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REMEDIAL INVESTIGATION

WORK PLAN

FOR

WESTWOOD COUNTRY CLUB
772 NORTH FOREST ROAD (SBL #68.01-1-1)
AMHERST, ERIE COUNTY, NEW YORK
SITE NO. C915291

Prepared by:

C&S ENGINEERS, INC.
141 ELM STREET, SUITE 100
BUFFALO, NEW YORK 14203

Prepared on Behalf of:

MENSCH CAPITAL PARTNERS, LLC
5477 MAIN STREET
WILLIAMSVILLE, NY 14221

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ACRONYM LIST

IR	REMEDIAL INVESTIGATION
IRM	INTERIM REMEDIAL MEASURES
NYSDEC	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DER	DEPARTMENT OF ENVIRONMENTAL REMEDIATION
SITE	772 NORTH FOREST ROAD
SCO	SOIL CLEANUP OBJECTIVES
BGS	BELOW GROUND SURFACE
VOC	VOLATILE ORGANIC COMPOUNDS
SVOC	SEMI-VOLATILE ORGANIC COMPOUNDS
PAH	POLYCYCLIC AROMATIC HYDROCARBONS
PID	PHOTO-IONIZATION DETECTOR
CPP	CITIZEN PARTICIPATION PLAN
CAMP	COMMUNITY AIR MONITORING PLAN
RI/AAR	REMEDIAL INVESTIGATION / ALTERNATIVE ANALYSIS REPORT
MS/MSD	MATRIX SPIKE / MATRIX SPIKE DUPLICATE
NYSDOH	NEW YORK STATE DEPARTMENT OF HEALTH
ELAP	ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
ASP	ANALYTICAL SERVICES PROTOCOL
U.S. EPA	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
DUSR	DATA USABILITY AND SUMMARY REPORT
HASP	HEALTH AND SAFETY PLAN
EDD	ELECTRONIC DATA DELIVERABLE

EXECUTIVE SUMMARY

This document presents the Remedial Investigation Work Plan for the Brownfield Cleanup Program Site No. C915291 located at 772 North Forest Road, Amherst, NY. The project is summarized below:

Contaminant Source and Constituents

The contamination at the Site consists of arsenic in the soil and sediment, the source of which is likely the application of arsenic-based pesticides. The Site has been used as a golf course since 1921, and the use of arsenic-based pesticides at the Westwood Country Club reportedly ended in 1994. No additional constituents of concern related to pesticide use were identified.

Extent of Contamination

The soil and sediment contamination is believed to be confined to the upper few inches of material. The soil contamination is expected to be mostly located within the more heavily manicured portions of the Site, primarily the greens and fairways, as well as in areas in which maintenance equipment and pesticides were stored. The sediment contamination is expected to be located closest to the edges of each of the ponds on the Site.

Proposed Site Redevelopment

The proposed clean-up will include soil and sediment remedial activities to allow the construction of a mixed use development that will comprise the entire 170.54 acres of the BCP Site. The conceptual master plan for the project includes:

- Single Family & Patio Home Residential Subdivision (46± acres). The Project will include a total of 154 detached single-family homes consisting of 113 patio home lots and 47 single family residential lots.

- Condominium Townhome Development (27.6± acres). A total of 84 two-story attached condominium townhome units..

- Synagogue Development (5± acres). A 25,000 sq. ft. one-story synagogue with 184 parking spaces.

- Senior Living Development (15± acres). A two-story building with approximately 200 assisted living units and approximately 96 independent living senior apartment units.

- Westwood Neighborhood Center (58.9± acres). The Neighborhood Center will be located on the southernmost portion of the Project Site that is closest to Sheridan Drive. The following development types and density are anticipated in the proposed Neighborhood Center component of the mixed use project:

  a. *Neighborhood Center (22.2± acres)*. A combination of commercial and residential

uses, situated around a central plaza and a four-story hotel. Neighborhood business and office space is planned on the first floor level of the two-story and three-story mixed use buildings. The Neighborhood Center portion of the Project includes a total of 352 residential units within 2-story wholly residential buildings as well as the upper stories of 3-story mixed use buildings.

b. *Townhomes (16.4± acres)*. A total of 93 townhome units are planned within the Neighborhood Center.

c. *Medical and Professional Office Park (15.2± acres)*. Several two-story medical and professional office buildings with approximately 200,000 sq. ft. of space.

d. *Four story hotel Development (1.5± acres).* A four-story hotel with approximately 130 rooms.

e. *Clubhouse/Public Event space (3.6± acres)*. The Neighborhood Center will retain the original WCC Clubhouse, providing banquet and catering facilities, shops, and conference spaces. Directly adjacent to the clubhouse will be a 1.2-acre outdoor public gathering and open green space.

- Westwood Park Area (22.5± acres). The proposed publicly accessible parkland area will include Westwood Lake and an extensive trail system within the Ellicott Creek corridor.

Remedial Investigation

To facilitate the redevelopment of the Site as described above, the Site will require a more thorough site characterization. The proposed RI includes:

- The collection and analysis of 851 surface and eight subsurface soil samples
- The installation and sampling of twelve groundwater monitoring wells
- The collection and analysis of 25 sediment samples

As part of the BCP process, the results of the RI will subsequently be used to identify and evaluate remedial alternatives. Once the preferred remedial alternative is selected, a Remedial Work Plan will be prepared.

1 INTRODUCTION

Mensch Capital Partners, LLC (Mensch), owners of the Westwood Country Club property on Sheridan Drive at North Forest Road in Amherst, has developed an innovative conceptual master plan to create Westwood, a new traditional neighborhood in the heart of Amherst. Westwood will feature public spaces, a variety of residences and a neighborhood center that complements to the surrounding community and the entire Town of Amherst. The 170-acre property is located at 772 North Forest Road, Amherst, New York, and is herein referred to as the "Site." Figure 1 shows the location of the Site.

As part of the project Environmental Impact Statement prepared for the Town of Amherst, Mensch completed preliminary sampling of surface soils to determine if long-term, historic use of pesticides as art of routine golf course maintenance has impacted the property. Contamination was identified on the Site based on a limited site characterization program. Consequently, Mensch submitted an application to enter into the New York State Brownfield Cleanup Program (BCP) on November 13, 2014. The application was issued for public comment on December 8, 2014. The project was accepted into the program and assigned NYSDEC Site No. C915291.

To implement the BCP Remedial Investigation (RI) portion of the BCP project, Mensch retained C&S Engineers, Inc. (C&S). C&S has prepared this Work Plan to provide a detailed description of the RI program to be implemented at the Site, the purpose of which is to characterize the nature and extent of contamination occurring on the Site. The resulting information will be utilized to identify an appropriate approach for the remediation of the Site, if necessary, which will be described in an Alternatives Analysis Report.

This document has been developed in general accordance with DER-10, Technical Guidance for Site Investigation and Remediation, published by the New York State Department of Environmental Conservation (NYSDEC), and details the scope and objectives of the RI program. The following supporting technical documents have also been appended to the Work Plan:

- Community Air Monitoring Plan
- Quality Control Plan
- Health and Safety Plan

Collectively, these plans form one document that is intended to define the scope of tasks, technical approach and specific procedures to be utilized to complete the RI for the Site.

The scope of the RI program to be implemented at the site is the product of a scoping process that involved the review of historical information concerning the Site, a meeting with NYSDEC representatives, and limited site reconnaissance and sampling. Because the RI process is dynamic and iterative, the Work Plan may be modified during the site characterization process to incorporate new information and refine project objectives, as necessary.

1.1 Site Description

The 170-acre Site is located at 772 North Forest Road, 385 Maple Road and 391 Maple Road in the south-central portion of the Town of Amherst, Erie County, New York. The Site is bounded

by Sheridan Drive (State Route 324) on the south; Maple Road (County Road 192) on the north; North Forest Road (County Road 294), Ellicott Creek, and the Audubon Par 3 Golf Course on the east; and Frankhauser Road and Fairways Boulevard on the west. Figure 2 shows the Site Boundaries.

The Site is relatively flat with some minor topographic relief commonly associated golf courses. The Site's fairways, greens, and rough remain visible although the Site has not been maintained as a golf course since 2014.

The Site contains areas developed with a number of structures consisting of the clubhouse and associated buildings in one area and maintenance buildings in another. An area in the center of the Site is undeveloped but appears to contain piles of soil and other materials likely generated during routine maintenance operations. Figure 3 shows the locations of the structures and the stockpile area.

Five ponds exist on-site. Rather than receiving rainwater run-off, water was often pumped into the ponds to create and maintain water features for the golf course. Each pond contains an overflow drain for heavy rain events which are connected via a network of underground pipes that discharge into Ellicott Creek. Figure 4 shows the locations of the ponds and the piping network.

1.2 Site History

The Site was first developed as a golf course, including a clubhouse and golf course maintenance areas, in 1921 and has remained as such until 2014, when the course closed due to changes in market forces. Prior to 1921, land use was agricultural and residential.

1.3 Site Geography, Geology, and Hydrogeology

Structures on the property include six main buildings, several sheds, a swimming pool and tennis courts associated with the Westwood Country Club golf course, as shown on Figure 3. The Site has been subject of a recent investigation which demonstrated that the environmental integrity property has been impacted by the past site uses.

The Project Site is located within the Erie-Ontario Lake Plain physiographic province of New York. This physiographic region has little relief and is characteristic of an abandoned lakebed. The region includes three plains (Ontario, Huron, and Erie), which are separated by the east-west trending Niagara, Portage and Onondaga escarpments. The Town of Amherst is located in the Salina Lowland of the east-west trending Huron plain and is bounded by the Onondaga and Niagara escarpments, which are comprised of more resistant rock. No unique landforms or geological formations exist on or in the vicinity of the Site.

Topography on the Site averages approximately 600 feet above sea level. In general, the topography gradually drops approximately 10 to 13 feet in elevation from south to north across the Site. Overall, the topography of the Site is relatively level, with the exception of previous modifications resulting from the construction, operation, and maintenance of the existing private golf course, including golf tees, fairways, hazards, greens, ponds and cart paths. In addition, Ellicott Creek meanders along portions of the eastern boundary of the Site. The natural topography in the vicinity of the Site also has been influenced by previous development of sites adjacent to and in the vicinity of the Site, including residential neighborhoods to the east

and west of the Site, and the Audubon Recreation Center and Golf Courses (Par 3 and 18-hole) to the north and northeast of the Site.

The Soil Survey of Erie County (U.S. Department of Agriculture, Soil Conservation Service www.websoilsurvey.nrcs.usda.gov) identifies soils on the Site as including: Claverack loamy fine sand, Cosad loamy fine sand, Lakemont silt loam, Odessa silt loam, Schoharie silt loam, Teel silt loam, and Urban land-Odessa complex series, with Odessa, Claverack and Cosad being the predominate soil types. Of these types, only Lakemont is considered hydric soil, although hydric inclusions are possible in Cosad, Odessa, and Teel soils series. These soil types on the Project Site are described as follows:

- The Claverack series consists of very deep, moderately well drained soils formed in sandy deposits that overlie clayey lacustrine sediments. They are nearly level to sloping soils in shallow deltas on lake plains.
- The Cosad series consists of very deep somewhat poorly drained soils formed in sandy deposits that overlie clayey lacustrine sediments. They are nearly level soils on lake plains.
- The Lakemont series consists of deep, poorly drained and very poorly drained soils of lake plains. They are nearly level soils formed in very slowly permeable reddish colored clayey lacustrine sediments.
- The Odessa series consists of very deep, somewhat poorly drained soils formed in clayey lacustrine deposits. These soils are in moderately low areas on lake plains.
- The Schoharie series consists of very deep, moderately well drained soils formed in clayey lacustrine sediments. They are on glacial lake plains and uplands mantled with lake sediments.
- The Teel series consists of very deep, moderately well drained soils on floodplains. They formed in nearly level silty alluvial deposits.
- The Urban Land-Odessa complex consists of nearly level areas of urban land and somewhat poorly drained Odessa soils. This complex is on relatively flat landscapes in the City of Buffalo and surrounding metropolitan area, including the Town of Amherst.

The results of the soil borings conducted during the geotechnical evaluation were consistent with the mapped soils information. Specifically, the soil borings encountered native soils consisting of glacial till deposited silty clay, clayey silt, silt and silty or clayey sand soils overlying the shale bedrock. In most cases, the soil borings indicated the presence of surface topsoil and man-placed fill or disturbed indigenous soils above native soils, and this is consistent with topographic modifications associated with golf course construction.

Bedrock in the vicinity of the Site consists generally of gray, medium hard, sound, thinly bedded to bedded shale rock of the Camillus shale formation, with occasional partings, seams and layers of gypsum. The depth to bedrock on the Site ranges from approximately 13.5 to 62.5 feet as evidenced by refusal in soil borings conducted during the geotechnical analysis of the Site.

Based on a review of NYSDEC data, the Site is not underlain by any mapped principal or primary aquifers. Groundwater at and in the vicinity of the Site is not used for public drinking water supply.

Groundwater was evaluated as part of a geotechnical evaluation of the Site. As part of its geotechnical analysis, three groundwater observation wells were installed. Results indicate that

the water table is present at 17 to 22 feet beneath the surface, although perched water is present in the upper soils, in some instances within a few feet of the surface.

2 SUMMARY OF ENVIRONMENTAL CONDITIONS

2.1 Environmental Reports

Preliminary environmental information currently exists for the Site. The following summarizes the 2012 Phase I ESA and a limited soil characterization program completed in 2014.

February 27, 2012 – Quality Inspection Services/Applus RTD Phase I ESA Report
The Phase I ESA for the BCP Site did not identify recognized environmental conditions (RECs).

November 2014 – Surface Soil and Sediment Characterization
C&S conducted a sampling program to characterize surface soil and sediment at the BCP Site. The characterization program consisted of the sampling and analysis of 15 surface soil samples and 12 sediment samples at the Site. The surface soil samples were analyzed for pesticides, herbicides, and arsenic using USEPA Methods 8082, 8151, and 6010, respectively. The sediment samples were analyzed for arsenic using EPA Method 6010. Analytical sample results from these investigations are summarized in Section 2.2 below.

2.2 Nature and Extent of Contamination

A total of 15 surface soil and 12 sediment samples were collected from the Site in 2014. The soil samples were analyzed for pesticides, herbicides, and arsenic, while the sediment samples were analyzed only for arsenic.

Known contaminants include arsenic associated with pesticide use at the Site during routine golf course maintenance operations across the BCP Site. NYSDEC Industrial Use SCOs were exceeded in 5 of the 15 surface soil sampling locations, and one sediment sample fell within the Class B category. However, further evaluation of the surface soil is needed.

The location of the soil and sediment samples and relative exceedance level is shown on Figure 5 and Tables 1 and 2 summarize the sampling results. The full report is included in Appendix A. The following is a brief summary of the contaminants on-site.

2.2.1 Soil

The surface soil samples did not contain detectable concentrations of pesticides and herbicides. However, concentrations of arsenic ranged from 2.2 to 66.3 mg/kg. The detected arsenic concentrations in five of the surface soil samples were above the NYSDEC's least stringent Soil Cleanup Objective (SCO) for Industrial Use, suggesting that some level of cleanup and/or management of impacted soils will be required prior to redevelopment of the Site. The samples with concentrations contravening the SCOs were located in various portions of the Site, rather than in a limited number of discrete locations. The remaining ten samples contained arsenic at concentrations below the Unrestricted Use SCOs.

2.2.2 Sediment

The sediment sampling results ranged from 1.3 to 11.3 mg/kg. These concentrations are below the NYSDEC Unrestricted Use SCO. Using the NYSDEC's June 24, 2014 "Screening and Assessment of Contaminated Sediments Guidance," eleven of the concentrations are characterized as Class A, which is defined as sediments that present little to no potential for risk to aquatic life. One sample, collected from the pond on Hole 15, contained arsenic concentrations falling within the Class B classification, indicating that the additional information is needed to determine the potential risk to aquatic life.

3 OBJECTIVES, SCOPE AND RATIONALE

The objectives of this Work Plan are to evaluate contaminant impacts to soil and sediment in order to identify and evaluate appropriate remedial actions necessary to redevelop the Site. The investigation work will include evaluating the magnitude and extent of arsenic impacts, conducting a qualitative exposure assessment for actual or potential exposures to contaminants at the Site and/or emanating from the Site, and producing data that will support the development of an acceptable RI Report and subsequently a Remedial Work Plan.

The RI scope of work is based on information previously gathered regarding historical operations conducted at the Site, the results of the limited site characterization, and the project objectives. The RI will include the following:

- Radiological Survey – Because Technologically-Enhanced, Naturally Occurring Radioactive Material (TENORM) has been identified in construction material at a number of sites in Western New York, a survey of the parking areas will performed.

- Surface Soil Evaluation – This task will be the focus of the project, as arsenic is the only known contaminant of concern and pesticide applications occurred at the surface of the Site.

- Subsurface Soil Evaluation – This task will consist of two types of investigative activities: soil borings and test pits.

    - The soil boring task will be conducted in two areas of the Site in which impacts to the subsurface may have occurred. This task will consist of the advancement and sampling of soil borings in the area of the maintenance operations buildings (including the pesticide storage area) and the area in the central portion of the Site in which soil and other materials were placed, likely during routine golf course maintenance operations.

    - The test pit task will be conducted in an area of the Site that was identified by a resident as an area in which operational fluids (likely pesticides) were reportedly dumped by golf course employees.

- Groundwater Evaluation – Subsequent to completing the above tasks, groundwater monitoring wells will be installed. Although groundwater impacts at the Site are not anticipated, groundwater monitoring wells have been proposed to characterize site-wide groundwater conditions and flow direction as well as within the two areas targeted in the Subsurface Soil Evaluation.

- Sediment Evaluation – The limited sampling previously conducted at the Site identified arsenic in sediment at slightly elevated concentrations. This task is designed to provide additional characterization of the sediment within the ponds and in Ellicott Creek and help determine the presence, or lack of, impacts to sediments in Ellicott Creek.

The RI work will be completed in general accordance with NYSDEC Division of Environmental Remediation: Technical Guidance for Site Investigation and Remediation dated May 2010 (DER-10).

4 REMEDIAL INVESTIGATION

This RI describes the scope of work necessary to collect sufficient data to determine the extent of contaminated fill material which will support the identification and implementation of a remedy that facilitates the redevelopment of the Site. This RI will provide an outline for the following sections:

- Field Investigation
- Sampling Plan
- Laboratory Analysis

4.1 Field Investigation

The RI has been separated into the following tasks:

4.1.1 Radiological Survey

Because Technologically-Enhanced, Naturally-Occurring Radioactive Materials (TENORMs) have been used as construction materials (primarily slag sub-base) at many properties in Western New York, the RI will include a Radiological Survey across the parking lot areas. The survey will include the establishment of background radiation levels; creation of transect lines; and use of a radiation meter (Ludlum Model #2221 with a 44-10 gamma scintillation probe) along the transects. The locations of areas of elevated radiation measurements, if any, will be marked using Global Positioning System (GPS) or measured relative to fixed site features. Proposed Radiological Survey locations are shown on Figure 6.

4.1.2 Surface Soil Sampling

Surface soil samples will be collected from a large number of locations throughout the Site based on a grid. Figure 7 shows the surface soil sampling locations.

The general details of the sampling program include the following:

- Sampling on a 50-foot by 50-foot grid, shown in Figure 7A, in areas in which historic pesticide application rates were presumed to be highest (tee boxes, fairways, and greens)
    - Also includes a minimum of three samples per green

    - Borings at greens may need to extend beyond four feet depending on construction of the greens, including fill within elevated greens
- Sampling on a 50-foot by 50-foot grid in the operational areas and in the soil and other materials stockpile area
- Sampling on a 200-foot by 200-foot grid, shown in Figure 7B in all other areas of the Site
    - Where the Site abuts residential properties, the sampling locations will be placed within ten feet of the property line

Prior to sample collection, the gird locations will be marked out and surveyed using GPS. The surface soil sample collection will be initiated using a track-mounted, direct-push drilling rig. At each location, the drilling rig will advance shallow borings to four feet below existing ground surface. The sampling device will be a two-inch inner diameter macro-core sampler that consists of a four-foot long hollow tube lined with a disposable acetate liner and equipped with a hardened steel probing tip. Upon retrieval, each soil sample will be screened with a photoionization detector (PID) and evaluated for soil classification and evidence of contamination, and observations will be recorded.

From each sample location, five surface soil samples will be collected from the following depth horizons:

- Horizon A: 0 to 3 inches below grade
- Horizon B: 3 to 6 inches below grade
- Horizon C: 6 to 12 inches below grade
- Horizon D: 12 to 18 inches below grade
- Horizon E: 18 to 24 inches below grade

The samples will be placed in jars provided by the laboratory using decontaminated stainless steel sampling spoons. Decontamination procedures will include an alconox and water wash followed by a water rinse. The collected samples will be placed on ice in a cooler with ice and delivered to a NYSDOH Environmental Laboratory Approval Program (ELAP) certified laboratory for testing.

Because the pesticide applications occurred and the surface and arsenic is not appreciably mobile, the samples from the A and B Horizons (0 to 3 inches and 3 to 6 inches, respectively) will be submitted to the laboratory for analysis of total arsenic. The samples from the remaining horizons will also be submitted to the laboratory but will be held pending the results of the uppermost samples.

For a particular location, if the B Horizon sample contains an arsenic concentration above the applicable Soil Cleanup Objective (SCO), the C Horizon sample will be analyzed to determine the bottom of the contaminated zone. In turn, if the C Horizon sample contains an arsenic concentration above the SCO, the D Horizon sample will be analyzed, and the E Horizon sample will be analyzed if the D Horizon sample is above the SCO.

In addition to total arsenic analysis described above, a subset of the surface soil samples (20 samples) will be analyzed for the following analyte list:

- Target Compound List (TCL) semivolatile organic compounds (SVOCs)
- TCL pesticides

- Polychlorinated biphenyls (PCBs)
- Target Analyte List (TAL) metals
- Total cyanide
- Hexavalent chromium (five of the 20 samples only)

The samples to be analyzed for this expanded list will be selected based on field observations, will be distributed spatially across the Site, and include at least one sample each from the maintenance area and the soil and other materials stockpile area.

4.1.3 Soil Boring Program

Soil borings will be advanced in the maintenance area and the stockpile area to characterize subsurface conditions. Four to six borings will be advanced in the maintenance area, particularly focusing on areas in which pesticides were likely handled. Four borings will be advanced in the stockpile area. Figure 8 shows the proposed boring locations.

The soil boring program will be completed using a track-mounted, direct-push drilling rig. At each location, the drilling rig will advance shallow borings to the shallower of refusal or 12 feet below grade. The sampling device will be a two-inch inner diameter macro-core sampler that consists of a four-foot long hollow tube lined with a disposable acetate liner and equipped with a hardened steel probing tip.

Upon retrieval, each soil sample will be classified and observations will be recorded on a log sheet. Soils from the borings will be screened in the field for visible impairment, olfactory indications of impairment, and/or indication of detectable VOCs with a PID collectively referred to as "evidence of impairment."

Soil samples will be collected from the borings based on evidence of impairment. Up to four subsurface soil samples will be collected from each area and analyzed for the following analyte list:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- PCBs
- TAL metals
- Total cyanide
- Hexavalent chromium (one of the four samples only)

Following sample collection, the non-dedicated portion of the macro-core sampler will be decontaminated by manually removing all soil material followed by washing with an alconox detergent and rinsing with distilled water. Wash fluids will be allowed to infiltrate the ground surface of the Site in the vicinity of each soil sampling location. Excess soil will be returned to the boring from which it is removed.

4.1.4 Test Pit Program

The test pitting program is anticipated to consist of approximately six to eight test pits. The test pits will be excavated in the area identified by a local resident in which operational fluids were

reportedly dumped by golf course employees. The area of the proposed test pits is shown on Figure 8. Actual test pit locations will be based on field observations.

The work to be completed as part of the test pitting program will be completed using a backhoe to advance test pits to the shallower of refusal, native material, or eight feet below grade. Soils from the test pits will be screened in the field for impairment by measuring total organic vapors using a photoionization detector (PID). Additionally, visual and olfactory indications of impairment and evidence of staining will be evaluate during test pit operations.

Test pit logs will be completed and include soil description, test pit dimensions, PID readings, etc. The test pit logs will be included in the RI Report.

Soil samples will be collected from the borings based on evidence of impairment. Up to four subsurface soil samples will be collected from the test pits and analyzed for the following analyte list:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- PCBs
- TAL metals
- Total cyanide
- Hexavalent chromium (one of the four samples only)

4.1.5 Monitoring Well Installation and Groundwater Sampling

To characterize groundwater conditions at the Site, 12 monitoring wells will be installed and sampled. One well will be located in the maintenance area, one in the stockpile area, and ten will be distributed across the Site. Figure 8 shows the proposed monitoring well locations.

A rotary drill will be used to advance 4-1/4-inch hollow stem augers. Split-spoon samples will be advanced at two-foot intervals using a 140-pound hammer ahead of the augers. The augers and drilling rods will be decontaminated prior to use via high pressure sprayer. The split-spoons will be decontaminated prior to use via an Alconox wash followed by a potable water rinse. Between each soil sample and soil boring, decontamination procedures will be repeated.

Soils from the in the split-spoons will be screened in the field for visible impairment, olfactory indications of impairment, evidence of NAPLs, and/or indication of detectable VOCs with a PID collectively referred to as “evidence of impairment” and the results recorded on boring logs.

The overburden wells will be constructed to intersect the top of the water table. Each well will be completed with 5 to 10 feet of 2-inch Schedule 40 0.010-slot well screen connected to an appropriate length of schedule 40 PVC well riser to complete the well. The annulus will be sand packed with quartz sand to approximately one to two feet above the screen section, and one to two feet of bentonite chips or pellets. The remaining annulus will be grouted to ground surface. Each well will be completed with a stick-up protective casing.

Following installation, the monitoring wells will be developed through the removal of up to ten well volumes using dedicated bailers or a peristaltic or submersible pump.

Groundwater sampling will follow well development and be conducted using low flow purging and sampling techniques. Before purging the well, water levels will be measured using an electric water level sounder capable of measuring to the 0.01 foot accuracy. Peristaltic or bladder pumps using manufacturer-specified tubing will be used for purging and sampling groundwater. Calibration, purging and sampling procedures will be performed as specified by the USEPA[1] for low flow sampling. Decontamination will be conducted after each well is sampled to reduce the likelihood of cross contamination. Calibration times, purging volumes, water levels and field measurements will be recorded in a field log and will be provided in the Final Engineering Report.

The groundwater samples will be analyzed for the following analyte list:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- PCBs
- TAL metals
- Total cyanide
- Hexavalent chromium (two of the 12 samples only)

Wash, development, and purge fluids will be allowed to infiltrate the ground surface of the Site in the vicinity of each soil sampling location. Excess soil will be broadcast in the vicinity of the boring.

4.1.6 Sediment Sampling

To characterize the sediment at the Site, sediment samples will be collected from three locations in each of the five ponds. Figure 8 shows the proposed locations of the sediment samples. Based on the previous sampling, the ponds contain a layer of sediment less than a foot thick underlain by dense clay.

Because it is likely that the impacts to sediment quality are most significant closest to the edges of the ponds, the sediment samples will be collected approximately five feet from the edge of the ponds. At each sampling location, a C&S field staff member will measure the depth of the sediment. The samples will be collected using a decontaminated shovel or other similar device. Two samples will be collected from each location: the first sample will consist of sediment and the second will consist of the underlying clay. The uppermost sample will be analyzed for:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- PCBs
- TAL metals
- Total cyanide
- Hexavalent chromium (three of the 15 samples only)
- Total organic carbon (TOC)

[1] U.S. EPA Region 1 Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, January 19, 2010.

The samples of the clay material will be submitted to the laboratory but placed on hold pending the results of the upper layer sampling. The results from the uppermost layer (the sediment) will be compared to the applicable standards. Any analyte detected at concentrations exceeding the standards in the uppermost sample will be analyzed in the clay sample from that sample pair.

Additionally, sediment samples will be collected from Ellicott Creek. One sample will be collected from the following locations:

- Immediately upstream of the Site
- Immediately upstream of each pond outfall
- Immediately downstream of each pond outfall
- The downstream edge of the Site

The creek sediment samples will be analyzed for the same parameters as the pond sediment samples.

4.2 Sampling Plan and Laboratory Analysis

Table 3 summarizes the sampling program described in the sections above. Additionally, Quality Assurance/Quality Control (QA/QC) samples will be collected, and the following describes the minimum number of samples per media type:

- Surface soil samples
    - Blind duplicate – 1 per 20
    - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 per 20
- Subsurface soil samples (borings and test pits)
    - Blind duplicate – 1 per 20
    - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 per 20
- Groundwater samples
    - Trip blank – 1 per shipment
    - Blind Duplicate – 1 per 20
    - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 per 20
- Sediment samples
    - Blind duplicate – 1 per 20
    - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 per 20

C&S will utilize the services of an NYSDOH Environmental Laboratory Approval Program (ELAP) certified laboratory for analytical testing. The laboratory results for the samples will be reported in a Category B deliverables package to facilitate validation of the data, and a third party validator will review the laboratory data and prepare a Data Usability Summary Report (DUSR). The validator will evaluate the analytical results for the field samples and quality assurance/quality control samples and compare the findings to USEPA guidance to determine the accuracy and validity of the results.

5 QUALITY ASSURANCE AND QUALITY CONTROL PROTOCOLS

To ensure that suitable and verifiable data results are obtained from the information collected at the Site, quality assurance procedures are detailed in this section.

5.1 Sampling Methods

Sampling procedures will be conducted in accordance with the NYSDEC *Sampling Guidelines and Protocols Manual*. Collecting of representative samples will include the following procedures:

- Ensuring that the sample taken is representative of the material being sampled;
- Using proper sampling, handling and preservation techniques;
- Properly identifying the collected samples and documenting their collection in field records;
- Maintaining chain-of-custody; and
- Properly preserving samples after collection.

5.1.1 Soil Sampling

Soil sampling will be performed using two methods: (1) grab samples and (2) field screening including visual and olfactory observations and using a PID. Selected samples will be placed directly in pre-cleaned jars provided by the laboratory.

The contaminant of concern during excavation is arsenic. As detailed in the *Sampling Guidelines and Protocols Manual*, grab samples will be placed in 8oz, wide-mouth, glass jars. Sample jars will immediately be placed on ice in a cooler. Soil samples submitted for the analysis of other analytes will be placed in appropriately sized jars as per the analytical method requirements.

The sampling plan and rationale for the RI are provided in Section 4.

5.1.2 Water Sampling

Water samples will be collected via pouring directly into pre-cleaned bottles provided by the laboratory and immediately placing the bottles on ice. The bottles used will be based on the requirements of the analytical methods.

5.1.3 Sediment Sampling

Sediment samples will be collected via placing the collected sediment directly into pre-cleaned bottles provided by the laboratory and immediately placing the jars on ice. The bottles used will be based on the requirements of the analytical methods.

5.1.4 QA/QC Sampling

As described in Section 4.2, QA/QC samples will be collected to help evaluate the validity of the laboratory data. Trip blanks, duplicate samples, and MS/MSD samples will be analyzed per the various media as described in Section 4.2.

5.2 Sample Nomenclature

Because such a large number of samples will be generated during the course of this project, strict adherence to a planned nomenclature scheme is necessary. The sampling nomenclature

will be based on a grid created for the Site, and figure 7 shows the grid. The following presents the planned sample nomenclature:

- Surface soil samples – SS-A1-01-3-6
    - SS – Surface soil
    - A1 – East-west sample block
    - 01 – North-south sample block
    - 3-6 – Sample depth in inches
- Subsurface soil samples (soil borings) – SB-A1-01-36-48
    - SS – Subsurface soil
    - A1 – East-west sample block
    - 01 – North-south sample block
    - 36-48 – Sample depth in inches
- Subsurface soil samples (test pits) – TP-A1-01-36-48
    - SS – Subsurface soil
    - A1 – East-west sample block
    - 01 – North-south sample block
    - 36-48 – Sample depth in inches
- Groundwater samples – GW-MW02-01
    - GW – Groundwater
    - MW01 – Monitoring Well 02
    - 01 – First sampling event
- Sediment samples - SD-A1-01-0-6
    - SD – Subsurface soil
    - A1 – East-west sample block
    - 01 – North-south sample block
    - 0-6 – Sample depth in inches

For clarity, the letters "I" and "O" were omitted from the grid nomenclature to avoid confusion with the similar numbers one and zero.

5.3 Analytical Procedures

5.3.1 Laboratory Analysis

Laboratory analysis will be conducted by a third-party laboratory that is accredited by the NYSDOH Environmental Laboratory Accreditation Program ("ELAP"). Laboratory analytical methods will include the most current NYSDEC Analytical Services Protocol ("ASP").

Soil samples sent to a certified laboratory will be analyzed in accordance with EPA SW-846 methodology for the following contaminants:

- TCL VOCs (EPA Method 8260)
- TCL SVOCs (EPA Method 8270)
- TCL Pesticides (USEPA 8081)
- PCBs (USEPA 8082)
- Target Analytes List for Metals (EPA Method 6010)

Category B deliverable will be requested to be used in a third-party data validation.

5.3.2 Data Usability

A Data Usability Summary Report (DUSR) will be prepared by a third-party data consultant using the most recent methods and criteria from the USEPA. The DUSR will assess all sample analytical data, blanks, duplicates and laboratory control samples and evaluate the completeness of the data package.

5.4 Documentation

5.4.1 Custody Procedures

As outlined in NYSDEC *Sampling Guidelines and Protocols*, a sample is in custody under the following conditions:

- It is in your actual possession;
- It is in your view after being in your physical possession;
- It was in your possession and then you locked or sealed it up to prevent tampering; or
- It is in a secure area

The environmental professional will maintain all chain-of-custody documents that will be completed for all samples that will leave the Site to be tested in the laboratory.

5.4.2 Air Monitoring Records

Air monitoring will be conducted for on-site health and safety. Air monitoring will be conducted during active invasive activities periods. The monitoring will include VOC screening. The specifics of the air monitoring procedures and criteria are detailed in the Health and Safety Plan (HASP) in Appendix B) and Community Air Monitoring Plan (CAMP) in Appendix C.

6 HEALTH AND SAFETY

To assure the safety of the workers and the local community, monitoring practices of the work environment will be in place during all phases of RI activities. A Health and Safety Plan (HASP) was prepared that details procedures for maintaining safe working conditions and minimizing the potential for exposure to hazardous material. The HASP is provided in Appendix B.

Additional, the Community Air Monitoring Plan (CAMP) in Appendix C describes the air monitoring procedure to be employed during ground intrusive activities to ensure the health and safety of residents and others proximal to the Site.

7 QUALITATIVE EXPOSURE ASSESSMENT

As part of the RI, a Qualitative Exposure Assessment will be performed in accordance with DER-10 Appendix 3B and Section 3.6 of the BCP Guidance. This Qualitative Exposure Assessment will evaluate whether potential or completed exposure pathways exist. This assessment will be based on the soil, sediment and groundwater sampling data generated during the RI.

The Qualitative Exposure Assessment will include the following areas of evaluation:

- Source Areas – Areas with identified impacts will be included as part of the exposure assessment.
- Fate & Transport – The data will be evaluated for potential on-site impacts as well as off-site migration via soil, sediment, and groundwater.
- Route of Exposure – The results of site sampling will be interpreted to determine if contaminant concentrations are at levels that have the potential to be inhaled or ingested.
- Receptor Population – The Site will be evaluated to determine the size and makeup of potential on-site and down-gradient receptors including residents, workers, and neighbors.

8 REMEDIAL INVESTIGATION REPORT

Subsequent to completing the work outlined above, a Final Remedial Investigation Report will be developed in general accordance with NYSDEC DER-10. The report will describe the findings of the RI and implications of those findings. The report will contain summary tables, field logs, laboratory reports, site photographs, and other related materials that are necessary to accurately present the RI results.

9 CITIZEN PARTICIPATION ACTIVITIES

A Citizen Participation Plan (CPP) will be developed for the project and submitted separately within 20 days of an executed Brownfield Cleanup Agreement (BCA). The CPP will include the following (at a minimum):

- Updates to the names and addresses on the BCP Application (if any);
- Identifies major issues related to the Site;
- A description of citizen participation activities already performed;
- Identifies the document repository; and,
- Includes a description and schedule of public participation activities.

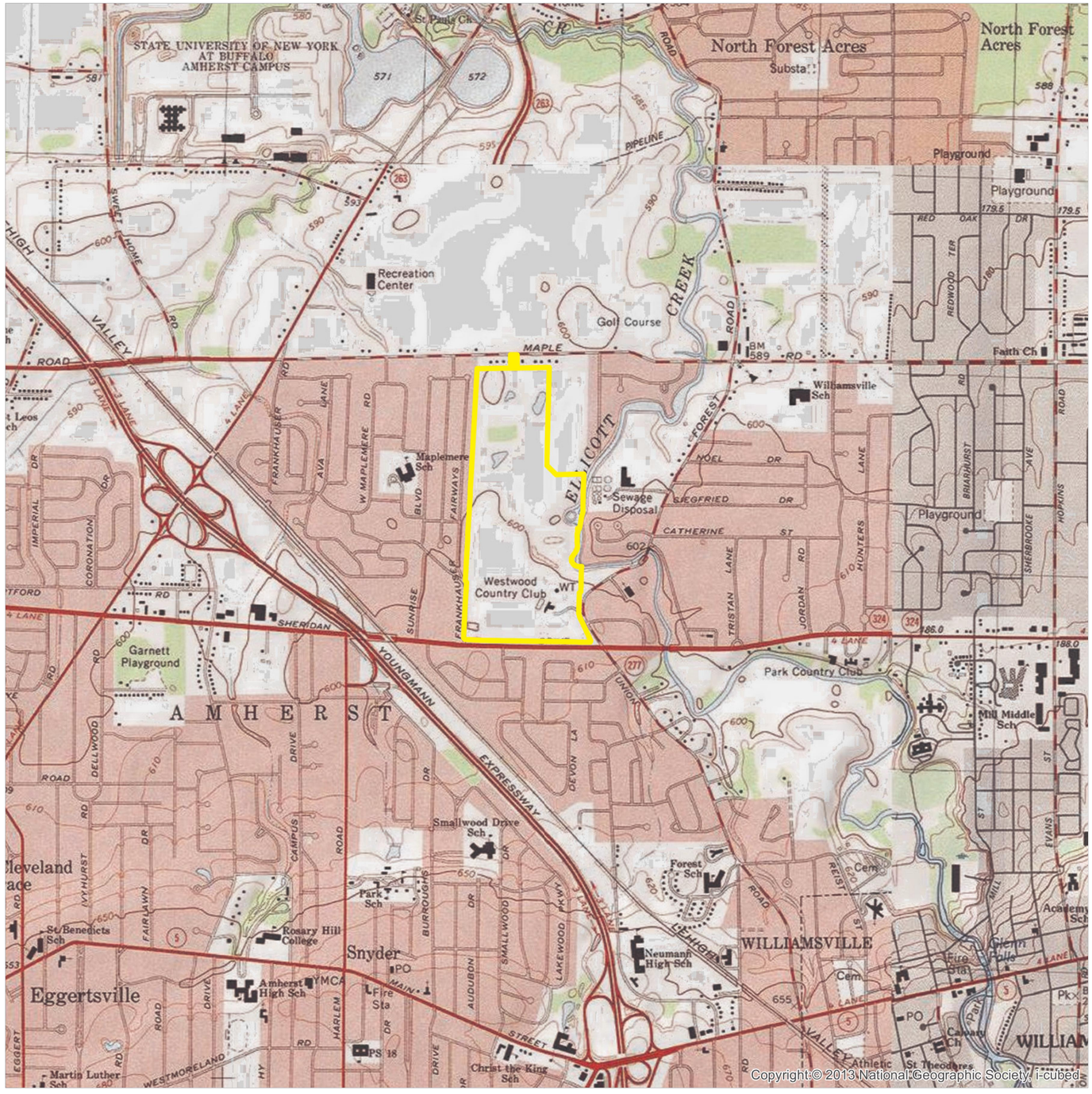
10 SCHEDULE

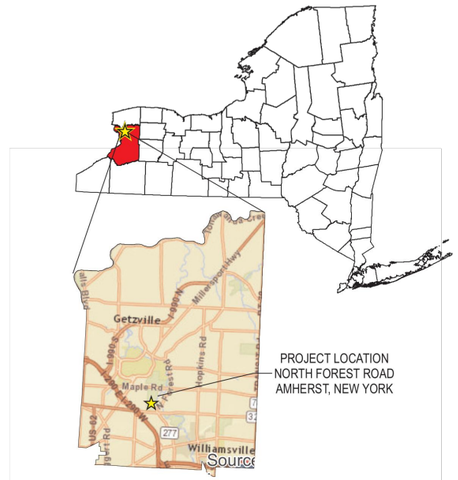
The following schedule presents milestones of the proposed schedule of remedial investigation and remedial action activities for the Site. This schedule is dependent on NYSDEC approvals and does not account for potential delays due to public comments, weather conditions, etc.

Anticipated Date	Milestone
December 8, 2014	Brownfield Cleanup Program Application Submission
February 26, 2015	BCP Acceptance
March 10, 2015	BCA Fully Executed
April 2, 2015	Draft Remedial Investigation Work Plan Submittal

May 15, 2015	Remedial Investigation Work Plan Approved
August 1, 2015	Remedial Investigation Initiated

FIGURES





LEGEND

BROWNFIELD CLEANUP PROGRAM ("BCP") BOUNDARY AND PROJECT LIMITS

0 500 1,000 2,000 4,000 FEET

C&S COMPANIES®
C&S Engineers, Inc.
141 Elm Street.
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454
www.cscos.com

N

WESTWOOD COUNTRY CLUB
BROWNFIELD CLEANUP PROGRAM
REMEDIAL INVESTIGATION
AMHERST, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	O76.001.001
DATE:	FEBRUARY 3, 2015
DRAWN BY:	C. MARTIN
DESIGNED BY:	C. MARTIN
CHECKED BY:	M. COLMERAUER

SITE LOCATION

FIGURE 1

F:\Project\O76 - Mensch Capital Partners\O76001001 - Westwood Sampling\Planning-Study\CADD\Sheet Files\FIGURE 1 SITE LOCATION.dwg

LEGEND

- BROWNFIELD CLEANUP PROGRAM ("BCP") BOUNDARY AND PROPERTY LINE
- 10 — GOLF COURSE HOLE NUMBER
- 600 — ELEVATION CONTOUR (FEET)

NOTES

1) BCP BOUNDARY CREATED FROM PROPERTY BOUNDARY. PROPERTY BOUNDARY PROVIDED IN "A.L.T.A. SURVEY FOR WESTWOOD COUNTRY CLUB," NUSSBAUMER & CLARK, INC., JULY 19, 2005.

2) ELEVATION CONTOURS OBTAINED FROM NEW YORK STATE, ERIE COUNTY LiDAR DATASET, 2008. VERTICAL COORDINATE SYSTEM: NORTH AMERICAN DATUM 1988 (GEOID 03). ORIGINAL DATASET IN METERS CONVERTED TO US SURVEY FEET.

0 50 100 200 400 FEET

F:\Project\O76 - Mensch Capital Partners\O76001001 - Westwood Sampling\Planning-Study\CADD\Sheet Files\FIGURE 2 SITE MAP.dwg

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C&S Engineers, Inc.
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Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454
www.cscos.com

MENSCH Capital Partners, LLC
5477 Main Street
Williamsville NY 14221

WESTWOOD COUNTRY CLUB
BROWNFIELD CLEANUP PROGRAM
REMEDIAL INVESTIGATION

AMHERST, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	O76.001.001
DATE:	FEBRUARY 3, 2015
DRAWN BY:	C. MARTIN
DESIGNED BY:	C. MARTIN
CHECKED BY:	M. COLMERAUER

SITE MAP

FIGURE 2