The electronic version of this file report should have the file name:

Type of document.Spill Number.Year-Month.File *Year-Year* or Report name.pdf

letter._____._____-_____.File spillfile.pdf

report. HW915129 . 2001 - 11-21 . IMMEDIATE .pdf
INVESTIGATION WORK ASSIGNMENT

Project Site numbers will be proceeded by the following:

Municipal Brownfields - b
Superfund - hw
Spills - sp
ERP - e
VCP - v
BCP - c

non-releasable - put .nf.pdf
Example: letter.sp9875693.1998-01.Filespillfile.nf.pdf

New York State Department of Environmental Conservation

Division of Environmental Remediation

OLD LAND RECLAMATION SITE
REGISTRY #915129
CHEEKTOWAGA (T), ERIE COUNTY

IMMEDIATE INVESTIGATION
WORK ASSIGNMENT (IIWA)

November, 21, 2001

New York State
Department of Environmental Conservation
GEORGE E. PATAKI, Governor
ERIN M. CROTTY, Commissioner
GERALD MIKOL, Regional Director

OLD LAND RECLAMATION SITE, (REGISTRY #915129)

CHEEKTOWAGA (T), ERIE COUNTY

IMMEDIATE INVESTIGATION WORK ASSIGNMENT (IIWA)

PROJECT WORK PLAN

November 21, 2001

I. SITE HISTORY

The Old Land Reclamation Site (the Site) is located in the Town of Cheektowaga in Erie County. New York (see Figure 1). Due to some citizen complaints regarding the nearby Buffalo Crushed Stone (BCS) quarry, followed by inquiries into the history and operation of the Schultz . Land Reclamation and the Old Land Reclamation landfills, the Site has been under recent review by the Division of Environmental Remediation (DER). The DEC's Division of Solid and Hazardous Materials (DSHM) has been responsive to this issue also, as the Schultz and Land Reclamation landfills have been reviewed under their program's authority. DER has been involved in past investigations of the Old Land Reclamation Site (see Registry Report, attached) and has been monitoring leachate seeps and groundwater quality at this site in recent years. Health concerns of local residents were brought to the New York State Department of Health's attention as well. Due to Public concerns over unknown exposure risks arising from potentially contaminated groundwater in bedrock near the proximal landfills, the DEC is prepared to undertake this IIWA to install monitoring wells (MWs) that may be used to evaluate groundwater quality in bedrock on the Southern side of Cayuga Creek, and at the Southern side of the Site, North of Cayuga Creek. Overburden wells are proposed as well, to evaluate groundwater which is expected to be present in soils above the bedrock at the Southern side of the Site. Sediment samples from a ditch along the joint border of the Land Reclamation and the Old Reclamation Sites will be taken to investigate allegations that contaminants are present in this drainage pathway. Additional samples may be taken from the bottom of a ditch along the Eastern side of the Old Land Reclamation Site to assess sediment quality. Leachate samples will be collected from the exposed face of the landfill as identified and analyzed for parameters consistent with those chosen for Groundwater samples

.

II. SITE DESCRIPTION

The Site exists East of the BCS quarry and the Schultz and Land Reclamation landfills, and is bordered by Broadway on the North, two (2) commercial properties to the East, Cayuga Creek on the South Side and an abandoned railway along the West. (See Figure 2). Three (3) bedrock wells and one (1) overburden well currently exist on the Site, but the northernmost bedrock well was found to be obstructed during a February 2001 groundwater sampling event conducted by the NYSDEC. Although groundwater monitoring wells exist along the Southern boundaries of the other two landfills, none are known to exist on the South side of Cayuga Creek. It should be noted that bedrock is shallow and is readily exposed along the Creek's bed, often rising above the water level in the Creek. Most residences are built above the Creek's flood plain which is fairly wide on either side of the creek south of where the landfills are sited. Terrain is flat in the flood plain areas and is densely foliated with tree and shrub growth. Access to this area is difficult at best for heavy equipment and would require extensive clearing and grubbing, if not actual roadbed construction, to accommodate vehicular access.

III. OBJECTIVES OF THE INVESTIGATION

The objectives of this IIWA project are:

- Define and evaluate groundwater quality in the bedrock aquifer at south side of Cayuga Creek.

- Define and evaluate groundwater quality in the overburden aquifer and in bedrock aquifer at south side of Old Land Reclamation Site.

- Plot Groundwater flow direction.

- Define and evaluate sediment quality in ditches along the Western and Eastern edges of the Old Land Reclamation Site.

- Locate and evaluate leachate seeps for potential impacts to Cayuga Creek.

IV. SCOPE OF WORK.

This IIWA consists of primarily five separate elements. These elements are: Site Stakeout and Utility Location, Sub-surface Soil Sample screening and collection (continuous Split-Spoon sampling during monitoring well construction), Monitoring Well Installation, Groundwater Sampling Element, Ditch Sediment and Leachate Sampling . The primary focus of the IIWA project is to determine if bedrock groundwater has been contaminated by documented landfill constituents. To attain this information the Standby Work Assignment Contractor (SWAC) or their subcontractor will install and develop up to three - 2" diameter groundwater monitoring wells into the overburden aquifer (if present) above the bedrock, and up to five - 2"diameter groundwater monitoring wells into the bedrock aquifer, all at a final depth to be determined in the field by NYSDEC personnel. All bedrock-well borings and installations will include continuous split-spoon sampling for soil evaluation and analysis. In addition, up to four discreet samples will be taken from the ditch bottom along the Western edge and up to four will be taken from the ditch bottom along the Eastern edge of the Old Land Reclamation Site by NYSDEC personnel. Leachate samples may be taken (by NYSDEC staff) from leachate seeps along the landfill face that are located during this work assignment. All sample bottles and laboratory analyses will be provided by NYSDEC. All data interpretations associated with this program (and its elements) will be conducted using NYSDEC equipment and staff. Due to the possible presence of Hazardous Wastes, personnel for the SWAC and any subcontractors involved with intrusive work will be OSHA 40 Hour trained for Hazardous Site Work and will adhere to appropriate Health and Safety practices.

Site Stakeout and Utility Location

Prior to initiation of off-site work, the Department will obtain access to properties adjacent to the noted sites, as needed. Prior to any work initiation, the Department will meet with the SWAC at the Site for a walkover to review Site conditions and potential Monitoring Well locations. At least 5 days prior to the start of the intrusive work, the SWAC will contact affected property owners prior to site entry and

arrange for delineation of all underground utilities in work areas. As at least two of the bedrock well locations will be in the subdivision area South of Cayuga Creek, it is required that monitoring well location (pavement or lawn) and work hours be set to minimize impact to residents.

Subsurface Soil Sampling Element

Subsurface soil materials will be collected during the advance of split-spoon sampling equipment during the bedrock monitoring well installations. Subsurface soil sampling will follow the procedures described in section 4.6.4.1 of the attached "New York State Department of Environmental Conservation, Superfund Standby Contract, Program Quality Assurance Project Plan, Contract no. D002472, April 1994, ABB Environmental Services". Split-spoon samplers will be adequately decontaminated between each sample to insure proper sample isolation. The extracted subsurface soil materials will be described and logged with respect to their geologic character, features, and properties. The extracted subsurface soil materials will be screened visually for signs of obvious contamination. Additionally the materials will be screened for the presence of volatile organic chemicals (VOCs) with a calibrated flame-ionization or photo-ionization instrument that has been equipped with an 11.7 eV bulb-tip. All or some part of any subsurface soil interval extracted from a specific monitoring point may be collected as a subsurface soil sample for chemical analysis at the discretion of the NYSDEC representative. Up to fifty (50) (maximum) subsurface soil samples may be collected for chemical analysis during this IIWA project . Selected samples will be analyzed for total VOCs (Volatile Organic Compounds), TAL metals, Pesticides and PCBs, and/or SVOCs (Semi-Volatile Organic Compounds) as determined by the NYSDEC representative. The SWAC will provide all equipment necessary for the collection of the samples, except for that which the NYSDEC will provide (e.g.: glass sample bottles and coolers). The number of subsurface soil samples collected for chemical analysis from any one monitoring point is at the discretion of the NYSDEC representative. The selection of subsurface soil materials for submission as a subsurface soil sample will be made at the discretion of the NYSDEC representative and based upon:

a.) subsurface soil materials that show visual signs of contamination;

b.) subsurface soil materials that cause a sustained response above the measured background response on a calibrated flame or photo ionization screening instrument;

c.) pre-determined sampling depth or;

d.) a combination of these situations.

After the subsurface soil materials from a particular interval have been described/logged/screened and all subsurface soil samples have been collected for chemical analysis (as applicable), the remaining subsurface soil materials may be discarded at the direction/discretion of the NYSDEC representative. If any of the remaining subsurface soil materials show visual signs of contamination, cause a sustained response above the measured background response on a calibrated flame or photo-ionization screening instrument, display hazardous waste characteristics (by lab analysis), or a combination of these situations, those materials should be retained for proper disposal *to be provided by the SWAC*.

The sampling program and its associated elements will be accomplished with the assistance of the designated Standby Work Assignment Contractor and approved subcontractors as applicable and appropriate. Details of the work distribution for this program are presented in the 'Notice to Proceed' letter issued for this IIWA project unless otherwise specified. Note that all data interpretations associated with this program (and its elements) will be conducted using NYSDEC equipment and staff.

Groundwater Monitoring Well Installation

A total of up to five (5) soil borings will be completed as bedrock monitoring wells, two of which are to be located on Town of Cheektowaga property to be determined by the NYSDEC representative and the SWAC in a pre-work Site walk over. The remaining three (3) bedrock monitoring wells are to be sited on the Southern side of the Old Land Reclamation Site. The three (3) overburden monitoring wells are to be installed either alone or as part of a couplet with the bedrock wells installed on the Old Land Reclamation Site. If part of a couplet, split-spoon sampling will not be required of the second well installation of the pair. Soil borings will be completed using appropriate well drilling equipment to properly install a bedrock-aquifer monitoring well. "Telescopic" well installation (w/ appropriate casing) may be required to insure that contaminants in the soil above the bedrock interface do not migrate into any bedrock-aquifers which may not have been contaminated. The soil borings/ bedrock corings at the selected monitoring well locations will be completed with a riser cover (or a flush-mount casing to be used in pavement/ lawn locations) with locking covers by the SWAC or their subcontractor under the supervision of the SWAC geologist. The exact depth of the remaining wells will be determined by information provided by the initial well installation. In any case, these well installations will extend to competent bedrock, with the exact depth and screened interval dependent on the water table and bedrock stratigraphy. The total depth of these wells will not exceed competent bedrock. Prior to constructing these wells, the boreholes will be allowed to stabilize for a limited time to confirm the presence of water and to allow the water to equilibrate. The monitoring well will be constructed using 2-inch ID threaded, flush-joint, Schedule 40 PVC, with appropriate lengths of 0.010-inch machine slotted well screens. The well screen will be placed to intercept groundwater. It is anticipated that these wells be screened from the initial bedrock layer to the point of competent bedrock. Well installation may also be made to intercept possible overburden groundwater that may be encountered above the bedrock. The overburden well installations may require minor coring (approximately one foot) into the top of the initial bedrock layer to provide a sump for interface groundwater collection. All final screen placements are to be determined by the NYSDEC representative.

The monitoring well installation and development will follow the procedures described in section 4.7 of the attached "New York State Department of Environmental Conservation, Superfund Standby Contract, Program Quality Assurance Project Plan, Contract no. D002472, April 1994, ABB Environmental Services". "ASTM Method D5092-90" and "ASTM Method D5784-95" are also to be referenced as common-practice guidance. All wells will be finished as riser-cased wells (except for flush-mounted casings in pavement locations) with appropriate, locking protective covers. All boring logs will be completed by the SWAC geologist. These logs, as well as any field notes, will be a deliverable quantity of this work assignment. All disturbed areas will be returned to pre-site conditions. Any damage to off-site property or on-site property as deemed necessary by the NYSDEC representative will be corrected at the expense of and by the SWAC. All provisions for drilling water and drilling wastewater collection and disposal is to be arranged at the SWAC's (or their subcontractor's) expense. If monitoring well development water disposal is required, the SWAC will arrange for appropriate transportation and disposal.

All work involving the monitoring well installation will adhere to health and safety procedures for well installations in accordance with the generic health and safety standards established by the Standby Work Assignment Contractor.

Groundwater Sampling Element

At a minimum, a single groundwater sample will be collected for chemical analysis from each of the groundwater monitoring wells installed during this IIWA project in order to monitor the water quality within the appropriate aquifers. Prior to sampling, the SWAC will measure the static water level with reference to the ground surface and well casing, and record it along with the time and date for future use in the generation of a groundwater map.

The SWAC will then purge groundwater from the installed monitoring point until the pH, specific conductivity, temperature, and turbidity of the extracted water have stabilized (IE: parameters are consistent during successive volumes purged). All parameters measured during this process will be recorded along with the time, date, and volume of water extracted. Development and purge waters will be collected into DOT shippable drums with appropriate disposal to be arranged by the SWAC as necessary. Once the given parameters have stabilized (at the discretion of the NYSDEC representative), a portion of the groundwater will be collected for chemical analysis by the NYSDEC representative . Each of the samples will be analyzed for TAL metals and cyanide, semi-volatile organic compounds (B/N/As), volatile organic compounds, pesticides/ PCBs and total petroleum hydrocarbons in accordance with their respective EPA methods. All groundwater samples collected during this IIWA project will be analyzed by a NYS DOH ELAP certified laboratory selected by the NYSDEC representative. All sample bottles and laboratory analyses will be provided by the NYSDEC. All data interpretations associated with this program (and its elements) will be conducted using NYSDEC equipment and staff.

After the applicable groundwater sample collection is complete and all down-probe measurements have been made and recorded, all retrievable equipment will be removed from the monitoring point and either discarded or cleaned, as appropriate, using approved methods.

Sediment/ Leachate Sampling Element

Sediment sampling at the Western and Eastern property lines of Old Land Reclamation will serve a two-fold purpose. 1) To attempt to replicate the sampling of purported areas of contamination in the Western ditch which have been reported to the NYSDEC, and 2) To examine sediment quality in locations along the two ditches that have not previously been sampled. Observation of ditch flow will give the best indication as to where sedimentation is occurring and provide the best point for sampling. Sample locations, depths and number collected will be determined by NYSDEC outside of the IIWA work prescribed to the SWAC or their subcontractors. All proposed sediment samples will be taken from 0"-3" depth using new plastic sampling scoops or a stainless-steel bucket auger that will be appropriately decontaminated prior to and between each use. Samples will be submitted for VOCs, SVOCs, TAL metals/cyanides and pesticides/ PCBs analyses. Additional augering to a depth of 2'-3' may be attempted to ascertain underlying stratigraphy and observe any potential areas of differing contamination levels, if any. Additional samples will be taken at the NYSDEC representative's discretion.

Leachate samples will, likewise at the NYSDEC representative's discretion, be selected by visual observation of seeps from the landfill face that are relevant to potential contaminant releases. Samples will be analyzed for the same parameters selected for the groundwater sampling element of this IIWA.

Figure 1
Old Land Reclamation - IIWA
Scope of Work
Project Location

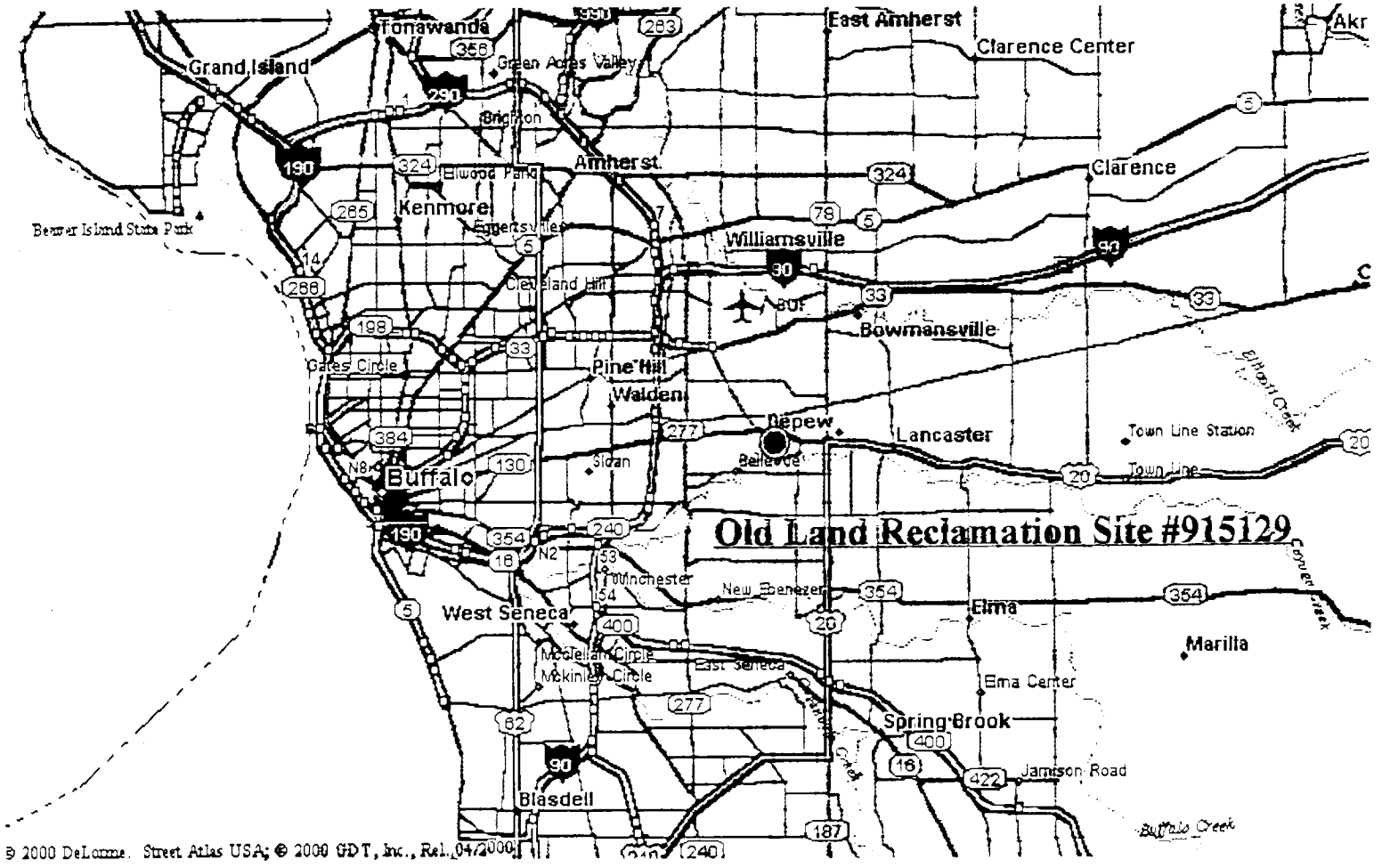
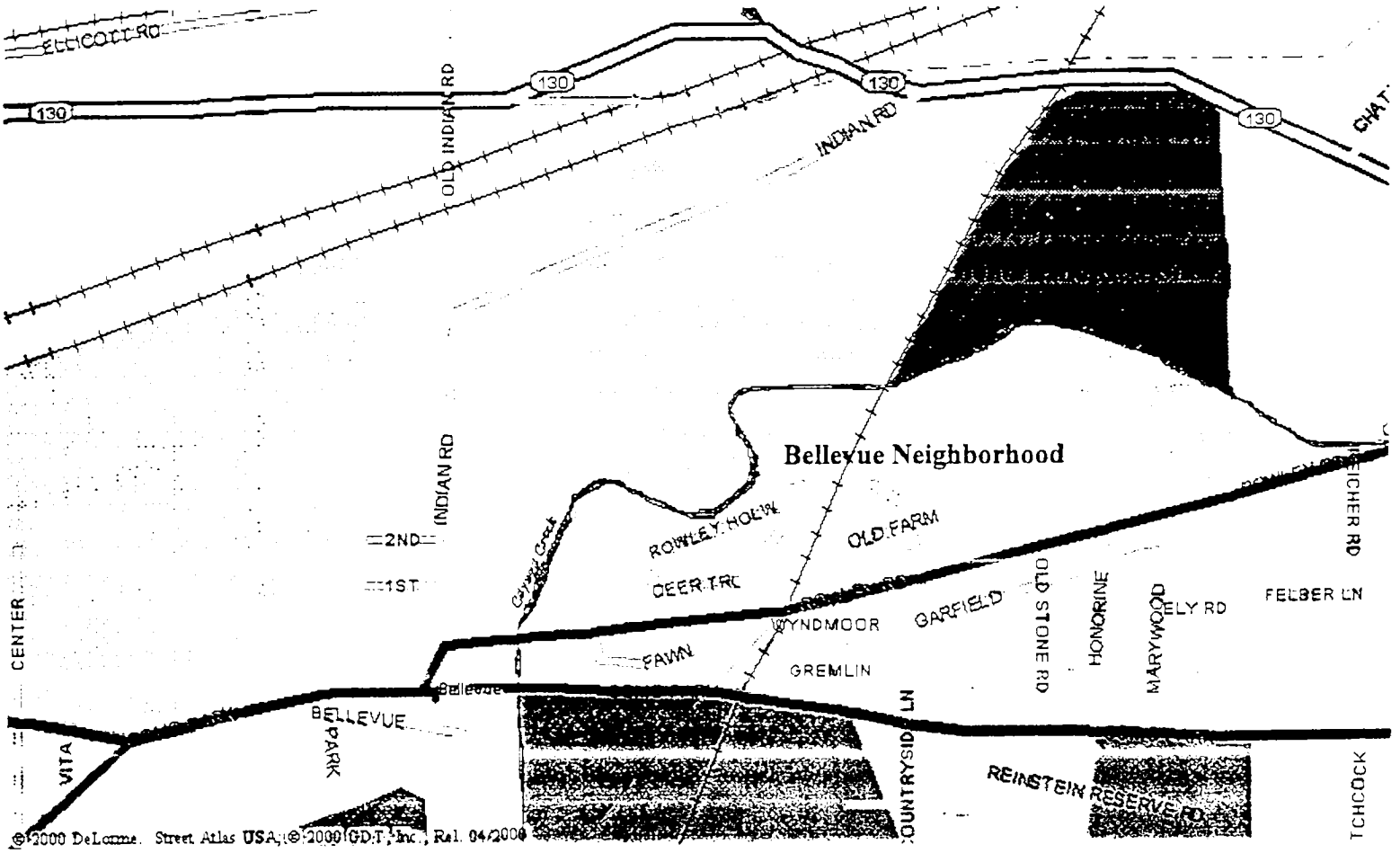
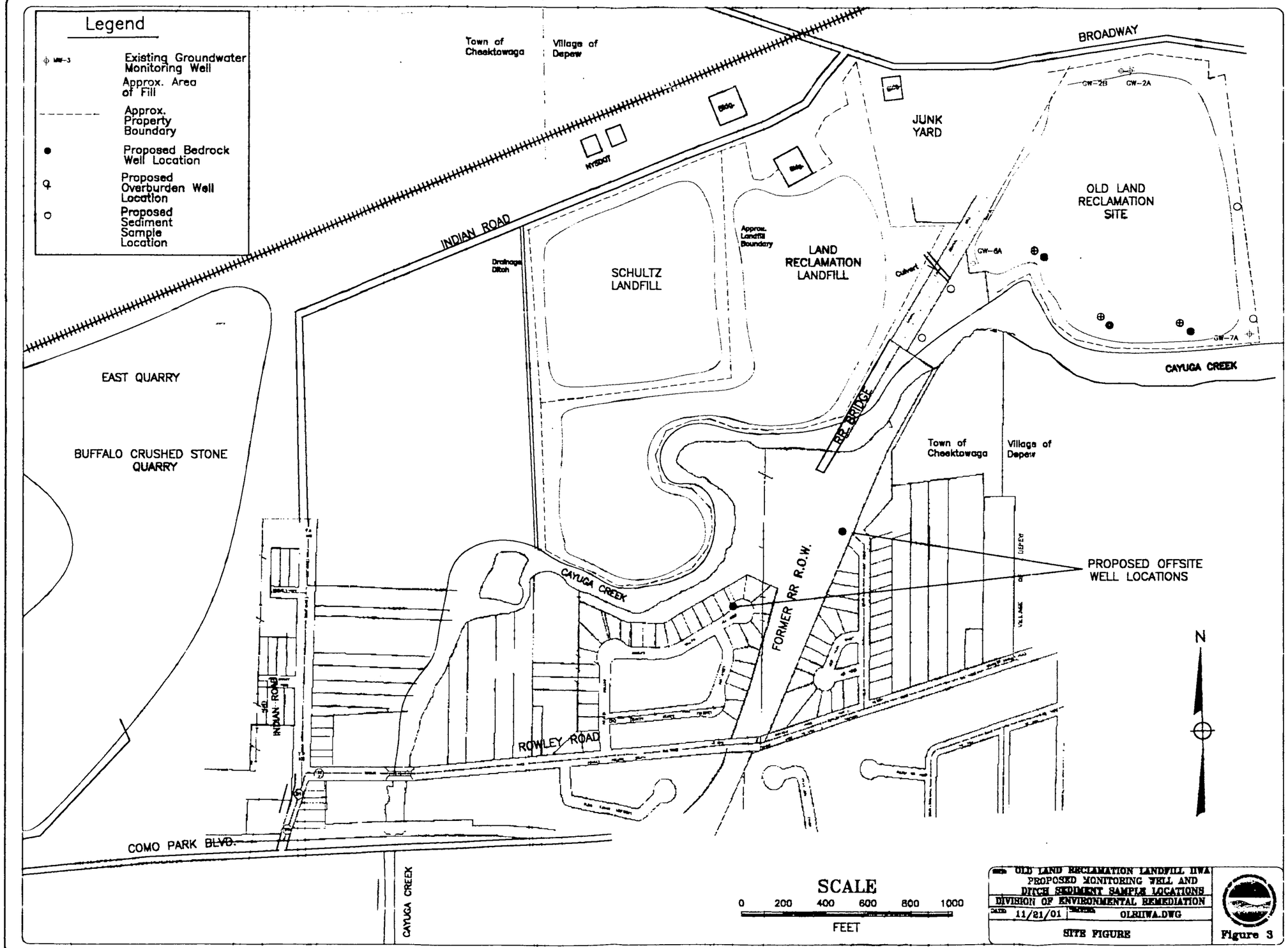


Figure 2
Old Land Reclamation - IIWA
Scope of Work
Site Map




Legend
MW-3
Existing Groundwater Monitoring Well
Approx. Area of Fill
Approx. Property Boundary
Proposed Bedrock Well Location
Proposed Overburden Well Location
Proposed Sediment Sample Location
Town of Cheektowaga
Village of Depew
BROADWAY
JUNK YARD
GW-2B
GW-2A
OLD LAND RECLAMATION SITE
INDIAN ROAD
Drainage Ditch
SCHULTZ LANDFILL
Approx. Landfill Boundary
LAND RECLAMATION LANDFILL
GW-6A
Culvert
GW-7A
CAYUGA CREEK
EAST QUARRY
BUFFALO CRUSHED STONE QUARRY
RR BRIDGE
Town of Cheektowaga
Village of Depew
PROPOSED OFFSITE WELL LOCATIONS
CAYUGA CREEK
FORMER RR R.O.W.
ROWLEY ROAD
INDIAN ROAD
COMO PARK BLVD.
CAYUGA CREEK
N
SCALE
0 200 400 600 800 1000
FEET
OLD LAND RECLAMATION LANDFILL IIWA
PROPOSED MONITORING WELL AND DITCH SEDIMENT SAMPLE LOCATIONS
DIVISION OF ENVIRONMENTAL REMEDIATION
DATE 11/21/01
OLRIIWA.DWG
SITE FIGURE
Figure 3

Attachments

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SUPERFUND STANDBY CONTRACT

PROGRAM QUALITY ASSURANCE PROJECT PLAN

CONTRACT NO. D002472

APRIL 1994

ABB Environmental Services

- sample type and depth
- soil description (using Unified Soil Classification System [USCS] (ASTM-D-2488-84) and ABB-ES' soil description procedures in Appendix A)
- date and time of sampling
- project and sample designations
- sampler identification
- analyses requested

For laboratory samples, the sampler must initiate COC procedures and describe the sample site in adequate detail to allow the analytical results to be properly interpreted and, if necessary, to allow collection of additional samples from the same sample location. ABB-ES uses preprinted labels, and standardized record forms to expedite this process and ensure uniformity of records. The sampling protocols and recordkeeping requirements for the types of samples described in the following pages vary according to the sampling techniques. Additional requirements may also be established on a site-specific basis. The entire soil sampling process should be designed and conducted in a manner that provides properly documented samples suitable for the intended analyses.

4.6.4.1 Soil Boring Sampling. Sampling from soil borings provides soil samples suitable for chemical analysis from depths greater than 5 feet below ground surface. Borings are advanced using a variety of methods including HSA, drive-and-wash casing, or spun-and-wash casing methods. The boring method chosen is based on subsurface conditions and the selected method is presented in the Work Plan considerations in selecting a drilling method include the technical ability of a method to achieve the projected drilling depth in the materials to be drilled; whether telescoping through contaminated zones might be required; whether rock coring is also to be performed in that boring; availability of water; and cost. ABB-ES prepares detailed drilling specifications governing the drilling subcontractor's efforts. These specifications are modified on a site-specific basis to reflect the needs of each project.

Description of Drilling Methods. One of the most commonly used drilling methods is the HSA method, which utilizes coupled lengths of continuous flight augers to bring cuttings upward as the auger string is rotated and advanced into the ground. ABB-ES routinely specifies 4.25-inch ID HSA drilling at sites where overburden is composed of sand or silt, and cobbles, boulders, or rubble are not expected to be encountered. The hollow-stem allows for collection ahead of the augers using a split-spoon sampler or other device, and is large enough for installation of 2-inch ID monitoring wells inside the annular space of the casing. Auger sections are usually 5 feet in length and are attached directly to each other with bolts or with bolted collars. During drilling, the open end of the auger can be blocked as it advances to prevent soil from entering the hollow stem. No drilling fluids are used under normal circumstances. More commonly, the soil is allowed to pack into the open end a few inches. After the auger is advanced to the desired sampling level, the sampling tool is inserted through the hollow stem and driven. HSA drilling is not compatible with rock coring.

In washed casing methods (driven or spun), the boring is advanced by first driving or spinning the casing (smooth sided, threaded, flush joint pipe) into the soil to the desired depth and then clearing out to a maximum depth of three inches below the bottom of the casing using a rollerbit and rod through which water is pumped as the bit is advanced. Where driven casing is used, the lead casing is equipped with a bit called the drive shoe. Spun casing uses a spin shoe. ABB-ES commonly specifies 4-inch ID washed casing in tight, heavy soils such as clay, soil containing cobbles, boulders, or rubble through which augers could not be advanced, or in borings that are planned to be advanced through the overburden into bedrock.

Driven casing is advanced using the blows of a 300-pound hammer falling 24-inches. Hammer blows are recorded for each 12 inches of penetration. In cohesive soils, the inner bit may be advanced further than 3-inches ahead of the casing, and then the casing advanced. During washing of the casing and advance of the roller bit and rod, water will not be recirculated (to prevent cross-contamination) unless specified in the Work Plan. Disposal of the wash water and soil cuttings will be specified in the Work Plan. As washed borings are advanced, special care shall be taken to note and record the depth where drilling fluid is lost if this occurs, the depth of an apparent change in soil type, consistency, or color, as can be detected practically while advancing the boring, or other details about the progress of the boring.

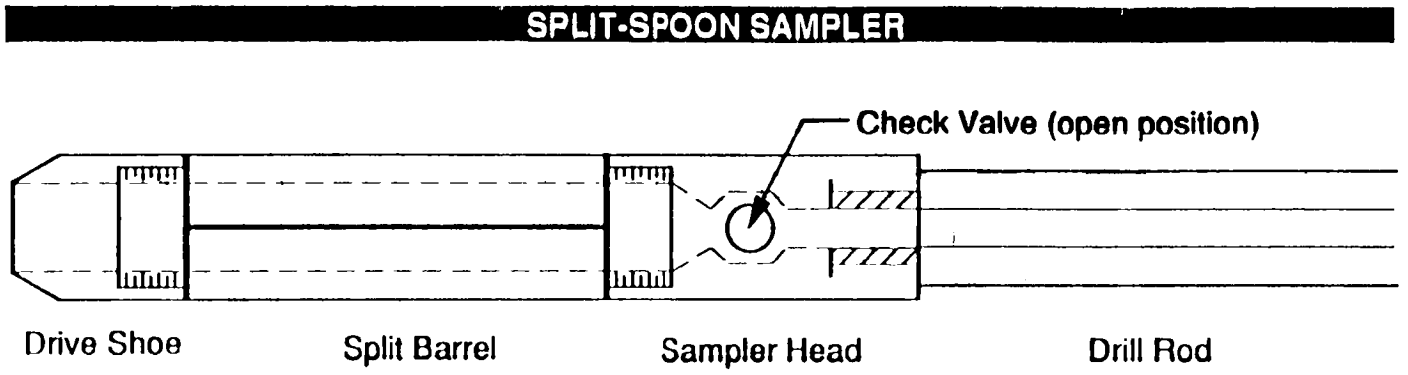
Other types of drilling methods to be considered include use of the TerraProbe® (see Subsection 4.6.5) for shallow boreholes (to 25 feet bgs), Air Rotary, Air Hammer, and Dual-Walled Methods. If these are specified for a site, the drilling procedure will be summarized in the site-specific Work Plan. When drilling and installing a well in a confined aquifer, proper techniques must be employed to avoid cross-contamination between aquifers. Under most conditions, this is accomplished using double-cased borings. This technique involves drilling a large diameter boring through the upper aquifer and 1 to 3 feet into the underlying confining layer, and if required, pressure grouting the large diameter casing into the confining layer. A smaller diameter boring is then advanced inside the large diameter casing through the confining layer for installation of the monitoring well into the lower aquifer. A minimum period of 24 hours shall be allowed to set up the grout before drilling through the confining layer.

Split-spoon Soil Sampling. Soil boring samples are taken from undisturbed soil at the bottom of the boring with a split-spoon sampler. This sampler consists of a split steel tube or sample barrel threaded at both ends. A sharpened drive shoe secures the bottom of the barrel and an adaptor secures the top. The adaptor is threaded to connect directly to the drill rods and contains a check valve (Figure 4-4). The split-spoon is driven into undisturbed soil below the casing using the standard penetration test (ASTM-D-1586-84) (Figure 4-5). The standard penetration test consists of driving a 1⅜-inch ID, 2-foot split spoon 18 inches into the soil at the end of the drilling rods using a 150-pound hammer dropped 30-inches. Blows per foot are recorded as a SPT-N value defined as total blows for the penetration from 6 to 18 inches. If the split-spoon is to be driven greater than 18 inches, or will be larger than 1⅜-inch ID, this will be specified in the Work Plan.

After the sampler has been driven, it is withdrawn from the borehole and the sampler is opened by removing the drive shoe and adaptor.

The field geologist will take custody of the sampling device as soon as it is withdrawn from the borehole. The sample will be collected and documented in the field logbook and on the boring log (Figure 4-6) employing the procedures as outlined below.

1. Scan the soil with a PI meter and record any measurements.



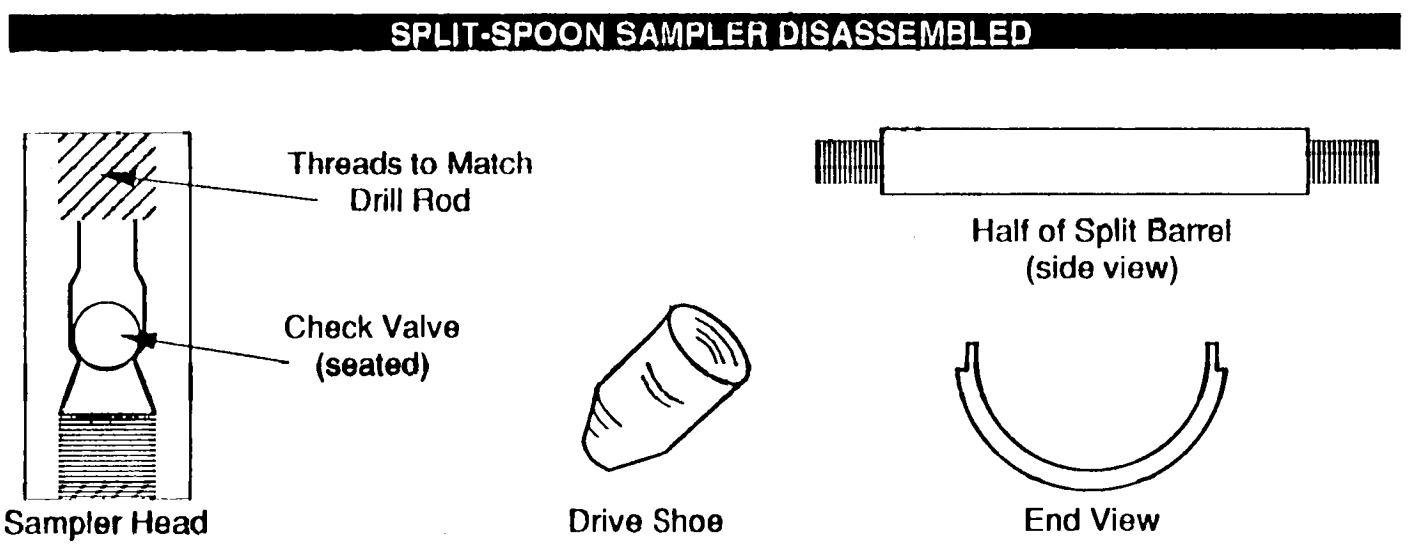


FIGURE 4-4
SPLIT SPOON SAMPLER
NYSDEC PROGRAM QUALITY ASSURANCE PROJECT PLAN

NOT TO SCALE

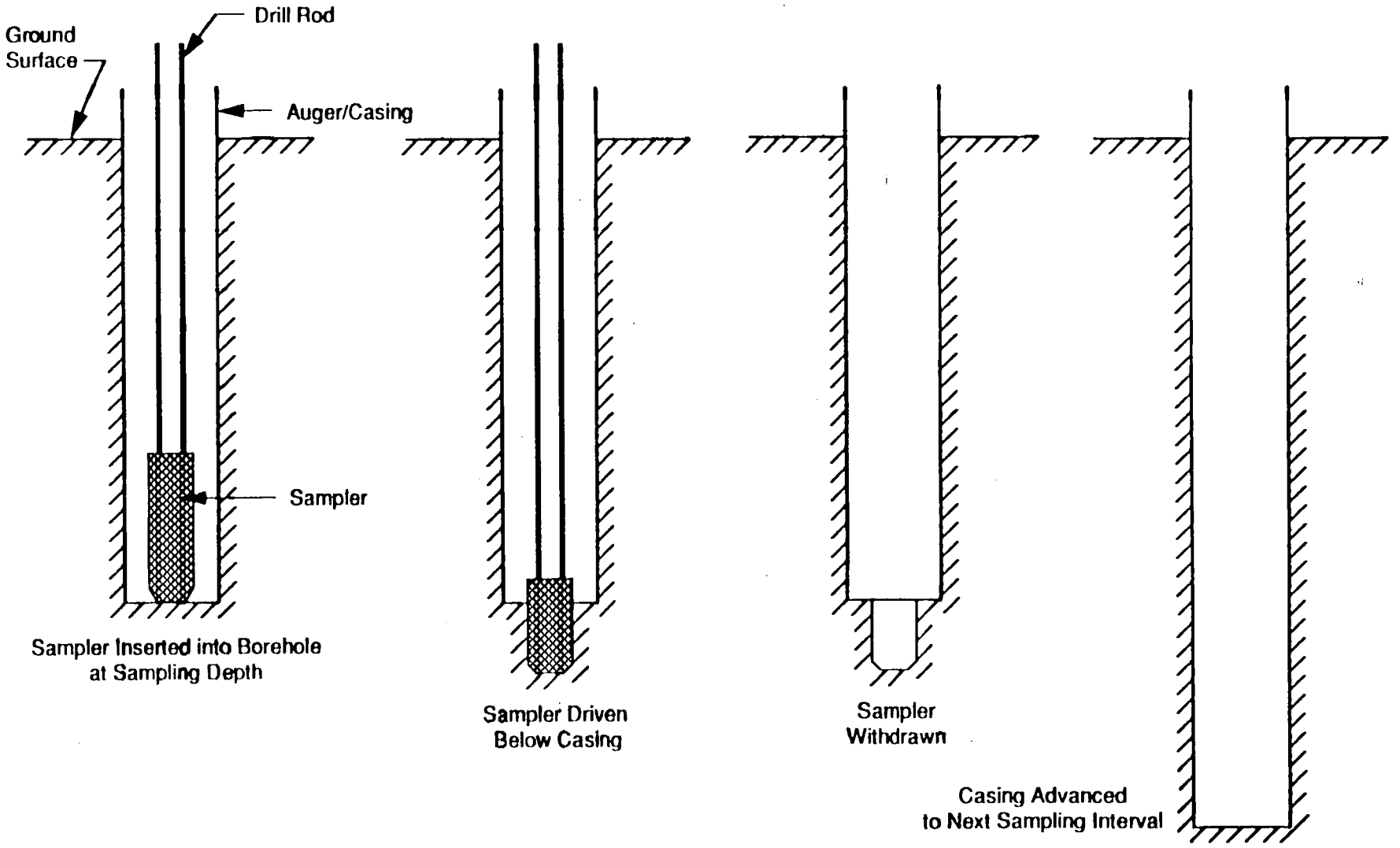


FIGURE 4-5
STEPS IN SAMPLING A TEST BORING
NYSDEC PROGRAM QUALITY ASSURANCE PROJECT PLAN

9404014D(P)

Test Boring Log

Project		Boring/Well No.	Project No.
Client **NYSDEC**	Site		Sheet No. _____ of _____
Logged By	Ground Elevation	Start Date	Finish Date
Drilling Contractor	Driller's Name		Rig Type
Drilling Method	Protection Level	P.I.D. (eV)	Casing Size / Auger Size
Soil Drilled / Rock Drilled	Total Depth	Depth to Groundwater/Date	Piez ☐ Well ☐ Boring ☐

Depth(Feet)	Sample No. & Penetration/ Recovery (Feet)	Sample Type	SPT Blows/6" or Core Rec./Rqd. %	SPT-N (Blows/Ft.)	Graphic Log	Sample Description	USCS Group Symbol	Notes on Drilling	Monitoring (ppm): PI Meter Field Scan	PI Meter Head Space		Lab Tests

FIGURE 4-6
TYPICAL TEST BORING LOG
NYSDEC PROGRAM QUALITY ASSURANCE PROJECT PLAN

2. Remove the portion(s) of the sample selected for chemical analysis and place into appropriate containers using a clean spatula. Soil intended for VOC analysis should be placed in the appropriate wide-mouth glass jar and capped as quickly as possible. The containers should be filled as near to capacity as practicable to minimize volatilization of the sample into the container headspace. Soil intended for other types of analyses should be placed in appropriate containers and capped.

3. Visually examine the sample and record its characteristics (e.g., texture, color, consistency, moisture content, layering and other pertinent data), and classify using the Unified Soil Classification System (ASTM-D-2488-84) summarized in Appendix A.

4. Place the remainder of the sample in an 8- or 16-oz reference jar. This sample portion will be used for headspace PI meter measurement and for any physical materials testing that is required.

5. Discard any excessively disturbed or loose material found in the sampler which may not be representative of the interval sampled. This material will be discarded in the same manner as the boring spoils at each boring location.

6. Decontaminate the sampling device in accordance with the procedure specified in Subsection 4.3.

In some instances, there may be no analytical samples collected from a given boring. In these instances, steps 2 and 3 of the procedure listed above are omitted and the sample is placed in one or more reference jars. A grain-size analysis of Atterberg limits will be conducted for each lithologic unit encountered, as well as for the screened interval of borings completed as monitoring wells (NYSDEC TAGM 4007).

Immediately after the samples are collected, all labeled vials and jars are checked for completeness of the sampling objective and COC procedures are initiated. The boring log is also updated by the geologist. Boring logs may be completed by the driller, but for purposes of completeness and documentation a separate boring log is also compiled by the ABB-ES geologist. The boring log includes

interpretations of subsurface materials and conditions encountered, sample locations, PID meter readings, and other notes pertinent to how the boring was conducted or conditions encountered during sampling such as staining, odor, etc. The geologist's boring log will be completed in a site field logbook and on a boring log form (Figure 4-6).

The sampler must exercise considerable care while collecting samples for analysis. Some methods for sample collection are described below.

1. Obtain samples from undisturbed soil below the casing or auger. This is accomplished by monitoring or checking the drill crew's measurements, observing the sampling process and examining the sample once it is retrieved.

2. Carefully remove and discard portions of the sample that are suspected to be contaminated by contact with the casing, auger, or drilling fluids.

3. Conserve sample volume since under certain soil conditions it may be difficult or impossible to achieve good sample recovery with split-spoons.

Procedures employed to minimize cross-contamination during test boring sampling operations include the following:

- Samples are taken immediately after the boring is advanced to the desired sampling depth.

- The sampling tools are decontaminated prior to taking each sample.

- The drilling contractor is not permitted to use oil, grease or other petroleum based lubricants on the drill rods, casing or sampling tools. Use of any other lubricants will be documented.

- The drilling technique and procedures to be utilized, particularly the use of drilling fluids, are carefully evaluated for each site.

PI meter should be recorded. A description of the drum contents should be recorded (color, consistency, etc.).

Solids can be sampled from the drums using several methods: a bucket auger, hand auger, or hand scoop. As the drums to be sampled are open to the atmosphere, all of these methods can be used. When the drum has been sampled, all sampling equipment should be decontaminated as described in the site-specific HASP.

4.7 MONITORING WELL/PIEZOMETER INSTALLATION

The objectives for each monitoring well and/or piezometer may vary from site to site and from well to well. The objectives will be clearly defined in the Work Plan before the monitoring system is designed. Monitoring wells serving different purposes require different types of construction. The objectives for installing monitoring wells may include:

- determining groundwater flow direction and velocity
- sampling or monitoring for contaminants
- determining aquifer characteristics (e.g., hydraulic conductivity testing)
- performing site remediation (e.g., injection or recovery wells)

In cases where only groundwater flow or velocities are to be determined, piezometers, cluster wells, or well points may be used.

Well Materials. Well riser pipe materials are specified by diameter, type of materials, and thickness of pipe. Well screens require an additional specification of slot size. Well specifications are presented in the Work Plan and/or site-specific QAPP.

The selection of well material depends on the method of drilling, the type of contamination expected, natural water quality, and anticipated depth. The cost may also be a consideration. The two most-commonly used materials are polyvinyl chloride (PVC) and stainless steel. PVC is generally preferred to stainless steel because it is light-weight, less expensive, non-corrosive, and generally easier to work with. However, PVC may deteriorate in the presence of

ketones, aromatics, alkyl sulfides, and some chlorinated hydrocarbons. In such cases stainless steel may be preferred.

When the aquifer is bedrock, a well screen may not be necessary (the well is simply an open hole in bedrock). Unconsolidated materials such as sands, clay, and silts, require a well screen. The screen slot size should be selected to retain 90 percent of the filter pack material or in situ aquifer material, after development (Driscoll, 1989). The gradation of the filter pack material will be selected based on the gradation of the native soils within the screened interval. A screen slot size of 0.010-inches is generally used when a screen is necessary and site conditions are not known.

The thickness of pipe depends on the strength required for the well. In general, larger diameter pipe requires greater thickness to maintain adequate strength. Similarly, driven well points require greater strength, and therefore greater thickness, than wells installed inside drilled borings.

Well Design. The well depth and diameter are tailored to the specific monitoring needs of each site and generally depends on the purpose of the monitoring system and the geologic setting. The decision concerning the depth of placement and length of the well screen is based on the following information:

- aquifer depth, thickness, and characteristics (e.g., permeability and specific yield)
- anticipated depth, thickness, and characteristics (e.g., density relative to water) of the contaminant plume
- head distribution and estimated flow in the aquifer
- fluctuation in groundwater levels

In most situations, screen lengths are 5 to 10 feet.

Standard well inside diameters are 2, 4, 6, or 8 inches. For most groundwater monitoring and sampling programs, a 2-inch ID well is preferred. Pumping tests for determining aquifer characteristics may require larger diameter wells; however, in situ hydraulic conductivity testing can be performed during drilling or after well installation in small diameter wells. Other considerations in selecting well diameters include the types and size of the sampling equipment, and any in situ instrumentation that may be used in the well.

In general, the borehole diameter should be at least 4 inches larger than the well riser pipe diameter to provide an annular space of at least 2 inches for placement of filter pack, seal, and grout or backfill.

Well Installation. Monitoring well installation details will be recorded in the field geologists' notebook and on an overburden or bedrock Monitoring Well Sheet (Figures 4-11 and 4-12).

Materials placed in the annular space between the borehole and the riser include filter pack, bentonite seal, and grout. In general, all of these materials may be installed via a tremie pipe placed in the annular space. In shallow wells, these materials may be emplaced from the ground surface, but the rationale and procedures must be described in the site-specific Work Plan and/or site-specific QAPjP.

The filter pack is usually a fine to medium uniform sand. The exact filter pack gradation should be chosen to retain approximately 60 percent of the aquifer material after well development (Driscoll, 1989). The filter pack is installed around the well screen and extending 2 to 3 feet above the top of the screen. At least 2 feet of bentonite pellets will be placed above the filter pack.

The bentonite expands by absorbing water and serves to isolate the screened interval from the rest of the annular space and the formation. If the bentonite seal is emplaced above the water table, care must be taken to adequately hydrate the pellets before proceeding with well construction. If the seal is below the water table the bentonite slurry may be tremied into place.

Grout is placed from the top of the bentonite to the ground surface. Grout generally consists of a cement-bentonite mixture or Portland cement. Grout seals minimize the possibility of surface run-off reaching the screened interval, and replaces material removed from the boring during drilling minimizing hole collapse and subsidence around the well.

In certain cases, the borehole may be drilled to a depth greater than the well installation depth. For these cases, the well is backfilled to the desired depth with bentonite and sand is placed between the bottom of the well and the bentonite.

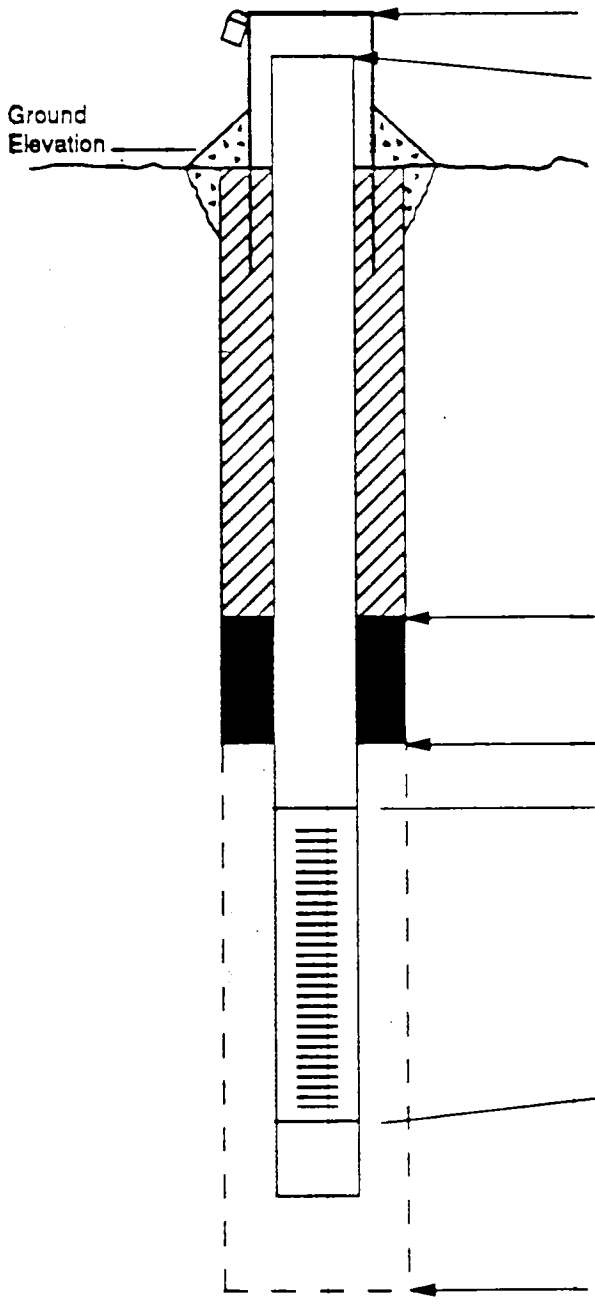
OVERBURDEN MONITORING WELL CONSTRUCTION DIAGRAM

Project _____ Location _____ Driller _____

Project No. _____ Boring No. _____ Drilling Method _____

Date Installed _____ Development Method _____

Field Geologist _____



Elevation of Top of Surface Casing: _____

Stick-up of Casing Above Ground Surface: _____

Elevation of Top of Riser Pipe: _____

Type of Surface Seal: _____

Type of Surface Casing: _____

ID of Surface Casing: _____

Diameter of Borehole: _____

Riser Pipe ID: _____

Type of Riser Pipe: _____

Type of Backfill: _____

_____

_____

Elevation of Top of Seal: _____

Depth of Top of Seal: _____

Type of Seal: _____

Elevation of Top of Sand: _____

Depth of Top of Sand: _____

Elevation of Top of Screen: _____

Depth of Top of Screen: _____

Type of Screen: _____

Slot Size x Length: _____

ID of Screen: _____

Type of Sandpack: _____

Elevation of Bottom of Screen: _____

Depth of Bottom of Screen: _____

Depth of Sediment Sump with Plug: _____

Elevation of Bottom of Borehole: _____

Depth of Bottom of Borehole: _____

FIGURE 4-11

OVERBURDEN MONITORING WELL CONSTRUCTION DIAGRAM

NYSDEC PROGRAM QUALITY ASSURANCE PROJECT PLAN

ABB Environmental Services

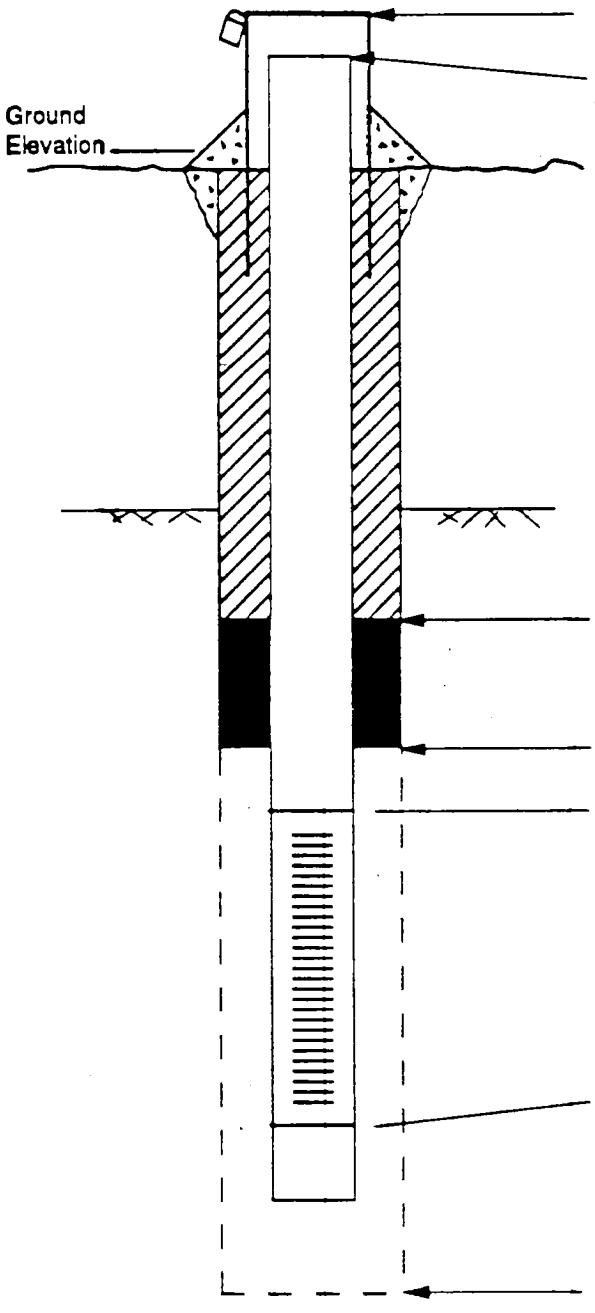
BEDROCK MONITORING WELL CONSTRUCTION DIAGRAM

Project _____ Location _____ Driller _____

Project No. _____ Boring No. _____ Drilling Method _____

Date Installed _____ Development Method _____

Field Geologist _____



Elevation of Top of Surface Casing: _____

Stick-up of Casing Above Ground Surface: _____

Elevation of Top of Riser Pipe: _____

Type of Surface Seal: _____

Type of Surface Casing: _____

ID of Surface Casing: _____

Diameter of Borehole: _____

Riser Pipe ID: _____

Type of Riser Pipe: _____

Type of Backfill: _____

_____

Bedrock Elevation /Depth _____

Elevation of Top of Seal: _____

Depth of Top of Seal: _____

Type of Seal: _____

Elevation of Top of Sand: _____

Depth of Top of Sand: _____

Elevation of Top of Screen: _____

Depth of Top of Screen: _____

Type of Screen: _____

Slot Size x Length: _____

ID of Screen: _____

Type of Sandpack: _____

Elevation of Bottom of Screen: _____

Depth of Bottom of Screen: _____

Depth of Sediment Sump with Plug: _____

Elevation of Bottom of Borehole: _____

Depth of Bottom of Borehole: _____

FIGURE 4-12

OVERBURDEN MONITORING WELL CONSTRUCTION DIAGRAM

NYSDEC PROGRAM QUALITY ASSURANCE PROJECT PLAN

ABB Environmental Services

9404014D(S)

Well sections and all materials coming in contact with the well must be cleaned before installation. The screen and well-riser pipe can be placed in the boring either manually or using the rig to hold the pipe, depending on the weight of the well. The pipe is lowered and sections added until desired screen depth is reached. No glues or solvent-cement will be used in well construction monitoring wells. When the screen and riser are in place, the filter pack, bentonite seal, and grout are installed using tremie pipes. The well is completed with a vented PVC cap.

When the well is completed and grouted to the surface, a protective steel casing is often placed over the top of the well. This casing generally has a hinged cap and must be able to be locked to prevent vandalism. The protective casing is larger in diameter than the well and is set over the well into the wet grout or is cemented in place. Protective casings can be above ground or flush-mounted. Above ground protective casings will have weep holes to allow drainage. Special care must be taken with flush-mounted installations to ensure that surface drainage does not enter the well. The protective casing and surface cement should extend below the frost line to prevent heaving.

Well Development. Well development is a process of pumping or purging a new monitoring well, designed to stabilize and increase the permeability of the filter pack around the well screen and to restore the permeability of the formation which may have been reduced by drilling operations. The selection of the well development method will be made by the site hydrogeologist based on the drilling methods, well construction and installation details, and the site geology. Monitoring wells should be allowed to set for a minimum of 24 hours before well development to allow for the seal and grout to set. (NYSDEC TAGM 4007). Any equipment introduced into the well will be decontaminated in accordance with the procedures presented in the HASP. Water levels will be taken from each well before and after development (NYSDEC TAGM 4007). To avoid aeration of the filter pack, the water level will not be allowed, to the extent feasible, to fall below the top of the filter pack during development.

Well development may be accomplished using one of several methods including:

- Overpumping, which uses a pump (e.g., submersible or peristaltic) or compressed air (air lift) to remove water from the well.

- Surge block which uses a plunger, the approximate diameter of the well, to agitate water in and out of the screen. No water is removed from the well.

- Compressed air which develops a well by either backwashing (forcing water out of the well and reducing pressure to let water flow back in) or surging (releasing a large volume of air suddenly into an open well below the water table producing a strong surge due to resistance of water head, friction and inertia). Water is pumped from the well using airlift.

In accordance with NYSDEC TAGM 4007, well development will continue until the pumped water has a turbidity reading of 50 NTUs or less. Field measurements of turbidity, temperature, pH, and specific conductivity will be recorded for each well volume removed. Should a well fail to achieve the required turbidity within a reasonable amount of time (to be specified in the site-specific Work Plan), field personnel will provide the field data to the site manager who will contact the NYSDEC Project Manager for guidance on how to proceed. An average of two weeks should be allowed between development and subsequent sampling or water level measurements to allow the aquifer to re-equilibrate.

Well development will be documented in the field notebook and on the Well Development Record (Figure 4-13).

4.8 TESTING

Testing activities include those field tasks that do not involve the collection of environmental samples, such as remote-sensing geophysical surveys, aquifer testing, and rock coring.

4.8.1 Geophysical Methods

Geophysical methods are remote-sensing techniques that provide information about subsurface conditions. This information is used to plan locations of explorations including, test pits, monitoring wells, and borings. The principles, instrumentation, methodology, and techniques of data evaluation of ground

WELL DEVELOPMENT RECORD

Project:	Well Installation Date:		Project No.
Client:	Well Development Date:	Logged by:	Checked by:
Well/Site I.D.:	Weather:	Start Date:	Finish Date:
Initial Water Level (ft):		Start Time:	Finish Time:
Water Level during Initial Pumping/Purging (ft):			
Water Level at Termination of Pumping/Purging (ft):			

Height of Water Column: _____ ft

_____ 0.16 gal/ft (2 in.)
x_____ 0.65 gal/ft (4 in.)
_____ 1.5 gal/ft (6 in.)
_____ ___ gal/ft (__in.) = _____ Well Volume (gal/vol)

Number of Well Volumes	TIME	TEMP.	pH	Conductivity	Approximate Pumping Rate (gal/min)	Turbidity (NTU's)

Notes:

WELL DEVELOPER'S SIGNATURE _____

FIGURE 4-13
WELL DEVELOPMENT RECORD
NYSDEC PROGRAM QUALITY ASSURANCE PROJECT PLAN

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Environmental Remediation

Inactive Hazardous Waste Disposal Report

April 1, 2001

Site Name: Old Land Reclamation | **Site Code:** 915129
Class Code: 3 | Region: 9 | County: Erie | EPA Id:
Address: Broadway | City: Depew | Zip: 14043
Latitude: 42 54' 9" | Longitude: 78 43' 2"
Site Type: Landfill | Estimated Size: 64 Acres

Site Owner / Operator Information:
Current Owner(s) Name: *** Multiple Site Owners ***
Current Owner(s) Address:
Owner(s) during disposal: Land Reclamation, Inc.
Operator(s) during disposal: *** Multiple Site Operators ***
Stated Operator(s) Address:
Hazardous Waste Disposal Period: From 1960 To 1975

Site Description:
This site is an inactive solid waste landfill which, during its years of operation, accepted municipal and industrial wastes. The site is bordered by an active scrap yard, an inactive railroad spur, Cayuga Creek and another inactive landfill which operated concurrently (Land Reclamation).
Investigations conducted at this site to date include an Erie County DEP Sampling Study and Site Evaluation in 1984, and a NYSDEC Phase I Investigation in 1986 and a Phase II Investigation in 1991.
Currently the site remains undeveloped with no buildings on site and densely covered with field grasses and brush.
Numerous leachate seeps breach the site's south side and flow directly into Cayuga Creek. Cayuga Creek is a Class C creek used for recreation and fishing. Hazardous waste disposal has been documented at this site and analysis has demonstrated that groundwater and surface water have been affected. However, evidence does not demonstrate that a significant threat is posed by this site.

Confirmed Hazardous Waste Disposal:	Quantity:
sludge: centrifuge (WTP)	4910 tons
benzidine sulfate	2 tons
sludge: chrome oxide	367 tons
sludge: nuchar (CSA)	118 tons

Analytical Data Available for: **Groundwater** **Surface Water** **Soil** **Sediment**
Applicable Standards Exceeded in: **Groundwater** **Drinking Water** **Surface Water**
Geotechnical Information:
Soil/Rock Type: **Silt-rich loam.**
Depth to Groundwater: **Range: 5 to 10 feet.**

Legal Action: Type: Status:
Remedial Action: Nature of action:

Assessment of Environmental Problems:
It has been demonstrated that this site is contributing to the contamination of groundwater, surface water and soil. Exposed fill is evident along the site's south edge along Cayuga Creek as a result of erosion. Numerous iridescent leachate seeps breach the site's south side and flow directly into the creek.

Assessment of Health Problems:
Surface water in drainage ditches and leachate seeps contains elevated barium, lead, zinc, analine and phenols. In 1984, soil quality was found to be no different than background levels in the Buffalo area. The preliminary investigation found exposed fill on the surface of the landfill and at the southern edge of the landfill as a result of Cayuga Creek bank erosion. However, no surface soil sampling was conducted. Although groundwater is impacted, area residents are served by public water so exposures via drinking water are not expected. Elevated concentrations of inorganics (metals) in surface water and semi-volatiles in sediment found directly downstream indicate the site is contributing to the contamination of Cayuga Creek.