REMEDIAL ACTION REPORT

NIAGARA COUNTY REFUSE DISTRICT SITE REMEDIAL CONSTRUCTION

Wheatfield, Niagara County, New York NYSDEC Site No.9-32-026

VOLUME I REPORT

SUBMITTED TO:

UNITED STATES
ENVIRONMENTAL PROTECTION
AGENCY

NEW YORK STATE
DEPARMENT OF
ENVIRONMENTAL CONSERVATION

SUBMITTED FOR:

NIAGARA COUNTY REFUSE DISTRICT AND PRP GROUP

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PARSONS

OCTOBER 2000
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REMEDIAL ACTION REPORT FOR NIAGARA COUNTY REFUSE SITE NYSDEC SITE NO. 9-32-026 WHEATFIELD, NEW YORK CLOSURE CONSTRUCTION

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SECTION 1

INTRODUCTION – NOTICE OF COMPLETION

1.1 PURPOSE

This Remedial Action Report presents the observations and data collected during the Remedial Action (RA) at the Niagara County Refuse Site (NYSDEC Site No. 9-32-026). This report documents that the RA was completed in conformance with the United States Environmental Protection Agency (USEPA) approved remedial design report, the Record of Decision (ROD), and the Consent Decree Docket No. 94CV-849. This report contains information regarding the site activities, construction techniques, quality assurance/quality control testing, and construction difficulties and their resolution.

1.2 PROJECT BACKGROUND

The Niagara County Refuse Site (herein after referred to as "the Site") is a former municipal landfill comprised of approximately 60 acres, located along the eastern border of the Town of Wheatfield, New York; and the western border of the City of North Tonawanda, New York. The southern edge of the Site lies approximately 500 feet north of the Niagara River.

The Site is generally surrounded to the west by active farmland; to the north by wooded wetlands; to the east by woodlands and low density housing (approximately 1,000 feet from the Site boundary); and to the south by access roads, railroad tracks, River Road, and the Niagara River (see Figure 1-1).

1.3 CONCLUSION – NOTICE-OF-COMPLETION

This report constitutes the Notice-of-Completion for the Niagara County Refuse Site. Remedial Action was completed in accordance with the Final (100%) Design Report (Conestoga-Rovers & Associates, 1997), and ROD (United States Environmental Protection Agency, 1993). Remediation goals specified in the ROD have been attained. As such, routine post-remediation maintenance and monitoring has commenced in accordance with the Draft Post Remediation Operation, Maintenance and Monitoring Plan presented with the Final Design Report (Conestoga-Rovers & Associates, 1997).

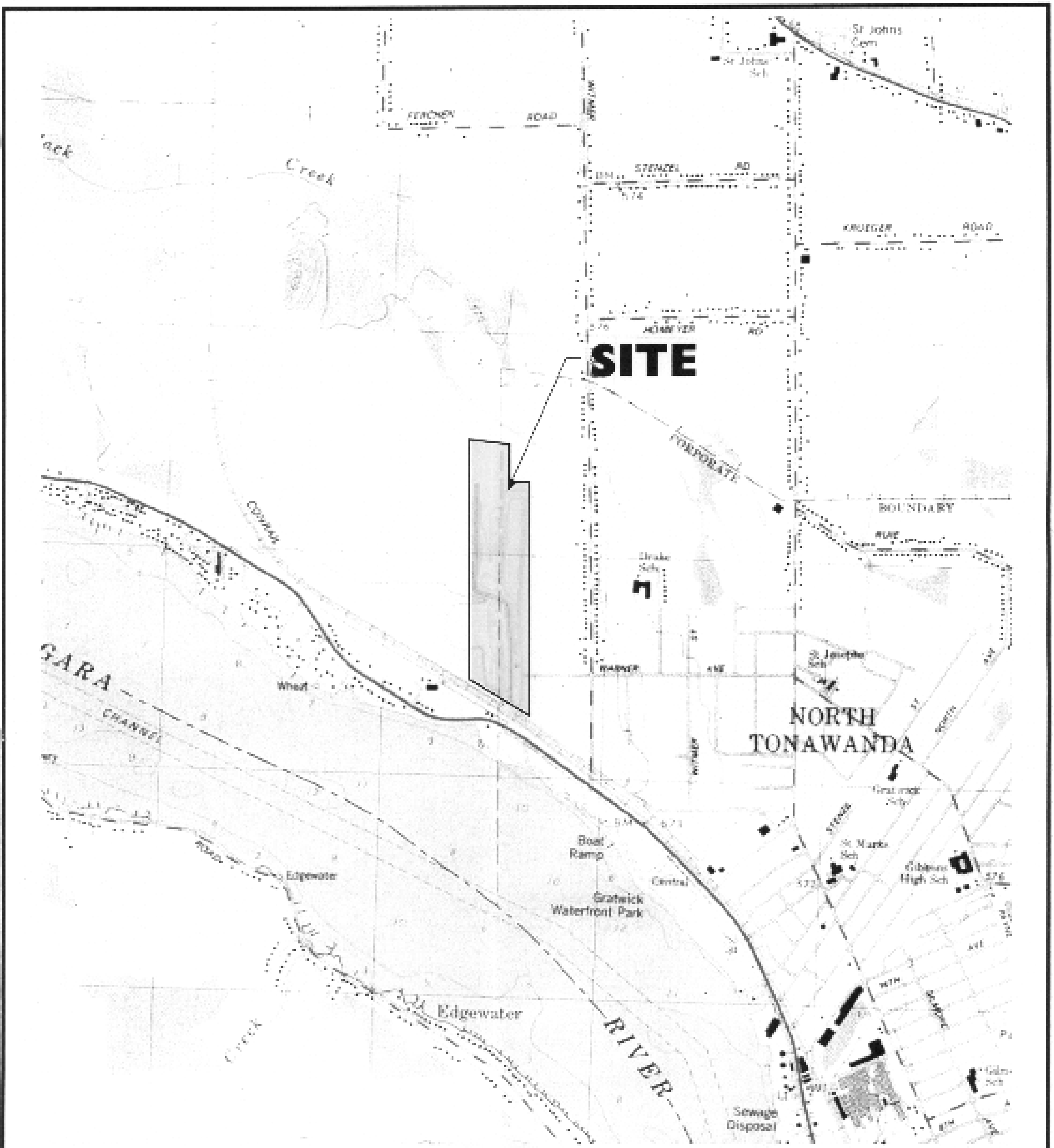
1.4 REPORT ORGANIZATION

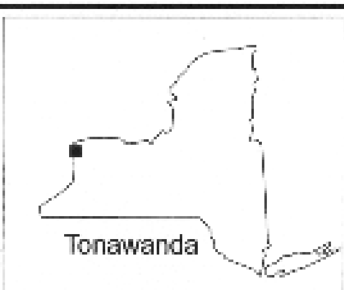
The report is organized into eight sections and ten appendices:

- Section 1 includes the introduction and project background;
- Section 2 provides a sequential narrative of the construction activities;
- Section 3 provides documentation that performance standards have been met, and summarizes the implementation of the construction quality control plan;

- Section 4 presents a summary of the pre-final and pre-certification inspections;
- Section 5 includes the notice of completion and the remedial action report certification;
- Section 6 summarizes the operation and maintenance plan;
- Section 7 includes references to as-built drawings; and
- Section 8 includes references used in the generation of this report.

Appendices A through I contain as-built documentation, drawings, test results, and photographs needed to document remedial action construction.





New York Quadrangle

SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP. TONAWANDA WEST, NY QUADRANGLE, 1980.

FIGURE 1-1

NIAGARA COUNTY REFUSE DISTRICT

SITE LOCATION MAP

PARSONS ENGINEERING SCIENCE, INC.

DESIGN * RESEARCH * PLANNING

Offices in Principal Cities

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SECTION 2

CONSTRUCTION ACTIVITIES

2.1 INTRODUCTION

This section includes a narrative description of the construction activities undertaken during the RA. The purpose of this section is to describe the materials, methods, and sequence of activities performed during remedial action construction; and to report significant dates, techniques, equipment, materials, and the sequence of each phase of the construction process. Daily work reports, prepared by Parsons ES, describing the work performed during each day of construction activities are provided in Appendix A.

2.2 CLOSURE CONSTRUCTION

The USEPA-approved remedial design for the Site consisted of the following:

- Clearing and grubbing the Site prior to remedial construction activities.
- Installation of a perimeter barrier and collection system around the Site to contain and collect impacted groundwater/leachate from the Site.
- Installation of a multi-layered capping system with a geomembrane barrier layer to minimize the infiltration of precipitation, and prevent exposure to the site waste.
- Installation of a forcemain to convey collected impacted groundwater/leachate from the Site to the City of North Tonawanda's (City's) sanitary sewer trunk line for treatment at the City's Publicly Owned Treatment Works (POTW).
- Access restrictions and limitations for future Site use, by means of deed restrictions.
- Monitoring to ensure the selected remedy is effective in satisfying the project objectives.

The RA design prepared by Conestoga-Rovers & Associates (CRA) was submitted to the USEPA, and New York State Department of Environmental Conservation (NYSDEC). Approval was obtained from the USEPA and NYSDEC prior to commencement of RA construction. Additional approvals were obtained by the U.S. Army Corps of Engineers (USACE) in the form of a joint permit for activities related to Site wetlands.

2.3 PROJECT RESPONSIBILITIES

Niagara County Refuse District Site PRP Group (PRP Group)

The PRP Group was responsible for the administration and partial financing of the RA (22.5% of RA costs were funded by New Yok State under the Environmental Quality Bond Act). The County of Niagara contracted directly with CRA for the remedial design, with Parsons

Engineering Science, Inc. (Parsons ES) for construction oversight, and with Haseley Construction for remediation construction.

Conestoga-Rovers & Associates (CRA)

CRA, as the engineer of record, was the remedial design engineer responsible for the preparation of all plans and specifications for the RA. During construction, CRA provided input and approvals on modifications to the design and materials substitutions.

Parsons Engineering Science, Inc. (Parsons ES)

Parsons ES was responsible for the field and construction inspection of the contractors' work. Parsons ES subcontracted with Quality Inspection Services for quality assurance activities; Foit-Albert and Associates to provide survey support; and Geotest Express to perform independent, third party destructive testing on geomembrane seam samples. Also, Parsons ES was responsible for documenting and certifying that the RA was completed in accordance with the approved remedial design report, ROD, and the Consent Decree. Parsons ES has prepared this Remedial Action Report.

Haseley Construction (Haseley)

Haseley, as the prime contractor, was responsible for all remedial construction activities, including ensuring that the appropriate health and safety procedures were followed. Haseley subcontracted several elements of the work. A list of the major subcontractors and the work elements they performed is noted below.

Activities	Haseley Subcontractors
Health and Safety	Edward O. Watts, PE, PC
Clearing and grubbing	Pine Ridge Inc.
Surveying	Modi Associates
Mechanical construction	John W. Danforth Co.
Electrical construction	CIR Electrical Contracting
Geotechnical testing of soils	GZA GEOEnvironmental of NY, Inc
Chemical analysis of soils	Severn Trent Laboratories (a subcontractor to GZA GEOEnvironmental)
Geotextile material supplier	Trevira, Inc
Groundwater monitoring well abandonment, gas vents	SJB Services
Landscape/Wetland plantings	Wayne Hydroseeding and Landscaping
Pre-engineered metal building supplier	Butler Manufacturing Co.
Pre-engineered metal building installer	LBM Construction, Inc

Activities Cont'd	Haseley Subcontractors Cont'd
Building concrete supplier	United Materials, LLC
Crushed aggregate supplier	Redland Niagara, Inc.
Earthen material suppliers	Haseley owned portion of the Summit Borrow Pit
Geonet composite supplier	FSI Fluid System, Inc.
Geonet composite installer	Chenango Contracting
Geomembrane supplier	Poly-Flex, Inc.
Geomembrane installer	Chenango Contacting
Security fence installer	Wire Products, Inc.

2.4 CONSTRUCTION SCHEDULING AND SEQUENCING

Construction activities associated with the implementation of the RA commenced on October 19, 1998, and were substantially complete on January 25, 2000. Work completed during this period included site preparation, pre-construction surveying, and the installation of the force main from the Site to the municipal sanitary sewer tie-in. The intrusive work related to subgrade preparation for the new landfill cover system started March 29, 1999. Work remaining after substantial completion included the completion of miscellaneous punch list items. The construction phase of the RA was anticipated to take two construction seasons to complete, but due to the contractor's efficiency, good project management, and minimal inclement weather, the work was primarily completed in one season.

2.5 HEALTH AND SAFETY

2.5.1 Health and Safety Officer

Health and safety monitoring was subcontracted to Edward O. Watts, PE, PC (Watts). A Watts health and safety specialist was designated as the health and safety officer (HSO). The HSO was responsible for conducting air monitoring, and ensuring that all workers onsite adhered to the Site-specific health and safety plan (HASP). The responsibilities of the HSO included execution of the air monitoring program, as specified in the HASP; weekly health and safety meetings; and the issuance of daily and monthly summary health and safety reports during the construction period. In addition to the above, independent health and safety audits were periodically performed by a Parsons ES safety specialist to evaluate compliance with the HASP and OSHA safety requirements at construction sites.

2.5.2 Air Monitoring

The HSO performed daily, real-time monitoring of volatile organic compounds (VOCs), total particulates (dust), and combustible gases. Additionally, vinyl chloride, carbon monoxide, hydrogen sulfide and oxygen levels were monitored. Real-time monitoring was performed continuously throughout workdays in the area of the active work or where intrusive construction activities were occurring. Perimeter monitoring was performed to monitor if airborne contaminants and dust were leaving the Site

Monitoring for VOCs was conducted within the breathing zones of high-risk workers during work activities in which workers could be exposed to vapors, using a photoionizer detector (PID). Ambient VOC levels were also monitored around the perimeter of the site at least every two hours during intrusive construction activities.

Monitoring for total airborne particulates was performed. Monitoring occurred downwind of intrusive construction activities. Monitoring was performed using personal aerosol monitors worn on worker belts.

Monitoring for combustible gases including carbon monoxide and hydrogen sulfide was performed during all intrusive construction activities. Oxygen levels were also routinely monitored when monitoring for combustible gases. Monitoring was performed using personal gas monitors worn by a safety technician. Direct readings were taken from the monitoring instrument.

Monitoring for vinyl chloride was performed during intrusive construction activities. Monitoring was performed using detection tubes and hand pump operated by a safety technician. In active work areas, monitoring occurred at least every two hours.

Health and safety monitoring data are available for review, but are not included with this report. The air monitoring results were documented in monthly health and safety reports. Separately bound copies of all Health and Safety Monitoring Reports have been provided to the USEPA and NYSDEC for reference purposes. An additional copy of the monitoring reports will be placed in the site file available for public review at the North Tonawanda Public Library, 505 Meadow Road, North Tonawanda, NY.

With the exception of a single incident, the air monitoring results revealed no sustained elevated levels for the monitored parameters. The single incident involved VOC levels above the established action level for upgrading personal protective equipment. On May 13, 2000, the installation of gas vent 25 resulted in sustained levels of 10.8 ppm of VOCs. Level C personal protective equipment (PPE) was donned to complete this task.

2.5.3 Health and Safety Measures

Site specific training by the HSO was required for all site personnel to working at the Site. The site personnel were informed of the Site-specific HASP including health and safety hazards, safety precautions, and PPE requirements. Weekly safety meetings were conducted by the HSO, usually every Monday morning. All site personnel were required to attend. Topics discussed during the weekly safety meetings included the analytical and real-time monitoring results from the previous week, safety issues/problems, and potential problems during the forthcoming week.

The HASP directed PPE necessary at the Site. Most of the work was performed in Level D PPE. At their own discretion, some workers wore dust respirators. When monitoring results revealed monitoring results above action levels, PPE levels were upgraded accordingly.

Other health and safety measures included dust suppression. Water trucks were employed during grading construction phases to control dust emissions. Water was sprayed on soil/fill and roadways during grading and compaction to minimize offsite dust migration and exposure to dust by construction workers.

2.5.4 Decontamination

At the onset of the 1999 construction season, a worker decontamination (decon) trailer and a temporary water tank were set up onsite. The water storage tanks for decontamination were filled with water from potable water sources, as needed. All wash waters and decon wastes were collected and disposed under the landfill cap.

2.6 PERIMETER COLLECTION SYSTEM

Before full mobilization at the Site occurred, Haseley installed the perimeter collection system and forcemain from the Site to the sanitary trunk sewer connection at Riverview Avenue. The perimeter collection system was installed around the perimeter of the landfill to intercept impacted contaminated leachate from the landfill. The perimeter collection system was constructed by digging a trench outside the waste limits through native soil until the clay/till soil layer below the Site was encountered. A six-inch diameter corrugated, perforated high density polyethylene (HDPE) drainage pipe, and a fine crushed aggregate were installed in the trench to intercept and convey contaminated leachate from the Site to a series of pre-cast concrete wet wells. A total of four wet wells were installed at locations indicated in the Final Design drawings. The fourth wet well is connected to the forcemain that discharges to the sanitary trunk sewer for treatment of collected contaminated leachate at the City of North Tonawanda POTW. Also, the electrical conduits and intermediate forcemains were placed in the trench at higher elevations. A metal shelter building was constructed at the southern end of the Site to house electrical controls for the forcemain system.

The forcemain consists of a two-inch HDPE pipe onsite, and a three-inch diameter HDPE pipe offsite. The pipe was installed by excavating a trench to the desired depth, installing appropriate bedding material, installing the pipe, covering the pipe with additional bedding material, and backfilling with the trench spoils. The pipe arrived in 40-foot lengths that were butt fused together. After installing the pipe sections, the pipe was pressure tested to ensure that the fusion welds were leak-free.

Prior to the installation of the perimeter collection system, two agricultural drain tiles (4 inches in diameter) situated adjacent to the north western side of the Site were removed. The two sections drain tiles identified on the drawings were removed in accordance with the remedial action plan. Excavated tile and up to one foot of soil below the tile was disposed of in the landfill area. Initially, only two drain tiles known to exist were to be removed. As the installation of the perimeter collection system advanced along the northwestern side of the landfill, additional drain tiles were encountered and subsequently cut at the trench during the installation of the perimeter collection trench. The portions of tile inside the perimeter collection trench limits were allowed to drain into the collection trench. As the perimeter barrier system was installed, the portions of the drain tile outside the limits of the perimeter drainage were encountered again and subsequently cut to install the perimeter barrier wall. The ends of the drain tile outside of the perimeter barrier wall were plugged with soil during the backfilling operation.

2.7 SITE PREPARATION

2.7.1 Mobilization

Haseley mobilized to the Site on October 19, 1998; and demobilized at the end of the 1999 construction season, on November 2, 1999.

2.7.2 Temporary Field Office and Facilities

During the mobilization phase, Haseley established field offices and temporary facilities, and installed perimeter fencing. Two temporary field offices were delivered and set up onsite by Haseley at the beginning of the construction.

2.7.3 Erosion and Sediment Control

Silt fencing was installed around the Site, as needed, when excavation began during the 1998 construction season. The silt fence was checked and repaired, and debris that collected along the fence was removed, as needed. Additional silt fencing was installed throughout the construction period, as needed.

2.7.4 Clearing and Grubbing

The Site was cleared and grubbed at the beginning of the 1998 construction work. Cutting of trees was accomplished using chain saws. Chipping of trees and brush was completed using a chipper. Trees situated on the landfill side slopes that could not be chipped were excavated and buried in the landfill. Also, the wood chips and brush generated while clearing the Site were disposed of in the landfill.

2.7.5 Construction Entrance and Parking Areas

The construction entrance and parking area were installed during 1998. A bulldozer was used to place crushed stone aggregate for the construction entrance and parking area.

2.8 MONITORING WELL ABANDONMENT AND MODIFICATION

In accordance with the approved remedial action plan, several existing monitoring wells at the site were abandoned. The abandoned monitoring wells consist of the following: NCR3M, NCR4M, NCR5M, NCR5D, NCR6M, NCR7M, NCR8M, NCR8D, NCR9M, NCR10M, and NCR12D (reference record drawing G-2). The monitoring wells were abandoned in accordance with NYSDEC-approved procedures by excavating around the well riser casing and removing the riser casing and well casing to a depth of approximately five feet. The remaining portion of the well was grouted in-place to ground surface. Abandonment of the monitoring wells was completed during April 1999.

Four existing monitoring wells situated in the capped fill areas of the Site remain (wells East A, East B, East C, and East D) for monitoring purposes. These wells were extended such that the riser portion and casing were accessible after cap construction. The wells were extended by extending the well riser to the appropriate final elevation. Soil was backfilled around the well risers to design grades. The portion of the well riser extending above the final surface received a carbon steel protective casing.

During the course of the work, existing monitoring well MW-NCR13S was damaged during construction and required replacement. A replacement well was subsequently installed.

2.9 GRADING AND SUBGRADE PREPARATION

Site grading and subgrade preparation included grading the Site to conform to the design grades, in accordance with the approved subgrade grading plan. Rough grading and compaction of uneven areas of the Site were completed to provide the necessary subgrade for the placement of the capping systems, maintenance roadway, and storm sewer system. Though there were some minor grading plan changes, the intent of the overall grading plan was unchanged.

Subgrade preparation involved consolidation of fill from site grading, utility trench line excavations, groundwater collection trench spoils, perimeter clay barrier wall spoils, consolidation of material from ditch clearing, debris disposal, as well as reworking of existing cap soils to conform to design contours. The balance of the subgrade was achieved by importing clean fill soil from an adjoining NYSDEC permitted surface mine (Summit Park Borrow Pit) to achieve the desired subgrades. Off-road dump trucks were utilized to move soil from the Summit Park Borrow Pit to locations where additional soil was needed to achieve subgrade. Subgrade areas were compacted with a smooth drum vibratory roller to provide a smooth, compact base for the cover system. Soil property testing and *in situ* compaction of imported soil necessary to construct the Site to design subgrade was routinely conducted. Because of the variable nature of soil materials, no *in situ* compaction or soil property testing program was implemented for the onsite soils. This was in accordance with the approved Final Design.

2.10 CAP CONSTRUCTION

2.10.1 Landfill Geomembrane Cover System

The Final Design included covering the landfill Site with a multi-layered landfill geomembrane cover system. The landfill geomembrane cover system consists of the following from top to bottom in accordance with the Final Design:

- Six-inch topsoil layer;
- Twenty-four-inch cover soil layer (no permeability requirements);
- Geonet drainage layer composite (single and double sided);

- Forty-mil geomembrane (textured and smooth); and
- Six-inch granular gas venting layer.

The geomembrane was composed of a linear, low-density polyethylene (LLDPE) sheet membrane. The topsoil layer was stabilized with a turf-type grass and wildflower seed mixture.

2.10.2 Landfill Gas Vents

Gas vents were installed on the landfill prior to installation of the cover system components. The gas vents consist of six-inch diameter solid walled HDPE pipe that extended into the waste a minimum of four feet. The base of the vent that extended into the waste was perforated with holes. The base portion was backfilled with a fine granular aggregate to allow gas to migrate to the vent. The vents extended above the subgrade and through the landfill geomembrane cover system. The top of the gas vent was terminated with an inverted "u" to prevent rainwater from entering the vent. The vent opening was covered with a screen mesh to prevent birds from entering the vent. The vents were installed at locations identified on the Final Design plans.

2.10.3 Granular Gas Venting Layer

A six-inch thick layer of a granular media was installed directly over the approved subgrade. Tandem-end dump trucks were utilized to move granular gas venting media from the borrow source (Redlands Niagara Quarry) to the Site, where it was placed directly on the subgrade. In accordance with the approved Final Design, no compaction of this layer was performed. The lift thickness was controlled and verified using grade stakes.

2.10.4 Geomembrane

A 40-mil LLDPE geomembrane was installed over the gas venting layer during the 1999 construction season. The geomembrane was delivered in 22.5 feet wide rolls, and installed in a series of panels. The geomembrane barrier layer was laid out in panels and welded together. Each panel was fused to an adjoining panel using a thermal fusion welding process (double wedge hot shoe). This welding device thermally fused panels together, leaving a channel for non-destructive testing of the seams by the geomembrane installer. Boots were installed around each gas vent, monitoring well, and collection manhole. The geomembrane installed was either smooth or textured depending on the application. Smooth membrane was used on the gently sloped top areas, and textured membrane was used on the steeper side sloped areas.

2.10.5 Geonet Composite Drainage Layer

A geonet drainage composite was installed on top of the geomembrane barrier layer to drain cover soil pore water and ensure stability of the slopes. The geonet was installed in a similar fashion as the geomembrane. The geonet was delivered in rolls and installed in a series of panels. Geonet panels were joined together by strapping the netting together with nylon ties and sewing the geotextile fabric covering together. Drainage of water transmitted along the geonet layer, is accommodated through a series of slope underdrains installed at the bottom of the slopes. The slope underdrains drain into the new storm water facilities along the Site or adjoining wetlands. The geonet installed was either a single-sided fabric/geonet composite or double-sided fabric/geonet composite. The single-sided composite was placed over the smooth geomembrane, and the double-sided composite was placed over the textured geomembrane.

2.10.6 Cover Soil Layer

Once the geomembrane/geonet layers were installed, they were covered with a 24-inch thick (one lift) layer of soil, which was obtained from an offsite borrow source. Off-road dump trucks were utilized to move soil. The cover soil layer was compacted with a smooth drum type vibratory drum roller. Physical testing and *in situ* compaction testing of cover soil was performed, in accordance with the approved Final Design. The lift thickness was verified using grade stakes and instrument survey.

2.10.7 Topsoil Layer and Seeding

A six-inch layer of topsoil was placed directly over the cover soil layer. The topsoil obtained from offsite borrow sources was trucked directly to the area of placement, where it was spread and loosely compacted with bulldozers. Completed topsoil areas were hydroseeded with a slurry containing seed, paper-based mulch, and starter fertilizer applied in one operation. Placement of topsoil and seeding was completed in phases as the work progressed. The lift thickness was verified using grade stakes and instrument survey.

2.10.8 Slope Underdrains

Corrugated HDPE piping with drainage slots was installed at the toe of the slope, and wrapped with a non-woven geotextile to drain moisture from the composite geonet layer. The underdrains discharge into the perimeter storm water drainage system and wetlands. The discharge locations are noted on the drawings.

2.11 PERIMETER BARRIER SYSTEM

A perimeter barrier system was installed around the perimeter of the landfill. The perimeter barrier system consisted of a cutoff wall on the exterior perimeter of the landfill area. The perimeter barrier system is integrated with the perimeter collection system on the interior of the perimeter barrier system. The perimeter collection system was presented in Section 2.6.

The barrier portion of the system was constructed by excavating a trench outside of the perimeter collection system trench to the clay/till layer. Once the desired depth was achieved, the geomembrane barrier material from the landfill cover system was placed in the trench. The trench was subsequently backfilled with clean imported soil. The geomembrane material placed in the trench was continuous with the landfill cover system geomembrane barrier layer.

2.12 STORM DRAINAGE SYSTEM

Due to a new maintenance roadway system, riprap was installed in lieu of "cable concrete" mats as a cost saving measure. Hydraulic calculations for assessing water velocities along ditch channels were reevaluated, and it was determined that the cable concrete mats were not necessary and that conventional blasted rock riprap would be adequate. The USEPA and NYSDEC representatives accepted this modification. Riprap was placed in the areas where the "cable concrete" mats were specified on the drawings. Additional riprap was placed as needed to protect slopes where erosive velocities would be anticipated.

2.13 CONTROL BUILDING CONSTRUCTION

A pre-engineered metal building was erected to house the leachate transfer pump system controls. The building structural components and shell were pre-manufactured offsite and erected onsite. A cast-in-place concrete foundation and floor slab was placed before building erection.

2.14 INSTITUTIONAL CONTROLS

2.14.1 Property Acquisitions

Because waste extended beyond the landfill property limits onto adjoining properties, acquisition of portions of adjoining properties was required. It was necessary to acquire approximately 28 acres from various property owners to construct the proposed remedial action. Property acquisition was completed before remedial action construction was allowed to proceed.

2.14.2 Property Easements

Property easements necessary to install the forcemain to Allen Street were secured prior to construction.

2.14.3 Access Restrictions

A perimeter fence was installed around the Site as a security measure to protect the cap from damage by trespassers. The fence consisted of a six-foot high chain link fence. Four man gates were installed at prescribed locations and two vehicle gates. A vehicle gate was installed at the southern side of the Site, near the old site access road. Haseley installed two temporary vehicle gates along the central western fence line and at the southeastern fence line corner. These vehicle gates will be in place for the duration of the temporary easement granted to Haseley.

Warning signs indicating that unauthorized site access is prohibited were placed on the fence at a spacing of approximately every 500 feet.

2.14.4 Deed Restrictions

Though not a part of the remedial construction, deed restrictions are required as part of the remedial action. The Site owner recorded in the office of the Clerk of the County of Niagara, a notation on the deed to the Site property (an instrument normally examined during a title search), which provides perpetual notice to any potential purchaser of the property that hazardous substances have been buried on the property, and that the use of the property is restricted. The municipal owner of the property on which the deed restrictions exist will agree for itself and its successors to continue in perpetuity to monitor any violations of the deed restrictions and to enforce against such violations. This notation provides that any future use of the property must not breach the integrity of the final cap, covers, liners or any other components of the containment system; disturb or disrupt the function of the Site's monitoring systems; or otherwise increase the potential to human health and the environment.

2.15 WETLAND RESTORATION/MITIGATION

The remediation of the Site involved removal of sediments from adjoining wetlands, and consolidating the sediments under the landfill cap. Additionally, the remediation of the Site encroached upon existing wetlands. According to the Final Design, approximately 0.52 acres from five separate wetland areas would be lost due to the remedial action construction. Wetland restoration/mitigation involved restoration of impacted wetlands that remained adjacent to the Site, and contributing monies to expand wetland mitigation efforts at the Gratwick Riverside Park Site (Gratwick site) wetland. Documentation of wetland restoration at the Site is provided in this report. Because the Niagara County Refuse Site PRPs are not responsible for mitigation efforts at the Gratwick site, documentation of wetland mitigation at the Gratwick site is not included in this report, rather it will be addressed in the final report for the Gratwick site.

Impacts to the remaining wetlands included the removal of contaminated sediments, up to 18 inches in depth. The restoration of these wetlands involved replacement of up to 12 inches of hydric soil, and replanting restored areas with wetland plants indigenous to the area. An area approximately 50 feet by 150 feet at the northwest section of the Site, was dredged of contaminated sediments. The soil that was used to replace the excavated sediments was hydric wetland soil obtained from the NYSDEC-sponsored wetland restoration at Buckhorn Island, located on the north side of Grand Island, New York. Wetland plantings were installed in Spring 2000. Because of the deeper water depth in the reconstructed wetland, the planting plan was revised under the direction of the NYSDEC Wetland Biologist.

2.16 VARIATIONS FROM CONTRACT DOCUMENTS

2.16.1 Waterline Abandonment

An unmarked City of North Tonawanda waterline was discovered leading to the Site, near the southeast corner of the site, from Warner Avenue. Because this portion of the waterline entering the Site was not in use, it was abandoned. The abandoned section was cut at the barrier wall, and an eight-foot section was removed and plugged. The active portion of the line outside the landfill cap limits was terminated with a fire hydrant.

2.16.2 Waterline Relocation

An active Town of Wheatfield waterline was discovered at the northwest corner of the Site. It was determined that the line extended under the proposed cap, and was partially covered with waste. It was decided that the portion of the active waterline under the Site be relocated outside the Site and cap limits. The existing line was exposed at the edge of the Site and cut to install a new pipeline outside the Site limits. There was a portion of the waterline that was abandoned in-place under the Site. The ends of this waterline were plugged with concrete grout and covered.

The existing waterline consisted of cement asbestos pipe. The new waterline consisted of PVC pipe. The pipe was installed in accordance with the Town of Wheatfield's requirements.

2.16.3 Permanent Maintenance Road

A permanent gravel covered maintenance road was installed to gain access to the wet wells. The Final Design specified a grass covered pathway, but during the construction phase, it was determined that a gravel covered maintenance roadway would be more suitable. The roadway is approximately 12 feet wide, and consists of eight inches of "run-of-crusher" stone aggregate over a woven polyester geotextile. The alignment of the road is indicated on the as-built drawings. Most of the road was constructed on top of the cap. Haseley constructed a portion of the maintenance road along the western side of the Site, at their expense, to serve as a haul road for cover soil from the adjoining borrow pits. This road was constructed adjacent to the cap, and is wider and thicker to accommodate heavy truck traffic. Haseley was granted a temporary five-year easement to enable Haseley to utilize their borrow pit for other projects.

SECTION 3

CONSTRUCTION STANDARDS AND QUALITY CONTROL

3.1 INTRODUCTION

The construction monitoring activities used to document and verify the remedial action construction presented in the Final Design Report and Construction Quality Assurance/Quality Control (QA/QC) Plan are reviewed in this section. This section provides a description of tasks conducted in order to record and confirm the grading of existing cap soils, covers soils, and topsoil; the raising and abandonment of monitoring wells; installation of geomembrane barrier layer; and placement of riprap. Daily work reports describing the work performed during each day of construction are provided in Appendix A. Records of test reports and documentation for constructed elements of the remedial action are contained in respective appendices.

3.2 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

The Haseley Project Manager was responsible for the coordination and management of all work performed during the construction phase. Parsons ES and the Parsons ES QC subcontractor, Quality Inspection Services, provided full-time construction quality assurance. Some portions of QC were provided by Haseley subcontractors. QA/QC was performed to ensure compliance with the plans, specifications, and engineering requirements referenced in the Contract Documents. The Parsons ES inspectors communicated directly with the Contractor's superintendent, and kept the PRP Group Manager informed of these communications. The Parsons ES inspectors communicated regularly with the Parsons ES Project Manager/Quality Assurance Engineer regarding site activities, quality control testing, and corrective actions required. Parsons ES reviewed QA/QC activities, such as testing of borrow material sources, grade controls, thickness verification, and cover soil material testing for conformance to construction standards. Parsons ES employed Geotest Express as an independent third party to perform geomembrane seam destructive testing on seam samples from the project.

3.3 SHOP DRAWING REVIEW AND APPROVAL

Prior to the start of construction activities, and before installation of construction materials and equipment, a series of work plans, shop drawings, and product information was submitted by Haseley to Parsons ES for review, in order to determine compliance with specifications. A list of shop drawings and submittals reviewed by Parsons ES is attached to end of Appendix A. Haseley was not allowed to proceed with construction or installation of specific materials without review and express authorization by Parsons ES. Parsons ES reviewed Haseley submittals for general conformance with the specifications. Upon authorization by Parsons ES, Haseley was allowed to proceed with certain work elements or installation of specific materials or equipment. Materials and equipment not meeting specification requirements were not allowed onsite and were not installed. All installed materials received approval from Parsons ES. Items that constituted substitutions of specified items required acceptance by Parsons ES. In some instances, substitutions required CRA, USEPA, and NYSDEC approval.

3.4 SURVEY CONTROL

Survey control, layout, and record survey documentation for RA construction at the Site was performed by a Haseley subcontractor, Modi Associates, a State of New York-licensed surveying firm. Haseley surveyors were responsible for grade control during construction. Survey control, both horizontal and vertical, was provided by Modi Associates. A construction baseline and coordinate system was developed, prior to the start of construction activities. Modi completed the layout of all pertinent cleanup construction features including setting grades, setting membrane limits, layout of the storm sewer system, and layout of the forcemain. Modi also performed field surveying to document the placement and thickness of each cover layer. Refer to Section 7 for record drawings. Record drawings include record survey drawings provided by Modi. These record survey drawings were used to prepare the project as-built drawings.

Throughout all phases of construction, Parsons ES monitored field surveying activities. On occasion, Foit-Albert, a subcontractor to Parsons ES, performed spot survey checks to verify the survey work completed by Modi.

3.5 PERIMETER COLLECTION SYSTEM

The conveyance pipe force mains between wet wells and the sanitary sewer were pressure tested in accordance with QA requirements. The pipeline pressure test certifications are presented in Appendix B-1. The results of the pressure testing were in compliance with project requirements.

3.6 MONITORING WELL ABANDONMENT, MODIFICATION, AND REPLACEMENT

During the course of monitoring well abandonment, a field inspection log was completed for each well. The log was maintained in accordance with the approved decommissioning procedures. The field inspection log included information such as the physical condition of the well casing, lock, and seal; and physical characteristics of the well such as the well depth, and the depth to water. Well abandonment logs for each well are contained in Appendix C-1.

Logs documenting the well extensions are contained in Appendix C-2.

A log documenting the replacement of the monitoring well MW-NCR13S is contained in Appendix C-3.

3.7 GRADING AND SUBGRADE PREPARATION

Subgrade preparation involved fine grading of the existing landfill cover soils, or importing clean fill to provide a suitable base for placing the geomembrane cap. Subgrade areas were compacted with smooth drum vibratory compactors to provide a smooth, uniform, compacted sub-base for landfill cover system capping materials. No *in situ* or laboratory tests were required or performed on existing soil. All imported soil necessary to achieve the desired subgrade required QA/QC sampling and analysis for physical properties and chemical contaminants. Prior to, and during installation of the common fill soil, the imported soil was sampled and tested to determine the suitability for use (source QA). In accordance with the specifications, quality assurance testing, consisting of particle size analysis using American Society of Testing Material (ASTM) method D422, was conducted on soil from the borrow source at a frequency of three tests per borrow source to determine the suitability of the material. The physical property test results are contained in Appendix D-1. The test results indicate that the soil met specification requirements, and was suitable for use at the Site.

Additionally, testing of soil imported from offsite borrow sources was required, at a frequency of one test every 10,000 cubic yards, to determine the presence of chemical contaminants in the soil. The soil was analyzed for Target Compound List/Target Analyte List (TCL/TAL) parameters. The chemical property test results are contained in Appendix D-2. Because the imported soil was obtained from a common permitted borrow source (Summit Borrow Pit) adjacent to the Site, the frequency of chemical testing was reduced to a frequency of one test every 30,000 cubic yards. Documentation of the approval for this change is contained in Appendix D-2. The test results indicated that the soil was acceptable for use on the Site, and that no additional contaminants were introduced to the Site.

Field QA consisted of in-place compaction and moisture content tests (ASTM D2922) for every 5,000 cubic yards of placed imported soil or for every 24-inch soil lift. The field compaction test QA results are presented in Appendix D-3. The minimum compaction criteria for imported fill soil was 95 percent of the standard Proctor density.

Once subgrade preparation was complete, the subgrade was surveyed. The results of the subgrade survey were incorporated in the record drawings (refer to Section 7). Thickness confirmation was performed using before and after surveys (Modi Associates). The subgrade record drawings served as a basis for determining the thickness of subsequent cover system layers.

3.8 GEOMEMBRANE CAP

3.8.1 Landfill Gas Venting Layer

Before the granular gas venting layer was installed, a series of gas vents were installed at prescribed locations and depths indicated on the plan drawings. Logs documenting the construction of the gas vents are contained in Appendix E-1.

The granular landfill gas venting media was obtained from an offsite borrow source, Redland Niagara Inc. Quarry. In accordance with specifications, quality assurance testing, consisting of particle size analysis (ASTM D422), was conducted on the granular media from each borrow source. A frequency of one test per 5,000 cubic yards was used to determine the suitability of the material. The test results are presented in Appendix E-2. Thickness confirmation of the gas venting layer was performed by Parsons ES using grade stakes. A written acceptance of the area was given to Haseley before they were allowed to proceed with the subsequent cap layer. In accordance with the approved cleanup, no *in situ* compaction testing was performed.

3.8.2 Geomembrane

Quality Assurance/Quality Control (QA/QC) for geomembrane installation consisted of a rigorous testing and inspection program that was implemented by the geomembrane installer, Chenango Contracting. Chenango reviewed pre-certification geomembrane QA test results, inspected the subgrade for geomembrane installation, performed all field QC testing, obtained samples of seams for destructive QC testing, and prepared daily work reports. Following the completion of geomembrane installation, Chenango prepared record drawings depicting geomembrane panel layout and sample locations. Field destructive test results were verified through offsite laboratory testing. Geotest Express, a subcontractor to Parsons ES, performed independent destructive testing on samples of the panel welds. The results of the field and destructive testing, the field inspection logs, Chenango's daily work reports, and certification of subgrade acceptance are provided in Appendix F-1. The independent destructive test reults are contained in Appendix F-2. The as-built drawing of the panel layout is included in Appendix F-1. The as-built limits of the geomembrane were recorded by instrument survey performed by Modi, and incorporated into as-built record drawings. Refer to Section 7 for additional discussion on as-built record drawings

Parsons ES personnel were onsite at all times during the geomembrane installation to oversee the geomembrane installation, document geomembrane construction activities, and observe field testing of seams. Parsons ES maintained field inspection logs during the geomembrane installation. Each log lists the panel number, the initials of the Parsons ES inspector, and if the panel was accepted.

The liner was installed in accordance with the approved Construction QA/QC Plan. Prior to placement of the geomembrane, Chenango inspected the subgrade to ensure that the surface was suitable for installation of the geomembrane. Acceptance of the subgrade by Chenango is provided in Appendix F-1. Prior to installation, Parsons ES inspected each panel. As each panel was installed, Parsons ES visually inspected the installation. Also, Parson ES monitored QC testing completed by Chenango, including pressure testing along double wedge seams and vacuum testing along extrusion welded seams and patches.

QC testing was completed in accordance with the specifications. Prior to startup of membrane seaming each day, Chenango completed trial seams. The trial seam logs are contained in Appendix F-1. Non-destructive testing of the seams was accomplished by pressurizing the channel and monitoring the pressure gauge. The results of these tests are contained in Appendix F-1. On occasion, a non-destructive test failed. Failed tests typically required isolating the location of the faulty seam and repairing the seam by an extrusion welding process. Seam repair logs are also contained in Appendix F-1. Additional QC testing of the seams involved destructive tests. At intervals prescribed in the specifications, test seam coupons were cut from the installed membrane along the seams. Test specimens were cut from the coupon panel for destructive testing by Chenango and by a third party (Geotest Express) for independent testing. The results of the destructive test results are contained in Appendix F-1, and independent test results in Appendix F-2. There were no instances where the test results did not pass the criteria.

At the areas where the test coupons were obtained, a patch panel was extrusion welded in-place. The patch panel welds were tested by soaping the weld seams and applying a vacuum to the weld using a vacuum box device. Patches with faulty seams would result in soap bubbles forming at the faulty seam which would be repaired and retested.

Prior to the initiation of sequential cap construction activities and tasks, Parsons ES reviewed the geomembrane installation QA/QC documentation to ensure that the geomembrane was installed to project standards. Subsequent cap installation was allowed to proceed only when the QA/QC documentation supported conformance with the project standards. Any areas requiring attention were corrected before subsequent cap installation was allowed.

3.8.3 Geonet Composite Drainage Layer

A composite geonet drainage layer was placed on top of the geomembrane. A single-sided composite geonet was placed over the smooth geomembrane, and a double sided geomembrane was placed over the textured geomembrane. Lab testing and QA/QC documentation for this layer was not required by the QA/QC Plan. There were no quality assurance requirements for the geonet other than routine monitoring of the installation.

3.8.4 Cover Soil Layer

All imported soil necessary to achieve the desired subgrade required QA/QC sampling analysis for physical properties and chemical contaminants. A nominal 24-inch thick cover soil layer was placed over the drainage layer and geomembrane. Prior to, and during installation of the cover soil layer, the soil was sampled and tested to determine the suitability for use (source QA). In accordance with the specification, quality assurance testing, consisting of particle size analysis (ASTM D422), was conducted on soil from the borrow source at a frequency of one test every 5,000 cubic yards to determine the suitability of the material.

Additionally, testing of imported soil from the borrow source was initially conducted at a frequency of one test every 10,000 cubic yards to determine the presence of chemical contaminants in the soil. Since the soil came from a single borrow source, the testing frequency was reduced to one test every 30,000 cubic yards. The soil was analyzed for TCL/TAL parameters. The physical property test results are contained in Appendix D-1. The results of chemical analyses are presented in Appendix D-2.

Field QA consisted of in-place compaction and moisture content tests (ASTM D2922) for every 5,000 cubic yards of placed imported cover soil. The field QA results are presented in Appendix D-3.

Once cover soil placement was complete, the top of cover soil was surveyed for thickness confirmation. The thickness measurements are presented on cover soil record survey drawings. The results of the as-built record survey were incorporated in the as-built record drawings (refer to Section 7).

3.8.5 Topsoil Layer

A nominal six-inch topsoil layer was placed over the cover soil to support the establishment of vegetative growth. In accordance with the specification, QA testing consisting of particle size analysis by method ASTM D-422, soil classification by method ASTM D2487, and soil pH by method ASTM D-4922 was conducted on topsoil at a frequency of one test per 10,000 cubic yards to determine the suitability of the material.

Additionally, testing of imported soil was conducted on topsoil from the borrow source at a frequency of one test every 10,000 cubic yards to determine the presence of chemical contaminants in the soil. The topsoil was analyzed for TCL/TAL parameters. The physical property test results are contained in Appendix G-1. The results of chemical analyses are presented in Appendix G-2.

Once cover soil placement was complete, the top of topsoil was surveyed for thickness confirmation. The thickness measurements are presented on the topsoil record survey drawings. The results of the as-built record survey were incorporated in the record drawings (refer to Section 7).

3.9 PERIMETER BARRIER SYSTEM

The barrier portion of the perimeter barrier/collection system involved placing geomembrane barrier material from the landfill cover system in a perimeter barrier trench. The trench was subsequently backfilled with the excavated soil. The geomembrane and backfill material placed in the trench was continuous with landfill cover system layers. Testing of respective materials was accomplished with the installation of the respective cover system layers.

3.10 STORM DRAINAGE SYSTEM

For construction quality control, the storm sewer system installed along the western side of the Site was monitored continuously for grade, alignment, and backfilling. The specifications required pressure testing of storm sewers to ensure proper construction. However, pressure testing of the pipes could not be accomplished because the pipe joints specified would not pass pressure testing. After a review of the specification, testing methods and typical criteria applied for QA of storm sewer, it was determined that testing of the storm drain sewer pipes was not necessary, and was therefore discontinued. This change was approved by the USEPA and NYSDEC project representatives.

3.11 PERIMETER FENCING

The perimeter fence was installed per plan. No specific QC measures were specified for fence installation other than adherence to the plans, specifications, and good construction practices.

3.12 WETLANDS RESTORATION

The wetland restoration was installed in accordance with the revised planting plan. No specific QC measures were specified for wetland restoration other than adherence to the plans, specifications, and good installation practices. Because of a greater depth of water in the remediated wetland area, the wetland planting plan was revised at the direction of the NYSDEC wetland biologist.

In accordance with the approved remedial action plan, up to 18 inches of impacted sediment/soil was removed from an area approximately 150 feet by 50 feet and approximately 12 inches of hydric soil was placed over the excavated wetland area. This resulted in an wetland area approximately six inches deeper than previous elevations. Several options to remedy the situation were considered including placing additional hydric soil and lowering the water level by approximately six inches. The NYSDEC wetland biologist preferred to keep the wetland area slightly deeper. The NYSDEC wetland biologist indicated that by keeping the wetland area deeper, it should not dry up completely during the dry seasons. Review of the approved Final Design Report (CRA, 1997) reveals that it was the intent of wetland restoration plan to leave this area deeper to increase water storage, and keep the area in a wet condition for longer periods during dry summer months.

The NYSDEC wetland biologist suggested that the proposed wetland planting plan be modified by planting the selected plants in the shallower water along the southern edge of the replanting area, and continuing along the landfill northern toe-of-slope to the east. This allowed the use of the remaining allotted wetland plants. The modified planting plan resulted in an unplanted area in the deeper center, and the shallower area along the northern side, where the NYSDEC wetland biologist indicated that natural revegetation had already started growing.

3.13 VARIATIONS FROM CONTRACT DOCUMENTS

Closure construction deviations from the Contract Documents, approved by the USEPA and NYSDEC, consisted of the following:

3.13.1 Waterline Abandonment

The abandoning of the waterline was not envisioned in the Final Design. Therefore, no specific QC measures were specified for waterline abandonment other than adherence to the plans, specifications, and good construction practices.

3.13.2 Waterline Relocation

The new water pipe line was not envisioned in the Final Design. Therefore, no specific QC measures were specified. However, the pipe was installed in accordance with Town of Wheatfield's requirements, which included chlorine cleaning and testing of water. A pressure test report, and an as-built record drawing approval by the Town of Wheatfield is contained in Appendix B-2.

3.13.3 Permanent Stone Maintenance Road

The permanent stone maintenance road was not envisioned in the Final Design. Therefore, no specific QC measures were specified for stone road construction other than adherence to good construction practices. The stone road aggregate was uniformly placed to desired thickness and compacted with a smooth drum roller. No specific compaction testing was performed or required.

3.13.4 Substitution of Riprap for Cable Concrete for Erosion Control

Riprap was used in lieu of cable concrete mattresses. The change did not alter the intended purpose of the cable concrete, which was erosion protection at designated areas. Review of design calculations revealed that the use of cable concrete was overly conservative. As a cost saving measure, riprap was substituted. No specific QC measures were required for cable concrete or riprap.

3.13.5 Reduction of Chemical Testing on Imported Fill/Cover Soil

The imported soil used as general fill and cover soil was obtained from a single borrow source. Because a single source was being used, and it was a NYSDEC permitted borrow source that was formerly a agricultural field, the frequency of chemical tests to determine the presence of chemical contaminants was reduced for cost saving measures. The soil sampling and analysis testing frequency of one sample every 10,000 cubic yards of imported soil was reduced to one sample every 30,000 cubic yards.

3.13.6 Elimination of Storm Sewer Pressure Testing

Pressure testing of storm sewer pipes was eliminated because of problems with factory fabricated joints and seals, which tended to leak. Because the pipe supplied met specifications and was installed in accordance with good construction practices, the leak testing requirements were waived. An evaluation was conducted by Parsons ES to determine the need for leak testing. Testing requirements were waived because the pipe only conveys stormwater runoff; the pipe was installed in native soil outside waste limits and perimeter barrier system, and leak testing is not typically performed on storm sewer pipes, testing requirements were waived. This change was approved by USEPA and NYSDEC representatives.

3.13.7 Revised Toe Drain Outlets

Portions of the toe drain pipe and several toe drain outlets along the eastern side of the landfill were not installed. The toe drains and toe drain outlets provide outlets from water wicked away from the landfill cap drainage layer and were typically situated along the proposed grass covered perimeter roadway. Instead, a gravel covered roadway was installed along an alternate alignment. The toe drains and outlets along an abandoned grass perimeter road alignment along the eastern perimeter were not installed. Areas where the toe drain was eliminated was constructed in accordance with the toe of slope detail where toe drains were not originally proposed (i.e., northern end of the landfill adjacent to the landfill). Both the USEPA and NYSDEC approved the variation.

3.14 CONSTRUCTION PHOTOGRAPHS

A photolog was compiled by Parsons ES during the construction, and is provided in Appendix H to record the progress of work and to provide additional documentation for constructed project elements.

SECTION 4

PRE-FINAL AND FINAL INSPECTIONS

4.1 PRE-FINAL INSPECTION

A pre-final inspection of the Site by the USEPA and the NYSDEC was conducted on June 27, 2000. As a result of the inspection the following items required correction:

- Removal of silt fencing adjacent to the wetland area; and
- Repair of erosion rills (this was subsequently addressed as a maintenance item).

4.2 FINAL INSPECTION

Following the completion of punchlist items identified during the pre-final inspection, a final inspection of the Site was conducted by the USEPA and the NYSDEC on September 19, 2000. With the exception of some remaining silt fence, the remedial construction and punchlist items were determined to be complete and final. The silt fence was removed shortly after the final inspection.

SECTION 5

CERTIFICATION

5.1 NOTICE OF COMPLETION

Parsons ES monitored the closure construction according to generally accepted practices. Based on the field observations made by QC personnel, laboratory and field test data, the record drawings, and data provided by the Contractor, the construction observed at the site generally complied with the Contract Documents and the Remedial Action Plan approved by the USEPA.

5.2 LIMITATIONS

This Remedial Action Report was prepared by Parsons ES for the Niagara County Refuse Site PRP Group. This report applies specifically to the remedial action construction of the NCR Site, in accordance with generally accepted engineering practices. No warranty, expressed or implied, is made.

The observations and monitoring described in this report were made under the conditions stated. Conclusions made in this report were based on these observations and data obtained from both field and laboratory tests that were obtained from randomly spaced samples. Variations on material properties between test samples and locations may occur.

5.3 CERTIFICATION

The following page contains a certification statement issued by Parsons ES that the Site Remedial Action was constructed in accordance with the approved Final Design Report (CRA,1997), and approved field changes to the design.

REMEDIAL ACTION REPORT
Niagara County Refuse Site
NYSDEC Site No. 9-32-026
Town of Wheatfield,
Niagara County, New York

CERTIFICATION STATEMENT

I hereby certify[1], under penalty of law and as a Professional Engineer licensed in the State of New York that this document and all attachments were prepared by Parsons Engineering Science, Inc. (Parsons ES) under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

The purpose of this document, the Final Report, is to present documentation that the Remedial Action for the Niagara County Refuse Site, NYSDEC Site No. 9-32-026, Town of Wheatfield, Niagara County, New York was completed in general conformance with the US Environmental Protection Agency (EPA) approved Final Design Report (Conestoga-Rovers and Associates, 1997). Parsons ES construction inspection personnel were present daily during each construction phase, and documented the observations and data that are presented in this Remedial Action Report.

Eugene W. Melnyk, P.E.
State of New York Professional Engineer
No. 071847-1

Parsons Engineering Science, Inc.
180 Lawrence Bell Drive, Suite 100
Williamsville, New York 14221

[1]. Certification/Certify means to state or declare a professional opinion of conditions whose true properties cannot be known at the time such certification is made, despite appropriate professional evaluation. The professional opinion made is based on limited observations and widely spaced tests. This certification of conditions in no way relieves any other party from meeting requirements imposed by contract or other means, nor does it warranty/guarantee the conditions of the constructed product.

SECTION 6

OPERATION, MAINTENANCE AND MONITORING

6.1 INTRODUCTION

An approved draft Operation and Maintenance (O&M) Plan (Appendix G of the Final Design Report (CRA, 1997)) has been implemented on a routine basis since the completion of the Remedial Action construction. CRA updated the draft O&M Plan to reflect as-built conditions to create the Operation, Maintenance and Monitoring (OMM) Manual, as approved by the USEPA in December 2000. The OMM will be implemented upon certification of completion of the remediation. The OMM Manual may be revised periodically, subject to USEPA approval, in response to field experience gained during implementation and the need to make revisions to improve the function of the OMM Manual.

According to CRA, the OMM Manual was prepared in accordance with the Superfund Remedial Design and Remedial Action Guidance, dated September 1986, OSWER Directive 9355.0-4A. The general elements of the OMM Manual includes the following:

1. Normal operation and maintenance, consisting of:
   a. a description of operation tasks;
   b. a description of maintenance tasks;
   c. a description of prescribed operation conditions; and
   d. a schedule showing frequency of each OMM task.
2. Potential operating problems, including:
   a. a description and analysis of potential operation problems;
   b. a presentation of common remedies or alternatives; and
   c. sources of information regarding problems.
3. Routine monitoring and laboratory testing, including:
   a. a description of monitoring tasks, including, but not limited to, groundwater monitoring by the use of existing monitoring wells, effluent monitoring, and surface water monitoring;
   b. required laboratory testing and data analysis;
   c. required QA/QC; and
   d. monitoring frequency schedule, an expanded schedule for monitoring in a contingency plan, and when to discontinue monitoring.

4. Description of contingency OMM procedures, including:
   a. alternate procedures during system failure to prevent releases or threatened releases to protect public health and the environment; and
   b. analysis of vulnerability and additional resource requirements should a failure occur.
5. Corrective actions, including:
   a. a description of corrective action to be implemented in the event that extracted groundwater exceeds the limits described in the City of North Tonawanda Industrial Wastewater Discharge Permit;
   b. a description of corrective action to be implemented in the event that the cap has sustained any form of damage, including, but not limited to, cracking, penetration, and erosion; and
   c. a schedule for implementing these corrective actions.
6. Safety plan, including:
   a. a description of standard safety practices including precautions and necessary safety equipment, etc., for Site personnel; and
   b. safety tasks required in the event of systems failure.
7. Description of equipment, including:
   a. equipment identification;
   b. installation of monitoring components;
   c. maintenance of Site equipment; and
   d. replacement schedule for equipment and installed components.
8. Required records and reporting mechanisms, including:
   a. records for operating costs upon takeover;
   b. mechanism for reporting emergencies;
   c. personnel and maintenance records; and
   d. annual reports to USEPA and NYSDEC.
9. List of spare parts and provisions.

Specific monitoring requirements included in the OMM Manual are summarized in the following sections.

6.2 GROUNDWATER MONITORING

A groundwater monitoring program was established to monitor the effectiveness of the perimeter groundwater collection system. The objective of this monitoring program is to provide data for the demonstration of hydraulic containment, collection, and extraction of Site-related chemicals in the overburden groundwater. Details concerning the groundwater monitoring program are presented in the OMMManual.

The groundwater monitoring program consists of groundwater quality monitoring via samples collected from the perimeter groundwater collection system at Wetwell A, and groundwater monitoring using directly adjacent offsite wells. Although no contaminant plume currently exists within the overburden materials beyond the Site boundary, a limited offsite groundwater monitoring program including chemical sampling will be conducted. There is, however, no advantage to hydraulic monitoring of the offsite groundwater table, as the overburden materials consist of a shallow silt/fill layer (approximately two to five feet), overlying the native clay/till. As a result, any water present in the shallow zone is perched above the regional aquifer and is typically intermittent. Monitoring of this water table beyond the perimeter barrier system and comparing these data to wells installed within the landfill would not prove to be useful. In effect, as long as the perimeter groundwater collection system is operating and water level in this trench is maintained at the pipe invert (approximately top of clay/till surface), outward migration across the perimeter barrier system would not be possible.

Groundwater monitoring will be conducted for a period of five years after completion of Remedial Action construction. After the initial five-year period, the groundwater monitoring program will be assessed to determine the suitability of the monitoring program and the need for modification. Additionally, the data will be evaluated as they are collected and, if warranted, an evaluation with possible modifications will be performed sooner than five years.

The groundwater monitoring program includes protocols to monitor the effluent from the Site to ensure that the requirements of the North Tonawanda Industrial Wastewater Discharge Permit are fulfilled.

6.3 LANDFILL CAP MAINTENANCE AND MONITORING

To ensure that the integrity of the soil cover and gas vents is being maintained, a maintenance and monitoring program will be implemented. The landfill cap maintenance and monitoring program is included in the OMM Manual.

6.4 SURFACE WATER MONITORING

A surface water monitoring program has also been established to ensure surface water management works are operating as designed, and that surface water quality has not been impacted by the Remedial Action (i.e., construction). The surface water monitoring program will be implemented annually for a period of two years, after which a review will be conducted to determine the necessity for continued monitoring. The surface water monitoring program is presented in the OMM Manual.

SECTION 7

RECORD DRAWINGS

7.1 INTRODUCTION

Record drawings to reference post-remedial Site conditions are presented in Appendix I. The electronic file copies of the CRA Final Design drawings were updated by Parsons ES to reflect as-built conditions. The Parsons ES prepared as-built record drawings are contained in Appendix I-1. The record drawings contain as-built Site grading and capping features. Site grading and capping features were recorded via instrument survey by Modi Associates, a subcontractor to Haseley. Modi Associates is a New York State-licensed land surveyor. The record survey prepared by Modi Associates is contained in Appendix I-2. The electronic record survey drawing files were used by Parsons ES to update the CRA Final Design drawing files. Where required, the CRA Final Design drawings were augmented by field measured or observed data.

SECTION 8

REFERENCES

1. Record of Decision, Niagara County Refuse Site, Wheatfield, Niagara County, New York; United States Environmental Protection Agency, September 1993.

2. Consent Decree, Docket 946-849; United States Environmental Protection Agency, February 5, 1995.

3. Final Design Report, Niagara County Refuse Site, Wheatfield, Niagara County, New York; Conestoga-Rovers and Associates, November 1997.