APPENDIX 1

Department of Environmental Conservation

Division of Environmental Remediation

Site Evaluation Report

Bisonite Paint Company, Site No 915010
Town of Tonawanda,
Erie County, New York

December 2008

New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203

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Erie County, New York

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1.0 INTRODUCTION

Remediation of a portion of the Bisonite Paint Company Site was completed in 1996 by 2251 Military Road Associates, Inc. (MRA) under a precursor to the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program (VCP). Following the completion of these remedial activities, the NYSDEC redelineated the boundaries of the site to include only a former settling lagoon located in the northwest portion of the property. No environmental activities have taken place at the site since that time.

This Site Evaluation Report was completed by the NYSDEC to evaluate the existing analytical data associated with the settling lagoon to determine if additional investigation and/or remedial activities are required at the site, and if not, what the appropriate site classification should be. As part of this evaluation, the characteristics, areal extent and hydrogeologic properties of the strata underlying the site were also assessed to determine the effect of the adjacent Town of Tonawanda Landfill on the shallow groundwater flow pattern in the area.

The remaining sections of this report are organized as follows:

- **Section 2.0, Site History and Background:** This section describes the site, and discusses the disposal history and previous investigations completed at the site;

- **Section 3.0, The Voluntary Cleanup Program:** This section describes the remedial activities completed at the site and discusses the results of confirmatory and documentation soil samples;

- **Section 4.0, Site Geology and Hydrogeology:** This section describes the characteristics, areal extent and hydrogeologic properties of the strata underlying the site;

- **Section 5.0, Investigation Results:** This section presents the results of soil, waste and groundwater samples collected from the site;

- **Section 6.0, Discussion and Recommendations:** This section summarizes the findings of Sections 4.0 and 5.0, and makes recommendations for future actions at the site; and

- **Section 7.0, References:** This section contains a list of references utilized or cited in this report.

2.0 SITE HISTORY AND BACKGROUND

2.1 Site Description

The former Bisonite Paint Company ("Bisonite") property consists of four parcels totaling approximately 3.7 acres at 2250 Military Road in the Town of Tonawanda, Erie County, New York (Figures 2-1 and 2-2). The property is bordered on the east by Military Road and commercial properties, on the north by 84 Lumber, on the west by railroad tracks and the Town of Tonawanda Landfill, and on the south by vacant property owned by the Niagara Mohawk Power Corporation (Figure 2-2). The London Norway Corporation, current owner of the 52.12-6-16.2, 52.12-6-17.1 and 52.12-6-17.2 parcels (Figure 2-2), leases all of the original buildings and the Tonawanda Self-Stor facility on the southern portion of the site. The Bisonite Company, Inc. is the reputed owner of the parcel (52.12-6-16.1) containing the settling lagoon (Figure 2-2).

The Bisonite Paint Company Site is listed as a Class 3 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York State ("Registry"). This classification code is given to sites that do not present a significant threat to public health or the environment and that further action could be deferred. The original site consisted of a landspreading area on the southern portion of the property, and a settling lagoon on the northwestern portion of the property (Figure 2-3). Following the remediation of the landspreading area in 1996, the NYSDEC redelineated the boundaries of the site to include only the former settling lagoon. The size of the current site is approximately 0.4 acres.

2.2 Disposal History

The property was formerly utilized by the Bisonite Paint Company from 1947 until May 1, 1991 for the manufacture of water and oil based paints. Prior to 1978, paint pigments and approximately 1,800 gallons per year of spent solvents and mineral spirits were landspread over a one-acre parcel of the property for weed control (Figure 2-3). In addition, a settling lagoon approximately 50 feet long, 30 feet wide, and 8 to 10 feet deep was located on the northwestern portion of the property (Figure 2-3), and utilized for the disposal of metal paint pigments and by-products from the manufacture of water and oil based paints. This waste reportedly contained titanium dioxide, calcium carbonate, lime, clay, calcium hypochlorite, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), toluene and xylenes. Paint wastes were reportedly dumped into an

open trench drain within the Main Manufacturing Building; this drain continued outside the Main Manufacturing Building as an open ditch and discharged to the settling lagoon (Figure 2-3). Spills and leaks of raw chemical product to the open trench drain were also reported.

Landspreading operations ceased in 1978 when the NYSDEC notified Bisonite that wastes must be hauled off site for disposal at an approved facility. Use of the lagoon also ceased in 1978. Over a period of approximately four years, the lagoon was backfilled and by early 1983 was finally capped and seeded. It is unknown, however, if the lagoon was dredged prior to its backfill and closure. A site inspection conducted on November 20, 1985 during a NYSDEC Phase I Investigation noted that the lagoon was not properly covered, while leachate was observed in small ponded areas at the surface. Also observed was a small 3 feet by 7 feet area of stained ground on the side of the former lagoon sloping west toward the railroad tracks.

On July 27, 1990 a site reconnaissance was performed by a NYSDEC contractor as part of a Preliminary Site Assessment. The area where the lagoon was located appeared to be completely covered and was overgrown with grassy vegetation. This was also the case for the former landspreading area. A second site inspection was conducted on December 12, 1990. No additional contamination was observed during the second inspection, but several filled waste drums previously stored on a drum storage pad west of the resin building were removed.

Bisonite manufacturing operations ceased on May 1, 1991 when the company closed and filed for bankruptcy.

2.3 RCRA Consent Order and Cleanup

During the Preliminary Site Assessment the NYSDEC contractor located a 1972 aerial photograph that showed poor housekeeping practices at the site. This photo prompted an informal inspection by the NYSDEC RCRA program in April 1991. A number of concerns regarding the handling, storage, and disposal of paint, paint wastes, and solvents were identified during this preliminary inspection.

A formal RCRA inspection was triggered when, on September 18, 1991, two abandoned box trailers containing nearly 300 drums of waste paint from Bisonite were discovered in the City of

Buffalo outside a warehouse. The RCRA inspection identified approximately 50,000 gallons of waste materials stored in tanks, drums, and 5-gallon pails at the site. Samples collected from waste drums and tanks indicated the presence of several solvents including xylene, toluene, methyl ethyl ketone, and methyl isobutyl ketone at concentrations ranging from low part per million (ppm) to percent levels.

The results of this inspection prompted the NYSDEC to enter into an Order on Consent with Bisonite for the proper cleanup and decommissioning of the site. While the terms of this Order were negotiated, Bisonite proceeded with site cleanup and addressed many of the concerns identified in an early draft of the Order. A final Order on Consent was issued to Bisonite on December 4, 1991, with Bisonite completing decommissioning activities during the Fall of 1992.

The activities addressed under the Order on Consent included on-site tanks, drums, debris, and obviously contaminated surficial areas of the property. This Order, however, did not address soil or groundwater contamination. As a result, the NYSDEC determined that a field investigation for the Preliminary Site Assessment was needed to further evaluate the site.

2.4 The Preliminary Site Assessment

The Preliminary Site Assessment field investigation was conducted during the Fall of 1993 and included the collection of surface soil, subsurface soil, waste, and groundwater samples. While the RCRA inspection confirmed the presence of hazardous waste at the site, the goal of the PSA investigation was to assess whether buried waste (i.e., the former lagoon) existed, and whether contamination at the site could pose a significant threat to public health or the environment through direct contact with contaminated soil or through migration of contaminated groundwater. The PSA identified three areas of concern at the site:

- the former landspreading area;
- the former tank farm area where solvents were handled; and
- the former settling lagoon.

The PSA concluded that surface and subsurface soils were contaminated with elevated concentrations of volatile and semivolatile organic compounds, while metal concentrations exceeded

background levels for eastern U.S. soils. Groundwater underlying the site, however, did not appear to be impacted by waste disposal activities. On the basis of these findings, the site was reclassified to Class 3, indicating that the site did not present a significant threat to public health or the environment.

3.0 THE VOLUNTARY CLEANUP PROGRAM

3.1 General

On April 18, 1996, Mr. James Cornell of 2251 Military Road Associates, Inc. (MRA) and his legal representative, Harter, Secrest & Emery, met with the NYSDEC to discuss a Voluntary Cleanup of the former landspreading and tank farm areas to further MRA's plans to redevelop portions of the property for viable commercial/industrial purposes. The proposed future use of the site would include a mini-storage warehouse complex on the former landspreading portion of the site, with the creation of paved parking areas over the remaining portions of the site.

This section briefly describes both the investigative and remedial activities completed at the site as part of the Voluntary Cleanup. For more detail concerning the remediation portion of this program the reader is referred to the December 1996 Removal Action Implementation Report prepared by Barron & Associates, P.C.

3.2 Test Pit Investigations

Prior to the implementation of the Voluntary Cleanup, it was agreed to by both parties that additional investigation would be required to delineate the horizontal and vertical extent of metals (specifically chromium and lead) contaminated soil in the landspreading area identified during the NYSDEC PSA. It was also agreed that additional investigation would be required in the former tank farm area to delineate the horizontal and vertical extent of volatile organic contaminated soil.

To evaluate the extent of contamination associated with the former tank farm, MRA conducted a limited Test Pit Investigation of this area on April 26, 1996. Samples were not submitted for laboratory analyses, but were screened with a Microtip HL-2000 Photovac air monitoring device. Although these measurements exceeded background levels, they did not document extensive contamination in the former tank farm area of the site.

A Supplemental Test Pit Investigation of the landspreading area was implemented by MRA on May 28, 1996. During this investigation, two rings (10 feet and 20 feet) of test pits were completed around each of the PSA surface soil sample locations (SS-1 through SS-3). Each pit was excavated to a depth of 6 feet, with samples collected from 0"-2" depth, 2' depth, 4' depth, and 6'

depth. The samples collected from 0"-2" depth, 2' depth, and 4' depth were submitted for chemical analysis for total chromium, lead, and zinc, while the samples collected from 6' depth were archived for possible future analysis. Based upon the results of the samples collected from 4' depth, none of the samples collected from 6' depth required analysis.

Analytical results from this initial Test Pit Investigation documented exceedances of the Target Cleanup Goals (1,000 ppm for lead; 50 ppm for chromium; 70 ppm for zinc) at certain locations. These results also indicated that a majority of the contamination, especially chromium and lead, was restricted to the upper two feet of soil. Although several samples collected from 4' depth contained elevated zinc concentrations, most of these samples did not contain elevated concentrations of lead and chromium. These data suggested that the 70 ppm background concentration for zinc that was utilized for the Target Cleanup Goal was too low, possibly owing to the paucity of samples collected from background locations.

Because the Target Cleanup Goals were exceeded for lead and chromium an expanded test pit investigation was conducted on July 2, 1996 to completely delineate the horizontal extent of soil contamination. During this investigation, soil samples were only collected from 1' and 2' depths to more precisely define the vertical extent of contamination.

3.3 Purpose and Objectives of the Removal Action

A Removal Action Work Plan (RAP) was prepared by Waste Stream Technologies, Inc. for MRA and submitted to the NYSDEC in October, 1996. The purpose of the Removal Action was to excavate contaminated soils from the former landspreading and tank farm areas to delist those areas from the site. This Removal Action was necessary for MRA to further its plans to redevelop portions of the property for viable commercial/industrial purposes. The NYSDEC and MRA subsequently entered into an Order on Consent on November 4, 1996 that required MRA to implement the RAP. The overall objectives of the Removal Action were to:

- remove contaminated soil from the delineated areas within the landspreading area that contain total lead and chromium above the Target Soil Cleanup Goals of 1,000 ppm and 50 ppm, respectively;

- remove contaminated soil from the former tank farm area until screening with a PID confirmed that removal was complete; and

- transport excavated soils off site to approved disposal/treatment facilities.

3.4 Soil Excavation and Disposal

The excavation of contaminated soils from the landspreading area of the Bisonite Paint Company Site began on October 14, 1996 and was completed the following day. The total extent of the remediation is shown on Figure 3-1. All excavated soil was placed directly into a dump truck for transport to an on-site staging area where the soil was dumped into discrete piles. During the first day of excavation, the B&A on-site representative observed paint waste within discrete areas of the excavation. As a result, an attempt was made to segregate this material. The segregation of paint waste continued throughout the remainder of the excavation activities.

Upon completion of excavation activities in the landspreading area, confirmatory samples were collected for analysis to confirm that the Target Soil Cleanup Goals had been achieved. Each composite sample consisted of three discrete soil samples, which were submitted under chain-of-custody to Waste Stream Technology, Inc. (WST) for analysis of total lead and chromium. The results from these samples achieved the Target Soil Cleanup Goals for chromium and lead, indicating that the remediation of the landspreading area was complete.

On October 16, 1996, B&A personnel returned to the site to initiate and complete the excavation of the former tank farm area. Due to elevated PID readings, the excavation was expanded beyond the initial boundaries until the PID readings of the floor and sidewalls were 3 ppm or less. Upon achieving these PID readings, the on-site NYSDEC representative inspected the excavation and confirmed that remediation of the former tank farm area was complete. The excavated soils from this excavation were also placed in the on-site staging area.

A total of 354 tons of contaminated soil excavated from the site required off-site disposal. This total included 224 tons of non-hazardous soil and 130 tons of RCRA-hazardous soil (TCLP failure for lead). The hazardous soils were transported to the CWM Chemical Services permitted facility in Model City, New York for disposal, while the non-hazardous soils were transported to

Waste Management's High Acres Landfill in Fairport, New York.

Several of the discrete soil stockpiles did not exceed the Target Soil Cleanup Goals so the NYSDEC determined that these soils could be reused on site. In addition, the VOC results from the former tank farm area soils achieved the NYSDEC's soil cleanup objectives as set forth in Technical and Administrative Guidance Memorandum (TAGM) 4046: Determination of Soil Cleanup Objectives and Cleanup Levels. As a result, the NYSDEC determined that these soils could also be reused on site.

3.5 Site Boundary Delineation

Following the completion of remedial activities, the NYSDEC redelineated the boundaries of the Bisonite Paint Company Site to include only the former settling lagoon. The current Registry description reflects this redelineation.

4.0 SITE GEOLOGY AND HYDROGEOLOGY

The geology and hydrogeology of the Bisonite Paint Company Site are important as the characteristics, areal extent and hydrogeologic properties of the strata underlying the site govern the occurrence and flow of groundwater. These attributes, however, also govern the potential for contaminant migration from the site, and determine the rate and extent of this migration. As a result, this section contains a brief discussion of the geology and hydrogeology of the site. While the focus of the following discussion is the Bisonite Paint Company Site, information from the adjacent Town of Tonawanda Landfill and nearby Spaulding Composites Site (Figure 4-1) is also discussed where appropriate to develop a better understanding of area geology and hydrogeology. Many of the borings and wells completed at these sites have completely penetrated the native deposits, while several borings at the Spaulding Composites Site have been advanced into the underlying Camillus Shale bedrock.

4.1 Site Geology

The stratigraphy of the Bisonite Paint Company Site has been evaluated by examining stratigraphic logs obtained from test borings and monitoring wells completed at the site (Table 4-1). The locations of these borings and monitoring wells are shown on Figure 4-2. The stratigraphic logs evaluated indicate that intrusive activities at the site have been confined to the fill material and the upper 20± feet of the underlying native deposits.

4.1.1 *Fill Material*

Fill material at the Bisonite Paint Company Site was encountered within the former settling lagoon and in borings MW-2 and MW-4, while native deposits were encountered directly at the surface (immediately below a thin organic silt layer) at the other boring locations (Table 4-1). The fill material encountered within the lagoon consisted predominantly of brown to reddish brown silty clay intermixed with brick fragments, white chips, white powder, resin and wood overlying approximately 2 feet of multicolored paint pigments and by-products from paint manufacturing operations. Fill material in the monitoring well borings consisted of dark brown silt intermixed with cinders and charcoal (MW-4) and multicolored silt intermixed with glass and metal fragments (MW-2).

4.1.2 *Glaciolacustrine Deposits*

A glaciolacustrine deposit consisting predominantly of reddish brown to brown silty clay with subangular gravel either underlies the fill material or was encountered directly at the surface (below the thin organic silt layer). This deposit also contained layers of sand, silt, silty sand and fine sand of various thicknesses. These layers were only observed in borings MW-1 and MW-2 located in the southwestern portion of the site (Table 4-1). The upper several feet of the glaciolacustrine deposit are commonly mottled (yellow, brown, orange and gray is common) and contain vertical desiccation cracks to depths of 25 feet or more (URS, 1992; Weston, 1992; Weston, 1997).

None of the borings completed at the Bisonite Paint Company Site completely penetrated the glaciolacustrine deposit; however, several borings completed at the adjacent Town of Tonawanda Landfill and nearby Spaulding Composites Site have penetrated this deposit (Appendix A). These borings indicate that the glaciolacustrine deposit directly overlies glacial till, and ranges in thickness from 36.2 to 65.7 feet in this portion of Tonawanda (Appendix A). At boring BM-6 at the Town of Tonawanda landfill the thickness of this deposit is only 20.0 feet because some of the silty clay was excavated during landfilling activities (Appendix A).

4.1.3 *Glacial Till*

Glacial till was not encountered at the Bisonite Paint Company Site, but was encountered at the adjacent Town of Tonawanda Landfill and nearby Spaulding Composites Site. Stratigraphic logs from these sites indicate that a relatively thin, continuous layer of glacial till underlies the area and mantles the underlying Camillus Shale bedrock. This till consists predominantly of a soft to very compact, moist to wet, reddish brown to gray, heterogeneous mixture of clay, silt and sand containing rock fragments and fine grained, subangular to round gravel. The thickness of this deposit is quite variable, ranging from 2.0 to 37.0 feet (Appendix A). Depth to glacial till is also quite variable, ranging from 38.0 to 67.7 feet in this portion of Tonawanda (Appendix A).

4.1.4 *Camillus Shale*

The uppermost bedrock unit underlying the Bisonite Paint Company Site is the Camillus Shale Formation of the Salina Group. While bedrock was not encountered at the site, it was encountered at the adjacent Town of Tonawanda Landfill and nearby Spaulding Composites Site.

Only borings completed at the Spaulding Composites Site, however, have penetrated this unit, with the deepest boring being completed at a depth of 30 feet below top of rock. The bottom of the Camillus Shale was not penetrated by this boring. The Camillus Shale underlying this portion of Tonawanda is characterized as a light to dark gray, fine grained, moderately to heavily weathered, thin bedded shale containing layers of limestone and dolostone. The Camillus Shale also contains numerous shale and gypsum partings, gypsum filled vugs and gypsum masses. Bedrock cores indicate that the upper 1.5 to 5 feet of this formation is a zone of weathered rubble. Numerous other lightly to heavily weathered shale and gypsum partings, rubble zones, weathered gypsum and shale interbeds, and weathered vertical fractures were observed during the logging of the cores. Vertical fractures were also observed but are rare. Depth to bedrock beneath this portion of Tonawanda is quite variable, ranging from 40.0 to 95.5 feet (Appendix A).

4.2 Site Hydrogeology

To evaluate in detail the hydrogeology of the Bisonite Paint Company Site, data from the adjacent Town of Tonawanda Landfill and nearby Spaulding Composites Site have again been utilized. These data suggest that three distinct hydrogeologic zones underlie this portion of the Tonawanda area: (1) a shallow zone consisting of fill materials and the upper desiccated portion of the glaciolacustrine deposit, (2) an intermediate zone consisting of the lower, unfractured portion of the glaciolacustrine deposit, and (3) a deep zone consisting of the upper Camillus Shale bedrock and the overlying saturated glacial till deposit. Since the monitoring wells at the Bisonite Paint Company Site only encountered fill material and the glaciolacustrine deposit, only the shallow hydrogeologic zone will be discussed in this report.

4.2.1 *Shallow Hydrogeologic Zone*

Thirty-three shallow zone monitoring wells exist in this portion of Tonawanda: three at the Bisonite Paint Company Site, nineteen at the Town of Tonawanda Landfill, and eleven at the Spaulding Composites Site (Figure 4-3; Appendix B). Figure 4-4 illustrates the shallow zone groundwater flow pattern across the area on September 22, 1997. The data utilized to construct these contours are summarized in Table 4-2. Figure 4-4 indicates that shallow zone groundwater flows radially from the Town of Tonawanda Landfill, and generally mirrors the surface topography of the area. This figure also indicates that Bisonite wells MW-1 thru MW-3 are not downgradient

of the site as intended when they were installed. While Bisonite well MW-4 is at a downgradient location, it may be too far south to detect contamination migrating from the settling lagoon.

5.0 INVESTIGATION RESULTS

During the field investigation for the 1993 Preliminary Site Assessment, two soil borings were completed in the settling lagoon, with one waste sample collected from each boring for chemical analysis. The four monitoring wells were also sampled during the PSA. On May 1, 1997 groundwater samples from three of the monitoring wells (well MW-2 was destroyed during the Voluntary Cleanup) were collected by NYSDEC personnel to supplement data obtained during the Preliminary Site Assessment. The waste and groundwater results will be evaluated to determine what future remedial activities, if any, are required at the Bisonite Paint Company Site.

5.1 Lagoon Samples

Two waste samples were collected from the settling lagoon at the Bisonite Paint Company Site during the Preliminary Site Assessment. The locations of these borings are shown on Figure 4-2, while information concerning sample collection and analysis is given in Table 5-1. The samples were submitted to NYTEST Environmental Inc. of Port Washington, New York for chemical analysis of Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides, TCL polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals and cyanide. These samples were further analyzed for hazardous waste characteristics using the Toxicity Characteristic Leaching Procedure (TCLP). The analytical results for these samples are summarized in Table 5-2.

Analytical results were evaluated against the residential and commercial soil cleanup objectives of Table 375-6.8(b) contained in the December 2006 NYSDEC publication entitled "*6NYCRR Part 375: Environmental Remediation Programs*". For contaminants not included in Part 375, the soil cleanup objectives identified in the October 1995 NYSDEC publication entitled "*Technical and Administrative Guidance Memorandum (TAGM) 4046: Determination of Soil Cleanup Objectives and Cleanup Levels*" were utilized. When utilized, the soil cleanup objectives for individual semivolatile organic compounds were taken directly from Table 2 of the TAGM, while the soil cleanup objective for metals were taken directly from Table 4. For metals, TAGM 4046 allows the use of background concentrations so long as the background samples are collected from areas not impacted by the site and any other source of contaminants. Only one background sample, however, was collected during the Preliminary Site Assessment of the Bisonite Paint

Company Site. As a result, the background metals concentrations obtained during investigations at the nearby Spaulding Composites Site were combined with the Bisonite background concentrations to determine the mean background concentrations for this portion of Tonawanda. The site background metals values, when utilized, are given in Table 5-2. The regulatory limits for the hazardous waste characteristics were obtained from the January 1995 NYSDEC publication entitled "*6 NYCRR Part 371: Identification and Listing of Hazardous Wastes*".

The analytical results for the waste samples indicate that five volatile organic compounds were detected in sample B2 at concentrations that exceeded the NYSDEC Part 375 residential soil cleanup objectives (Table 5-2). These compounds include acetone (1,300,000 µg/kg), ethylbenzene (200,000 µg/kg), methylene chloride (1,100,000 µg/kg), toluene (19,000,000 µg/kg) and total xylenes (1,000,000 µg/kg). Concentrations of acetone, methylene chloride, toluene and total xylenes also exceeded the NYSDEC Part 375 commercial soil cleanup objectives (Table 5-2). Acetone and methylene chloride, however, were also detected in the associated laboratory blanks at similar concentrations, suggesting that these contaminants are not site related. Four volatile organic compounds were detected in sample B1, but not at concentrations that exceeded the NYSDEC Part 375 soil cleanup objectives (Table 5-2).

Table 5-2 also indicates that semivolatile organic compounds and PCBs were detected in the two lagoon waste samples. None of the concentrations, however, exceeded the NYSDEC Part 375 or TAGM 4046 soil cleanup objectives (Table 5-2).

Seventeen metals were detected in the lagoon waste samples collected during the Preliminary Site Assessment (Table 5-2). Of these compounds, five were detected at concentrations that exceeded the NYSDEC Part 375 residential soil cleanup objectives, with three of these metals being EPA priority pollutant metals. USEPA priority pollutant metals are toxic metals for which technology-based effluent limitations and guidelines are required by Federal law. The priority pollutant metals exceeding the NYSDEC Part 375 residential soil cleanup objectives (with the number of exceedances and maximum concentrations) include: chromium (1 sample; 154 µg/kg), lead (1 sample; 640 µg/kg) and mercury (1 sample; 6.7 µg/kg). These metals are known paint waste contaminants, with chromium and lead known to have been utilized in the paint manufacturing process at the facility. Other metals that exceeded the NYSDEC Part 375 residential soil cleanup

objectives (with the number of exceedances and maximum concentrations) include: antimony (1 sample; 23.7 µg/kg) and barium (2 samples; 973 µg/kg). Concentrations of barium and mercury (1 sample each) also exceeded the NYSDEC Part 375 commercial soil cleanup objectives (Table 5-2).

The results of the TCLP analysis indicate that neither lagoon waste sample was a characteristic hazardous waste.

5.2 Groundwater

Groundwater samples from four on-site monitoring wells were collected during the Preliminary Site Assessment. The farm well was not sampled during the investigation. The locations of these wells are shown on Figure 4-2, while information concerning sample collection and analysis is given in Table 5-1. The samples were submitted to NYTEST Environmental Inc. of Port Washington, New York for chemical analysis of TCL volatile organic compounds, TCL semivolatile organic compounds, TCL pesticides, TCL PCBs, TAL metals and cyanide. On May 1, 1997 groundwater samples from three of the monitoring wells (well MW-2 was destroyed during the Voluntary Cleanup) were collected by NYSDEC personnel and submitted to Recra Environmental, Inc. of Amherst, New York for chemical analysis of TCL volatile organic compounds, TCL semivolatile organic compounds, TCL pesticides, TCL PCBs and TAL metals (Table 5-1). The analytical results for both rounds of groundwater sampling are summarized in Table 5-3.

The water quality standards and guidance values for groundwater were obtained from the NYSDEC publication entitled "*Technical and Operational Guidance Series (TOGS) 1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*", Division of Water, June 1998. The groundwater standards and guidance values for individual contaminants were taken directly from Table 1 of that document.

The analytical results for the groundwater samples reveal the presence of volatile and semivolatile organic compounds (Table 5-3) including methylene chloride (4 samples), 4-methyl-2-pentanone (1 sample) and bis(2-ethylhexyl)phthalate (1 sample). Of these compounds, only the concentrations of methylene chloride (4 samples) exceeded the NYSDEC groundwater standards or guidance values (Table 5-3). Methylene chloride, however, was also detected in the associated

laboratory blanks at similar concentrations, suggesting that this contaminant is not site related. The absence of methylene chloride in the 1997 groundwater samples supports this conclusion. Dichloroethene and bis(2-ethylhexyl)phthalate were detected in the 1997 groundwater samples, but at concentrations that did not exceed the NYSDEC groundwater standards (Table 5-3).

Pesticides and PCBs were not detected in any of the groundwater samples collected from the Bisonite Paint Company Site (Table 5-3).

Seventeen metals were detected in the groundwater samples collected from the Bisonite Paint Company Site (Table 5-3). Of these compounds, five were detected at concentrations that exceeded the NYSDEC groundwater standards or guidance values, with only antimony being an EPA priority pollutant metal. This metal was detected in three of the Preliminary Site Assessment samples at concentrations ranging from 39.4 to 47.2 µg/L (Table 5-3). Antimony, however, was not detected in any of the 1997 groundwater samples (Table 5-3). Other metals that exceeded the NYSDEC groundwater standards or guidance values (with the number of exceedances and maximum concentrations) include: iron (7 samples; 12,900 µg/L), magnesium (7 samples; 132,000 µg/L), manganese (3 samples; 526 µg/L) and sodium (6 samples; 83,200 µg/L). Aluminum and calcium were also detected at significant concentrations, ranging from 1,460 to 7,970 µg/L, and 55,800 to 156,000 µg/L, respectively. There are no NYSDEC groundwater standards or guidance values for these contaminants. Cyanide was not detected in any of the samples in which this contaminant was analyzed (Table 5-3).

6.0 DISCUSSION AND RECOMMENDATIONS

6.1 Discussion

The objective of this report was to evaluate the existing analytical data associated with the settling lagoon at the Bisonite Paint Company Site to determine if additional investigation and/or remedial activities are required, and if not, what the appropriate site classification should be (e.g., Class 4 or N). As part of this evaluation, the characteristics, areal extent and hydrogeologic properties of the strata underlying the site were assessed. In addition, the effect of the adjacent Town of Tonawanda Landfill on the shallow groundwater flow pattern in the area was also evaluated. This section discusses the results presented in Sections 4.0 and 5.0 as they relate to the stated objective.

6.1.1 *Hazardous Waste Presence*

The results of the TCLP analysis conducted on lagoon waste samples during the Preliminary Site Assessment indicate that lagoon waste is not a characteristic hazardous waste. However, based upon the significant concentrations of toluene (maximum concentration 19,000,000 µg/kg) and total xylenes (maximum concentration 1,000,000 µg/kg) in this waste, the presence of total xylenes and toluene in the waste drums sampled during the 1991 RCRA investigation, reported spills and leaks of raw chemical product to the open trench drain within the Main Manufacturing Building and the connection of this drain with the settling lagoon through an open ditch, the lagoon waste is likely a "listed hazardous waste" as defined by 6 NYCRR Part 371. These wastes include U220 (toluene) and U249 (xylene).

Lagoon waste also contains barium (maximum concentration 973 µg/kg), chromium (maximum concentration 154 µg/kg), lead (maximum concentration 640 µg/kg) and mercury (maximum concentration 6.7 µg/kg) at concentrations that exceeded the NYSDEC Part 375 residential soil cleanup objectives (Table 5-2). The concentration of barium and mercury also exceeded the NYSDEC Part 375 commercial soil cleanup objectives (Table 5-2). These metals are known paint waste contaminants.

6.1.2 *Groundwater Monitoring Results*

Metals were the principle contaminants detected in groundwater samples collected from the

Bisonite Paint Company Site (Table 5-3). Of these compounds, five were detected at concentrations that exceeded the NYSDEC groundwater standards or guidance values (with the number of exceedances and maximum concentrations) including: antimony (3 samples; 47.2 µg/L), iron (7 samples; 12,900 µg/L), magnesium (7 samples; 132,000 µg/L), manganese (3 samples; 526 µg/L) and sodium (6 samples; 83,200 µg/L). A groundwater contour map constructed from water level data from the Town of Tonawanda Landfill, the Spaulding Composites Site and the Bisonite Paint Company Site reveals that shallow zone groundwater flows radially from the Town of Tonawanda Landfill (Figure 4-4), indicating that Bisonite wells MW-1 thru MW-3 are not downgradient of the site. While Bisonite well MW-4 is at a downgradient location, it may be too far south of the settling lagoon to detect any contamination migrating from it. As a result, the existing groundwater results are not useful in evaluating the impact of the settling lagoon on shallow groundwater underlying the site.

6.2 Recommendations

Hazardous waste (U220 - toluene and U249 - xylene) has been documented at the Bisonite Paint Company Site. This waste also contains barium, chromium, lead and mercury at concentrations that exceed the NYSDEC Part 375 residential soil cleanup objectives (Table 5-2). The concentration of barium and mercury also exceeded the NYSDEC Part 375 commercial soil cleanup objectives (Table 5-2). These metals are known paint waste contaminants. The analytical results obtained during the Preliminary Site Assessment, however, did not suggest that a significant threat to the environment exited; shallow groundwater underlying the site has not been impacted, and other environmental receptors such as surface water, wetlands, and streams are not located near the site. On the basis of these findings, the site was reclassified to Class 3 in 1996, indicating that the site did not present a significant threat to public health or the environment and that further action could be deferred. A regional groundwater contour map developed in 1997 reveals that Bisonite wells MW-1 thru MW-3 are not downgradient of the site as intended when they were installed, and that Bisonite well MW-4 may be too far south of the settling lagoon to detect any contamination migrating from it. As a result, it is recommended that the Bisonite Paint Company Site remain in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as a Class 3 site. It is further recommended that additional assessment of the settling lagoon be completed, including lagoon waste sampling and analysis, and the installation of additional downgradient monitoring wells to assess the impact of the settling lagoon on shallow groundwater underlying the site.

7.0 REFERENCES

Barron & Associates, 1996, Removal Action Implementation Report, 2250 Military Road: Barron & Associates, P.C., Clarence, New York.

Dunn, 1993, Preliminary Site Assessment Report, Bisonite Paint Company: Dunn Engineering Company, Buffalo, New York.

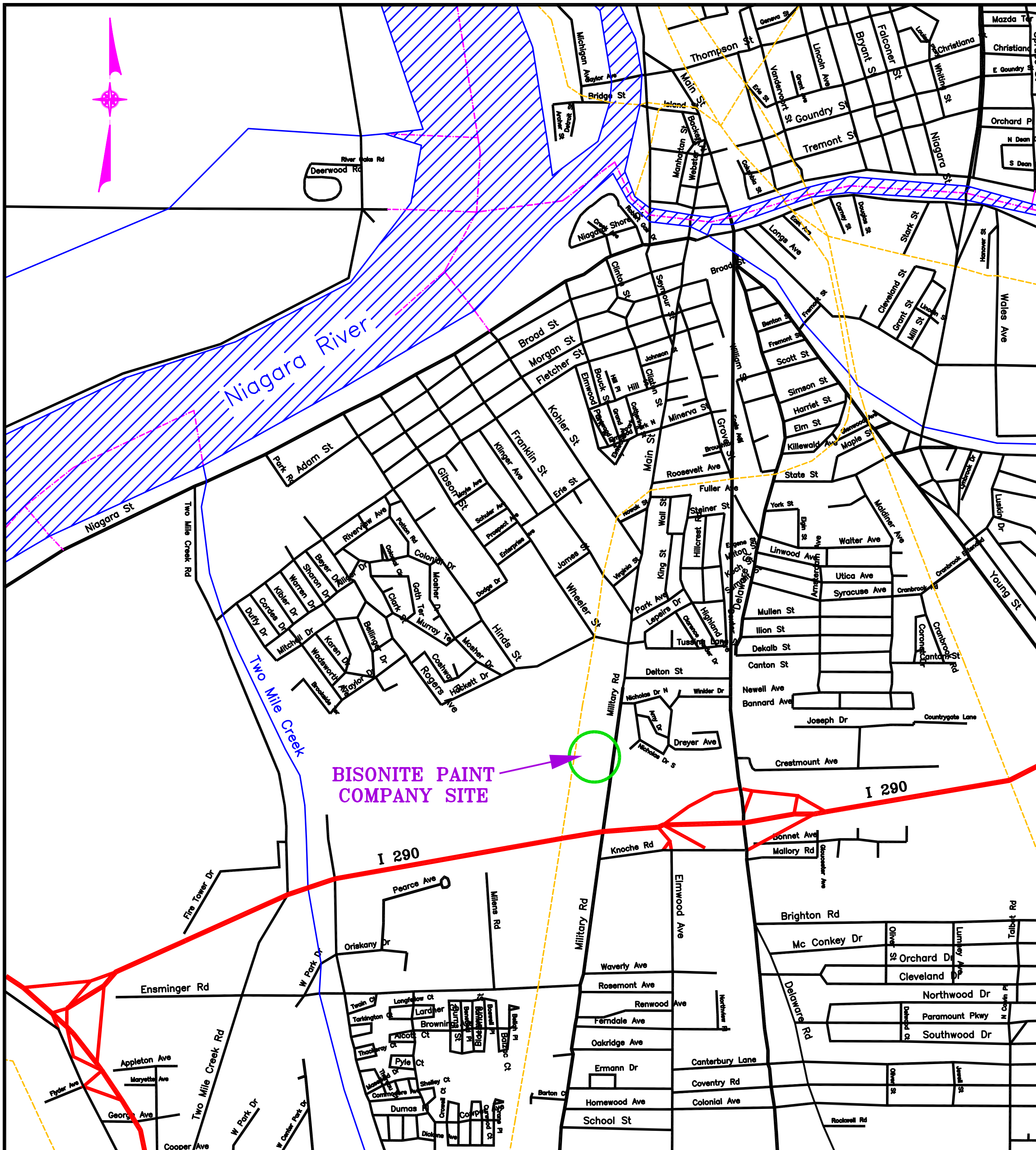
NYSDEC, 1995, Determination of Soil Cleanup Objectives and Cleanup Levels: New York State Department of Environmental Conservation, Division of Environmental Remediation Technical and Administrative Guidance Memorandum # HWR-95-4046, Albany, New York.

NYSDEC, 1995, Identification and Listing of Hazardous Wastes, New York State Codes, Rules and Regulations Title 6, Part 371: New York State Department of Environmental Conservation, Division of Hazardous Substances Regulation, Albany, New York.

NYSDEC, 1998, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations: New York State Department of Environmental Conservation, Division of Water Technical and Operational Guidance Series (1.1.1), Albany, New York.

NYSDEC, 2006, 6 NYCRR Part 375: Environmental Remediation Programs, Restricted Residential Soil Cleanup Objectives: New York State Department of Environmental Conservation, Division of Environmental Remediation, Albany, New York.

FIGURES



Tonawanda East & West Quadrangles; Buffalo East & West Quadrangles

Scale Depends on Final Plotted Size

BISONITE LOCATION MAP

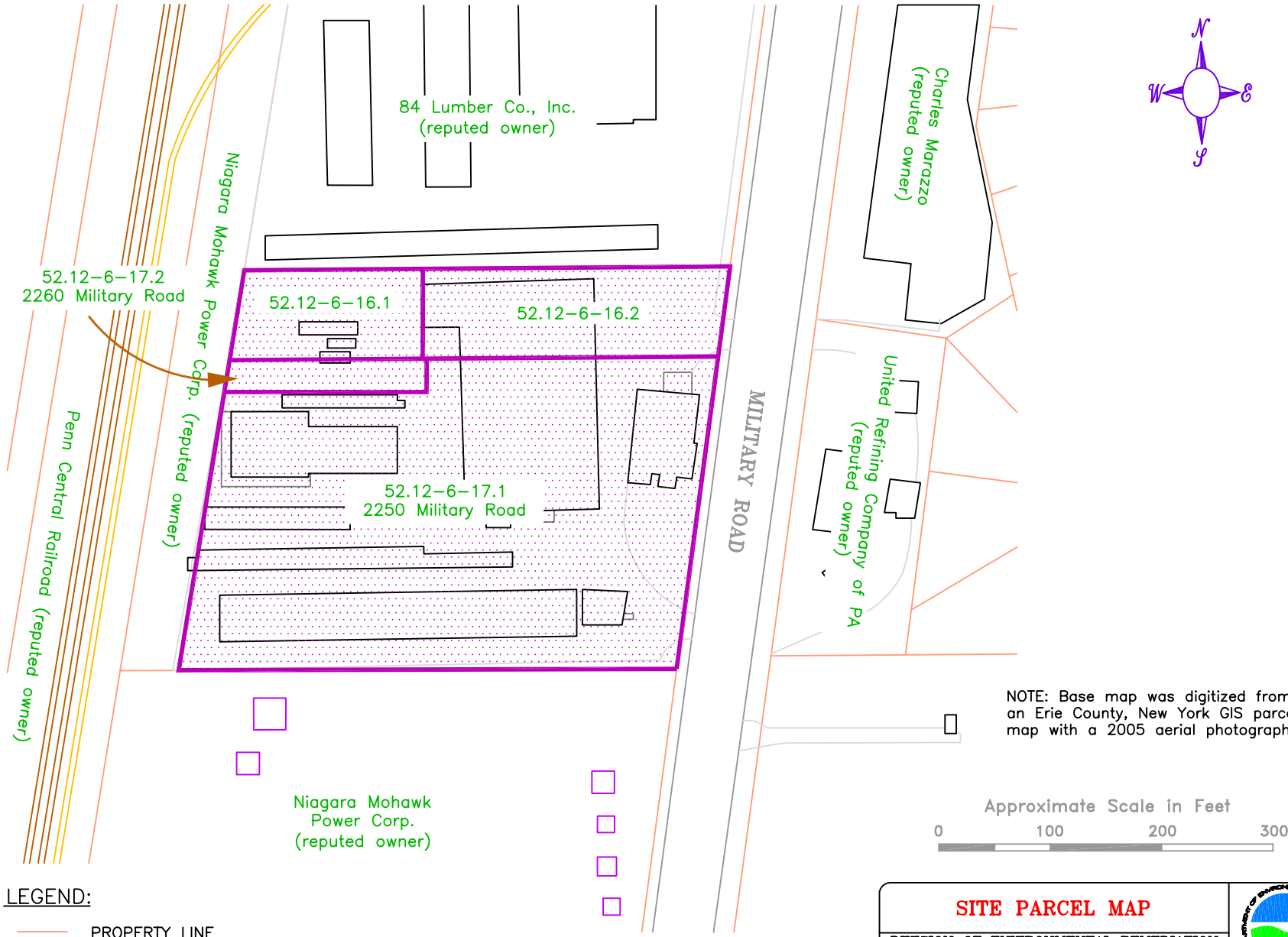
DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/12/08 **DRAWING:** Location Map.dwg

SITE: BISONITE PAINT COMPANY SITE

FIGURE 2-1

DEPARTMENT OF ENVIRONMENTAL CONSERVATION • NEW YORK STATE •

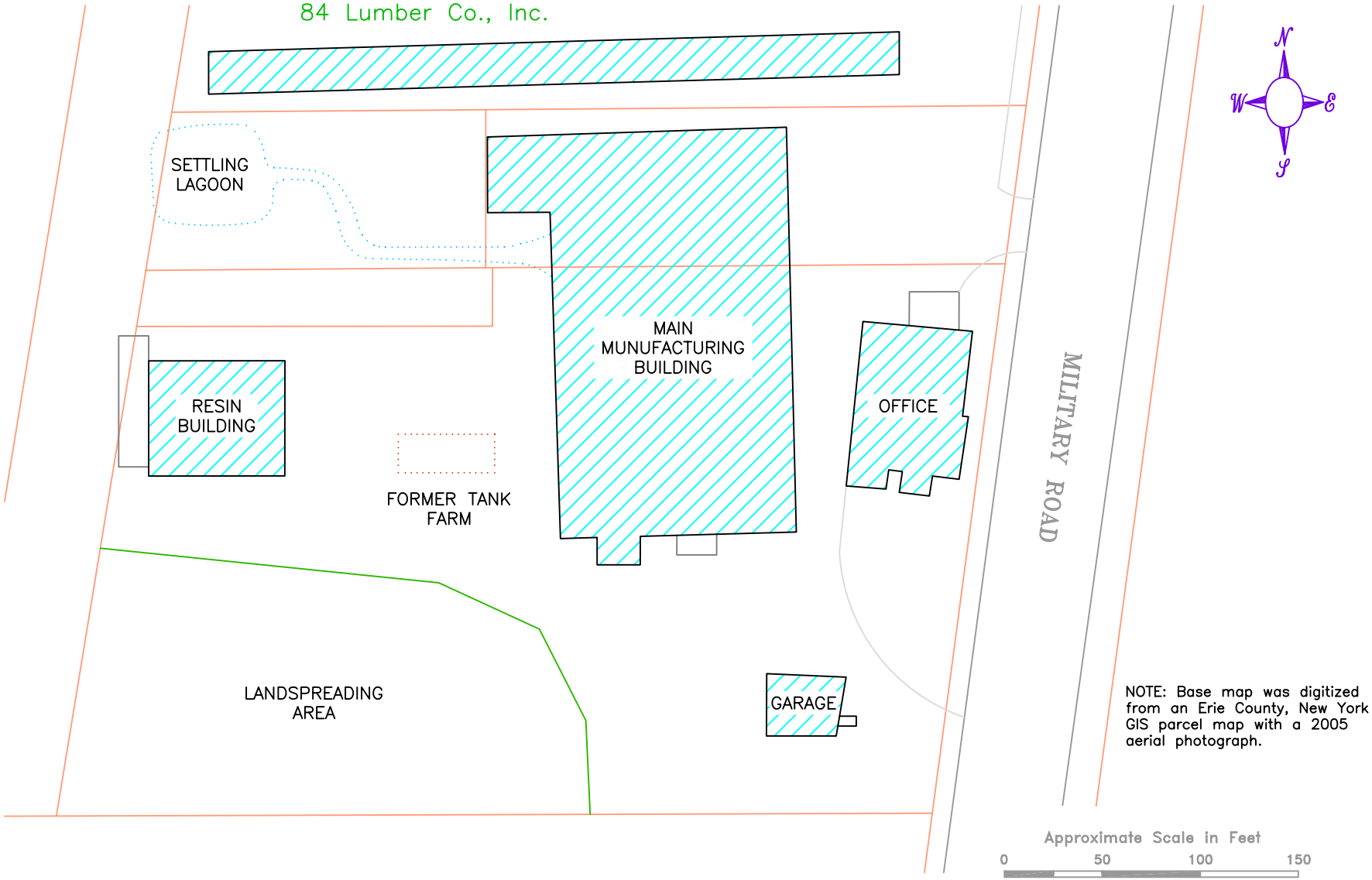


SITE PARCEL MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/15/08 DRAWING: Bisonite Site Map.dwg

PROJECT: BISONITE PAINT COMPANY SITE FIGURE 2-2



HISTORICAL SITE FEATURES MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/15/08 DRAWING: Bisonite Site Map.dwg

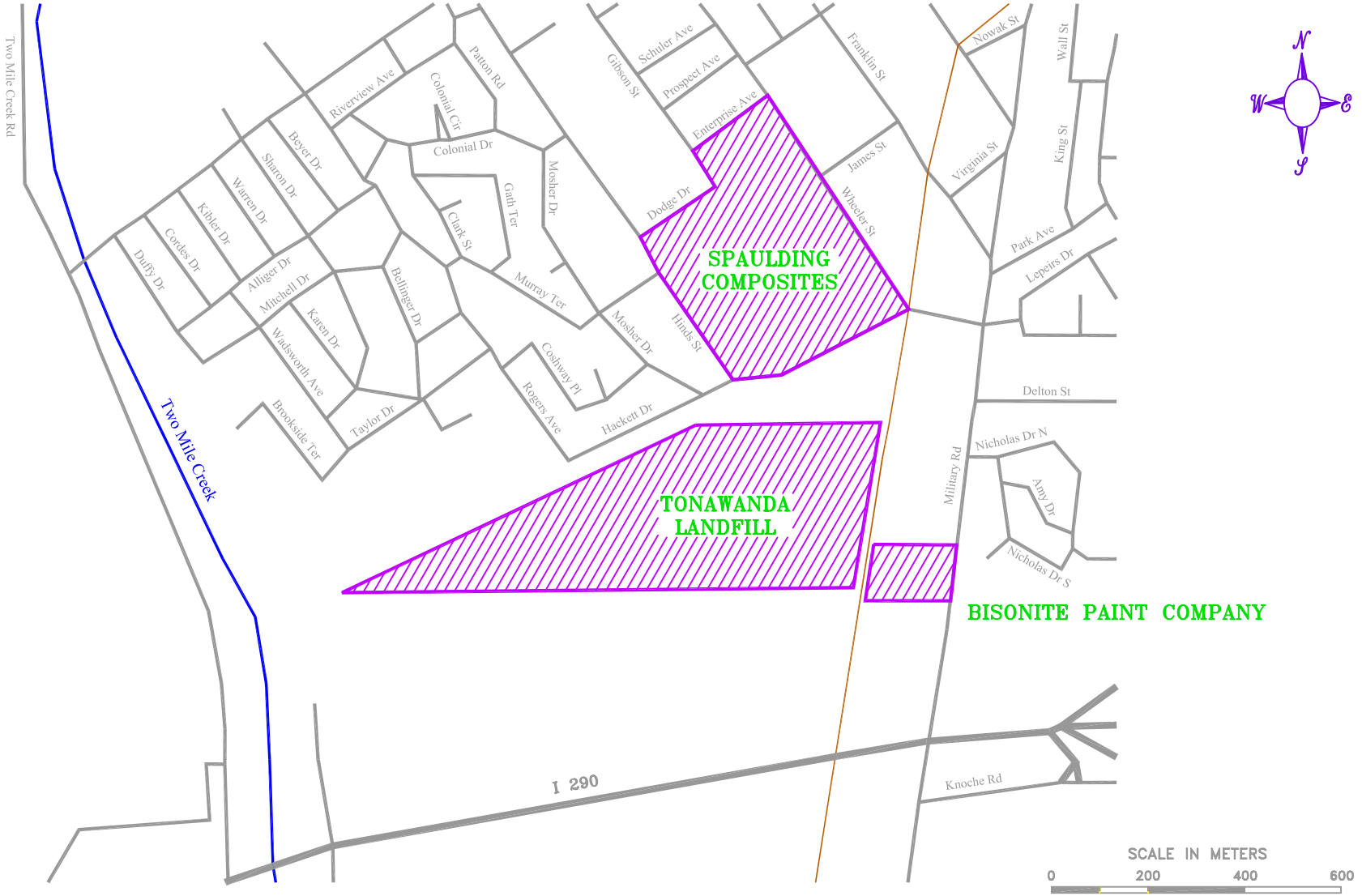
PROJECT: BISONITE PAINT COMPANY SITE FIGURE 2-3

EXTENT OF EXCAVATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/15/08 DRAWING: Bisonite Site Map.dwg

PROJECT: BISONITE PAINT COMPANY SITE FIGURE 3-1



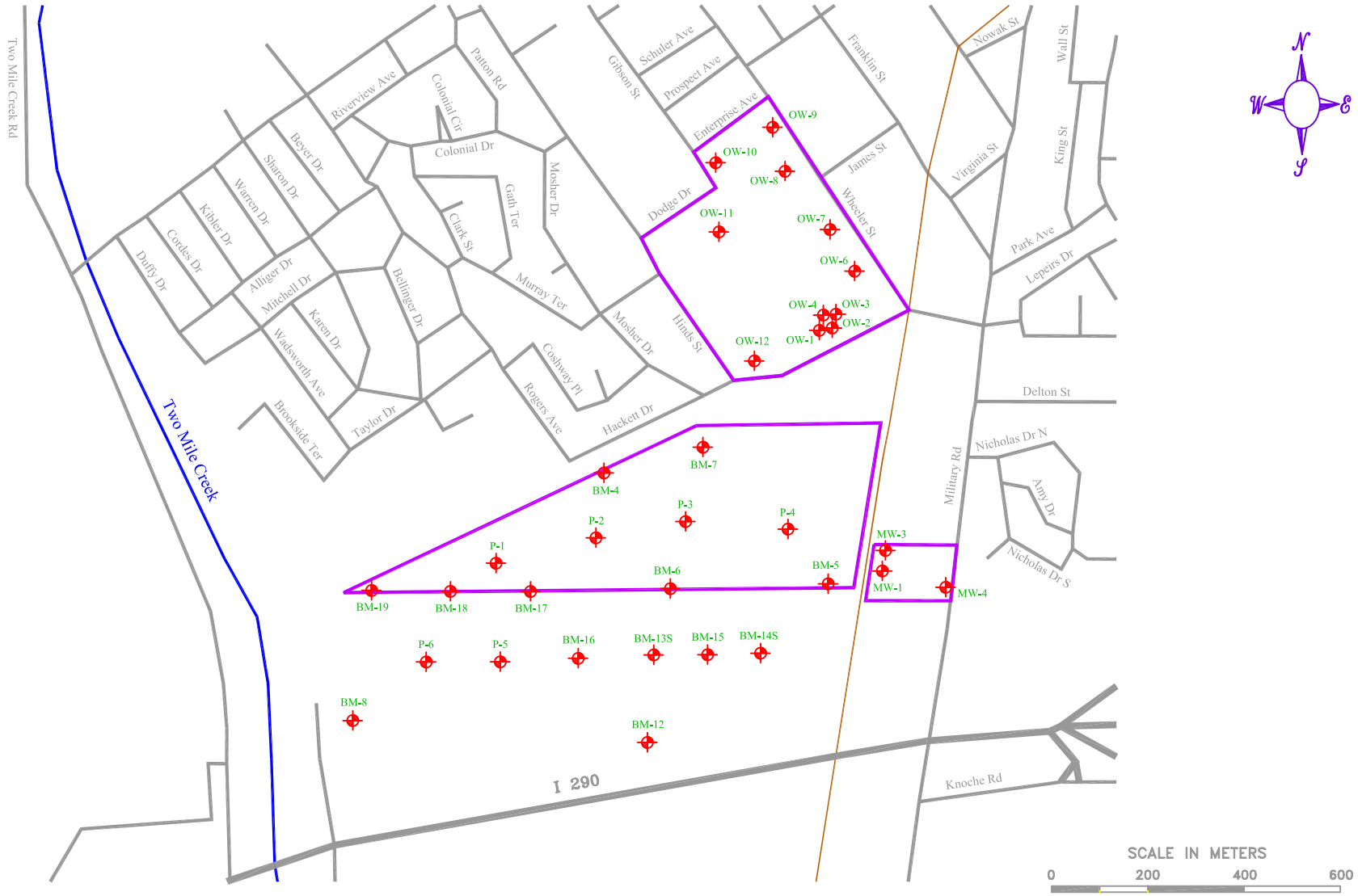
SITE LOCATION MAP	
DIVISION OF ENVIRONMENTAL REMEDIATION	
DATE: 06/23/08	DRAWING: Bisonite Area Map.dwg
SITE NAME: BISONITE PAINT COMPANY SITE	FIGURE 4-1

SOIL BORING AND MONITORING WELL LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/15/08 DRAWING: Bisonite Site Map.dwg

PROJECT: BISONITE PAINT COMPANY SITE FIGURE 4-2



LEGEND:

MONITORING WELL LOCATION

MONITORING WELL LOCATION MAP		
DIVISION OF ENVIRONMENTAL REMEDIATION		
DATE: 06/23/08	DRAWING: Bisonite Area Map.dwg	
SITE NAME: BISONITE PAINT COMPANY SITE		FIGURE 4-3

LEGEND:

MONITORING WELL LOCATION

SHALLOW ZONE GROUNDWATER CONTOUR MAP – SEPTEMBER 1997

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 06/23/08 | DRAWING: Bisonite Area Map.dwg

SITE NAME: BISONITE PAINT COMPANY SITE

FIGURE 4-4

TABLES

Table 4-1.
Stratigraphic Summary of Borings Completed at the Bisonite Paint Company Site.
All Depths and Elevations are Measured in Feet.

Boring Number	Ground Surface Elevation	Topsoil			Fill			Reddish Brown Silty Clay			Sandy Silty & Silty Sand		
		Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness
B-1	614.5*	N/A			0.0	614.50	8.0	8.0	606.50	> 4.0			
B-2	614.5*	N/A			0.0	614.50	8.3	8.3	606.20	> 1.7			
MW-1	614.12	0.0	614.12	0.3	N/A			0.3	613.82	4.2	4.5	609.62	> 15.5
MW-2	616.16	0.0	616.16	0.3	0.3	615.86	3.7	4.0	612.16	11.0	15.0	601.16	> 9.0
MW-3	614.51	0.0	614.51	0.3	N/A			0.3	614.21	> 21.7			
MW-4	612.99	0.0	612.99	0.3	0.3	612.69	1.3	1.6	611.39	>20.4			

***** **Estimated Elevation.**
N/A **Not Applicable.**

Table 4-2.
Groundwater Elevations in Shallow Zone Wells Installed in the Study Area.
(All water levels and elevations measured in feet)

Well Designation	Top of Riser Elevation	12/20/95		3/25/96		6/12/96		12/19/96		9/22/97	
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Town of Tonawanda Landfill (Unlisted)											
BM-4	621.60	2.12	619.48	1.98	619.62	2.02	619.58	1.97	619.63	6.63	614.97
BM-5	618.91	2.65	616.26	1.78	617.13	2.39	616.52	2.44	616.47	8.64	610.27
BM-6	619.66	3.71	615.95	3.44	616.22	3.62	616.04	3.54	616.12	5.59	614.07
BM-7	625.24	3.85	621.39	3.68	621.56	4.01	621.23	3.73	621.51	12.91	612.33
BM-8	600.54	6.25	594.29	6.18	594.36	5.93	594.61	5.37	595.17	8.56	591.98
BM-12	603.24	11.30	591.94	5.51	597.73	8.26	594.98	8.47	594.77	11.90	591.34
BM-13S	605.78	17.71	588.07	11.33	594.45	3.02	602.76	3.81	601.97	13.54	592.24
BM-14S	610.90	4.83	606.07	2.99	607.91	2.90	608.00	2.69	608.21	12.35	598.55
BM-15	606.20	NM	NA	11.58	594.62	13.16	593.04	13.26	592.94	15.89	590.31
BM-16	613.86	12.97	600.89	11.21	602.65	10.60	603.26	11.01	602.85	13.14	600.72
BM-17	621.73	7.47	614.26	6.85	614.88	6.91	614.82	7.20	614.53	9.88	611.85
BM-18	619.51	7.64	611.87	6.68	612.83	6.65	612.86	6.95	612.56	12.29	607.22
BM-19	610.20	3.78	606.42	3.29	606.91	3.90	606.30	3.21	606.99	8.65	601.55
P-1	622.46	NM	NA	4.26	618.20	3.83	618.63	4.83	617.63	6.43	616.03
P-2	628.84	9.31	619.53	9.05	619.79	9.10	619.74	9.14	619.70	10.80	618.04
P-3	636.37	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA
P-4	639.49	17.11	622.38	16.47	623.02	16.98	622.51	16.86	622.63	18.94	620.55
P-5	615.82	7.08	608.74	3.56	612.26	3.72	612.10	2.85	612.97	18.60	597.22
P-6	612.26	17.15	595.11	NM	NA	NM	NA	NM	NA	NM	NA

Table 4-2 (Continued).
Groundwater Elevations in Shallow Zone Wells Installed in the Study Area.
(All water levels and elevations measured in feet)

Well Designation	Top of Riser Elevation	12/20/95		3/25/96		6/12/96		12/19/96		9/22/97	
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Spaulding Composites Site (Registry Number 915050)											
OW-1	605.16	4.56*	600.60	3.49	601.67	6.94**	598.22	4.22+	600.94	7.66	597.50
OW-2	604.35	4.61*	599.74	3.59	600.76	6.82**	597.53	4.18+	600.17	7.03	597.32
OW-3	604.32	5.94*	598.38	4.70	599.62	7.14**	597.18	5.34+	598.98	7.42	596.90
OW-4	603.90	4.93*	598.97	4.02	599.88	5.99**	597.91	4.45+	599.45	6.16	597.74
OW-6	601.58	6.69*	594.89	5.83	595.75	6.91**	594.67	6.84+	594.74	7.88	593.70
OW-7	596.67	3.73*	592.94	3.37	593.30	4.70**	591.97	4.50+	592.17	4.50	592.17
OW-8	595.98	7.53*	588.45	7.25	588.73	9.52**	586.46	7.39+	588.59	7.64	588.34
OW-9	593.12	6.93*	586.19	6.35	586.77	7.45**	585.67	6.49+	586.63	8.23	584.89
OW-10	595.96	5.41*	590.55	4.18	591.78	8.65**	587.31	3.74+	592.22	9.77	586.19
OW-11	602.61	9.05*	593.56	8.39	594.22	7.85**	594.76	7.98+	594.63	9.77	592.84
OW-12	610.76	4.39*	606.37	4.12	606.64	7.13**	603.63	3.97+	606.79	9.54	601.22
Bisonite Paint Site (Registry Number 915010)											
MW-1	616.12		616.12	5.40++	610.72		616.12		616.12	5.18	610.94
MW-3	616.76		616.76	4.52++	612.24		616.76		616.76	5.42	611.34
MW-4	613.74		613.74	5.85++	607.89		613.74		613.74	8.32	605.42

***** **Water level measured on December 27, 1995 .**
+ **Water level measured on November 21, 1996 .**
NM **Not Measured.**
****** **Water level measured on July 22, 1996 .**
++ **Water level measured on April 30 and May 1, 1997.**
NA **Not Applicable.**

Table 5-1.
Summary Key for Samples Collected at the Bisonite Paint Company Site and Discussed in this Report.

Sample ID	Report ID	Date Sampled	Time Sampled	Analytical Parameters	Comments	Table Reference
Waste Samples						
BIS-B1-4-6	B1	10/26/93	1020	VOCs, SVOCs, Pesticides, PCBs, Metals, Cyanide, TCLP	Silty clay with layered white fragments and fibrous dried resin from soil boring B-1	Table 5-2
BIS-B2-6-8	B2	10/26/93	1110	VOCs, SVOCs, Pesticides, PCBs, Metals, Cyanide, TCLP	Multicolored resin from soil boring B-2	Table 5-2
Groundwater Samples						
BIS-MW-1	MW-1	11/04/93	1330	VOCs, SVOCs, Pesticides, PCBs, Metals, Cyanide	Monitoring Well MW-1	Table 5-3
A51801	MW-1	05/01/97	1045	VOCs, SVOCs, Pesticides, PCBs, Metals	Monitoring Well MW-1	Table 5-3
BIS-MW-2	MW-2	11/04/93	1430	VOCs, SVOCs, Pesticides, PCBs, Metals, Cyanide	Monitoring Well MW-2	Table 5-3
BIS-MW-3	MW-3	11/04/93	1400	VOCs, SVOCs, Pesticides, PCBs, Metals, Cyanide	Monitoring Well MW-3	Table 5-3
A51803	MW-3	05/01/97	1015	VOCs, SVOCs, Pesticides, PCBs, Metals	Monitoring Well MW-3	Table 5-3
BIS-MW-4	MW-4	11/04/93 & 11/08/93	1545 & Unknown	VOCs, SVOCs, Pesticides, PCBs, Metals, Cyanide	Monitoring Well MW-4	Table 5-3
A51804	MW-4	05/01/97	0950	VOCs, SVOCs, Pesticides, PCBs, Metals	Monitoring Well MW-4	Table 5-3

VOCS **Volatile organic compounds.**
SVOCS **Semivolatile organic compounds.**
PCBs **Polychlorinated biphenyls.**
TCLP **Toxicity Characteristic Leaching Procedure.**

Table 5-2.
Analytical Results of Lagoon Samples Collected During the State Funded PSA of the Bisonite Paint Company Site.

Sample Number Date Sampled Sample Depth Sample Location	Part 375 Residential Soil Cleanup Objective *	Part 375 Commercial Soil Cleanup Objective *	B1 09/03/93 4.0' - 6.0' Soil Boring 1	B2 09/17/93 6.0' - 8.0' Soil Boring 2
Volatile Organic Compounds (µg/kg or ppb)				
Acetone	100,000	500,000		**1,300,000 BJD**
Benzene	2,900	44,000		210.0
2-Butanone	100,000	500,000		54.0
Ethylbenzene	30,000	390,000	14.0	**200,000 DJ**
Methylene Chloride	51,000	500,000	11 BJ	**1,100,000 BJD**
Tetrachloroethene	5,500	150,000		10 J
Toluene	100,000	500,000		**19,000,000 D**
Total Xylenes	100,000	500,000	36.0	**1,000,000 D**
VOC TIC's	NS	NS	41 J	26,310 J
Semivolatile Organic Compounds (µg/kg or ppb)				
Bis(2-ethylhexyl)phthalate	50,000 +	NS	590 B	7,700 B
2-Methylnaphthalene	36,400 +	NS		610 J
Naphthalene	100,000	500,000		3,900 J
SVOC TIC's	NS	NS	11,926 J	156,600 J
PCBs (µg/kg or ppb)				
Aroclor-1242	-----	-----	28 J	
Aroclor-1254	-----	-----	27 J	190 J
Total PCBs	1,000	1,000	55 J	190 J
Inorganic Compounds (mg/kg or ppm)				
Aluminum	SB (13,333) +	NS	11,700	10,300
Antimony	SB (13.5) +	NS	11.5	**23.7**
Arsenic **	16.0	16.0	3.5	1.9 B
Barium	350.0	400.0	**973.0**	**350.0**
Beryllium **	14.0	590.0	0.62 B	0.32 B
Cadmium **	2.5	9.3		1.4
Chromium **	36.0	1,500	19.9	**154.0**
Cobalt	30.0 +	NS	12.1	28.4

Table 5-2 (Continued).
Analytical Results of Lagoon Samples Collected During the State Funded PSA of the Bisonite Paint Company Site.

Sample Number Date Sampled Sample Depth Sample Location	Part 375 Residential Soil Cleanup Objective *	Part 375 Commercial Soil Cleanup Objective *	B1 09/03/93 4.0' - 6.0' Soil Boring 1	B2 09/17/93 6.0' - 8.0' Soil Boring 2
Inorganic Compounds (Continued)				
Copper **	270.0	270.0	18.5	39.2
Iron	SB (23,450) +	NS	21,900	17,500
Lead **	400.0	1,000	46.7	**640.0**
Manganese	2,000	10,000	450.0	371.0
Mercury **	0.81	2.8	0.69	**6.7**
Nickel **	140.0	310.0	22.5	16.7
Silver **	36.0	1,500	1.5 B	1.6 B
Vanadium	150.0 +	NS	27.9	20.8
Zinc **	2,200	10,000	109.0	669.0

***** 6 NYCRR Part 375: Environmental Remediation Programs, Restricted Use Soil Cleanup Objectives, NYSDEC, 2006.
****** EPA priority pollutant metal.
+ NYSDEC Technical and Guidance Memorandum (TAGM) 4046: Determination of Soil Cleanup Objectives and Cleanup Levels, 1995.
B Analyte detected in the associated blank, as well as in the sample (organics); or the value is greater than or equal to the instrument detection limit, but less than the contract required detection limit (inorganics).
D Compound identified in an analysis at a secondary dilution factor.
J Compound reported at an estimated concentration below the sample quantitation limit.
NS No standard or guidance value available.
SB Site background concentration determined from investigations at the nearby Spaulding Composites Site and the Bisonite Paint Company Site.

Blanks indicate that the sample was analyzed for the associated compound but it was not detected.
Shaded values equal or exceed the Part 375 residential or TAGM 4046 soil cleanup objectives.
Hachured values equal or exceed both the Part 375 residential and commercial soil cleanup objectives.

Table 5-3.
Analytical Results of Groundwater Samples Collected from The Bisonite Paint Company Site in November 1993 and May, 1997.

Well Number	Groundwater Standard *	MW-1		MW-2		MW-3		MW-4	
Date Sampled		11/04/93	05/01/97	11/04/93	05/01/97	11/04/93	05/01/97	11/04/93	05/01/97
Volatile Organic Compounds (µg/L or ppb)									
Methylene Chloride	5.0	**10 B**		**11 B**	NA	**9 BJ**		**13 B**	
4-Methyl-2-Pentanone	NS			9 J	″				
1,2-Dichloroethene (total)	5.0		4 J		″				
Semivolatile Organic Compounds (µg/L or ppb)									
Bis(2-ethylhexyl)phthalate	5.0			2 BJ	NA		1 J		
Semi-Volatile TIC's	NS	240 J	174 J	90 J	″	63 J	134 J	180 J	97 J
Inorganic Compounds (µg/L or ppb)									
Aluminum	NS	4,980	7,560 N	4,510	NA	2,450	1,460 N	7,970	5,010 N
Antimony **	3.0	**39.4 B**		**47.2 B**	″			**44.5 B**	
Arsenic **	25.0				″				
Barium	1,000	118 B	138 B	97.2 B	″	105 B	63.5 B	277 B	69.2 B
Beryllium **	3.0 G				″				
Cadmium **	5.0				″	4.3 B			
Calcium	NS	111,000	101,000	111,000	″	55,800	63,700	113,000	156,000
Chromium **	50.0	12.1 B	9.6 B	9.4 B	″			11.6 B	
Cobalt	NS		5.2 B		″				2.4 B
Copper **	200.0	11.8 B	36.0		″		16.3 B		8.0 B
Iron	500.0	**7,930**	**11,200**	**5,510**	″	**3,990**	**1,450**	**12,900**	**4,180**
Lead **	25.0	9.3	12.4	5.9	″	3.6	ND	7.3	2.6 B

Table 5-3 (Continued).
Analytical Results of Groundwater Samples Collected from The Bisonite Paint Company Site in November 1993 and May, 1997.

Well Number	Groundwater Standard *	MW-1		MW-2		MW-3		MW-4	
Date Sampled		11/04/93	05/01/97	11/04/93	05/01/97	11/04/93	05/01/97	11/04/93	05/01/97
Inorganic Compounds (Continued)									
Magnesium	35,000 G	**51,900**	**43,000**	**92,700**	NA	**120,000**	**154,000**	**102,000**	**132,000**
Manganese	300.0	**367.0**	**351.0**	282.0	″	168.0	66.1	**526.0**	104.0
Mercury **	0.7				″				
Nickel **	100.0		15.4 B		″		8.3 B		18.0 B
Potassium	NS	5,800	4,260 B	4,430	″	4,340	6,420	6,680	6,540
Silver **	50.0				″				
Sodium	20,000	**44,400**	**46,300**	14,300	″	**35,500**	**47,900**	**42,400**	**83,200**
Vanadium	NS	14.9 B	15.4 B	10.8 B	″	ND	4.1 B	11.5 B	9.2 B
Zinc **	2,000 G	60.0	170.0	31.6	″	21.7	73.9	50.6	88.5
Cyanide	200.0		NA		″		NA		NA

***** **NYSDEC Ambient Water Quality Standards and Guidance Values, June 1998.**
****** **EPA priority pollutant metal.**
B **Analyte was detected in the associated blank as well as the sample (organics) or value greater than or equal to the instrument detection limit, but less than the contract required detection limit (inorganics).**
G **Guidance value.**
J **Compound reported at an estimated concentration below the reporting limit.**
N **Spike sample recovery is not within the quality control limits.**
NA **Not analyzed.**
NS **No standard or guidance value available.**
Blanks indicate that the sample was analyzed for the associated compound but it was not detected.
Shaded values equal or exceed the NYSDEC groundwater standards or guidance values.

APPENDIX A

SOIL BORING AND MONITORING WELL STRATIGRAPHIC SUMMARY TABLES

Table A-1.
Stratigraphic Summary of Borings, Test Pits, and Monitoring Wells Installed Near the Bisonite Paint Company Site.

Well or Boring Number	UTM Coordinates		Ground Surface Elevation	Glaciolacustrine Deposit			Glacial Till			Camillus Shale	
	Easting	Northing		Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation
Bisonite Paint Company (915010)											
B-1	NS	NS	614.5*	8.0	606.5	> 4.0					
B-2	NS	NS	614.5*	8.3	606.2	> 1.7					
MW-1	672450	4762585	614.1	0.3	613.8	> 19.7					
MW-2	NS	NS	616.2	4.0	612.2	> 20.0					
MW-3	672456	4762628	614.5	0.3	614.2	> 21.7					
MW-4	672582	4762553	613.0	1.6	611.4	> 20.4					
Spaulding Composites Site (915050)											
OW-A1	672340	4763066	602.8	No Stratigraphic Log Available							
OW-B2	672333	4763142	600.4	No Stratigraphic Log Available							
OW-1	672313	4763084	602.5	2.3	600.2	> 17.7					
OW-2	672340	4763089	602.4	Well Augered to Depth Without Sampling - See OBW-2							
OBW-2	672337	4763085	601.6	0.2	601.4	45.8	46.0	555.6	12.0	58.0	543.6
OW-3	672347	4763118	601.7	4.0	597.7	> 16.0					
OW-4	672321	4763116	602.0	2.0	600.0	> 18.0					
OW-6	672385	4763208	599.2	1.0	598.2	> 19.0					
OW-7	672333	4763294	597.0	1.2	595.8	> 18.8					
OW-8	672238	4763414	596.0	1.0	595.0	> 19.0					
OW-9	672211	4763505	591.1	Well Augered to Depth Without Sampling - See BW-9							
BW-9	672215	4763506	591.3	1.0	590.3	37.0	38.0	553.3	2.0	40.0	551.3
OW-10	672094	4763430	593.9	Well Augered to Depth Without Sampling - See BW-10							
BW-10	672092	4763433	594.0	2.3	591.7	36.2	38.5	555.5	5.5	44.0	550.0
OW-11	672102	4763286	599.9	6.4	593.5	> 13.6					
OW-12	672179	4763019	608.8	Well Augered to Depth Without Sampling - See BW-12							
BW-12	672171	4763016	609.0	0.7	608.3	46.8	47.5	561.5	6.5	54.0	555.0
MW-A	672258	4763469	593.5*	4.0	589.5	> 16.0					
MW-B	672277	4763439	593.5*	2.0	591.5	> 18.0					
BW-C3	672066	4763252	601.4	No Stratigraphic Log Available							

Table A-1 (Continued).
Stratigraphic Summary of Borings, Test Pits, and Monitoring Wells Installed Near the Bisonite Paint Company Site.

Well or Boring Number	UTM Coordinates		Ground Surface Elevation	Glaciolacustrine Deposit			Glacial Till			Camillus Shale	
	Easting	Northing		Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation
Spaulding Composites Site (continued)											
BH-14	NS	NS	596.2	4.5	591.7	> 15.5					
BH-15	NS	NS	598.0	4.2	593.8	> 15.8					
BH-16	NS	NS	597.3	4.0	593.3	> 16.0					
BH-18	NS	NS	599.6	2.2	597.4	> 17.8					
BH-19	NS	NS	599.1	1.1	598.0	> 18.9					
BH-20	NS	NS	603.1	1.8	601.3	> 18.2					
BH-21	NS	NS	601.7	2.7	599.0	> 17.3					
BH-22	NS	NS	599.8	16.9	582.9	> 3.1					
BH-23	NS	NS	599.1	4.5	594.6	> 15.5					
BH-24	NS	NS	601.6	2.0	599.6	> 18.0					
BH-25	NS	NS	601.3	0.7	600.6	> 19.3					
BH-40C	NS	NS	599.4	10.0	589.4	> 2.0					
BH-41	NS	NS	597.8	0.3	597.5	> 9.7					
BH-43	NS	NS	599.2	2.0	597.2	> 12.0					
BH-48	NS	NS	601.8	3.5	598.3	> 1.0					
BH-53	NS	NS	606.6	8.0	598.6	> 2.0					
BH-55	NS	NS	598.8	6.0	592.8	> 2.0					
BH-60	NS	NS	599.8	3.5	596.3	> 6.5					
BH-61	NS	NS	599.4	6.0	593.4	> 4.0					
BH-64	NS	NS	593.8	4.5	589.3	> 3.5					
BH-67	NS	NS	595.8	3.2	592.6	> 14.8					
BH-88	NS	NS	596.0	3.5	592.5	> 18.5					
BH-95	NS	NS	596.1	1.5	594.6	> 14.5					
Town of Tonawanda Landfill (Unlisted)											
H-1	NS	NS	NS	0.4	N/A	> 25.6					
H-2	NS	NS	NS	0.4	N/A	> 20.6					
H-3	NS	NS	NS	0.3	N/A	> 20.7					

Table A-1 (Continued).
Stratigraphic Summary of Borings, Test Pits, and Monitoring Wells Installed Near the Bisonite Paint Company Site.

Well or Boring Number	UTM Coordinates		Ground Surface Elevation	Glaciolacustrine Deposit			Glacial Till			Camillus Shale	
	Easting	Northing		Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation
Town of Tonawanda Landfill (continued)											
H-4	NS	NS	NS	0.4	N/A	> 20.6					
H-5	NS	NS	NS	0.4	N/A	> 20.6					
H-6	NS	NS	NS	0.5	N/A	> 20.5					
H-7	NS	NS	NS	0.3	N/A	> 20.7					
H-8	NS	NS	NS	0.4	N/A	> 20.6					
H-9	NS	NS	NS	0.5	N/A	> 20.5					
C-15	NS	NS	585.3	1.1	584.2	> 56.4					
DW-1	671398	4762536	608.4	3.0	605.4	55.5	58.5	549.9	37.0	95.5	512.9
DW-2	672405	4762871	607.3	2.0	605.3	41.5	43.5	563.8	12.5	56.0	551.3
DW-3	672311	4762210	609.6	2.0	607.6	> 61.0					
DW-4R	672065	4762831	621.2	2.0	619.2	65.7	67.7	553.5	6.5	74.2	547.0
BM-4	671869	4762782	620.2	0.0	620.2	39.0	39.0	581.2	> 1.0		
BM-5	672338	4762557	616.8	2.0	614.8	> 44.0					
BM-6	672010	4762543	618.0	25.0	593.0	20.0	45.0	573.0	> 1.0		
BM-7	672074	4762838	622.8	2.5	620.3	> 43.5					
BM-8	671353	4762261	598.6	0.0	598.6	> 41.5					
BM-12	671966	4762223	601.5	0.0	601.5	> 41.5					
BM-13S	671977	4762405	604.2	0.0	604.2	> 20.5					
BM-13D	671981	4762405	604.2	0.0	604.2	> 46.5					
BM-14S	672199	4762411	609.0	0.0	609.0	> 20.0					
BM-14D	672195	4762411	608.6	0.0	608.6	> 46.5					
BM-15	672089	4762407	603.7	0.0	603.7	> 30.0					
BM-16	671820	4762396	612.0	0.0	612.0	> 40.0					
BM-17	671719	4762534	618.8	6.4	612.4	> 19.6					
BM-18	671553	4762532	617.2	6.5	610.7	> 19.5					
BM-19	671389	4762532	607.9	2.0	605.9	> 24.0					
P-1	671647	4762592	620.6	27.0	593.6	> 3.0					

Table A-1 (Continued).
Stratigraphic Summary of Borings, Test Pits, and Monitoring Wells Installed Near the Bisonite Paint Company Site.

Well or Boring Number	UTM Coordinates		Ground Surface Elevation	Glaciolacustrine Deposit			Glacial Till			Camillus Shale	
	Easting	Northing		Depth	Surface Elevation	Thickness	Depth	Surface Elevation	Thickness	Depth	Surface Elevation
Town of Tonawanda Landfill (continued)											
P-2	671854	4762647	627.0	30.8	596.2	> 3.2					
P-3	672040	4762683	634.1	18.1	616.0	> 3.9					
P-4	672253	4762670	637.6	29.0	608.6	> 3.0					
P-5	671658	4762387	613.6	0.1	613.5	48.2	48.3	565.3	> 1.7		
P-6	671504	4762385	610.8	0.0	610.8	> 26.0					

***** **Estimated Elevation or Location. Estimated Elevations Were Obtained from Individual Site Surveys.**
N/A **Not Applicable.**
NS **Not Surveyed.**

APPENDIX B

MONITORING WELL INSTRUMENTATION SUMMARY TABLES

Table B-1.
Monitoring Well Instrumentation Summary for Shallow Zone Wells Installed in the Study Area.

Well Designation	Ground Surface Elevation (ft. AMSL)	Top of Riser Elevation (ft. AMSL)	Sandpack Interval (ft. BGS)	Sandpack Interval (ft. AMSL)	Well Screen Interval (ft. BGS)	Well Screen Interval (ft. AMSL)	Screened Unit
Town of Tonawanda Landfill (Unlisted)							
BM-4	620.20	621.60	8.50 to 24.50	611.70 to 595.70	9.50 to 24.50	610.70 to 595.70	Reddish Brown Silty Clay
BM-5	616.80	618.91	14.00 to 31.00	602.80 to 585.80	14.00 to 29.00	602.80 to 587.80	Reddish Brown Silty Clay
BM-6	618.00	619.66	9.00 to 26.00	609.00 to 592.00	5.00 to 20.00	613.00 to 598.00	Miscellaneous Fill
BM-7	622.80	625.24	8.00 to 30.00	614.80 to 592.80	9.00 to 24.00	613.80 to 598.80	Reddish Brown Silty Clay
BM-8	598.60	600.54	12.00 to 29.00	586.60 to 569.60	13.50 to 28.50	585.10 to 570.10	Reddish Brown Silty Clay
BM-12	601.50	603.24	14.00 to 31.00	587.50 to 570.50	15.00 to 30.00	586.50 to 571.50	Reddish Brown Silty Clay
BM-13S	604.20	605.78	9.00 to 20.50	595.20 to 583.70	9.50 to 19.50	594.70 to 584.70	Reddish Brown Silty Clay
BM-14S	609.00	610.90	9.00 to 20.00	600.00 to 589.00	9.70 to 19.70	599.30 to 589.30	Reddish Brown Silty Clay
BM-15	603.70	606.20	17.50 to 30.00	586.20 to 573.70	19.50 to 29.50	584.20 to 574.20	Reddish Brown Silty Clay
BM-16	612.00	613.86	26.00 to 38.50	586.00 to 573.50	28.00 to 38.00	584.00 to 574.00	Reddish Brown Silty Clay
BM-17	618.80	621.73	12.90 to 25.00	605.90 to 593.80	14.50 to 24.50	604.30 to 594.30	Reddish Brown Silty Clay
BM-18	617.20	619.51	12.50 to 25.00	604.70 to 592.20	14.50 to 24.50	602.70 to 592.70	Reddish Brown Silty Clay
BM-19	607.90	610.20	12.50 to 25.00	595.40 to 582.90	14.50 to 24.50	593.40 to 583.40	Reddish Brown Silty Clay
P-1	620.60	622.46	5.00 to 28.00	615.60 to 592.60	22.50 to 27.50	598.10 to 593.10	Miscellaneous Fill
P-2	627.00	628.84	5.00 to 32.00	622.00 to 595.00	26.50 to 31.50	600.50 to 595.50	Miscellaneous Fill
P-3	634.10	636.37	5.00 to 20.00	629.10 to 614.10	14.50 to 19.50	619.60 to 614.60	Miscellaneous Fill
P-4	637.60	639.49	5.00 to 30.00	632.60 to 607.60	24.50 to 29.50	613.10 to 608.10	Miscellaneous Fill
P-5	613.60	615.82	5.00 to 20.00	608.60 to 593.60	9.50 to 19.50	604.10 to 594.10	Reddish Brown Silty Clay
P-6	610.80	612.26	11.50 to 24.00	599.30 to 586.80	13.50 to 23.50	597.30 to 587.30	Reddish Brown Silty Clay

Table B-1 (continued).
Monitoring Well Instrumentation Summary for Shallow Zone Wells Installed in the Study Area.

Well Designation	Ground Surface Elevation (ft. AMSL)	Top of Riser Elevation (ft. AMSL)	Sandpack Interval (ft. BGS)	Sandpack Interval (ft. AMSL)	Well Screen Interval (ft. BGS)	Well Screen Interval (ft. AMSL)	Screened Unit
Spaulding Composites Site (Registry Number 915050)							
OW-1	602.50	605.16	8.00 to 20.00	594.50 to 582.50	10.00 to 20.00	592.50 to 582.50	Reddish Brown Silty Clay
OW-2	602.40	604.35	8.00 to 20.00	594.40 to 582.40	10.00 to 20.00	592.40 to 582.40	Reddish Brown Silty Clay
OW-3	601.70	604.32	8.00 to 20.00	593.70 to 581.70	10.00 to 20.00	591.70 to 581.70	Reddish Brown Silty Clay
OW-4	602.00	603.90	8.00 to 20.00	594.00 to 582.00	10.00 to 20.00	592.00 to 582.00	Reddish Brown Silty Clay
OW-6	599.20	601.58	8.00 to 20.00	591.20 to 579.20	10.00 to 20.00	589.20 to 579.20	Reddish Brown Silty Clay
OW-7	597.00	596.67	8.00 to 20.00	589.00 to 577.00	10.00 to 20.00	587.00 to 577.00	Reddish Brown Silty Clay
OW-8	596.00	595.98	8.00 to 20.00	588.00 to 576.00	10.00 to 20.00	586.00 to 576.00	Reddish Brown Silty Clay
OW-9	591.10	593.12	7.00 to 19.00	584.10 to 572.10	9.00 to 19.00	582.10 to 572.10	Reddish Brown Silty Clay
OW-10	593.90	595.96	12.00 to 24.00	581.90 to 569.90	14.00 to 24.00	579.90 to 569.90	Reddish Brown Silty Clay
OW-11	599.90	602.61	8.00 to 20.00	591.90 to 579.90	10.00 to 20.00	589.90 to 579.90	Reddish Brown Silty Clay
OW-12	608.80	610.76	17.00 to 29.00	591.80 to 579.80	19.00 to 29.00	589.80 to 579.80	Reddish Brown Silty Clay
Bisonite Paint Site (Registry Number 915010)							
MW-1	614.10	616.12	8.00 to 19.10	606.10 to 595.00	9.00 to 19.00	605.10 to 595.10	Brown Silty Sand; Brown Sandy Silt
MW-3	614.50	616.76	10.50 to 22.00	604.00 to 592.50	11.50 to 21.50	603.00 to 593.00	Reddish Brown Silty Clay
MW-4	613.00	613.74	10.50 to 22.00	602.50 to 591.00	11.50 to 21.50	601.50 to 591.50	Reddish Brown Silty Clay

Ft. AMSL **Feet Above Mean Sea Level.** **Ft. BGS** **Feet Below Ground Surface.**