MEMORANDUM

TO: Vic Cardona, Division of Environmental Remediation

FROM: Paul Carella, Division of Fish, Wildlife and Marine Resources

SUBJECT: Liberty Industrial Finishing, Ecological Evaluation Revised Scope of Work, March 9, 1998

DATE: March 17, 1998

I have reviewed the scope of work referenced above. I do not agree that the proposed work should be conducted in the phased manner described. At a minimum, Phase I should include surface water and sediment sampling and analysis, and sediment toxicity testing. Past sampling has already revealed levels of contaminants that indicate the need for toxicity tests. Phase II should include community analysis and tissue analysis.

As presently proposed in the scope of work, the decision of whether or not to conduct sediment toxicity tests depends on the results of macroinvertebrate and fish community assessments. I do not believe that this work will supply the necessary information to make such a decision. The results of community assessments are difficult to interpret, and in this instance it will be especially difficult since the reference area is located in a different, rather than the same, stream.

Following are comments keyed to specific sections of the scope of work:

1. Section 2.1. It is stated that the Dvirka and Bartilucci streamflow study prediction (1993) that Massapequa Creek will eventually be dry north from the outlet of **Pond 1** agrees with recent survey observations. However, it is stated in the same section that the 1998 field survey found that the stream south of **Pond A** could provide habitat capable of supporting a year-round aquatic community. Pond A is upstream (north) of Pond 1.

The last sentence states that proposed biological sampling should only occur south of Pond A. The pond itself should also be included in biological sampling since it is a sediment deposition area where contaminants may concentrate and exposure pathways exist.

2. Page 4, lst bullet. It is stated that if sampling locations 1 or 2 are dry, no surface water or sediment samples will be taken. Sediment samples should be taken at each location even if they are dry at the time of sampling.

3. Section 2.3, page 5. The second and third sentences should refer to Pond A rather than Pond 1.

4. Section 2.4. Sediment toxicity tests should be chronic rather than acute and should include two invertebrate species. Both growth and survival should be evaluated.

5. Surface water samples should not be taken at a time when surface runoff and stormwater sewers are contributing significant amounts of water to the stream since this will likely have a diluting effect on contaminant concentrations. Under normal flow conditions, surface water in Massapequa Creek originates almost entirely from groundwater.

If you have any questions, please call me at 457-9015.

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Biologist 1 (Ecology)

cc: Christina Dowd/SS/RK/ET
Ed Woltmann, Region 1
Chuck Hamilton, Region 1

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March 9, 1998

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Attn: Mr. Lorenzo Thantu
Remedial Project Manager

Re: Ecological Evaluation
Revised Scope of Work and Responses to Comments
Continued Remedial Investigation/Feasibility Study (RI/FS)
Liberty Industrial Finishing Site
Farmingdale, New York

Dear Mr. Thantu:

This letter presents a revised scope of work for the ecological evaluation of Massapequa Creek and ponds during the continued RI/FS at the Liberty Industrial Finishing Site in Farmingdale, New York. On April 24, 1997, the Liberty Group submitted the original scope of work to the U.S. Environmental Protection Agency (EPA), in response to a January 13, 1997 memorandum from the New York Department of Environmental Conservation (NYSDEC) Division of Fish and Wildlife (DFW), and a February 26, 1997 memorandum from NYSDEC. Subsequently, on November 25, 1997, the EPA provided comments and recommendations regarding the April 24, 1997 submittal. The revised scope of work presented in this letter is based upon these EPA comments and recommendations, and a January 1998 habitat reconnaissance survey of Massapequa Creek. Specific responses to the EPA comments are presented in Appendix A.

1.0 INTRODUCTION

In the April 24, 1997 submittal, the Liberty Group proposed to perform a phased ecological evaluation of Massapequa Creek and associated ponds, consisting of biological characterization using rapid bioassessment protocol (RBP-III & V) investigations (Phase I), and, based on the results of the RBPs, bioassays on selected aquatic species (Phase II). In their November 25, 1997 letter, the EPA rejected this phased approach and recommended that toxicity testing and tissue analysis be performed regardless of the results derived from the proposed Phase I biological characterization. Specifically, the EPA recommended to rely on ecological screening criteria (such as NYSDEC Technical Guidance for Screening Contaminated Sediments and NYSDEC ambient Water Quality Criteria) to implement Phase II bioassay investigations. The

EPA expressed concerns that the RBP III and RBP V that were proposed for Phase I would not sufficiently differentiate between habitat-related effects and contaminant-related effects.

2.0 REVISED SCOPE OF WORK

In order to put the revised scope of work into context with the actual physical characteristics of Massapequa Creek, a brief discussion of a recent field survey and review of a report on stream flows in Massapequa Creek is presented below.

2.1 Characterization of Massapequa Creek

On January 20, 1998 a 1-day field survey was conducted of Massapequa Creek (the Creek), including the eastern branch of the Creek from its headwaters at Roberts Street to south to Pond 2 (see Figure 1), as well as, the entire western branch of the Creek. The purpose of the survey was to gain a better understanding of the stream habitat, surrounding land use, and to identify potential reference streams in the area.

During this survey, the east branch of the Creek north of 6th Avenue was completely dry. Water was not observed in this branch until approximately 7th Avenue and flow was not observed until 8th Avenue. The entire west branch was also dry from its headwaters downstream to its confluence with Pond A (see Figure 1). Based on observations of Dames & Moore personnel and local residents, the observed dry conditions in the northern reaches of the Creek are common and typically occur in the summer and winter months as far downstream as the weir dam at Pond A. The eastern branch, north of Pond A, appeared to have been channeled some time in the past. This portion of the Creek is essentially an ephemeral urban runoff driven stream, augmented by groundwater flow during portions of the year. Evidence of stormwater surges was present, as shown by matted down woody herbaceous vegetation along the shallow banks and extensive trash rack lines. Potential aquatic macro-invertebrate structure was extremely limited in quantity and quality. The channel substrate in the reach north of Pond A consisted almost entirely of sand mixed with gravel. Downstream substrate within the Creek channel down to Pond 2 was also dominated by sand. Few depositional areas existed throughout the Creek, except for small areas upstream of the ponds and occasional pockets where aquatic vegetation slowed water flow. In general, the depositional areas appeared to consist of a small layer of recently deposited silty material underlain by sand. The western branch of the Creek was observed to be dry and no signs of recent flow were evident. In many places, the bifurcated stream channel of the western branch was completely filled with trash.

Although current flow in the Creek was very slow (approximately less than 0.1 feet/second), it appeared to be perennial south of Pond A. Consequently, habitat began to improve downstream. Occasional in-stream structure (roots, snags, and vegetation) exists below Pond A, and aquatic vegetation became prevalent throughout the Creek south of Pond 1. Based on the perennial flow and increased diversity of habitat, the stream reaches south of Pond A could provide habitat capable of supporting some form of a year-round aquatic community. However, the extent that urban runoff might have affected the aquatic community is unknown at this time.

Pond A appeared to be a constructed runoff retention pond that controls water flow and retains sediment carried by ground surface flow. The fringes of the pond contained cattails and reed grass. Depth in this pond appeared to be from 6 inches to 3 feet. Pond 1 is also an urban runoff pond (Dvirka and Bartilucci, 1993), but the flow of Massapequa Creek is separated from the Pond by a bermed dike on the Pond's western edge. It is not known at this time if the water in the Creek has always been isolated from the Pond. Approximately 80 percent of this pond have silted in and overgrown by cattails and reed grass.

In addition to the brief stream survey, the Massapequa Creek Streamflow Augmentation Feasibility Study (Dvirka and Bartilucci, 1993) was reviewed to further assess the nature of the Creek. Massapequa Creek lies in the Nassau County Sewer District 3. According to this report, in the 1970s and 1980s a number of sewer improvements were made that resulted in the lowering of the groundwater table and of the stream stage in Massapequa Creek, and caused the elimination of water in streams and ponds and the loss of freshwater wetland areas. In Massapequa Creek the baseflow has decreased from 14 cubic feet per second (cfs) in 1948 to 4.7 cfs in 1985, and annual mean base flow has decreased from 92 percent of annual mean discharge to 82 percent. A hydrologic model was used in the report to determine future groundwater elevations along the Creek. The model indicated that due to increased groundwater withdrawal for drinking water purposes, increases in the area of impervious ground surface, and construction of sanitary sewers, the reach of Massapequa Creek from the outlet of Pond 1 north to its present headwaters will eventually be dry, except during and immediately after rain events. This 1993 prediction concurs with the recent survey observations and has important implications for the aquatic community in this reach of the Creek.

Based on the above discussion, any studies to assess potential impacts to the aquatic community in Massapequa Creek should also consider the physical and hydrologic characteristics of the Creek. The extreme ephemeral nature of the northern stream reaches indicates that any proposed biological sampling should occur south of Pond A, so that impacts from habitat factors might be distinguishable from potential constituent impacts.

2.2 PHASE I – SURFACE WATER/SEDIMENT SAMPLING

The objective of Phase I is to evaluate if the constituents present in groundwater are present in Massapequa Creek, to what levels they occur in the Creek and the two associated ponds (see Figure 1), and if there is evidence for downgradient dispersion of these constituents. Currently, surface water and sediment data for Massapequa Creek is limited to the eastern and western branches upgradient of Pond A.

This phase of the ecological investigation will consist of surface water and sediment sampling according to the Sampling and Analysis Plan (SAP; Section 2.3.2.4 and Sections 2.5.5 and 2.5.6; Weston, February 1995) and collection of four additional sediment samples from the ponded areas, as described below and presented in Figure 1. Thus, samples will be collected from fifteen sample locations. If possible, these samples will be collected from areas of fine grained sediments and analyzed for Target Compound List (TCL) volatile organic compounds (VOC),

Target Analyte List (TAL) metals, hexavalent chromium, and total organic carbon (TOC). Sediment samples will also be subjected to grain size and acid-volatile sulfide (AVS) analysis.

Sediment (SE) and surface water (SW) samples will be taken in both the east and west branches. This is necessary to help distinguish between potential constituents from the Liberty site and those in runoff from the surrounding urban area. If possible, sediment samples will be collected in depositional areas. However, few, if any, depositional areas were observed in the Creek channel during the January survey. As mentioned previously, the substrate in the Creek bed throughout the study area is composed primarily of sand mixed with gravel, containing a very thin recent silty deposition layer. Due to this thin depositional layer in the Creek, it is expected that composite samples may be needed to obtain adequate sample volume. In the ponds, lack of deposition is not an issue and plenty of mixed organic-type sediment exists. Surface water and sediment samples will be collected when there is water in both the east and west branches. This is likely to occur in early to late spring. Thus, sampling is proposed to occur in late March or early April of 1998.

Samples will be collected from the following locations to evaluate "background" concentrations of potentially site-related constituents:

- Sample Locations 1 and 2: West branch - One SE and SW sample will be taken just upstream from the confluence of the west branch and Pond A, and one SE and SW sample will be taken 100 ft upstream of the confluence of the west fork (west side of Bethpage State Parkway) of the West branch. These samples will provide data for upgradient comparison of constituent concentrations. Note that one or both of these locations may be dry during the time of sampling: in that case, no SW and SE samples will be collected.

The following locations will be sampled to determine the concentrations of site-related constituents in the Creek and to evaluate their downgradient extent and/or dispersion:

- Sample Locations 3 and 4 (Eastern branch, upstream of the weir at Pond A) - One SE and SW sample will be taken between 6th and 7th Avenue and one SE and SW sample will be taken between 9th and 10th Avenue.

- Sample Locations 5, 6 and 7 (Pond A) - Three SE samples and one SW sample will be collected in this pond. One sample location will be at the inflow from the Creek, one location in the middle of the pond, and a third location will be collected just prior to the discharge to the Creek.

- Sample Location 8: One SE and SW sample will be taken between the Southern State Parkway and South Park Drive.

- Sample Location 9: One SE and SW sample will be taken between Linden and Violet Roads.

- Sample Location 10 (Pond 1) - One SE and SW sample will be collected in the pond just prior to the discharge to the Creek. Only one sample location is proposed because the Creek appears to be isolated from the pond.

- Sample Location 11: One SE and SW sample will be collected in the reach that flows adjacent to Pond 1.

- Sample Location 12: One SE and SW sample will be collected just north of Illinois Street.

- Sample Location 13: One SE and SW sample will be taken at Cypress Avenue.

- Sample Location 14: One SE and SW sample will be taken just upstream from Pond 2 at the small cement dam structure.

- Sample Location 15: The most down gradient SE and SW sample will be collected in the area adjacent to the USGS gauging station south of Pond 2.

All samples (fifteen SE samples and thirteen SW samples) will be collected in a downstream to upstream manner to minimize disturbance of sampling areas. Also, if Phase II occurs (as discussed below), one SW and SE will be collected at a RBP reference location (as discussed below) for comparison to Massapequa Creek data.

The results of chemical analyses from Phase I will be compared to ecological screening values (NYSDEC Technical Guidance for Screening Contaminated Sediments and NYSDEC ambient Water Quality Criteria) to determine locations where constituents are at concentrations elevated enough to potentially cause impact to the aquatic community. If the data indicate constituent exceedances that could be site-related, then based on these comparisons and an understanding of the Creek habitat, locations will be selected to be sampled using EPA's Rapid Bioassessment Protocols (USEPA 1989b) during Phase II.

2.3 PHASE II – RBP Sampling

If Phase II is warranted, a brief technical memorandum will be prepared for review by EPA that presents the specific locations in Massapequa Creek to be sampled using RBP III and V. It is anticipated that RBP sampling may be warranted only in the reaches of the Creek south of Pond 1 (the ponds itself will not be sampled for RBPs). As indicated in the preceding characterization of the Creek, both the east and west branches north of Pond 1 are ephemeral and completely dry for periods as long as 4 months and perhaps even longer in dry years. Also, as indicated in the Massapequa Creek Streamflow Augmentation Feasibility Study (Dvirka and Bartilucci 1993), the entire stream north of Linden Street is expected to become dry in the near future, even if flow augmentation is employed in the lower part of the Creek. Thus, due to the extreme stress on the aquatic community in the northern reaches caused by ephemeral conditions, it is considered unfeasible to distinguish potential impacts due to groundwater constituents from severe habitat stress. Therefore, RBP sampling would occur in the reaches of the Creek south of Pond A and

between Pond 1 and Pond 2. To the extent possible, RBP sampling will occur soon after receiving results of chemical analyses and will be co-located with sediment sampling locations identified in Phase I. The assumption at this time is that should Phase II be required, five (5) locations would be sampled for RBP data: two locations between Pond A and Pond 1, and three locations between Pond 1 and Pond 2.

A number of local streams were visually surveyed in January 1998 for possible use as a RBP reference stream. Theses include: Seaford Creek in the Tackapusha Preserve, Jones Creek in Post Park, and both the upper and lower reaches of Carman Creek. The reference location that appears to most resemble the reaches of Massapequa Creek south of Pond 1 is the reach of Carman Creek as it flows adjacent to the running track of Berner High School (Figure 2). This is in the area of Carmans Mill Road and Oakley Street. At this time, this location is considered to be the reference site.

2.3.1 RBP III - Macroinvertebrate Assessment

RBP sampling for aquatic macroinvertebrates will include laboratory identification of organisms sampled (including one reference location) to the lowest practical taxon. Sample collection equipment will include kick nets, dip nets, sieve buckets, and Ponar samplers, although artificial substrates, and other related samplers may be considered. The proposed level of assessment will allow the assignment of four levels of impairment relative to the reference station. These levels are: non-impaired, slightly impaired, moderately impaired, and severely impaired. The community "metrics" employed in making this determination will include:

- Species richness;
- Hilsenhoff biotic index;
- *Ephemeroptera, Plecoptera, and Trichoptera* (EPT) and chironomid abundance;
- Percent of dominant taxon;
- EPT index;
- Community similarity indices;

The Phase II sampling effort will also include a first order evaluation of stream characteristics and corresponding water quality measurements, such as:

- Estimated stream channel width;
- Estimated stream channel depth;
- High water mark;
- Flow velocity;
- Presence of dams and channelization;
- Extent of canopy cover;
- Sediment odors, oils, and deposits;
- Inorganic substrate components (e.g., particle size distribution);
- Organic substrate components (e.g., detritus characteristics);
- Surface water temperature, pH, dissolved oxygen (mg/l), conductivity (µmhos/cm)

2.3.2 RBP V - Fish Assessment

RBP sampling for fish involves standardized field collection, species identification and enumeration, and community analyses using biological indices. This technique is similar in effort and accuracy to RBP III for macro-invertebrate sampling. Electroshocking is the most commonly used method for obtaining fish; however, other methods may be employed depending on site-specific conditions. An index of biotic integrity (IBI) will be calculated from comparison of measurements from the reference station including the following metrics:

- Total number of species
- Number and identity of darter species
- Number and identity of sunfish species
- Number and identity of sucker species
- Number and identity of intolerant species
- Proportion of individuals as green sunfish (or substitutes)
- Proportion of individuals as omnivores
- Proportion of individuals as insectivorous cyprinids
- Proportion of individuals as top carnivores
- Proportion of individuals with obvious disease (tumors, fin damage, and skeletal anomalies)

RBP V also includes habitat and water quality measurements (similar to those described for RBP III) that are ultimately integrated with the biological condition scores described above and when compared to a reference location, will permit to draw defensible conclusions regarding the condition of the assessed stream.

A technical memorandum summarizing the findings and methods of Phase II will be prepared. Based on the results of the aquatic community assessment, and if deemed appropriate, recommendations will be made for additional work as a Phase III.

2.4 Phase III – Sediment Toxicity Testing

If Phase II indicates impacts to the aquatic community - unrelated to habitat factors or typical urban stressors, and if the chemical data generated in Phase I suggest levels of constituents that occur significantly above screening thresholds, then Phase III will be recommended. Phase III will focus on determining if constituents in sediments might be the cause of impacts. A range of possible tests and test species exist for use in this task. It is likely that Phase III (if necessary) will include standard 10-day acute laboratory sediment toxicity tests, using *Chironomus spp.* and/or *Hyalella azteca*, on samples collected at selected locations. However, factors such as sediment grain-size and TOC will affect the choice of test species, as many standardized test species do not perform well in sandy, low organic matter sediments. Thus, at this time the specific locations and test protocols are not presented. Should Phase III be necessary, a Sampling and Analysis Plan Memorandum will be prepared that details the specific locations to be sampled and the selected test methods.

REFERENCES

Dvirka and Bartilucci. 1993. Massapequa Creek Stream Flow Augmentation Feasibility Study (Draft). Nassau County, New York Department of Public Works.

United States Environmental Protection Agency (USEPA). 1989a. Risk Assessment Guidance for Superfund. Volume II. Environmental Evaluation Manual. EPA/540/189/001. March 1989.

United Stated Environmental Protection Agency (USEPA). 1989b. Rapid bioassessment protocols for use in streams and rivers - benthic macroinvertebrates and fish. Office of Water. EPA/444/4-89-001. May 1989.

United States Environmental Protection Agency (USEPA). 1994. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. USEPA, Environmental Response Team. Edison, N.J., September 26, 1994. Review Draft.

Please contact us if you have any questions or comments regarding the information provided in this letter.

Sincerely
DAMES & MOORE

Ralph T. Golia
Project Coordinator

Matthias Ohr
Project Manager

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cc: Liberty Group
USEPA Regional Counsel
Mr. V. Cardona (NYSDEC)
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Enclosures

APPENDIX A
Responses to Specific Comments

Appendix A presents the EPA and New York State Department of Environmental Conservation (NYSDEC) comments, as contained in the November 25, 1997 letter by the EPA. The EPA and NYSDEC comments are printed in italics and are addressed in turn by the responses of the Liberty Group (respondents). The responses are the basis for the revised Scope of Work (SOW) that is presented in this letter.

GENERAL COMMENT (EPA and NOAA):

1. There is no existing surface water pathway between the Liberty Industrial site and Massapequa Creek, approximately 0.3 kilometers (km) downgradient of the site. Instead, the dominant pathway is via groundwater. As approximately 95% of stream flow on Long Island originates from groundwater, the groundwater plume associated with the site is of major concern to EPA and the National Oceanic and Atmospheric Administration (NOAA). Massapequa Creek flows for about 8 km before discharging into Oyster Bay. The NOAA trust resources utilize both the lower reach of Massapequa Creek and Oyster Bay. Except for the American eel, access to the upper reach of Massapequa Creek is blocked by a dam located about 6.7 km-below the site.

Maximum concentrations of inorganic substances measured in Massapequa Creek surface water during the original RI included 11 µg/l cadmium, 45 µg/l chromium, 13 µg /l copper, 12 µg /l lead, and 110 µg/l zinc. Aluminum, cadmium, cobalt, copper, iron, lead, and zinc were measured in creek surface water at concentrations above New York State Ambient Water Quality Standards for class C (trout) streams. Cadmium, chromium, copper, and lead concentrations in surface water also exceeded (federal) freshwater chronic ambient water quality criteria. Since groundwater discharges to and site-related contaminants within Massapequa Creek have been documented, a potential threat exists to aquatic life, including the American eel, in the upper reach of the creek. On the other hand, contaminant concentrations measured in the upper reach of Massapequa Creek present an unknown threat to NOAA trust species and habitats in the lower reach of the creek or Oyster Bay. The degree of the threat is dependent on control over and remediation of the groundwater plume, the mobilization and downstream transport of metals, i.e. cadmium, and the effects of dilution. To date, downstream sampling has not occurred.

Response: A revised scope of work has been prepared and is presented in this letter. The revised scope of work is designed to identify the extent and level of constituents in the plume of concern that may have reached Massapequa Creek. The scope of work proposes sample locations in the west branch of the creek and downstream of the plume to further characterize the nature of these constituents. The sample locations were selected following a site survey in January 1998.

SPECIFIC COMMENTS (EPA and NOAA):

1. A phased approach for conducting the ecological evaluation is proposed in the Scope of Work (SOW). Sediment sampling and chemical analysis along with an assessment of the benthic and fish communities are the first phase. The results from the first phase will be used to determine if the second phase (bioassays) is necessary. However, due to the uncertainties associated with the potential differences between communities (i.e., habitat), it would not be appropriate to use the results from the fish and benthic assessment to determine if further ecological work is needed. Therefore, the decision to implement the second phase should be based on comparison of contaminant concentrations in the sediments to appropriate ecological screening values (i.e., New York State Department of Environmental Conservation (NYSDEC) Technical Guidance for Screening Contaminated Sediments). If chemical analysis of sediments results in concentrations exceeding screening values, the second phase should be implemented. In addition, given the inorganic contamination identified on-site, it is recommended that both sediment and tissue analyses be conducted for all metals comprising the TAL.

With regard to Phase I of the investigation, which calls for sediment sampling/analysis and biological characterization using rapid bioassessment protocols (RBP), the SOW provides no details on when samples will be collected or the effects of seasonality on benthic and fish communities. There is also no detail of sediment sampling locations. It is recommended that deposition areas be emphasized as previous collections were primarily from gravelly sand substrates. Therefore, the sediment samples should be collected from the deep areas of the ponds. These locations may reflect depositional areas or groundwater discharge points. In addition, as stated above, the proposed SOW decision tree could result in the termination of the ecological evaluation solely based on the qualitative results of the RBP. According to Klemm et al. (1990), Chironomidae, Plecoptera, Ephemeroptera and Tricoptera sensitivity or tolerance to metals may be genera or species specific; therefore, the potential metals impact on these species may not be properly addressed with the qualitative RBP approach.

Eisler (1985) concluded that cadmium in exceedance of 3 ug/l in freshwater is potentially harmful to aquatic organisms. Eisler (1986) reported that sensitive freshwater biota exhibit decreased growth, inhibited reproduction and increased bioaccumulation at 10 ug/l Cr^{+6} and other adverse effects at 30 ug/l Cr^{+3}. Cadmium and chromium have been documented in Massapequa Creek in excess of these concentrations. It is of concern that biological data obtained during the proposed Phase I could result in a misinterpretation of site impacts and may not differentiate between habitat-related effects and contaminant-associated effects. We offer two alternative scenarios to the phased approach presented in the SOW.

One alternative approach would be to only conduct sediment/water sampling and analysis in Phase I and perform all biological work (toxicity, bioaccumulation, community studies) during Phase II, with the recognition that collocated sediment samples would be required during Phase II. This could allow for the addition of stations downstream of the lower ponded area should Phase I sediment analysis-reveal elevated levels of site-derived contaminants.

A second alternative is to perform sediment/water sampling, toxicity testing and quantitative benthic analysis on collocated samples during Phase I. Phase II activities could then emphasize the bioaccumulation potential, with quantitative fish community data obtained concurrently with

collections for tissue analysis. The Phase I benthic study would provide information as to the availability of tissue for Phase II chemical analysis.

Response: The respondents agree to use NYSDEC screening criteria as one factor to help determine the need for conducting further assessments, such as aquatic community studies and toxicity testing. As discussed in the revised scope of work, the respondents plan on using a phased approach to assess potential impacts in Massapequa Creek. Phase I will consist of sediment/water sampling, at locations and for parameter that are generally according to the SAP (Weston, February 1995). Community assessments (RBPs III and V) would be implemented based on the results of Phase I, and toxicity testing would only be used if data from Phase I and Phase II suggest that impairment might be caused by site-related constituents in the groundwater. At this time, the respondents believe that additional characterization on the nature and extent of constituent presence is needed before tissue analysis might be proposed. Thus, at this time no analyses of tissue for bioaccumulation are proposed.

The nature and extent of exceedances identified in Phase I will determine the location of biological samples (benthic and fish assessments) to be taken during Phase II. A reference location along Carman Creek (near Berner High School and Carmans Mill Road) will also be sampled if RBPs are conducted. A brief technical memorandum will be prepared and made available for EPA review that discusses specific RBP sampling locations as part of Phase II.

2. *The reference locations are located in the Eastern and Western Branches of the Massapequa Creek and in an unnamed tributary of the Massapequa Creek (just south of Maple Street). Neither of the locations in the Eastern and Western Branch of Massapequa Creek appears to represent a ponded habitat comparable to the ponded areas along Massapequa Creek for which this limited biological characterization is being conducted. The reference location in the unnamed tributary was not included in Figure 1. Also, reference locations with pond habitat would need to be identified.*

In addition, the reference location in the Eastern Branch of Massapequa Creek may not be appropriate, given the documented presence of the groundwater plume extending from the Liberty site into the Eastern Branch, as far downgradient as south of the Southern State Parkway (as illustrated in Figure 4-16 of the January 1994 RI Report). Surface water and groundwater cadmium and chromium concentrations were highest in the vicinity of the Eastern Branch monitoring wells MW-9 and MW-9B, upgradient of the two ponded areas. Surface water cadmium exceeded NYSDEC Ambient Water Quality Criteria and both the shallow and deep upper glacial aquifers were contaminated with chromium above 400 ug/l and 500 ug/l respectively. Therefore, it would be inappropriate to designate the Eastern Branch as reference area unimpacted by site contamination.

Based on the January 1994 RI Report's data and also D&M's recent groundwater screening data, there is no evidence that the groundwater plume has reached the Western Branch. The groundwater appears to be flowing in a south/southwesterly direction and is unlikely to intercept Western Branch except near its junction with Eastern Branch. In addition, the highest sediment lead level was recorded from sample SD-8, located within the Western Branch near the junction

with the Eastern Branch. At this station, lead was in excess of NOAA effects range-median (Long et al. 1995) and was just under the Ontario Ministry of the Environment and Energy severe effect level (Persaud et al. 1993). The proposed reference sample within the Western Branch appears to be positioned between SD-9 than SD- 10 but it is suggested that if Western Branch is used as a reference location, then thc station should be as close to the headwaters as possible since inorganics were lowest in SD-10 and it is furthest removed from the fringes of the plume. Please note that this location may be acceptable for contaminant level determinations but, as stated above, is not likely to match habitat characteristics of the ponded areas of interest.

Comment cannot be made on the third reference location, the unnamed tributary just south of Maple Street, because neither a description of the habitat was provided nor a sampling location was specified on-the supplied map.

In summary, it is recommended that alternative reference locations be selected that are similar in habitat to the ponded areas of the creek and are unimpacted by site contaminants.

Response: The respondents are aware that the stream locations proposed were not indicative of ponded habitat characteristics. The respondents agree with the NYSDEC comment dated May 6, 1997, that the ponds are primarily sediment catch basins and not intended to be a fish habitat. Because NYSDEC's primary concern appears to be with the stream habitat and its future as trout water, the revised scope of work is focused on the habitat of the stream. The revised scope of work does not propose biological sampling in the ponds.

Should Phase II of the revised work plan be implemented, the reference location along Carman Creek, near Berner High School (see Figure 2), will be used in the biological assessments. This reference location contains similar habitat to that of Massapequa Creek below Pond A. No reference areas for the ponds will be selected, as RBP work will not be conducted in these habitats.

3. In Figure 1, there are fourteen proposed sampling locations. However, it is noted in the SOW that three sediment samples will be collected in each of the two ponds. In addition, there are proposed surface water sampling locations illustrated in this figure which are not included in the text of the SOW. These discrepancies should be clarified. It may also be appropriate to differentiate the reference locations in the figure.

Response: The revised scope of work now proposes fifteen sampling locations, based on the January 1998 stream survey. Please refer to Figure 1 in the revised work plan for specific sampling locations. Per the 1995 SAP, sediment/surface water samples are to be analyzed as follows:

- TCL VOA, TAL metals + cyanide (total), Cr-VI, hardness for surface water;
- TCL VOA, TAL metals + cyanide, Cr-VI, TOC for sediments.

The revised scope of work adds sediment grain size analysis and acid-volatile sulfide (AVS) analysis to this parameter list.

4. With regard to the map dated 4-28-97, it is recommended that the samples proposed under the SOW be clearly differentiated from stations proposed in the 1995 EPA work plan. The figure depicting groundwater, surface water and sediment sampling locations is difficult to interpret. A separate map showing only the stations proposed in the SOW would be helpful. In addition, the use of different symbols or codes for the reference stations is suggested.

Response: A sampling location map specific to the proposed scope of work has been prepared and is included as Figure 1 in this submittal. Sampling locations 3, 4, 6, 8, 9, 10, 12, 13, and 14 are roughly equivalent to the stations proposed in the 1995 EPA work plan. Sampling locations 1, 2, 5, 7, 11, and 15 are specific to this revised scope of work.

5. References that were consulted in preparation of majority of the comments above are provided below

a) Eisler, R. 1985 Chromium hazards to fish, wildlife, and invertebrates: a synoptic review. USFWS Biological Report 85(1.6), Contaminant Hazard Reviews Report No. 6, July 1985.

b) Eisler, R. 1986 Cadmium hazards to fish, wildlife, and invertebrates: a synoptic review. USFWS Biological Report 85(1.2), Contaminant Hazard Reviews Report No. 2, January 1986.

c) Klemm, DJ, PA Lewis, F Fulk and JM Lazorchak (1990) Macroinvertebrate field and laboratory methods for evaluating the biological integrity of surface waters, USEPA, Office of Research and Development, EPA/600/4-90/030, November 1990.

d) Long, ER, DD MacDonald, SL Smith, FD Calder 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environmental Management l9(1):81-97.

e) Persaud, D, R Jaagumagi and A Hayton 1993. Guidelines for the protection and management of aquatic sediment quality in Ontario. Ontario Ministry of the Environment and Energy. (August)

Response: Thank you.

Comment from Mr. Paul Carella (NYS Fish, Wildlife & Marine Resources):

I have reviewed the document referenced above, which is presented in the Dames & Moore letter of April 24, 1997 to Lorenzo Thantu of EPA.

I agree with the additional sediment sampling and analysis proposed for the two ponded areas of Massapequa Creek. I do not, however, believe that assessment of the benthic and fish communities in the ponds will supply sufficient information regarding impacts to the creek

resulting from the discharge of contaminated groundwater. With such assessments it is always difficult to interpret the level of community impairment and the exact conditions responsible for the impairment. This is especially problematic in an urban area where there are many factors that may affect the state of benthic invertebrate and fish communities.

Massapequa Creek is the only stream in southern Nassau County that is capable of supporting trout. It is stocked annually by the Department. Because of the Creek's significance. I believe an approach is required that is more direct than community analysis. Specifically, sediment toxicity analysis and fish tissue analysis should be undertaken as recommended in Steve Sanford's memo of January 13, 1997. Information from such analyses, along with the results from the planned sediment sampling, will provide important quantitative data for an assessment of contaminant-related impacts.

Response: The respondents agree that a direct approach is necessary such as sediment and surface water comparisons to NYSDEC criteria; this will occur in Phase I of the revised scope of work. If deemed appropriate, during Phase II benthic and fish community assessments will be used to complement this data and to identify ecological impacts and/or impairments. The respondents strongly believe that this additional chemical and ecological characterization is necessary before any tissue analyses might be proposed. Thus, at this time, no analyses of tissue for bioaccumulation are proposed.

Comment from Mr. Ed Woltman (NYSDEC Region 1)

I strongly concur with Paul Carella's statement that the sediment toxicity analysis and fish tissue analysis should be undertaken in accordance with the recommendations contained within the 1/13/97 memo by Steve Sanford.

I am particularly concerned that since our primary concern with Massapequa Creek is with the trout population that will be using the flowing segment of the stream that any assessment key on this area of the creek. In addition to the pond sediment collections, additional sediment samples should be taken from the stream itself to determine if contaminant concentrations may currently be impacting stream insect life and whether these concentrations may pose a bioaccumulation hazard to fish species in the stream.

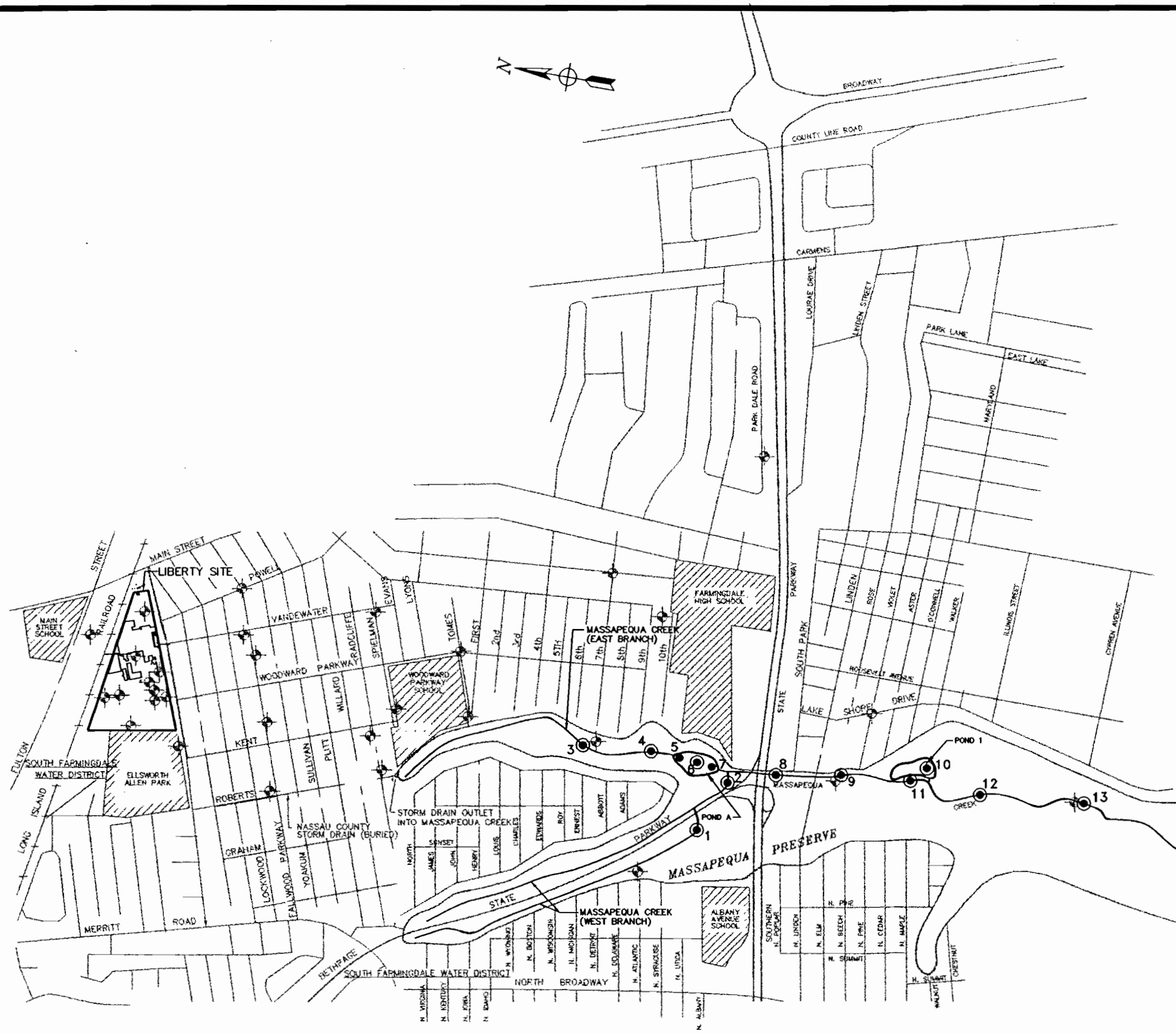
I do not understand why invertebrate collections are being conducted solely in the ponded areas. These ponds were originally developed as sediment catch basins and were never intended to be fish habitat. As our primary concern is whether contaminants are impacting the creek and its future as a trout water, invertebrate collections should be completed at a number of locations within the stream itself.

In addition to the above, fish samples should be taken from the stream, as well as impounded areas (i.e., Massapequa Reservoir) to determine current levels (if any) of the contaminants you describe in fish found in these waters. We have been getting repeated phone calls from concerned residents about contaminants in the creek and how they are impacting the edibility of

the fish caught from the creek. These fish flesh contaminant analyses will allow us to properly address these concerns.

Response: The revised scope of work no longer proposes to conduct benthic surveys in any of the ponds, only in the flowing water areas of the Creek. The main concern is with the Creek itself and not the upper ponds. Although trout are stocked in the Creek and Massapequa Reservoir, at this time the nature and downgradient extent of constituents needs further characterization before tissue samples might be collected.

The revised scope of work proposes a phased approach on which the need for further studies of the Massapequa Creek aquatic community will be based. Based on results of Phase I and comparisons to NYSDEC screening values, Phase II may be implemented. During Phase II, RBPs III and V will be used at locations deemed necessary by the chemical data comparison with NYSDEC criteria. Once this data is collected and evaluated, and if impacts are observed, Phase III will be proposed to determine if constituents from groundwater may be the cause of impacts.



EXPLANATION

- EXISTING RI AND CRI/FS MONITORING WELL
- 3 SEDIMENT AND SURFACE WATER SAMPLING LOCATION NO. 3
- 5 SEDIMENT SAMPLING LOCATION NO. 5
- MASSAPEQUA PRESERVE
- MASSAPEQUA CREEK
- PONDS IN MASSAPEQUA PRESERVE, NAMED ACCORDING TO STREAM FLOW AUGMENTATION STUDY (DVIRKA & BARTILUCCI, 1993)

0 630 1260 FEET
GRAPHIC SCALE

TITLE
ECOLOGICAL EVALUATION REVISED SCOPE OF WORK

PROJECT
LIBERTY INDUSTRIAL FINISHING SITE
FARMINGDALE, NEW YORK

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

SCALE	DWN. BY	JOB NO.
AS SHOWN	R.G.B.	35550-001
DATE	APPR. BY	FIG. NO.
2/11/98	M.O.	1

(1) H:\LIBERTY\35550001\8010201A 03/09/98 08:48


Massapequa Creek
Gaging Sta
Reference Location
MASSAPEQUA PARK
AMITYVILLE
Copiague
Nassau Shores
Biltmore Shores
2,000 ft

Figure 2