TIME

(a) The Contract Time may only be changed by a Change Order. If the Contractor is entitled by the Contract Documents to make a claim for an extension in the Contract Time, his claim shall be in writing delivered to the Owner within 10 days of the occurrence of the event giving rise to the claim. Any change in the Contract Time resulting from any such claim shall be incorporated in the Change Order.

(b) The Contract Time will be extended to an amount equal to time lost due to delays beyond the control of the Contractor if he makes a claim therefore as provided in Section 1D.19a.

1D.21 APPLICATION FOR PROGRESS PAYMENT

(a) At least ten days prior to submitting the first application for a progress payment, the Contractor will submit a schedule of values of the work including quantities and unit prices, aggregating the Contract Price. This schedule shall be satisfactory in form and substance to the Owner and shall subdivide the work into component parts in sufficient detail to serve as the basis for progress payments during construction. Upon approval of the schedule of values by the Owner, it shall be incorporated into the form of application of payment.

(b) At least ten (10) days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Inspector for review the Application for Payment filled out and signed by the Contractor covering the work completed as of the date of application and supported by such data as the Architect/Project Manager may reasonably require.

(c) The Contractor warrants that he and all his subcontractors have and will have good title to all materials and equipment incorporated in the Project and all material and equipment otherwise listed in an Application for Payment, free and clear of all liens, claims, security interests and encumbrances; and he will not permit any Subcontractor to, acquire any such material and equipment subject to an agreement under which an interest therein or encumbrance thereon is retained by the seller or otherwise imposed by the Contractor.

(d) The Inspector will, within ten (10) days after receipt of each application for payment, either indicate in writing his approval of payment, or return the Application to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and re-submit the application. The Department will, within ten (10) days of presentation to him of an approved Application of Payment, pay the Contractor the amount approved by the Inspector.

1D.22 APPROVAL OF PAYMENTS

(a) The Inspector's approval of any payment requested in an Application of Payment shall constitute a representation by him, based on the on-site observation of work in progress and on his review of the Application of Payment and the supporting data, that the work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the work is in accordance with the Contract Documents (subject to the results of any subsequent tests called for in the Contract Documents and any qualifications stated in his approval); and that the Contractor is entitled to payment of the amount approved. However, by approving any such payment the Inspector shall not thereby be deemed to have represented that he made exhaustive or continuous on-site inspections to check the quality or the quantity of the work, or that he has made any examination to ascertain how or for what purpose the Contractor has used monies paid or to be paid to him on account of the Contract Price.

(b) The Inspector may refuse to approve the whole or any part of any payment if, in his opinion, he is unable to make such representations. He may also refuse to approve any such payment, or, because of subsequent tests, nullify in his opinion to protect the Department from loss because:

1. The work does not comply with the requirements of the Contract Documents.

2. Claims have been filed or there is reasonable evidence indicating the probable filing thereof.

3. The Contract Price has been reduced because of modifications, or

4. The Department has been required to correct faulty or defective work or complete work in accordance with Section 1D.16.

1D.23 SUBSTANTIAL COMPLETION

Prior to final payment, the Contractor may, in writing to the Department certify that the entire project is substantially complete and request that the Department issue a certificate of Substantial Completion. With a reasonable time thereafter, the Contractor and Inspector will make an inspection of the project to determine the status of completion. If the Department does not consider the project substantially complete, the Department will execute and deliver to the Contractor a certificate of Substantial Completion with a tentative list of items to be completed or corrected before final payment will be made and the certificate shall fix the time within which such items shall be completed or corrected.

The Department shall have the right to exclude the Contractor from the project after the date of Substantial Completion, but the Department will allow the Contractor reasonable access to complete or correct items on the tentative list.

1D.24 GUARANTEES AND CORRECTION OR WORK AFTER SUBSTANTIAL COMPLETION

The Contractor warrants and guarantees that all work, materials and equipment will be of good quality and free from faults or defects and in accordance with the Contract Documents. Upon receipt of written instructions from the Department, he will correct all faults and deficiencies in the work and remedy all variations from the Contract Documents which appear within one year after Substantial Completion and also comply with the terms of any special guarantee provided in the Contract Documents. The Department will give prompt written notice of observed defects. The warranties and guarantees provided in this Section shall be in addition to and not a limitation of any other remedies provided by the Contract Documents or by law.

If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Department may have the work corrected and the Contractor and his surety shall be liable for all expenses incurred.

1D.25 FINAL PAYMENT

(a) Upon written notice from the Contractor that the project is complete, the Inspector and Engineer will make final inspection with the Contractor and will notify the Contractor in writing of any particulars in which this inspection reveals that the work does not comply with the requirements of the Contract Documents. The Contractor shall immediately make such corrections as are necessary to meet such requirement.

(b) After the Contractor has completed any such corrections to the satisfaction of the Department and delivered all maintenance and operating instructions, schedules, guarantees, bonds, certificates or inspection and other documents, all as required by the Contract Documents, he may make application for final payment following the procedure for progress payments. The final application for payment shall be accompanied by such supporting data as the Inspection may require, together with complete and legally effective releases and releases (satisfactory to the Department) of all liens arising out of the Contract Documents and the labor and services performed and the material and equipment furnished receipts and releases in full and affidavit of the Contractor that the releases and receipts include all labor, services, materials and equipment for which a lien could be filed. If any Subcontractor or supplier fails to furnish a release or receipt in full, the Contractor shall furnish a bond satisfactory to the Department to indemnify him against any liens.

(c) If, on the basis of his observation and review of the work during construction, his final inspection and review of the final application for payment, all as required by the Contract Documents, the Inspector is satisfied that the work has been completed and the Contractor has fulfilled all of his obligations under the Contract Documents, he will within ten (10) days after receipt of the final application for payment indicate in writing his approval of payment and present the application to the Department for payment. Otherwise, he will return the application to the

Contractor indicating in writing his reasons for refusing to approve final payment, in which case the Contractor will make the necessary corrections and re-submit the application.

(d) The acceptance by the Contractor of the final payment made shall operate as and be released to the Owner and every agent thereof from all claims and liabilities to the Contractor for anything done or furnished for or relating to the work, or for any act or neglect of the Owner or of any persons relating to or affecting this work.

1D.26 WAIVERS OF CLAIMS AND CONTINUING OBLIGATIONS

(a) The Contractor's obligation to perform the work and complete the project in accordance with the Contract Document shall be absolute. Neither approval of any progress for the issuance of a certificate of Substantial Completion, nor any payment by the Department to the Contractor under the Contract Documents, nor any use of occupancy of the project or any part thereof by the Department, nor any act of acceptance by the Department nor any failure to do so, nor any correction of faulty or defective work by the Department shall constitute an acceptance of work not in accordance with the Contract Documents.

(b) The making and acceptance of final payment shall constitute:

1. A waiver of all claims by the Department against the Contractor other than those arising from unsettled liens, from faulty or defective work appearing after final payment or from failure to comply with the requirements of the Contract Documents or the terms of any special guarantees specified therein, and

2. A waiver of all claims by the Contractor against the Department other than those previously made in writing and still unsettled.

1D.27 INDEMNIFICATION

The Contractor will indemnify and hold harmless the Department and the Engineer and/or Architect and all of their agents and employees from and against all claims, damages, losses and expenses (including attorney's fees) arising out of or resulting from operations under the Contract Documents by the Contractor, any Subcontractor, anyone directly or indirectly employed by the Contractor or any Subcontractor, or anyone for who’s acts the Contractor or Subcontractor, may be liable, the indemnification obligations of the Contract under this Section 1D.26 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor, or any Subcontractor, under Workman's Compensation Laws, disability benefit laws, or other employee benefit laws.

1D.28 OWNER'S RIGHTS TO SUSPEND WORK

The Owner may, at any time without cause, suspend the work or any portion thereof for a period of not more than ninety (90) days by notice in writing to the Contractor which shall fix the date on which work shall be resumed. The Contractor will resume the work on the date so fixed. In general, no allowance will be made for suspended work except for possible extension of the Contract Time, if completion of the work is later carried on to successful conclusion. If the Contractor believes that

the suspension of work by the Owner entitled him to increase in the Contract Price of any extension of the Contract Time directly attributable to any suspension, he may make a claim within five (5) days after receipt of a notice of suspension and any equitable adjustment will be made as provided in Sections 1D.18 and 1D.19.

1D.29 OWNER'S RIGHT TO TERMINATE

(a) If the Contractor is adjudged as bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files petition to take advantage of any debtors act, or to reorganize under the bankruptcy or similar laws, or if he refuses to supply sufficient skilled workmen or suitable materials and equipment, or if he fails to make prompt payments to Subcontractor or for labor, materials or equipment or if he disregards laws and ordinances, or if he otherwise violates any provision of the Contract Documents, then the Owner, may without prejudice to any other right or remedy and after giving the Contractor seven (7) days written notice, terminate the services of the Contractor and take work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance the Contractor will pay the difference to the Owner.

(b) Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any rights of the Owner against the Contractor then existent or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from liability.

(c) Upon seven (7) days written notice to the Contractor, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the project and terminate the Agreement. In such case, the Contractor shall be paid for all work executed and any expense sustained plus a reasonable profit.

1D.30 CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE

If, through no act or fault of the Contractor, the work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Owner's Representative fails to act on any application for payment within thirty (30) days after it is submitted, or the Owner fails to pay the Contractor any sum approved by the Owner's Representative or awarded by arbitrators within thirty (30) days of its approval and presentation, then the Contractor may, upon seven (7) days written notice to the Owner, terminate the Agreement and recover from the Owner payment for all work executed and any expense sustained plus a reasonable profit.

1D.31 PAYMENT FOR EXTRA WORK

(a) All extra work done will be paid for in the following manner.

(b) Labor. For all labor and foreman indirect charge of the specific operations, the Contractor shall receive the State wage rates (or scale) agreed upon in writing before beginning work for each and every hour that said labor and foreman are actually engaged in such work.

The Contractor shall receive the actual cost paid to, or in behalf of, workmen by reason of subsistence and travel allowances, health and welfare benefits, pension fund benefits or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. An amount equal of 20% of the sum of the above items will also be paid the Contractor.

(c) Bond, Insurance and Tax. For property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and social security taxes on the force account work, the Contractor shall receive the actual cost, to which cost 6% will be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance and tax.

(d) Materials. For materials accepted by the Engineer and used, the Contractor shall receive the actual cost of such materials delivered on the work, including transportation charges paid by him (exclusive of machinery rentals as hereinafter set forth), to which cost 15% will be added.

(e) Equipment. For any machinery or special equipment (other than small tools) including fuel and lubricants, plus transportation costs, the use of which has been authorized by the Engineer, the Contractor shall receive the rental rates agreed upon in writing before such work is begun for the actual time that such equipment is in operation on the work, to which rental sum 15% will be added.

(f) Miscellaneous. No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

(g) Compensation. The Contractor's representative and the Engineer shall compare records daily of the cost of work done as ordered on a force account basis.

(h) Statements. No payment will be made for work performed on a force account basis until the Contractor has furnished the Engineer with duplicate itemized statements of the cost of such force account work detailed as follows:

1. Name, classification, date, daily hours, total hours, rental rate, and extension for each laborer and foreman.

2. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.

3. Quantities of materials, prices and extensions.

4. Transportation of materials.

5. Cost of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions, and social security tax.

(i) Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices the Contractor shall furnish an affidavit certifying that such materials were taken from his stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor. If unit measurement is by weight, certified weight slips will be required.

Should the Contractor refuse or fail to prosecute the work as directed or to submit his claim as required, the Engineer may withhold payment of all current estimates until the Contractor complies with these requirements or, after giving the Contractor due notice, the Engineer may make payment for said work on the basis of a reasonable estimate for the value of work performed.

1D.32 ASSIGNMENT OF ANTITRUST CLAIMS

As consideration for the award and execution by the Owner of this Contract, the Contractor hereby grants, conveys, sells, assigns and transfers to the State of Delaware all of its right, title and interests in and to known or unknown causes of action it presently has or may now or hereafter acquire under the antitrust laws of the United States and the State of Delaware, relating to the particular goods or services purchased or acquired by the Owner pursuant to this Contract.

1D.33 MISCELLANEOUS

(a) Whenever any provision of the Contract Documents requires the giving of written notice, it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, who it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to him who gives the notice.

(b) Should the Owner or the Contractor suffer injury or damage to its person or property because of any error, omission or act of the other or of any of his employees or agents or others for whose acts he is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage.

(c) The Contract Documents shall be governed by all Delaware laws and all such laws shall be as binding as though quoted herein and their applicable provisions shall be fully adhered to by all parties affected thereby.

1D.34 ARCHAEOLOGICAL EVIDENCE

When in the course of construction any archaeological evidence is encountered on the surface or below the surface of the ground the Contractor shall notify the Bureau of Archives and Historic Preservation and suspend work in the immediate area for a reasonable time to permit those authorities, or persons designated by them to examine the area and insure the proper removal of the archaeological evidence for suitable preservation in the State Museum.

1D.35 SAFETY AND HEALTH REGULATIONS

All contracts shall be governed by the Department of Labor Safety and Health Regulations for Construction, provided by the Associated General Contractors of America, printed March 14, 1972.

1D.36 FOREST PROTECTION

In carrying out work within or adjacent to State, County and National Forests and/or Parks, the Contractor shall comply with all regulations of the State Fire Marshal, Conservation Commission, State Forestry Department, or other Authority having jurisdiction, governing the protection of forests and the carrying out of work within forests, and shall observe all sanitary laws and regulations with respect to the performance of work in forest areas. He shall keep the areas in an orderly condition, dispose of refuse, and obtain permits for the construction and maintenance of all construction camps, stores, warehouses, residences, latrines, cesspools, septic tanks and other structures in accordance with the requirements of the State Forester.

The Contractor shall take all responsible precautions to prevent and suppress forest fires and shall require his employees and subcontractors, both independently and at request of the forest or park officials, to do all reasonably within their power to prevent and suppress and to assist in preventing and suppressing forest fires and make every possible effort to notify a forest or park official at the earliest possible moment of the location and the extent of any fire seen by them.

SECTION 1E

SPECIAL CONDITIONS - PART 1

SCOPE OF WORK

1E.01 SCOPE OF WORK

Furnishing all materials, labor and supervision, and performing all operations required to complete the construction described in Section 1J, Special Provisions, as shown on the drawings or described in the specifications and as evidently necessary to complete the work.

1E.02 LOCATION AND ACCESS

The site upon which the contract work is to be performed, and it access, is set out in Section 1J, Special Provisions.

1E.03 REFERENCE POINTS

The Owner and/or Engineer will, if required, establish a base line as shown on the drawings and an adjacent bench mark. The Contractor will be responsible for the layout of the work and will protect and preserve the established reference points and will make no changes or relocations without the prior written approval of the Department. The Contractor will be responsible for replacing and accurately relocating reference points lost, destroyed or moved.

1E.04 DATUM

The datum, from which all elevations mentioned herein or shown on the drawings, is measured from Mean Lower Low Water (MLLW) with MLLW understood to mean zero depth and zero elevation. References to North American Vertical Datum (NAVD 88) shown in parenthesis on the drawings are for reference purposes only.

1E.05 COOPERATION WITH PUBLIC UTILITY CORPORATIONS

It shall be the duty of the Contractor to ascertain from the utility corporations the locations of services adjacent to the work under this contract. Wherever water or gas pipes, telephone or electric cable ducts or poles are encountered, and may be interfered with in any way, the Contractor shall keep the utility company involved fully informed of same. He shall fully protect such structure and, where necessary, shall cooperate with the utility company in the removal, relocation, or replacement of same. Any damage caused by the neglect of the Contractor to first locate these structures shall be repaired by the Contractor at his expense.

1E.06 WORK IN OR OVER NAVIGABLE WATERS

All work in, on or over waters declared navigable by the Department of the Army of the United States shall conform to all applicable Federal Rules and Regulations. All such rules and regulations are hereby made a part of the Contract. The Contractor is cautioned and charged with the responsibility of obtaining complete knowledge thereof and complying therewith. The Contractor shall also comply with the provisions of other applicable Federal, State and local laws which pertain to work in these locations.

1E.07 USE OF EXPLOSIVE

The use of explosives will not be permitted adjacent to or on any existing structures unless authorized in writing by the Engineer. When the use of explosives is permitted, the Contractor shall use the utmost care, so as not to endanger life or property. Whenever necessary the number of charges and size of the charge shall be reduced. The Contractor's attention is directed to the necessity of safeguarding the public during dynamiting operations and a sufficient number of watchmen, flagmen signs, etc., shall be clearly marked, and shall be in care of competent watchmen at all times. Explosives shall be stored and handled in conformity with the provisions of the statutes of the State of Delaware, and local laws and ordinances.

The Contractor shall notify each public utility company, having structures in proximity to the site of the work, of his intention to use explosives and such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury. Such notice shall not relieve the Contractor of responsibility for any damage resulting from his blasting operations.

1E.08 EROSION CONTROL AND WATER POLLUTION

The Contractor shall schedule and conduct his operations to minimize erosion of soils and to prevent silting and muddying of streams, rivers, irrigation systems and impoundments (lakes, reservoirs, etc.). Construction of drainage facilities and performance of other contract work which will contribute to the control of erosion and sedimentations shall be carried out in conjunction with earthwork operations or as soon thereafter as practicable. The area of bare soil exposed at any one time by construction operations shall be kept to a minimum.

Prior to suspension of construction operations for appreciable lengths of time the Contractor shall shape the earthwork in a manner that will permit storm run-off with a minimum of erosion. Temporary erosion and sediment control measures such as berms, dikes, slope drains, or sedimentation basins deemed necessary by the Engineer shall be provided and maintained until permanent drainage facilities and erosion control measures are installed. Temporary measures will not be paid for directly, but will be considered as a subsidiary obligations of the Contractor covered under the various contract items of work.

The Contractor shall also conform to the following practices and controls:

1. When borrow material is obtained from other than commercially operated sources, erosion of the borrow site shall be so controlled during and after completion of the work that erosion will be minimized and sediment will not enter streams or other bodies of water. Waste or disposal areas and construction roads shall be located and constructed in a manner that will keep sediment from entering streams.

2. Frequent fording of live streams will not be permitted; therefore, temporary bridges or other structures shall be used wherever an appreciable number of stream crossings are necessary. Unless otherwise approved in writing, mechanized equipment shall not be operated in live streams.

3. When work areas or gravel pits are located in or adjacent to live streams, such areas shall be separated from the main stream by a dike or other barrier to keep sediment from entering a flowing stream. Care shall be taken during the construction and removal of such barriers to minimize the muddying of a stream.

4. All waterways shall be cleared as soon as practicable of falsework, piling, debris or other obstructions placed during construction operations and not a part of the finished work.

5. Water from aggregate washing or other operations containing sediment content shall not contain more sediment than that of the stream into which it discharges.

6. Pollutants such as fuels, lubricants, bitumens, raw sewage and other harmful materials shall not be discharged into or near rivers, streams, and impoundments or into natural or manmade channels leading thereto. Wash water or waste from concrete mixing operations shall not be allowed to enter live streams.

7. All applicable regulations of fish and wildlife agencies and statutes relating to the prevention and abatement of pollution shall be compiled with in the performance of the contract.

8. It shall be the responsibility of the Contractor to comply with all applicable regulations of the Department of Natural Resources and Environmental Control regarding any open burning operations carried out during the conduct of this contract.

9. When it becomes necessary, the Engineer will inform the Contractor of unsatisfactory construction procedures and operations insofar as erosion control and water pollution are concerned. If the unsatisfactory construction procedures and operations are not corrected promptly, the Engineer may suspend the performance of the other construction until unsatisfactory condition has been corrected. There will not be any adjustment of contract time for suspension of other work in the event it is necessary to suspend the other work until correction of unsatisfactory control of erosion and water pollution has been accomplished.

SECTION 1F

SPECIAL CONDITIONS - PART II

MINIMUM WAGES AND EMPLOYMENT

1F.01 MINIMUM WAGES

The following minimum wages are to be paid various classes of laborers and mechanics as determined by the Department of Labor and Industrial Relations of the State of Delaware in accordance with Title 29, Section 6960, Delaware Code relating to wages. Delaware Code relating to wages further stipulates that the Contractor or his subcontractor shall pay all mechanics and laborers employed directly upon the site of the work, unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the advertised specifications, regardless of any contractual relationship which may be alleged to exist between the contractor or sub-contractor and such laborers and mechanics, and that the scale of wages to be paid shall be posted by the contractor in a prominent and easily accessible place at the site of work; and so much of accrued payments as may be considered necessary by the contracting officer to pay laborers and mechanics employed by the contractor or any sub-contractor on the work, the difference between the rates of wages required by the contractor to be paid laborers and mechanics on the work and rates of wages required received by such laborers and mechanics and not refunded to the contractor, subcontractor or their agents.

These rates in certain instances include a monetary equivalent for health, welfare and pension, benefits which are given employees pursuant to a bona fide enforceable, uniformly applied agreement between employers and employees. The direct payment to the employee may be reduced by such monetary equivalent. In the absence of any such agreement, the full amount indicated, less any legal deductions, shall be paid directly to the employee.

The Wage scale for this project is; Heavy Construction in New Castle, Kent and Sussex Counties:

The Scope of Work includes: Hydraulic dredging of the Murderkill River's federal authorized channel including using the beach quality sand material for beach nourishment of South Bowers' beach. Supplementing nourishment of South Bower's beach, nourishment of North Bowers Beach and rehabilitation of the northerly entrance jetty is **N**ot **I**n **C**ontract (NIC).

In addition, the following information shall be furnished weekly to the Department by the Contractor and Sub-Contractor (if any) in the form of sworn copies of payrolls.

(a) Identification of the contract.

(b) Payroll period covered.

(c) For each worker listed on the payroll:

1. Name of worker

2. Job classifications or classifications at which he was employed during the payroll period.

3. Hourly rate paid for work at such classification or classifications.

4. Number of hours worked at such classification or classifications.

The Department may withhold from the contractor and sub-contractors the amount of funds necessary to pay laborers and mechanics employed on the work the minimum prevailing hourly wages.

The Delaware Code (Title 29, Chapter 69, Section 6960, Paragraph (c)) requires the Contractor to keep and maintain the sworn payroll information for a period of 2 years from the last day of the work week covered by the payroll.

If the Contractor needs further clarification pertaining to prevailing wage rates, the Department has on file two publications published by the Delaware Department of Labor, entitled "Delaware Prevailing Wage Regulations" and "Classifications of Workers Under Delaware Prevailing Wage Law." These publications are available for review upon request. These documents and other relevant information can also be found online at:

http://www.delawareworks.com/industrialaffairs/services/LaborLawEnforcementinfo.shtm1#pw1

1F.02 SUNDAYS AND OFFICIAL HOLIDAYS

Except with the written permission of the Secretary, and extreme emergencies, there shall be no contract work performed on Saturdays, Sundays and the following official holidays of this Department:

New Year's Day
M.L. King's Birthday
Election Day
Good Friday
Memorial Day
Independence Day
Labor Day
Veterans Day
Return Day (Sussex Co. only)
after 12:00 noon Election Year
Thanksgiving Day
Day after Thanksgiving
Christmas Day

1F.03 OVERTIME WORK

(a) Overtime Notices:

If the contractor should desire to perform work at night or outside regular working hours, he shall notify the Secretary and shall allow ample time for satisfactory arrangements to be

made for observation by the Inspector of the work in progress. The contractor shall adequately light the work as necessary for safety and for satisfactory performance of the work.

(b) Compensation for Overtime:

If and when the Owner orders the contractor to perform work included in the Contract outside of regular working hours for purposes not covered by the Contract, the contractor shall be paid an extra to the contract price. The payment for such overtime ordered by the Owner shall be at the applicable rate for overtime hours, minus the applicable rate for straight time hours. The contractor shall not be entitled to extra compensation for overtime necessary to meet the construction schedule of the completion date of the Contract. Note: The provisions of this paragraph 1F.02 (b) apply only when the Contract is performed on a lump sum, unit price or maximum sum basis.

1F.04 DELAWARE STATE EMPLOYMENT AGENCY (BRANCH OFFICES)

New Castle County	Delaware State Employment Agency 3403 Lancaster Ave. Wilmington, DE 19805
Kent County	Delaware State Employment Agency Carrolls Plaza - Rt. 113 Dover, Delaware 19901
Sussex County	Delaware State Employment Agency Rt. 113 & 20 Georgetown, DE 19947

1F.05 DELAWARE LAW, SECTION 6913 OF TITLE 29 OF THE DELAWARE CODE (AS AMENDED)

"On the construction of all public works for city, county or the State, preference in employment of laborers, workmen or mechanics shall be given to bona fide legal citizens of the State, who have established such citizenship by residence of at least 90 days in the State. Each contract for the construction of public works for city, county or the State shall contain a stipulation that any person, company or corporation who violates the provisions of this section shall pay a penalty to the State Treasurer equal to the amount of compensations paid to any person, in violation of this chapter. This section shall not apply to any project or contract, any part of the cost of which shall be paid by the United States Government, if the provisions of this section are contrary to or inconsistent with any Federal statute, regulation or rule governing or applying to the Federal participation in the cost of such project."

SECTION 1G

SPECIAL CONDITIONS PART III

PERMITS, LAWS, TAXES, INSURANCE AND INDEMNIFICATION

1G.01 PERMITS

The Owner will secure the U.S. Army Corps of Engineers and State of Delaware DNREC permits. The Contractor will secure and pay for all remaining construction permits and licenses including all governmental and public utility charges and inspection fees necessary for the prosecution of the Work.

1G.02 LAWS AND REGULATIONS

The Contractor will give all notices and comply with all laws, ordinances, rules and regulations applicable to work. If the Contractor observes that the Specifications or Drawings are at variance therewith, he will give the Owner prompt written notice thereof. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he will bear all costs arising therefrom.

1G.03 INSURANCE AND INDEMNIFICATION

2. **Insurance coverage**

2.1 The Contractor shall carry all insurance required by law, such as Unemployment Insurance, etc. He shall carry such insurance coverage as he desires on his own property such as his field office, storage sheds or other structures erected upon the project site that belong to him and for his own use. The Subcontractors involved with this project shall carry whatever insurance protection they consider necessary to cover the loss of any of their personal property, etc.

2.2 Upon being awarded the contract, the Contractor shall obtain a minimum of two (2) copies of all required insurance certificates called for herein, and submit one (1) copy of each certificate, to the Owner, within 20 days of contract award.

2.3 Bodily Injury Liability and Property Damage Liability Insurance shall, in addition to the coverage included herein, include coverage for injury to or destruction of any property arising out of the collapse of or structural injury to any building or structure due to demolition work and evidence of these coverages shall be filed with and approved by the Owner.

2.4 The Contractor's Property Damage Liability Insurance shall, in addition to the coverage noted herein, include coverage on all real and personal property in their care, custody and

control damaged in any way by him or his Subcontractors during the entire construction period on this project.

2.5 The Contractor and his Subcontractors shall be responsible for insuring building materials (installed and stored) and their tools and equipment whenever in use on the project, against fire damage, theft, vandalism, etc.

2.6 Certificates of the insurance company or companies stating the amount and type of coverage, terms of policies, etc., shall be furnished to the Owner, within 20 days of the contract award.

2.7 The Contractor shall, at his own expense, (in addition to the above) carry the following forms of insurance:

2.7.1 Contractor's Contractual Liability Insurance

Minimum coverage to be:

Bodily Injury	$ 500,000 for each person
	$ 1,000,000 for each occurrence
	$ 1,000,000 aggregate
Property Damage	$ 500,000 for each occurrence
	$ 1,000,000 aggregate

2.7.2 Contractor's Protective Liability Insurance

Minimum coverage to be:

Bodily Injury	$ 500,000 for each person
	$ 1,000,000 for each occurrence
	$ 1,000,000 aggregate
Property Damage	$ 500,000 for each occurrence
	$ 500,000 aggregate

2.7.3 Automobile Liability Insurance

Minimum coverage to be:

Bodily Injury	$ 1,000,000 for each person
	$ 1,000,000 for each occurrence

Property Damage $ 500,000 per accident

2.7.4 Prime Contractor's and Subcontractor's policies shall include contingent and contractual liability coverage in the same minimum amounts as 2.7.1 above.

2.7.5 Workman's Compensation (including Employer's Liability):

Minimum Limit on employer's liability to be as required by law.

Minimum Limit for all employees working at one site.

2.7.6 Certificates of Insurance must be filed with the Owner guaranteeing fifteen (15) days prior notice of cancellation, non-renewal, or any change in coverage and limits of liability shown as included on certificates.

2.7.7 Social Security Liability

2.7.7.1 With respect to all persons at any time employed by or on the payroll of the Contractor or performing any work for or on his behalf, or in connection with arising out of his business, the Contractor shall accept full and exclusive liability for the payment of any and all contributions or taxes or unemployment insurance, or old age retirement benefits, pensions or annuities now or hereafter imposed by the Government of the United States and the State or political subdivision thereof, whether the same be measured by wages, salaries or other remuneration paid to such persons or otherwise.

2.7.7.2 Upon request, the Contractor shall furnish Owner such information on payrolls or employment records as may be necessary to enable it to fully comply with the law imposing the aforesaid contributions or taxes.

2.7.7.3 If the Owner is required by law to and does pay any and/or all of the aforesaid contributions or taxes, the Contractor shall forthwith reimburse the Owner for the entire amount so paid by the Owner.

SECTION 1H

SPECIAL CONDITIONS - PART IV

DRAWINGS

1H.01 BIDDING DRAWINGS

Proposals shall be based upon the bidding drawings as listed in the Special Provisions Section J, and included with the specifications as issued to all bidders, which drawings may be modified by addenda issued by the Department during the bidding period, and later will, as modified by the addenda, become the contract drawings.

1H.02 CONSTRUCTION DRAWINGS

The owner will furnish to the Contractor, free from charge, five (5) sets of the drawings as issued or released for construction and for each subsequent construction revision. The Contractor shall bear the cost of reproduction of any additional copies which he may require.

1H.03 RECORD OR AS-BUILT DRAWINGS

The Contractor shall keep at the site a record set of prints on which he shall clearly and accurately record all approved changes and/or additions to the contract work made to meet field conditions. The set of drawings shall be used for this purpose only. At project completion, the Contractor shall obtain a set of sepia reproducibles, and neatly transfer to it all the recorded as-built information; and then provide two (2) prints of these sepias, along with the sepias themselves. These drawings shall be delivered to the Owner at the completion of the work, before the final payment shall be due and payable, as an accurate record of the work as actually executed.

1H.04 ADJACENT CONDITIONS

Wherever existing conditions, or construction not required as part of the work of this contract are shown on the drawings, they are so shown as a source of information to the Bidder. The Owner while believing such information to be substantially correct assumes no responsibility therefore. The Contractor shall have made himself familiar with all conditions affecting the nature and manner of performing the work and shall not be entitled to any extra compensation for any work or expense arising from or caused by his neglect to have verified all existing conditions and requirements.

1H.05 DIMENSIONS

The drawings are made to scale unless otherwise noted on drawing. All working dimensions shall be taken from the figured dimensions, or by actual measurements at the job. The Contractor shall study and compare all drawings and verify all figures before laying out or constructing the work and shall be responsible for any and all errors in his work which might have been avoided thereby. Whether or not an error is believed to exist, deviations from the drawings and the dimensions given thereon shall be made only after all measurements of existing established conditions notwithstanding the figured dimensions on the drawings. When figured dimensions are not in agreement with the Contractor's measurements, he shall immediately notify the Owner, who shall promptly adjust the same.

1H.06 DISCREPANCIES

If the Contractor discovers any discrepancies between the physical conditions of the work and the drawings, he shall immediately notify the Owner, who shall promptly adjust the same. Any work performed after such discovery without the approval of the Owner shall be at the Contractor's risk and expense.

1H.07 SHOP DRAWINGS

(a) After checking and verifying all field measurements, the Contractor will submit to the owner for approval in accordance with the accepted schedule of shop drawings submissions, a minimum of three copies of all shop or setting drawings or schedules for approval, two will be retained by the Department and one copy will be returned. When the drawings or schedules have been corrected, if necessary, and approved, six (6) copies shall be furnished to the Owner, including, if requested, one (1) transparent reproducible copy. All shop drawings shall have been checked and approved by the Contractor before submitting to the Owner. The date shown on the shop drawings will be complete with respect to dimensions, design criteria, materials of construction and the like to enable the Owner to review the information as required.

(b) The Contractor will also submit to the Owner for approval with such promptness as to cause no delay in the work, all samples required by the Contract Documents. All samples will have been checked and approved by the Contractor, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended.

(c) At the time of each submission, the Contractor will, in writing, call the Owner's attention to any deviations that the shop drawing or sample may have from the requirements of the Contract Documents. Substitution of alternate materials or equipment will be considered for approval by the Owner only in accordance with the provisions of Section 1D.09.

(d) The Owner will check and approve with reasonable promptness shop drawings and samples, but his checking and approval shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The Contractor will make any corrections required by the Owner and return the required number of

corrected copies of shop drawings or resubmit new samples. The approval of a separate item as such will not indicate approval of the assembly in which the item functions.

(e) No work requiring a shop drawing or sample submission shall be proceeded with until the submission has been approved by the Owner.

(f) The Owner's approval of shop drawings or samples shall not relieve the Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless the Contractor has in writing called the Owner's attention to such deviations at the time of submission and the Owner has given written approval to the specific deviation, nor shall it relieve the Contractor from errors or omissions in the shop drawings.

1H.08 LIST OF BIDDING DRAWINGS

The drawings issued for bidding and which are a part of these specifications are listed in Section 1J, Special Provisions.

SECTION 1I

SPECIAL CONDITIONS PART V

COMPLETION DATE AND PENALTY CLAUSE

1I.01 COMPLETION DATE

All work of this contract shall be completed within the time limit set out in Section 1-J of the Special Provisions, (1J19; 1J20).

1I.02 FAILURE TO COMPLETE WORK ON TIME

Failure to Complete on Time. For each calendar day or work day that work remains uncompleted after the Contract time has expired or beyond the completion date established by the Contract, the sum specified in Subsection 1.03 will be deducted from any money due the Contractor. This sum shall not be considered and treated as a penalty but as liquidated damages due the Department by reason of inconvenience to the public, added cost of engineering and supervision, and other extra expenditures of public funds due to the Contractor's failure to complete the work on time. Any adjustment of the Contract time for completion of work granted will be considered in the assessment of liquidated damages.

The column indicated in the charts as "Calendar Day" will also be used in the assessment of liquidated damages for contracts with a predetermined completion date.

Computations for the assessment of liquidated damages shall be made in accordance with the daily computations described in the definition of working day, when the Contract is a working contract. On all other contracts each and every consecutive calendar day, including Saturdays, Sundays and holidays, shall be included in the computations for the assessment of liquidated damages.

The Contractor shall become liable for liquidated damages for delays commencing from the date on which the Contract timeshall expire.

If there is a delay in the delivery of critical materials, such as steel, copper, or aluminum, due to defense needs, energy crisis, etc. a time extension shall be allowed for such delays. Each case will be independently evaluated to determine if delays were, in fact, beyond the control of the Contractor or fabricator and delayed the Project completion. Satisfactory supported time extension requests shall be made concurrently with the delay and not after the fact.

Requests for time extensions shall be subject to review by the Engineer, and the Engineer will determine the amount of time extension allowed.

There will be no acceptance of unsupported claims of delays in delivery of material as a basis for time extensions. The Contractor is presumed to have included in its Contract price, allowance for any anticipated delays in procurement of materials, which procurement is its sole responsibility. Unless some unusual market condition such as an industry wide strike, natural disaster, or area wide storages arises after bids are taken and prevents procurement of materials within the allowable time limitations, delays in delivery of such materials do not provide sufficient reason for suspending time charges.

Permission for the Contractor or surety to continue and finish work after the Contract

time and approved extensions have elapsed shall not waive the Department's rights under the Contract.

The Department may waive such portions of the liquidated damages as may accrue after the work is substantially complete and is in a condition for safe and convenient use by the traveling public.

Payment of liquidated damages will be deducted from payments otherwise due the Contractor or be made by direct payment by the Contractor in the event the total liquidated damages due exceed said deductions.

Subsection I.03 Schedule of Liquidated Damages

Schedule of Liquidated Damages

Awarded Contract Value		**Daily Change**	
For More Than---	To and including--	Work Day	Calendar Day
$ 0	$ 25,000	$ 380.00	$ 275.00
25,000	50,000	400.00	290.00
50,000	100,000	540.00	390.00
100,000	500,000	840.00	600.00
500,000	1,000,000	1,090.00	780.00
1,000,000	2,000,000	1,350.00	960.00
2,000,000	5,000,000	1,410.00	1,010.00
5,000,000	10,000,000	1,590.00	1,130.00
10,000,000	15,000,000	2,510.00	1,790.00
15,000,000	20,000,000	4,180.00	2,990.00
20,000,000	25,000,000	5,850.00	4,180.00
25,000,000	30,000,000	7,520.00	5,370.00
30,000,000	35,000,000	9,190.00	6,570.00
35,000,000	Over	10,870.00	7,760.00

CONTRACT NO. NAT201301 - HYD.DREDGE

SPECIAL PROVISIONS (SECTION 1-J)

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

CONTRACT NO. NAT201301 – HYD.DREDGE

SECTION 1-J

SPECIAL PROVISIONS

1J.01 GENERAL

These special conditions shall govern over the drawings and other sections of these Specifications.

1J.02 SCOPE OF WORK

A. The Contractor shall not begin construction until authorization is received from the State.

B. The plans and specifications are intended to cover a complete project. It should be distinctly understood that failure to mention any work that would be required to complete this project shall not relieve the Contractor of his responsibility to perform such work.

C. The work to be done under this contract includes, but is not limited to furnishing all labor, materials, tools, equipment, superintendent, transportation and performing all work in strict accordance with these specifications and required drawings.

D. The work shall be accomplished under contract to and supervision of Department of Natural Resources and Environmental Control (DNREC) for the State of Delaware.

E. The Contractor shall assume all responsibility for the project and construction site until accepted by DNREC, Division of Watershed Stewardship.

F. The work under this Contract including all necessary temporary items required for good, safe and sanitary construction practices and administration of the project, is subject to the approval of the Owner or Owner's Representative.

G. The work shall be complete in all its parts and ready for use in the time specified and in strict accordance with the terms and conditions of the Contract. Any deviation shall be subject to the written approval of the Owner and Owner's Representative.

H. The Contractor shall follow the requirements of all the permits issued for the proposed construction.

1J.03 CONTRACT DOCUMENTS AND SCHEDULE OF DRAWINGS

A. The Contract Documents consist of these specifications and any all subsequent addenda thereto and the Drawings as listed below.

The following list of, Inc. drawings all dated September 2013 form a part of the Contract Documents.

INDEX OF SHEETS

C-1	**Cover Sheet**
C-2	**Key Sheet**
C-3	**Plan View (Channel Maintenance Dredging)**
C-4	**Plan View – South Bowers beach nourishment**
C-8	**Details**
C-9	**Dredging Sections (Sta. 0+00 to Sta. 32+00)**
C-10	**Dredging Sections (Sta. 33+00 to Sta. 58+39)**
C-11	**Beach Nourishment Sections – South Bowers beach**

1J.04 PROJECT SITE

A. The project site is located in the Murderkill River channel and adjacent coastline of South Bowers beach, Kent County, Delaware as indicated on the Drawings.

B. The project site will be turned over to the Contractor as is, including any and all structures and/or construction work that may be present. He shall perform all work of every description necessary to permit him to proceed with the execution of all the work called for in the Specifications and/or as shown or indicated on the Contract Drawings.

C. The Contractor shall satisfy himself as to the accuracy and completeness of these specifications regarding the nature and extent of all work described.

D. Because of the proximity of improved properties, the Contractor shall exercise extreme care in his construction operations. The Contractor shall secure the approval of the property owner for the particular method of ingress and egress, place for storage of materials and equipment, etc., prior to beginning work.

E. The existing bottom profiles, beach contours and/or bank alignment shown on the Drawings were correct when surveyed. However, because of interim erosion and littoral transport, the Contractor shall satisfy himself as to all conditions at the time of bidding this project and include in his proposal any changes that would be necessary to accomplish a complete and functional project.

F. The Contractor shall make all necessary field measurements at the job site so as to complete the project as required in the specifications.

G. Should there be any discrepancies between the Drawings, Specifications and/or field conditions after bidding and prior to the beginning work, the Contractor shall bring such discrepancies to the attention of the Owner or Owner's Representative at the initiation conference.

H. The Contractor shall take all necessary precautions and measures to protect all properties from damage. He shall repair all damage caused by his operations to all public and private property including roads, walks, curbing, utilities, trees, shrubs, plantings, etc. and leave the property in good condition and/or at least equivalent to the condition found.

I. The Contractor shall, at all times, keep the work site free from accumulation of waste materials, rubbish, surplus materials, etc. and shall leave the work area completely clean.

1J.05 PRE-BID MEETING AND BID OPENING

A mandatory pre-bid meeting will be held at **10:00 A.M., October 29, 2013** at the site. The bid quotation reply section must be completed and returned no later than **2:00 P.M., November 14, 2013**. The bid must be returned in a sealed envelope clearly marked on the outside, **"Contract No. NAT201301.HYD-DREDGE Murderkill River Maintenance Dredging and Beach Nourishment" to DNREC DIVISION OF WATERSHED STEWARDSHIP** the bid opening will be held in Room B172, 89 Kings Highway, Dover, Delaware 19901.

1J.06 PRICE

Prices shall be quoted net 30 days.

1J.07 BOND REQUIREMENTS

A. Bid Bond

Each bidder shall furnish a bond to the State of Delaware, for the benefit of the Department of Natural Resources and Environmental Control, in the amount equal to 10% of the total bid. The bond shall be drawn upon an insurance or bonding company authorized to do business in the State of Delaware. If the enclosed State of Delaware bond form is not used, the substitute bond must reflect the minimum conditions specified in the standard form. A certified check made out to the Department of Natural Resources and Environmental Control in an amount equal to 10% of the total contract value may be submitted in lieu of a bid bond.

B. Performance Bond and Payment Bonds

Vendors awarded contracts are required to furnish 100% Performance Bond AND Payments Bonds to the State of Delaware for the benefit of the Department of Natural Resources with each surety in the amount of the 100% of total contract. Said bonds shall be conditioned upon the faithful performance of the contract. These guarantees shall be submitted in the form of good and sufficient bond drawn upon an insurance or bonding company authorized to do business in the State of Delaware. If the Department form is not utilized, the substituted bond form must reflect the minimum conditions specified in the form. (1C.03)

1J.08 DRAWINGS

Any required drawings shall be produced by the Contractor, following on the job measurements. All drawings must be approved by the Owner and/or Engineer before fabrication or construction begins.

1J.09 SPECIFICATIONS

The Technical specification section lists the materials to be used for this project. The list generally indicates the type and quality of the desired item. Substitutes are permitted provided the substituted item is of equal quality and will provide the same functionality and longevity as the item specified. Items with the initials OAE (OR APPROVED EQUAL) will require written approval of the Project Manager for substitution.

1J.10 REFUSE & WASTE MATERIALS

The Contractor shall at all times keep the project site clean and free from refuse and construction waste materials. It shall be the contractor's responsibility to arrange for removal of any and all waste material generated from this project. The project area shall be clean and free from construction refuse at project completion.

1J.11 BID ALTERNATIVES

Bid alternatives that provide comparable functionality, maintenance, and utility, while reducing the project cost, will be entertained as a value engineering issue following the award of the contract.

1J.12 CONTACT PERSON(S)

Charles E. Williams, II
DNREC – Division of Watershed Stewardship
(302) 739-9921

1J.13 FUNDING

The Department reserves the right to award partially by BID Item or to make no award pending availability of funds.

1J.14 AWARD OF CONTRACT

This contract shall be awarded to the lowest responsible bidder submitting the lowest lump sum price accepted by the Owner, pending availability of funds.

The Owner reserves the right to select any combination of lump sum or unit prices (based on estimated quantities), to be consistent with allowable moneys and to best serve the interest of the State.

1J.15 SPECIAL INSTRUCTIONS TO THE CONTRACTOR

A. As soon as possible after the Award of Contract, and before starting work, the Contractor shall meet with the State on site, to discuss all aspects of the proposed work. At this meeting the Contractor shall be prepared to review all procedures involved in carrying out the proposed work and shall deliver a planned work schedule and material delivery schedule.

B. The Contractor shall coordinate his work schedule with the State at all times. The Contractor shall not perform any work at the site without representatives of the State present unless he has previously obtained the permission from the State.

C. The Contractor shall not ingress into the existing wetlands areas.

D. Existing Utilities: The Contractor shall contact Miss Utility at 1-800-257-7777 at least 72 hours prior to the onset of construction, so that existing utilities in the work area may be located and marked. If utilities are to remain in place, provide adequate means of protection during earthwork operations. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Owner or Owner's Representative immediately for directions on how to proceed. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when permitted in writing by the Owner or Owner's representative, and then only after acceptable temporary utility services have been provided.

E. While it is believed that the test borings accurately indicate subsurface conditions for boring locations on the date taken, the Owner and Engineer assume no responsibility for actual conditions which may be encountered in execution of Contract. Should Contractor rely, for any purpose, upon accuracy or completeness of said borings, or log thereof, he does so at his own risk.

F. Certifications, material testing, and soil testing as outlined elsewhere in these Specifications shall be performed by an independent testing firm approved by the State or State's Representative. The testing firm shall coordinate and perform all testing with the General Contractor and his suppliers. Certification and test reports shall be submitted to the Project Manager for approval. Costs associated with testing shall be borne by the General Contractor and included in the Contractor's lump sum price bid.

G. The Contractor shall be allowed to work the dredging aspect of the Contract (including grading at the beach nourishment areas) 24 hours a day, 7 days a week. Otherwise, construction work is allowed from 7:00 am to 6:00 pm.

1J.16 SCHEDULES

The Contractor shall coordinate his work schedule with the Owner at all times. The Contractor shall not perform any work at the site without representatives of the Owner and Engineer present unless he has previously obtained the permission of both.

1J.17 TRAFFIC

Local traffic at the site must be maintained as necessary in accordance with plans which must be approved at the pre-construction meeting.

1J.18 COMPLETION DATE

Dredging and beach nourishment shall be completed no later than February 28, 2014.

1J.19 GUARANTEE

The Contractor shall guarantee the work of its employees, suppliers and subcontractors for one year from time of final payment, and the Contractor shall, at his expense, remedy any defects of which the Contractor is given written notice, in a manner acceptable to the owner.

1J.20 INSPECTION

Inspection of the supplies, material and/or work will be performed by the Department and/or its authorized representative. The Department reserves the right to reject or stop any or all portions of the work which fail to meet these specifications.

1J.21 INVOICES

All billing shall be to the Department of Natural Resources and Environmental Control Division of Watershed Stewardship, 89 Kings Highway, Dover, DE 19901 and marked Contract No. NAT201301 – HYD.DREDGE; Attention: Charles E. Williams, II.

1J.22 BASIS OF PAYMENT

Payment of this contract shall be at the accepted contractual bid price. There will be monthly progress payments allowed based on percentage complete. Request for payments must be submitted by the 25th of each month. As referenced in 29 DELC 6962 (c) (5) (a): "Retainage shall be withheld from each monthly request for payment. The amount withheld shall be ten (10) percent of each request for payment. Upon completion of ninety (90) percent of the project the retainage shall be reduced to five (5) percent. Upon completion of the final punch list and acceptance of the project the remaining retainage shall be released."

1J.23 ENGINEER AND/OR ARCHITECT

Andrews Miller and Associates
A Division of Davis, Bowen & Friedel, Inc.
106 North Washington Street
Easton, Maryland 21601

CONTRACT NO. NAT201301- HYD.DREDGE

SECTION 2
TECHNICAL SPECIFICATIONS

DIVISION 35 –WATERWAY AND MARINE CONSTRUCTION

SECTION 35 20 23.23 – HYDRAULIC DREDGING

Part 1 – General

1.1 Scope:

1.1.1 The Contractor shall provide all labor, material, equipment and services necessary to hydraulically dredge the federal authorized channel (Base Bid) as shown on the Drawings, as described in these Specifications and as directed by Delaware Department of Natural Resources and Environmental Control (DNREC) or DNREC's representative. Dredging at the Off-Shore Borrow Area to obtain beach nourishment material is Not In Contract **(NIC)**.

1.1.2 The Contractor shall adhere to the terms of the various permits issued to this project. This shall include permits from the U.S. Army Corps of Engineers, Delaware Department of Natural Resources and Environmental Control (DNREC) and any other applicable permits.

1.1.3 The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to work. If the Contractor observes that the Specifications and/or Drawings are at variance therewith, he will give DNREC prompt written notice thereof. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to DNREC, he will bear all costs arising therefrom.

1.1.4 The Contractor is responsible for the stakeout of the channel and beach nourishment areas. Once the stake out is complete, a pre-construction meeting may be conducted for all parties to approve the layout. The Contractor shall furnish at his own expense all stakes, templates, platforms, equipment tools and materials and labor as may be required to layout any part of the work. The Contractor shall be held responsible for the execution of the work to such lines and grades as indicated by the Plans. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks established until authorized to remove them. If such marks are destroyed by the Contractor or through his negligence, prior to their authorized removal, they shall be replaced by the Contractor at his expense.

1.1.5 Related work not included in this Section consists of the following:

1.1.5.1 Beach Nourishment provided under Section 35 20 24.

1.2 Site Investigation:

The Contractor acknowledges that he has satisfied himself to the nature and location of the work, the general and local conditions, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, tides or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work. The Contractor further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site,

including all exploratory work done by DNREC, as well as, from information presented by the drawings and specifications made a part of this contract.

Any failure by the Contractor to acquaint himself with the available information will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work.

DNREC assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by DNREC. DNREC also assumes no responsibility for any understanding or representations made by its officers or agents during or prior to the execution of this contract unless (i) such understanding or representations are expressly stated in the contract and (ii) the contract expressly provides that the responsibility therefore is assumed by DNREC which are not expressly assumed by DNREC in the contract shall be deemed only for the information of the Contractor.

1.3 **Surveyors' Qualifications:** All surveys shall be conducted under the direction and supervision of a surveyor or professional engineer licensed in the State of Delaware with a minimum of 5 years documented experience in bathymetric surveying environment similar in nature to the surveys required under this contract. The Contractor shall submit qualifications to DNREC for approval prior to performing any work.

1.4 **Weather Conditions:**

1.4.1 Complete weather records and reports may be obtained from the U.S. Weather Bureau. The Contractor shall satisfy himself as to the hazards likely to occur from weather conditions during the dredging period. The site work is exposed, and suspension of the work may at times be necessary during extreme storm or weather periods.

1.4.2. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all-weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5	4	5	6	4	3	6	6	5	4	5	2

1.4.3 Tidal currents are not sufficient velocity to have a serious adverse effect on dredging operations. The mean range of the tide is 5.1 feet, with greater fluctuation occurring during storm periods.

1.5 **Estimated Quantities:** The total estimated quantities of materials necessary to be removed from within the specified dredging limits to complete the work as shown on the permit drawings is an estimate only. The Contractor will be required to complete all the dredging work specified herein in accordance with the Contract and at the Contract lump sum price.

1.5.1 **Estimated Quality and quantity of material to be dredged:** The depths of water, elevations of land, and other data contained in these Plans and Specifications are made available as information held by DNREC, but DNREC assumes no responsibility that this information was complete or correct when obtained, or that it will not change. Before submitting his bid, the Contractor shall

determine for himself the depth of water, the elevations of land, the possibilities of scouring of the bottom with deepening of the water and erosion of the land before construction can be complete, and all other information necessary to him in calculating risks, the degree of difficulty of the work, the yardage of material, and a firm lump sum contract bid price. It is emphasized that the Contractor must anticipate changes in the construction site not only before the start of construction, but during construction as well.

1.5.2 The Contractor shall be furnished with copies of all Federal and State permits, which are required to be available at the construction site. The engineering sketches and notes are approximate and suitable only for permit purposes. Since the final design may be adjusted from the issued permit, the Contractor shall attach no significance to volume mentioned in these permits; the Contractor shall compute his own as hereinafter specified.

1.5.3 **The Contractor shall be solely responsible for determining the character, quality and quantity of the material to be encountered and shall submit his bid as a lump sum price which includes all costs involved in the dredging of the channel as well as those costs associated with the beach nourishment area at South Bowers and satisfactory completion of the project.**

1.6 Character of Materials:

1.6.1 Channel Dredging: Subsurface investigations of the channel area have been conducted by DNREC and results of these investigations are attached in Appendix 2. The channel material to be dredged is predominately beach quality sand from Sta. 0+00 to approximately Sta. 38+00 and unsuitable fine sand and silt from approximately Sta. 38+00 to Sta. 58+39. Although the results of these explorations are representative of subsurface conditions at their respective locations and for their vertical reaches, local minor variations in the subsurface materials are to be expected.

1.6.2 Off-Shore Borrow Area Dredging **(NIC):** Subsurface investigations of the borrow area has been conducted by DNREC and results of these investigations are available upon request. The off-shore borrow area has up to 8.8 feet of unsuitable material over beach quality sand. Although the results of these explorations are representative of subsurface conditions at their respective locations and for their vertical reaches, local minor variations in the subsurface materials are to be expected. All material, excluding material obtained from channel dredging, for beach fill shall be dredged from within this area. In the event any portion of the borrow area yields material unsuitable for use on the beach, DNREC, may direct that the depth of excavation be changed or that the excavating equipment be moved to other portions of the borrow area that will yield suitable material. Under no circumstances shall material be obtained from outside the established limits of the borrow area. Borrow area limits shown on the drawings are toe of slope.

1.6.3 Beach Fill Materials: Dredging from the channel (Base Bid) and off-shore borrow area (NIC) shall be accomplished so that only satisfactory beach fill material is placed on the beach. The presence of satisfactory material shall be indicated by subsurface soils data, visual inspection of discharged material on the beach, and subsequent laboratory test results if necessary. Inspections and tests for discovery of satisfactory material for beach fill shall be the responsibility of the Contractor. Should the Contractor encounter unsatisfactory materials for beach fill within the designated channel (and/or Off-Shore Borrow Area which is not in Contract), the Contractor shall record in his Daily Report the location of the unsatisfactory beach

fill material and move borrow operations to another location within the designated dredge area. Should unsatisfactory beach fill material be discovered during beach fill placement operations, placement operations shall immediately be stopped and DNREC notified. DNREC will determine the corrective measures and final disposition of unsatisfactory material placed in the beach fill area.

1.6.3.1 Satisfactory Materials: Materials classified in accordance with ASTM D 2487 as SW, SP, and SP-SM containing not more than 10 percent fines passing a U.S. Standard Sieve No.200, are satisfactory for beach fill. Material placed on the beach meeting these requirements shall be considered as satisfactory.

1.6.3.2 Unsatisfactory Materials: Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Materials classified in accordance with ASTM D 2487 as SP-SM with greater than 10 percent fines, SM, SC, CL, CH, ML, MH, OL, OH, Pt, GP, GW, GM, and GC are unsatisfactory.

1.7 Misplaced Equipment:

1.7.1 Should the Contractor, during the progress of the work, lose, dump, throw overboard, sink or misplace any material, plant, machinery or appliance which in the opinion of DNREC or the Engineer, may be dangerous to or obstruct navigation, the Contractor shall recover and remove the same with the utmost dispatch. The Contractor shall give immediate notice with description and location of such obstructions, to DNREC or inspector, and when required shall mark or buoy such obstructions until the same are removed. Should the Contractor refuse, neglect or delay compliance with the above requirements, such obstructions may be removed by DNREC and the cost of such removal may be deducted from any money due or to become due to the Contractor, or may be recovered under his bond. The liability of the Contractor for the removal of a vessel wrecked or sunk without fault or negligence shall be limited to that provided in Sections 15, 19 and 20 of the River and Harbor Act of March 3, 1899.

Part 2 - Products

Not Used.

Part 3 - Execution

3.1 General Excavation:

3.1.1 Notification of U.S. Coast Guard

3.1.1.1 Navigation Aids: Navigation aids located within or near the areas to be dredged will be removed, if necessary, by the U.S. Coast Guard in advance of dredging operations. The Contractor shall not remove, change the location of, obstruct, willfully damage, make fast to, or interfere with any aid of navigation.

3.1.1.2 Dredging Aids: The Contractor shall obtain approval from the U.S. Coast Guard for all buoys, dredging aid markers to be placed in the water, and dredging aid markers affixed with a light prior to the installation. Dredging aid markers and lights shall not

be colored or placed in a manner that they will obstruct or be confused with navigation aids.

3.1.2 Dredging Plans: The Contractor shall supply a “Dredging Plan” to DNREC within ten (10) days after the Notice to Proceed for approval. His proposed plan for dredging shall indicate schedule, phasing and direction for dredging the channel and off-shore borrow area. The plan shall include the type of dredge plant to be utilized, the location and type of any booster pump (if required) to be utilized, type and route of pipeline, the order of dredging, etc. DNREC reserves the right to reject any scenario which in their opinion may be detrimental to the environment or for any other credible reason. Dredging at the off-shore borrow area is NIC.

3.1.3 Works Areas: The Contractor shall prevent public access to the discharge end of the pipeline. The Contractor shall erect, maintain, and move as necessary, a restrictive barrier around the discharge of the hydraulic pipeline. The barrier shall be constructed so as to prevent the public from approaching the discharge from any direction closer than 40 feet. The Contractor shall post signs in a conspicuous location with the wording "DANGER - HIGH PRESSURE DISCHARGE FROM DREDGE". Enforcement shall be the Contractor's responsibility at no additional cost to DNREC.

3.1.3.1 Access: The Contractor shall be responsible for providing and maintaining access necessary for his equipment and plant to and from the dredge sites, mooring areas, and disposal areas. The Contractor shall ascertain the environmental conditions which can affect the access such as climate, winds, currents, waves, depths, shoaling, and scouring tendencies.

3.1.3.2 Obstruction of Navigable Waters: DNREC will not undertake to keep the waterway free from vessels or other obstructions, except to the extent of such regulations, if any, as may be prescribed by the Secretary of the Army, in accordance with the provisions of Section 7 of the River and Harbor Act approved 8 August 1917. The Contractor will be required to conduct the work in such a manner as to obstruct navigation as little as possible. Upon completion of the work the Contractor shall promptly remove his plant, including ranges, buoys, piles and other marks placed by him under the contract in navigable waters or on shore.

3.1.3.3 Signal Lights: The Contractor shall display signal lights and conduct his operation in accordance with the General Regulations of the Department of the Army and of the Coast Guard governing lights and day signals to be displaced by the vessels of more than 65 feet in length moored or anchored in a fairway or channel, and the passing by the other vessels of floating plant working in navigable channels, as approved by the Secretary of the Army, (Title 33 C.F.R. 201.16) and the Commandant, U.S. Coast Guard (Title 33 C.F.R. 80.18 – 80.31a and Title 33 C.F.R. 95.51 – 95.70).

3.1.4 Subaqueous Cable Crossing: The Contractor shall be responsible for verifying the locations and depths of all utility crossings and take precautions against damages which might result from his operations, especially the sinking of dredge spuds and/or anchors into the channel bottom, in the vicinity of utility crossings. If

any damage occurs as a result of his operations, the Contractor will be required to suspend dredging until the damage is repaired by the Contractor and approved by DNREC. Costs of such repairs and downtime of the dredge and attendant plant shall be at the Contractor's expense.

3.1.5 Daily Inspections: The Contractor shall institute a daily inspection program to assure all safety requirements are being fulfilled. Reports of daily inspections shall be maintained in the Contractor's official daily log book. The reports shall be records of the daily inspections and resulting actions. Each Report will include, as a minimum, the following:

3.1.5.1 Phase (s) of construction underway during inspection.

3.1.5.2 Locations of areas inspections were made.

3.1.5.3 Results of inspection, including nature of deficiencies observed and corrective actions taken, or to be taken, date, and signature of the person responsible for its contents.

3.1.6 Removal and Transport of Material Dredged from Channel

3.1.6.1 The dredging of the channel is to be accomplished using a hydraulic dredge. It is estimated that the following quantity of material will be removed: 45,000 cubic yards. However, the Contactor shall be solely responsible for determining the Character, Quality and Quantity of the material to be encountered and shall submit his bid as a lump sum price which includes all costs involved in the dredging of the channel/basin, as well as those costs associated with the disposal area and satisfactory completion of the project. The quantities shown in the bid documents are approximations only and differences between those and the Contractor's measured quantities shall not be cause for a cost extra.

3.1.6.2 The channel shall be dredged in such a manner that upon completion of the Contract Work, a post dredge survey conducted by the Contractor shall show the minimum depth and width of the channel as required by the drawings. Depth and elevation shall be measured from meal lower low water (M.L.L.W.) with the M.L.L.W. understood to mean zero depth and zero elevation. DNREC has established a Contract vertical datum by establishing a bench mark relating as closely as is practicable to M.L.L.W. **The Contractor has understood before submitting his bid that this bench mark shall be the sole datum for measuring the Contract Dredging and Beach Nourishment Work and that no other bench marks which may be found in the area shall be used.**

3.1.6.3 The channel shall be dredged to the bottom depth, width and length specified on the design drawings. The side slopes shall be dredged to or allowed to slough to produce a resultant rise from the dredged bottom on a slope no steeper than one foot vertically to three feet horizontally. If a square cut method is used, then sloughing of sides must take into account this minimum channel width.

3.1.6.4 Should the Contractor dredge to a depth greater than that shown on the plans in the vicinity of the existing jetties, bulkheads, and piers, he shall be responsible for any additional costs required to reconstruct and/or reinforce the structures as directed by DNREC and/or Engineer. All costs associated with this work shall be borne solely by the Contractor.

3.1.6.5 Any debris, trash, wreckage and/or materials which cannot be discharged by pipeline onto the beach nourishment sites or overboard disposal area shall be disposed of in a manner and location pre-approved by DNREC. Any obstruction that cannot be removed by the normal dredging operations shall immediately be brought to the attention of DNREC. Cost for removal and disposal shall be negotiated with DNREC prior to the execution of the work. Should the Contractor, during dredging operations, encounter any objects on the channel bottom which could be a hazard to navigation, he will immediately notify the U.S. Coast Guard and request that the location and description of the navigational hazard be published in the Local Notice to Mariners. The Contractor shall also notify DNREC so that the appropriate arrangement can be made for removal of the navigational hazard.

3.1.6.6 To cover the inaccuracies to the dredging process, the Contractor may elect to dredge deeper than the specified project's dredge depth of -8' MLLW. The Contractor shall take all measures necessary to ensure that no dredging is performed to a depth less than -7.5' MLLW. The channel width may not be exceeded unless approved by DNREC. If these limitations prove inadequate, then the Contractor shall bring this immediately to the attention of DNREC. It shall be understood that the Contractor has included this excess in his lump sum bid and that no additional payment shall be allowed. Any material dredged exceeding these dimensions shall be classified as misplaced material and subject to the provisions referenced elsewhere in these specifications.

3.1.6.7 The dredged channel shall have a finished bottom depth and width as specified on the Contract Drawings. This shall be checked by a bathymetric survey performed by the Contractor after completion of the work and prior to final payment. It shall the Contractor's responsibility to contact DNREC at (302) 739-9921 at least five (5) business days prior to the post dredge survey. In the event that a side slope has not completely formed from a vertical cut by the time the Contract Work has been completed, and prior to the final payment, DNREC shall be the judge as to the sufficiently of the vertical cut to allow eventual slumping of this particular type of bottom material without encroachment on the channel. When the site and vicinity of the work are found to be in satisfactory condition and disposal has been completed in accordance with these Specifications, the dredging will be accepted finally.

3.1.8 Removal and Transport of Material Dredged from Off-Shore Borrow Area **(NIC)**

3.1.8.1 The Contractor shall remove all material by hydraulic dredge and transport materials dredged from the off-shore borrow area by a hydraulic pipeline to the overboard disposal and beachfill placement areas as indicated. The dredge cuts in the borrow area shall not have side slopes steeper than 1 on 5. Dredging shall be performed such that the dredge excavates the overburden (disposing the material at the off-shore disposal area) to gain access to the underlying sand material. The Contractor shall use relatively shallow, uniform passes excavating the beach quality sand with a maximum overall cut depth of 7 feet. The Contractor shall use the contour method (i.e. dredged to a uniform depth over the portion of the borrow area as practical and specified in the Contractor's "Dredging Plan" as approved by DNREC) to maintain the relative profile and shape of the sand borrow area. As much as is practicable, passes of the dredge shall be made such that the bottom is excavated uniformly, Dredge pipeline shall be placed on the beach and advanced in a manner as approved by DNREC and in accordance with Section 35 20 24 –Beach Nourishment.

3.1.9 Disposal of Excavated Material: Material excavated shall be transported to and deposited in the disposal areas designated on the drawings and as specified in Section 35 20 24 Beach Nourishment.

3.1.9.1 Dredged Material Pump-out Controls: The Contractor shall provide constant monitoring of the material placement operations. Qualified monitoring personnel shall have fully functional two-way radio communications with the dredge operator and on-beach monitors at all times when pump out operations are in progress. Requirements for monitoring material discharged on the beach are specified in SECTION 35 20 24. Frequent communication checks shall be made to assure proper discharge of the material placement during the pump out operations. In the event of any communications failure or improper material placement is determined, all pump out and placement operations shall be immediately suspended until communications are restored as approved by DNREC, or in the event improper material placement, until proper material placement procedures are reestablished by the Contractor as approved by DNREC

3.1.9.2 Dredge Discharge Pipeline: The Contractor shall plainly mark the pipeline access routes with conspicuous stakes, targets, and/or buoys to be maintained throughout the contract operations. A tight dredge discharge pipeline shall be maintained to prevent spilling of dredged material or dredge water outside of the disposal areas. The Contractor shall provide and maintain radio communication between the dredge and disposal areas. The pipeline shall be inspected at least twice daily for leaks. Failure to immediately repair leaks in the discharge pipeline will result in suspension of dredging operations and require prompt repair of pipeline as a prerequisite to the resumption of dredging. Any damage to private or public property resulting from the

Contractor's operations shall be repaired by the Contractor at his expense.

3.1.9.3 Submerged Pipeline: In the event the Contractor elects to submerge his pipeline, the pipeline shall rest on the bay bottom. Should the Contractor elect to use a pipeline material which is buoyant or semi-buoyant, such as PVC pipe or similar low density materials, the Contractor shall securely anchor the pipeline to prevent the pipeline from lifting off the bottom under any conditions. The Contractor shall make daily inspections of the submerged pipeline to ensure buoyancy has not loosened the anchors. The Contractor shall remove all anchors when the submerged pipeline is removed. The location of the entire length of submerged pipeline shall be marked with signs, buoys, lights, and flags conforming to the U.S. Coast Guard regulations.

3.1.9.4 Floating Pipeline: Should the Contractor's pipeline not rest on the bottom, it will be considered a floating pipeline and shall be visible on the surface and clearly marked. In no case will the Contractor's pipeline be allowed to fluctuate between the surface and the bottom, or lie partly submerged. Lights shall be installed on the floating pipeline as required in paragraph “Signal Lights” above. The lights shall be supported either by buoys or by temporary piling, provided by the Contractor and approved by DNREC. Where the pipeline does not cross the navigable channel, the flashing yellow all-around lights shall be spaced not over 200 feet apart, unless closer spacing is required by U.S. Coast Guard personnel, in which case the requirements of the U.S. Coast Guard shall govern, at no additional cost to DNREC.

3.1.9.5 Misplaced Dredged Materials: Misplaced dredged materials deposited outside of the beachfill and off-shore disposal area will be classified as misplaced material and will result in a suspension of dredging operations. Redredging of such materials will be required as a prerequisite to the resumption of dredging unless DNREC, at their discretion, determines that redredging of such material is not practical.

3.1.10 Quality Assurance:

3.1.10.1 Inspection: The work is subject to inspection by DNREC as provided in the Contract, but the presence of the inspector shall not relieve the Contractor of responsibility for the proper execution of the work in accordance with the specifications. The Contractor will be required:

3.1.10.1.1 To furnish, on the request of DNREC or any inspector, the use of such boats, boatmen, laborers, and material forming a part of the ordinary and usual equipment and crew of the plant as may be reasonably necessary in inspecting, examining partially completed work, and supervising the work.

3.1.10.1.2 To furnish, on the request of DNREC or any inspector, suitable transportation from all points on shore designated by DNREC to and from the various pieces of plant, and to and from the disposal areas.

3.1.10.1.3 Should the Contractor refuse, neglect, or delay compliance with these requirements, the specific facilities may be furnished and maintained by DNREC and the cost thereof will be deducted from any amounts due or to become due the Contractor.

3.1.10.2 Conditional Acceptance – Channel Dredging: As soon as practicable after the completion of the dredging operations, and as confirmed by DNREC's inspector, DNREC will issue a Conditional Acceptance for the channel dredging portion of the contract only. This Conditional Acceptance will remain in effect until the Contractor performs a post-dredge bathymetric survey of the channel.

3.1.10.3 Post Dredge Surveys: The Contractor shall perform a post-dredge survey that will thoroughly examine the designated dredging area by sounding or by sweeping, to determine whether the work has been done in accordance with these specifications and Contract Drawings. When the post-dredge surveys confirm that the designated dredging areas and the vicinity of the dredging work meets the design dredging depths according to the Contract Drawings and these specifications, the dredging work (only) will be finally accepted by DNREC.

3.1.10.3.1 The contractor shall perform the post-dredge survey within seventy-two (72) hours from the confirmed date of completion of dredging operations.

3.1.10.3.2 Prior to establishing a date of completion of dredging operations as described above, the Contractor shall take into account possible natural scenarios that might delay his surveyor from performing the post-dredge survey within the 72 hour window. Natural scenarios may include, but not limited to, the freezing of the waterway, forecasts of a significant storm event or Northwest winds, spring and neap tides, etc.

3.1.10.3.3 The inability of the Contractor to perform the post-dredge survey within the 72 hours from the confirmed date of completion due to natural causes does not relieve the Contractor of his responsibility to maintain the designated dredged area.

3.1.10.3.4 The Contractor is responsible for the designated dredging areas until completion and acceptance by DNREC of the post-dredge surveys.

Part 4 – Measurement and Payment

4.1 General:

4.1.1 No measurement for payment for dredging the Murderkill River channel will be made since the cost shall be included in the lump sum base price bid.

- END OF SECTION -

DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

SECTION 35 20 24 - BEACH NOURISHMENT

Part 1 – General

1.1 Scope:

1.1.1 The Contractor shall furnish all labor, materials and equipment necessary to perform all operations in connection with placement/ grading of the hydraulically dredged material obtained from dredging the Murderkill River Channel along South Bowers' shoreline to the lines and grades as shown on the Drawings, as described in these Specifications and as directed by Delaware Department of Natural Resources and Environmental Control (DNREC) or their Representative.

1.1.2 Supplemental nourishment of the shorelines at South Bowers and North Bowers Beach shorelines using the Off-shore Borrow Area as a sand source are **N**ot-**I**n-**C**ontract **(NIC)**.

1.1.3 The Contractor shall adhere to the terms of the various permits issued to this project. This shall include permits from the U.S. Army Corps of Engineers, DNREC, and any other applicable permits.

1.1.4 The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to work. If the Contractor observes that the Specifications and/or Drawings are at variance therewith, he will give DNREC prompt written notice thereof. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to DNREC, he will bear all costs arising therefrom.

1.1.5 Related work not included in this Section consists of the following:

1.1.5.1 "Hydraulic Dredging" provided under Section 35 20 23.23.

1.1.5.2 Appendix 2: Geotechnical Report dated August 20, 2013.

1.2 Surveyors' Qualifications: All surveys shall be conducted under the direction and supervision of a surveyor or professional engineer licensed in the State of Delaware with a minimum of 5 years of documented experience. The Contractor shall submit qualifications to DNREC for approval prior to performing any dredging and/or beach nourishment.

Part 2 - Products

2.1 Beach Nourishment Sand Material: Sand material shall be obtained by the Contractor for beach nourishment from dredging the Murderkill River Channel (borrow dredging from the off-shore borrow area is NIC). Material classified in accordance with ASTM D2487 as SW, SP, and SP-SM containing not more than 10 percent fines passing a U.S. Standard Sieve No. 200 is satisfactory for beach fill. Material placed on the beach meeting these requirements shall be considered as satisfactory.

2.2 Unsatisfactory Material: Material located at the waterward end of the Murderkill River Channel (and overlaying the beach quality sand at the off-shore borrow area NIC) classified in accordance with ASTM S2487 as SP-SM with greater than 10% fines, SM, SC, CL, CH, ML, MH, OL, OH, PT, GP, GW and GC shall be considered unsuitable for beach nourishment materials.

2.3 **Survey Equipment and Materials:** The Contractor shall furnish, at his own expense, all such stakes, spikes, steel pins, templates, platforms, equipment, tools and material, and all labor as may be required in layout of any part of the work from the control points established by DNREC as shown on the plans. He shall utilize electrical metallic tubing (EMT) or other method approved by the DNREC or their representative for survey stakes and grade markers on and around the beach area or in the water. Wood stakes shall not be utilized in these areas.

2.4 **Sand Fence (NIC):** Sand fence fabric shall consist of 4 feet high, 3/8 inch thick, 1-1/2 inch wide spruce or aspen wood slats spaced 2 inches apart having red oxide finish. Sand fence posts shall be galvanized steel "T" posts, rigid, heavy-gauge with studded grooves for attachments and an anchor plate near the base.

Part 3 - Execution

3.1 **Surveys at beach nourishment areas resulting from Murderkill River maintenance dredging:**

3.1.1 All surveys at the South Bowers beach nourishment area shall be performed at the Contractor's expense by a Land Surveyor or Professional Engineer registered in Delaware acceptable to DNREC. Horizontal control shall consist of a closed traverse loop which shall be tied to the control points shown on the drawings. All legal requirements and procedures for accuracy in establishing control and in performing surveys shall be met. All traverse and level runs shall be closed and adjusted. Accuracy of traverse shall be 1:3000 whereas elevation loop levels shall close to within 0.05 feet prior to adjustment.

3.1.2 The Contractor shall take after beach nourishment placement surveys along the lengths of the shoreline to be nourished. Surveys shall commence not more than five (5) calendar days after final grading of each operation.

3.1.3 As-Built surveys shall be used to confirm that the Contractor has fulfilled all Contract requirements with respect to beach nourishment.

3.1.4 One (1) copy each of the As-Built survey data shall be submitted by the Contractor with each application for payment. Cross sections used for verification of the beach nourishment fill sections shall be spaced no more than 50 feet apart with four range stakes placed; one at the landward edge of the fill material, one at the landward edge of beach crest, one at the bayward beach crest and one at the bayward edge of the fill.

3.1.5 The Contractor shall lay out the work by establishing all lines and grades at the site necessary to control the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the Specifications or on the Contract Drawings. The Contractor shall place and establish such additional stakes and markers as may be necessary for control and guidance of his construction operations. All survey data shall be recorded in accordance with standard and approved methods. All field notes, sketches, recordings and computations made by the Contractor in establishing horizontal and vertical control points shall be available at all times during the progress of the work for ready examination by DNREC.

3.1.6 Cross section data shall be plotted on paper or other reproducible media at no smaller scale than 1 inch = 10 feet and all sheets shall be sealed by a Land Surveyor or Professional Engineer as acceptable to DNREC. The location of the range stakes shall be noted on the profile plots.

3.1.7 It shall be the responsibility of the Contractor to maintain and preserve all stakes and other markers established by him until authorized to remove them. If any of the control points established at the site are destroyed by or through the negligence of the Contractor prior to their authorized removal, they may be replaced by DNREC and the expense of the replacement will be deducted from any amount due or which may become due to the Contractor. DNREC or their Representative may require that work be suspended at any time when horizontal and vertical control points established at the site by the Contractor are not reasonably adequate to permit checking the work. Such suspension will be withdrawn upon proper replacement of the control points.

3.1.8 The Contractor shall remove the survey stakes or grade markers as directed by DNREC. The Contractor shall keep an accurate record and count of all stakes and markers used on the job site to ensure total recovery and removal. The top 12" of all stakes and markers shall be painted with iridescent orange or red paint for identification.

3.2 Surveys at beach nourishment areas resulting from dredging at the Off-Shore Borrow Area (NIC):

3.2.1 All surveys at the beach nourishment areas shall be performed at the Contractor's expense by a Land Surveyor or Professional Engineer registered in Delaware acceptable to DNREC. Horizontal control shall consist of a closed traverse loop which shall be tied to the control points shown on the drawings. All legal requirements and procedures for accuracy in establishing control and in performing surveys shall be met. All traverse and level runs shall be closed and adjusted. Accuracy of traverse shall be 1:3000 whereas elevation loop levels shall close to within 0.05 feet prior to adjustment.

3.2.2 The Contractor shall take before and after beach nourishment placement surveys along the lengths of the shoreline to be nourished. Surveys shall commence no more than thirty (30) calendar days following the Notice-to-Proceed and not more than five (5) calendar days after final grading of each operation.

3.2.3 As-Built surveys shall be used to confirm that the Contractor has fulfilled all Contract requirements with respect to beach nourishment.

3.2.4 One (1) copy each of the As-Built survey data shall be submitted by the Contractor with each application for payment. Cross sections used for verification of the beach nourishment fill sections shall be spaced no more than 50 feet apart with four range stakes placed; one at the landward edge of the fill material, one at the landward edge of beach crest, one at the bayward beach crest and one at the bayward edge of the fill.

3.2.5 The Contractor shall lay out the work by establishing all lines and grades at the site necessary to control the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the Specifications or on the Contract Drawings. The Contractor shall place and establish such additional stakes and markers as may be necessary for control and guidance of his construction operations. All survey data shall be recorded in accordance with standard and approved methods. All field notes, sketches, recordings and computations made by the Contractor in establishing horizontal and vertical control points shall be available at all times during the progress of the work for ready examination by DNREC.

3.2.6 Cross section data shall be plotted on paper or other reproducible media at no smaller scale than 1 inch= 10 feet and all sheets shall be sealed by a Land Surveyor or Professional Engineer as acceptable to DNREC. The location of the range stakes shall be noted on the profile plots. Profile verification computations shall be submitted and shall show all work performed for computation of the final in-place beach nourishment fill section.

3.2.7 It shall be the responsibility of the Contractor to maintain and preserve all stakes and other markers established by him until authorized to remove them. If any of the control points established at the site are destroyed by or through the negligence of the Contractor prior to their authorized removal, they may be replaced by DNREC and the expense of the replacement will be deducted from any amount due or which may become due to the Contractor. DNREC or their Representative may require that work be suspended at any time when horizontal and vertical control points established at the site by the Contractor are not reasonably adequate to permit checking the work. Such suspension will be withdrawn upon proper replacement of the control points.

3.2.8 The Contractor shall remove the survey stakes or grade markers as directed by DNREC. The Contractor shall keep an accurate record and count of all stakes and markers used on the job site to ensure total recovery and removal. The top 12" of all stakes and markers shall be painted with iridescent orange or red paint for identification.

3.3 Overburden Disposal:

3.3.1 The Contractor shall supply an “Overburden Disposal Plan” to DNREC within ten (10) days after the Notice to Proceed.

3.3.2 The Contractor shall dispose of the overburden at the off-shore disposal area shown on the drawings. A baffle plate or other approved apparatus attached to the discharge end of the pipeline shall be directed away from the channel.

3.4 Beach Nourishment:

3.4.1 The Contractor shall supply a “Beach Nourishment Placement Plan” to DNREC for approval within ten (10) days after the Notice-To-Proceed. His proposed plan for beach fill placement shall indicate planned beach fill reaches and the direction and order of the beach fill. The plan shall include the type of dredge plant to be utilized, the location and type of any booster pumps (if needed) to be utilized, the type and route of pipeline, and the means, methods and order of work for beach fill placement. DNREC reserves the right to reject any scenario which in their opinion may be detrimental to the stability of the in-place beach fill, or for any other credible reason. Excavation of sand from the existing beach for use as beach fill will not be permitted. However, sand resulting from the jetty construction (NIC) may be incorporated into Contractor’s beach fill placement plan.

3.4.2 In the event of a breakdown of dredging equipment which causes fill operation to cease in any work area, the Contractor shall provide verbal notification to DNREC immediately. The Contractor shall document at a minimum the nature of the problem, the time of the problem’s discovery, the expected duration to affect repairs, and the actual times of shutdown and restating dredging operations. This documentation shall be provided to DNREC within 24 hours following breakdown.

3.4.3 Beach Fill Placement Area Control

3.4.3.1 The Contractor shall maintain and protect the beach fill in a satisfactory condition at all times until acceptance of the work. Prior to placement of beach fill, the Contractor shall remove from the worksite all snags, driftwood, and similar foreign debris lying within the limits of the beach fill section. All materials removed shall be disposed of in areas provided by and at the expense of the Contractor and as approved by DNREC.

3.4.3.2 The Contractor shall begin hydraulically placing sand resulting from dredging the Murderkill River Channel starting at South Bowers beach in the vicinity of Sta. 8+75 and proceed in a northerly direction along the beach. Once the Contractor begins placement in an acceptance reach, placement in that reach must be completed before proceeding to another acceptance reach. Beach fill placement operations shall proceed in an orderly manner from reach to reach.

3.4.3.3 The Contractor shall supplement beach nourishment along South Bowers' shoreline to the lines and grades specified after placement /grading sand from the Murderkill River channel dredging. Beach quality sand shall be obtained from hydraulic dredging at the off-shore borrow area. If more than one dredge is utilized by the Contractor, more than one beach fill operation may be accomplished simultaneously. However, placement of beach fill in more than two locations at any one time will not be permitted unless otherwise specifically approved by DNREC. **(NIC)**

3.4.3.4 The Contractor shall begin hydraulically placing sand resulting from dredging at the off-shore borrow area at North Bowers Beach starting near the jetty and proceeding in a northerly direction along the beach. **(NIC)**

3.4.3.5 The beach fill placement area control points, including construction staking, gages, range markers, and buoys required to accomplish the work shall be set by a land surveyor or Professional Engineer currently registered and licensed in Delaware as specified and shall be maintained by him to define the work and to facilitate inspection. The Contractor shall suspend beachfill operations when staking or ranges cannot be seen or followed.

3.4.3.6 Construction staking used on the beach shall be electrical metallic tubing (EMT) or other approved material that shall be promptly removed as the work areas are accepted by DNREC.

3.4.3.7 Beach fill material shall be placed in a manner to avoid damage or undermining to all existing structures. The Contractor shall be solely responsible for any damage caused by him to bulkheads, structures, jetties, seawalls, unbulkheaded properties, dunes, or any other real property adjacent to the beach fill areas. Any damage to such items due to fault or negligence of the Contractor

shall be repaired or replaced at his own expense in a manner as approved by DNREC. The beach fill material shall be controlled and graded to prevent material from overtopping existing bulkheads, dunes, or in any way encroaching landward of such structures unless indicated or specified otherwise. The Contractor shall submit to DNREC for approval the details for preventing beach fill material during pipeline placement from flowing landward of the lines indicated and specified. The Contractor shall be responsible for any damage caused by excessive water flowing landward of the beach fill section. Water shall not be permitted to flow landward of the beach fill segment and, to the maximum extent practical, shall not be permitted to pond on the upland side of the beach fill.

3.4.4 Method of Discharge to Temporarily Contain Material Prior to Spreading: The Contractor shall install a baffle plate, spreader pipes, pocket pipes, or other approved apparatus to the discharge end of the pipeline that precisely controls the placement of the beach fill material and increases the settlement rate of the material to the maximum extent practicable. Temporary longitudinal control dikes shall be constructed as close to the shoreline as practical and in a manner that requires the effluent water to travel a sufficient distance to minimize turbidity prior to returning to the Bay waters. Such longitudinal dikes and outfall devices shall be used to prevent transverse gullying and erosion at the point of deposit and the subsequent loss of material directly into the Bay waters. Once the material has been deposited, the Contractor shall distribute and grade the material to the lines and elevations as indicated and specified.

3.4.5 Beach Fill Construction and Grading: The beach fill material shall be placed along the beach front as indicated. The finished berm shall be constructed at elevation 11.2 feet MLLW with 65 foot widths. The remainder of the respective beach fill segment shall be constructed with a foreshore graded slope not steeper 1 vertical on 10 horizontal from +11.2 feet MLLW to the existing Bay bottom. The final graded beach fill segments shall be constructed to an acceptable tolerance of 0.5 foot above or 0.5 foot below the required berm elevation and specified grade.

3.4.6 Dune Fill Construction and Grading: The dune fill material shall be placed along the beach front as indicated. The finished dune shall be constructed to a top elevation +12 feet MLLW with a minimum crest width of 10 feet. Dune slopes shall be graded at a slope not steeper than 1 vertical on 5 horizontal, from the 11.2 feet MLLW beach crest elevation to the +12.8 feet MLLW dune crest elevation. The final graded dune fill segments shall be constructed to an acceptable tolerance of 0.5 feet above and minus 0 foot below the required dune elevation and specified grade.

3.4.7 Temporary Protection: If beach/dune fill placement operations are temporarily terminated, the Contractor shall be required to place a protective zone of sand at the end of the last completed acceptance reach for each placement location. The protective zone shall transition from the full section at the end of the last acceptance reach to blend smoothly to the existing beach over a distance of approximately 150 linear feet. The exact length and configuration of the protective zone will depend on the location and shall be constructed as approved or directed by DNREC. The Contractor is required, however to provide his best efforts in placing material to the designated lines and grades. The contractor shall ensure that there are no undrained areas or abrupt mounds within the completed segments. Any beach/dune fill material that is rehandled or moved and placed in

its final position by mechanical methods (i.e. bulldozer, rubber tired loader, pan, etc.) shall be placed in layers not exceeding 3 feet in vertical thickness.

3.4.8 Final Acceptance of the Beach/Dune Fill Placement Area: Upon completion of all filling operations in any acceptance reach, the beach/dune fill shall be graded and dressed so as to eliminate any undrained pockets and abrupt mounds or depressions in the beach/dune fill surface as necessary to comply with tolerance requirements specified below. All temporary dikes shall be completely regraded. The Contractor is not required to perform grading in or seaward of the project's adjusted water line at mean low water. Final acceptance of respective beach/dune fill placement area shall include removal of all dredge discharge pipeline and Contractor equipment, all markings and stakes placed by the Contractor for the control of his work, clean-up of all trash and debris from all areas affected by the Contractor's operations. The Contractor shall take minutes of all on-site inspections, and all parties present shall sign the completed inspection conclusions. Copies of all minutes, photographs and video tapes from inspections shall be included separate of the Daily Report of Operations.

3.4.9 Gradation Tests: The Contractor shall perform gradation tests on sand fill material placed in the beach/dune fill at the rate of three (3) tests for each 200 feet of sand placement. Where less than 5000 cubic yards are required to be placed in any acceptance reach, only two (2) tests will be required. The exact location for taking samples for testing shall be as directed by DNREC. Samples shall be labeled as Quality Control (QC) tests. Gradation tests shall be performed in accordance with ASTM D 422 except that sieve sizes corresponding to the Wentworth Classifications shall be utilized. Unless otherwise approved the Contracting Officer, the following sieves shall be use at a minimum:

Wentworth Phi Value	mm Size	Equivalent ASTM Mesh
-2	4.0	#5
-1	2.0	#10
0	1.0	#18
0.5	0.71	#25
1	0.5	#35
1.5	0.35	#45
2	0.25	#60
2.5	0.177	#80
3	0.125	#120
4	0.0625	#230

Hydrometer analysis shall be performed on the minus #230 material if the percentage by weight of the minus #230 material is greater than 15% of the total sample. The results of gradation tests shall be tabulated and plotted on the forms furnished by the Contractor's testing agency within 48 hours after sampling. No separate payment will be made for performing gradation tests and all costs thereof shall be considered a subsidiary obligation of the Contractor.

3.4.10 Improperly Placed Beach Fill Material: Any beach fill material placed outside the vertical or horizontal limits of the fill area will not be paid for and shall be regraded or removed as directed by DNREC at the Contractor's expense.

3.4.11 Pipeline Safety on the Beach: The Contractor shall provide drawings showing locations of temporary alignment routes of pipeline, placement of booster pumps if

used in the work, and proposed location of temporary ramps over the pipeline for pedestrian and emergency vehicle access along the beach. The location of the pipeline shall be limited to the shortest alignment route from dredge plant to the respective beach fill area under construction. The Contractor shall construct a barrier as specified to keep personnel at least 40 feet from the discharge end of the pipe in all directions up and down the beach, and no closer than 100 feet of bulkheads, jetties, seawalls, structures, or dune lines unless directed otherwise by DNREC. Warning signs shall be posted by the Contractor in conspicuous and strategic places along the pipeline alignment stating "Danger - High Pressure Discharge From Dredge". The signs shall be at least 2 feet square and their final placement location approved by DNREC. The Barricade shall as a minimum be orange polypropylene fencing not less than four feet in height with posts spaced sufficient to prevent access of personnel to the immediate site of work in a manner as approved by DNREC. During night time operations, the dredge discharge pipeline and point of discharge, as well as all ramp areas provided as access across the discharge pipeline, shall be clearly marked and well lighted in accordance with OSHA for site lighting and as approved by DNREC. Any deviation from the approved plan will require approval in writing from DNREC.

3.4.12 Existing Beach Berm Protection: The Contractor shall protect from damage all existing beach berms and maintain in place any existing beach material that is above the required placement elevation for this contract. The Contractor shall not borrow material or grade materials from these areas or disturb vegetation.

3.4.13 Field Quality Control: The Contractor shall establish and maintain quality control for the beach/dune fill placement work and all other operations in connection with the work in the field to assure compliance with contract requirements. The Contractor shall inspect for compliance with contract requirements and record the inspection of all operations including but not limited to the following:

3.4.13.1 The fill material meets classification requirements and is placed within the beach segment to the lines, grade, and tolerance specified.

3.4.13.2 Beach fill operations are confined within the limits of the designated work area.

3.4.13.3 The dredge effluent does not flow landward of the fill section or other limits as specified and established by DNREC.

3.4.13.4 Damage to the existing and newly constructed beach is held to the minimum from Contractor's operations.

3.5.13.5 Adequate control is provided to prevent unnecessary loss of material by seaward flow of pipeline effluent.

3.5.13.6 The pipeline is periodically inspected for leakage as specified.

3.5.13.7 All joints of pipe for discharge line are tight, sound and in a safe condition.

3.5.13.8 All equipment used in the work is approved and in satisfactory working condition.

3.5.13.9 Checks to insure safe work practices around structures and the public is performed at all times as specified.

3.5.13.10 Checks conducted for proper lines, grades and elevations in finished fill area including proper grading and elimination of undrained pockets and abrupt humps.

3.5.13.11 Ensure all equipment and construction materials have been removed from completed work segments.

3.5.13.12 All results of inspections shall be documented with video tapings, narrative explanations and photographs as required to document the conditions of field quality.

3.4.14 Sand Fence **(NIC)**: Immediately upon completion and approval of the nourishment of North Bowers Beach, a sand fence shall be erected where shown on the drawings. Fence posts shall be driven at eight feet maximum spacing along the alignment shown on the drawings. Fence fabric shall be attached to the westerly side of the posts with minimum of five wire fasteners per posts. Ends of fence fabric rolls shall be lapped two feet minimum at posts only. Contractor shall use the longest fabric rolls available (50 feet long maximum) in order to minimize laps.

3.4.15 Final Clean Up: Final clean-up shall be performed by the Contractor immediately after completion of all work and shall include the removal of all the Contractor's plant and equipment either for disposal or reuse. Plant and/or equipment to be disposed of shall be disposed in a manner and at a location approved by DNREC. No separate payment shall be made for final clean-up and all costs thereof shall be considered a subsidiary obligation of the Contractor.

3.4.16 Sprigging “Cape” American Beachgrass on the graded dune systems as shown on the drawings is **N**ot-**I**n-**C**ontract **(NIC).**

3.4.17 Acceptance of completed dredged sand fill placement will be based upon the receipt of the plotted cross-sectional survey showing that the sand was installed to the proposed lines and grades shown on the Drawings.

Part 4 – Measurement and Payment

4.1 General:

4.1.1 No measurement for payment for beach nourishment resulting from dredging the Murderkill River channel will be made since the cost shall be included in the lump sum base bid price.

- END OF SECTION -

CONTRACT NO. NAT201301- HYD.DREDGE

SECTION 3
BID QUOTATION REPLY

SECTION 3A

PROPOSAL FORM

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
MURDERKILL RIVER
MAINTENANCE DREDGING and BEACH NOURISHMENT
CONTRACT NO. NAT201301 – HYD.DREDGE

The undersigned having read the specifications, examined the drawings and received, read and taken into account Addenda Nos., _____, hereby proposes to provide all necessary machinery, tools, labor to do all the work and to furnish all the materials necessary to perform and complete the said contract for the following quoted lump sum base bid for hydraulic dredging the federal authorized channel to -8.0' MLLW including beach nourishment at South Bowers beach with beach quality sand material; unsuitable material disposed at the designated overboard disposal area.

LUMP SUM BASE BID _____

_____Dollars ($_____)
(Written) (Figures)

NOTE: Price shall be written in both words and numbers. The State reserves the right to accept or reject any or all bids. The Base Bid shall be the controlling figure determining the value of the contract.

The Base Bid is divided as follows:

BID ITEM 1 – Mobilization / Demobilization: _____

_____Dollars ($_____)
(Written) (Figure)

BID ITEM 2 – Hydraulic dredging of Murderkill River Entrance Channel including beach nourishment at South Bowers using beach quality sand: _____

_____Dollars ($_____)
(Written) (Figure)

BID ITEM 3 – Hydraulic dredging of Murderkill River Entrance Channel including overboard disposal of unsatisfactory dredged material: _____

_____Dollars ($_____)
(Written) (Figure)

SCHEDULED UNIT PRICES:

The following unit prices, if accepted in the award of contract, shall be applied in computing the value of changes, additions, deletions and substitutions, which may be made in the work. Each unit price shall include all work, materials, and incidentals necessary to complete the items.

NOTE: Price shall be written in both words and numbers.

1. Hydraulic dredging including beach nourishment:_____

_____ ($_____) per CY
(Written) (Figures)

2. Hydraulic dredging including overboard disposal:_____

_____ ($_____) per CY
(Written) (Figures)

If the undersigned is notified of the acceptance of this proposal, he agrees to execute a contract within twenty (20) days of the notification and to guarantee the completion by February 28, 2014.

COMPANY _____

ADDRESS _____

BY _____

TITLE _____

DATE _____

Construction Firm Delaware Business License Number: _____

Federal Employer I.D. Number: _____

Certified Check or Bid Bond in the Amount of $ _____ is enclosed.

Sworn to and subscribed before me on this ____ day of _____, 20_____.

_____
Notary Public

_____
(Sign for Identification)

SECTION 3B

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

10% BID BOND TO ACCOMPANY PROPOSAL

(NOT NECESSARY IF CERTIFIED CHECK IS USED)

KNOW ALL MEN BY THESE PRESENTS That _____ of _____ of the County of _____ and State of _____ as surety, legally authorized to do business in the State of Delaware, are held and firmly bound unto the State of Delaware in the sum of _____ dollars or ____ percent (not to exceed _____dollars) of amount bid on Contract No. _____ to be paid to said State of Delaware for the use and benefit of Department of Natural resources and Environmental Control (hereinafter referred to as Agency) of said State, for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators and successors, jointly and severally for and in the whole, firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden principal _____ who has submitted to said Agency of the State of Delaware, a certain proposal to inter into a certain contract to be known as Contract No. _____ for the furnishing a certain product and/or services within the said State of Delaware shall be awarded said Contract No. _____ and furnish therewith such surety bond as may be required by the terms of said contract and approved by said Agency, said contract and said bond to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation to be void or else to be and remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord _____.

SEALED AND DELIVERED IN THE
Presence of: _____ (Seal)
Name of Bidder (Principal)

Witness
_____By _____ (Seal)

Corporate Seal _____
Title

_____By _____ (Seal)
Name of Surety

_____ (Seal)

_____Title

MURDERKILL RIVER MAINTENANCE DREDGING AND BEACH NOURISHMENT
CONTRACT NO. NAT201301 – HYD.DREDGE

SECTION 3C

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d) (10)G Delaware Code the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.

SUBCONTRACTOR CATEGORY	**NAME, ADDRESS AND STATE OF DE BUSINESS LICENSE NUMBER**
_____	Name: _____ Address: Address: St. of DE. Bus. Lic. #:
_____	Name: _____ Address: Address: St. of DE. Bus. Lic. #:
_____	Name: _____ Address: Address: St. of DE. Bus. Lic. #:
_____	Name: _____ Address: Address: St. of DE. Bus. Lic. #:

_____ _____
Signature Date

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

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____DAY OF_____, 2013.

_____
NOTARY PUBLIC
CITY of_____; COUNTY of _____; STATE of_____.

MURDERKILL RIVER DREDGING AND BEACH NOURISHMENT
CONTRACT NO. NAT201301 – HYD.DREDGE

SECTION 3-D

BID FORM

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date to DNREC- Division of Watershed Stewardship.

It is agreed by the undersigned bidder that the signed delivery of this bid represents the bidder's acceptance of the terms and conditions of this invitation to the bid including all specifications and special provisions.

NAME OF BIDDER _____

SIGINATURE OF AUTHORIZED REPRESENTATIVE _____

TITLE _____

ADDRESS OF BIDDER _____

PHONE NUMBER _____

PURCHASE ORDERS SHOULD BE SENT TO:

COMPANY NAME _____
ATTENTION OF: _____

ADDRESS _____
_____

PHONE NUMBER _____

FEDERAL I.D. NUMBER _____
STATE OF DELAWARE
LICENSE NUMBER _____

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED
SWORN TO AND SUBSCRIBED BEFORE ME THIS _____DAY OF_____, 2013.

_____
NOTARY PUBLIC

City of,_____,County of,_____,Date of_____

MURDERKILL RIVER DREDGING AND BEACH NOURISHMENT
CONTRACT NO. NAT201301 – HYD.DREDGE

SECTION 3-E

CERTIFICATION OF NONSEGREGATED FACILITIES

NOTE: Applicable to federally assisted construction contracts and related subcontracts exceeding $10,000 which are not exempt from the Equal Opportunity clause.

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms work area, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color or national origin, because of habit, local custom or otherwise. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed contractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontractors exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause and that he will retain such certifications in his files.

_____ _____
Signature Date

NOTE: The penalty for making false statement in offers is prescribed in 18 U.S.C. 1001.

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

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 2013.

_____
NOTARY PUBLIC
City of _____, County of _____, State of _____

SECTION 3F

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

PURCHASING SECTION

NO BID REPLY FORM

Contract No._____ Bid Title_____

To assist us in obtaining good competition on our Request for Bid, we ask that each firm that has received an invitation, but does not wish to bid, state their reason. This information will not preclude participation in future invitations to bid.

Unfortunately, we must offer a "no Bid" at this time because:

_____1. We do not wish to participate in the bid process.

_____2. We do not wish to bid under the terms and conditions of the Request for Bid document. Our objections are:

_____3. We do not feel we can be competitive.

_____
Firm Name

_____
Signature

_____We wish to remain on the Bidder's List.

_____We wish to be deleted from the Bidder's List.

SECTION 3G

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

CONTRACT NO. NAT201301 – HYD.DREDGE

EQUALITY OF EMPLOYMENT OPPORTUNITY STATEMENT

2) § 6962 (b7) Equality of Employment opportunity on public works.

a) As a condition to the awarding of any contract for public works financed in whole or in part by state appropriation all state contracting agencies shall include in every contract hereinafter entered into the following provisions:

"During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed color, sex or national origin. Such action shall include, but not limited to, the following: Employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous notices to be approved by the contracting agency setting forth this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex or national origin.

b) The term "contract for public works" means construction, reconstruction, demolition, alteration and repair work and maintenance work paid for in whole or in part out of the funds of a public body except work performed under a vocational rehabilitation program. The manufacturing or furnishing of materials, articles, supplies or equipment is not a public work within the meaning of this subsection unless conducted in connection with and at the site of the public work.

c) The Secretary of the Department of Labor shall be responsible for the administration of this section and shall adopt such rules and regulations and issue such orders as he deems necessary to achieve the purposes thereof, provided that no requirement established hereby shall be in conflict with § 6904 of this title. (29 Del. C. 1953, § 6921; 58 Del. Laws, C. 370, §1)

It is agreed by the undersigned bidder that the signed delivery of this bid represents the bidder's acceptance of the terms and conditions of the invitation to bid including all specifications and special provisions.

NAME OF BIDDER _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE _____

TITLE _____

ADDRESS OF BIDDER _____

PHONE NUMBER _____

PURCHASE ORDERS SHOULD BE SENT TO:

COMPANY NAME _____

ADDRESS _____

CONTACT _____

PHONE NUMBER _____

FEDERAL E.I. NUMBER _____

STATE OF DELAWARE LICENSE NUMBER

_____

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

SWORN TO AND SUBSCRIBED BEFORE ME THIS_____DAY OF_____, 2013

NOTARY PUBLIC _____

City of _____

County of _____

State of _____

SECTION 3H
PERFORMANCE BOND
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

BOND TO ACCOMPANY CONTRACT NO. NAT201301 – HYD.DREDGE

KNOW ALL MEN BY THESE PRESENTS THAT:_____ of _____ in the County of _____ and the State of _____ as surety, legally authorized to do business in the State of Delaware, are held and firmly bound unto the State of Delaware in the sum of _____ dollars ($_____) or _____ percent (not to exceed _____ dollars) of amount bid on Contract No. _____ to be paid to the said State of Delaware for the use and benefit of the Department of Natural Resources and Environmental Control for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrators, successors and assigns, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH that if the said above bounded principal _____ who has been awarded by the Department of Natural Resources and Environmental Control, a certain contract designated by the parties thereto as Contract No. _____, and dated the _____ day of _____ in the year of our Lord Two thousand and thirteen _____ (2013) for completion of a certain project within the said State of Delaware, shall well and truly provide and furnish all materials, appliances and tools and perform all the work and labor required under and pursuant to the terms and conditions of said Contract No. _____, and of the proposal, plans and specifications contained therein, and shall also indemnify and keep harmless the said State of Delaware and said Department of Natural Resources and Environmental Control, from all costs, damages and expenses growing out of or by reason of the work not in accordance with reasonable and customary engineering practices prevailing at the time under said Contract No. _____, above mentioned and shall well and truly pay all and every person furnishing material or performing labor in and about the said Project, all and every sum or sums of money due him, them or any of them, for all such labor and materials for which the contractor is liable; then this obligation shall be void or else to be and remain in full force and virtue.

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

Corporate Seal

_____ _____

BY _____

_____
Title

THESE PAGES MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.
SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 2013.

_____
NOTARY PUBLIC
City of _____
County of _____
State of _____

SECTION 3I
PAYMENT BOND
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

BOND TO ACCOMPANY CONTRACT NO. NAT201301-HYD. DREDGE

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we _____, as principal (**Principal),** and _____, a _____ Corporation, legally authorized to do business in the State of Delaware, as surety ("**Surety**"), are held and firmly bound unto the _____ ("**Owner**") (**insert State agency name**), in the amount of _____ ($_____), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20___.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. _____dated the _____day of _____, 20___ (the "Contract"), which Contract is incorporated herein by reference, shall well and truly pay all and every person furnishing materials or performing labor or service in and about the performance of the work under the Contract, all and every sums of money due him, her, them or any of them, for all such materials, labor and service for which **Principal** is liable, shall make good and reimburse **Owner** sufficient funds to pay such costs in the completion of the Contract as **Owner** may sustain by reason of any failure or default on the part of **Principal** and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by an

extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

Surety hereby stipulates and agrees that no modifications, omission or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITHNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest: Address: _____

_____ By: _____(SEAL)
Name: Name:
Title:

(Corporate Seal)

SURETY

Name: _____

Witness or Attest: Address: _____

_____ By: _____(SEAL)
Name: Name:
Title:

(Corporate Seal)

SECTION 3 J

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL

89 KINGS HIGHWAY

DOVER DE 19901

CONTRACT DOCUMENT

FOR

MURDERKILL RIVER DREDGING and BEACH NOURISHMENT
CONTRACT NO. NAT201301 – HYD.DREDGE

THIS AGREEMENT, made and executed this _____day of _____, 2013, by and between _____(Hereinafter designated as Contractor) party of the first part, and the Department of Natural Resources and Environmental Control, a Department created under the laws of the State of Delaware (hereinafter designated as Department) party of the second part.

WITNESSETH that the Contractor, in consideration of the covenants and agreements herein contained and made by the Department, agrees to the following:

ARTICLE ONE. The Contractor shall will provide and furnish all the material, supplies, machinery, implements, appliances, tools and labor required to complete this contract in Kent County, State of Delaware, as shown and specified in the specifications, proposals, drawings or plans as indicated in the project manual issued for the Department, which specifications, proposals, drawings or plans entitled **MURDERKILL RIVER DREDGING and BEACH NOURISHMENT CONTRACT NO. NAT201301 – HYD.DREDGE** is hereby incorporated by reference as part of this contract. This contract will be binding on both parties upon receipt by the Contractor of an approved State of Delaware Purchase Order. The Contractor must prosecute the work in such order as to complete the dredging and beach nourishment no later than February 28, 2014.

CONTRACT DOCUMENT (CONTINUED)

IN WITNESS WHEREOF, the said parties have duly executed this agreement in triplicate the day and year first above written.

IN WITNESS WHEREOF, the parties below have hereunto set their hands on the _____ day of _____, 2013.

_____
Contractor

_____ By: _____
Witness Title

State of _____
County of _____

Sworn and subscribed before me this _____ day of _____, 2013.

_____
Notary Public

IN WITNESS WHEREOF, the parties below have hereunto set their hands on the _____ day of _____, 2013.

_____ _____
Witness Project Manager
Division of Watershed Stewardship

State of _____
County of _____

Sworn and subscribed before me this _____ day of _____, 2013.

_____
Notary Public

CONTRACT DOCUMENT (CONTINUED)

IN WITNESS WHEREOF, the parties below have hereunto set their hands on the _____ day of _____, 2013.

_____ _____

Witness Director, Division of Watershed Stewardship

State of _____
County of _____

Sworn and subscribed before me this _____ day of _____, 2013.

_____
Notary Public

_____ _____

Witness Secretary, Department of Natural Resources & Environmental Control

State of _____
County of _____

Sworn and subscribed before me this _____ day of _____, 2013.

_____
Notary Public

APPENDIX 1

PAYROLL REPORT SAMPLE

PAYROLL REPORT

NAME OF CONTRACTOR [ ] OR SUBCONTRACTOR [ ]

Delaware Department of Labor
Division of Industrial Affairs
225 Corporate Boulevard
Suite 104
Newark, DE 19702
302-451-3423

ADDRESS:

PHONE:

PROJECT AND LOCATION

WEEK ENDING DATE

CONTRACT NUMBER

DATE OF PREVAILING WAGE DETERMINATION USED ON THIS PROJECT:

NAME, ADDRESS AND SOCIAL SECURITY NUMBER OF EMPLOYEE	WORK CLASSIFICATION		DAY & DATE & HOURS WORKED EACH DAY							TOTAL HOURS & RATE OF PAY		GROSS AMOUNT EARNED	DEDUCTIONS					NET WAGES PAID	HOURLY VALUE OF FRINGES
			M	T	W	T	F	S	S	HOURS	RATE		FICA	FWT	SWT				
1.		S																	
		O																	
2.		S																	
		O																	
3.		S																	
		O																	
4.		S																	
		O																	
5.		S																	
		O																	
6.		S																	
		O																	
7.		S																	
		O																	
8.		S																	
		O																	

DATE _____

I,_____ _____
(Name of signatory party) (Title)

do hereby state:

1. That I pay or supervise the payment of persons employed by

_____ on the
(Contractor or Subcontractor)

_____:
(public project)

that during the payroll period commencing on the _____ day of

_____, 20_____ and ending on the _____ day of

_____, 20 _____ all persons employed on said project

have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of the contractor or subcontractor from the full weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in the prevailing wage regulations of the State of Delaware.

2. That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work performed.

3. That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a state apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, and that the worksite ratio of apprentices to mechanics does not exceed the ratio permitted by the prevailing wage regulations of the State of Delaware.

An employer who fails to submit sworn payroll information to the Department of Labor weekly shall be subject to fines of $1,000.00 and $5,000. for each violation.

List only those fringe benefits:

For which the employer has paid; and
Which have been used to offset the full prevailing wage rate.

(See Delaware Prevailing Wage Regulations for explanation of how hourly value of benefits is the be computed.)

HOURLY COST OF BENEFITS (List in same order shown on front of record)							
Employee							
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							

I hereby certify that the foregoing information is true and correct to the best of m knowledge and belief. I realize that making a false statement under oath is a crime in State of Delaware

_____
Signature

STATE OF _____

COUNTY OF _____

SWORN TO AND SUBSCRIBED BEFORE ME, A NOTARY PUBLIC,

THIS _____ DAY OF _____, A.D. 20_____.

_____
Notary Public

APPENDIX 2

GEOTECHNICAL REPORT

DATED AUGUST 20, 2013

HYNES

JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

August 20, 2013

Edward T. Fulford, P.E.
Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

Re: Report of Subsurface Exploration and Geotechnical Engineering Recommendations
DNREC Open End Contract 2012-Coastal Engineering-Murderkill River Entrance Channel Dredging and Jetty Improvements
Kent County, Delaware
Project No.: JDH-10/13/123-1

Dear Mr. Fulford:

John D. Hynes & Associates, Inc. has completed the authorized subsurface exploration and geotechnical engineering evaluations for the Murderkill River Entrance Channel Dredging and Jetty Improvements located in Kent County, Delaware. Our services were conducted, generally, in accordance with our proposal dated April 4, 2013, and subsequent communications between our offices.

This report describes the exploration methods employed, exhibits the data obtained, and presents our evaluations and recommendations. In summary, this report includes our recommendations for subgrade preparation for, and our evaluations for expected settlements of the proposed jetty structure. Our report also includes all boring logs and laboratory test results for the jetty, channel, borrow area and beach areas. Also, we include the chemical test results on composite soil/sediment samples taken at each of the 30 borings in the proposed channel dredging area. The results of these chemical tests were transmitted to you previously. The test results are contained in the PSS Analytical Report in the Appendix. Samples were taken at 22 vibracore locations by Aqua Survey, Inc. at the proposed borrow area. Aqua Survey retained these samples. The Vibracore boring logs are included in the Appendix.

We appreciate the opportunity to be of service to you. If you have any questions regarding the contents of this report or if we may be of further assistance, please contact our office.

Respectfully,

JOHN D. HYNES & ASSOCIATES, INC.

Walter C. Parish
Project Engineer

John D. Hynes, P.E.
President

JOHN D. HYNES REGISTERED NO. 7591 DELAWARE PROFESSIONAL ENGINEER

WCP: JDH/jsl

32185 Beaver Run Drive • Salisbury, Maryland 21804 • 410-546-6462 • Fax 410-548-5346
Email: jdhynes@aol.com

HYNES

REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING RECOMMENDATIONS

DNREC OPEN END CONTRACT 2012-COASTAL ENGINEERING-MURDERKILL RIVER ENTRANCE CHANNEL DREDGING AND JETTY IMPROVEMENTS KENT COUNTY, DELAWARE

PREPARED FOR
ANDREWS, MILLER & ASSOCIATES, INC.

AUGUST 20, 2013
PROJECT NO.: JDH-10/13/123-1

32185 Beaver Run Drive • Salisbury, Maryland 21804 • 410-546-6462 • Fax 410-548-5346
Email: jdhynes@aol.com

HYNES

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32185 Beaver Run Drive • Salisbury, Maryland 21804 • 410-546-6462 • Fax 410-548-5346
Email: jdhynes@aol.com

PURPOSE AND SCOPE

The subsurface exploration study was performed to evaluate the subsurface conditions with respect to the following:

1. Subgrade preparation for stone jetty/sill construction;
2. Jetty settlement estimates;
3. Materials to be dredged from the channel;
4. Chemical test results of materials to be dredged;
5. Soil gradation (Sieve) of North and South Beach surficial soils;
6. Soil quality of soils to depths of 15 feet as borrow area;
7. Vibracore soil profiles (by Aqua Surveys);
8. Groundwater and tidal considerations; and
9. Other aspects of the design and construction for the proposed structures indicated by the exploration.

An evaluation of the site, with respect to potential construction problems and recommendations dealing with earthwork and inspection during construction, is included. The inspection is considered necessary both to confirm the subsurface conditions and to verify that the soils related construction phases are performed properly.

EXISTING SITE CONDITIONS

As shown on our Project Location Map (Drawing No.: JDH-10/13/123-1-A) in the Appendix, the project site is located on the Delaware Bay shore at Bowers Beach in Kent County, Delaware. The specific project area is the Murderkill River estuary where the river meets the Bay. An existing channel extends from the existing Murdekill River channel out into the bay towards the east-northeast. The depth of the existing channel varies generally between Elevation 3.5 and 6.5 feet MLLW, and will be deepened to Elevation 8 MLLW as part of this contract. The existing jetty which will be extended out into the bay, affords shore protection to the north bank of the river basin to the point at which the north beach shoreline angles 90 degrees from the jetty. The jetty, which is sand covered up to approximately one to three feet below the present top, was built using concrete-filled bags made of high strength 100 percent nylon woven fabric, stacked into a triangular configuration. The bag/blocks are roughly rectangular in plan, and approximately 2 to 3 feet long by one to two feet wide by a foot or so thick. Lengths of steel reinforcement are usually installed through the bags while the concrete is still unhydrated, to keep the bags together and maintain the triangular configuration of the jetty. However, we do not know whether reinforcement was used here.

The North and South Bowers beaches are typical, relatively narrow bay beaches with a surface of clean, fine to coarse SAND (SP). These beaches are to be nourished (built up) with sands available from the proposed channel dredging and/or, from a borrow area located offshore of the south end of South Beach (see Drawing JDH-10/13/123-1-B-2) in the Appendix. A disposal site for fine-grained soils from the proposed channel dredging has been established approximately 1,000 feet south of the Channel.

Topographically, the channel depth ranges between Elevation 3.5 to 6.5 feet MLLW. The existing ground at centerline of the proposed jetty ranges from approximately 7 feet at the shore and 3 feet at the outer end. The top of the proposed borrow area ranges from roughly Elevation -8 to -10 MLLW, while the existing ground at the beaches rises from Elevation zero MLLW at the shoreline to approximately Elevation 8 or 10.

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Email: jdhynes@aol.com

HYNES

FIELD EXPLORATION AND STUDY

In order to determine the nature of the subsurface conditions at the site, 62 borings were drilled to various depths between July 17, 2013 and July 29, 2013. The borings, generally in five groups, were drilled as described below, in the locations shown on the Boring Location Plans in the Appendix.

Borings designated JB-1 through JB-4 were drilled by Hynes & Associates at the proposed jetty alignment on July 23 and July 26, 2013, to depths of 45.5 feet at JB-1 and JB-2 and 40.5 feet at JB-3 and JB-4, using a Mobile B-47 HD trailer-mounted drill rig. Boring locations are indicated on the Boring Location Plan (Drawing No.: JDH-10/13/123-1-B-1) in the Appendix.

Borings designated V-1 through V-17, V-19, V-20, V-21, V-23 and V-25 were drilled on July 17 through July 19 and July 22 through July 24, 2013, at the proposed "Borrow Area", at the location shown on Boring Location Plan (Drawing No.: JDH-10/13/123-1-B-2) in the Appendix. The borings were drilled to depths of 7 to 10.5 feet below the mud line of the Bay, which ranged between Elevation -8 and -10 MLLW, using a driven casing and a vibrated sampler, working from the Aqua Survey, Inc. boat with an A-frame. Samples taken by ASI were logged by Hynes & Associates. We present the boring logs in the Appendix. ASI split the samples in the field. Half of the samples were taken to the ASI laboratory for testing. Half of the samples were delivered to DNREC for their use.

Borings designated as T-3, T-6, T-8, T-12 and T-15 were drilled by Hynes & Associates on July 27 and 29, 2013, also at the proposed Borrow Area at the locations shown on the Boring Location Plan (Drawing No.: JDH-10/13/123-1-B-2) in the Appendix. The borings were drilled to depths of 15.5 feet below the mudline, using a Mobile B-47 HD drill rig mounted on a Hynes barge, positioned by Hynes' boat. Mudline was at Elevation -8 feet to -10 feet.

Borings designated as NB-1 and SB-1 and SB-2 were drilled by Hynes & Associates at North Beach (NB) and South Beach (SB), respectively. They were drilled on July 25, 2013, using a hand auger. Locations are indicated on our Boring Location Plan (Drawing No.: JDH-10/13/123-1-B-1).

Borings designated as B-1 through B-30, were drilled on July 19 and July 22, 2013, at the proposed channel area at the locations shown on Boring Location Plan (Drawing No.: JDH-10/13/123-1-B-3) in the Appendix. The borings were drilled to depths of 1.25 feet to 5 feet deep below the mudline which varied from Elevation -7 to Elevation -3.6 MLLW, using a hand auger positioned within a driven casing. A Hynes & Associates boat was used for the drilling.

Soil sampling and testing by Hynes & Associates were carried out in accordance with ASTM Specification D-1586. A brief description of our field procedures is included in the Appendix. The results of all boring and sampling operations are shown on the boring logs.

Samples of the subsurface soils were examined by our engineering staff and were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM Specification D-2488. The estimated USCS symbols appear on the boring logs and a key to the system nomenclature is provided in the Appendix of this report. Also included are reference sheets which define the terms and symbols used on the boring logs.

32185 Beaver Run Drive • Salisbury, Maryland 21804 • 410-546-6462 • Fax 410-548-5346
Email: jdhynes@aol.com

We note that the test boring records represent our interpretation of the field data based on visual examination and selected soil classification tests. Indicated interfaces between materials may be gradual.

The field exploration data was supplemented with laboratory testing data. The laboratory at John D. Hynes & Associates, Inc. performed 51 Sieve Analysis tests. The test results are noted in Particle Size Data Tables in the Appendix. Testing guidelines transmitted by DNREC and passed along by AMA indicated that for the Channel borings, all samples that are predominantly sands should be evaluated by Sieve Analysis.

SUBSURFACE CONDITIONS

Surficial materials encountered at the boring locations consisted of sands, silts or clays as shown on the boring logs. For convenience and clarity in using this report, the subsurface conditions are reported separately for each of the project elements shown in the section above. These are:

- Proposed Jetty: SPT Borings: JB Borings
- Borrow Area: Vibratory Testing: V Borings
- Borrow Area: SPT Borings: T Borings
- North/South Beaches: Hand Auger Borings: NB/SB Borings
- Channel Borings: Hand Auger with Casing: B Borings

Proposed Jetty Boring JB-1 through JB-4

Subsurface materials encountered consisted predominantly of interbedded sands: SANDs (SP), Silty SANDs (SM, SM/OL), Clayey SANDs (SC, SC/OL), Silty clayey SANDs (SM/SC, SC/SM), Clayey SILTs (ML), Organic SILTs (OL) and fat Organic CLAYs (OH). The OL and OH materials were below Elevation 34.

The subsurface materials were characterized by Standard Penetration Test (SPT) values (N-values) of 2 to 31 blows per foot in the sands. This range of penetration resistance indicates in-place relative densities of very loose to dense. N-values of 15 to 17 blows per foot in the silts, and clays indicate in-place consistencies of stiff to very stiff.

Almost all sands in the upper 25 feet or so of Borings JB-1 and JB-2 (closest to shore) are in the very loose relative density category.

Groundwater was encountered at 1 to 3 feet below the existing ground surface at JB-1 and JB-2. These borings were offset and drilled to the north side of the existing jetty. Groundwater elevations may vary at other times of the year depending upon the amount of precipitation, the extent of local development and the action of the adjacent bay. Borings JB-3 and JB-4 were drilled from a barge in approximately 6 feet of water.

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Borrow Area – Vibracore Borings

Soils consisted of predominantly sands and silts as follows (thin layers < 1 foot ignored).

Legend: SM = Clayey SAND; SP = SAND; ML = Clayey SILT; OL = Organic SILT; SM-SP = Low Silt SAND
Mudline = 0 (approximately Elevation -9 MLLW ± 2 feet)
N/R = No Recovery

V-1: 0 to 2 feet, ML; 2 to 7.7 feet, SM
V-2: 0 to 4 feet, N/R; 4 to 6 feet, ML; 6 to 8.5, SM; 8.5 to 9 feet, SM-SP
V-3: 0 to 1.5 feet, N/R; 1.5 to 5.5 feet, ML; 5.5 to 7 feet, SM
V-4: 0 to 1 foot, N/R; 1 to 3.5 feet, ML; 3.5 to 7.3 feet, SM
V-5: 0 to 2 feet, N/R; 2 to 5 feet, ML; 5 to 7 feet, SM
V-6: 0 to 3 feet, N/R; 3 to 6 feet, ML; 6 to 7.8 feet, SM
V-7: 0 to 2 feet, N/R; 2 to 4 feet, ML; 4 to 5.5 feet, SM; 5.5 to 7.5 feet, SP; 7 to 7.8 feet, ML
V-8: 0 to 1.5 feet, N/R; 1.5 to 5 feet, ML; 5 to 8 feet, SM
V-9: 0 to 1 foot, N/R; 1 to 5.5 feet, ML; 5.5 to 7 feet, OL and MH; 7 to 8 feet, SM
V-10: 0 to 3 feet, N/R; 3 to 5 feet, ML; 5 to 6 feet, SM; 6 to 7.5 feet, SM-SP
V-11: 0 to 2.5 feet, N/R; 2.5 to 5 feet, ML; 5 to 7.2 feet, SM
V-12: 0 to 1.5 feet, N/R; 1.5 to 3 feet, ML and OL; 3 to 7.5 feet, SM
V-13: 0 to 1.5 feet, N/R; 1.5 to 4 feet, ML and OL; 5 to 7.5 feet, SM; 7.5 to 8.5, SM-SP
V-14: 0 to 4.5 feet, N/R, 4.5 to 7 feet, ML; 7 to 10 feet, SM
V-16: 0 to 5 feet, N/R; 5 to 6.5 feet, ML; 6.5 to 10.5 feet, SM
V-17: 0 to 4 feet, N/R; 4 to 7 feet, ML; 7 to 8.5 feet, SM
V-19: 0 to 5 feet, N/R; 4 to 7 feet, ML; 7 to 10 feet, SM
V-20: 0 to 2 feet, N/R; 2 to 8 feet, ML and OL; 8 to 9 feet, SM
V-22: 0 to 5 feet, N/R; 5 to 7.5, ML; 7.5 to 9 feet, SM; 9 to 10.1 feet, SM-SP
V-23: 0 to 3 feet, N/R; 3 to 4 feet, ML; 4 to 7 feet, OL; 7 to 9.5 feet, SM
V-25: 0 to 3 feet, N/R; 3 to 9 feet, ML and OL; 9 to 10.5 feet, SM and SP

Vibracore borings were drilled by Aqua Surveys (ASI). ASI retained the samples. Therefore, we did not perform Sieve Analysis tests on Vibracore samples. We note that ASI collected "composite samples" of the Vibracore materials for each boring.

Borrow Area – SPT Borings: T-3, T-6, T-8, T-12, T-15

Subsurface materials encountered consisted predominantly of Organic SILT (OL) and Fat Organic CLAY (OH) in the upper 4 to 6 feet of the borings. N-values were WOH/24" in all of the samples for these materials. This generally indicates N = 0 with consistencies of very soft. This is consistent with the N/R (no recovery) readings in the upper portions of the V borings, taken at the proposed borrow area. Below the very soft silts (roughly below Elevation -12.5 to -14) borings identified interbedded Silty SANDs, predominantly (SM) and minor deposits of Clayey SANDs (SC) and SANDs (SP). N-values of 12 to 45 blows per foot indicate in-place relative densities of medium dense to dense for these materials. Therefore, based on the soil type – predominantly

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medium dense to dense SM sand, the material may be used for borrow if the 4 to 6 feet of very soft organic soils is stripped off.

North and South Beaches Borings: NB-1, SB-1, SB-2

Borings encountered very clean SANDs (SP) in the 3 foot depth of the three borings. Only small amounts of fine gravel were present in the samples. The beaches are to receive fill to replenish the beaches. Groundwater was encountered at depths of 1.5 to 2 feet in these borings.

Channel Borings: B-1 through B-30

Considering the thirty borings drilled, boring depths varied between 1.5 feet and 5 feet. Mudline grade varied between Elevation 7 to Elevation 3.6. Generally, the high elevation to low elevation varies from west to east. Soils encountered by Borings B-1 through B-17 consisted predominantly of surficial SANDs (SP) in the upper 1 to 3 feet, with Silty SANDs and Organic SILT (SM/OL) below, to boring termination depth.

From boring B-18 to B-30 soils were mostly Clayey SILT and Organic SILT (ML/OL) for the full depth of the borings. Sieve Analysis tests were run on all samples that were predominantly sands. Test results should be referred to in the Sieve Analysis reference tabulations in the Appendix for more specific soil characteristics of the in-place channel soils.

PROJECT CHARACTERISTICS

Proposed for construction at the Murderkill River entrance from Delaware Bay is the dredging out of the partially filled-in entrance channel. The channel is to extend the Murderkill River channel approximately one mile out into the Bay with a bottom grade at Elevation -8 and a channel bottom width of 60 feet. The side slopes are to be 3H to 1V. Dredged spoil that is acceptable for use as fill material is to be deposited on the Bowers Beach areas to the north and south of the Murderkill Channel to improve these beaches. Dredged materials not acceptable for use as structural fill will be deposited in a disposal area approximately 1,000 feet south of the channel. If additional borrow is required for beach replenishment, a borrow area has been established out in the bay to the east southeast of South Bowers Beach.

The existing cement bag riprap jetty protecting the north bank of the Murderkill River basin and channel is to be improved and extended an additional 50 feet or so into the bay. The top layers of the cement bag rip rap are to be removed to an elevation of roughly zero MLLW, and built up with core stone and rip rap to a top grade at Elevation +10. The stone will be placed over geotextile at a nominal subgrade of Elevation -2.6 MLLW or higher. The proposed jetty section can be referenced on the AMA Drawing C-8. The maximum jetty section can be seen to have a width of 10 feet, with side slopes at 2H to 1V extending out 16 to 18 feet. The toe extensions will be 7 feet, for a total nominal maximum jetty width of 58 feet. The jetty will extend approximately 420 feet out from the center of the existing shore protection corner of North Beach. The jetty cross section described is preliminary and is still under design by Andrews, Miller & Associates pending the projected estimated settlement and other considerations.

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RECOMMENDATIONS

The following recommendations are based on our understanding of the proposed construction, the data obtained from the exploration, and our previous experience with similar subsurface conditions and projects. If there are any significant changes to the project characteristics, such as revised breakwater locations, elevations, etc., we request that this office be advised so that the recommendations of this report can be re-evaluated.

A. Subgrade Preparation for Jetty Construction

Prior to the construction of the jetty and the placement of stone in jetty areas, old riprap, existing organic materials, excessively soft or loose soils, pavement debris, concrete rubble and other deleterious materials should be removed and wasted. Removal of all extraneous material, rubble or debris should be carried out to permit construction of the revetment. After the stripping operations have been completed, the exposed subgrade soils should be inspected by the Geotechnical Engineer or his approved representative, to assure a reasonably level, smooth subgrade (harbor bottom) acceptable for the placement of geotextile fabric and geogrid. Both geotextile and geogrid materials are recommended: the geotextile to provide for separation between stone materials and the very loose subgrade, and the geogrid to enhance the strength and spread the jetty loading over the very loose soils in the subsurface. Considering the jetty subgrade soils; i.e., SANDs (SP), Silty SANDs (SM) and Clayey SANDs (SC), overexcavations of the very loose (N = 2) material maybe required.

At all overexcavations requiring backfill, or adjacent slopes back of the jetty requiring fill, structural fill materials should be inspected, tested and approved by the Geotechnical Engineer prior to use. Acceptable structural fill should include GW, GP, SW and SP materials classified in accordance with the Unified Soil Classification System (USCS).

B. Jetty Structure

In order to evaluate bearing and settlement of the jetty, we have assumed a maximum section in accordance with the stone and cross-section data transmitted to us and listed above under "Project Characteristics." See the Jetty Rehab Section on AMA's Drawing C-8, dated July 2013. For stone weight, we assumed an average density of 165 pcf with 10 percent voids. While 15 or 20 percent voids is often applicable, in this case, the AMA drawing calls for smaller chinking stone to fill in voids in the rip rap. For this reason, we assumed 10 percent voids and a stone density of 149 pcf. Considering buoyancy at mid-tide height of approximately 40 percent of the height of the jetty, stone bearing pressure was 1.65 ksf at the center 20 feet of the jetty's width, which was considered to be a flexible continuous spread footing. To this we added the weight of an extra foot of stone as a design factor. Lesser bearing pressures at the cross section's slope and toe extensions will result in a roughly parabolic settlement curve, with a maximum settlement estimated at the center of the jetty section. Total maximum settlement would occur at the heavy central portion of the jetty as described above. Estimated maximum settlements were as noted below:

Immediate Settlement	6 inches
Consolidation Settlement	2 inches
Total Settlement	8 inches

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Of the total settlement, 6 inches in the upper 40 feet of sands should occur during construction of the breakwaters and shortly after construction. The remaining 2 inches of settlement, all in cohesive silts below 40 feet, will be consolidation settlement over time.

While the type and characteristics of the strength of geotextile fabric and geogrid used as transition between the stone and harbor bottom is a function of the jetty's designer, we note that submerged applications are usually considered to be severe or critical enough to require the use of geogrids. The bottom should be relatively smooth prior to the placement of the geotextile fabric and the cloth should be laid loosely, i.e., not in stretched condition, but free of wrinkles, folds and creases. The large size sheets that are available should be used to reduce the number of laps required. Lap dimensions should follow manufacturer's recommendations. Because of the weak subgrade soils, as described above, we recommend the use of Tensar TriAx geogrid, a relatively new geogrid with a triangular structure that has multi-directional properties that will tend to even out the breakwater loading.

Riprap should be placed on the subgrade fabrics in such manner as to produce a reasonably well-graded mass of rock with a minimum percentage of voids. Riprap should also be placed to its full course thickness in one operation and in a way that will avoid displacing the geogrid and geotextile fabric.

C. Groundwater and Tidal Considerations

Based on the tide charts during a recent month, tide at the North Beach harbor was approximately +5.5 feet at maximum high tide. Minimum low tide was about +0.6 feet. This indicates an average tide of about 5 feet, which is consistent with this Delaware Bay area.

Existing ground elevations were derived from the above time and tide values and associated measurements from the barges where used. Otherwise, existing ground elevations were averaged from the AMA drawings as noted in the text of this report.

ADDITIONAL SERVICES RECOMMENDED

Additional engineering, testing and consulting services recommended for this project are summarized below.

Site Preparation

The Geotechnical Engineer or experienced soils inspector should inspect the site after it has been stripped and excavated. The inspector should determine where undercutting, or in-place densification are necessary to prepare a subgrade for fill placement support. The inspector should verify that organic soils, organic matter rubble, debris, etc. have been removed from all structural subgrade areas prior to filling operations.

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REMARKS

This report has been prepared solely and exclusively for Andrews, Miller & Associates, Inc. to provide guidance to design professionals in developing plans for the Murderkill River Entrance Channel Dredging and Jetty Improvements project located in Kent County, Delaware. It has not been developed to meet the needs of others, and application of this report for other than its intended purpose could result in substantial difficulties. The Consulting Engineer cannot be held accountable for any problems which occur due to the application of this report to other than its intended purpose. Additional recommendations can be provided as necessary.

These analyses and recommendations are, of necessity, based on the concepts made available to us at the time of the writing of this report and on-site conditions, surface and subsurface that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the areal extent of the site and to depth, are representative of conditions across the site. If conditions are encountered during construction which differ significantly from those reported herein, our office should be notified so that our recommendations can be reviewed and revised as necessary. It is also recommended that we be given the opportunity to review the plans and specifications in order to comment on the interaction of soil conditions as described herein and the design requirements. This report, in its entirety, should be attached to the project specifications.

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted engineering principles and practices.

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APPENDIX

1. Investigative Procedures
2. Project Location Map
3. Boring Location Plans
4. Boring Logs
5. Particle Size Data Tables
6. Chemical Test Results: Phase Separation Science Report
7. Unified Soil Classification Sheet
8. Field Classification Sheet
9. Information Sheet

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INVESTIGATIVE PROCEDURES

SOIL TEST BORINGS

Soil drilling and sampling operations were conducted in accordance with ASTM Specification D-1586. The borings were advanced by mechanically turning continuous hollow stem auger flights into the ground. At regular intervals, samples were obtained with a standard 1.4 inch I.D., 2.0 inch O.D. splitspoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is the "Standard Penetration Resistance". The penetration resistance, when properly evaluated, is an index to the soil's strength, density and behavior under applied loads. The soil descriptions and penetration resistances for each boring are presented on the Test Boring Records in the Appendix.

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our investigation, jar samples obtained during drilling operations are examined in our laboratory and visually classified by the geotechnical engineer in accordance with ASTM Specification D-2488. The soils are classified according to the AASHTO or Unified Classification System (ASTM D-2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior.

SIEVE ANALYSIS

Gradational analysis tests were performed to determine the particle size and distribution of the samples tested. The grain size distribution of soils coarser than a No. 200 sieve is determined by passing the sample through a standard set of nested sieves. The percentage of materials passing the No. 200 sieve is determined by washing the material over a No. 200 sieve. These tests are in accordance with ASTM D-421, D-422 and D-1140 including the hydrometer. The results are presented in the Appendix to our report.

NATURAL MOISTURE

Portions from representative soil samples obtained during drilling operations were selected for Natural Moisture Content tests. The Natural Moisture Content Test determines the water content of soils by drying into an oven with a standard drying temperature of 110 °C. The lost of mass drying the sample, determines the water content into the soil. The water content of the sample is calculated in percentage. The water content of soils (natural moisture) is determined in accordance with ASTM Specification D-2216.

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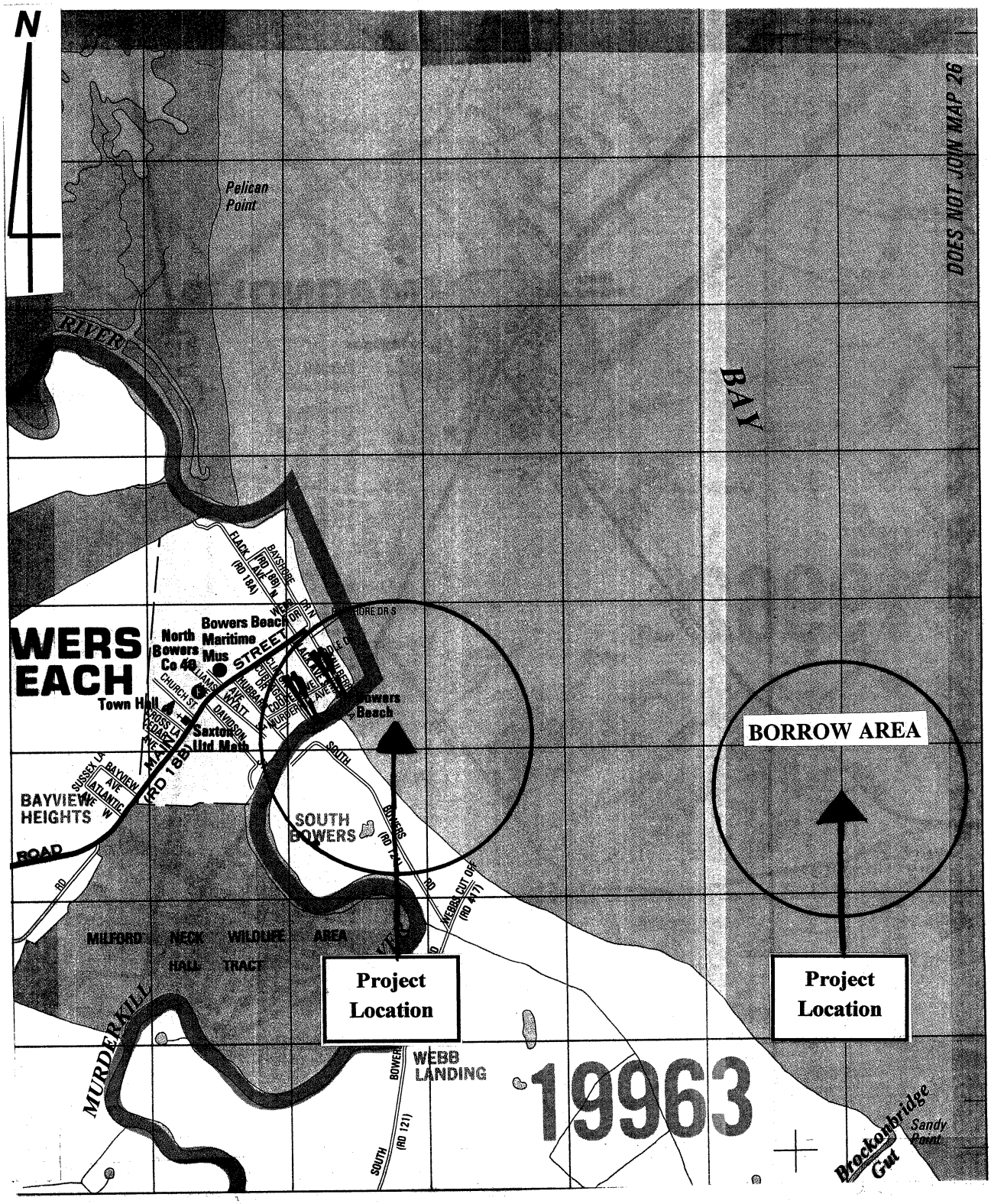

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	Date: August 2, 2013
	Scale: 1"= 2000'
	Drawn: ADC Map
Project Location Map Murderkill River Entrance Channel Dredging and Jetty Improvements Kent County, Delaware	**DWG. No.** **JDH-10/13/123-1-A**

HYNES **JOHN D. HYNES & ASSOCIATES, INC.**
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410-546-6462 / Fax: 410-548-5346

Date: August 1, 2013
Scale: Unknown
Drawn: Google Earth

Boring Location Plan: Jetty and Beach Borings
Murderkill River Entrance Channel Dredging and Jetty Improvements
Kent County, Delaware

DWG. No.
JDH-10/13/123-1-B-1

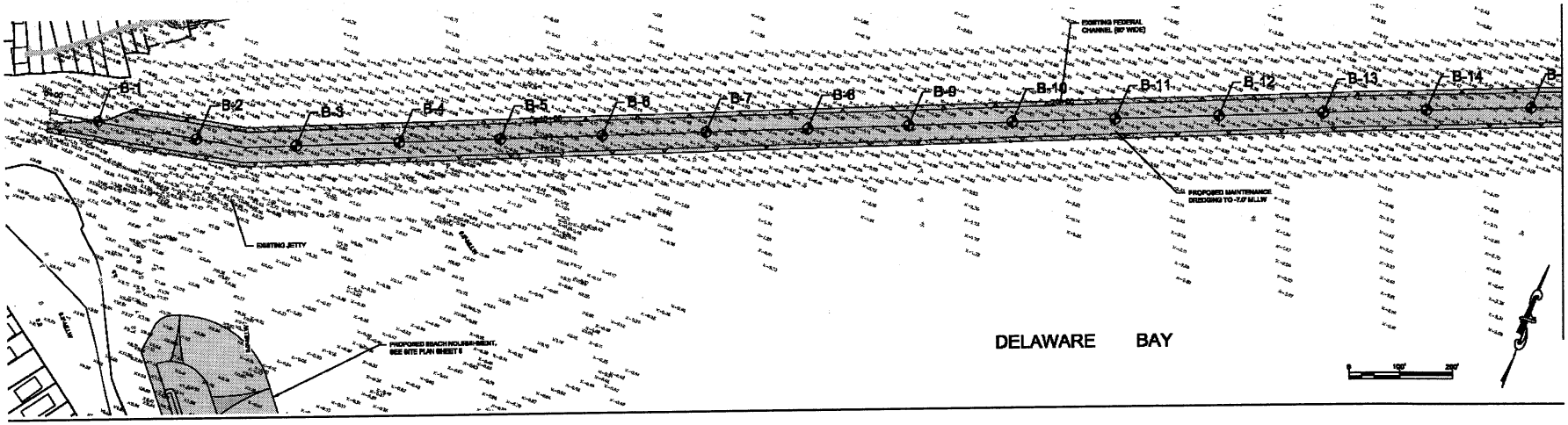
HYNES **JOHN D. HYNES & ASSOCIATES, INC.**
32185 Beaver Run Drive • Salisbury, Maryland 21804
410-546-6462 / Fax: 410-548-5346

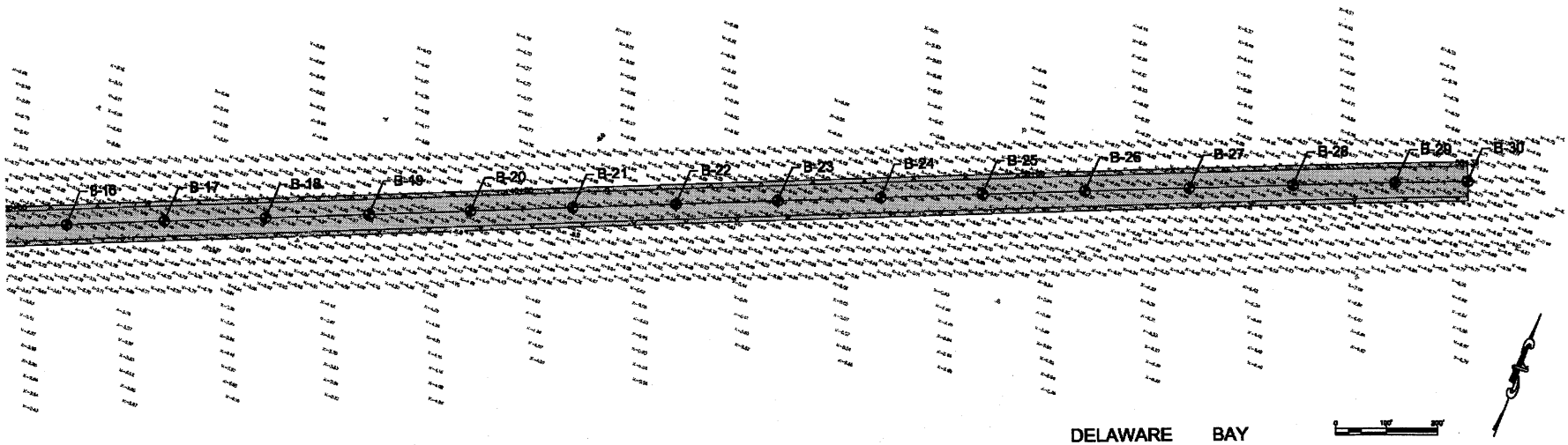
Date: August 1, 2013
Scale: Unknown
Drawn: Google Earth

Boring Location Plan: Borrow Area Borings
Murderkill River Entrance Channel Dredging and Jetty Improvements
Kent County, Delaware

DWG. No.

JDH-10/13/123-1-B-2





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410-546-6462 / Fax: 410-548-5346

Boring Location Map: Channel Boring Locations
Murderkill River Entrance Channel Dredging and
Jetty Improvements
Kent County, Delaware

Date: August 1, 2013
Scale: Unknown
Drawn: DBF
DWG. No. 10/13/123-1-B-3

HYNES & ASSOCIATES

LOG OF BORING B-1

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 1.5 feet

Depth in Feet	Mudline Elev. -7.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-7	Brown, saturated, fine to coarse SAND, with little fine to medium gravel, little silt, little organic silt, trace clay		SM	1	Scale 1" ~ 7.5 feet
2	-9	Black saturated, fine to medium SAND and organic SILT		SM/OL		Lat: N39° 03' 30.48" Long: W075° 23' 47.10"
4	-11	Boring terminated at 1.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-13					Note: Laboratory Testing Results: 35 Sieve Analysis tests were performed in all samples that were predominantly sands. Test results are in tabular format in the Appendix.
8	-15					
10	-17					
12	-19					
14	-21					
16	-23					
18	-25					
20	-27					
22	-29					
24	-31					
26	-33					
28	-35					
30	-37					
32	-39					
34	-41					
36	-43					
38	-45					
40	-47					
42	-49					
44	-51					
46	-53					
48	-55					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-2

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3.5 feet

Depth in Feet	Mudline Elev. -5.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-5	Dark gray, saturated, fine to medium SAND, with some organic silt		SP	1	Scale 1" ~ 7.5 feet
2	-7				2	Lat: N39° 03' 30.85"
4	-9	Boring terminated at 3.5 feet.				Long: W075° 23' 44.61"
6	-11					Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
8	-13					
10	-15					
12	-17					
14	-19					
16	-21					
18	-23					
20	-25					
22	-27					
24	-29					
26	-31					
28	-33					
30	-35					
32	-37					
34	-39					
36	-41					
38	-43					
40	-45					
42	-47					
44	-49					
46	-51					
48	-53					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-3

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4.5 feet

Depth in Feet	Mudline Elev. -4.4	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.4	Gray, saturated, fine to coarse SAND, with some fine to medium gravel, little organic silt		SP	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 31.42" Long: W075° 23' 42.19" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-6.4					
4	-8.4	Brown and gray, saturated, clayey SILT and organic SILT, with some fine to coarse sand		ML/OL	2	
6	-10.4	Boring terminated at 4.5 feet.				
8	-12.4					
10	-14.4					
12	-16.4					
14	-18.4					
16	-20.4					
18	-22.4					
20	-24.4					
22	-26.4					
24	-28.4					
26	-30.4					
28	-32.4					
30	-34.4					
32	-36.4					
34	-38.4					
36	-40.4					
38	-42.4					
40	-44.4					
42	-46.4					
44	-48.4					
46	-50.4					
48	-52.4					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-4

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 5 feet

Depth in Feet	Mudline Elev. -4.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.5	Gray, saturated, fine to coarse SAND, with some fine to medium gravel, trace organic silt		SP	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 32.17" Long: W075° 23' 39.85" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-6.5					
4	-8.5	Gray, saturated, clayey SILT and organic SILT, with some fine to coarse sand		ML/OL	2	
6	-10.5	Boring terminated at 5 feet.				
8	-12.5					
10	-14.5					
12	-16.5					
14	-18.5					
16	-20.5					
18	-22.5					
20	-24.5					
22	-26.5					
24	-28.5					
26	-30.5					
28	-32.5					
30	-34.5					
32	-36.5					
34	-38.5					
36	-40.5					
38	-42.5					
40	-44.5					
42	-46.5					
44	-48.5					
46	-50.5					
48	-52.5					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-5

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 5.5 feet

Depth in Feet	Mudline Elev. -4.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.5	Gray, saturated, fine to coarse SAND, with some fine gravel, little organic silt		SP	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 32.92" Long: W075° 23' 37.50" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-6.5					
4	-8.5	Gray, saturated, clayey SILT and organic SILT, with some fine to coarse sand		ML/OL	2	
6	-10.5	Boring terminated at 5.5 feet.				
8	-12.5					
10	-14.5					
12	-16.5					
14	-18.5					
16	-20.5					
18	-22.5					
20	-24.5					
22	-26.5					
24	-28.5					
26	-30.5					
28	-32.5					
30	-34.5					
32	-36.5					
34	-38.5					
36	-40.5					
38	-42.5					
40	-44.5					
42	-46.5					
44	-48.5					
46	-50.5					
48	-52.5					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-6

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2.5 feet

Depth in Feet	Mudline Elev. -6.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-6	Brown, saturated, fine to coarse SAND, with some fine to medium gravel, trace organic silt		SP	1	Scale 1" ~ 7.5 feet
2	-8	Black, saturated, fine to medium SAND, with some organic silt		SM/OL		Lat: N39° 03' 33.68" Long: W075° 23' 35.16"
4	-10	Boring terminated at 2.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-12					
8	-14					
10	-16					
12	-18					
14	-20					
16	-22					
18	-24					
20	-26					
22	-28					
24	-30					
26	-32					
28	-34					
30	-36					
32	-38					
34	-40					
36	-42					
38	-44					
40	-46					
42	-48					
44	-50					
46	-52					
48	-54					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-7

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2 feet

Depth in Feet	Surf. Elev. -7.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-7	Brown, saturated, fine to coarse SAND, with trace silt		SP	1	Scale 1" ~ 7.5 feet
2	-9	Black, saturated, fine to medium SAND, with some organic silt		SM/OL		Lat: N39° 03' 34.43" Long: W075° 23' 32.82"
4	-11	Boring terminated at 2 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-13					
8	-15					
10	-17					
12	-19					
14	-21					
16	-23					
18	-25					
20	-27					
22	-29					
24	-31					
26	-33					
28	-35					
30	-37					
32	-39					
34	-41					
36	-43					
38	-45					
40	-47					
42	-49					
44	-51					
46	-53					
48	-55					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-8

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2 feet

Depth in Feet	Mudline Elev. -5.9	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-5.9	Brown, saturated, fine to coarse SAND, with some fine to medium gravel, trace silt		SP	1	Scale 1" ~ 7.5 feet
2	-7.9	Black, saturated, fine to medium SAND, with some organic silt		SM/OL		Lat: N39° 03' 35.19" Long: W075° 23' 30.47"
4	-9.9	Boring terminated at 2 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-11.9					
8	-13.9					
10	-15.9					
12	-17.9					
14	-19.9					
16	-21.9					
18	-23.9					
20	-25.9					
22	-27.9					
24	-29.9					
26	-31.9					
28	-33.9					
30	-35.9					
32	-37.9					
34	-39.9					
36	-41.9					
38	-43.9					
40	-45.9					
42	-47.9					
44	-49.9					
46	-51.9					
48	-53.9					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-9

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3.5 feet

Depth in Feet	Mudline Elev. -4.7	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.7	Brown, saturated, fine to coarse SAND, with some fine to medium gravel, trace silt		SP	1	Scale 1" ~ 7.5 feet
2	-6.7	Black, saturated, fine to medium SAND and organic SILT		SM/OL	2	Lat: N39° 03' 35.94" Long: W075° 23' 28.13"
4	-8.7	Boring terminated at 3.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-10.7					
8	-12.7					
10	-14.7					
12	-16.7					
14	-18.7					
16	-20.7					
18	-22.7					
20	-24.7					
22	-26.7					
24	-28.7					
26	-30.7					
28	-32.7					
30	-34.7					
32	-36.7					
34	-38.7					
36	-40.7					
38	-42.7					
40	-44.7					
42	-46.7					
44	-48.7					
46	-50.7					
48	-52.7					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-10

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3.75 feet

Depth in Feet	Mudline Elev. -4.4	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.4	Brown, saturated, fine to coarse SAND, with little fine to medium gravel, trace silt		SP	1	Scale 1" ~ 7.5 feet
2	-6.4	Black, saturated, fine to medium SAND, with little to some organic silt		SM/OL	2	Lat: N39° 03' 36.70" Long: W075° 23' 25.79"
4	-8.4	Boring terminated at 3.75 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-10.4					
8	-12.4					
10	-14.4					
12	-16.4					
14	-18.4					
16	-20.4					
18	-22.4					
20	-24.4					
22	-26.4					
24	-28.4					
26	-30.4					
28	-32.4					
30	-34.4					
32	-36.4					
34	-38.4					
36	-40.4					
38	-42.4					
40	-44.4					
42	-46.4					
44	-48.4					
46	-50.4					
48	-52.4					
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HYNES & ASSOCIATES

LOG OF BORING B-11

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3.75 feet

Depth in Feet	Mudline Elev. -4.3	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.3	Brown, saturated, fine to coarse SAND, with trace silt, trace fine gravel		SP	1	Scale 1" ~ 7.5 feet
2	-6.3				2	Lat: N39° 03' 37.45" Long: W075° 23' 23.44"
4	-8.3	Boring terminated at 3.75 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-10.3					
8	-12.3					
10	-14.3					
12	-16.3					
14	-18.3					
16	-20.3					
18	-22.3					
20	-24.3					
22	-26.3					
24	-28.3					
26	-30.3					
28	-32.3					
30	-34.3					
32	-36.3					
34	-38.3					
36	-40.3					
38	-42.3					
40	-44.3					
42	-46.3					
44	-48.3					
46	-50.3					
48	-52.3					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-12

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4.5 feet

Depth in Feet	Mudline Elev. -4.6	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.6	Brown, saturated, fine to medium SAND, with trace silt, trace fine gravel		SP	1	Scale 1" ~ 7.5 feet
2	-6.6	Black and brown, saturated, clayey SILT and organic SILT, with some fine to medium sand		ML/OL	2	Lat: N39° 03' 38.21" Long: W075° 23' 21.10"
4	-8.6	Boring terminated at 4.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-10.6					
8	-12.6					
10	-14.6					
12	-16.6					
14	-18.6					
16	-20.6					
18	-22.6					
20	-24.6					
22	-26.6					
24	-28.6					
26	-30.6					
28	-32.6					
30	-34.6					
32	-36.6					
34	-38.6					
36	-40.6					
38	-42.6					
40	-44.6					
42	-46.6					
44	-48.6					
46	-50.6					
48	-52.6					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-13

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4.5 feet

Depth in Feet	Mudline Elev. -3.8	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-3.8	Brown and black, saturated, fine to medium SAND, with trace organic silt		SP	1	Scale 1" ~ 7.5 feet
2	-5.8	Brown, saturated, fine to medium SAND, with little clay, trace silt, trace to little organic silt		SC	2	Lat: N39° 03' 38.96" Long: W075° 23' 18.75"
4	-7.8	Boring terminated at 4.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-9.8					
8	-11.8					
10	-13.8					
12	-15.8					
14	-17.8					
16	-19.8					
18	-21.8					
20	-23.8					
22	-25.8					
24	-27.8					
26	-29.8					
28	-31.8					
30	-33.8					
32	-35.8					
34	-37.8					
36	-39.8					
38	-41.8					
40	-43.8					
42	-45.8					
44	-47.8					
46	-49.8					
48	-51.8					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-14

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4.5 feet

Depth in Feet	Mudline Elev. -3.6	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-3.6	Brown, saturated, fine to coarse SAND, with trace organic silt		SP	1	Scale 1" ~ 7.5 feet
2	-5.6				2	Lat: N39° 03' 39.71"
4	-7.6					Long: W075° 23' 16.41"
6	-9.6	Boring terminated at 4.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
8	-11.6					
10	-13.6					
12	-15.6					
14	-17.6					
16	-19.6					
18	-21.6					
20	-23.6					
22	-25.6					
24	-27.6					
26	-29.6					
28	-31.6					
30	-33.6					
32	-35.6					
34	-37.6					
36	-39.6					
38	-41.6					
40	-43.6					
42	-45.6					
44	-47.6					
46	-49.6					
48	-51.6					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-15

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4 feet

Depth in Feet	Mudline Elev. -3.9	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-3.9	Brown, saturated, fine to coarse SAND, with trace to little organic silt		SP	1	Scale 1" ~ 7.5 feet
2	-5.9				2	Lat: N39° 03' 40.47"
4	-7.9					Long: W075° 23' 14.07"
6	-9.9	Boring terminated at 4 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
8	-11.9					
10	-13.9					
12	-15.9					
14	-17.9					
16	-19.9					
18	-21.9					
20	-23.9					
22	-25.9					
24	-27.9					
26	-29.9					
28	-31.9					
30	-33.9					
32	-35.9					
34	-37.9					
36	-39.9					
38	-41.9					
40	-43.9					
42	-45.9					
44	-47.9					
46	-49.9					
48	-51.9					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-16

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 5.5 feet

Depth in Feet	Mudline Elev. -3.7	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-3.7	Brown, saturated, fine to coarse SAND, with trace silt		SP	1	Scale 1" ~ 7.5 feet
2	-5.7	Dark brown to black, saturated, fine to medium SAND, with some organic silt		SM/OL	2	Lat: N39° 03' 41.22" Long: W075° 23' 11.72"
4	-7.7					
6	-9.7	Boring terminated at 5.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
8	-11.7					
10	-13.7					
12	-15.7					
14	-17.7					
16	-19.7					
18	-21.7					
20	-23.7					
22	-25.7					
24	-27.7					
26	-29.7					
28	-31.7					
30	-33.7					
32	-35.7					
34	-37.7					
36	-39.7					
38	-41.7					
40	-43.7					
42	-45.7					
44	-47.7					
46	-49.7					
48	-51.7					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-17

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 5.5 feet

Depth in Feet	Mudline Elev. -3.8	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-3.8	Dark brown, saturated, fine to coarse SAND, with trace silt, trace organic silt		SP	1	Scale 1" ~ 7.5 feet
2	-5.8				2	Lat: N39° 03' 41.98" Long: W075° 23' 09.38"
4	-7.8					
6	-9.8	Boring terminated at 5.5 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
8	-11.8					
10	-13.8					
12	-15.8					
14	-17.8					
16	-19.8					
18	-21.8					
20	-23.8					
22	-25.8					
24	-27.8					
26	-29.8					
28	-31.8					
30	-33.8					
32	-35.8					
34	-37.8					
36	-39.8					
38	-41.8					
40	-43.8					
42	-45.8					
44	-47.8					
46	-49.8					
48	-51.8					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-18

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4 feet

Depth in Feet	Mudline Elev. -3.9	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-3.9	Brown to gray, saturated, fine to coarse SAND, with little silt, little organic silt		SM/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 42.73" Long: W075° 23' 07.04" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-5.9					
4	-7.9	Boring terminated at 4 feet.				
6	-9.9					
8	-11.9					
10	-13.9					
12	-15.9					
14	-17.9					
16	-19.9					
18	-21.9					
20	-23.9					
22	-25.9					
24	-27.9					
26	-29.9					
28	-31.9					
30	-33.9					
32	-35.9					
34	-37.9					
36	-39.9					
38	-41.9					
40	-43.9					
42	-45.9					
44	-47.9					
46	-49.9					
48	-51.9					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-19

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 4 feet

Depth in Feet	Mudline Elev. -4.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4	Brown to gray, saturated, fine to coarse SAND, with litle silt, little organic silt		SM/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 43.49" Long: W075° 23' 04.69"
2	-6					
4	-8	Boring terminated at 4 feet.				Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
6	-10					
8	-12					
10	-14					
12	-16					
14	-18					
16	-20					
18	-22					
20	-24					
22	-26					
24	-28					
26	-30					
28	-32					
30	-34					
32	-36					
34	-38					
36	-40					
38	-42					
40	-44					
42	-46					
44	-48					
46	-50					
48	-52					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-20

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3.75 feet

Depth in Feet	Mudline Elev. -4.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-4.5	Dark gray, saturated, organic SILT, with little fine sand		OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 44.24" Long: W075° 23' 02.35" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-6.5					
4	-8.5	Boring terminated at 3.75 feet.				
6	-10.5					
8	-12.5					
10	-14.5					
12	-16.5					
14	-18.5					
16	-20.5					
18	-22.5					
20	-24.5					
22	-26.5					
24	-28.5					
26	-30.5					
28	-32.5					
30	-34.5					
32	-36.5					
34	-38.5					
36	-40.5					
38	-42.5					
40	-44.5					
42	-46.5					
44	-48.5					
46	-50.5					
48	-52.5					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-21

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3.5 feet

Depth in Feet	Mudline Elev. -5.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-5	Brown to gray, saturated, clayey SILT and organic SILT, with little fine sand		ML/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 45.00" Long: W075° 23' 00.00" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-7					
4	-9	Boring terminated at 3.5 feet.				
6	-11					
8	-13					
10	-15					
12	-17					
14	-19					
16	-21					
18	-23					
20	-25					
22	-27					
24	-29					
26	-31					
28	-33					
30	-35					
32	-37					
34	-39					
36	-41					
38	-43					
40	-45					
42	-47					
44	-49					
46	-51					
48	-53					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-22

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3 feet

Depth in Feet	Mudline Elev. -5.3	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-5.3	Brown to gray, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 45.75" Long: W075° 22' 57.66" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-7.3					
4	-9.3	Boring terminated at 3 feet.				
6	-11.3					
8	-13.3					
10	-15.3					
12	-17.3					
14	-19.3					
16	-21.3					
18	-23.3					
20	-25.3					
22	-27.3					
24	-29.3					
26	-31.3					
28	-33.3					
30	-35.3					
32	-37.3					
34	-39.3					
36	-41.3					
38	-43.3					
40	-45.3					
42	-47.3					
44	-49.3					
46	-51.3					
48	-53.3					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-23

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2.75 feet

Depth in Feet	Mudline Elev. -5.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-5.5	Brown to gray, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 46.50" Long: W075° 22' 55.32" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-7.5					
4	-9.5	Boring terminated at 2.75 feet.				
6	-11.5					
8	-13.5					
10	-15.5					
12	-17.5					
14	-19.5					
16	-21.5					
18	-23.5					
20	-25.5					
22	-27.5					
24	-29.5					
26	-31.5					
28	-33.5					
30	-35.5					
32	-37.5					
34	-39.5					
36	-41.5					
38	-43.5					
40	-45.5					
42	-47.5					
44	-49.5					
46	-51.5					
48	-53.5					
50						

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LOG OF BORING B-24

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2.5 feet

Depth in Feet	Mudline Elev. -5.6	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-5.6	Brown to gray, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 47.26" Long: W075° 22' 52.97" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-7.6	Boring terminated at 2.5 feet.				
4	-9.6					
6	-11.6					
8	-13.6					
10	-15.6					
12	-17.6					
14	-19.6					
16	-21.6					
18	-23.6					
20	-25.6					
22	-27.6					
24	-29.6					
26	-31.6					
28	-33.6					
30	-35.6					
32	-37.6					
34	-39.6					
36	-41.6					
38	-43.6					
40	-45.6					
42	-47.6					
44	-49.6					
46	-51.6					
48	-53.6					
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LOG OF BORING B-25

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2 feet

Depth in Feet	Mudline Elev. -6.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-6	Brown to gray, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet
2	-8	Boring terminated at 2 feet.				Lat: N39° 03' 48.01" Long: W075° 22' 50.63" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
4	-10					
6	-12					
8	-14					
10	-16					
12	-18					
14	-20					
16	-22					
18	-24					
20	-26					
22	-28					
24	-30					
26	-32					
28	-34					
30	-36					
32	-38					
34	-40					
36	-42					
38	-44					
40	-46					
42	-48					
44	-50					
46	-52					
48	-54					
50						

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HYNES & ASSOCIATES

LOG OF BORING B-26

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2 feet

Depth in Feet	Mudline Elev. -6.3	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-6.3	Brown to gray, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet
2	-8.3	Boring terminated at 2 feet.				Lat: N39° 03' 48.77" Long: W075° 22' 48.29" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
4	-10.3					
6	-12.3					
8	-14.3					
10	-16.3					
12	-18.3					
14	-20.3					
16	-22.3					
18	-24.3					
20	-26.3					
22	-28.3					
24	-30.3					
26	-32.3					
28	-34.3					
30	-36.3					
32	-38.3					
34	-40.3					
36	-42.3					
38	-44.3					
40	-46.3					
42	-48.3					
44	-50.3					
46	-52.3					
48	-54.3					
50						

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LOG OF BORING B-27

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2.5 feet

Depth in Feet	Mudline Elev. -6.3	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-6.3	Gray and black, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 49.52" Long: W075° 22' 45.94" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-8.3	Boring terminated at 2.5 feet.				
4	-10.3					
6	-12.3					
8	-14.3					
10	-16.3					
12	-18.3					
14	-20.3					
16	-22.3					
18	-24.3					
20	-26.3					
22	-28.3					
24	-30.3					
26	-32.3					
28	-34.3					
30	-36.3					
32	-38.3					
34	-40.3					
36	-42.3					
38	-44.3					
40	-46.3					
42	-48.3					
44	-50.3					
46	-52.3					
48	-54.3					
50						

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LOG OF BORING B-28

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2.5 feet

Depth in Feet	Mudline Elev. -6.6	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-6.6	Gray and black, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet
2	-8.6	Boring terminated at 1.5 feet.				Lat: N39° 03' 50.28" Long: W075° 22' 43.60" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
4	-10.6					
6	-12.6					
8	-14.6					
10	-16.6					
12	-18.6					
14	-20.6					
16	-22.6					
18	-24.6					
20	-26.6					
22	-28.6					
24	-30.6					
26	-32.6					
28	-34.6					
30	-36.6					
32	-38.6					
34	-40.6					
36	-42.6					
38	-44.6					
40	-46.6					
42	-48.6					
44	-50.6					
46	-52.6					
48	-54.6					
50						

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LOG OF BORING B-29

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2.5 feet

Depth in Feet	Mudline Elev. -6.8	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-6.8	Gray and black, saturated, clayey SILT and organic SILT, with little fine to medium sand		ML/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 51.03" Long: W075° 22' 41.25" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-8.8	Boring terminated at 1.5 feet.				
4	-10.8					
6	-12.8					
8	-14.8					
10	-16.8					
12	-18.8					
14	-20.8					
16	-22.8					
18	-24.8					
20	-26.8					
22	-28.8					
24	-30.8					
26	-32.8					
28	-34.8					
30	-36.8					
32	-38.8					
34	-40.8					
36	-42.8					
38	-44.8					
40	-46.8					
42	-48.8					
44	-50.8					
46	-52.8					
48	-54.8					
50						

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LOG OF BORING B-30

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 2.5 feet

Depth in Feet	Mudline Elev. -6.8	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	-6.8	Gray and black, saturated, clayey SILT and organic SILT, with little fine sand		ML/OL	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 51.55" Long: W075° 22' 39.63" Note: Ground elevation at boring locations was estimated from mudline soundings on AMA Dredging Plan of Federal Channel Drawing C-3, dated June 2013.
2	-8.8	Boring terminated at 1.25 feet.				
4	-10.8					
6	-12.8					
8	-14.8					
10	-16.8					
12	-18.8					
14	-20.8					
16	-22.8					
18	-24.8					
20	-26.8					
22	-28.8					
24	-30.8					
26	-32.8					
28	-34.8					
30	-36.8					
32	-38.8					
34	-40.8					
36	-42.8					
38	-44.8					
40	-46.8					
42	-48.8					
44	-50.8					
46	-52.8					
48	-54.8					
50						

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HYNES & ASSOCIATES

LOG OF BORING JB-1

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 45.5 feet

Depth in Feet	Ground Elev. 7.1	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Recovery (inches)	Remarks
0	7.1	Light brown, wet, very loose, fine to coarse SAND, with trace silt		SP	1	1-1-1	6	Scale 1" ~ 7.5 feet
2	5.1							
4	3.1	Brown, saturated, very loose, fine to coarse SAND, with some silt		SM	2	1-1-1	6	Groundwater was encountered at 1 to 3 feet during drilling operations.
6	1.1	Brown, saturated, very loose, fine to coarse SAND, with some silt, little fine to medium gravel		SM	3	5-1-1	7	Note: Ground elevation at boring locations was estimated from survey ground shots on AMA Jetty Rehabilitation Plan Drawing C-4 dated June 2013.
8	-.9							
10	-2.9	Gray, saturated, very loose, silty, fine to coarse SAND, with trace organic silt, trace fine gravel		SM	4	1-1-1	7	
12	-4.9							
14	-6.9				5	2-1-4	9	Boring was drilled on shore adjacent to the north side of Jetty.
16	-8.9							
18	-10.9	Light gray, saturated, clayey, fine to medium SAND, with trace silt		SC	6	1-1-1	18	
20	-12.9							
22	-14.9							
24	-16.9				7	2-2-3	16	
26	-18.9							
28	-20.9	Light brown, saturated, clayey, fine SAND, with trace silt		SC	8	1-1-1	15	
30	-22.9							
32	-24.9							
34	-26.9	Light brown, saturated, loose, fine SAND, with some clay, little silt		SC	9	3-5-5	10	
36	-28.9							
38	-30.9	Light brown, saturated, medium dense, fine SAND, with some silt, trace clay		SM	10	3-5-6	11	
40	-32.9							
42	-34.9							
44	-36.9				11	4-6-7	12	
46	-38.9	Boring was terminated at 45.5 feet.						
48	-40.9							
50								

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HYNES & ASSOCIATES

LOG OF BORING JB-2

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 45.5 feet

Depth in Feet	Ground Elev. 5.7	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Recovery (inches)	Remarks
0	5.7	Light brown, wet, very loose, fine to coarse SAND, with little silt, trace clay		SM	1	1-1-1	2	Scale 1" ~ 7.5 feet
2	3.7	Brown, saturated, very loose, fine to coarse SAND, with some silt, trace fine to medium gravel		SM	2	1-1-1	8	Groundwater was encountered at 1 foot during drilling operations.
4	1.7							
6	-.3				3	1-1-1	9	Note: Ground elevation at boring locations was estimated from survey ground shots on AMA Jetty Rehabilitation Plan Drawing C-4 dated June 2013.
8	-2.3	Dark gray, saturated, very loose, clayey, fine to medium SAND, with little organic silt		SC/OL				
10	-4.3	Gray, saturated, very loose, fine to medium SAND, with some silt, trace clay		SM	4	1-1-2	8	Boring was drilled on shoe adjacent to te north side of Jetty.
12	-6.3							
14	-8.3	Gray-brown, saturated, loose, fine SAND, with some silt, little clay		SM	5	3-5-5	17	
16	-10.3							
18	-12.3	Gray and brown, saturated, very loose, clayey, fine SAND, with trace silt		SC	6	1-1-1	18	
20	-14.3							
22	-16.3							
24	-18.3	Orange-brown, saturated, very loose, fine SAND, with little clay, little silt		SC/SM	7	2-2-2	16	
26	-20.3							
28	-22.3	Gray and brown, saturated, loose, fine SAND, with some silt, trace to little clay		SM	8	1-3-3		
30	-24.3							
32	-26.3							
34	-28.3	Light brown, saturated, loose, fine to medium SAND, with some silt, trace clay		SM	9	3-3-4		
36	-30.3							
38	-32.3	Brown and gray, saturated, loose, fine to medium SAND, with some silt, little clay		SC/SM	10	4-5-5	17	
40	-34.3							
42	-36.3							
44	-38.3	Brown, saturated, medium dense, fine SAND, with some clay, little silt		SC	11	5-6-7	16	
46	-40.3	Boring was terminated at 45.5 feet.						
48	-42.3							
50								

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HYNES & ASSOCIATES

LOG OF BORING JB-3

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 26, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 40.5 feet

Depth in Feet	Ground Elev. 3.9	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	3.9	Gray, saturated, loose, fine to coarse SAND, with some clay, trace silt		SC	1	2-3-3	Scale 1" ~ 7.5 feet The boring was drilled in 6 feet of water. Note: Ground elevation at boring locations was estimated from survey ground shots on AMA Jetty Rehabilitation Plan Drawing C-4 dated June 2013.
2	1.9						
4	-.1	Gray-brown, saturated, medium dense, fine to medium SAND, with little clay, little silt, trace fine gravel		SC	2	9-5-9	
6	-2.1						
8	-4.1	Light brown, saturated, medium dense, fine to medium SAND, with little silt, little clay		SM	3	12-12-14	
10	-6.1						
12	-8.1						
14	-10.1	Orange-brown, saturated, loose to medium dense, fine to medium SAND, with little clay, little silt		SC	4	4-3-4	
16	-12.1						
18	-14.1						
20	-16.1				5	10-11-15	
22	-18.1						
24	-20.1	Orange-brown, saturated, medium dense, fine SAND, with some clay, trace silt		SC	6	4-10-19	
26	-22.1						
28	-24.1	Orange-brown, saturated, dense, fine SAND, with some silt, trace clay		SM	7	15-15-16	
30	-26.1						
32	-28.1						
34	-30.1				8	3-4-10	
36	-32.1	Brown, saturated, stiff, clayey SILT, with some fine sand		ML			
38	-34.1	Dark gray, wet, very stiff, fat organic SILT, with trace fine sand		OH	9	4-8-9	
40	-36.1	Boring was terminated at 40.5 feet.					
42	-38.1						
44	-40.1						
46	-42.1						
48	-44.1						
50							

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HYNES & ASSOCIATES

LOG OF BORING JB-4

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 26, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 40.5 feet

Depth in Feet	Ground Elev. 3.3	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	3.3	Brown, saturated, very loose, fine to coarse SAND, with some silt, trace clay		SM	1	3-2-2	Scale 1" ~ 7.5 feet The boring was drilled in 6 feet of water. Note: Ground elevation at boring locations was estimated from survey ground shots on AMA Jetty Rehabilitation Plan Drawing C-4 dated June 2013.
2	1.3	Dark gray-gray, saturated, fine to medium SAND, with some organic silt, trace clay		SM/OL			
4	-.7	Gray, saturated, medium dense, fine to medium SAND, with some silt, trace clay		SM	2	7-8-8	
8	-4.7	Brown and gray, saturated, medium dense, fine to coarse SAND, with little silt, little organic silt, trace fine to medium gravel (mottled)		SM/OL	3	10-10-13	
12	-8.7						
14	-10.7	Brown and gray, saturated, loose to medium dense, clayey fine SAND, with trace silt		SC	4	3-3-4	
16	-12.7						
18	-14.7				5	9-9-12	
20	-16.7						
22	-18.7						
24	-20.7	Orange-brown, saturated, medium dense, fine SAND, with little silt, little clay		SM/SC	6	8-9-14	
26	-22.7						
28	-24.7				7	12-11-19	
30	-26.7						
32	-28.7						
34	-30.7	Dark gray, saturated, medium dense, fine SAND, with some organic silt		SM/OL	8	4-4-9	
36	-32.7						
38	-34.7	Dark gray, wet, stiff, fat organic SILT		OL	9	6-5-10	
40	-36.7						
42	-38.7	Boring was terminated at 40.5 feet.					
44	-40.7						
46	-42.7						
48	-44.7						
50							

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HYNES & ASSOCIATES

LOG OF BORING NB-1

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 25, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	Light brown, moist, fine to coarse SAND, with trace silt, trace fine gravel		SP	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 41.05" Long: W075° 23' 48.30" Groundwater was encountered at 1.5 to 2 feet during drilling operations.
2					
4	Boring terminated at 3 feet.				
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HYNES & ASSOCIATES

LOG OF BORING SB-1

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 25, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0	Light brown, moist, fine to coarse SAND, with little fine to coarse gravel, trace silt		SP	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 21.72" Long: W075° 23' 38.69" Groundwater was encountered at 1.5 to 2 feet during drilling operations.
2					
4	Boring terminated at 3 feet.				
6					
8					
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HYNES & ASSOCIATES

LOG OF BORING SB-2

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 25, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : Hand Auger
Total Depth: : 3 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample No.	Remarks
0–2	Light brown, moist, fine to coarse SAND, with little fine gravel, trace silt		SP	1	Scale 1" ~ 7.5 feet Lat: N39° 03' 16.26" Long: W075° 23' 33.12" Groundwater was encountered at 1.5 to 2 feet during drilling operations.
4–8	Boring terminated at 3 feet.				

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HYNES & ASSOCIATES

LOG OF BORING T-3

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 27, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 15.5 feet

Depth in Feet	Est. Mudline Elev. -8.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	-8.5	Dark gray, saturated, very soft, organic SILT, with trace fine sand		OL	1	WOH/24"	Scale 1" ~ 7.5 feet
2	-10.5				2	WOH/24"	Lat: N39° 03' 18.59" Long: W075° 21' 52.72"
4	-12.5	Gray, saturated, medium dense, fine to medium SAND, with some silt		SM/OL	3	9-11-16	11 feet of water at 9:45 am.
6	-14.5	Light gray, saturated, dense, fine SAND, with trace silt		SP	4	12-18-22	Note: Elevations at boring locations were estimated by Hynes & Associates to +/- 2 feet, based upon field measurements from barge, corrected to date & time of day to predicted tide chart for the area.
8	-16.5	Light gray, saturated, dense, fine to coarse SAND, with little silt		SM	5	9-16-20	
10	-18.5	Light gray, saturated, medium dense, fine to medium SAND, with some silt		SM	6	8-10-9	
12	-20.5				7	5-7-9	
14	-22.5				8	9-10-13	
16	-24.5	Boring was terminated at 15.5 feet.					
18	-26.5						
20	-28.5						
22	-30.5						
24	-32.5						
26	-34.5						
28	-36.5						
30	-38.5						
32	-40.5						
34	-42.5						
36	-44.5						
38	-46.5						
40	-48.5						
42	-50.5						
44	-52.5						
46	-54.5						
48	-56.5						
50							

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HYNES & ASSOCIATES

LOG OF BORING T-6

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 27, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 15.5 feet

Depth in Feet	Est. Mudline Elev. -8.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	-8	Dark gray, saturated, very soft, organic CLAY, with trace fine sand		OH	1	WOH/24"	Scale 1" ~ 7.5 feet
2	-10				2	WOH/24"	Lat: N39° 03' 28.83" Long: W075° 21' 39.31"
4	-12	Dark gray, saturated, very soft, organic SILT, with trace fine sand		OL	3	WOH/24"	12 feet of water at 11:45 am.
6	-14	Gray, saturated, dense, fine to medium SAND, with some silt, trace to little clay		SM	4	14-18-19	Note: Elevations at boring locations were estimated by Hynes & Associates to +/- 2 feet, based upon field measurements from barge, corrected to date & time of day to predicted tide chart for the area.
8	-16				5	7-9-14	
10	-18	Gray, saturated, medium dense, fine to coarse SAND, with some silt, trace clay		SM	6	6-10-13	
12	-20	Gray-brown, saturated, medium dense, fine to coarse SAND, with some silt, trace clay		SM	7	6-8-12	
14	-22				8	7-7-11	
16	-24	Boring was terminated at 15.5 feet.					
18	-26						
20	-28						
22	-30						
24	-32						
26	-34						
28	-36						
30	-38						
32	-40						
34	-42						
36	-44						
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42	-50						
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HYNES & ASSOCIATES

LOG OF BORING T-8

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 29, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 15.5 feet

Depth in Feet	Est. Mudline Elev. -10.0	DESCRIPTION	GRAPHIC	USCS	Sample	Blows per 6 inches	Remarks
0	-10	Dark gray, saturated, very soft, organic SILT, with trace fine sand		OL	1	WOH/24"	Scale 1" ~ 7.5 feet
2	-12	Dark gray, saturated, very soft, organic SILT, with little fine sand		OL	2	WOH/24"	Lat: N39° 03' 16.68" Long: W075° 22' 07.29"
4	-14	Gray, saturated, medium dense, clayey fine to medium SAND, with little silt		SC	3	6-9-13	13 feet of water at 12:00 pm.
6	-16	Gray, saturated, medium dense, fine to coarse SAND, with some silt, trace clay		SM	4	10-14-19	Note: Elevations at boring locations were estimated by Hynes & Associates to +/- 2 feet, based upon field measurements from barge, corrected to date & time of day to predicted tide chart for the area.
8	-18				5	9-13-17	
10	-20	Gray, saturated, medium dense, fine to medium SAND, with some silt		SM	6	9-9-11	
12	-22	Gray, saturated, medium dense, fine to medium SAND, with some silt, trace organic silt, trace clay		SM	7	7-9-9	
14	-24				8	9-10-12	
16	-26	Boring was terminated at 15.5 feet.					
18	-28						
20	-30						
22	-32						
24	-34						
26	-36						
28	-38						
30	-40						
32	-42						
34	-44						
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40	-50						
42	-52						
44	-54						
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HYNES & ASSOCIATES

LOG OF BORING T-12

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 29, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 15.5 feet

Depth in Feet	Est. Mudline Elev. -8.5	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	-8.5	Dark gray, saturated, very soft, organic SILT, with little fine sand		OL	1	WOH/24"	Scale 1" ~ 7.5 feet
2	-10.5	Dark gray, saturated, very soft, organic CLAY, with trace fine sand		OH	2	WOH/24"	Lat: N39° 03' 27.05" Long: W075° 21' 52.52"
4	-12.5	Gray, saturated, dense, fine to medium SAND, with little to some silt		SM	3	10-12-20	11 feet of water at 11:30 am.
6	-14.5				4	10-20-25	
8	-16.5	Gray, saturated, medium dense, fine SAND, with little silt		SM	5	8-12-14	Note: Elevations at boring locations were estimated by Hynes & Associates to +/- 2 feet, based upon field measurements from barge, corrected to date & time of day to predicted tide chart for the area.
10	-18.5	Gray, saturated, medium dense, fine to medium SAND, with some silt, trace organic silt		SM	6	7-8-11	
12	-20.5	Gray, saturated, medium dense, fine to coarse SAND, with little silt		SM	7	5-6-6	
14	-22.5	Gray, saturated, medium dense, fine to coarse SAND, with some silt, trace organic silt		SM	8	9-11-14	
16	-24.5	Boring was terminated at 15.5 feet.					
18	-26.5						
20	-28.5						
22	-30.5						
24	-32.5						
26	-34.5						
28	-36.5						
30	-38.5						
32	-40.5						
34	-42.5						
36	-44.5						
38	-46.5						
40	-48.5						
42	-50.5						
44	-52.5						
46	-54.5						
48	-56.5						
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HYNES & ASSOCIATES

LOG OF BORING T-15

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 27, 2013
Logged By: : J. Redding
Drilled By: : M. Hynes
Drilling Method: : HSA (Mobile B-47 HD)
Total Depth: : 15.5 feet

Depth in Feet	Est. Mudline Elev. -9.0	DESCRIPTION	GRAPHIC	USCS	Sample No.	Blows per 6 inches	Remarks
0	-9	Dark gray, saturated, very soft, organic SILT, with little fine to coarse sand, little shells		OL	1	WOH/24"	Scale 1" ~ 7.5 feet
2	-11	Dark gray, saturated, very soft, organic CLAY, with trace fine sand		OH	2	WOH/24"	Lat: N39° 03' 34.91" Long: W075° 21' 38.56"
4	-13	Dark gray, saturated, very soft, organic SILT, with trace fine sand		OL	3	WOH/24"	13 feet of water at 2:30 pm.
6	-15				4	16-20-22	Note: Elevations at boring locations were estimated by Hynes & Associates to +/- 2 feet, based upon field measurements from barge, corrected to date & time of day to predicted tide chart for the area.
8	-17	Gray, saturated, dense, fine to coarse SAND, with some silt, trace organic silt		SM	5	8-10-15	
10	-19	Gray, saturated, medium dense, fine to medium SAND, with some silt, trace organic silt		SM	6	7-9-14	
12	-21	Light gray, saturated, medium dense, fine to medium SAND, with some silt, trace to little clay		SM	7	7-12-14	
14	-23	Gray-brown, saturated, medium dense, fine to coarse SAND, with some silt, trace clay		SM	8	8-9-13	
16	-25	Gray-brown, saturated, medium dense, fine to coarse SAND, with some silt, trace clay, trace fine gravel					
18	-27	Boring was terminated at 15.5 feet.					
20	-29						
22	-31						
24	-33						
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28	-37						
30	-39						
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48	-57						
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HYNES & ASSOCIATES

LOG OF BORING V-1

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 17, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.7 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	Gray, saturated, clayey SILT, with trace sand		ML	Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with little sand, trace shells		ML	
4	Gray, saturated, fine to coarse SAND, with little silt, trace gravel		SM	Lat: N39° 03' 11.05" Long: W075° 22' 05.91"
6	Brown, saturated, fine to coarse SAND, with little silt, trace gravel		SM	
8	Boring was terminated at 7.7 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-2

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 17, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 9.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet Lat: N39° 03' 13.75" Long: W075° 22' 08.42"
4	Gray, saturated, clayey SILT, with trace sand, trace shells		ML	
6	Gray, saturated, fine to medium SAND, with little silt		SM	
8	Gray, saturated, fine to coarse SAND, with trace to little silt		SM-SP	
10	Boring was terminated at 9.5 feet.			

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HYNES & ASSOCIATES

LOG OF BORING V-3

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 17, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace sand		ML	Lat: N39° 03' 16.44" Long: W075° 22' 10.93"
4	Gray, saturated, clayey SILT, with little shells, trace sand, trace gravel		ML	
6	Gray, saturated, clayey SILT, with some sand		SM	
8	Gray, saturated, fine to medium SAND, with little silt, trace gravel			
10	Boring was terminated at 7 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-4

(Page 1 of 1)

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 18, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.3 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery		ML	Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace sand		ML	Lat: N39° 03' 13.03"
	Gray, saturated, clayey SILT, with trace shells			Long: W075° 21' 59.64"
4	Gray, saturated, fine to medium SAND, with little silt, trace gravel		SM	
6	Gray, saturated, clayey SILT, with trace sand		ML	
	Gray, saturated, fine to medium SAND, with little silt, trace gravel		SM	
8	Boring was terminated at 7.3 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-5

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 18, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace sand, trace shells		ML	Lat: N39° 03' 16.09" Long: W075° 22' 02.72"
4	Gray, saturated, clayey SILT, with little to some sand, trace shells		ML	
6	Gray, saturated, SAND, with little silt		SM	
8	Boring was terminated at 7 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-6

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 18, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.8 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2				Lat: N39° 03' 19.16"
4	Gray, saturated, clayey SILT, with trace shells		ML	Long: W075° 22' 05.81"
6	Gray, saturated, clayey SILT, with trace to little sand, trace shells, trace gravel		ML	
8	Gray, saturated, fine to coarse SAND, with little silt, trace gravel		SM	
10	Boring was terminated at 7.8 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-7

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.8 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace shells		ML	Lat: N39° 03' 15.01"
4	Gray, saturated, clayey SILT, with some sand, trace shells		ML	Long: W075° 21' 53.63"
6	Gray, saturated, fine to medium SAND, with little to some silt		SM	
8	Gray, saturated, fine to medium SAND, with trace silt, trace fine gravel		SP	
10	Gray, saturated, clayey SILT, with trace sand		ML	
12	Boring was terminated at 7.8 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-8

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 22, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 8 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace to little shells, trace sand		ML	Lat: N39° 03' 18.80" Long: W075° 21' 57.39"
4	Gray, saturated, clayey SILT, with little sand		ML	
6	Gray, saturated, fine to medium SAND, with little to some silt		SM	
8	Boring was terminated at 8 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-9

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.9 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace shells		ML	Lat: N39° 03' 22.54" Long: W075° 22' 01.16"
4	Gray, saturated, clayey SILT, with trace sand		ML	
6	Dark brown, saturated, organic SILT, with little clay		OL	
	Gray, saturated, clayey SILT		MH	
8	Gray, saturated, fine to medium SAND, with little to some silt		SM	
10	Boring was terminated at 7.9 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-10

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace shells		ML	Lat: N39° 03' 17.90"
4	Gray, saturated, clayey SILT, with trace sand, trace shells		ML	Long: W075° 21' 48.42"
6	Gray, saturated, fine to coarse SAND, with some silt		SM	
8	Gray, saturated, fine to medium SAND, with trace to little silt		SM-SP	
10	Boring was terminated at 7.5 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-11

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.2 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace shells		ML	Lat: N39° 03' 20.40" Long: W075° 21' 50.95"
4	Gray, saturated, clayey SILT, with some fine to medium sand		ML	
6	Gray, saturated, fine to medium SAND, with some silt		SM	
8	Gray, saturated, fine to coarse SAND, with little silt		SM	
10	Boring was terminated at 7.2 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-12

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Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 7.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace shells, trace sand		ML	
	Brown, saturated, organic SILT, with trace clay		OL	Lat: N39° 03' 22.91" Long: W075° 21' 53.47"
4	Gray, saturated, fine to medium SAND, with some silt, trace clay		SM	
6	Gray, saturated, fine to coarse SAND, with little silt, trace gravel		SM	
8	Boring was terminated at 7.5 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-13

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 19, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 8.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace shells		ML	
	Gray, saturated, clayey SILT, with trace sand		OL	Lat: N39° 03' 25.49" Long: W075° 21' 56.07"
4	Dark brown, saturated, organic SILT			
6	Gray, saturated, fine to medium SAND, with little silt, trace shells		SM	
8	Light gray, saturated, fine to medium SAND, with trace to little silt		SM-SP	
	Boring was terminated at 8.5 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-14

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 10 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet Lat: N39° 03' 28.07" Long: W075° 21' 58.68"
2				
4	Gray, saturated, clayey SILT, with trace to little shells, trace sand		ML	
6	Gray, saturated, clayey SILT, with trace sand		ML	
8	Gray, saturated, fine to medium SAND, with little silt		SM	
10	Boring was terminated at 10 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-16

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 24, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 10.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet Lat: N39° 03' 25.96" Long: W075° 21' 48.49"
6	Gray, saturated, clayey SILT, with trace shells, trace sand		ML	
8	Gray, saturated, fine to medium SAND, with some silt, trace shells, trace gravel		SM	
10	Gray, saturated, fine to coarse SAND, with little to some gravel, little silt		SM	
12	Boring was terminated at 10.5 feet.			

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HYNES & ASSOCIATES

LOG OF BORING V-17

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 8.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2				Lat: N39° 03' 30.35"
4	Gray, saturated, clayey SILT, with little shells		ML	Long: W075° 21' 52.91"
6	Gray, saturated, clayey SILT, with trace sand		ML	
8	Gray, saturated, clayey SILT, with some fine to medium sand		SM	
10	Gray, saturated, fine to medium SAND, with little silt			
12	Boring was terminated at 8.5 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-19

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 24, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 10 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2				
4				Lat: N39° 03' 29.01"
6	Gray, saturated, clayey SILT, with little shells		ML	Long: W075° 21' 43.50"
8	Gray, saturated, fine to medium SAND, with some silt, trace shells		SM	
10	Gray, saturated, fine to coarse SAND, with little silt, trace gravel		SM	
12	Boring was terminated at 10 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-20

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 9 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2	Gray, saturated, clayey SILT, with trace shells, trace gravel		ML	Lat: N39° 03' 33.04" Long: W075° 21' 47.56"
4				
6	Brown, saturated, organic SILT		OL	
8	Gray, saturated, clayey SILT, with little to some sand		ML	
	Gray, saturated, fine to coarse SAND, with some silt		SM	
10	Boring was terminated at 9 feet.			
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LOG OF BORING V-22

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 24, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 10.1 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0–2–4	No Recovery			Scale 1" ~ 7.5 feet Lat: N39° 03' 32.07" Long: W075° 21' 38.52"
6	Gray, saturated, clayey SILT, with trace shells		ML	
8	Gray, saturated, fine to medium SAND, with some silt		SM	
10	Gray, saturated, fine to coarse SAND, with trace to little silt, trace fine gravel		SM-SP	
12–14–16–18–20–22–24–26–28–30–32–34–36–38–40–42–44–46–48–50	Boring was terminated at 10.1 feet.			

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LOG OF BORING V-23

Andrews, Miller & Associates
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Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 23, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 9.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2				Lat: N39° 03' 36.59"
4	Gray, saturated, clayey SILT, with trace shells		ML	Long: W075° 21' 43.08"
6	Brown, saturated, organic SILT		OL	
8	Gray, saturated, fine to coarse SAND, with some silt, trace fine gravel		SM	
10	Boring was terminated at 9.5 feet.			
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HYNES & ASSOCIATES

LOG OF BORING V-25

Andrews, Miller & Associates
106 North Washington Street, Suite 103
Easton, Maryland 21601

DNREC Murderkill River

Project No.: JDH-10/13/123-1

Date Completed: : July 24, 2013
Logged By: : C. Dalton
Drilled By: : A.J. Mattola (ASI)
Drilling Method: : Vibracore
Total Depth: : 10.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Remarks
0	No Recovery			Scale 1" ~ 7.5 feet
2				Lat: N39° 03' 35.75"
4	Gray, saturated, clayey SILT, with trace shells		ML	Long: W075° 21' 32.50"
6	Dark brown, saturated, organic SILT		OL	
8	Gray, saturated, clayey SILT, with little sand		ML	
	Gray, saturated, fine to medium SAND, with little to some silt		SM	
10	Gray, saturated, fine to coarse SAND, with trace silt		SP	
12	Boring was terminated at 10.5 feet.			
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JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

Laboratory Test Results
Murderkill River Entrance Channel Dredging and Jetty Improvements
Project No.: JDH-10/13/123-1

Boring No./Sample No.	B-2/S1	B-2/S2	B-3/S1	B-3/S2	B-4/S1	B-4/S2	B-5/S1	B-5/S2
Begin Depth (ft.)	0	2.5	0	3	0	3	0	3
End Depth (ft.)	2.5	3.5	3	4.5	3	5	3	5.5
Sieve Size	Percent Passing							
2 ½"								
2"								
1 ½"								
1"			100		100			
¾"			85.1		93.3		100	
½"	100		80.6	100	87.8	100	90.7	100
⅜"	99.0	100	72.9	96.5	76.3	91.2	77.6	86.1
No. 4	97.8	97.4	61.8	89.7	57.0	85.2	53.8	76.2
No. 10	95.7	96.3	50.8	81.0	45.3	75.4	40.8	68.7
No. 20	91.6	93.0	40.6	70.6	36.9	62.0	33.5	58.3
No. 40	69.6	75.3	28.3	55.8	26.3	42.9	24.1	41.9
No. 60	17.2	29.0	13.4	35.6	11.2	23.3	10.6	24.8
No. 100	5.0	11.8	4.0	21.3	2.5	10.4	2.3	9.7
No. 200	3.1	8.1	2.2	18.3	1.2	7.4	1.1	6.6
Natural Moisture %	31.7	44.1	15.0	46.4	15.0	29.6	12.3	38.0

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Construction Inspection and Materials Testing

Laboratory Test Results
Murderkill River Entrance Channel Dredging and Jetty Improvements
Project No.: JDH-10/13/123-1

Boring No./Sample No.	B-6/S1	B-7/S1	B8/S1	B-9/S1	B-9/S2	B-10/S1	B-10/S2	B-11/S1
Begin Depth (ft.)	0	0	0	0	2.5	0	2.5	0
End Depth (ft.)	2.5	2	2	2.5	3.5	2.5	3.75	2
Sieve Size	Percent Passing							
2 ½"								
2"								
1 ½"								
1"			100			100		
¾"	100		94.6	100		93.5		100
½"	75.2		92.9	92.4		87.9		99.4
⅜"	70.1	100	81.1	83.7	100	86.0	100	99.4
No. 4	54.2	95.9	65.7	73.8	99.13	82.8	99.1	94.0
No. 10	42.0	78.4	54.9	64.7	96.1	76.4	96.2	82.3
No. 20	32.5	42.3	37.7	51.8	92.2	65.7	90.7	52.4
No. 40	10.4	7.7	7.0	22.2	60.0	28.1	68.1	11.2
No. 60	2.6	1.5	1.0	4.8	24.1	4.6	39.2	1.5
No. 100	1.4	0.9	0.6	1.0	14.6	1.0	28.7	0.9
No. 200	0.9	0.8	0.4	0.5	11.4	0.5	18.1	0.7
Natural Moisture %	16.2	19.6	14.7	14.0	53.7	16.6	55.0	20.5

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Construction Inspection and Materials Testing

Laboratory Test Results
Murderkill River Entrance Channel Dredging and Jetty Improvements
Project No.: JDH-10/13/123-1

Boring No./Sample No.	B-12/S1	B-12/S2	B-13/S1	B-14/S1	B-15/S1	B-16/S1	B-16/S2	B-17/S1
Begin Depth (ft.)	0	1.5	0	0	0	0	1.5	0
End Depth (ft.)	1.5	4.5	2	2	1.5	1.5	5.5	1.5
Sieve Size	Percent Passing							
2 ½"								
2"								
1 ½"								
1"								
¾"								
½"	100		100					
⅜"	98.1	100	99.5	100		100	100	100
No. 4	94.7	97.5	98.6	99.7	100	99.8	99.0	99.6
No. 10	88.9	92.8	96.5	97.1	98.3	98.3	95.3	98.3
No. 20	72.2	86.0	78.6	87.2	93.9	92.2	69.4	92.7
No. 40	18.2	62.0	17.8	30.1	57.4	44.5	31.6	53.2
No. 60	2.4	32.4	3.0	5.4	24.3	9.6	21.1	13.0
No. 100	1.3	20.4	1.9	1.9	11.1	4.2	17.8	5.2
No. 200	1.0	11.2	1.6	1.1	6.2	3.0	15.0	3.6
Natural Moisture %	29.5	49.8	26.9	23.8	33.0	21.3	47.9	26.4

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Monitoring Well Installation
Construction Inspection and Materials Testing

Laboratory Test Results
Murderkill River Entrance Channel Dredging and Jetty Improvements
Project No.: JDH-10/13/123-1

Boring No./Sample No.	B-18/S1	B-19/S1	B-23/S1	B-28/S1	B-29/S1	B-30/S1	JB-1/S2	JB-1/S6
Begin Depth (ft.)	0	0	0	0	0	0	3	19
End Depth (ft.)	4	4	2.75	1.5	1.5	1.25	4.5	20.5
Sieve Size	Percent Passing							
2 ½"								
2"								
1 ½"								
1"								
¾"								
½"								
⅜"	100	100	100	100				
No. 4	96.0	97.5	99.9	98.0	100	100		
No. 10	91.3	94.1	98.0	93.7	97.8	99.8		
No. 20	86.8	89.1	96.7	91.7	91.1	99.0		99.4
No. 40	75.5	75.6	84.5	90.2	89.6	98.5		93.4
No. 60	49.2	45.6	90.4	85.3	84.7	96.2		65.5
No. 100	34.6	29.6	85.0	78.2	78.9	91.1		38.4
No. 200	25.9	22.1	76.0	66.4	64.7	80.9		32.0
Natural Moisture %	96.6	73.5	93.7	136.5	126.6	109.5	20.1	27.4

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Construction Inspection and Materials Testing

Laboratory Test Results
Murderkill River Entrance Channel Dredging and Jetty Improvements
Project No.: JDH-10/13/123-1

Boring No./Sample No.	JB-3/S4	JB-3/S7	JB-4/S2	JB-4/S5	T-3/S3	T-3/S4	T-3/S6	T-6/S4
Begin Depth (ft.)	14	29	4	19	4	6	10	6
End Depth (ft.)	15.5	30.5	5.5	20.5	6	8	12	8
Sieve Size	Percent Passing							
2 ½"								
2"								
1 ½"								
1"								
¾"								
½"					100			
⅜"		100			99.69		100	
No. 4		99.9		100	98.5	100	99.6	100
No. 10		99.7		99.7	97.2	99.8	99.3	99.35
No. 20		99.3		98.3	91.3	98.9	98.4	95.6
No. 40		98.6		89.8	51.1	62.7	68.8	75.6
No. 60		71.1		58.0	22.7	22.4	24.8	41.0
No. 100		17.4		22.4	11.3	8.9	9.6	23.4
No. 200		11.2		13.6	6.2	4.6	4.4	16.3
Natural Moisture %	21.5	27.8	17.2	27.2	17.8	19.2	19.0	16.4

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Monitoring Well Installation
Construction Inspection and Materials Testing

Laboratory Test Results
Murderkill River Entrance Channel Dredging and Jetty Improvements
Project No.: JDH-10/13/123-1

Boring No./Sample No.	T-6/S5	T-6/S6	T-8/S3	T-8/S5	T-8/S6	T-12/S3	T-12/S4	T-12/S5
Begin Depth (ft.)	8	10	4	8	10	4	6	8
End Depth (ft.)	10	12	6	10	12	6	8	10
Sieve Size	Percent Passing							
2 ½"								
2"								
1 ½"								
1"								
¾"				100		100		
½"	100	100		97.7		95.9		
⅜"	99.3	97.7		97.7	100	95.9	100	100
No. 4	99.0	95.6	100	97.0	99.7	94.6	99.71	99.7
No. 10	98.0	93.3	99.92	94.9	98.3	92.7	99.44	99.2
No. 20	95.5	90.1	94.7	89.7	92.7	86.4	97.8	97.3
No. 40	74.0	72.5	52.7	56.1	53.6	48.6	66.9	68.3
No. 60	32.9	35.1	24.0	28.6	25.2	25.2	27.5	28.6
No. 100	15.5	19.1	15.2	15.9	15.1	13.0	10.7	12.4
No. 200	9.3	12.4	12.4	12.2	10.2	7.3	4.7	5.8
Natural Moisture %	17.3	15.9	16.1	15.3	15.1	16.1	18.8	19.6

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Construction Inspection and Materials Testing

Laboratory Test Results
Murderkill River Entrance Channel Dredging and Jetty Improvements
Project No.: JDH-10/13/123-1

Boring No./Sample No.	T-15/S4	T-15/S5	T-15/S6	NB-1/S1	SB-1/S1	SB-2/S1
Begin Depth (ft.)	6	8	10	0	0	0
End Depth (ft.)	8	10	12	3	3	3
Sieve Size	Percent Passing					
2 ½"						
2"						
1 ½"						
1"						
¾"				100	97.4	100
½"			100	98.1	90.1	96.7
⅜"	99.0		99.1	97.8	88.3	92.1
No. 4	98.6	100	97.6	94.8	83.6	85.7
No. 10	96.5	99.67	93.7	88.0	80.7	76.4
No. 20	93.8	98.0	87.7	81.0	76.1	71.5
No. 40	73.3	77.2	63.8	61.8	40.5	34.5
No. 60	34.5	33.1	35.0	7.5	6.5	4.4
No. 100	16.5	15.5	20.6	0.4	0.3	0.3
No. 200	10.0	9.1	13.5	0.1	0.1	0.1
Natural Moisture %	18.9	17.4	15.3	4.0	4.6	3.0

Analytical Report for

John D. Hynes & Associates

Certificate of Analysis No.: 13072505

Project Manager: John Hynes
Project Name : DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID : 13/123-1

August 1, 2013

Phase Separation Science, Inc.
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PHASE SEPARATION SCIENCE, INC.

August 1, 2013

John Hynes
John D. Hynes & Associates
32185 Beaver Run Drive
Salisbury, MD 21801

Reference: PSS Work Order(s) No: **13072505**
Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID.: 13/123-1

Dear John Hynes :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **13072505**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on August 29, 2013. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt , the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal

Dan Prucnal
Laboratory Manager

Sample Summary

Client Name: John D. Hynes & Associates

Project Name: DNREC - Murderkill

Work Order Number(s): 13072505

Project ID: 13/123-1

The following samples were received under chain of custody by Phase Separation Science (PSS) on 07/25/2013 at 10:29 am

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
13072505-001	Comp 1	SOIL	07/21/13 00:00
13072505-002	Comp 2	SOIL	07/22/13 00:00
13072505-003	Comp 3	SOIL	07/22/13 00:00
13072505-004	Comp 4	SOIL	07/22/13 00:00

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. The following analytical results are never reported on a dry weight basis: pH, flashpoint, moisture and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminates, and part 141.3, for the secondary drinking water contaminates.
5. The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for non-potable water samples tested for compliance for Virginia Pollution Discharge Elimination System (VDPES) permits and Virginia Pollutant Abatement (VPA) permits, have a maximum holding time of 15 minutes established by 40CFR136.3.

Standard Flags/Abbreviations:

- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J The target analyte was positively identified below the reporting limit but greater than the LOD.
- LOD Limit of Detection. An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RL PSS Reporting Limit.
- U Not detected.

Case Narrative Summary

Client Name: John D. Hynes & Associates

Project Name: DNREC - Murderkill

Work Order Number(s): 13072505
Project ID: 13/123-1

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

Sample Receipt:

Sample(s) received at a temperature greater than 6 degrees C and ice packs were used.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

PP Metals | Analytical Method: SW-846 6020 A | Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Arsenic	**3.0**	mg/kg	0.52		1	07/26/13	07/29/13 17:20	1034
Beryllium	ND	mg/kg	2.6		1	07/26/13	07/30/13 13:35	1034
Cadmium	ND	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Chromium	**12**	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Copper	**3.5**	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Lead	**5.3**	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Mercury	ND	mg/kg	0.10		1	07/26/13	07/29/13 17:20	1034
Nickel	**3.7**	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Selenium	ND	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Silver	ND	mg/kg	2.6		1	07/26/13	07/29/13 17:20	1034
Thallium	ND	mg/kg	2.1		1	07/26/13	07/29/13 17:20	1034
Zinc	**18**	mg/kg	10		1	07/26/13	07/29/13 17:20	1034

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August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
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Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

Organochlorine Pesticides | Analytical Method: SW-846 8081 B | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
alpha-BHC	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
gamma-BHC (Lindane)	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
beta-BHC	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
delta-BHC	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Heptachlor	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Aldrin	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Heptachlor epoxide	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
gamma-Chlordane	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
alpha-Chlordane	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
4,4-DDE	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Endosulfan I	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Dieldrin	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Endrin	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
4,4-DDD	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Endosulfan II	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
4,4-DDT	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Endrin aldehyde	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Methoxychlor	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Endosulfan sulfate	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Endrin ketone	ND	ug/kg	9.4		1	07/28/13	07/29/13 13:36	1029
Toxaphene	ND	ug/kg	230		1	07/28/13	07/29/13 13:36	1029
Chlordane	ND	ug/kg	230		1	07/28/13	07/29/13 13:36	1029

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CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

Polychlorinated Biphenyls — Analytical Method: SW-846 8082 A — Preparation Method: 3550
Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.12		1	07/28/13	07/29/13 18:45	1029
PCB-1221	ND	mg/kg	0.12		1	07/28/13	07/29/13 18:45	1029
PCB-1232	ND	mg/kg	0.12		1	07/28/13	07/29/13 18:45	1029
PCB-1242	ND	mg/kg	0.12		1	07/28/13	07/29/13 18:45	1029
PCB-1248	ND	mg/kg	0.12		1	07/28/13	07/29/13 18:45	1029
PCB-1254	ND	mg/kg	0.12		1	07/28/13	07/29/13 18:45	1029
PCB-1260	ND	mg/kg	0.12		1	07/28/13	07/29/13 18:45	1029

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August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Dichlorodifluoromethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Chloromethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Vinyl Chloride	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Bromomethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Chloroethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Acetone	ND	ug/kg	25		1	07/26/13	07/26/13 20:04	1011
Cyclohexane	ND	ug/kg	25		1	07/26/13	07/26/13 20:04	1011
Trichlorofluoromethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,1-Dichloroethene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Methylene Chloride	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
trans-1,2-Dichloroethene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Methyl-t-butyl ether	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,1-Dichloroethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
2-Butanone (MEK)	ND	ug/kg	25		1	07/26/13	07/26/13 20:04	1011
cis-1,2-Dichloroethene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Bromochloromethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Chloroform	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,1,1-Trichloroethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,2-Dichloroethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Carbon Tetrachloride	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Benzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,2-Dichloropropane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Carbon Disulfide	ND	ug/kg	13		1	07/26/13	07/26/13 20:04	1011
Methylcyclohexane	ND	ug/kg	25		1	07/26/13	07/26/13 20:04	1011
Trichloroethene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Methyl Acetate	ND	ug/kg	25		1	07/26/13	07/26/13 20:04	1011
Bromodichloromethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
cis-1,3-Dichloropropene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
4-Methyl-2-Pentanone	ND	ug/kg	25		1	07/26/13	07/26/13 20:04	1011

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
trans-1,3-Dichloropropene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,1,2-Trichloroethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Toluene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
2-Hexanone	ND	ug/kg	25		1	07/26/13	07/26/13 20:04	1011
1,2-Dibromoethane (EDB)	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Dibromochloromethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Bromoform	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Tetrachloroethene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Chlorobenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Ethylbenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
m,p-Xylenes	ND	ug/kg	13		1	07/26/13	07/26/13 20:04	1011
Styrene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,1,2,2-Tetrachloroethane	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
o-Xylene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Isopropylbenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,3-Dichlorobenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,4-Dichlorobenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,2-Dichlorobenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,2-Dibromo-3-Chloropropane	ND	ug/kg	50		1	07/26/13	07/26/13 20:04	1011
1,2,4-Trichlorobenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
Naphthalene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011
1,2,3-Trichlorobenzene	ND	ug/kg	6.3		1	07/26/13	07/26/13 20:04	1011

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John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Acenaphthylene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Acetophenone	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Anthracene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Benzo(a)anthracene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Benzo(a)pyrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Benzo(b)fluoranthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Benzo(g,h,i)perylene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Benzo(k)fluoranthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Biphenyl (Diphenyl)	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Butyl benzyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
bis(2-chloroethoxy) methane	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
bis(2-chloroethyl) ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
bis(2-chloroisopropyl) ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
bis(2-ethylhexyl) phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
4-Bromophenylphenyl ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Di-n-butyl phthalate	ND	ug/kg	430		1	07/26/13	07/26/13 20:22	1014
Carbazole	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
4-Chloro-3-methyl phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
4-Chloroaniline	ND	ug/kg	430		1	07/26/13	07/26/13 20:22	1014
2-Chloronaphthalene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2-Chlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
4-Chlorophenyl Phenyl ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Chrysene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Dibenz(a,h)Anthracene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Dibenzofuran	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
3,3-Dichlorobenzidine	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2,4-Dichlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Diethyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Dimethyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dimethylphenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
4,6-Dinitro-2-methyl phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2,4-Dinitrophenol	ND	ug/kg	430		1	07/26/13	07/26/13 20:22	1014
2,4-Dinitrotoluene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2,6-Dinitrotoluene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Fluoranthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Fluorene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Hexachlorobenzene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Hexachlorobutadiene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Hexachlorocyclopentadiene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Hexachloroethane	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Indeno(1,2,3-c,d)Pyrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Isophorone	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2-Methylnaphthalene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2-Methyl phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
3&4-Methylphenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Naphthalene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
4-Nitroaniline	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
3-Nitroaniline	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2-Nitroaniline	ND	ug/kg	430		1	07/26/13	07/26/13 20:22	1014
Nitrobenzene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2-Nitrophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
4-Nitrophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
N-Nitrosodi-n-propyl amine	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
N-Nitrosodiphenylamine	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Di-n-octyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Pentachlorophenol	ND	ug/kg	430		1	07/26/13	07/26/13 20:22	1014
Phenanthrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Atrazine	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014

Final 1.000

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 1 | **Date/Time Sampled: 07/21/2013 00:00** | **PSS Sample ID: 13072505-001**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 77**

TCL Semivolatile Organic Compounds — Analytical Method: SW-846 8270 C — Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Pyrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Pyridine	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
Caprolactam	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2,4,6-Trichlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014
2,4,5-Trichlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:22	1014

Cyanide — Analytical Method: SW-846 9014 — Preparation Method: SW9010

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Cyanide, Total	ND	mg/kg	0.074		1	07/30/13	07/30/13 12:54	1047

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CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

PP Metals | Analytical Method: SW-846 6020 A | Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Arsenic	**3.7**	mg/kg	0.61		1	07/26/13	07/29/13 17:26	1034
Beryllium	ND	mg/kg	3.1		1	07/26/13	07/30/13 13:41	1034
Cadmium	ND	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Chromium	**9.1**	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Copper	**4.5**	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Lead	**5.5**	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Mercury	ND	mg/kg	0.12		1	07/26/13	07/29/13 17:26	1034
Nickel	**4.2**	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Selenium	ND	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Silver	ND	mg/kg	3.1		1	07/26/13	07/29/13 17:26	1034
Thallium	ND	mg/kg	2.4		1	07/26/13	07/29/13 17:26	1034
Zinc	**21**	mg/kg	12		1	07/26/13	07/29/13 17:26	1034

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August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

Organochlorine Pesticides | Analytical Method: SW-846 8081 B | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
alpha-BHC	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
gamma-BHC (Lindane)	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
beta-BHC	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
delta-BHC	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Heptachlor	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Aldrin	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Heptachlor epoxide	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
gamma-Chlordane	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
alpha-Chlordane	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
4,4-DDE	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Endosulfan I	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Dieldrin	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Endrin	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
4,4-DDD	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Endosulfan II	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
4,4-DDT	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Endrin aldehyde	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Methoxychlor	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Endosulfan sulfate	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Endrin ketone	ND	ug/kg	10		1	07/28/13	07/29/13 14:04	1029
Toxaphene	ND	ug/kg	260		1	07/28/13	07/29/13 14:04	1029
Chlordane	ND	ug/kg	260		1	07/28/13	07/29/13 14:04	1029

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No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: 3550
Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.13		1	07/28/13	07/29/13 18:45	1029
PCB-1221	ND	mg/kg	0.13		1	07/28/13	07/29/13 18:45	1029
PCB-1232	ND	mg/kg	0.13		1	07/28/13	07/29/13 18:45	1029
PCB-1242	ND	mg/kg	0.13		1	07/28/13	07/29/13 18:45	1029
PCB-1248	ND	mg/kg	0.13		1	07/28/13	07/29/13 18:45	1029
PCB-1254	ND	mg/kg	0.13		1	07/28/13	07/29/13 18:45	1029
PCB-1260	ND	mg/kg	0.13		1	07/28/13	07/29/13 18:45	1029

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August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Dichlorodifluoromethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Chloromethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Vinyl Chloride	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Bromomethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Chloroethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Acetone	ND	ug/kg	26		1	07/26/13	07/26/13 20:31	1011
Cyclohexane	ND	ug/kg	26		1	07/26/13	07/26/13 20:31	1011
Trichlorofluoromethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,1-Dichloroethene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Methylene Chloride	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
trans-1,2-Dichloroethene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Methyl-t-butyl ether	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,1-Dichloroethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
2-Butanone (MEK)	ND	ug/kg	26		1	07/26/13	07/26/13 20:31	1011
cis-1,2-Dichloroethene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Bromochloromethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Chloroform	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,1,1-Trichloroethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,2-Dichloroethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Carbon Tetrachloride	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Benzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,2-Dichloropropane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Carbon Disulfide	ND	ug/kg	13		1	07/26/13	07/26/13 20:31	1011
Methylcyclohexane	ND	ug/kg	26		1	07/26/13	07/26/13 20:31	1011
Trichloroethene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Methyl Acetate	ND	ug/kg	26		1	07/26/13	07/26/13 20:31	1011
Bromodichloromethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
cis-1,3-Dichloropropene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
4-Methyl-2-Pentanone	ND	ug/kg	26		1	07/26/13	07/26/13 20:31	1011

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
trans-1,3-Dichloropropene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,1,2-Trichloroethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Toluene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
2-Hexanone	ND	ug/kg	26		1	07/26/13	07/26/13 20:31	1011
1,2-Dibromoethane (EDB)	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Dibromochloromethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Bromoform	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Tetrachloroethene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Chlorobenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Ethylbenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
m,p-Xylenes	ND	ug/kg	13		1	07/26/13	07/26/13 20:31	1011
Styrene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,1,2,2-Tetrachloroethane	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
o-Xylene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Isopropylbenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,3-Dichlorobenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,4-Dichlorobenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,2-Dichlorobenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,2-Dibromo-3-Chloropropane	ND	ug/kg	53		1	07/26/13	07/26/13 20:31	1011
1,2,4-Trichlorobenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
Naphthalene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011
1,2,3-Trichlorobenzene	ND	ug/kg	6.6		1	07/26/13	07/26/13 20:31	1011

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Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Acenaphthylene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Acetophenone	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Anthracene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Benzo(a)anthracene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Benzo(a)pyrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Benzo(b)fluoranthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Benzo(g,h,i)perylene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Benzo(k)fluoranthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Biphenyl (Diphenyl)	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Butyl benzyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
bis(2-chloroethoxy) methane	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
bis(2-chloroethyl) ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
bis(2-chloroisopropyl) ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
bis(2-ethylhexyl) phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
4-Bromophenylphenyl ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Di-n-butyl phthalate	ND	ug/kg	440		1	07/26/13	07/26/13 20:51	1014
Carbazole	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
4-Chloro-3-methyl phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
4-Chloroaniline	ND	ug/kg	440		1	07/26/13	07/26/13 20:51	1014
2-Chloronaphthalene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2-Chlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
4-Chlorophenyl Phenyl ether	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Chrysene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Dibenz(a,h)Anthracene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Dibenzofuran	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
3,3-Dichlorobenzidine	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2,4-Dichlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Diethyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Dimethyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dimethylphenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
4,6-Dinitro-2-methyl phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2,4-Dinitrophenol	ND	ug/kg	440		1	07/26/13	07/26/13 20:51	1014
2,4-Dinitrotoluene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2,6-Dinitrotoluene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Fluoranthene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Fluorene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Hexachlorobenzene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Hexachlorobutadiene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Hexachlorocyclopentadiene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Hexachloroethane	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Indeno(1,2,3-c,d)Pyrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Isophorone	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2-Methylnaphthalene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2-Methyl phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
3&4-Methylphenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Naphthalene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
4-Nitroaniline	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
3-Nitroaniline	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2-Nitroaniline	ND	ug/kg	440		1	07/26/13	07/26/13 20:51	1014
Nitrobenzene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2-Nitrophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
4-Nitrophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
N-Nitrosodi-n-propyl amine	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
N-Nitrosodiphenylamine	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Di-n-octyl phthalate	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Pentachlorophenol	ND	ug/kg	440		1	07/26/13	07/26/13 20:51	1014
Phenanthrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Phenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Atrazine	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 2 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-002**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 76**

TCL Semivolatile Organic Compounds — Analytical Method: SW-846 8270 C — Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Pyrene	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Pyridine	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
Caprolactam	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2,4,6-Trichlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014
2,4,5-Trichlorophenol	ND	ug/kg	220		1	07/26/13	07/26/13 20:51	1014

Cyanide — Analytical Method: SW-846 9014 — Preparation Method: SW9010

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Cyanide, Total	ND	mg/kg	0.076		1	07/30/13	07/30/13 12:58	1047

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No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

PP Metals | Analytical Method: SW-846 6020 A | Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Arsenic	**8.0**	mg/kg	0.78		1	07/26/13	07/29/13 17:57	1034
Beryllium	ND	mg/kg	3.9		1	07/26/13	07/30/13 13:47	1034
Cadmium	ND	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Chromium	**27**	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Copper	**11**	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Lead	**18**	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Mercury	ND	mg/kg	0.16		1	07/26/13	07/29/13 17:57	1034
Nickel	**13**	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Selenium	ND	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Silver	ND	mg/kg	3.9		1	07/26/13	07/29/13 17:57	1034
Thallium	ND	mg/kg	3.1		1	07/26/13	07/29/13 17:57	1034
Zinc	**74**	mg/kg	16		1	07/26/13	07/29/13 17:57	1034

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Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

Organochlorine Pesticides | Analytical Method: SW-846 8081 B | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
alpha-BHC	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
gamma-BHC (Lindane)	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
beta-BHC	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
delta-BHC	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Heptachlor	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Aldrin	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Heptachlor epoxide	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
gamma-Chlordane	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
alpha-Chlordane	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
4,4-DDE	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Endosulfan I	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Dieldrin	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Endrin	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
4,4-DDD	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Endosulfan II	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
4,4-DDT	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Endrin aldehyde	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Methoxychlor	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Endosulfan sulfate	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Endrin ketone	ND	ug/kg	12		1	07/28/13	07/29/13 15:57	1029
Toxaphene	ND	ug/kg	310		1	07/28/13	07/29/13 15:57	1029
Chlordane	ND	ug/kg	310		1	07/28/13	07/29/13 15:57	1029

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John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

Polychlorinated Biphenyls — Analytical Method: SW-846 8082 A — Preparation Method: 3550
Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.15		1	07/28/13	07/29/13 19:13	1029
PCB-1221	ND	mg/kg	0.15		1	07/28/13	07/29/13 19:13	1029
PCB-1232	ND	mg/kg	0.15		1	07/28/13	07/29/13 19:13	1029
PCB-1242	ND	mg/kg	0.15		1	07/28/13	07/29/13 19:13	1029
PCB-1248	ND	mg/kg	0.15		1	07/28/13	07/29/13 19:13	1029
PCB-1254	ND	mg/kg	0.15		1	07/28/13	07/29/13 19:13	1029
PCB-1260	ND	mg/kg	0.15		1	07/28/13	07/29/13 19:13	1029

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August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Dichlorodifluoromethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Chloromethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Vinyl Chloride	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Bromomethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Chloroethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Acetone	ND	ug/kg	33		1	07/26/13	07/26/13 20:59	1011
Cyclohexane	ND	ug/kg	33		1	07/26/13	07/26/13 20:59	1011
Trichlorofluoromethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,1-Dichloroethene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Methylene Chloride	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
trans-1,2-Dichloroethene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Methyl-t-butyl ether	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,1-Dichloroethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
2-Butanone (MEK)	ND	ug/kg	33		1	07/26/13	07/26/13 20:59	1011
cis-1,2-Dichloroethene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Bromochloromethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Chloroform	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,1,1-Trichloroethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,2-Dichloroethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Carbon Tetrachloride	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Benzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,2-Dichloropropane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Carbon Disulfide	ND	ug/kg	17		1	07/26/13	07/26/13 20:59	1011
Methylcyclohexane	ND	ug/kg	33		1	07/26/13	07/26/13 20:59	1011
Trichloroethene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Methyl Acetate	ND	ug/kg	33		1	07/26/13	07/26/13 20:59	1011
Bromodichloromethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
cis-1,3-Dichloropropene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
4-Methyl-2-Pentanone	ND	ug/kg	33		1	07/26/13	07/26/13 20:59	1011

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CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
trans-1,3-Dichloropropene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,1,2-Trichloroethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Toluene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
2-Hexanone	ND	ug/kg	33		1	07/26/13	07/26/13 20:59	1011
1,2-Dibromoethane (EDB)	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Dibromochloromethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Bromoform	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Tetrachloroethene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Chlorobenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Ethylbenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
m,p-Xylenes	ND	ug/kg	17		1	07/26/13	07/26/13 20:59	1011
Styrene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,1,2,2-Tetrachloroethane	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
o-Xylene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Isopropylbenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,3-Dichlorobenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,4-Dichlorobenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,2-Dichlorobenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,2-Dibromo-3-Chloropropane	ND	ug/kg	66		1	07/26/13	07/26/13 20:59	1011
1,2,4-Trichlorobenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
Naphthalene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011
1,2,3-Trichlorobenzene	ND	ug/kg	8.3		1	07/26/13	07/26/13 20:59	1011

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Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Acenaphthylene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Acetophenone	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Anthracene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Benzo(a)anthracene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Benzo(a)pyrene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Benzo(b)fluoranthene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Benzo(g,h,i)perylene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Benzo(k)fluoranthene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Biphenyl (Diphenyl)	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Butyl benzyl phthalate	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
bis(2-chloroethoxy) methane	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
bis(2-chloroethyl) ether	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
bis(2-chloroisopropyl) ether	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
bis(2-ethylhexyl) phthalate	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
4-Bromophenylphenyl ether	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Di-n-butyl phthalate	ND	ug/kg	560		1	07/26/13	07/26/13 19:24	1014
Carbazole	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
4-Chloro-3-methyl phenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
4-Chloroaniline	ND	ug/kg	560		1	07/26/13	07/26/13 19:24	1014
2-Chloronaphthalene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2-Chlorophenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
4-Chlorophenyl Phenyl ether	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Chrysene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Dibenz(a,h)Anthracene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Dibenzofuran	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
3,3-Dichlorobenzidine	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2,4-Dichlorophenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Diethyl phthalate	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Dimethyl phthalate	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dimethylphenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
4,6-Dinitro-2-methyl phenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2,4-Dinitrophenol	ND	ug/kg	560		1	07/26/13	07/26/13 19:24	1014
2,4-Dinitrotoluene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2,6-Dinitrotoluene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Fluoranthene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Fluorene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Hexachlorobenzene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Hexachlorobutadiene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Hexachlorocyclopentadiene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Hexachloroethane	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Indeno(1,2,3-c,d)Pyrene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Isophorone	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2-Methylnaphthalene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2-Methyl phenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
3&4-Methylphenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Naphthalene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
4-Nitroaniline	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
3-Nitroaniline	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2-Nitroaniline	ND	ug/kg	560		1	07/26/13	07/26/13 19:24	1014
Nitrobenzene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2-Nitrophenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
4-Nitrophenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
N-Nitrosodi-n-propyl amine	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
N-Nitrosodiphenylamine	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Di-n-octyl phthalate	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Pentachlorophenol	ND	ug/kg	560		1	07/26/13	07/26/13 19:24	1014
Phenanthrene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Phenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Atrazine	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014

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CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 3 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-003**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 60**

TCL Semivolatile Organic Compounds — Analytical Method: SW-846 8270 C — Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Pyrene	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Pyridine	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
Caprolactam	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2,4,6-Trichlorophenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014
2,4,5-Trichlorophenol	ND	ug/kg	280		1	07/26/13	07/26/13 19:24	1014

Cyanide — Analytical Method: SW-846 9014 — Preparation Method: SW9010

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Cyanide, Total	**2.0**	mg/kg	0.096		1	07/30/13	07/30/13 13:02	1047

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No: 13072505

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August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 4 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-004**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

PP Metals | Analytical Method: SW-846 6020 A | Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Arsenic	**15**	mg/kg	1.0		1	07/26/13	07/29/13 18:03	1034
Beryllium	ND	mg/kg	5.1		1	07/26/13	07/30/13 13:53	1034
Cadmium	ND	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Chromium	**58**	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Copper	**22**	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Lead	**37**	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Mercury	**0.31**	mg/kg	0.20		1	07/26/13	07/29/13 18:03	1034
Nickel	**27**	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Selenium	ND	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Silver	ND	mg/kg	5.1		1	07/26/13	07/29/13 18:03	1034
Thallium	ND	mg/kg	4.0		1	07/26/13	07/29/13 18:03	1034
Zinc	**150**	mg/kg	20		1	07/26/13	07/29/13 18:03	1034

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Project ID: 13/123-1

Sample ID: Comp 4 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-004**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

Organochlorine Pesticides | Analytical Method: SW-846 8081 B | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
alpha-BHC	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
gamma-BHC (Lindane)	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
beta-BHC	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
delta-BHC	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Heptachlor	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Aldrin	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Heptachlor epoxide	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
gamma-Chlordane	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
alpha-Chlordane	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
4,4-DDE	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Endosulfan I	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Dieldrin	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Endrin	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
4,4-DDD	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Endosulfan II	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
4,4-DDT	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Endrin aldehyde	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Methoxychlor	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Endosulfan sulfate	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Endrin ketone	ND	ug/kg	17		1	07/28/13	07/29/13 16:25	1029
Toxaphene	ND	ug/kg	420		1	07/28/13	07/29/13 16:25	1029
Chlordane	ND	ug/kg	420		1	07/28/13	07/29/13 16:25	1029

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John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 4 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-004**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

Polychlorinated Biphenyls — Analytical Method: SW-846 8082 A — Preparation Method: 3550
Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.21		1	07/28/13	07/29/13 19:13	1029
PCB-1221	ND	mg/kg	0.21		1	07/28/13	07/29/13 19:13	1029
PCB-1232	ND	mg/kg	0.21		1	07/28/13	07/29/13 19:13	1029
PCB-1242	ND	mg/kg	0.21		1	07/28/13	07/29/13 19:13	1029
PCB-1248	ND	mg/kg	0.21		1	07/28/13	07/29/13 19:13	1029
PCB-1254	ND	mg/kg	0.21		1	07/28/13	07/29/13 19:13	1029
PCB-1260	ND	mg/kg	0.21		1	07/28/13	07/29/13 19:13	1029

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August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 4 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-004**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Dichlorodifluoromethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Chloromethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Vinyl Chloride	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Bromomethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Chloroethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Acetone	**55**	ug/kg	42		1	07/26/13	07/26/13 21:26	1011
Cyclohexane	ND	ug/kg	42		1	07/26/13	07/26/13 21:26	1011
Trichlorofluoromethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,1-Dichloroethene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Methylene Chloride	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
trans-1,2-Dichloroethene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Methyl-t-butyl ether	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,1-Dichloroethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
2-Butanone (MEK)	ND	ug/kg	42		1	07/26/13	07/26/13 21:26	1011
cis-1,2-Dichloroethene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Bromochloromethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Chloroform	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,1,1-Trichloroethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,2-Dichloroethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Carbon Tetrachloride	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Benzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,2-Dichloropropane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Carbon Disulfide	ND	ug/kg	21		1	07/26/13	07/26/13 21:26	1011
Methylcyclohexane	ND	ug/kg	42		1	07/26/13	07/26/13 21:26	1011
Trichloroethene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Methyl Acetate	ND	ug/kg	42		1	07/26/13	07/26/13 21:26	1011
Bromodichloromethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
cis-1,3-Dichloropropene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
4-Methyl-2-Pentanone	ND	ug/kg	42		1	07/26/13	07/26/13 21:26	1011

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No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 4 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-004**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

TCL Volatile Organic Compounds | Analytical Method: SW-846 8260 B | Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
trans-1,3-Dichloropropene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,1,2-Trichloroethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Toluene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
2-Hexanone	ND	ug/kg	42		1	07/26/13	07/26/13 21:26	1011
1,2-Dibromoethane (EDB)	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Dibromochloromethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Bromoform	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Tetrachloroethene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Chlorobenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Ethylbenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
m,p-Xylenes	ND	ug/kg	21		1	07/26/13	07/26/13 21:26	1011
Styrene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,1,2,2-Tetrachloroethane	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
o-Xylene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Isopropylbenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,3-Dichlorobenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,4-Dichlorobenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,2-Dichlorobenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,2-Dibromo-3-Chloropropane	ND	ug/kg	85		1	07/26/13	07/26/13 21:26	1011
1,2,4-Trichlorobenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
Naphthalene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011
1,2,3-Trichlorobenzene	ND	ug/kg	11		1	07/26/13	07/26/13 21:26	1011

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Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Acenaphthylene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Acetophenone	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Anthracene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Benzo(a)anthracene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Benzo(a)pyrene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Benzo(b)fluoranthene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Benzo(g,h,i)perylene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Benzo(k)fluoranthene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Biphenyl (Diphenyl)	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Butyl benzyl phthalate	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
bis(2-chloroethoxy) methane	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
bis(2-chloroethyl) ether	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
bis(2-chloroisopropyl) ether	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
bis(2-ethylhexyl) phthalate	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
4-Bromophenylphenyl ether	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Di-n-butyl phthalate	ND	ug/kg	710		1	07/26/13	07/26/13 19:53	1014
Carbazole	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
4-Chloro-3-methyl phenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
4-Chloroaniline	ND	ug/kg	710		1	07/26/13	07/26/13 19:53	1014
2-Chloronaphthalene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2-Chlorophenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
4-Chlorophenyl Phenyl ether	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Chrysene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Dibenz(a,h)Anthracene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Dibenzofuran	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
3,3-Dichlorobenzidine	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2,4-Dichlorophenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Diethyl phthalate	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Dimethyl phthalate	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014

Final 1.000

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800-932-9047
FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 4 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-004**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

TCL Semivolatile Organic Compounds | Analytical Method: SW-846 8270 C | Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2,4-Dimethylphenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
4,6-Dinitro-2-methyl phenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2,4-Dinitrophenol	ND	ug/kg	710		1	07/26/13	07/26/13 19:53	1014
2,4-Dinitrotoluene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2,6-Dinitrotoluene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Fluoranthene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Fluorene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Hexachlorobenzene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Hexachlorobutadiene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Hexachlorocyclopentadiene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Hexachloroethane	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Indeno(1,2,3-c,d)Pyrene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Isophorone	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2-Methylnaphthalene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2-Methyl phenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
3&4-Methylphenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Naphthalene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
4-Nitroaniline	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
3-Nitroaniline	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2-Nitroaniline	ND	ug/kg	710		1	07/26/13	07/26/13 19:53	1014
Nitrobenzene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2-Nitrophenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
4-Nitrophenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
N-Nitrosodi-n-propyl amine	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
N-Nitrosodiphenylamine	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Di-n-octyl phthalate	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Pentachlorophenol	ND	ug/kg	710		1	07/26/13	07/26/13 19:53	1014
Phenanthrene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Phenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Atrazine	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014

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800-932-9047
FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13072505

John D. Hynes & Associates, Salisbury, MD

August 1, 2013

Project Name: DNREC - Murderkill
Project Location: Bowers Beach, DE
Project ID: 13/123-1

Sample ID: Comp 4 | **Date/Time Sampled: 07/22/2013 00:00** | **PSS Sample ID: 13072505-004**
Matrix: SOIL | **Date/Time Received: 07/25/2013 10:29** | **% Solids: 46**

TCL Semivolatile Organic Compounds — Analytical Method: SW-846 8270 C — Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Pyrene	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Pyridine	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
Caprolactam	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2,4,6-Trichlorophenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014
2,4,5-Trichlorophenol	ND	ug/kg	360		1	07/26/13	07/26/13 19:53	1014

Cyanide — Analytical Method: SW-846 9014 — Preparation Method: SW9010

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Cyanide, Total	**1.8**	mg/kg	0.26		2	07/30/13	07/30/13 13:50	1047

Final 1.000

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

(1) CLIENT: Hynes & Associates OFFICE LOC: Salisbury, MD
PROJECT MGR: J.D. Hynes PHONE NO.: (410) 546-6462
EMAIL: jdhynes@aol.com FAX NO.: (410) 548-5346
PROJECT NAME: DNREC-Murderkill PROJECT NO.: 13123-1
SITE LOCATION: Bowers Beach, DE P.O. NO.: 010877
SAMPLERS:

PSS Work Order #: 1307250S PAGE 1 OF 1

Matrix Codes: SW=Surface Wtr DW=Drinking Wrt GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil WL=Waste Liquid WS=Waste Solid W= Wipe

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	(3) Analysis/ Method Required: VOCs	Semi VOCs	Pesticides	PCBs	Cyanide	Inorganics (TP Metals)	REMARKS
	Comp 1	7/21		S	3	C	X	X	X	X	X	X	
	Comp 2	7/22		S	3	C	X	X	X	X	X	X	
	Comp 3	7/22		S	3	C	X	X	X	X	X	X	
	Comp 4	7/22		S	3	C	X	X	X	X	X	X	

(5)

Relinquished By: (1)	Date	Time	Received By:
J. Redding	7/24	1500	UPS
Relinquished By: (2) UPS 1Z214388 0198 7720 88	Date 7/25/12	Time 10:25	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4) Requested Turnaround Time
☒ 5-Day ☐ 3-Day ☐ 2-Day ☐ Next Day ☐ Emergency ☐ Other

Data Deliverables Required:

# of Coolers: 1
Custody Seal: Abs
Ice Present: Ice Packs Temp: 16 °C
Shipping Carrier: UPS (Exp)

Special Instructions:
Please return cooler. Return UPS label is included.

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Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	13072505	**Received By**	Robyn Rhudy
Client Name	John D. Hynes & Associates	**Date Received**	07/25/2013 10:29:00 AM
Project Name	DNREC - Murderkill	**Delivered By**	UPS Priority Morning
Project Number	13/123-1	**Tracking No**	Not Applicable
Disposal Date	08/29/2013	**Logged In By**	Robyn Rhudy

Shipping Container(s)

No. of Coolers	1	Ice	Ice Packs Used
		Temp (deg C)	16
Custody Seal(s) Intact?	N/A	Temp Blank Present	No
Seal(s) Signed / Dated?	N/A		

Documentation

		Sampler Name	Not Provided
			N/A
COC agrees with sample labels?	Yes		
Chain of Custody	Yes		

Sample Container

		Custody Seal(s) Intact?	Not Applicable
Appropriate for Specified Analysis?	Yes	Seal(s) Signed / Dated	Not Applicable
Intact?	Yes		
Labeled and Labels Legible?	Yes		

Total No. of Samples Received 4

Total No. of Containers Received 12

Preservation

Metals	(pH<2)	N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, COD, Phenols	(ph<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	N/A
Do VOA vials have zero headspace?		N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Sample(s) received at a temperature greater than 6 degrees C and ice packs were used.

Samples Inspected/Checklist Completed By: Robyn Rhudy — Date: 07/25/2013

Robyn Rhudy

PM Review and Approval: Lynn Moran — Date: 07/31/2013

Lynn Moran

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

(1)
CLIENT: Hynes & Associates OFFICE LOC: Salisbury, MD
PROJECT MGR: J.D. Hynes PHONE NO.: (410) 546-6462
EMAIL: jdhynes@aol.com FAX NO.: (410) 548-5346
PROJECT NAME: DNREC-Murderkill PROJECT NO.: 13123-1
SITE LOCATION: Bowers Beach, DE P.O. NO.: 010877
SAMPLERS:

PSS Work Order #: 1307505 PAGE 1 OF 1

Matrix Codes:
SW=Surface Wtr **DW**=Drinking Wrt **GW**=Ground Wtr **WW**=Waste Wtr **O**=Oil **S**=Soil **WL**=Waste Liquid **WS**=Waste Solid **W**= Wipe

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C = COMP G = GRAB	Preservatives Used	Analysis/ Method Required (3) VOCs	Semi VOCs	Pesticides	PCBs	Cyanide	Inorganics (TP Metals)	REMARKS
	Comp 1	7/21		S	3	C		X	X	X	X	X	X	
	Comp 2	7/22		S	3	C		X	X	X	X	X	X	
	Comp 3	7/22		S	3	C		X	X	X	X	X	X	
	Comp 4	7/22		S	3	C		X	X	X	X	X	X	

(5)

Relinquished By: (1)	Date	Time	Received By:
J. Redding	7/24	1500	UPS
Relinquished By: (2) UPS 1Z2143X0198722188	Date 7/25/12	Time 10:25	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4)
Requested Turnaround Time
☒ 5-Day ☐ 3-Day ☐ 2-Day ☐ Next Day ☐ Emergency ☐ Other

Data Deliverables Required:

# of Coolers: 1
Custody Seal: Abs
Ice Present: Ice Packs Temp: 16 °C
Shipping Carrier: UPS (Exp)

Special Instructions:
Please return cooler. Return UPS label is included.

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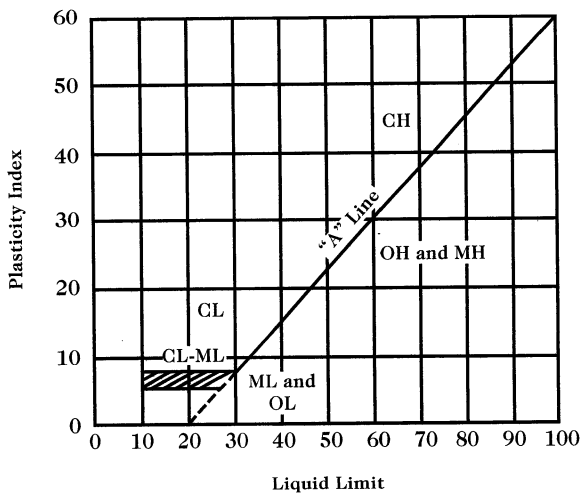
JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			*Group Symbols*	*Typical Names*	*Laboratory Classification Criteria*		
Coarse-grained soils (More than half of material is larger than No 200 sieve size)	Gravels (More than half of coarse fraction is larger than No 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No 200 sieve size), coarse grained soils are classified as follows: Less than 5 percent: GW, GP, SW, SP. More than 12 percent: GM, GC, SM, SC. 5 to 12 percent: *Borderline cases requiring dual symbols*[c]	$C_u=\frac{D_{60}}{D_{10}}$ greater than 4; $C_c=\frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly graded gravels, gravel sand mixtures, little or no fines		Not meeting all graduation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM[a] d u	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
	Sands (More than half of coarse fraction is smaller than No 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands,		$C_u=\frac{D_{60}}{D_{10}}$ greater than 6; $C_c=\frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly graded sands, gravelly sands, little or no fines		Not meeting all graduation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a] d u	Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols.
			SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL	Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH	Inorganic clays of high plasticity, fat clays			
			OH	Organic clays of medium to high plasticity, organic silts			
	Highly organic soils		Pt	Peat and other highly organic soils			

Plasticity Chart



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☐ *Dover Office* - 1039 Fowler Court • Dover, Delaware 19901 • 302-678-9718 • Fax 302-678-9733
E-mail - Salisbury jdhynes@aol.com

HYNES

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

NON-COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

DENSITY

Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

RELATIVE PROPORTIONS

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

PARTICLE SIZE IDENTIFICATION

Boulders	- 8 inch diameter or more
Cobbles	- 3 to 8 inch diameter
Gravel	- Coarse - 1 to 3 inch
	- Medium - 1/2 to 1 inch
	- Fine - 4.75 mm to 1/2 inch
Sand	- Coarse - 2.0 mm to 4.75 mm
	- Medium - 0.425 mm to 2.0 mm
	- Fine - 0.075 mm to 0.425 mm
Silt	- 0.075 mm to 0.002 mm

COHESIVE SOILS
(Clay, Silt and Combinations)

CONSISTENCY

Very Soft	- 3 blows/ft. or less
Soft	- 4 to 5 blows/ft.
Medium Stiff	- 6 to 10 blows/ft.
Stiff	- 11 to 15 blows/ft.
Very Stiff	- 16 to 30 blows/ft.
Hard	- 31 blows/ft. or more

PLASTICITY

Degree of Plasticity	Plasticity Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	over 22

Classification on logs are made by visual inspection of samples unless a sample has been subjected to laboratory classification testing.

Standard Penetration Test - Driving a 2.0" O.D., 1-3/8" I.D., splitspoon sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary to drive the spoon 6 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the test are recorded for each 6 inches of penetration on the drill log (Example - 6/8/9). The standard penetration test value (N - value) can be obtained by adding the last two figures (i.e. 8 + 9 = 17 blows/ft.). (ASTM D-1586)

Strata Changes - In the column "Soil Descriptions," on the drill log, the horizontal lines represent strata changes. A solid line (—) represents an actually observed change, a dashed line (----) represents an estimated change.

Groundwater - Observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc. may cause changes in the water levels indicated on the logs.

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410-546-6462 • Fax 410-548-5346

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one—not even you*—should apply the report for any purpose or project except the one originally contemplated.

Read the full report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject To Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations", many of these provisions indicate where geotechnical engineers responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE

8811 Colesville Road Suite G106 Silver Spring, MD 20910
Telephone: 301-565-2733 Facsimile: 301-589-2017
email: info@asfe.org www.asfe.org

UGER1000.10M

APPENDIX 3

PREVAILING WAGE RATE DETERMINATION

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
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PREVAILING WAGES FOR **HEAVY CONSTRUCTION** EFFECTIVE MARCH 15, 2013

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	21.14	18.60	40.43
BOILERMAKERS	69.82	30.73	56.37
BRICKLAYERS	44.98	22.19	23.83
CARPENTERS	50.06	50.06	39.82
CEMENT FINISHERS	23.15	23.30	17.35
ELECTRICAL LINE WORKERS	34.86	26.30	25.89
ELECTRICIANS	60.60	60.60	60.60
GLAZIERS	19.54	16.96	11.48
INSULATORS	51.48	51.48	51.48
IRON WORKERS	58.70	25.54	55.78
LABORERS	38.30	38.30	38.30
MILLWRIGHTS	62.18	62.18	48.75
PAINTERS	58.07	58.07	58.07
PILEDRIVERS	67.87	37.64	29.30
PLASTERERS	18.40	15.97	10.80
PLUMBERS/PIPEFITTERS/STEAMFITTERS	72.03	21.62	17.12
POWER EQUIPMENT OPERATORS	57.06	23.65	57.06
SHEET METAL WORKERS	29.40	18.23	17.13
SPRINKLER FITTERS	31.68	11.99	9.93
TRUCK DRIVERS	28.21	19.72	19.27

CERTIFIED: 9/24/13 BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: Murdkill River Entrance Channel Hydraulic Dredging Project, Kent County