REMEDIAL DESIGN WORK PLAN
NEW CASSEL INDUSTRIAL AREA
OFFSITE GROUNDWATER OU#3

NYSDEC STANDBY ENGINEERING CONTRACT
Work Assignment #D006129-06

PREPARED FOR
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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Prepared by

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1.0 PURPOSE AND OBJECTIVES

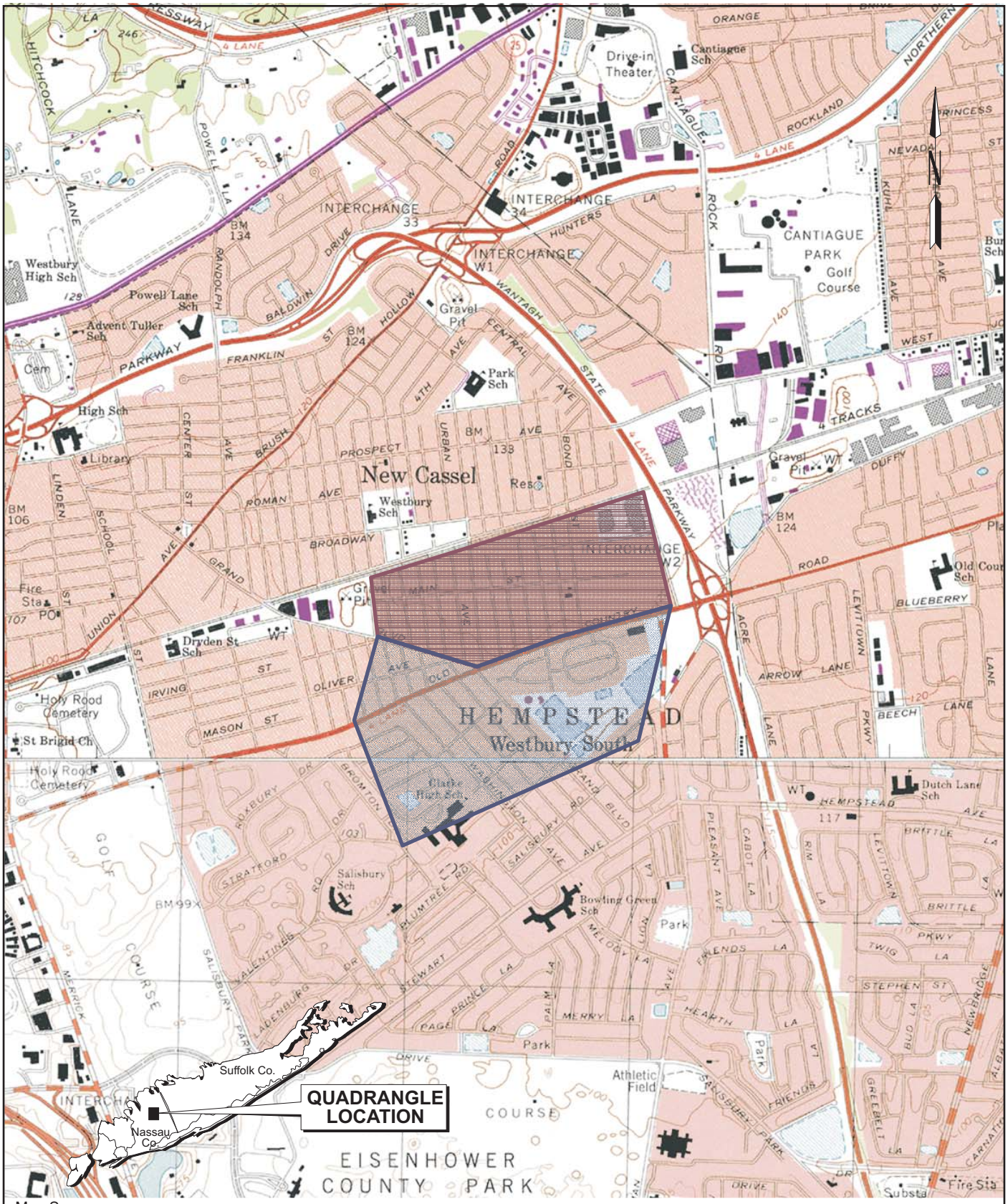
1.1 Purpose

This Remedial Design (RD) Work Plan has been prepared to describe the individual tasks that will be completed by Henningson, Durham & Richardson Architecture and Engineering, P.C. during the RD for the New Cassel Industrial Area, Operable Unit 03 – Off-site Groundwater (NCIA OU3) under Superfund Standby Engineering Contract No. D006129 WA#6. This document provides a description of the anticipated tasks that will be completed in conformance with the Program Field Activities Plan (FAP), Health & Safety Plan (HASP) and Quality Assurance Project Plan (QAP).

1.2 Remedial Design Objectives & Site Background Information

The objective of the remedial design task is to prepare a remedial design to remediate the New Cassel Industrial Area Off-Site groundwater contamination within the established off-site study area (Figure 1-1) to a depth of 285 feet below the existing ground surface. The October 2003 Record of Decision (ROD) for the site selected in-well air-stripping with localized vapor treatment to remediate the known groundwater contamination to a depth of 225 feet. The ROD also specified that if pilot testing of the in-well air stripping alternative indicated that this alternative was not practical for engineering or economic considerations, ex-situ treatment would be substituted to achieve the remedial goals. Subsequent to the ROD pre-design, investigation activities were initiated and one of the major findings was that the groundwater contamination was more extensive and found at a deeper depth than previously believed. Although an in-well air stripping pilot test was not conducted, the pre-design investigation activities indicated that, for both economic and engineering considerations, in-well air stripping with localized vapor treatment would not be an effective technology. Therefore, NYSDEC has substituted ex-situ treatment, an alternative technology provided in the ROD, to address the known contamination.

The New Cassel Industrial Area (NCIA) is located in the Town of North Hempstead, Nassau County. It encompasses approximately 170 acres of land and is bounded to the north by the Long Island Rail Road; to the south by Old Country Road; and to the southwest by Grand



Map Source:

©1998-2006, Maptech Inc.
USGS 7.7-min. Quadrangle, Hicksville, NY, 1967/photorevised 1979, and Freeport, NY 1994. \Fig1_SiteLocation.des

HDR	Henningson, Durham & Richardson Architecture and Engineering, P.C. One Blue Hill Plaza Pearl River, NY 10965	**Site Location Map** **New Cassel Industrial Area OU3 RD - NYSDEC Site # 130043**	**Figure 1-1**

Boulevard. The NCIA is a developed industrial and commercial area. OU-3 consists of the off-site groundwater primarily located to the south of the NCIA (Figure 1-1). Groundwater contamination plumes have migrated over 1,000 feet down gradient of the NCIA with contaminant concentrations greater than 1,000 parts per billion (ppb) of total volatile organic compounds (VOCs). Contaminants have impacted the down gradient public water supply wells located more than 500 feet below ground surface.

2.0 REMEDIAL DESIGN TASKS

The primary focus of the remedial design tasks is to prepare the design documents for the extraction and ex-situ treatment of contaminated groundwater within the NCIA Off-Site Study Area. The system will provide hydraulic control within the limits of the study area minimizing further downgradient migration of the contaminant plume as well as mass reduction from the highest concentration areas of the plume. Several pre-design investigation tasks will be completed, including a 72-hour pump test, in order to complete the remedial design. The various activities HDR will complete as part of the remedial design are as follows:

SECTION	RD TASK
3. 0	***Task 1- Work Plan & Scoping*** – Development of the scope and budget for the work assignment including the project budget (Schedule 2.11) and this RD Work Plan.
4.0	***Task 2- Pre-Design Investigation*** – Complete pre-design activities and collect the additional field data necessary to guide the remedial design including locating a suitable site(s) for the groundwater treatment plant(s), water elevation monitoring, evaluation of existing data and updating site conceptual model, 72-hour pump test, treatability study/pilot test, water disposal test and site survey.
5.0	***Task 3- Remedial Design –*** Preparation of the remedial design including the engineering report, construction drawings, technical specifications, engineer's cost estimate, bid packages and providing pre-bid assistance to NYSDEC.

3.0 TASK 1- WORK PLAN & SCOPING

Task 1 includes the activities associated with preparing the scope and budget (Schedule 2.11) for the work assignment. In addition this draft and subsequent final RD Work Plan will be prepared as part of this task.

3.1 Task 1.1 Project Scoping and Prepare 2.11

This subtask includes the preliminary scoping activities including review of the overall project objectives, review of the NYSDEC Quick Start template for the project and formulation of the project organization including the subcontractor procurement effort. This subtask also includes the preparation of the draft and final Schedule 2.11 for the work assignment.

3.2 Task 1.2 Project Meetings

A project scoping meeting was conducted with the NYSDEC on August 19, 2009. In order to finalize the scope and budget it is anticipated that one additional meeting will be held in Albany and a site visit will be conducted to verify existing site conditions. Both of the planned meetings will be attended by the HDR project manager (PM) and senior hydrogeologist.

3.3 Task 1.3 Review Project Records and Reports

HDR will compile and review existing documentation for the site. Initially, various resources will be utilized to gain an understanding of existing documents and reports that have been produced since we completed the remedial investigation/feasibility study (RI/FS) for OU3 in 2000. Many of the subject reports have already been received from the NYSDEC project manager and are currently under review. The goal of this task is to obtain all soil boring logs, existing monitoring well construction diagrams, and other data collected to refine the site conceptual model.

In addition to the reports compiled on previous investigative work conducted at the site, a research of recently published geologic/hydrogeologic report for the area will be completed. This research will include both regional and site-specific reports, as available.

3.4 Task 1.4 Work Plan Development

This Work Plan was prepared by HDR based on information from the Work Assignment #6-Remedial Design package, NYSDEC guidance; background/existing documentation, scoping meeting, and technical direction provided by the NYSDEC PM. This Work Plan provides a detailed description of each project task and subtask including project deliverables/documentation, project schedule, project organization chart, and project budget.

After receipt of comments from NYSDEC on the draft Work Plan, HDR will incorporate the comments and prepare the final Work Plan and budget.

3.5 Task 1.5 Task Management

The administrative costs associated with this task are included under this subtask. This includes the initial conflict-of-interest check, preparation of the monthly progress report, consultant application for payment (CAP), and cost control report (CCR) preparation.

4.0 TASK 2- PRE-DESIGN INVESTIGATION

The pre-design investigation task is intended to collect additional site specific data necessary to complete the design of the extraction well network and associated treatment plant. Initially this task will involve locating a suitable site for the treatment plant and the preferred location to dispose of the treated groundwater. Concurrently, a field investigation will be initiated that will collect additional data on the groundwater levels, groundwater quality, and the anticipated yield and capture zone of extraction wells located at the site.

4.1 Task 2.1 Preliminary Siting for Treatment Plant/Water Disposal

Up to 8 potential site(s) for the groundwater treatment plant location and potential water disposal locations will be identified and evaluated by HDR under this task. A review of the available properties within the OU-3 area cross referenced with potential extraction and injection well locations as well as viable transmission pipe routes will be conducted. A site visit will be conducted to evaluate and further refine the list of potential treatment plant locations. HDR will coordinate, prepare and attend a meeting between NYSDEC, Town of Hempstead, Town of North Hempstead and Nassau county representatives and other relevant stakeholders to discuss the proposed treatment plant locations. HDR will prepare meeting minutes and complete any action items resulting form the meeting. It is assume that a follow-up conference call meeting will be required to finalize the treatment plant location(s).

4.2 Task 2.2 Water Level Monitoring Program

A groundwater level monitoring program will be conducted at the site to examine the existing groundwater elevations and any dynamic changes within OU-3 due to pumping or other activities that may affect the groundwater table.

A total of 5 of the existing groundwater monitoring wells will be outfitted with data logging transducers and the data loggers will be programmed to collect water level data every 15 minutes over a period of one month. The five data logging transducers will be NYSDEC owned equipment that will be made available to HDR for this task. Once the one month monitoring period is completed the transducers will be retrieved and the data plotted with time to examine both water levels trends and the degree of hydraulic connection between the individual points. Since several high capacity public water supply wells are found in the area the data will also serve to quantify their effect on water levels and any potential extraction wells that may be installed as part of the groundwater extraction and treat system under design.

4.3 Task 2.3 Pre-Design Investigation Work Plan

A pre-design investigation Work Plan will be developed by HDR to identify the details and procedures for the 72-hour pump test, treatability study/pilot test and water disposal test. This investigation work plan will be separate from the project work plan and will incorporate information and data developed in Tasks 2.1, 2.2 and 2.4.

The Work Plan will outline details on the 72-hour pump test including the final test extraction well locations and construction details, pump size and flow rates, discharge location of extracted groundwater and water level monitoring point location and frequency.

The treatability study/pilot test details including, flow rates, duration, equipment sizes and configuration, sampling locations, frequency, and analysis will also be described in detail in the Work Plan.

The work plan will outline the water disposal test requirements including the injection well construction well detail, injection flow rates, pump sizes, water source and transducer monitoring points.

4.4 Task 2.4 Summary and Evaluation of Existing Data/Update Site Conceptual Model

HDR will review and compile available and relevant existing geologic, hydrogeologic and chemical analysis data. The data will be reduced in a manner and summarized onto figures to clearly present the existing site conditions and enhance an evaluation of the contaminant plumes within the OU-3 area. Horizontal and vertical flow and contaminant migration pathways for the three (eastern, central and western) plumes will be identified. Travel times will be calculated and future contaminant migration estimated so that the pump and treat extraction system can be designed. Because this task will be conducted concurrently with Task 2.3 any critical data gaps will be identified and can be addressed within the Pre-Design Investigation Work Plan.

Specific work activities that will be completed as part of this task include:

- Comprehensive review of existing investigation results with an emphasis on contaminant migration that may affect the target area for the remedial system;
- Compile and summarize existing data into easily accessible tables or database;
- Preparation chemical box type oversized figures summarizing all relevant historical groundwater analytical results for the eastern, central and western contamination plume;
- Prepare iso-concentration lines depicting the relative contaminant impacts at various depth of the aquifer. These figure will help visualize variations in the areal groundwater impacts versus the depth of the aquifer;
- Compilation, review and evaluation of available geologic data (boring logs) with an emphasis subsurface conditions that may affect the performance of the remedial system;
- Preparation of geological cross sections indicating significant lithology that may affect operation and effectiveness of the remedial system;
- Develop groundwater horizontal and vertical flow paths and velocities for each plume area;
- Combine groundwater flow, analytical, and geology data into a site specific conceptual model and identify data gaps;
- Utilize site conceptual model to establish contaminant migration pathways and predict contaminant migration over time (horizontally and vertically); and,
- Develop preliminary conceptual layout of remedial system extraction well and estimate order of magnitude pumping rates to establish hydraulic control.

This Task 2.4 will lay the foundation for the design of the remedial treatment system and is a critical step in defining the remedial technology application strategy and performance requirements needed to achieve the site specific remedial goals.

4.5 Task 2.5 Install Additional Groundwater Monitoring Points

During previous investigations conducted within the OU-3 area, a total of 24 groundwater monitoring points were installed that will be useful in the remedial design effort (Table 4-1). After examining the position and depths for the existing wells, it was recognized that additional groundwater monitoring locations would be necessary to complete the remedial design. A total of 10 locations were identified to install additional groundwater monitoring points and the specifics depths and purpose/objectives of the points are summarized on Table 4-2. The proposed locations for the monitoring points are shown on Figure 4-1.

Each of the proposed locations will be completed by a licensed drilling subcontractor using various rotary drilling techniques. In general, 4.25 inch ID hollow-stem augers will be used to install 2 inch diameter wells that will be less than 225 feet deep. The deeper monitoring wells

and proposed test extraction wells will be installed using mud rotary drilling techniques and, in the case of the extraction wells, Revert will be used as a drilling fluid to prevent mud caking within the screened zone. Revert is a common drilling fluid additive that is used to help prevent damage to the formation during drilling. Revert is a gum based food grade additive that does not contain any VOCs and will natural degrade in the environment. Split spoon samplers will be used to collect up to three soil samples from each of the proposed locations. The proposed screen zones of the new locations are also summarized on Table 4-2. The screened intervals were determined based on the data collected during previous investigations at the site. The construction methods and materials for the proposed points will conform to the Program FAP with the exception that the test extraction wells will be fitted with high capacity continuous slot stainless steel screen to assure maximum yield and communication with the aquifer.

Monitoring wells will be completed in flush mount curb boxes with protective steel manholes and the drilling contractor will restore the area to pre-existing conditions. The well locations and elevation will be surveyed by a New York State licensed surveyor. The elevations of all monitoring well casings will be established to within 0.01 ft based on the National Geodetic Vertical Datum.

Table 4-1
Existing NCIA OU3 Study Area Monitoring Wells
NYSDEC Site #130043

Well ID	Diameter and Material	Screen Zone*	
MW-1	2-inch PVC	90-110	
MW-2	2-inch PVC	110-130	
MW-3	2-inch PVC	130-150	
MW-4	4-inch PVC	180-200	
MW-5	2-inch PVC	90-110	
MW-6	2-inch PVC	110-130	
MW-7	2-inch PVC	90-110	
MW-8	2-inch PVC	119-139	
MW-9	4-inch PVC	310-315	
EW-1B	2-inch PVC	154-164	
EW-1C	4-inch Steel	506-516	
EW-2B	2-inch PVC	132-142	
EW-2C	4-inch Steel	504-514	
BG-1	20" Production	478-527	Well #1
BG-2	20" Production	524-583	Well #2
FS MW-13A	2-inch PVC	69-79	
FS MW-13B	2-inch PVC	119-129	
FS MW-13C	2-inch PVC	239-249	
FS MW-14A	2-inch PVC	119-139	
FS MW-14B	2-inch PVC	159-169	
FS MW-14C	2-inch PVC	239-249	
N-10478	4-inch PVC	100-121	
N-10476	4-inch PVC	110-130	
N-11852	2-inch PVC	90-95	

Notes:

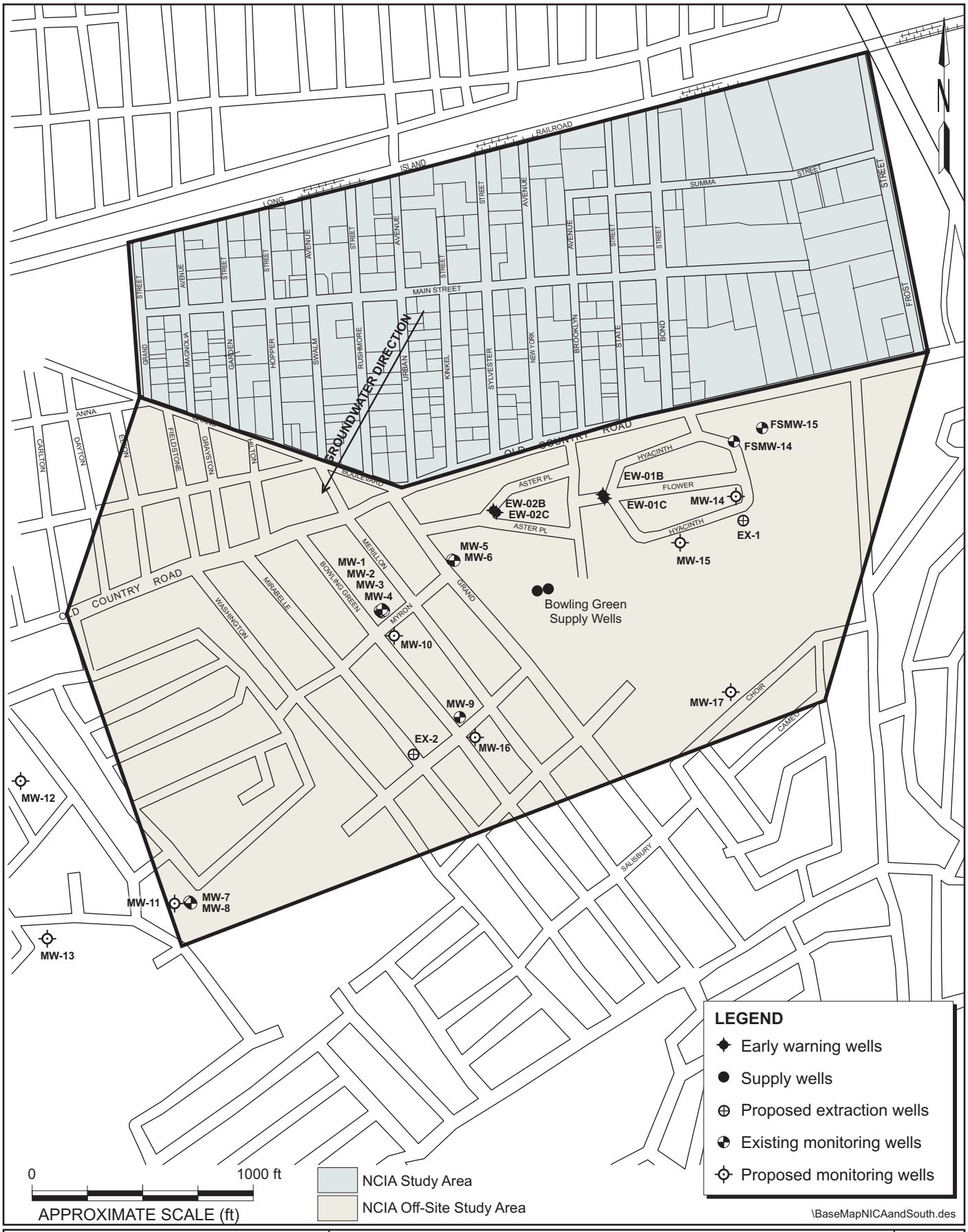
1. Table does not list other shallow watertable wells in the area
2. *Feet below ground surface

Table 4-2
Proposed Additional NCIA OU3 Wells
NYSDEC Site #130043

	Designation	Depth	Screen	Purpose/Notes	Objective
1	EX-1	205	185 to 205	Test extraction well- Eastern Plume (TMW-7)	Determine Q and capture for UGA/Magothy transition zone, shallow Magothy, pilot treatment
2	MW-14	205	185 to 205	MW for Aquifer Test - 100 ft EX-1	Determine Q and capture for UGA/Magothy transition zone, shallow Magothy
3	MW-15	205	185 to 205	MW for Aquifer Test - 200 ft EX-1	Determine Q and capture for UGA/Magothy transition zone, shallow Magothy
4	MW-10	285	275 to 285	MW- Central Plume (Clustered with MW-1 to MW-4)	Determine if test extraction well necessary for intermediate Magothy to 285 ft
5	MW-11	285	275 to 285	MW multi 225 ft and 285 ft- Western Plume vertical delineation (Clustered with MW-7 & 8)	Establish downgradient edge of SW corner of study area
6	MW-12	225	215 to 225	Western Plume delineation	Define Western edge of study area
7	MW-13	225	215 to 225	Western Plume delineation	Define Western edge of study area
8	EX-2	285	265 to 285	Test extraction well- intermediate Magothy	Q & capture for intermediate Magothy (aquifer test at later date)
9	MW-16	285	275 to 285	MW multi 225 ft and 285 ft- Central Plume vertical delineation (Paired near MW-9)	Establish downgradient edge of central portion of study area
10	MW-17	285	275 to 285	MW multi 225 ft and 285 ft- Eastern Plume vertical delineation	Establish downgradient edge of eastern portion of study area

Notes:

1. Proposed Locations Shown on Figure 4-1
2. Q =flow rate (gallons/minute)



HDR	Henningson, Durham & Richardson Architecture and Engineering, P.C. One Blue Hill Plaza Pearl River, NY 10965	**Proposed Well Locations** **New Cassel Industrial Area OU3 RD - NYSDEC Site # 130043**	**Figure 4-1**

It is anticipated that the proposed groundwater monitoring locations will require approximately 45 days in the field to complete and an HDR field geologist will provide oversight during this time. Investigation derived waste (IDW) generated by the drilling program will be staged at a centralized location for later off-site disposal. The costs associated with managing and disposing of the IDW are included as a subcontracting cost.

Once the additional groundwater monitoring points are installed, a single round of groundwater sampling will be conducted on up to 25 of the groundwater monitoring points. The purpose of this 2 week field effort is to obtain a current round of groundwater monitoring data to establish the current groundwater VOC concentrations.

4.6 Task 2.6 72-Hour Pump Test / Treatability Test

The 72-hour pump test will consist of one test extraction well screened at approximately 200 feet bgs. The test extraction well (EX-1) is located within the eastern plume (Frost Street sites) (Figure 4-1). Two additional monitoring points (MW-14 and MW-15) will be installed approximately 50 and 100 feet away from the pumping test well (Figure 4-1). A total of 15 of the existing and new groundwater monitoring wells will be outfitted with data logging transducers and the data loggers will be programmed to collect water level data every 15 minutes over a the pump test period (both drawdown and recovery). Five of the transducers will be NYSDEC owned equipment and the remaining five units will be vendor rented for a 2 week period.

Groundwater will be pumped from the well via a submersible pump at a maximum rate of 100 gallon per minute (gpm). The actually pumping rate will vary based on the yield properties of the extraction well and the subsurface formation. Extracted water from the pump test will be discharged to the Nassau County sanitary sewer located approximately 500 feet away from the proposed test well. Based on conversations with the Nassau County Department of Public Works a temporary discharge approval will be required that will allow water to be discharged directly to the sewer unless the sewer discharge standards are exceeded. If the extracted water exceed the sewer discharge standards pre-treatment of the water prior to discharge to the sewer

would be required. It is anticipated that the extracted groundwater will not exceed the sewer discharge standards and pre-treatment costs are not included in work assignment budget.

A treatability study/pilot test (TS/PT) will be conducted concurrently with the 72-hour pump test. The TS/PT results will be used to specify the treatment plant equipment needed to meet the groundwater clean up objectives. The effectiveness of GAC and air stripping in removing VOCs from the influent water will be assessed to determine the optimal treatment system components to remediate the groundwater based on site specific conditions.

A portion of the pump test discharge flow will be diverted for the purposes of the TS/PT. The target flow rate for the test is approximately 10 to 50 gpm and the discharge water will be disposed of in the Nassau County Sewer system within 500 feet of the test area. The TS/PT system will consist of the following equipment:

- Influent equalization tank;
- Pump(s);
- Bag filter;
- Air stripper;
- Granular activated carbon;
- Flow meter and influent/effluent sampling ports;
- Interconnecting hoses and/or piping;
- Instrumentation, gages, valving, and electrical controls to operate system; and,
- Secondary containment.

Upon completion of the test, all equipment that comes into contact with potentially contaminated groundwater will be decontaminated before being removed from the site. Spent carbon will be disposed off-site by the contractor.

The pump test/treatability study sampling locations, frequency, and analysis will also be described in detail in the Pre-Design Investigation Work Plan to be completed under Task 2.3.

Sampling is anticipated to include analysis for VOCs in both water and air. The water samples will also be analyzed for alkalinity, pH, hardness, and metals to aid in the design of the treatment system.

4.7 Task 2.7 Water Disposal Pilot Test

At this time the disposal location for the treated groundwater is unknown. Conceptually the disposal options fall into two categories- surface and subsurface. For cost and technical considerations the preferred disposal option would be a surface discharge outside of the study area. Currently there is not enough data to develop a specific scope of work for the water disposal pilot test. Activities from Tasks 2.1 to2.5 and 2.6 will provide the necessary information required to scope the water disposal pilot test. The location of the treatment plant and total flow rate would be required at a minimum to develop the disposal pilot study scope.

The level-of-effort provided for this task only includes sufficient hours to refine the scope and anticipated costs associated with conducting a water disposal pilot test. If the preferred water disposal option includes re-injection of the treated groundwater within the immediate vicinity of the study area the work assignment would need to be modified to include the additional investigations that would be required to determine the number and spacing of injection wells along with an assessment of the impact the re-injection may have on the current plume configuration.

4.8 Task 2.8 Pre-Design Summary Report

A pre-design summary report will be prepared by HDR that summarizes the results of all the pre-design investigation activities. The level-of-effort for this task assumes that one round of comments from the NYSDEC will be received prior to finalizing the report.

4.9 Task 2.9 Pre-design/Construction Site Survey

A site survey of the proposed treatment plant will be prepared to serve as the base map for the treatment plant design. The site survey will include a detailed topographic base map of the site

and immediate vicinity. Relevant features of the site and adjacent areas will be plotted including existing property lines, easements, and utilities.

4.10 Task 2.10 Task Management

The administrative costs associated with the task are included under this subtask. This included reviewing subcontractor invoices, preparation of the CCRs, preparation of the CAP, and monthly progress report.

5.0 TASK 3- REMEDIAL DESIGN

The remedial design of the groundwater extraction and treat system will be developed under Task 3. This task includes preparing a design report, construction plans and technical specifications, bid documents, engineer's cost estimate and assistance during the pre-bid process. A 95% complete version of the construction plans and technical specifications will be submitted to NYSDEC for review and comment. A final version of the plans and specifications will be issued that incorporates NYSDEC comments and revisions.

5.1 Task 3.1 Engineering Design Report

HDR will prepare and submit an engineering design report as part of the remedial design. The engineering design report will include a detailed description of design methodologies, calculations and equipment selection for the pump and treat system. Drawings depicting the conceptual and preliminary design of the system will be included in the design report. Construction QA/QC plan, site specific health and safety plan, community air monitoring plan, permit equivalencies and soil erosion and sedimentation control plan will be included as appendices to the engineering design report, as necessary. It is assumed that NYSDEC will obtain all necessary access agreements to the proposed remedial system site(s).

5.2 Task 3.2 Draft Final (95%)

HDR will prepare and submit to NYSDEC a Draft Final Design (95% complete) and Final Remedial Design. The design package will consist of draft construction plans and technical specifications as described below. The remedial design will be prepared in accordance with NYSDEC Part 375 and DER-10 guidance and comply with the criteria and guidance (SCGs) and Remedial Action Objectives (RAO) outlined in the ROD. In addition, the design will address and be in substantive compliance with applicable permits requirements.

Construction Drawings

HDR will prepare construction drawings as part of the 95% draft final remedial design submittal. The 95% submittal is anticipated to include the following:

- Cover sheet with anticipated drawing list of entire construction drawing set;
- Legend and symbol sheet;
- Pumping well location and details;
- Transmission piping routes and details;
- Treatment plant equipment layout and details;
- Effluent discharge pipe line and injection well location;
- Building architectural, structural and HVAC plans and details;
- Electrical power, lighting, and instrumentation details; and,
- Site layout and design details; and,
- Erosion and sedimentation control plan and details.

Technical Specifications

HDR will prepare technical specifications as part of the 95% draft final design submittal. The 95 % submittal is anticipated to include the following:

- General requirements specifications including summary of work, measurement and payment, submittal procedures, environmental controls and project close out;

- Earthwork including clearing and grubbing, excavation and fill, geosynthetics, and soil and erosion controls;
- Concrete;
- Masonry;
- Metals including structural steel;
- Openings including windows and doors; and
- Equipment specifying requirements for the treatment system components.

Three (3) copies of 95% draft final design package will be submitted to the NYSDEC for review and comment.

5.3 Task 3.3 Final Design

HDR will provide responses to these comments and incorporate requested changes into the design documents.

5.4 Task 3.4 Bid Documents

HDR will prepare bid documents that will include a request for proposal, instruction to bidders, a line item bid schedule with estimated quantities for each bid items and contractor qualifications and experience requirements. A summary/scope of work, work sequence, and measurement and payment criteria will be provided in the technical specifications. The NYSDEC Standard Construction Contract (Revision 3, January 2008) will be used to create the bid documents. All required sections of the standard contract will be completed. The contract documents will be signed and seal by a professional engineer licensed and registered in the State of New York.

After approval of the final design by the NYSDEC, HDR will submit 75 copies of the plans and specifications for contractor bidding. In addition, the bid documents, specifications and supporting documents will be provided on disk in PDF format and drawings will be provided in AutoCAD format.

5.5 Task 3.5 Cost Estimate

HDR will prepare a detailed engineer's cost estimate with back up documentation as part of the remedial design. Quantity take-off sheets and the basis for the development of unit and lump sum prices used in the estimate will be provided. A draft cost estimate will be included with the Engineering Design report and the estimate will be refined/updated with each subsequent submittal.

5.6 Task 3.6 Pre-Bid Assistance

HDR will provide assistance to NYSDEC for the purpose of competitively bidding the site remediation contract. Anticipated assistance in the pre-bid process includes a pre-bid conference and providing responses to requests for information from bidders.

The HDR PM will attend a pre-bid meeting at the site with prospective bidders. At the pre-bid conference, HDR will emphasize to the bidders important technical items of the project, tour the project site, answer any questions, and prepare minutes of the meeting. HDR will assist NYSDEC in responding to all questions from prospective bidders. It is assumed that NYSDEC will prepare and transmit the addendums to the bid package. Review of bids submitted by the prospective contractors is not included in this scope of work.

5.7 Task 3.7 Task Management

The administrative costs associated with the task are included under this subtask. This included reviewing subcontractor invoices, preparation of the CCRs, preparation of the CAP, and monthly progress report.

6.0 PROJECT MANAGEMENT

HDR as the prime contractor will be responsible for overall project technical direction and administration. Several subconsultants and subcontractors will be required to complete the scope of services and the subcontracting requires are outlined in detail in Section 6.1. Section 6.2 outlines our proposed project schedule and key milestones.

6.1 Project Management, Organization, and Key Technical Personnel

HDRs project team for this assignment is outlined in Figure 6-1 and our key technical personnel for this project include:

- Thomas Connors, P.E.- Project Manager
- Michael Lehtinen, P.G.- Senior Hydrogeologist
- Stuart Bassell, P.E.- QA/QC, Technical Advisor
- Scott Englert- Project Hydrogeologist
- Virginia Modafferi - Project Engineer

Our subconsultants/subcontractors and their role in the project include:

- YEC (MBE) - Surveying and engineering services during Task 2 including a site survey of the proposed treatment plant location and completion of a groundwater sampling round.
- Delta Well & Pump (WBE)- Drilling and aquifer testing services.
- Chemtech (MBE)- Standby analytical laboratory services
- American Environmental Assessment Corp.- IDW management and disposal
- Aztech Technologies (WBE)- Pilot testing services

6.2 Project Schedule and Key Milestones

Our proposed schedule for this assignment is presented in Figure 6-2 and the key milestones for this assignment include:

- Pre-design investigation summary report;

Figure 6-1
NYSDEC Standby Consulting Engineering Services
Standby Contract Project Organization

New Cassel Industrial Area (site #130043)

Contract / WA No. D006129-06

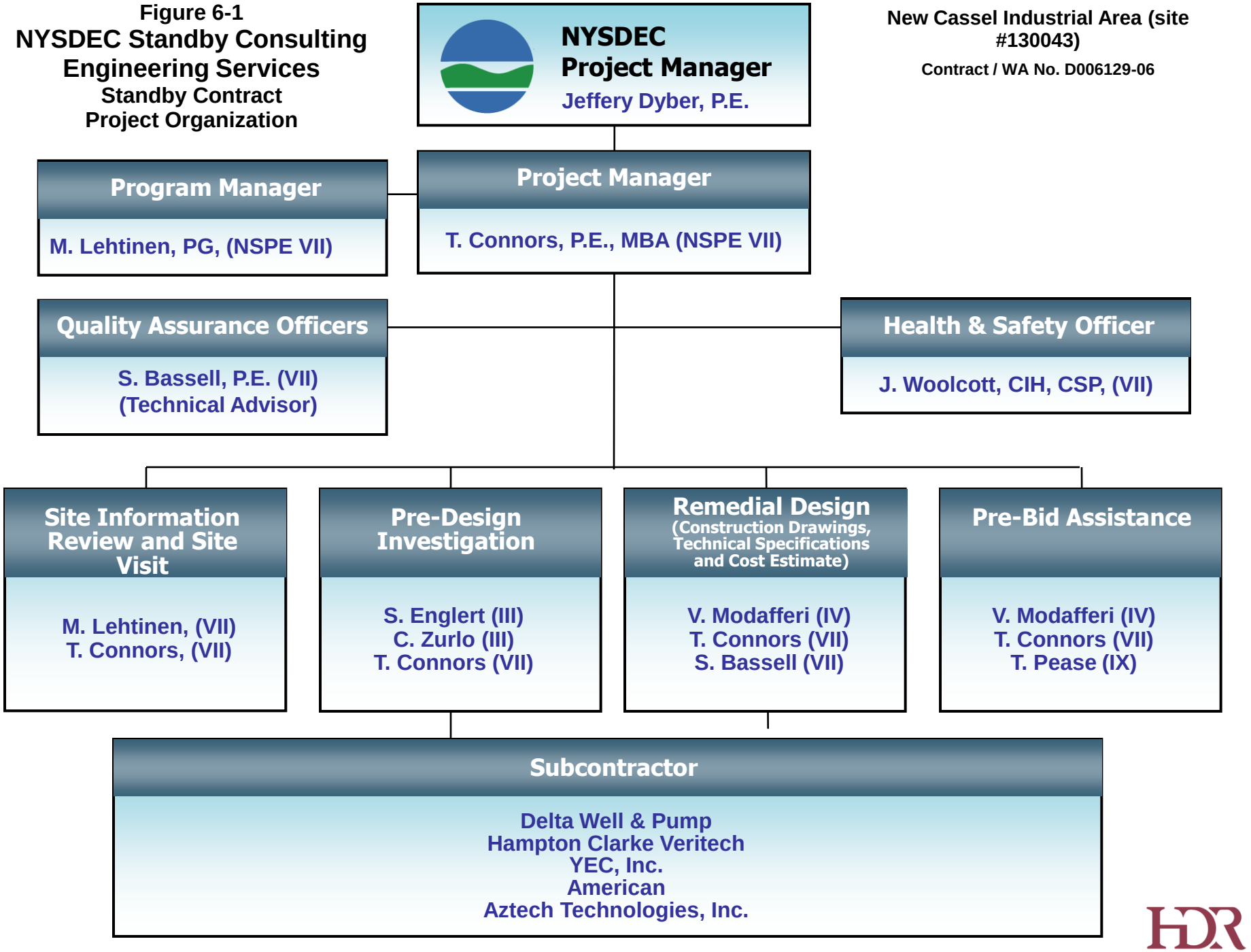
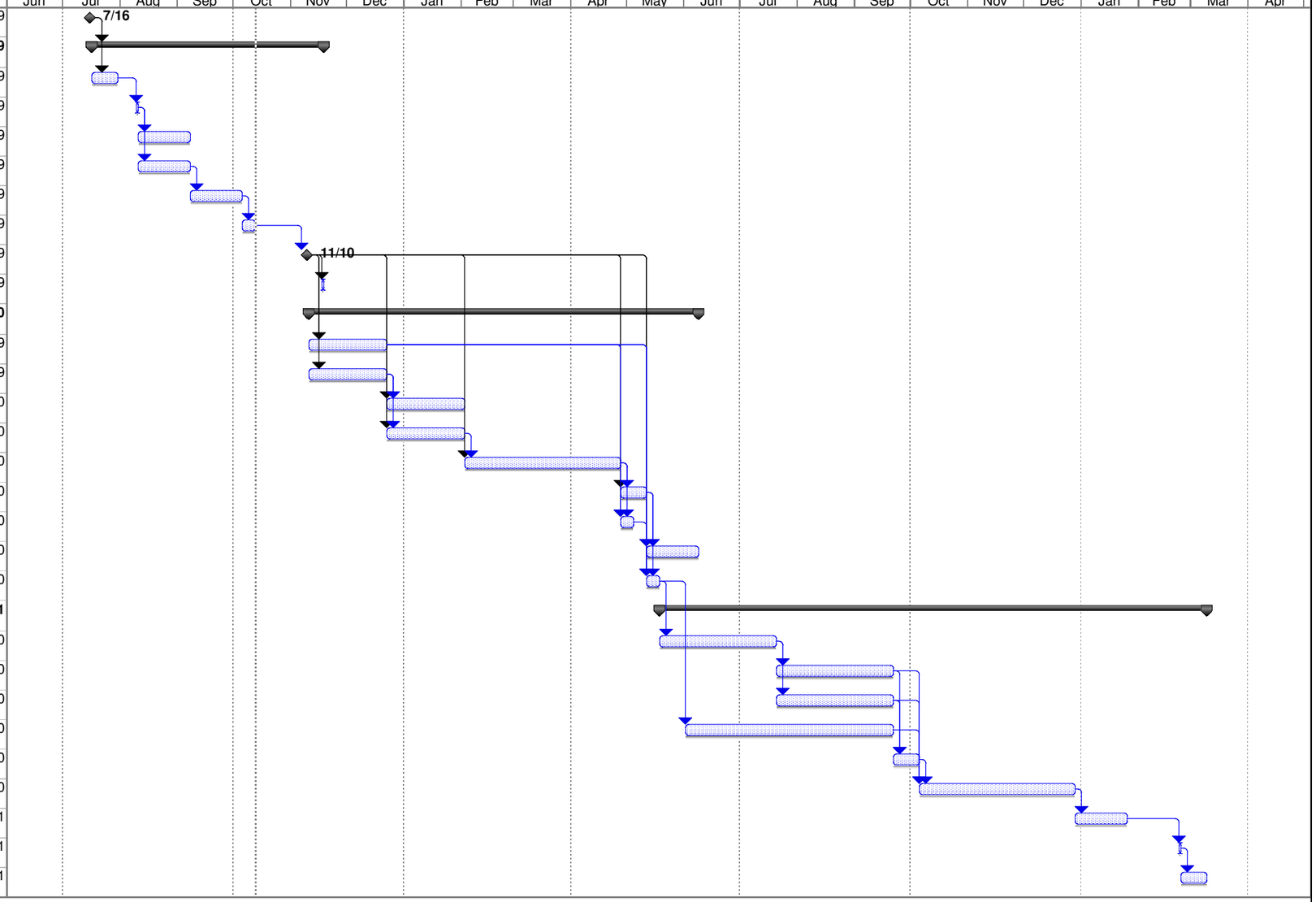


Figure 6-2
Preliminary Schedule for Remedial Design
New Cassel Industrial Area - OU-3

ID	Task Name	Duration	Start	Finish
1	WA Issuance/Notice to Proceed	1 day	Thu 7/16/09	Thu 7/16/09
2	**Work Plan and Scoping**	**89 days**	**Fri 7/17/09**	**Wed 11/18/09**
3	Review Project Records and Reports	10 days	Fri 7/17/09	Thu 7/30/09
4	Scoping Meeting	1 day	Mon 8/10/09	Mon 8/10/09
5	Prepare 2.11 Documentation	20 days	Tue 8/11/09	Mon 9/7/09
6	Work Plan Development	20 days	Tue 8/11/09	Mon 9/7/09
7	NYSDEC Work Plan/2.11 Review	20 days	Tue 9/8/09	Mon 10/5/09
8	Finalize Work Plan	5 days	Tue 10/6/09	Mon 10/12/09
9	NYSDEC Work Plan/Budget Approval	1 day	Tue 11/10/09	Tue 11/10/09
10	Site Visit	1 day	Wed 11/18/09	Wed 11/18/09
11	**Pre-Design Investigation**	**150 days**	**Wed 11/11/09**	**Tue 6/8/10**
12	Siting for Treatment Plant/Water Disposal	30 days	Wed 11/11/09	Tue 12/22/09
13	Water Level Monitoring Program	30 days	Wed 11/11/09	Tue 12/22/09
14	Pre-Design Investigation Work Plan	30 days	Wed 12/23/09	Tue 2/2/10
15	Eval. Existing Data/Site Conceptual Model	30 days	Wed 12/23/09	Tue 2/2/10
16	Additional Investigation	60 days	Wed 2/3/10	Tue 4/27/10
17	72-hour Pump Test/Treatability Study	10 days	Wed 4/28/10	Tue 5/11/10
18	Water Disposal Pilot Test	5 days	Wed 4/28/10	Tue 5/4/10
19	Pre-Design Summary Report	20 days	Wed 5/12/10	Tue 6/8/10
20	Pre-Construction Survey	5 days	Wed 5/12/10	Tue 5/18/10
21	**Remedial Design**	**211 days**	**Wed 5/19/10**	**Wed 3/9/11**
22	Engineering Report	45 days	Wed 5/19/10	Tue 7/20/10
23	Drawings	45 days	Wed 7/21/10	Tue 9/21/10
24	Technical Specifications	45 days	Wed 7/21/10	Tue 9/21/10
25	Cost Estimate	80 days	Wed 6/2/10	Tue 9/21/10
26	Bid Documents	10 days	Wed 9/22/10	Tue 10/5/10
27	NYSDEC Review	60 days	Wed 10/6/10	Tue 12/28/10
28	Final Design	20 days	Wed 12/29/10	Tue 1/25/11
29	Pre-Bid Conference	1 day	Wed 2/23/11	Wed 2/23/11
30	Response to Bid Questions	10 days	Thu 2/24/11	Wed 3/9/11



Project: Project Schedule 2009-05-28
Date: Tue 10/13/09

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External MileTask
Split

- Engineering design report;
- 95% percent submittal; and,
- Final design submittal.

7.0 PROJECT BUDGET

The estimated budget to complete the tasks outlined in this Work Plan is found on the Schedule 2.11 tables for this assignment. The Schedule 2.11 tables include a breakdown of all of the anticipated costs including the required labor, non-salary, and subcontracting costs.