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DATE: June 7, 2010

TO: Peter Petrone
Parsons
301 Plainfield Road, Suite 350
Syracuse, NY 13212

FROM: Christopher D. Hohman Christopher D. Hohman

SUBJECT: Onondaga Lake Upland Work

Attached is a table of the proposed Phase 1B cultural resource work for the upland and shoreline areas of the Onondaga Lake project. The table reflects the information from the work plan, the addendum work plan, as well as observations supplied in two reports from Geoarchaeological Research Associates (attached).

The Phase 1B archaeological work addresses only the identification of archaeological and architectural resources. PAF understands that USEPA has initiated government-to-government consultations with the Onondaga Nation in compliance with 36 CFR Part 800.4 (a)(b) regarding properties of religious and cultural significance. However, at this time, USEPA has not asked Honeywell, Parsons, or PAF to address the task of identifying religious and cultural properties. Therefore, no analysis has been proposed in the work plan to determine whether the remediation of the areas proposed for archaeological/architectural work may have an effect on Properties of Cultural and Religious Significance.

enc.

Table 1. Archaeological Work Proposed for Onondaga Lake Project, Upland and Shoreline Area

Area of Potential Remediation	# of STPs	# of Backhoe Trenches/Units
Wastebed 13	None	None
Ninemile Creek	300-900	6-10 possible
Geddes Brook IRM	1200-1440	Possible trenches or excavation units
Outfall 019 Drainage Ditch	0	None
Shoreline Survey - Northern shoreline	0	6-10 Backhoe trenches, bucket augers or geoprobes.
Harbor Brook IRM (Requires walkover for Geddes Pier, architectural survey of culverts and possible archaeological survey if any impacts are to occur adjacent to Harbor Brook and its tributaries)	0-10	0
Shoreline Survey - Eastern shoreline of Wastebeds 1-8	70-95	
Slurry Pipeline		Possible 4 Backhoe trenches or four 1x 2 meter units, dependent on any geoprobes
Effluent Pipeline	60-90	
Total	1630-2535	16-24 possible Backhoe Trenches, possible bucket augers or geoprobes or four 1 x 2 meter units

******AMOUNT OF WORK IS BASED ON PHASE 1A ASSESSMENT, GEOMORPHOLOGICAL OBSERVATIONS FOR THE ONONDAGA LAKE PROJECT (1/22/2010), GEOMORPHOLOGICAL OBSERVATIONS OF WASTEBEDS 1-8 (2/11/2010). ANY MINOR DEVIATIONS FROM THE PROPOSED WORK AND REQUESTED BY THE NATION MONITOR (E.G., A SMALL NUMBER OF EXTRA STPS) WILL BE EXECUTED IF FEASIBLE, AND NOTED IN WRITING TO PARSONS. MAJOR DEVIATIONS FROM THIS PROPOSED WORK WILL REQUIRE CONSULTATION AMONG ALL INVOLVED PARTIES PRIOR TO EXECUTION OF THE CHANGES.**

PRELIMINARY GEOMORPHOLOGICAL OBSERVATIONS FOR THE ONONDAGA LAKE PROJECT

Prepared for:
PAF, Binghamton University, Binghamton, New York

Prepared by:
Michael Aiuvalasit and Joseph Schuldenrein
Geoarcheology Research Associates, Yonkers, New York
1/22/2010

Geoarcheology Research Associates (GRA) has been contracted by the Public Archaeology Facility (PAF) to examine the geomorphic contexts of properties slated for remedial measures as part of the Onondaga Lake Project, which is sponsored by Honeywell and being conducted by Parsons. GRA's role is to evaluate whether project areas are intact and contain buried deposits with the potential for archeological materials. Evaluations are based on reviewing historical documents compiled by PAF (Hohman 2004 and Hohman and Versaggi 2009), the background literature on the geological and natural setting of Onondaga Lake, and examining logs from geotechnical and soil borings conducted in select portions of the project areas. A brief field visit on December 17, 2009 provided opportunities to examine the project areas first-hand. This document presents initial observations of the project areas (see Figures 31-33, 48-49, 74-75, and 86-88 in Workplan – Hohman and Versaggi 2009). Recommendations are made for use in the planning of upcoming fieldwork.

Ninemile Creek

Ninemile Creek consists of a narrow area of potential effects (APE) which is largely confined to the channel and adjacent banks of Ninemile Creek (Figures 31-33 in Workplan – Hohman and Versaggi 2009). Our geomorphic evaluation of Ninemile Creek is broken into segments using the New York State Department of Environmental Conservation (NYSDEC) Reach Boundaries: A) shoreline and mouth of Ninemile Creek; B) between the shoreline and I-690; C) between I-690 and the intersection of Pumphouse Road and the exit ramp of I-690; and D) between the Pumphouse Road intersection and the most upstream portion of the project area, approximately 400 feet upstream past the confluence of Ninemile Creek with Geddes Brook.

Segment A is the confluence of Ninemile Creek and Onondaga Lake. The mouth of this artificial channel has also been dredged in the late 1960s. Historical maps from the early 19th century depict segment A to be near salt springs and swamplands with muck soils (Carlisle and Edwards series) identified in historical soil surveys (USDA 1938, USDA 1977). Subsurface testing did not extend into segment A as it is offshore and subaqueous. The potential for deeply buried archaeological surfaces is low due to the

extensive disturbances which were involved in both the creation and maintenance activities along the mouth of the channel.

Segment B extends from the confluence of Ninemile Creek upstream to where it is crossed by I-690. This segment is an artificial channel created in 1927 after the placement of Wastebeds 1-8. The channel is narrow and runs parallel to the north of the I-690 right-of-way. Segment B includes a wetland adjacent to the mouth of the creek identified as SWY-10. Subsurface investigations have consisted of shallow groundwater test pits (series labeled GW-) conducted by Parsons and Geoprobe borings into the channel bottom conducted by Blasland, Bouck, and Lee (series labeled TN-; logs found in Hohman and Versaggi 2009: Appendix II). None of the groundwater test pits extended to depths greater than 36 inches (0.9 m). Two sequences were registered: shallow organic topsoil over Solvay waste (n=5); and soft black topsoil over mottled silts (n=5). Neither sequence is indicative of contexts which would preserve intact precontact deposits or buried soils. The seemingly undisturbed mottled silts are very likely historically recent alluvium accumulating along the channel and near the mouth of the stream.

Segment C is a narrow project area of the channel and banks of Ninemile Creek between I-690 and the intersection of Pumphouse Road. Subsurface investigations have consisted of shallow groundwater test pits (series labeled GW-) conducted by Parsons and Geoprobe borings into the channel bottom conducted by Blasland, Bouck, and Lee (series labeled TN-; logs found in Hohman and Versaggi 2009: Appendix II). The subsurface tests registered stratigraphy similar to what was observed in Segment B.

A narrow segment, Segment D on the southern sides of Ninemile Creek downstream of the confluence with Geddes Brook, is slated for remediation. Logs for this area (NMC-SB-07 to -21 (Hohman and Versaggi 2009: Appendix II)) were reviewed. The logs identified two sequences: either shallow impenetrable gravels with a veneer of approximately 6" (0.15 m) of black silts; or black and brown silts capping stiff clays to depths of 2-3'(0.6-0.9 m). Disturbances in the form of Solvay waste are noted in some of the test pits. Such contrasts between cores suggest a buried 'ridge and swale' topography, with gravel bar ridges and swales infilled with fines of clay and silt.

This shallowly buried landscape may register shallowly buried archeological surfaces in sediment either capping gravel bars and in swales infilled with clay. Archeological investigations in the form of shovel testing and the additional field observations of open shovel tests by geomorphologists are recommended to assess the floodplain segments along the southern banks of Ninemile Creek within segment D.

Geddes Brook

The Geddes Brook project area is an expanse of floodplain at the confluence of Geddes Brook and Ninemile Creek, which includes SYW-18 (Figures 48-49 in Workplan – Hohman and Versaggi 2009). The floodplain has already been delineated as wetlands. The vegetation is dominated by Phragmites. Bermed roads and utilities cross through the floodplain, and stand above lower floodplain surfaces heavily vegetated by Phragmites. Logs from soil testing (GW-1 to -15 and SB-1 to -54) were reviewed. The stratigraphic observations were recorded with differing levels of detail. The borings with the prefix "GW" were less detailed than those labeled "SB." The GW borings describe the soils largely as "gray or brown organic topsoil" with underlying "brown and gray clay." While the SB logs offer more detailed stratigraphy, the field for stratigraphic documentation on the majority of the printed log sheets obscures the entire description. Regardless, a review of all of the logs provides general impressions of the subsurface stratigraphy. Generally the logs register surface organic horizons (histic epipedons) to a depth of 12." Below are mineral horizons of sands, silts, and clays. While the logs describe the sediments as moist the water table is typically only encountered towards the base of the sequences (which average maximum depths of 36"). The mineral horizons underlying the organic surface horizons likely represent floodplain sequences (i.e. coarser sediments found within or adjacent to former channels, finer sediments in backchannels and swales) associated with Ninemile Creek and Geddes Brook. A cutbank across Ninemile Creek showed a thick sequence of alluvial sands below waste materials which suggests the potential for intact alluvial sequences. There are instances of disturbances in the form of Solvay waste and fill gravels, as noted in many of the logs.

While the project area is currently a wetlands the diversity of intact sediment types recorded in test pits suggest that there are alluvial contexts below more recent organic accumulations associated with wetlands. These buried sediments have the potential to register floodplain settings along the confluence of Ninemile Creek and Geddes Brook which are different than modern conditions.

These contexts have the potential to register archeological surfaces within what was depicted historically as a cedar swamp and alluvial contexts. Archeological survey employing shovel testing should go forward within this project area to test for intact alluvial surfaces below the approximately 12" of organic surface horizons. In-field geomorphic observations of select shovel tests could provide a clearer understanding of the alluvial sequences and wetland development of the project area through detailed examination of pedogenic features (redoximorphic concentrations, depletions) and correlating facies relationships between subsurface stratigraphic sequences.

Outfall 019 Drainage Ditch

The Outfall 019 Drainage Ditch is located along the southern edge of the floodplain of Ninemile Creek and Geddes Brook (Figures 61-62 in Workplan – Hohman and Versaggi 2009). Historical background research conducted by PAF (Hohman and Versaggi 2009) indicates that this tributary is an artificial drainage ditch created in the mid-20th century. GRA examined the logs of eighteen borings conducted within the project area. Typical profiles consist of organic muck (O horizons) in the upper two feet, with common organic fragments, roots, and disturbances. Solvay waste is identified in four of the cores, typically within or immediately below the organic muck epipedon. Red-brown silt and clay underlie the muck horizons. These deposits are stiff and moist, with trace gravels identified at the top of the horizon in four of the cores. Trace organics are common at the top of the deposit. The underlying fine silts and clays are largely indicative of lake-bottom sedimentation, which would have been deposited during either higher levels of Onondaga Lake, or preceding sequences of glacial lakes during the Late Wisconsinan. The potential for intact archaeological resources within the project area of the Outfall 019 Drainage Ditch is low. The channel is artificial, and therefore is not representative of a natural body of water. Historical maps describe the area as a cedar swamp and wetlands, and the muck soils corroborate this finding. The entire Holocene record is likely confined to the muck and disturbances within the upper two (2) feet of the sequence. This compressed sequence indicative of wetland contexts has been heavily impacted by historical disturbances. From a geomorphological perspective no additional archeological investigations are warranted.

Shoreline

Three shoreline locations adjacent to Ninemile Creek have been identified (Figures 74-75 in Workplan – Hohman and Versaggi 2009). Historical background research has identified that these areas were historical shorelines as well, and may have buried archeological surfaces. There are no soil boring logs for these areas to evaluate, therefore subsurface testing is recommended. As the vertical stratigraphy has not been established, testing should attain depths that span the entire Holocene sequence. Therefore limited deep testing in the form of either bucket augers or backhoe trenching should be conducted before devising an archeological testing strategy.

Harbor Brook/Wastebed B

Harbor Brook and the Wastebed B are located along the southwest shore of Onondaga Lake (Figures 86-88 in Workplan – Hohman and Versaggi 2009). Wastebed B is situated along the shoreline of Onondaga Lake behind artificial bulkheads. The waste bed consists of fill deposits placed atop Solvay wastes. Previews of subsurface stratigraphy come from two sources: engineering cross sections along Wastebed B near the shoreline compiled by Geosyntec Consultants and geotechnical borings by Parsons (Hohman and Versaggi 2009: Appendix II).

Nearly all of the borings identify a general sequence of: fill; Solvay waste; marl; silt and clay; silt and sand; and sand and gravel. The thickness of fill and waste materials extends to depths of 20 ft. The marl is typically described in Parsons geotechnical logs as a gray silt with little fine sand. Also observed are trace organics (peat), trace shells, and oncolites. None of the borings logs are suggestive of deeply buried intact shorelines or nearshore settings. Instead the thick marl deposits are indicative of basin and subaqueous shoreline deposits, which are nether conducive to precontact settlement, nor archeological preservation.

The course of Harbor Brook has been extensively modified across the project area to accommodate transportation structures (Erie Canal, highway and railroad) as well as the placement of waste beds. The site visit confirmed the widespread historical alteration of adjacent landscapes which are extensively documented by PAF (Hohman 2004 and Hohman and Versaggi 2009). There appears to be little potential for Harbor Brook to retain deeply buried intact sediments and soils.

Conclusions

Based on our preliminary evaluation of boring and test pit logs in relationship to background investigations GRA offers the following recommendations:

- The Outfall 019 Drainage Ditch and Harbor Brook areas do not require additional field investigations. Both areas were disturbed by historical activities and logs of subsurface tests indicate that these contexts have very limited potential for buried archeological surfaces.

- No subsurface testing has taken place in the three Shoreline locations. Geomorphological testing in the form of either deep bucket augers or backhoe trenching in each of the three segments is recommended to establish a baseline stratigraphy for these project areas, which will guide future archeological investigations.

- Ninemile Creek is also largely disturbed by historical activities. The only section that retains intact deposits is within segment D, along the southern banks of Ninemile Creek downstream of the confluence with Geddes Brook. Logs suggest that underneath a veneer of modern alluvium are ridge and swales of former alluvial channels of Ninemile Creek. Shovel tests within this area should be adequate for testing this area. Inspection of representative shovel tests by a geomorphologist will provide opportunities to model alluvial stratigraphy of this segment of Ninemile Creek.

- The Geddes Brook IRM has the potential for buried archeological surfaces. Logs indicate that below approximately 1' (0.30 m) of organic muck are intact alluvial sequences of sands, silts, and clays. While evidence of disturbances were recorded in some of the cores, these underlying alluvial deposits within the Geddes Brook IRM have the potential to register shallowly buried landforms which may have the potential for archeological deposits. It is recommended that shovel testing be conducted within this area. A geomorphologist should inspect a representative sample of the shovel tests and conduct limited deep testing in the form of bucket augering. Shovel testing should be conducted to the depth of 1 m or until silt or clay marls are encountered. A limited number of bucket augers should be excavated if necessary to correlate stratigraphic sequences between shovel tests.

Works Cited

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2004 Cultural Resource Management Report, Phase 1A Cultural Resource Assessment, Onondaga Lake Project, Onondaga Lake, Wastebed B and Wastebed 13, Towns of Camillus, Geddes and Salina and City of Syracuse, Onondaga County, New York. Prepared for Parsons, Liverpool, New York. Prepared by Public Archaeological Facility, Binghamton, New York.

Hohman, C. and N. Versaggi
2009 Cultural Resource Management Report, Phase 1B Archaeological Work Plan, Onondaga Lake Project, upland and shoreline area, Wastebed 13, Geddes Brook IRM, Tributary of Geddes Brook, Ninemile Creek RI/FS, Shoreline Survey, and Wastebed B/Harbor Brook IRM, Towns of Camillus and Geddes, Onondaga County, New York. Prepared for Honeywell, East Syracuse, New York. Prepared by Public Archaeology Facility, Binghamton, New York and Parsons, Syracuse, New York.

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1938 *Soil Survey of Onondaga County, New York.* USDA, Washington, D.C.

United States Department of Agriculture
1977 *Soil Survey of Onondaga County, New York.* USDA, Washington, D.C.

PRELIMINARY GEOMORPHOLOGICAL OBSERVATIONS FOR WASTEBEDS 1-8, ONONDAGA LAKE PROJECT

Prepared for:
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Prepared by:
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2/11/2010

Geoarcheology Research Associates (GRA) has been contracted by the Public Archaeology Facility (PAF) to examine the geomorphic contexts of properties slated for remedial measures as part of the Onondaga Lake Project, which is sponsored by Honeywell and being conducted by Parsons. GRA's role is to evaluate whether project areas are intact and contain buried deposits with the potential for archeological materials. Evaluations are based on reviewing historical documents compiled by PAF (Hohman 2004 and Hohman and Versaggi 2009), the background literature on the geological and natural setting of Onondaga Lake, and examining logs from geotechnical and soil borings conducted in select portions of the project areas. A brief field visit on December 17, 2009 provided opportunities to inspect the project area first-hand. This document presents initial observations of Wastebeds 1-8. Recommendations are made for use in the planning of upcoming fieldwork.

Wastebeds 1-8 run parallel to 2.1 miles of Onondaga Lake's southwest shoreline. The entire site covers approximately 404 acres (Figure 1). The topography consists of an approximately 200 ft wide shoreline terrace along the eastern third of the project area with the remainder of the project area dominated by high wastebeds. A small terrace and shoreline are found below the high wastebeds along the northern side of the project, while the northeastern portion of the project area is a steep promontory. Elevations range from approximately 363 ft along the shoreline to 430 ft at the highest point atop the wastebeds. The lake level is at 362.5 ft. The wastebeds consist primarily of Solvay waste. Extensive geotechnical borings have been conducted across the project area for developing an interim remedial measure (IRM) for Wastebeds 1-8. This summary report is an evaluation of the geomorphic context and the archeological potential of Wastebeds 1-8.

The project area was significantly different prior to historical manipulations of Onondaga Lake. In 1822 the water levels of the lake were lowered to present levels to facilitate an outlet to the Seneca River (Hohman 2004 and Crawford 2009). Before lowering water levels much of the current project area would have been marshes, swamps, salt springs, and areas immediately offshore. After the drop in water levels more land was created and the area became known as Geddes Marsh. In addition the

natural course of Ninemile Creek flowed through the project area until it was channelized and diverted around the wastebeds in 1926. Solvay waste was emplaced directly atop the Geddes Marsh with perimeter berms constructed around the margins of the wastebeds. The wastebeds were in use until 1943 and the site is now currently owned by the State of New York and Onondaga County.

Logs from geotechnical borings conducted in association with the remediation project serve as the basis for our stratigraphic interpretations. The geotechnical descriptions, and especially the geologic cross sections, provide enough detail to preview the subsurface stratigraphy. A generalized stratigraphy for the project area consists of (from bottom to top): bedrock, tills, and fining upward glacio-lacustrine sands to clay capped by marl and peats. The sequence is buried by Solvay waste (Crawford 2009). The former channel of Ninemile Creek is represented across the project area as a wedge of sand and gravel inset into the marl unit. Stratigraphic units that have no archeological potential are those which were either deposited prior to pre contact settlement or register lake-bottom contexts. Those strata include till, glacio-lacustrine sequences of fining upward sand to clay, and marl beds. Units with archeological potential consist of peats, organic soils, and paleo-shoreline sandy facies, as well as alluvial sediments of Ninemile Creek.

The lower terrace and shoreline positions have stratigraphic sequences reflecting submerged landforms attendant to higher lake levels of Onondaga Lake. Boring logs reviewed from the lower terrace portion along the eastern margins of the project area have a stratigraphic sequence of Solvay waste and fill immediately overlying marl. Some cores preserve trace organics as well as fragments and lenses of peat. However, there are no distributional configurations suggestive of an intact marsh surface or living surface. The marl is described as light olive gray wet sand and silt, with trace shell fragments, a sulfur odor, and occasional bands of organic lenses. Along the southern and eastern shorelines and lower terrace of the project area the marl is typically encountered below approximately 6.5 ft of fill and extends to depths of 30 ft below ground surface.

Logs from borings along the shorelines on the northern side of the project area reflect a similar stratigraphy, but when compared with the southern and eastern shorelines the former have shallower depths of fill (such as approximately 4 ft of fill in SB-160/MW-29) and the upper portions of the underlying marl are more peat-like. In core SB-160/WM-29 the top of the marl is described as black silt that is organically enriched with traces of roots, few shells, and few gravels, which is suggestive of terrestrial or near-shore settings. A further indication that nearshore or possibly terrestrial sediments are preserved along the northern shore is derived from borings placed along the edges of the high wastebeds (e.g. SB-18, SB-19). These borings yielded peat at approximately 30-40 ft below ground surface, which correlates altitudinally with peat-like materials from shoreline boring SB-160/WM-29. Elevations for the peat-like top of the marl are approximately at 361 ft asl. This elevation is *below* the elevation of the historical water levels (362.5 ft), and therefore it should also be below pre contact levels. However, early historical maps depict this area as a former shoreline, which when compared with documentation of the remainder of the project area it has experienced the least amount of

disturbance. These findings support the recommendations made in GRA's preliminary observations for the Shoreline Survey, which recommended limited deep testing in APE along the northern shoreline.

Testing along the northern shore of Wastebeds 1-8 is recommended to confirm the presence of these deposits, and to assess whether they are indicative of former terrestrial settings or are near-shore marshes and wetlands. Deep testing is necessitated because of the thickness of Solvay waste present atop these deposits. Depending on conditions and circumstances either backhoe trenches, bucket augers, or a geoprobe could be used to test potentially sensitive deposits at approximately 4 ft below ground surface. Based on characteristics of soil development, sediment types, and facies relationships between deposits a geomorphologist should be able to determine if the peat-like marls are intact and if they derive from either terrestrial settings and have the potential to contain archeological deposits, or if they are from offshore wetlands or sub-littoral zones with little to no potential.

Logs from the promontory in the northeastern section of the project area and the high wastebeds that make up the western half of the project area show that both of these areas have very thick accumulations (30-50 ft) of Solvay waste overlying natural deposits. Portions of the promontory overlie the former channel course of Ninemile Creek. Deposits associated with the creek were identified in boring MW-04 and SB-17. In both cases marl overlies sand and gravel deposits of Ninemile Creek at depths of 39 ft and 51 ft below ground surface, respectively. Along the western half of the project area thick Solvay waste overlies a marl and peat horizon which becomes increasingly more organically enriched from east to west. This likely reflects buried landforms along the margin of Onondaga Lake that becoming more terrestrial landward from the lake basin. While these peat deposits have the potential to represent former terrestrial environments the thick waste deposits atop the peat is likely to have severely impacted the archeological potential of these sediments. First, as opposed to the northern shoreline locations which historical documentation suggests are relatively intact, the areas with high wastebed piles were likely subjected to greater disturbances. Such disturbance is presumed initially because of ground contouring for wastebed preparation. An additional source of disturbance is compression due to the weight of the wastes and contamination by leachate. No work is recommended in these areas.

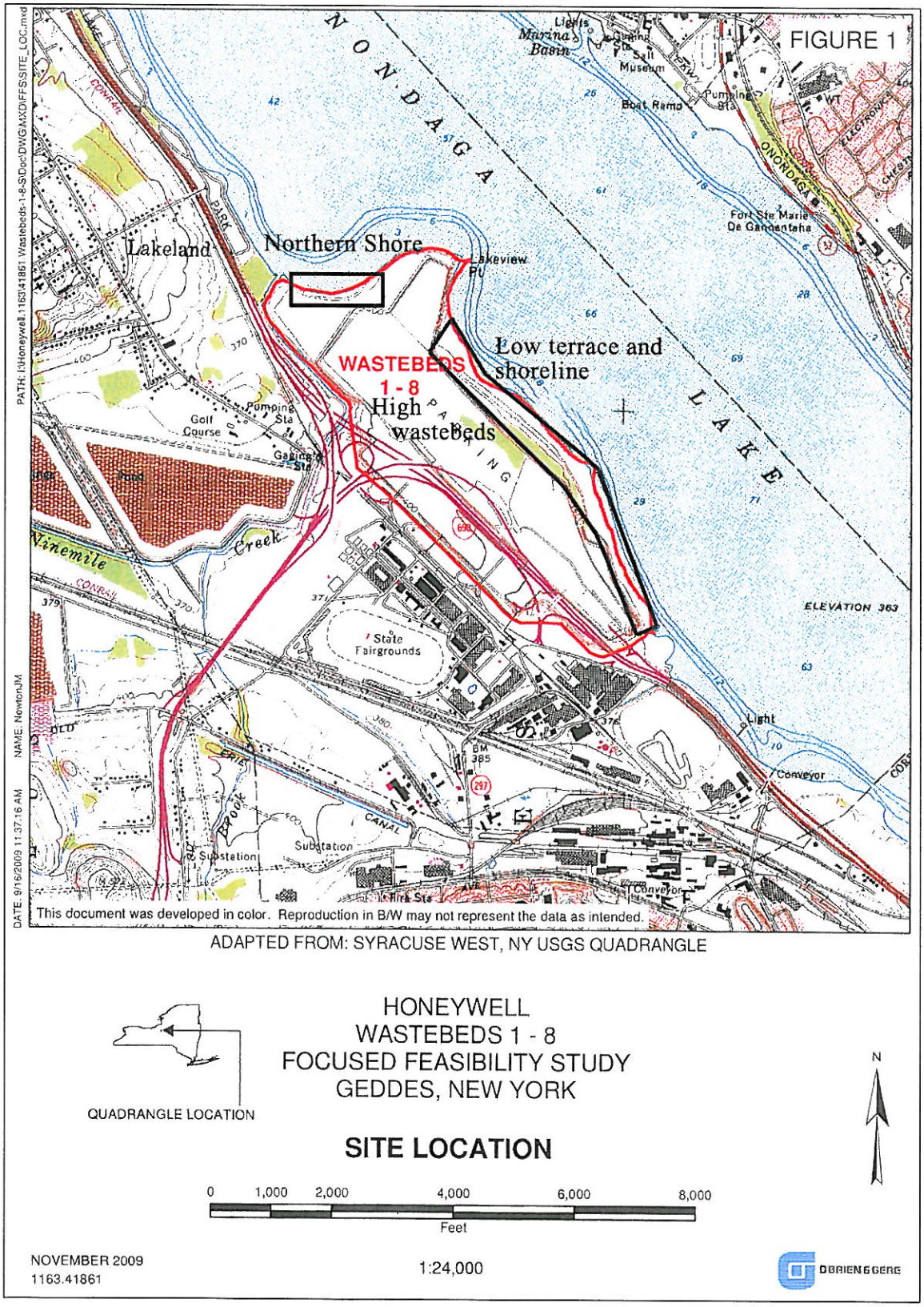

Figure 1. Wastebeds 1-8 with labels for areas discussed in the text (from Crawford 2009: Figure 1).

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