APPENDIX L

Revised Preliminary Water Quality Management Plan

REVISED PRELIMINARY WATER QUALITY MANAGEMENT PLAN
LOST LAKE RESORT
TOWN OF FORESTBURGH
SULLIVAN COUNTY, NEW YORK

EVALUATION OF LONG-TERM IMPACT TO GROUNDWATER AND SURFACE WATER FROM TURF AND MANAGED LANDSCAPED AREAS

Submitted in Conjunction with the Draft Environmental Impact Statement for the same

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ATTACHMENTS

1.0 OBJECTIVE

This document describes the proposed management and monitoring plan for maintaining the quality of water resources at the proposed planned residential community and golf resort known as Lost Lake Resort (LLR) in Forestburgh, Sullivan County. This document includes an analysis of the potential impacts from the LLR development, and the proposed actions and protocols for turf management, pest management, chemical and petroleum storage and spill response, and surface and groundwater monitoring. Because the LLR project is in the planning stages, some further refinement and changes to this document are anticipated after the final site layout and design are completed. This plan was developed as part of the larger Draft Environmental Impact Statement completed for the project by Double Diamond Corporation, the developer for the LLR.

In order to prepare this preliminary plan, CMX evaluated the potential impacts to surface and groundwater quality from the overall development, and especially as related to the maintenance of a golf course and from other managed turfgrass areas. This plan focuses on the following aspects of the LLR:

a) Potential impacts to the Bush Kill and Neversink Rivers, which receive run-off and groundwater baseflow from the Lost Lake property
b) Potential impacts to groundwater quality
c) Mitigation measures in the form of turf and pest management plans
d) The turf management operations for the proposed golf course
e) Mitigation measures related to impacts to surface water and groundwater

As part of our evaluation, CMX reviewed the following documents that were prepared for the LLR:

Conceptual Design Plans – LLR, 8/13/09, prepared by Brinkash Associates, Inc. and LLR, Inc.

PRELIMINARY STORMWATER POLLUTION PREVENTION PLAN AND EROSION AND SEDIMENT CONTROL REPORT , January 7, 2010, prepared by Brinkash Associates, Inc. (and referred to herein as the Stormwater Management Plan or SWMP).

In addition to the above sources, CMX relied on site-specific soil data collected in 2007. Based on our evaluation, it is our professional opinion that the resort community and golf course as proposed does not represent any unreasonable risk to the groundwater and surface quality of the area. The remainder of this document presents the findings and basis for our opinion.

2.0 POTENTIAL IMPACTS TO THE BUSH KILL AND NEVERSINK RIVERS

The LLR contains much of the western headwaters of the Bush Kill, and includes six (6) tributary streams. The Bush kill discharges to the Neversink River approximately 5.7 stream miles to the southeast. There is also a dammed lake (Crane Pond) between the Resort and the River confluence. The largest tributary dissects the site south of St. Joseph Road and meets with the Bush Kill at the southeast portion of the property. Upstream from this point, the discharge from Lost Lake (Trout Lake) flows directly into Bush Kill at a point just off-site to the east. Lost Lake, Bush Kill, and all of the tributary streams are each designated as a Class B water body, with the Bush Kill also designated as Trout Water. Recent New York Department Environmental Conservation (NYSDEC) and Tim Miller Associates (TMA) staff stream surveys at the site suggest that two (2) of the tributary streams may be reclassified as suitable for Trout Spawning (TS) waters. As such, these waters contain valuable and sensitive fisheries which warrant special protection to minimize and preclude adverse effects from the LLR development. These adverse effects could potentially occur in the form of point and non-point source discharges to the lake and streams that contained sediment, nutrients from fertilizers, impervious surface run off, and golf course chemicals contained in surface water run off and groundwater baseflow. The potential sediment impacts are a concern primarily during the

construction phase(s) of the project when the change from a forest ecosystem to mixed wooded, residential, and recreational land (golf & trails) uses occur as the ground surface is disturbed and replaced, in part, with different cover. The potential nutrient and chemical impact is of concern after development from ongoing maintenance of turf, and from pavement run off.

2.1 Protection and Mitigation Measures

The majority of potential adverse impacts to the site's water resources are from increased sediment loading to surface water during construction phases; and, post-construction impervious surface run off. Both concerns are addressed by the SWMP designed by Brinkash and Associates. This SWMP complies with the *New York State Stormwater Design Manual*, April, 2008; and, *New York Standards and Specifications for Erosion and Sediment Control*, April 2005. The Brinkash report describes detailed modeling of the watersheds and containment of the various storm event scenarios, and focuses on both the construction phase and post-development condition. As further described in this section, it contains various Best Management Practices (BMPs) that are recognized by NYDEC as effective in managing stormwater during the construction and post construction periods.

The post-construction concerns from turf management are addressed through the development of recommended practices for the golf course management, and development of turf and pest management protocols. Although the use of fertilizers, herbicides, pesticides, and other related turf chemicals, has led to a perception that turf systems are a major contributor to nonpoint source water pollution, a properly managed turf surface is much more likely to reduce or preclude surface water run off, and provide water quality filtering of contaminants. The surface and groundwater sampling program is discussed in Section 5.0 of this preliminary plan, and sets forth a program to monitor Lost Lake and the major tributaries to the Bush Kill to ensure water quality is maintained, and to provide early notice should activities at the site result in measurable water quality impacts.

Construction Phases

The golf course construction and other larger-scale construction activities (e.g., roads and amenities near Lost Lake) pose the greatest risk for sediment impact to the surface water. The SWMP includes several methods to address sediment. The overall strategy for the erosion and sedimentation plan is to route upland surface run off to diversion trenches and swales, and away from exposed areas. This method greatly reduces the volume of sediment-laden run off water. The following temporary controls included in the stormwater management plan are intended to eliminate erosion and control sedimentation:

1. The disturbed areas will have perimeter filter fabric fencing.
2. Run off water will pass through sediment traps sized for the 50-year storm event. Sediment will be removed as needed to maintain the trap capacity.
3. Exposed areas will be temporarily seeded and mulched where feasible.
4. Sediment traps will discharge to low velocity rock and vegetated swales, which will discharge to a sedimentation basin. Discharge from the basin will pass through a skimmer, which removes the cleanest water first and allows more time for sediment to settle.

Implementation of these measures should preclude any significant increase of sediment to surface waters.

Post-Construction Phases

Historically residential subdivisions were permitted to alter the natural system spatially, physically and chemically, ultimately altering the post-development biological and ecological system. Large amounts of wetland fill and stream relocations were permitted to achieve the desired site layout, drastically affecting the way in which the area could function as a natural system. The results were usually devastating to the natural system. Today, we have extensive knowledge and experience dealing with nutrient loading and methods to reduce the loading to the maximum extent practical. The planners and designers of the Lost Lake site are striving to accomplish this goal by mimicking the pre-existing natural hydrological system to the extent feasible. The methods employed to accomplish this goal include maintaining the natural forest setting throughout the property to the extent possible, maintaining the existing 268 acres of wetland areas and water bodies, capturing and infiltrating stormwater from impervious surfaces, and creating stormwater systems that mimic natural environments capable of sequestering nutrients before they reach stream and lake systems.

The result of clearing forest and placing impervious surfaces such as buildings and roads will have an effect on the area. These effects are expected to be mitigated by taking measures that will decrease tree removal to a minimum, mitigating tree removal by re-planting, creating riparian buffer systems, and controlling the volume and rate of stormwater runoff. Tree removal will be limited to the minimum feasible for constructing the required infrastructure and prepare the lots for buildings, driveways, and stormwater facilities. Natural buffers of at least 100 feet and 50 feet will be placed around all state-regulated wetlands and streams, respectively, on the site, creating an extensive buffer along waterways that will remain in perpetuity. This will allow the ecological systems that currently exist to continue to function as they currently do by providing woody debris and cover for macro invertebrates, fish and other residing organisms and maintain water temperatures.

The development style for LLR incorporates natural landscaping for the entire property, and maintains the existing conditions to the extent feasible, which minimizes tree removal and lawn surface at residential areas. Tree removal will be restricted by the Restrictions and Covenants Agreement that all property owners must accept, and which is enforceable by the Homeowners Association. The recommended restrictions related to residential landscaping are:

- Removal of any tree greater than three (3) inches in diameter from within twenty (20) feet of the lot boundaries (except where driveways and structures are located) will be prohibited unless approval is obtained from the Homeowners Association.
- Within 90 days of completion of a dwelling exterior, the outside ground surface that was disturbed shall be covered by mulch, grass, or shrubbery.

Overall, minimizing lawn space will reduce the likelihood of any surface runoff and potential pollutants and nutrients entering the Bush Kill. Providing a natural forest setting surrounding the homes and roadways will substantially decrease the pollutant loading on the Bush Kill in the same manner as a natural forest: evapotranspiration, interception of rainfall, sequestering of nutrients, etc.

The strategy of collecting and managing stormwater at it's source is very effective in reducing pollutant loads by reducing overland flow. Mitigating stormwater runoff at it source begins with developing a means to capture stormwater from rooftops. On-lot drywells will be utilized to collect the run-off from the roof-tops of the residential units and infiltrate the 100-year and smaller storm events. Drywells will be provided as an effective means of ground water infiltration in areas where soils are suitable for infiltration. Dry wells reduce peak run-off volume and increase recharge to groundwater, and preclude surface runoff that might otherwise affect stream water quality. Rain gardens are proposed for lots where soil permeability rates overly restrict infiltration.

Other "at source" infiltration devices include extensive vegetated infiltration trenches between homes, seepage beds and permeable pavements. The SWMP contains maintenance protocols that will keep these facilities functioning properly for an extended period of time.

Areas where stormwater cannot be infiltrated either due to soil type or storm event will be conveyed between lots and in street right-of-ways via culverts, and vegetated swales that are proposed to serve as filter strips. Typically, these swales and culverts will be designed to carry the 10-year storm with provisions to safely pass the 100-year storm event without damage. As design calculations dictate, swales will either be grass lined with temporary matting to be in place until stabilization or the swales will be rip-rap lined where necessary. Higher velocities and shear stress will necessitate the rock lining in areas of excessive flow and/or steep sloped swales. Most conveyance structures will flow into wet detention basins to attenuate post development flow rates. Unique outlet structures were designed to control flows from all year storm events. Each basin bottom will be lowered six inches below the primary outlet to allow for extended detention, infiltration, evapotranspiration and water quality controls. If possible, the basins will be managed as wet meadow with grass no shorter than 6 to 8 inches. Trees and brush with extensive woody root systems shall be completely removed from embankments to prevent the embankments from destabilizing and seepage routes from being created. Extended detention wet ponds should have enough volume to account for sediment accumulation over time preventing sediment and nutrients from discharging from basins and entering the streams. Also, the basins will have sediment forebays, which allow incoming sediment to settle prior to entering the basin. The forebays also allow easier sediment removal.

Impervious surface run off that does not infiltrate or evaporate prior to reaching a stormwater basin will benefit from passive treatment as it infiltrates through the basin bottom, based on studies performed by USEPA:

> "Numerous studies have shown that stormwater infiltration BMPs have a minor risk of contaminating either groundwater or soil. Perhaps the most comprehensive research was conducted by USEPA, summarized in "Potential Groundwater Contamination from Intentional and Nonintentional Stormwater Infiltration" (Pitt et al, 1994). The publication presents a summary table that identifies the potential pollutants to contaminate groundwater as either low/moderate, moderate, or high. Of the 25 physical pollutants listed, only one has a high potential (chloride)…Pentachlorophenol, cadmium, zinc, chromium, lead, and all pesticides listed are classified as having "low" contamination potential. Even nitrate which is soluble and mobile…is only given a "low/moderate" potential".

Given the extensive grass-lined swale network and grass-lined basins that are proposed for the project, and the capacity of the system to contain and safely pass the 100-year storm event, and the resultant water quality treatment benefits from infiltrating run off water through a grass surface, the potential for surface water and/or groundwater impact from stormwater run off is not considered to be significant for the development.

2.2 Conclusion

The stormwater management plan that has been proposed for the site addresses the potential for increased sediment in run off water during construction using recognized BMPS. Overall, increased sediment load should not pose a significant adverse impact to the surface water bodies at the site.

The post construction impact by the increased impervious surfaces on the Bush Kill should also be mitigated through the water quality BMPs that are designed in the stormwater management plan. In addition, the site design retains a natural setting with minimal tree removal, and establishment of the 100-foot wetland and 50-foot riparian buffers.

The residential areas will have little effect on the Bush Kill watershed due to minimal or non-existent turf cover, capture and infiltration of roof runoff, maintaining the forest setting for residential lots, the use of vegetated swales for any runoff, and the overall capacity of the stormwater system for containment and passage of the 100-year storm along with enhanced infiltration through the use of vegetated swales. Likewise, the golf course, lake recreational areas, and amenity areas are not anticipated to have significant adverse impacts to the stream and its tributaries, given the extent of the stormwater management system, overall design methods, and standard operating procedures.

The Neversink River is approximately 5.7 river miles from the LLR. There is also a dammed lake (Crane Pond) between the Resort and the River confluence. Given the distance and the sink of a dammed lake, as well as the substantial dilution effects from downstream area baseflow contributions, no adverse affects to the Neversink River are anticipated.

3.0 POTENTIAL IMPACTS TO GROUNDWATER AND SURFACE WATER QUALITY FROM TURF AREAS, CHEMICAL STORAGE, AND WASTEWATER

In order to assess potential risks from the managed turf areas, CMX evaluated the area soils and available scientific literature relative to the fate and transport of turfgrass fertilizers and pesticides. The proposed wastewater treatment method and chemical storage were also qualitatively evaluated for their potential to cause significant surface water and groundwater impact.

3.1 Soils

The soils on the property are mapped in the USDA-NRCS Web Soil Survey of Sullivan County as primarily the Wellsboro and Wurtsboro soil series. Both soils are very deep, moderately well and somewhat poorly drained soils that formed in glacial till derived from quartzite, conglomerate, and sandstone. These soils have moderate permeability in the upper soil horizons and very slow permeability deeper in the profile.

A CMX Professional Soil Scientist conducted soil testing on June 19 and 20, 2007 to determine the feasibility of the soils for on-site sewage disposal. Twenty-six (26) backhoe excavated test pits were advanced at accessible areas of the property. In each test pit, the soil morphology was described according to National Cooperative Soil Survey (NCSS) Standards. The soil was then classified to the series level and the seasonal high water table depth was determined. Attachment 1 contains the individual logs that describe the conditions that were observed, and a test pit location plan.

The soils encountered during this investigation were generally consistent with the soil mapping from the USDA-NRCS Web Soil Survey of Sullivan County, New York and would be classified as the Wurtsboro series. These soils are characterized by a fragipan, which is a dense subsurface horizon that is both root restrictive and hydraulically restrictive. A seasonal high water table as evidenced by redoximorphic features (drainage mottling) is present just above and within this hydraulically restrictive horizon. One can assume that this seasonal high water table is perched above this hydraulically restrictive soil horizon, but no excavation was conducted below this horizon to determine if there was unsaturated soil material.

Permeability testing was conducted at six (6) test locations for the most hydraulically restrictive soils horizons (fragipan). The geometric mean for the six (6) tube permeability test samples was 0.3 in/hr. Attachment 2 contains the permeability test worksheets. Based on the measured permeability rates, these soils were considered to have slow to very slow permeability. From the perspective of the use of turf grass chemicals, the generally moderate to slow permeability rates of the site soils, and shallow seasonal high water table, should provide retardation and attenuation of any fertilizers, pesticides, or other such chemicals that might pass below the root zone. Infiltrating water that eventually recharges the groundwater system will thus benefit from this natural water quality treatment.

3.2 Scientific Literature Review

Publications from leading research universities in the fields of turfgrass management were reviewed that pertain to turfgrass such as used at golf courses, and to fertilizer, herbicide, and pesticide application at golf course settings. Of those publications reviewed, the researcher's concluded that a turfgrass surface, such as a golf course, serves to: 1. enhance soil water retention; 2. nearly eliminates runoff except from the most intense storm events; 3. enhance biodegradation of synthetic organic compounds; and, 4. attenuate contaminants typically found in impervious surface run off. The publication search was not intended to be exhaustive on the subject, but rather to determine an overall conclusion regarding the environmental impacts. These conclusions are qualified by the assumption that chemical use is performed by well trained and educated golf course superintendents who handle and use the products in accordance with manufacturer instructions.

The following publication excerpts and/or summaries address the issue of golf course turfgrass and environmental impacts:

Does Fertilizer/Pesticide Use on a Golf Course Put Water Resources in Peril?, by Watschke, T., PSU Professor of Turfgrass Science, and Research Associates Harrison, S. and Hamilton, G., in *USGA Green Section Record*. Vol. 27, No. 3, May/June 1989, p. 5-8.

> The article presents a brief history of the increase in public concern over the use of pesticides on golf courses. Research into the effects on water quality from pesticide use was conducted at Penn State University. Three turf cover types were studied for establishment methods and hydrologic characteristics. The impact of well-managed turfgrass on water quality appears to be positive in nature. "The results indicate that dense, high-quality turfgrass stands, regardless of establishment method, affect the overland flow process to such a degree that runoff is insignificant. The ability of this type of vegetative community to allow water to infiltrate and promote the metabolism of solutes suggests it might possess the ability to be employed as a water quality treatment medium."

Nitrogen Leaching and Best Management Practices for Overseeded Bermudagrass Fairways, Green, R., Yates, M., and Pacheco, P., from Proceedings of the University of California Riverside Turfgrass and Landscape Management Research Conference and Field Day, September 1997.

Excerpted from the above:

> "Fertilization of turfgrasses, according to established cultural strategies, presents a negligible potential for nutrient elements to pass through the root zone into the groundwater or be transported by runoff water into surface water. This has been confirmed by a number of studies or reviews (Beard and Green, 1994; Cohen et al, 1990; Geron et al, 1993; Gold et al, 1990; Gross et al, 1990; Harrison et al, 1993; Miltner, et al, 1996; Morton et al, 1988; Petrovic, 1990, Watschke and Mumma, 1989)."

The Role of Turfgrasses in Environmental Protection and Their Benefits to Humans, Drs. James Beard and Robert Green, *Journal of Environmental Quality*, Vol. 23, no. 3, May-June 1994, Copyright 1994, ASA, CSSA, SSSA, 677 South Sego Road, Madison, WI 53711.

Excerpted from the above:

> "…studies and reviews…have demonstrated or concluded that quality turfgrass stands modify the overland flow process so that runoff is insignificant in all but the most intense rainfall events".
>
> "One of the key mechanisms by which turfgrasses preserve water is their superior capability to trap and hold runoff, which results in more water infiltrating and filtering through the soil-turfgrass ecosystem."
>
> "Runoff water and sediment that occurs from impervious surfaces in urban areas carries many pollutants…including metals such as lead, cadmium, copper and zinc; hydrocarbon compounds as from oil, grease and fuels; and household and industrial hazardous wastes such as waste oils, paints thinners, organic preservations, and solvents. Turfgrass areas can be designed for the catchment and filtration of these polluted runoff waters…It is significant that large populations of diverse soil microflora and microfauna are supported by this same soil-turfgrass ecosystem.

> Microflora constitute the largest proportion of the decomposer biomass of most soils".

Finally, the same process of water quality treatment that occurs across the soil interface at a stormwater basin (Pitt et al, 1994) that was previously referred to, is the same process that occurs across a golf course surface. Therefore, given the non-persistent nature of most golf course chemicals, and the characteristic "low" potential for pesticides to impact groundwater, the overall risk to groundwater and surface water from the golf course and other managed turf areas is not considered to be significant.

In summary, the scientific literature that was reviewed concludes that turfgrasses significantly reduce runoff and improve water quality through the capture of particulate and attenuation and degradation of both natural and synthetic chemicals. As applied to a golf course setting, these conclusions are based on the assumption of proper handling and application of herbicides/pesticides and fertilizers.

3.3 Chemical Storage Facilities

Improper storage and handling of chemicals used for golf course maintenance has the potential for water quality impacts from both a large-scale release and the cumulative effects from small spills that might wash into the stormwater system or directly into a water body. Also, releases of petroleum fuel from the storage facilities and fueling operations have the potential to affect both soil and water. For this reason, LLR has developed management strategies intended to minimize these potential effects; Section 4.0 of this document provides further discussion of the chemical management recommended standard operating procedures (SOPs) for the site. These precautions will minimize the possibility for any small or large scale spill of a hazardous material to directly affect the subsurface or discharge directly to a water body.

3.4 Wastewater Treatment

Groundwater impact from wastewater disposal is not an issue at the site because wastewater for all residential and commercial buildings will be treated at a new wastewater treatment plant (WWTP) which will be permitted and monitored in accordance with NYDEC regulations. Although there is a potential decrease in groundwater recharge associated with the central treatment plant, the increased infiltration at dry wells, swales, and detention ponds will reasonably offset the wastewater infiltration that might otherwise occur at on-lot septic systems, without the addition of nutrients. New York State Department of Health (NYSDH, 2008) recommends that wherever practical, public sewerage works are recommended for the collection and treatment of household sewage. Approval of individual sewage treatment systems is only granted (by NYDEC) where it has been demonstrated that public facilities are not feasible and where other conditions including soils, topography and geology are suitable.

The central WWTP is preferable to individual on-lot disposal systems from a groundwater and surface water protection perspective. Studies have shown that wastewater treatment at a properly functioning wastewater facility instead of on-lot septic systems will reduce nitrogen in downstream watersheds due to the ability for enhanced nitrogen removal; one such study concluded that the nitrate load is exponentially higher in septic tank effluent compared to a wastewater treatment plant discharge (Marion County Planning Department, 2005). A further problem is the potential for failure or poor performance in any group of systems; a study performed by the Oklahoma Conservation Commission (2007) listed malfunctioning rates of 10 percent at any one time for a particular community with on-site septic systems. Given that central treatment plants can be designed for a specific action, be continuously monitored and maintained, and upgraded over time if necessary, it can be argued that development and implementation of a central treatment plant can provide better nitrogen and other pollutant removal performance than individual on site septic systems.

The LLR WWTP is to be located along the north side of the main tributary stream where it discharges to the Bush Kill, at the southeastern portion of the site. NYDEC has provided preliminary effluent parameter concentration and temperature limits for the proposed WWTP discharge to the Bush Kill based on critical low flow water quality based calculations, for flows of 0.55 Million Gallons per Day (MGD), 0.25 MGD, and 0.1 MGD. These discharge limits were calculated to be protective of the Bush Kill water quality, and are as follows:

1. BOD5 - daily max limits of 10 mg/l, 15 mg/l, and 30 mg/l for flows of 0.55 MGD, 0.25 MGD and 0.1 MGD respectively.

2. TSS - daily max limits of 10 mg/l, 15 mg/l and 20 mg/l respectively.

3. Ammonia - daily max limits of 2 mg/l, 3 mg/l and 6 mg/l for the three flows respectively.

4. pH - 6.5 to 8.5

5. Settleable Solids - 0.1 ml/l

6. Phosphorus - 0.5 mg/l (30 day avg.)

7. Disinfection - recommended seasonally per Class B(T) stream. Typically May 15 - October 15.

8. Total Residual Chlorine - 0.01 mg/l if chlorine is used for disinfection.

9. Dissolved Oxygen >= 4 mg/l.

10. Temperature <= 70 Deg. Far.

3.5 Conclusion

Based on our evaluation of the proposed development with special focus on the golf course and other managed landscaped areas, CMX is of the opinion that there is no unreasonable risk to the surface and ground water quality of the area. It is unlikely that fertilizers and pesticides, applied at minimal rates as determined by a site-specific turf management plan, will leach into the groundwater in excessive concentrations. The permanent turfgrass surface of a golf course is recognized as almost eliminating runoff except during the most intense rainfall events, and provides substantial water quality improvement benefits through the attenuation and biological degradation of many inorganic and organic compounds. Chemical storage facilities will be managed in accordance with protocols designed to minimize the potential for uncontrolled releases and environmental impact to the extent feasible. The wastewater treatment and disposal at the site will be accomplished by a central WWTP that will discharge to the Bush Kill, and therefore groundwater impact from wastewater is not an issue. NYDEC has provided preliminary effluent parameter concentration and temperature limits for the proposed WWTP discharge that were calculated to be protective of the Bush Kill water quality.

4.0. MITIGATION MEASURES IN THE FORM OF CHEMICAL MANAGEMENT AND TURF AND PEST MANAGEMENT PLANS

This section presents recommendations for chemical/petroleum storage, and the preliminary Turf and Pest Management Plan for the new golf course. Also included are details regarding the common problems that occur in turf grass, the benefits of proper chemical uses, and the specific chemicals that may be used (but subject to change). At this early stage of the project there are many site-specific details that can not be determined at present. In lieu of these details, the protocols employed at the Eagle Rock Resort, which is an existing golf and ski resort community in Hazleton, Pennsylvania that is owned by Double Diamond Corporation, will be implemented (at a minimum) for the LLR development. The Eagle Rock Resort is located in a forested setting within an area with designated cold water streams suitable for trout, and therefore very similar to the LLR project.

Each golf course has its own unique site characteristics. There is a unique combination of geology, soils, topography, surrounding flora and fauna, general climate, and microclimate. The pesticides and other chemicals listed in this Plan are effective at the Eagle Rock site, but may require some changes to be effective at the LLR site. For these reasons it should be understood that this Plan is preliminary, and will be modified with addenda as more specific information for the LLR site becomes available. Part of these addenda will be an Integrated Pest Management (IPM) strategy, which is the application of an interconnected set of methods for managing the pests specific to the LLR site, including pest prevention techniques, pest monitoring methods, biological controls, pest attractants and repellents, biopesticides, and pesticides. The goal of the IPM is to minimize the use of chemicals that could potentially affect surface and ground water, and is a decision based program that relies principally on monitoring information to determine pest densities and outbreaks. Through early detection of pest problems, it is emphasized to utilize least-toxic approaches as defined by factors such as water quality impact, effects on non-target organisms and toxicity to humans. The IPM should be developed in accordance with the guidelines set forth in New York State by both the NYSDEC and Cornell Cooperative Extension.

This Plan also address nutrient management in the form of the timing and placement of fertilizers based on seasonal demand and usage of the anticipated turf species, landscape position and weather. As with the listed pesticides, the nutrient management described in the Plan is likely to require modification for maximum effectiveness at the LLR site.

4.1 Chemical and Petroleum Management and Storage

With respect to chemical and petroleum storage, at this time it can be said that the storage and use of golf course chemicals will be managed by personnel with experience in golf course management; ultimately, the Golf Course Superintendent will be responsible for ensuring the safe management of both the golf course chemicals, and the petroleum storage. The regulated chemical products that are used at the site will be registered with NYDEC as required.

Fertilizers, fuels and chemicals for golf course maintenance operations will be stored at the Maintenance Building, located to the east of the Practice Facility at the north portion of the site. The stormwater management plan and sanitary facilities were designed to prevent any direct discharges to watercourses, and to the sanitary system from this area. The following design measures were included:

- All floor drains discharge to a single, concrete tank that will be periodically pumped of liquid, which will be disposed of in accordance with NYDEC waste disposal regulations. No floor drains will be located in the same room where chemicals are stored or mixed.
- Exterior swales will cut-off and divert drainage from upgradient areas.

- Exterior run off will be conveyed to an adjacent bio-retention basin designed to safely attenuate the 100-year storm. The basin will ultimately discharge during the high flow conditions to the large wetland area next to Lost Lake.
- There will be no exterior storm drains in proximity to the Maintenance Building in order to preclude a direct conduit for a large surface spill to reach a water body.

Proper chemical storage at the Maintenance Building is a critical part of the overall effort to preclude a chemical release. CMX recommends that the Cornell University Best Management Practices for their greenhouse management program be implemented at the LLR Maintenance Building. That BMP is included as Attachment 2 to this document.

It is anticipated that both diesel fuel and unleaded gasoline will be used for golf course equipment and LLR maintenance/service vehicles. These fuels will only be stored at the Maintenance Building complex. The following protocols will be used for petroleum products:

- Petroleum storage tanks and associated appurtenances will comply with the applicable requirements of the Bulk Storage Program operated by NYDEC. These regulations include registration and inspection requirements.
- Petroleum fuels will be stored in above ground storage tanks with 110% secondary containment, and which are located on impervious surfaces.
- There will be no underground piping.
- Fueling will be performed on concrete or other impervious surface.
- The petroleum storage and dispensing area will undergo a monthly inspection to ensure that fueling operations do not result in any significant spillage. Corrective measures will be implemented as necessary.
- Smaller, portable fuel containers will comply with state and local requirements where applicable. The containers will include spill-proof spouts, and will be stored inside the Maintenance Building at a location that complies with local fire code regulations.

4.2 Spill Prevention

A formal Spill Prevention and Response Plan (SPRP) will be prepared after additional details are available regarding the actual chemicals to be used, the interior layout of the Maintenance Building is complete, and other necessary details needed to prepare a meaningful SPRP. The goal of the SPRP is to have a series of steps to ensure a quick and safe response to an emergency spill that precludes or minimizes environmental impact. The SPRP will address both the golf course chemicals and the petroleum fuels. The following general procedures will be included in the SPRP, and were adapted from the Connecticut Department of Environmental Protection *Best Management Practices for Golf Course Water Use:*

- Tailor the plan to the specific potential hazards posed by each chemical used on site. Plans should identify all potential hazards, develop safe-handling measures, and outline appropriate spill response procedures.

- Clearly identify the appropriate responding authorities – NYSDEC, Town of Forestburgh, state police, or local emergency response.

- Maintain a list of people to be notified in the event of a spill, including the site potable water system operator if the spill occurs within the groundwater capture zone of any supply well.

4.3 Turf Installation Procedures

The general process for installation of the turf surface is provided herein for informational purposes; a much more detailed scope will be prepared after the final course design is completed. A site specific erosion and sedimentation control plan was developed to address the construction of the golf course, and was discussed in Section 2.0 of this document. Those measures should minimize any sediment impact to the local surface water to the extent feasible.

Suitable topsoil is not available at the site, and will be obtained from a nearby source. The general turf installation procedures are as follows:

1. Clear the land of any trees, plant growth, and rocks.
2. Place sediment controls (Filter Fabric Fence, Temporary Seeding and Mulching, Stabilized Construction Entrance, Sedimentation Basin, Sediment Traps, Diversion Berm/Swales, and Skimmer).
3. Rough grade for fairways, tee and green locations, bunkers, mounds, and other features, including the grading necessary to channel surface run off and direct it to the planned stormwater collection areas.
4. Begin topsoil placement.
5. Install drainage in the necessary areas, including the subsurface drainage for greens, bunkers, and the areas identified as wet.
6. Install the irrigation system and check operation.
7. Add several inches of screened topsoil that is spread evenly over the sub soil that is present (topsoil may or may not have nutrients and soil amendments premixed before it is spread) followed by final grading
8. Tees and greens prepared with root zone mix (commonly a sand and peat mix). Fertilizer and lime may or may not be applied on the growing areas as dictated by soil tests.
9. Final seeding, with sod placed over areas that are conducive to washouts and steep slopes that are not likely to hold seed
10. Begin mowing as grass matures, and fix any areas where seed has not germinated (typically washed and weak areas) by over seeding
11. Finish bunkers by installing a liner, shaping the edges, and filling them with sand.

The programmable irrigation system will allow for independent irrigation of tees, greens, fairways, and roughs, which permits irrigation to be performed only where needed and in the necessary amounts. The source of the irrigation water will be Lost Lake.

The combination of turfgrasses proposed for the golf course are as follows:

<u>Greens</u>
The greens will be sand-based, and consist of A-4 Bentgrass (*Agrostis* stolonifera) cultivated from seed. Greens will be seeded by hand with a drop type spreader.

<u>Tees</u>
The tees will be sand-based and seeded with low- mow Kentucky Bluegrass (*Poa pratensis*). Tees will be seeded with a hydro- seeder.

<u>Fairways</u>
Fairways will be screened topsoil with low-mow Kentucky Bluegrass (*Poa pratensis*), and will be seeded with a hydro-seeder.

<u>Rough</u>
The Rough will be screened topsoil with low-mow Kentucky Bluegrass (*Poa pratensis*), and will be seeded with a hydro-seeder.

Areas throughout the golf course that are susceptible to washouts such as bunker banks, steep slopes, and areas around drain grates will have Kentucky Bluegrass (*Poa pratensis*) sod to prevent washouts that can occur during seed germination. The selected grasses are considered hardy and disease resistant varieties, which minimizes the need for chemical applications.

4.4 Turf and Chemical Management

The following Standard Operating Procedures (SOPs) will be implemented at the LLR site:

1. Chemical application will be performed only by those individuals with the proper NYDEC certification(s).
2. Pesticides and herbicides are only utilized to treat an identified problem in order to maintain expected performance of the turfgrass.
3. A post-emergent management strategy will be employed, i.e., treatment of discovered conditions is implemented only when the need exists, as opposed to pre-emergent chemical application that applies chemicals as a preventative measure whether or not the need arises.
4. Chemicals will be spot-sprayed where needed, as opposed to broad application.
5. Spray containers will be rinsed by adding water and re-applying at the target location. This results in the chemical residue remaining at the application site, rather than rinse waters discharged to a drain or other such location where migration might occur.
6. Chemicals will not be bulk mixed, which avoids any possibility for a large spill, and reduces incidence of unused chemical stockpiles.
7. Chemicals will be stored at a secure location inside the golf maintenance building. The storage area will include an impervious base that will be bermed, and will not be near any stormwater inlet. All storage will comply with manufacturer's instructions and any local and NYDEC requirements.
8. Should a spill outside the storage area occur, standard operating procedure will include berming, precluding any run-off to a swale or drain, excavating and stockpiling any affected soils, and disposing in accordance with NYSDEC waste regulations.
9. All chemicals used must be approved for such use by EPA and NYSDEC, must not be environmentally persistent, and preferably become inactive once they contact soil.
10. Chemicals will not be applied if it is windy, raining, or rain is forecast for the immediate future.
11. Areas of seasonally high water tables should be flagged during typically wet periods in spring and fall. Special care should then be taken in the timing of applications to these areas to preclude surface runoff zones during storms.
12. Only dry and bagged fertilizer will be stored, and will be kept inside the maintenance building.
13. Organic fertilizer will be used on tees and greens.
14. Phosphate will not be in any products used.
15. Nitrogen fertilizer will be added in accordance with the Nutrient Application Schedule (next section).
16. Records for all applications of chemicals should be maintained for at least two (2) years.
17. Any employee involved in any aspect of chemical and fertilizer application and handling must be properly trained, including periodic refresher training.
18. Pesticide/herbicide free zones of a minimum of 100 feet will be established around water bodies and drinking water wells.
19. Compost piles will be located away from surface waters, wetlands, floodplains, steep slopes and areas with high water tables.

4.5 Nutrient Applications

Fertilizers will be added as needed to keep a healthy and vigorous stand of turfgrass. The growth cycle of the grass is accounted for in both the timing and application rates of the fertilizer. A well-fertilized turfgrass is hardy and less susceptible to disease. There also is less opportunity for weed infestations in vigorous stands of turfgrass. Attachment 3 includes a Preliminary Nutrient Management Plan for the course. This fertilization schedule is designed to maximize plant uptake of fertilizers and minimize potential impacts through leaching to the groundwater and runoff to surface waters. Fertilizers will only be applied when a significant rain is not forecast. The fertilizer applications are based on a general maintenance program. There will be regular soil tests in order to determine if there are nutrient surpluses or deficiencies, which would affect the timing and application rates. There may be variations in nutrient application rates and timing, depending on results from soil tests.

4.6 Disease Control

Diseases in turfgrass arise from a pathogen (usually a fungus) attacking a susceptible plant. These pathogens are virtually always present in a turfgrass situation. Given the proper environmental conditions causing stress in the turfgrass, a disease outbreak is likely to occur, negatively affecting turfgrass appearance and playability. There are many different kinds of diseases that are for specific times of year and moisture conditions.

There are three primary methods to reduce the possibility of a disease outbreak on a golf course. The first method is to select turfgrass varieties for the golf course that are hardy and disease resistant. The second method is to reduce the amount of free water that is present on a golf course. This can be done through surface and subsurface drainage faculties. There also can be installation of fans around greens and tee boxes in order to increase the rate of evaporation from the soil surface. Care must also be used in the irrigation of the golf course in order to ensure that areas are not overwatered. Based on the soils encountered during previous site investigations, there are likely to be drainage issues at this golf course. Improving the drainage of the soils will be important in reducing the potential for disease outbreaks. The third method for turfgrass control is to keep the turfgrass vigorous and strong. This can be accomplished through proper fertilization as well as pest and weed control. Diseases are more likely to occur on stressed grass; turfgrass that is optimally fertilized and free of damage from insects and competition for light and nutrients from weeds will have less stress and be less susceptible to disease.

4.7 Pest Control

Pests in turfgrass arise from an infestation attacking a susceptible plant. Insects can damage turfgrass roots and crowns, which can result in reduced turfgrass vigor and playability. This damage to the turfgrass can cause stress, making it more prone to disease and more susceptible to weed infestation. Generally, healthy turfgrass is less vulnerable to pests and can recover faster from an infestation. There should be proper fertilization in order to maintain turfgrass vigor. There also should be care taken in mowing and irrigation to ensure vigor as well. Steps should be made to reduce over-watering the turfgrass and mowing should not be too short (this damages turfgrass). There also should be cultural practices utilized such as top-dressing with sand in order to reduce the amount of thatch (insects are present in thatch).

4.8 Weed Control

Weeds in turfgrass arise from an infestation where the weed outcompetes the existing turfgrass for sunlight, water, and nutrients. Weeds can intefere with turfgrass vigor, resulting in an uneven playing surface, reducing playability. The weeds can be a place for insects and grubs to inhabit and then impact the turfgrass. Generally, healthy turfgrass provides a thick stand, where weeds cannot

invade. There should be proper fertilization in order to maintain turfgrass vigor. There also should be care taken in mowing and irrigation to ensure vigor as well. Steps should be made to reduce over-watering the turfgrass and mowing should not be too short (this damages turfgrass).

4.9 Growth Regulators

Plant growth regulators are applied to turfgrass on a bi-monthly basis during the growing season to reduce clipping production, increase stand density, reduce seedhead formation and enhance stand color. The plant growth regulator reduces vertical growth of the turfgrass, thus increasing the root density of the plant. This greater root growth makes the turfgrass more resistant to stresses, such as cold, moisture, drought, and disease.

4.10 Chemical Applications

Inevitably, there will likely be disease and pest outbreaks; however, it is difficult to definitively ascertain at this time which pest weed and disease pressures will occur at the golf course since it has not yet been constructed. Listed below are the common problems at golf courses that require application of chemicals. In order to provide some detail for the types of chemical use at the LLR site, a Preliminary List of Golf Course Chemicals is provided in Attachment 4, which lists and describes the specific fungicide, pesticide, herbicide, and growth regulator chemicals used at the Eagle Rock site. Many of these chemicals may also be used at the LLR site, but the final decision will be made after actual site conditions are evaluated by the Golf Course Superintendent.

For the chemicals listed in Attachment 4, there are three categories of toxicity:

- Caution (LD50 of 500 to 5,000 mg/kg)
- Warning (LD50 of 50 to 500 mg/kg)
- Danger (LD50 of 0 to 50 mg/kg)

The LD50 for a chemical is the dose which has been found in controlled experiments to kill 50% of a large number of test animals. The LD50 dose is usually expressed as the number of milligrams (mg) of pure active ingredient per kilogram (kg) body weight of the test animals. Most of these chemicals are classified with the “Caution” toxicity level. If feasible, those chemicals with a higher toxicity category will be replaced with a lower toxicity variety, preferably with only a “Caution” toxicity rating.

The toxicity ratings and application rates/instructions are approved by EPA. Based on that approval and assuming all application is in accordance with the label instructions, none of the chemicals should cause environmental impact. Most, if not all of the chemicals are non-persistent in the environment, and degrade within hours to days of application.

4.11 Residential Lawn Management

It is proposed to allow individual homeowners to maintain their lawns and landscaping as they see fit, within the guidelines of the EPA and the NYDEC. However, fertilizer and lawn chemical applications at the residential areas, which are not managed by LLR, will be restricted by the Restrictions and Covenants Agreement that all property owners must accept. The recommended restrictions related to residential landscaping are:

- Phosphate fertilizer is prohibited.
- Lawn chemical application
  shall be limited to those with no greater than a “Caution” toxicity rating.

In addition to these restrictions, all property owners will be provided with information that describes the overall goal of maintaining the natural setting and minimizing environmental impacts from fertilizer and chemical applications, along with recommendations for environmentally-friendly

alternatives. This information will be conveyed by providing printed information, from such sources as the USEPA Greenscaping Program (USEPA, 2006), and Cornell Cooperative Extension informative brochures (10 Tips: Water Right, Mow Sharp: How to Have a Healthier Lawn with Less Work; How to Protect the Environment; and How to Fertilize Your Lawn). It is also recommended that the Lost Lake Homeowners Association host information sessions by Cornell Cooperative Extension in the areas of environmentally-friendly and natural yard care and gardening.

5.0 MITIGATION MEASURES RELATED TO IMPACTS TO SURFACE WATER AND GROUNDWATER

5.1 Water Quality Monitoring Plan

This plan focuses on the potential impacts to the Bush Kill headwaters, which receive run-off and groundwater base flow from the Lost Lake property, as well as associated wetlands and tributaries. This plan describes a water monitoring plan, and was prepared in general accordance with NYDEC sampling protocol and methodologies.

Scope

A Protocol for testing and monitoring potential impacts to both surface water and groundwater are presented below based on available information. The purpose of the protocol is to establish background surface water and groundwater quality in the area of the golf course and at the Bush Kill, and to provide a frame work for monitoring surface and groundwater quality as development occurs at the site. This section provides details of the monitoring program for the site.

Sampling Locations

The locations selected for water quality monitoring are identified and located on the Lost Lake Sample Location Plan (next page). A total of six (6) locations were selected and are listed below with a brief description.

- Area A – Area is located in the upper portion of the water shed and primarily drains the golf course and associated residential lots.

- Area B – Area B is located on an unnamed tributary which is centrally located at the site. The drainage area of the tributary does not constitute a large portion of the site; however, 9 golf holes are located within this sub-basin.

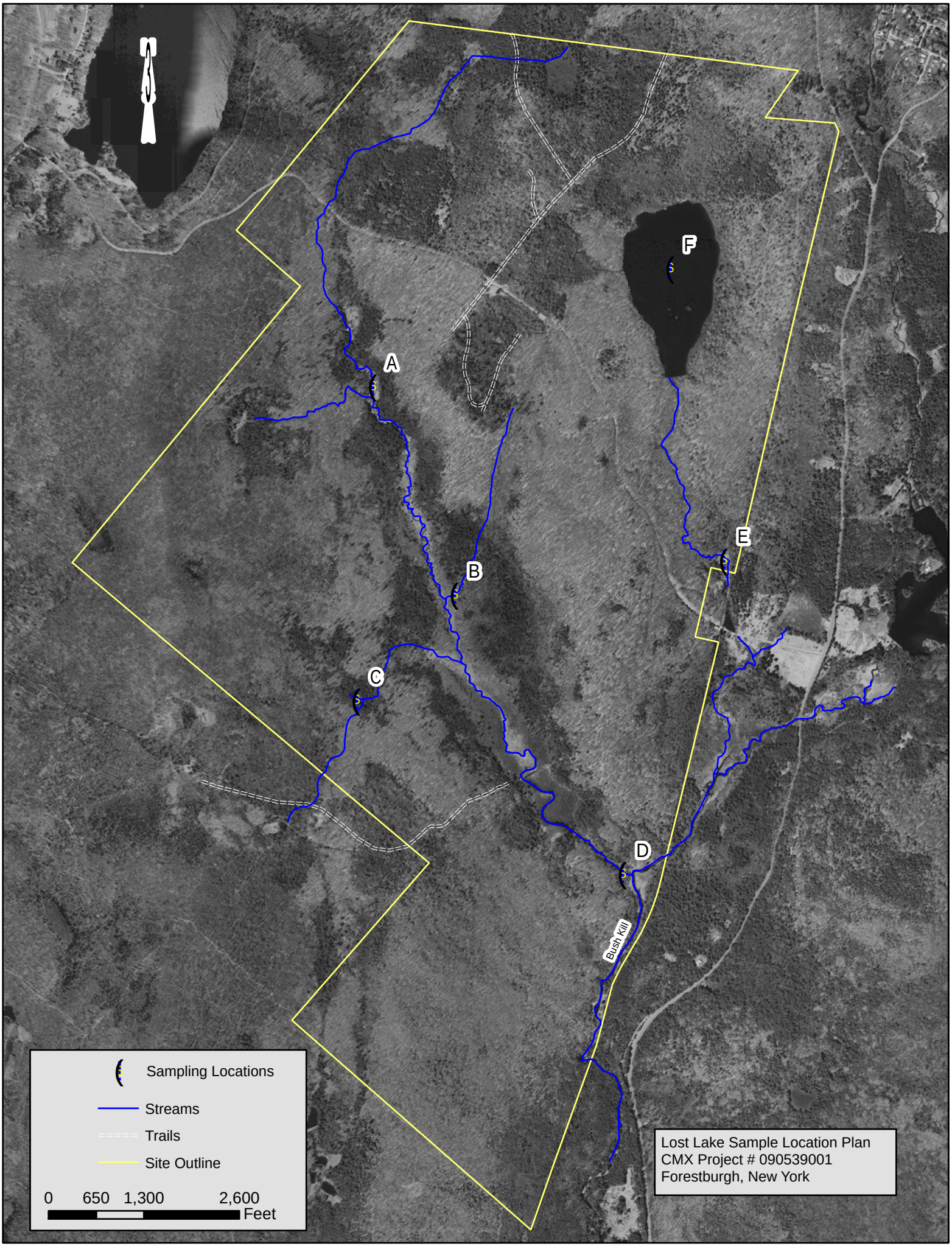
- Area C – Area C is located on the south-western portion of the site, and only drains residential lots. This sampling location is anticipated to reflect only residential influences on water quality.

- Area D – Area D is located in the southeastern portion of the site, before the main tributary at the site reaches the Bush Kill. This sampling location drains the majority of the site, prior to reaching the proposed Waste Water Treatment Plant (WWTP) and Bush Kill.

- Area E – Area E is located on the northeastern portion of the site, and drains Lost Lake and the upper portion of the site, including the proposed maintenance building which is anticipated to store golf course chemicals.

- Area F – Area F is Lost Lake in the northern portion of the site. Lost Lake, also known as Trout Lake, is the only lake on the property and is located directly downgradient from the majority of the golf course including the clubhouse and Maintenance Building.

The sampling locations were selected in an effort to divide the site into manageable drainage units. Should samples indicate an increase in the analyzed parameters, the location of the sampling areas will help determine the potential source(s).


A
B
C
D
E
F
Bush Kill
Sampling Locations
Streams
Trails
Site Outline
0 650 1,300 2,600
Feet
Lost Lake Sample Location Plan
CMX Project # 090539001
Forestburgh, New York

Groundwater Wells

The existing water supply wells are proposed for use as groundwater monitoring points. Because these wells will be pumped more or less on a regular basis, they will serve as effective indicators to changes to the ambient groundwater quality. Water quality samples will be collected from each well after it has been operating, and the raw discharge water will be monitored for field parameters (temperature, pH, conductance, dissolved oxygen, oxidation-reduction potential, and turbidity) to ensure representative groundwater is present before sample collection.

Since the groundwater supply well network is currently under development, a final selection of wells to be monitored can not be made at this time. However, it is recommended that at least three (3) wells be included, and preferably spaced in different sub-drainage basins within the site. Preferably, these wells would be located near the lower end of the Lost Lake drainage basin, and at the western and southern portions of the property.

One (1) or two (2) monitoring wells will also be installed south of the Maintenance Building, which is the presumed hydraulic downgradient location; the actual number will depend on whether a shallow, overburden groundwater system is present. This location is intended to reflect any changes to the groundwater beneath this area of the site where chemicals and petroleum fuels are stored. If a shallow groundwater system is contained within the overburden materials, one (1) well will be constructed above the bedrock surface, along with a second bedrock well. Conversely, only a bedrock well will be constructed if the groundwater surface lies below the bedrock surface. The monitoring well(s) will be constructed using four-inch diameter polyvinyl chloride (PVC) well screen and riser pipe. The well screen will be placed at least 10 feet below the estimated seasonal low groundwater elevation, and will extend several feet above the estimated seasonal high elevation. The annular space will be appropriately completed with filter sand and bentonite in accordance with industry standard methods. The wells will be completed with above-grade casing and locking cap. Water quality samples will be collected from the monitoring well(s) after purging 3 to 5 well volumes, during which time purge water will be monitored for field parameters; a sample will be collected after these parameters have stabilized.

Chemical Analysis

The primary concerns at the site are the fertilizers, herbicides and pesticides used for the proposed golf course, as well as landscaped areas within the residential portion of the development. Based on this information it is proposed that the following constituents be analyzed by a New York DEC Accredited Laboratory:

Permanent Constituents
pH
Dissolved Oxygen
Nitrate-Nitrogen
Total Sodium
Total Dissolved Solids
Total Suspended Solids
Chloride
Total Phosphorous
Total Kjeldahl Nitrogen
Sulfates
Ammonia-Nitrogen
Volatile Organic Compounds (EPA 524.2 list)

Variable Constituents*
Herbicides (specific to the Golf Course)
Pesticides (specific to the Golf Course)

***** A complete list of constituents will be established prior to the first baseline sample to insure appropriate sampling.

The variable constituents are not identified per chemical due to the fact that specific herbicides and pesticides have not been identified. The sampling plan should be based on actual chemicals used at the golf course.

5.2 Baseline Assessment

Two (2) rounds of pre-development sampling will be conducted at each of the designated stream sampling locations (A through F), three (3) of the production wells, and the Maintenance Building monitoring well(s). These samples will be collected following NYDEC Sampling Guidelines and Protocols: Division of Water 1991, which should ensure that all samples collected provide comparable results. The results will be tabulated, evaluated for any trends, and submitted to all appropriate review agencies.

A stream sample was collected on December 21, 2009 from the main tributary stream, several hundred feet above the confluence with the Bush Kill. The sample was collected during a period of baseflow conditions, in order to generalize the current surface water quality at the site with respect to wastewater constituents. This was a preliminary assessment and not intended as the baseline assessment described above. The results, which are provided in Attachment 5, indicate that the water quality is excellent, and does not appear to be impacted from any wastewater discharge. The water had very low specific conductance, total dissolved solids, and total suspended solids. There were no detected organic nitrogen compounds and the dissolved oxygen level was very high and near saturation, which both are indicative of non-impacted water. The dissolved mineral matter (chloride and sulfate), and slightly acidic pH are typical for groundwater sourced from a shale and sandstone setting such as occurs at the site. Trace nitrate nitrogen was detected (0.05 milligrams per liter), and is attributed to naturally-occurring sources.

Water quality samples were also collected from three (3) production wells (Wells O, P, and DD) that were subject to constant rate pumping tests prior to sample collection. The samples were analyzed for the NYDEC parameters list for a public water supply well, and include an extensive list of volatile and semi-volatile organic compounds, pesticides, herbicides, metals, inorganic mineral constituents (e.g. sulfate), PCBs, and radiologic parameters. The analytical results were reviewed and indicated that none of the groundwater samples contained detectable concentrations of any of the organic compounds. The remaining parameter concentrations that were present above the detection limits were all considered to be naturally-occurring constituents. Overall, the groundwater did not appear to be impacted by anthropogenic sources.

5.3 Post Development Monitoring

After the baseline assessment is completed, the sampling will be performed bi-annually. It is anticipated that bi-annual monitoring will provide sufficient notification of any significant change to surface and groundwater quality. This sampling should be completed at any time during the following periods:

Spring during the months of March or April
Fall during the months of September or October

After the golf course is established, and at least two (2) years of data are available, the sampling plan will be reviewed and altered to remove or add sampling locations and/or constituents, and/or frequency based, on a review of the previous data.

Reporting

Results of each sampling event will be summarized and evaluated in order to assess whether the LLR results in any regulatory adverse impacts to the area surface and groundwater. Depending on

these results, the reporting will also include recommendations to modify the monitoring program as necessary; and, recommend appropriate actions to address any impact. Sampling will be conducted for four (4) years following the beginning of full use of the golf course, unless results indicate the need for further monitoring.

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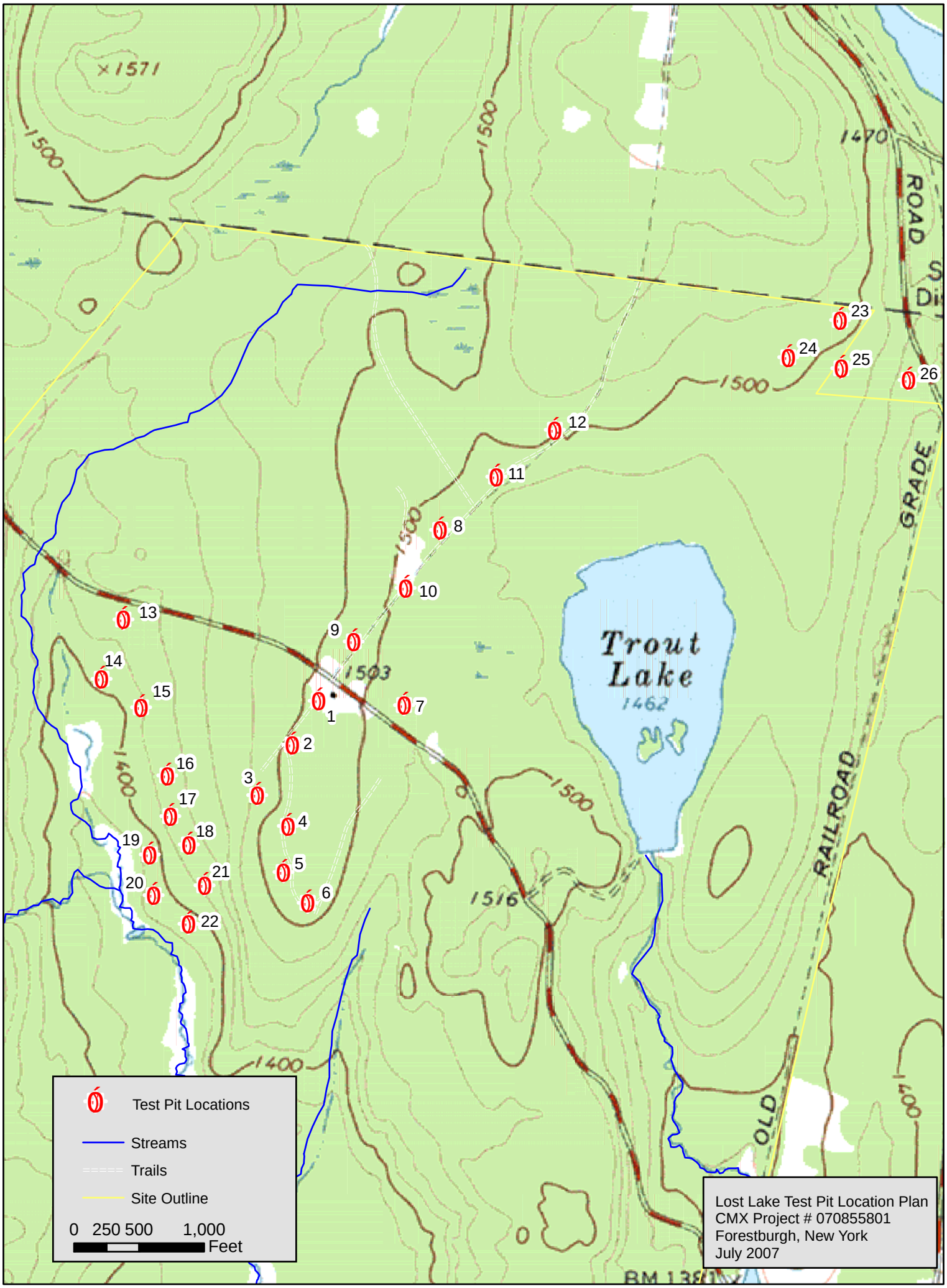
ATTACHMENT 1

2007 PRELIMINARY SOIL INVESTIGATION


Test Pit Locations
Streams
Trails
Site Outline
0 250 500 1,000
Feet
Lost Lake Test Pit Location Plan
CMX Project # 070855801
Forestburgh, New York
July 2007
Trout Lake
1462
1503
1516
1500
1400
1470
ROAD
RAILROAD
GRADE
OLD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 1

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	6-18	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	18-54	10YR 5/4	gravelly silt loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 2

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	6-20	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	20-48	10YR 5/4	gravelly silt loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 3

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	6-20	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	20-48	10YR 5/4	gravelly silt loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 4

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-5	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	5-17	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	17-40	10YR 5/4	gravelly silt loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 5

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-4	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	4-17	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	17-40	10YR 5/4	gravelly silt loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 6

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-5	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	5-18	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	18-36	10YR 5/4	gravelly silt loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 7

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-4	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	4-16	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	16-36	10YR 5/4	gravelly loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 8

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-5	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw	5-17	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	17-40	10YR 5/4	gravelly loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 9

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-9	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	9-14	10YR 5/6	gravelly silt loam	1	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	14-36	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 10

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	6-14	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	14-20	10YR 5/4	gravelly loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	20-36	10YR 5/4	gravelly loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 11

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-4	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	4-15	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw1	15-22	10YR 5/4	flaggy loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	22-40	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 12

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	6-17	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	17-21	10YR 5/4	gravelly loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	21-36	10YR 5/4	gravelly loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 13

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-4	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	4-20	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	20-36	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	clear/wavy

Notes:

Test Pit #: 14

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	6-22	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	22-26	10YR 5/4	gravelly loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	26-44	10YR 5/4	gravelly loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/19/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 15

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	6-18	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	18-20	10YR 5/4	gravelly silt loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	20-48	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 16

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-5	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	5-20	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	20-36	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	clear/wavy

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/20/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 17

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-3	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	3-14	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	14-20	10YR 5/4	gravelly silt loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	20-36	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 18

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-2	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	2-10	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	10-17	10YR 5/4	gravelly silt loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	17-40	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/20/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 19

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-7	10YR 3/2	silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	7-22	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	22-26	10YR 5/4	gravelly silt loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	26-40	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	

Notes:

Test Pit #: 20

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-7	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	7-22	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	22-30	10YR 5/4	flaggy loam	2	m	sbk	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/20/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 21

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-7	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	7-17	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	17-40	10YR 5/4	flaggy loam	2	m	sbk	firm	common	medium	distinct	

Notes:

Test Pit #: 22

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	6-22	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	22-30	10YR 5/4	flaggy loam	2	m	sbk	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/20/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 23

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	6-18	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	18-36	10YR 5/4	flaggy loam	2	m	sbk	firm	common	medium	distinct	

Notes:

Test Pit #: 24

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-2	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw1	2-10	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bw2	10-22	10YR 5/4	gravelly silt loam	2	m	sbk	friable	common	medium	distinct	clear/wavy
Bx	22-36	10YR 5/4	flaggy loam	2	m	pr	firm	common	medium	distinct	

Notes:

Soil Profile Description Sheet

Project Name: Lost Lake Resort

Date: 7/20/2007

Project Number: 070855801

Tested by: Stephen Dadio, CPSS/CPSC

Test Location:

Witnessed by:

Test Pit #: 25

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-6	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	6-18	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	18-36	10YR 5/4	flaggy loam	2	m	sbk	firm	common	medium	distinct	

Notes:

Test Pit #: 26

Soil classified: Wurtsboro

Taxonomic class: Coarse-loamy, mixed, mesic Typic Fragiudepts

Horizon	Depth (inches)	Color	Texture	Structure			Moist Consistence	Redoximorphic Features			Boundary
				Grade	Size	Type		Abundance	Size	Contrast	
A	0-5	10YR 3/2	stony silt loam	1	f	gr	very friable				abrupt/wavy
Bw	5-20	10YR 5/6	gravelly silt loam	1	m	sbk	friable				clear/wavy
Bx	20-36	10YR 5/4	flaggy loam	2	m	sbk	firm	common	medium	distinct	

Notes:

Borehole Permeability Test
Hydraulic Conductivity Calulations

Project Name: Lost Lake

Project Number: 070855801 Date: 7/19/2007

Test Location: **1** Tested by: Steve Dadio

Trial Number	Start/ End	Time	Elasped Time (min)	Depth drop (in)
1	S		Pre-Soak 1	
	E			
2	S		Pre-Soak 2	
	E			
3	S		60	0.040
	E			
4	S		60	0.040
	E			
5	S		60	0.040
	E			
6	S		60	0.040
	E			
7	S			
	E			
8	S			
	E			
9	S			
	E			
10	S			
	E			
		TOTAL	240	0.16

Testing Depth (in)	30
Initial Depth of Water (in)	6
Final Drop (in)	0.040
Total Time (min)	60
Ave Height of Water (in)	5.98
Perc Rate (in/hr)	0.04
Hole Diameter (in)	6

Hydraulic Conductivity (K) **0.04 in/hr**

Borehole Permeability Test
Hydraulic Conductivity Calulations

Project Name: Lost Lake

Project Number: 070855801 Date: 7/19/2007

Test Location: **2** Tested by: Steve Dadio

Trial Number	Start/ End	Time	Elasped Time (min)	Depth drop (in)
1	S		Pre-Soak 1	
	E			
2	S		Pre-Soak 2	
	E			
3	S		30	0.125
	E			
4	S		30	0.125
	E			
5	S		30	0.125
	E			
6	S		30	0.125
	E			
7	S			
	E			
8	S			
	E			
9	S			
	E			
10	S			
	E			
		TOTAL	120	0.5

Testing Depth (in)	30
Initial Depth of Water (in)	6
Final Drop (in)	0.125
Total Time (min)	30
Ave Height of Water (in)	5.9375
Perc Rate (in/hr)	0.25
Hole Diameter (in)	6

Hydraulic Conductivity (K) **0.25 in/hr**

Borehole Permeability Test
Hydraulic Conductivity Calulations

Project Name: Lost Lake

Project Number: 070855801 Date: 7/19/2007

Test Location: **3** Tested by: Steve Dadio

Trial Number	Start/ End	Time	Elasped Time (min)	Depth drop (in)
1	S		Pre-Soak 1	
	E			
2	S		Pre-Soak 2	
	E			
3	S		30	0.350
	E			
4	S		30	0.300
	E			
5	S		30	0.300
	E			
6	S		30	0.300
	E			
7	S			
	E			
8	S			
	E			
9	S			
	E			
10	S			
	E			
		TOTAL	120	1.25

Testing Depth (in)	36
Initial Depth of Water (in)	6
Final Drop (in)	0.300
Total Time (min)	30
Ave Height of Water (in)	5.85
Perc Rate (in/hr)	0.6
Hole Diameter (in)	6

Hydraulic Conductivity (K) **0.60 in/hr**

Borehole Permeability Test
Hydraulic Conductivity Calulations

Project Name: Lost Lake

Project Number: 070855801 Date: 7/19/2007

Test Location: **7** Tested by: Steve Dadio

Trial Number	Start/ End	Time	Elasped Time (min)	Depth drop (in)
1	S		Pre-Soak 1	
	E			
2	S		Pre-Soak 2	
	E			
3	S		60	0.040
	E			
4	S		60	0.040
	E			
5	S		60	0.040
	E			
6	S		60	0.000
	E			
7	S			
	E			
8	S			
	E			
9	S			
	E			
10	S			
	E			
		TOTAL	240	0.12

Testing Depth (in)	36
Initial Depth of Water (in)	6
Final Drop (in)	0.020
Total Time (min)	60
Ave Height of Water (in)	5.99
Perc Rate (in/hr)	0.02
Hole Diameter (in)	6

Hydraulic Conductivity (K) **0.02 in/hr**

Borehole Permeability Test
Hydraulic Conductivity Calulations

Project Name: Lost Lake

Project Number: 070855801 Date: 7/19/2007

Test Location: **23** Tested by: Steve Dadio

Trial Number	Start/ End	Time	Elasped Time (min)	Depth drop (in)
1	S		Pre-Soak 1	
	E			
2	S		Pre-Soak 2	
	E			
3	S		30	3.500
	E			
4	S		30	3.250
	E			
5	S		30	3.000
	E			
6	S		30	3.000
	E			
7	S			
	E			
8	S			
	E			
9	S			
	E			
10	S			
	E			
		TOTAL	120	12.75

Testing Depth (in)	30
Initial Depth of Water (in)	6
Final Drop (in)	3.000
Total Time (min)	30
Ave Height of Water (in)	4.5
Perc Rate (in/hr)	6
Hole Diameter (in)	6

Hydraulic Conductivity (K) **6.00 in/hr**

Borehole Permeability Test
Hydraulic Conductivity Calulations

Project Name: Lost Lake

Project Number: 070855801 Date: 7/19/2007

Test Location: **24** Tested by: Steve Dadio

Trial Number	Start/ End	Time	Elasped Time (min)	Depth drop (in)
1	S		Pre-Soak 1	
	E			
2	S		Pre-Soak 2	
	E			
3	S		30	0.750
	E			
4	S		30	0.625
	E			
5	S		30	0.500
	E			
6	S		30	0.500
	E			
7	S			
	E			
8	S			
	E			
9	S			
	E			
10	S			
	E			
		TOTAL	120	2.375

Testing Depth (in)	30
Initial Depth of Water (in)	6
Final Drop (in)	0.500
Total Time (min)	30
Ave Height of Water (in)	5.75
Perc Rate (in/hr)	1
Hole Diameter (in)	6

Hydraulic Conductivity (K) **1.00 in/hr**

ATTACHMENT 2

RECOMMENDED PRACTICES FOR CHEMICAL STORAGE AND MANAGEMENT

LOST LAKE RESORT GOLF COURSE MAINTENANCE BUILDING RECOMMENDED PRACTICES FOR CHEMICAL STORAGE AND MANAGEMENT [1]	
OPERATION	**ENVIRONMENTAL ACTION**
Emergency Preparedness	emergency contact numbers posted; all staff trained to call emergency contact numbers; staff have basic training in cleaning up small pesticide spills
Environmental Awareness	staff are aware of hazards to the environment associated with pesticide spills and cross-contamination; hazards are actively reduced
Training	staff receive instruction from experienced users regarding proper pesticide storage management activities
Communication	pesticide storage guidelines are discussed on a regular basis with staff
Inspection	regular inspection of pesticide storage area performed
Records Maintenance	pesticide storage facility policy, emergency plan, emergency contact information and maintenance logs kept and posted,
Building Materials	some construction materials fire resistant; wooden shelves
Chemical Compatibility and Segregation	pesticides stored in storage area; pesticides stored by hazard class and pesticidal function with incompatible materials stored physically separated from one another
Containers	all chemicals stored in their original containers unless damaged; labels are visible and readable; caps are secure; food or beverage containers are never used for storage
Container Arrangement	labels in plain sight; no containers on floor; all containers stored up-right; aisles wide enough to accommodate workers; containers not crowded on shelves

Containment	no floor drain; secondary containment routinely used for open containers
Contents	storage area contains pesticides, other greenhouse chemicals (but not fertilizers), various application equipment; the storage area NEVER contains: food, drink, tobacco products, personal protective equipment, livestock feed, living plants, and/or seeds
Fire Prevention and Suppression	multi-media fire extinguisher immediately available and inspected annually
Inventory	inventory updated at least once per year; outdated pesticides removed annually
Lighting	electrical lighting allows view into all areas and cabinets within storage area
Location of Storage Area	location of storage area away from extreme heat, flooding, groundwater, and environmentally sensitive areas
Security	lock on door; windows prohibit access; access restricted to trained personnel
Signage	warning sign(s) posted; emergency contact information posted
Spill Preparedness	spill clean-up materials (e.g., vermiculite, Slik-Wik®, or other commercial product) available at the storage area; all staff trained in proper use of these materials
Storage of Small Quantities of Chemicals	always stored on shelf or other solid surface; never on floor
Temperature Control	No mechanical temperature control; area insulated; no direct sources of heat (sunny windows, steam pipes, furnaces, etc.); area will not freeze
Ventilation	mechanical ventilation working and used

[1] Adapted from Cornell University Best Management Practices for Greenhouses

ATTACHMENT 3

PRELIMINARY NUTRIENT MANAGEMENT PLAN

LOST LAKE RESORT
PRELIMINARY NUTRIENT MANAGEMENT PLAN
(All rates are expressed as pounds per acre)

Greens

April- 2nd week	½ lb of Nitrogen, granular
May- 1st week	½ lb of Organic Nitrogen, granular
3rd week	1/8 lb of Nitrogen, liquid
June- 1st week	1/8 lb of Nitrogen, liquid
3rd week	1/8 lb of Nitrogen, liquid
July- 1st week	1/8 lb of Nitrogen, liquid
3rd week	1/8 lb of Nitrogen, liquid
August- 1st week	1/8 lb of Nitrogen, liquid
3rd week	½ lb of Nitrogen, Granular
September- 1st week	1/8lb of Nitrogen, liquid
3rd week	1/2lb of Organic Nitrogen, granular
October- 1st week	1/8lb of Nitrogen, liquid

Tees

April 1st week	1 lb of Nitrogen, granular
May 1st week	½ lb of Organic Nitrogen, granular
June 2nd week	½ lb of Nitrogen, granular
July 2nd week	½ lb of Nitrogen, granular
August 2nd week	½ lb of Nitrogen, granular
September 3rd week	1 lb of Organic Nitrogen, granular

Fairways

April- 1st week	1 lb of Nitrogen, granular
June- 1st week	½ lb of Nitrogen, granular
August- 1st week	½ lb of Nitrogen, granular
September- 4th week	1lb of Nitrogen, granular

Rough

April- 1st week	1lb of Nitrogen, granular
June- 1st week	1 lb of Nitrogen, granular
September- 1st week	1lb of Nitrogen, granular

ATTACHMENT 4

PRELIMINARY LIST OF GOLF COURSE CHEMICALS

LOST LAKE RESORT
PRELIMINARY LIST OF GOLF COURSE CHEMICALS

Fungicides

Daconil Ultrex is for use on golf course tees, fairways, greens, and sod. Daconil controls 14 diseases, including dollar spot, brown patch, gray leaf spot, algae, leaf spot, melting out, anthracnose, rust, Fusarium patch, Gray snow mold and red thread. This funigicide is registered with the NYDEC and is labeled "**Danger**". There is the potential for this fungicide to negatively impact wildlife if not properly applied.

Banner MAXX is a systemic fungicide that provides effective broad-spectrum disease control in turf and ornamentals. This funigicide is registered with the NYDEC and is labeled "**Warning**". There is the potential for this fungicide to negatively impact fish if not properly applied.

Concert is a preventative fungicide for disease control on greens, fairways and roughs. It consists of a blend of Daconil Ultrex and Banner Maxx fungicides. Concert can be an important component of spray programs for cool-season grasses to protect the entire course from a broad spectrum of 13 diseases, including anthracnose, dollar spot and brown patch. This funigicide is registered with the NYDEC and is labeled "**Danger**". There is the potential for this fungicide to negatively impact fish and aquatic invertebrates if not properly applied.

Headway provides turf disease control on fairways. This funigicide is registered with the NYDEC and is labeled "**Caution**". There is the potential for this fungicide to negatively impact fish and aquatic invertebrates if not properly applied.

Instrata provides snow-mold control. In addition, Instrata controls a broad spectrum of additional turf diseases, including anthracnose, dollar spot, brown patch and summer patch. This funigicide is registered with the NYDEC and is labeled "**Caution**". There is the potential for this fungicide to negatively impact fish and aquatic invertebrates if not properly applied.

Pesticides

Arena Insecticide is the only preventive and curative grub control product. With a wide window of application that lasts from May to September, Arena provides the longest and most consistent control of white grubs and other surface-feeding insects, including ants, billbugs and pyrethroid-resistant chinch bugs. This insecticide is registered with the NYDEC and is labeled "**Caution**". There is no potential for negative impacts on wildlife.

Scimitar GC controls insect pests on golf courses. The list of pests controlled including (but not limited to) ants, armyworms, bagworms, black vine weevils, crickets, cutworms, eastern tent caterpillars, fall webworms, Japanese beetles, leafhoppers, leafminers, leaf rollers, pillbugs, root weevils, sawflies, striped beetles, and tip moths. This insecticide is registered with the NYDEC and is labeled "**Caution**". This insecticide is federally restricted by the EPA and requires a specific permit to apply. There is the potential for this fungicide to negatively fish and bees if not properly applied.

Herbicides

Trimec provides post-emergent broad-leaf weed control in turfgrass. This herbicide is registered with the NYDEC and is labeled "Warning". This herbicide is restricted by NYDEC only to commercial applicators. There is the potential for this herbicide to negatively impact aquatic invertebrates if not properly applied.

Barricade is a pre-emergence herbicide that offers low-rate, season-long control of more than 30 grassy and broadleaf weeds, including crabgrass, goosegrass, and Poa annua (annual bluegrass). This herbicide is registered with the NYDEC and is labeled "Caution". This herbicide is restricted by NYDEC only to commercial applicators. There is no potential for negative impacts on wildlife.

Banvel provides post-emergent broad-leaf weed control in turfgrass. This herbicide is registered with the NYDEC and is labeled "Warning". There is no potential for negative impacts on wildlife.

Growth Regulator

Primo MAXX is a plant growth regulator that protects against the stresses like heat, drought, disease and traffic. This growth regulator strengthens the turfgrass, and therefore allow it to withstand ongoing stresses throughout the season. This growth regulator is registered with the NYDEC and is labeled "Caution". This herbicide is restricted by NYDEC only to commercial applicators. There is no potential for negative impacts on wildlife.

ATTACHMENT 5

STREAM SAMPLE ANALYTICAL REPORT

ANALYTICAL REPORT

Job Number: 420-32174-1

Job Description: Tim Miller Associates, Inc.

For:
Tim Miller Associates, Inc.
10 North Street
Cold Spring, NY 10516

Attention: Ms. Maureen Fisher

Debra Bayer
Customer Service Manager
dbayer@envirotestlaboratories.com
01/11/2010

EnviroTest Laboratories, Inc. Certifications and Approvals: NELAP Accredited, NYSDOH 10142, NJDEP NY015, CTDOPH PH-0554, EPA NY00049.

METHOD SUMMARY

Client: Tim Miller Associates, Inc. Job Number: 420-32174-1

Description	Lab Location	Method	Preparation Method
Matrix Water			
Anions by Ion Chromatography	EnvTest	MCAWW 300.0	
Anions by Ion Chromatography	EnvTest	MCAWW 300.0	
Nitrogen, Total Kjeldahl (Colorimetric, Semi-Automated Block Digester, AAII)	EnvTest	MCAWW 351.2	
Nitrogen, Total Kjeldahl (Colorimetric, Semi-Automated	EnvTest		MCAWW 351.2
Phosphorus, All Forms, Colorimetric, Two Reagent	EnvTest	EPA 365.3	
Sample Digestion for Total Phosphorous	EnvTest		MCAWW 365.2/365.3/365
Inductively Coupled Plasma - Atomic Emission Spectrometry	EnvTest	SW846 6010B	
Acid Digestion of Aqueous Samples and Extracts for	EnvTest		SW846 3010A
Conductivity, Specific Conductance	EnvTest	SM18 SM 2510B	
Total Dissolved Solids (Dried at 180 °C)	EnvTest	SM18 SM 2540C	
Total Suspended Solids Dried at 103-105°C	EnvTest	SM18 SM 2540D	
pH	EnvTest	SM19 SM 4500 H+ B	
Ammonia - Titrimetric method	EnvTest	SM20 SM 4500 NH3 C	
Ammonia Distillation	EnvTest		SM20 SM 4500 NH3 B
Dissolved Oxygen; Azide Modification	EnvTest	SMWW SM 4500 O C	
5 Day BOD test	EnvTest	SM20 SM 5210B	

Lab References:

EnvTest = EnviroTest

Method References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

SM19 = "Standard Methods For The Examination Of Water And Wastewater", 19Th Edition, 1995."

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SMWW = "Standard Methods for the Examination of Water and Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

SAMPLE SUMMARY

Client: Tim Miller Associates, Inc. Job Number: 420-32174-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
420-32174-1	Location A Lost Lake Resort	Water	12/21/2009 1130	12/21/2009 1048

Ms. Maureen Fisher
Tim Miller Associates, Inc.
10 North Street
Cold Spring, NY 10516

Job Number: 420-32174-1

Client Sample ID: Location A Lost Lake Resort
Lab Sample ID: 420-32174-1

Date Sampled: 12/21/2009 1130
Date Received: 12/21/2009 1048
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Method: 6010B			Date Analyzed:	12/28/2009 1201		
Prep Method: 3010A			Date Prepared:	12/23/2009 1104		
Na	5000	U	ug/L	5000	5000	1.0
Method: 300.0			Date Analyzed:	12/21/2009 1703		
Nitrate as N	0.050		mg/L	0.010	0.010	1.0
Chloride	4.1		mg/L	1.5	1.5	1.0
Sulfate	6.1		mg/L	5.0	5.0	1.0
Method: 351.2			Date Analyzed:	12/23/2009 1556		
Prep Method: 351.2			Date Prepared:	12/22/2009 1416		
TKN	1.0	U	mg/L	1.0	1.0	1.0
Method: 365.3			Date Analyzed:	12/29/2009 1658		
Prep Method: 365.2/365.3/365			Date Prepared:	12/29/2009 1525		
Phosphorus, Total	0.10	U	mg/L	0.10	0.10	1.0
Method: SM 2510B			Date Analyzed:	01/11/2010 1320		
Specific Conductance	36		umhos/cm	0.50	0.50	1.0
Method: SM 2540C			Date Analyzed:	12/28/2009 0930		
Total Dissolved Solids	26		mg/L	5.0	5.0	1.0
Method: SM 2540D			Date Analyzed:	12/28/2009 1632		
Total Suspended Solids	1.3		mg/L	1.2	1.2	1.0
Method: SM 4500 H+ B			Date Analyzed:	12/21/2009 1602		
pH	6.37		SU	0.200	0.200	1.0
Method: SM 4500 NH3 C			Date Analyzed:	12/22/2009 1155		
Prep Method: SM 4500 NH3 B			Date Prepared:	12/21/2009 1640		
Ammonia	1.0	U	mg/L	1.0	1.0	1.0
Method: SM 4500 O C			Date Analyzed:	12/21/2009 1605		
Oxygen, Dissolved	12		mg/L	1.0	1.0	1.0
Method: SM 5210B			Date Analyzed:	12/24/2009 0900		
Biochemical Oxygen Demand	4.0	U H	mg/L	4.0	4.0	2.0

DATA REPORTING QUALIFIERS

Client: Tim Miller Associates, Inc. Job Number: 420-32174-1

Lab Section	Qualifier	Description
Metals		
	U	The analyte was analyzed for but not detected at or above the stated limit.
General Chemistry		
	H	Sample was prepped or analyzed beyond the specified holding time
	U	The analyte was analyzed for but not detected at or above the stated limit.

EnviroTest Laboratories, Inc.

CHAIN OF CUSTODY

REPORT# (Lab Use Only): 32174

Lab Name: EnviroTest Laboratories
Address & Phone: 315 Fullerton Avenue, Newburgh, New York 12550 845-562-0890

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION
Lost Lake Resort		
ENVIROTEST PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Debbie Rohl		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Maureen Fisher	845-265-4400	845-265-4418
CLIENT NAME		
Tim Miller Assoc., Inc.		
CLIENT ADDRESS		
10 North Street, Cold Spring, New York 10516		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 1 of 1

TURNAROUND TIME: NORMAL _____ QUICK _____ VERBAL _____

#OF COOLERS

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) *INDICATE*	MATRIX: AQUEOUS (WATER)	MATRIX: D (Drinking Water) or W (Waste Water) *Indicate*	MATRIX: SOLID OR SEMISOLID	MATRIX: OTHER *Specify*	REQUIRED ANALYSES: NUMBER OF CONTAINERS SUBMITTED — Total # of Containers	40ml vial HCL	40ml vial sulfuric	250ml Plasic Sulfuric	250ml amber sulfuric	250 Plastic Nitric Acid	250ml Plastic Sod. Hydrox.	Liter Plastic	250ml Plastic	125ml Plastic Sterile	8 oz. Soil	DO Bottle	REMARKS
12/21	11:30	Location A Lost Lake Resort						7			1		1		3	1			1	pH, DO, Spec.Cond., Nitrate,
																				Ammonia, TKN, Sulfate,
																				Chloride, TDS, TSS, Sodium,
																				BOD, Total Phosphorous

RELINQUISHED BY: (SIGNATURE)	COMPANY	DATE	TIME	RECEIVED BY: (SIGNATURE)	COMPANY	DATE	TIME
Maureen S. Fisher	TMA	12/21/09	1425				
SAMPLED BY: (SIGNATURE) Maureen S. Fisher	TMA	12/21/09	1425	RECEIVED BY: (SIGNATURE)	COMPANY	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	COMPANY	DATE	TIME	RECEIVED BY: (SIGNATURE)	COMPANY	DATE	TIME

NOTE: ** SHORT HOLDING TIME **

Field Service Time:

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	Cooler Temp.	LABORATORY REMARKS: ICE____ pH____ CL2____ Reveiwed by_____
D Bayer	12/21/09	2.25	YES NO	5.4	

LOGIN SAMPLE RECEIPT CHECK LIST

Client: Tim Miller Associates, Inc. Job Number: 420-32174-1

Login Number: 32174

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	NA	
The cooler's custody seal, if present, is intact.	NA	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	NA	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	