crossroads ventures llc

DRAFT
Environmental Impact Statement

Appendix 19

Surface Water and Groundwater
Assessment Big Indian Plateau

The Belleayre Resort at Catskill Park

SURFACE WATER AND GROUND WATER ASSESSMENT

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mt. Tremper, New York 12457

December 2, 2002

ALPHA
GEOSCIENCE

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Geology
Hydrology
Remediation
Water Supply

Surface Water and Ground Water Assessment

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mt. Tremper, New York 12457

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

December 2, 2002

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1.0 INTRODUCTION

This report contains an assessment of the anticipated backup potable water supply for the proposed Big Indian Plateau development, an assessment of the local surface water and ground water resources associated with the development site, and an assessment of possible impacts of the Big Indian Plateau development on those local surface water and ground water resources. The Big Indian Plateau development is a portion of the Belleayre Resort at Catskill Park (the Resort), which is proposed by Crossroads Ventures, LLC (the Applicant).

The Resort consists of three components identified as Big Indian Plateau, Wildacres Resort and Highmount Estates. The Big Indian Plateau portion of the development is shown on Figure 1. Big Indian Plateau will include the Big Indian Country Club, an 18-hole championship golf course with associated lodging units and recreational facilities; Big Indian Resort and Spa, a 150 room hotel; and Belleayre Highlands, a development of lodging units in a quadplex configuration. The Belleayre Highlands complex will lie on that portion of Belleayre Mountain that is directly upslope from the hamlet of Pine Hill and within the surface drainage area of the tributaries of Birch Creek that flow through Pine Hill. The combined Big Indian Plateau facilities will also require 91,854 gallons per day (gpd) of potable water.

The Applicant initially intended to use springs alone to meet the potable demand of Big Indian Plateau. It was determined that the demand could be met collectively, or individually, by Silo A Spring, Silo B Spring, and Woodchuck Hollow Spring. Concerns regarding potential impacts to existing water supplies and the impact to base flow of Crystal Spring Brook, however, led the Applicant to focus instead on wells as the primary source to meet the Big Indian Plateau potable demand.

A bedrock well, identified as Rosenthal #2, was installed near the base of the Giggle Hollow valley as a potential source of ground water for Big Indian Plateau. A 72-hr pumping test was performed

on the Rosenthal #2 well, and the results indicate that the well is fully capable of meeting the potable demand as the primary source. A full report on the Rosenthal #2 well construction, drilling, and pumping test results has been prepared and is included as Exhibit E within the "Big Indian Plateau Water Supply Treatment and Distribution" section of the DEIS.

In order to receive a permit to use a water source as a potable supply, the source must meet the requirements of the "Ten States Standards." These standards require the potable water supply be "equal or exceed the average day demand with the largest producing well out of service." If the largest producing well, Rosenthal #2, is out of service, then the average day demand for potable water must be supplied from a backup source. It was determined that the spring identified as Silo A spring qualified under the Ten States Standards as the appropriate backup water supply for the project.

The water resource demands and the associated development in the Birch Creek Watershed has raised the possibility that the Pine Hill water supply (the Pine Hill Water Company) may be affected and that the water quality of the streams may be adversely impacted. The assessment presented in this report was prepared to address these water resource concerns.

1.1 Objectives

The general objectives of this investigation were to assess the existing quantity, occurrence and quality of both surface water and ground water in the project area and to evaluate the potential impacts on those resources by Big Indian Plateau. The specific objectives were to:

- determine if Silo A Spring has a sufficient yield to meet the potable needs of Big Indian Plateau,
- determine whether the use of spring water will affect the quality and quantity of water available to the Pine Hill water supply

- estimate the impact to the base flow of the local stream, which is Crystal Spring Brook, during dry periods and drought as the result of the use of Silo A Spring by Big Indian Plateau,
- quantify potential changes in ground water recharge and surface water runoff (water balance) at Big Indian Plateau as the result of site development, and
- develop a database of pre-development (existing condition) ground water and surface water quality to serve as a baseline for detection of potential project impacts during, and after, development of Big Indian Plateau.

1.2 Scope of Investigation

The project objectives were addressed through a scope of investigation that included several data collection, data analysis and impact assessment tasks. These tasks consisted of:

- monitoring of stream and spring flows,
- assessing sufficiency of Silo A Spring yield to meet potable demands as a backup water supply
- evaluating the impact of Silo A Spring use on stream base flow,
- conducting a water budget analysis,
- defining the recharge area for the springs,
- monitoring spring and stream water quality, and
- assessing the potential impacts of the Big Indian Plateau Development on ground water and surface water.

The purpose of each of these tasks is defined within this section of the report, and the detailed methods are described in subsequent sections along with the results.

1.2.1 Stream and Spring Flow Monitoring

The major springs and related surface water flows were measured monthly from January 2000 through December 2001. The monthly measurements provide seasonal data necessary to estimate low flow conditions during dry season and drought periods. The monthly measurements also provide the seasonal fluctuation in stream and spring flows that naturally occur under existing conditions.

1.2.2 Assessment of Silo A Spring Flow to Meet Potable Requirements

The Silo A Spring flow measurements were used to determine if Silo A Spring has sufficient yield to serve as the backup potable water supply for Big Indian Plateau. This assessment was conducted by correlating the monthly spring flow data with the precipitation data to predict low flows during normal seasonal dry periods (summer) and drought conditions. These results were sufficient to determine whether there would be periods when Silo A Spring would not be sufficient to meet the potable needs of the project.

1.2.3 Silo A Spring Use Impacts on Stream Flow

The spring and stream flow monitoring results were compared to determine the seasonal contribution of the Silo A Spring to Crystal Spring Brook. The seasonal variation in that contribution was also correlated with rainfall data to determine the relative significance of Silo A Spring in the maintenance of stream base flow.

The spring flow and stream flow data were also used to estimate if, and how often in the past Crystal Spring Brook may have dropped below flow rates necessary to sustain aquatic life under existing conditions. This analysis was conducted by correlating the Crystal Spring Brook discharge rates with daily flow measurements of Esopus Creek that were conducted by the U.S. Geological Survey

(Gauge #01362200). Crystal Spring Brook and Esopus Creek are within the Ashokan Reservoir watershed.

1.2.4 Water Budget Analysis

A water budget analysis (water balance) is a predictive model used to determine the relative contribution of precipitation to evapotranspiration (evaporation from plants and the ground surface), runoff to streams and infiltration to ground water. The water budget analysis was conducted for the Big Indian Plateau development site to assess the existing balance and evaluate the degree to which that balance will change after the golf course and facilities are constructed. The results were used to assess impacts of Big Indian Plateau to the springs and streams.

1.2.5 Delineate Recharge Basins for Springs

This task involved delineating the areas upslope from the springs that represent the recharge areas for the springs of interest. The objective of this task was to determine which springs, if any, are downgradient from the development and to identify those springs which have the greatest potential to be impacted.

1.2.6 Monitoring of Spring and Stream Water Quality

Water quality of the springs and related streams in the area were measured in the field monthly from October 2000 through October 2001. Samples were also collected and submitted to a laboratory for an expanded list of quality parameters at selected spring and stream locations in October and November 2000. Quarterly sampling of the expanded list was conducted in 2001. The primary purpose of this monitoring was to develop a baseline database of current water quality conditions in response to concerns raised by the New York State Department of Environmental Conservation (NYSDEC) and New York City Department of Environmental Protection (NYCDEP) regarding

potential surface water impacts during development and operation. This baseline will provide the data necessary to identify changes in water quality if they occur in the future.

1.2.7 Assessment of Potential Impacts

This is a summary task involving the prediction of potential impacts by the Big Indian Plateau development. This assessment of potential impacts is based on a review of the results of the data collection and analysis tasks.

2.0 ASSESSMENT OF SPRING YIELDS AND STREAM FLOWS

2.1 Methods

Monthly flow measurements of springs and streams were made in the field at 18 locations in the Crystal Spring Brook drainage basin and at two locations in Birch Creek, above and below its confluence with Crystal Spring Brook (spring yields were also measured monthly at six spring locations on the Wildacres Resort site, which is in Pepacton Reservoir watershed). Figure 2 shows the approximate locations for all the springs and stream flow measurement sites.

Spring yields were determined by measuring the flow from the spring box/reservoir discharge pipes with a 5-gallon bucket or 18-gallon tub. Stream discharges were determined by first measuring stream flow velocities with a propeller-type current meter that displays direct readouts of mean velocity. The discharges were then calculated from velocity by using the velocity-area method (Q=VA) where Q = discharge, V = the measured velocity, and A = the cross sectional area of the stream. The stream cross sections were determined at each station during each monthly flow measurement.

The stream flow measurements by Alpha were compared with USGS stream flow data obtained for a stream gauging station that the USGS operates in Birch Creek at Big Indian (Gauge #013621955), approximately two miles downstream from the Birch Creek (below Crystal Spring Brook) location (W, Figure 2) of this study. The stream flow values from the USGS gauging station in Birch Creek should be larger in general than the flows measured in this study since they are further downstream. The U.S.G.S. data serve as a check on the quality of stream flow data obtained in this study.

2.2 Results

2.2.1 Spring Flow Data

The results of the monthly spring yield measurements and stream discharge calculations for all locations are presented in Table 1A, and the average flows, to date, for each location are presented in Table 1B. The ID numbers listed for each location are keyed to Figure 2.

Tables 1A and 1B include the total spring yield for Depot Spring, which could not be determined directly in the field. Silo B Spring yield represents a portion of the total Depot Spring yield. The Depot Spring total yield was determined by measuring the flow in Station Road ditch below the spring discharge point, subtracting any flow in the ditch that was present above the spring discharge point, and adding the overflow from Silo B.

The springs around Wildacres proved to be inadequate to meet the potable demand for Wildacres Resort and were highly variable in their discharge rates. For this reason, and because of the reported low production rates of on-site test wells, alternative water supplies for Wildacres were examined. The search for alternative water supply wells and springs led to the identification of the Village of Fleischmanns water supply as viable alternatives with adequate capacity. Yield measurements at five of the six springs on the Wildacres Resort Site were discontinued when it was determined that

Wildacres could potentially meet its water demands through the purchase of water from the Village of Fleischmanns.

Silo A Spring was identified as a possible source of potable water for the Big Indian Plateau portion of the Resort. An analysis was made of the relative wet period and dry period contribution that Silo A Spring makes to the local stream, which is Crystal Spring Brook. The Crystal Spring Brook (above Birch Creek) flow measurements are compared to the flow contributions from Silo A Spring in Table 2. The data indicate that Silo A Spring contributes a greater fraction of the total Crystal Spring Brook flow during the dry season months (0.113) than it does during wet periods (0.023).

2.2.2 Climatological Data

Climatological data indicate that the Crystal Spring Brook drainage basin receives more annual precipitation on average than the rest of the upper Esopus Creek drainage basin. Significant variations in the amount of total precipitation occur throughout the Catskills due to orographic effects. Precipitation at the Slide Mountain Station (NOAA Station ID 307799) is likely to be more similar to the project area than any other station since it is the closest, is at a comparable elevation and is in a similar physiographic setting.

Table 3 presents the daily precipitation data from the Slide Mountain Station since January 2000, when stream and spring flow measurements began in the project area. The Slide Mountain monthly precipitation data is shown in Figure 3 plotted against the normal monthly precipitation for the Slide Mountain Station. "Normal" precipitation is based on 30 years of precipitation data from the station. The precipitation data from the Slide Mountain Station indicate that total precipitation for the year 2000 was just slightly above normal, with only three months receiving significantly greater precipitation than normal.

Total precipitation during 2001 through December 18 was 17.37 inches below normal. The NYSDEC issued a drought watch for Ulster County on November 5, 2001. By the end of November, the Catskills Region was in a drought emergency condition based on NYSDEC's evaluation of stream flows and ground water levels alone. Evaluation of the state drought index, which consists of a composite of all hydrological conditions, led the NYSDEC to issue a drought warning for Ulster County on December 3, 2001. The NYCDEP issued a drought watch on December 27, 2001 for the City's Water Supply System. A drought watch is declared by the NYCDEP when there is less than a 50 percent chance that either the Delaware System or the Catskill System reservoirs will be full by June 1.

2.2.3 Relationship of Spring and Stream Flow Data to the Climatological Data

The project area has a higher annual rainfall than the rest of the upper Esopus Creek drainage basin. These high local precipitation totals result in the spring flows that maintain Crystal Spring Brook during the dry season. Precipitation is plotted with spring flows and with Crystal Spring Brook discharge in Figures 4 and 5, respectively.

Crystal Spring Brook flows into Birch Creek, which joins Esopus Creek in Big Indian, New York. Esopus Creek flow data were obtained from the daily mean flows recorded at the USGS stream gauging station at Allaben (Table 4). The monthly ratios of the relative flow contribution of Crystal Spring Brook (above Birch Creek) to Esopus Creek at Allaben, New York were calculated (Table 5). The data show that the Crystal Spring Brook flow is a slightly greater percentage of the Esopus Creek flow during the drier, autumn months (0.055, Figure 6) than during the wetter periods (0.047). The major springs in the Crystal Spring Brook drainage basin help sustain the dry season flow in Crystal Spring Brook and add a higher proportion to the dry season flow in the Esopus Creek at Allaben.

A portion of the yields from springs to Crystal Spring Brook may be the result of snow-making at the Belleayre Mountain Ski Center. These effects were not analyzed, although snow-making activities must be considered part of the current background conditions. The Ski Center uses water from the NYSDEC's Pine Hill Lake (water from Birch Creek) and a small pond formed from the damming of Cathedral Glen Brook. The increased snow-melt from the Ski Center in the springtime most likely elevates the stream flows in Cathedral Glen Brook, Crystal Spring Brook, Birch Creek and Esopus Creek over what they would be without snow-making. Discharge rates at Railroad Spring and Bonnie View Spring are likewise interpreted to be greater in response to the increased snow-melt from the Ski Center; although, it is not known by how much. Railroad Spring and Bonnie View Spring are the only springs measured in the Crystal Spring Brook drainage basin that receive recharge from the Ski Center lands.

3.0 ASSESSMENT OF THE SPRING FLOW REQUIRED TO MEET POTABLE DEMANDS

3.1 Methods

The assessment of available potable water from Silo A Spring was based on monthly and daily mean flow data from the Esopus Creek at Allaben, on historical precipitation data from the Slide Mountain weather station, on the water budget analysis, and on the spring and stream flow measurements made in the Crystal Spring Brook drainage basin since January, 2000. Comparisons were made between the measured Silo A Spring flows and the corresponding recorded flows at the Esopus Creek USGS gauging station in order to develop a method of estimating historical Silo A Spring flows during droughts. An analysis was subsequently performed to determine the extent to which the Silo A Springs could meet potable demand during dry season and drought conditions. The worsening drought conditions from July 2001 through December 2001 afforded the opportunity to collect data during a period approaching "worst-case" conditions.

3.2 Results

The water budget analysis, included as Exhibit A, indicates that the dry season for the project area typically begins in June or July and ends in November. As discussed previously, the springs of the Crystal Spring Brook drainage area contribute a higher percentage of the Crystal Spring Brook flow during the dry season than during the wetter periods of the year. This relationship also holds true with respect to the Esopus Creek flow.

Table 6 shows the ratio of Silo A discharge versus the Esopus Creek flow. During the dry season and drought months of 2001, the highest ratio of the Silo A discharge to the Esopus Creek flow was 0.014, which occurred with the August 30, 2001 monthly measurement. The August 30, 2001 discharge measurements at Silo A, Crystal Spring Brook (Above Birch Creek), Birch Creek, and Esopus Creek were the lowest discharge measurements made at those locations during the two-year monitoring period (Table 1A). Spring yield at Silo A remained at approximately 70 gpm from August, 2001 through November, 2001, despite the fact that drought conditions worsened from July, 2001 into December, 2001.

The average potable daily demand for Big Indian Plateau is 64 gpm (0.14 cfs), which correlates to an Esopus Creek flow of 4,571 gpm (10.19 cfs), using the 0.014 dry season ratio (64 gpm/0.014 = 4,571 gpm). An Esopus Creek discharge value at Allaben of 4,571 gpm (10.19 cfs) represents a threshold indicator discharge value below which there may not be enough discharge from Silo A spring to meet the potable demand for Big Indian Plateau. A review of the Esopus Creek historical discharge data through November, 2001 indicates that monthly, mean, daily discharge dropped below the threshold flow rate indicator of 10.19 cfs (4571 gpm) for 12 months out of the 458 months since measurements began in 1963. These low flows are indicative of severe drought conditions that historically occurred during the months of July through November.

The Ten States Standards require the potable water supply to "equal or exceed the average day demand with the largest producing well out of service." This condition can be met for Big Indian Plateau by using the Rosenthal #2 well as a primary water supply (see separate Rosenthal #2 Well Report) and Silo A as a backup water supply. Silo A spring yielded approximately 70 gpm throughout the entire drought of 2001.

4.0 SPRING USE IMPACTS ON STREAM FLOW

4.1 Method

An analysis was conducted to determine whether flows in Crystal Spring Brook would remain acceptable for the viability of trout and other aquatic life forms despite the potential withdrawal of Silo A Spring water by the Big Indian Plateau portion of the Resort when the primary water supply is out of service. The Tennant Method indicates that for a stream to sustain good survival conditions for most aquatic life forms, a flow of greater than 30% of the mean average flow must be maintained. A basin-to-basin analysis between the Crystal Spring Brook drainage basin and the Esopus Creek drainage basin was performed to determine the average Crystal Spring Brook discharge. Comparisons of spring and stream flows with historical Esopus Creek flows were made to assess the frequency of past low flow periods. The worsening drought conditions from July 2001 through December 2001 afforded the opportunity to assess flows during conditions approaching a "worst-case" scenario.

4.2 Results

The Esopus Creek discharge data (Table 4) indicate that the Esopus Creek drainage basin, which contains the Crystal Spring Brook drainage area, has an average flow of 2.3 cfs per square mile for the reach above Shandaken. This data is for the period up until October 1988 when the station was moved to Allaben. The Allaben readings from October 1988 through November 2001 yielded an

average flow of 2.39 cfs per square mile. The two values provide a weighted average of 2.33 cfs per square mile (Table 4).

The Crystal Spring Brook drainage basin, which includes Silo A Spring, covers approximately 2.54 square miles. If it is assumed that the Crystal Spring Brook drainage system is typical of the rest of the Esopus Creek drainage area, then the average flow should be approximately 5.92 cfs, or 2,657 gpm. The average Crystal Spring Brook (above Birch Creek) flow to date, based on 18 monthly measurements during the last two years, is 2661 gpm, or 5.93 cfs. The flow measurements of Crystal Spring Brook made for this project supports the use of the basin-to-basin comparison in determining a historical average flow for Crystal Spring Brook (2657 gpm). The Tennant threshold for Crystal Spring Brook (above Birch Creek) is 797 gpm (30% of 2657 gpm).

The Esopus Creek data (Table 4) indicates that the monthly average daily discharge in the Esopus Creek has fallen below the Tennant threshold 109 times since 1963, and seven times during the past two years. By comparison, Crystal Spring Brook (above Birch Creek) discharge measurements have fallen below the Tennant threshold of 797 gpm (30% x 2657gpm) twice during the past 2 years, both times during the 2001 drought (August 30 and October 1). No measurement of Crystal Spring Brook flow was made during November, 2001. Flow data from the USGS gauging stations at Esopus Creek and Birch Creek (at Big Indian), and precipitation data from Slide Mt., indicate that the Crystal Spring Brook flow during November was also likely below the Tennant threshold. Drought conditions in the past, and in the future, naturally cause the flow in Crystal Spring Brook to fall below the Tennant threshold flow. It should be noted that 10% of the mean average flow is considered a minimum instantaneous flow to sustain short-term survival for aquatic life.

Silo A spring discharge during the 2001 drought, fell to approximately 70 gpm and remained there for several months as drought conditions worsened. This shows that the potable demand of Big Indian Plateau (64 gpm) can be met during typical drought conditions, such as the 2001 drought, by Silo A spring. The discharge from Silo A during the dry seasons of the past two years ranged from

4.7% to 37% of the total stream flow measured in Crystal Spring Brook. The use of Silo A spring to meet the potable demand for extended periods of time during drought conditions could cause the flow in Crystal Spring Brook to fall further below the Tennant threshold. Demand should continue to be met by the primary water supply well, Rosenthal #2, during drought conditions.

5.0 WATER BUDGET ANALYSIS

5.1 Methods

The methods for the water budget analysis are contained in Exhibit A.

5.2 Results

The results (Exhibit A) indicate that infiltration to the ground water system for the project area under existing conditions is approximately 0.94 gpm per acre. The results of the water budget analysis for the future, post-development conditions indicate that infiltration to the ground water system in the project area will be approximately 1.03 gpm per acre. This small increase (0.09 gpm per acre) amounts to a 110 gpm change for the whole 1232 acre site. Although this estimated increase in percolation to the ground water is a beneficial characteristic, this change is relatively small when compared to the normal seasonal and yearly climate fluctuations.

6.0 SPRING RECHARGE AREAS

6.1 Method

The recharge areas for the major springs in the Crystal Spring Brook drainage basin were interpreted based on physiographic features. These recharge areas are outlined in Figure 7. The larger brooks, ridge crests, and divides were used to define the recharge areas. Each recharge area covers the area upgradient from a particular spring or springs and extends along the mountain side to the nearest divide or large ravine with a brook.

6.2 Results

The recharge areas for Railroad Spring and Bonnie View Spring are considered to be the same. The recharge areas for Silo A, Depot Spring, and Woodchuck Hollow Spring also share a common recharge area, although separate from the Railroad and Bonnie View Spring recharge area. Woodchuck Hollow Spring recharge area is separated out on Figure 7; however, it is interpreted that some of the ground water within the Woodchuck Hollow Spring recharge area continues downgradient and contributes to Silo A and/or Depot Spring.

A fracture trace analysis was conducted in the recharge basins to assess whether fractures could be carrying water across the topographically defined recharge basin boundaries. A map of topographic linear features was constructed (Figure 8) by identifying natural linear features from 7.5 minute topographic maps. The natural linear features represent potential fractures along joints and bedding planes in the rock. There did not appear to be any significant cross basin fractures that would transfer water between basins.

The Big Indian Plateau is not expected to have an influence on the recharge to any of the major springs within the Crystal Spring Brook drainage basin. All of the major springs are cross-gradient to the development and receive water from areas on Belleayre Mountain that lie west of the substantial ravine of Woodchuck Hollow.

7.0 WATER QUALITY

7.1 Methods

The water quality monitoring objectives were met through a combination of routine field testing and periodic sampling for laboratory analysis.

7.1.1 Field Testing

Routine water quality field parameters were measured on a monthly basis from October 2000 through October 2001, at the same time as the ongoing monthly stream flow and spring flow measurements. The field parameters were measured at each of the stream and spring flow locations, and included temperature, specific conductivity, pH, oxidation-reduction potential (ORP), turbidity, and dissolved oxygen. Additional locations for water quality field testing were added along Birch Creek (at Covered Bridge, and below the treatment plant) and at Rose Mountain Brook to check the potential surface water quality effects from Pine Hill Lake and the NYCDEP waste water treatment plant discharge. The treatment plant discharges to Rose Mountain Brook, which discharges to Birch Creek. Water quality parameters were measured in Rose Mountain Brook above and below the treatment plant outfall. A sampling location was added along Lost Clove Brook to obtain water quality data from the stream that receives the south-directed drainage from the site. Figure 9 shows the location of all water quality field testing locations.

7.1.2 Water Temperatures

Surface water and spring water temperatures have been monitored in response to concerns raised over the possibility that site development has the potential to increase or decrease the surface water and/or ground water temperatures to the detriment of trout viability. Monthly, manual, water temperature measurements were made with a thermometer during each round of field testing at all of the testing locations to determine the seasonal variability of the water temperatures in the streams and springs.

Temperature data loggers were submerged in the water at two spring and four stream locations. The temperature loggers were programmed to record temperature measurements every four to six hours. The spring locations included Railroad Spring and Silo B. The four stream locations included Crystal Spring Brook above Birch Creek, Birch Creek below Crystal Spring Brook, Birch Creek at

Covered Bridge, and Birch Creek below the treatment plant outfall. Data loggers at three locations (Crystal Spring Brook above Birch Creek, Birch Creek below Crystal Spring Brook, and Birch Creek at Covered Bridge) were lost during a flooding event on December 17, 2000. These three locations have only one measurement per month during December 2000 and January 2001. The temperature data logger in Birch Creek below the treatment plant outfall was removed on February 1, 2001 to prevent loss from possible spring flooding. Manual temperature measurements were made at all four stream locations on a weekly basis during February, March, and April of 2001 while the data loggers were removed. The temperature loggers were reinstalled at the initial four locations on April 26, 2001 and programmed to resume recording stream temperatures at four-hour intervals.

7.1.3 Analytical Testing

Analytical water quality sampling for laboratory analysis was performed in October and November of 2000 at four spring and nine stream locations. Figure 10 shows all of the water quality analytical sampling locations. These first two months of analytical sampling served to create a baseline of seasonal water quality effects. Four of the stream locations were sampled quarterly during 2001 to detect any seasonal changes that exist under current background conditions, prior to site development. The quarterly sampling events were completed in October 2001.

7.2 Results

Summary tables of the results of field testing and analytical sampling to date are contained in Exhibits B and C, respectively. Manual temperature data are presented in Table 6, and the monthly mean temperatures for the two springs and four stream locations that were monitored are presented in Table 8. The monthly mean temperatures were calculated using the data from the programmable temperature data loggers as well as the available manual measurements.

The data collected to date indicate that all water quality parameters are within typical ranges for surface and ground water. The October and November 2000 baseline chloride and sodium levels at Railroad Spring, Pine Hill Water Supply overflow (pre-treatment) and Crystal Spring Brook (above Cathedral Glen Brook) were higher than at the remaining 10 analytical sampling locations. This is most likely due to the use of de-icing salts at Belleayre Mountain Ski Center, which is within the recharge area for Railroad and Bonnie View Springs (Figure 7). Specific conductivity was generally higher at these locations during the non-winter months (Exhibit B). Specific conductivity at most locations increased with the onset of winter and the use of road salts, and decreased again in April. The sewer treatment plant outfall had the highest specific conductivity readings among all locations over the monitoring period

8.0 SUMMARY OF RESULTS AND POTENTIAL PROJECT IMPACTS

The Big Indian Plateau portion of Belleayre Resort at Catskill Park will reportedly require an average daily potable water demand of 64 gpm (91,854 gpd). The primary source of potable water supply will be from a well identified as Rosenthal #2. Silo A Spring is anticipated to be the backup potable water supply for the Rosenthal #2 well.

The total flow from Silo A Spring should be able to meet the potable demand for the Big Indian Plateau portion of the Resort, even during drought conditions. Severe drought months during which there may not be enough discharge from Silo A spring to meet the potable demand have occurred 12 times out of a total of 458 months on record (3% of all months), based on the historical flow data from Esopus Creek. Drought conditions typically last one to two months and have occurred during at least three years of each decade since 1964, except for the 1970s. No drought conditions are reflected in the Esopus Creek flow data recorded during the 1970s.

Although Big Indian Plateau could meet its average daily potable water demand (64 gpm) during drought periods using Silo A as a backup water supply, the use of Silo A Spring should be curtailed

once the flow within Crystal Spring Brook falls below 861 gpm. The Tennant threshold of 797 gpm for Crystal Spring Brook might not be met if Silo A Spring is utilized during these low flows. The Rosenthal #2 well primary water source should continue to be used during drought conditions.

The water budget analysis indicates that the development of the Big Indian Plateau portion of the Resort would result in a very small net increase in infiltration of approximately 0.09 gpm per acre to the ground water system. This increase indicates that the development of Big Indian Plateau will not negatively impact the quantity of available water resources in the project area.

The development of Big Indian Plateau and the rest of the Resort will not have an impact on the Pine Hill water supply (Bonnie View Springs). The development is not in the recharge area of the Bonnie View Springs. The primary potable water supply will be obtained from the Rosenthal #2 well, which lies downgradient of the Bonnie View system and recharge basin. The backup potable water supply, Silo A, is within a recharge basin that is independent of the Bonnie View Springs and recharge basin.

Potable water obtained from Silo A Spring comes from the recharge area shown on Figure 7. The water, once treated after being used to meet potable needs, would be discharged to the fill absorption beds (beyond the spring recharge areas), enter the ground water system, and eventually contribute directly to the flow in the Crystal Spring Brook or Birch Creek systems.

Surface and ground water quality were monitored in the area's streams and springs. The monitoring consisted of monthly field testing and quarterly analytical sampling. The results establish a baseline set of data that reflects the seasonal changes in water quality that currently exist at the site. This baseline information provides the data necessary for making comparisons with similar data collected as the project is developed.

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TABLES

TABLE 1A
2000-2001 MONTHLY
SPRING AND STREAM FLOW MEASUREMENTS
Gallons Per Minute

Belleayre Resort
Alpha Project No. 00109

	2000												2001										
Stream/Spring	**18-Jan**	**2-Mar**	**27-Mar**	**20-Apr**	**22-May**	**26-Jun**	**26-Jul**	**29-Aug**	**28-Sep**	**26-Oct**	**28-Nov**	**27-Dec**	**30-Jan**	**28-Feb**	**29-Mar**	**25-Apr**	**30-May**	**29-Jun**	**30-Aug**	**1-Oct**	**13-Nov**	**29-Nov**	**14-Dec**
Woodchuck Hollow Spring	NM[6]	NM	NM	NM	NM	87	27	28	22	56	38	39	NM	NM	NM	226	44	31	12	41	NM	NM	38
Railroad Spring[1]	NM	NM	NM	NM	386	351	193	247	80	63	102	435	100	306	199	525	214	172	0	0	0	0	0
Crystal Spring Brook-above Bonnie View Spg.	73	1005	777	879	899	655	122	120	46	77	78	430	105	220	101	1644	97	80	30	16	NM	NM	NM
Bonnie View side ditch[2]	19	39	24	56	49	49	29	20	10	8	10	55	26	44	15	45	35	68	5	0	NM	NM	NM
Pine Hill H_20 Supply (meter)	0	NM	118	118	0	118	114	114	112	112	113	NM	113	113.5	113.4	119	113.4	112	80	102.5	NM	95	100
Pine Hill H_20 Supply overflow	48	11	10	10.5	102	7.5	0.7	.25 est.	0	0	0.7	9.5	NM	3	2.8	17.7	13.5	2.3	0	0	NM	NM	NM
Crystal Spring Brook-above Cathedral Glen Brook	127	1,456	1,072	1,104	1,121	990	197	297	149	184	230	542	235	372	459	1,913	322	280	45	69	NM	NM	NM
Cathedral Glen Brook-above CSB	242	3,499	3,730	2,531	2,889	2,317	730	843	286	653	1,070	597	335	1,154	464	7,882	920	540	42	372	NM	NM	NM
Black ABS Pipe-above Silo A	NM	NM	19	19.7	18	18	9.9	5.1	2.2	2.2	1.7	11.5	5.6	9.4	12	20.6	9.9	5	1	0	NM	NM	NM
Silo A	120	212	150	175	178	125	104	98	87	86	87	139	109	113	106	167	93.5	93	69.5	73	69.3	70.8	70.8
Crystal Spring Brook-below Silo A	435	4,941	4,618	4,857	4,307	3,157	1,391	1,074	799	1,296	1,304	1,880	600	1,299	827	9,401	1,312	785	182	853	NM	NM	NM
Silo B 4" Pipe	NM	NM	NM	NM	NM	NM	96	94	51	121	113	150	133	161	176	189	187	185	27.5	159	NM	NM	165
Silo B Overflow	29	25	28	24	26	25	25	26	25	25	26	28.5	25	26.5	0	0	0	0	0	0	NM	NM	0
Silo B (M + N)	NM	NM	NM	NM	NM	NM	121	120	76	146	139	178.5	158	187.5	176	189	187	185	27.5	159	NM	NM	165
Station Rd. ditch-above Depot Spg.	35	101	55	226	287	164	89	26	0	50	11	226	0	67	49	311	0	4	0	0	NM	NM	NM
Station Rd. ditch-below Depot Spg.	107	433	167	402	372	426	220	245	90	193	176	472	123	406	387	813	223	170	28	147	NM	NM	NM
Depot Spring Total[3,4]	101	357	140	200	111	287	156	246	115	168	192	275	148	365	338	502	223	166	28	147	NM	NM	NM
Crystal Spring Brook-below Depot Spg.	780	5,565	4,316	4,939	4,570	4,158	1,677	1,172	1,048	1,467	1,882	2,744	1,088	1,528	1,373	9,039	1,336	1,022	280	738	NM	NM	NM
Bailey Brook-above Crystal Spring Brook[5]	NM	NM	NM	NM	925	509	127	60	22	87	104	446	41	71	84	1699	110	51	0	24	NM	NM	NM
Crystal Spring Brook-above Birch Creek	NM	NM	NM	6,437	6,032	5,045	1,866	1,116	846	1,473	1,835	2,827	851	1,699	1,445	12,156	1,460	946	188	601	NM	NM	1080
Birch Creek-above Crystal Spring Brook	NM	NM	NM	11,209	10,421	6,463	4,347	2,528	1,085	2,501	2,286	7,128	2,481	3,470	3,822	12,257	3,046	2,101	614	591	NM	NM	1435
Birch Creek-below Crystal Spring Brook	NM	NM	NM	15,984	17,343	9,884	6,362	3,978	1,917	4,385	4,833	9,502	3,874	4,980	5,505	25,096	4,453	3,214	696	1,225	NM	NM	2205
Wildacres #1 Spring	1	10.7	1.7	10	10.6	5.8	3.3	2.9	1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Wildacres #2 Spring	5.6	15	0.6	5.5	7.1	4.6	2.5	1.3	0.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Wildacres #3 Spring	8.4	17.5	6.8	17.5	5.8	5.3	10.3	11.5	4.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Davenport Spring	3.2	10.1	5.6	12.4	12.5	6.7	2	1.8	1.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Highmount Spring	3.8	11.5	10	23	18.7	10.2	2.4	1.8	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Leach Spring	3.4	4.4	6.1	13	5.1	6.9	11.1	6.3	5.6	6.8	6.1	12.2	2.5	4.9	NM	5.6	4	12	0	0	NM	NM	NM
Birch Creek at USGS Big Indian Gauging Station[7]	5,835	41,741	19,300	25,134	26,481	13,914	6,284	4,488	2,154	3,725	2,873	12,567	5,386	8,527	9,874	31,418	7,630	6,732	987	1,885	1,212	2,289	5,386
Esopus Creek at USGS Allaben Gauging Station[7]	50,718	235,187	76,301	107,719	132,854	80,789	33,662	24,686	11,220	22,890	29,623	72,710	22,890	38,151	55,206	121,633	66,307	25,583	4,937	11,221	7,630	8,303	23,788

Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook
Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.
Depot Spring flow = Station Rd ditch flow below DepotSpring, minus Station Rd. ditch flow above Depot Spring, plus Silo B overflow
Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring flow =
Station Rd Ditch below Depot Spring, minus Station Rd. Ditch above Depot Spring
Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.
NM = Not Measured
Esopus Creek and Birch Creek flow values for September 2000 through December 2001 are "Provisional Data Subject To Revision" by the USGS

TABLE 1B
AVERAGE FLOWS
SPRING AND STREAM FLOW MEASUREMENTS (GPM)

BELLEAYRE RESORT
Alpha Project No. 00109

	STREAM OR SPRING (see Figure 2 for locations)	AVERAGE FLOW TO DATE
A	Woodchuck Hollow Spring	53
B	Railroad Spring[1]	198
C	Crystal Spring Brook-above Bonnie View Spg.	373
D	Bonnie View side ditch[2]	30
E	Pine Hill H_20 Supply (meter)	99
F	Pine Hill H_20 Supply overflow	5
G		
H	Crystal Spring Brook-above Cathedral Glen Brook	558
I	Cathedral Glen Brook-above CSB	1555
J	Black ABS Pipe-above Silo A	9
K	Silo A	113
L	Crystal Spring Brook-below Silo A	2266
M		
N		
O	Silo B	148
P	Station Rd. ditch-above Station Rd. Spg.	85
Q	Station Rd. ditch-below Station Rd. Spg.	280
R	Depot Spring Total[3,4]	213
S	Crystal Spring Brook-below Station Rd. Spg.	2536
T	Bailey Brook-above Crystal Spring Brook[5]	273
U	Crystal Spring Brook-above Birch Creek	2661
V	Birch Creek-above Crystal Spring Brook	4321
W	Birch Creek-below Crystal Spring Brook	6969
X	Wildacres #1 Spring	5
Y	Wildacres #2 Spring	5
Z	Wildacres #3 Spring	10
AA	Davenport Spring	6
BB	Highmount Spring	9
CC	Leach Spring	6
DD	Birch Creek at USGS Big Indian Gauging Station	10688
EE	Esopus Creek at USGS Allaben Gauging Station	54957

Notes:

1 Railroad Spring drains into Cathedral Glen Brook, upstream from its confluence with Crystal Spring Brook.

2 Bonnie View Side Ditch = Water from Bonnie View Spring that does not enter piping to Bonnie View Spring collection system.

3 Depot Spring flow = Station Rd ditch flow below Spring, minus Station Rd. ditch flow above Spring, plus Silo B overflow.

4 Silo B overflow to reservoir disconnected in March 2001. For March 2001 and subsequent dates, total Depot Spring flow = Station Rd Ditch below Spring, minus Station Rd. Ditch above Depot Spring.

5 Bailey Brook = Name given to unnamed stream in Woodchuck Hollow.

TABLE 2
Monthly Silo A Spring Flow Measurements and Ratio of Relative Contribution to
Crystal Spring Brook (Above Birch Creek)

Belleayre Resort
Alpha Project No. 00109

	4/20/2000		5/22/2000		6/26/2000		7/26/2000		8/29/2000		9/28/2000		10/26/2000		11/28/2000		12/27/2000	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio
Silo A	175	0.027	178	0.030	125	0.025	104	0.056	98	0.088	87	0.103	86	0.058	87	0.047	139	0.020
Crystal Spring Brook flow (gpm)	6,437		6,032		5,045		1,866		1,116		846		1,473		1,835		2,827	

	1/30/2001		2/28/2001		3/29/2001		4/25/2001		5/30/2001		6/29/2001		8/30/2001		10/1/2001		12/14/2001		Average Ratio
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	
Silo A	109	0.128	113	0.067	106	0.073	167	0.014	93.5	0.064	93	0.098	69.5	0.370	73	0.121	79.7	0.074	0.081
Crystal Spring Brook flow (gpm)	851		1,699		1,445		12,156		1,460		946		188		601		1,080		

n=18

Average Ratio During Dry Season Months =0.113 (July 2000 through November 2000, and August 2001 through December 2001)
Average Ratio During Wet Season Months =0.023 (April 2000 through June 2000, December 2000, and April 2001)

TABLE 3
Slide Mountain Precipitation: January 2000 through December 2000

Belleayre Resort
Alpha Project No. 00109

STATION: SLIDE MOUNTAIN STATE: NY ID: 307799
LATITUDE: 42.02 deg LONGITUDE: -74.42 deg ELEVATION: 2649 ft

Day of Month	2000											
	January-00	February-00	March-00	April-00	May-00	June-00	July-00	August-00	September-00	October-00	November-00	December-00
1	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.01
2	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.06	0.52	0.00	0.00	0.00
3	0.01	0.00	0.09	0.00	0.00	0.50	0.00	0.07	0.06	0.00	0.00	0.01
4	0.02	0.10	0.00	1.18	0.00	0.00	0.50	0.06	0.05	0.02	0.00	0.00
5	0.41	0.00	0.00	0.28	0.04	0.10	0.00	0.00	0.03	0.18	0.01	0.00
6	0.00	0.01	0.00	0.00	0.06	0.42	0.00	0.00	0.00	1.18	0.01	0.01
7	0.00	0.00	0.00	0.00	0.00	3.43	0.00	0.54	0.00	0.00	0.00	0.00
8	0.03	0.02	0.02	ND	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.07
9	0.00	0.00	0.00	0.87	0.02	0.00	0.00	0.16	0.00	0.03	0.00	0.04
10	0.03	0.00	0.60	0.09	0.29	0.00	0.03	0.02	0.60	0.00	0.64	0.00
11	0.76	0.12	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.02	0.22	0.02
12	0.04	0.01	1.59	0.13	0.28	1.28	0.00	1.76	0.03	0.00	0.05	0.20
13	0.27	0.00	0.04	0.00	0.38	ND	0.00	0.13	2.05	0.00	0.00	0.00
14	0.18	1.06	0.00	0.00	0.53	0.33	0.00	0.01	0.00	0.00	0.02	0.65
15	0.00	0.33	0.03	0.00	0.00	0.02	2.06	0.59	0.17	0.00	0.69	0.01
16	0.00	0.07	0.00	0.00	0.00	0.00	3.85	0.40	0.01	0.00	0.01	0.00
17	0.05	0.02	0.76	0.00	0.00	0.03	0.04	0.00	0.00	0.19	0.00	3.42
18	0.00	0.00	0.03	0.66	0.17	ND	0.00	0.00	0.00	0.44	0.00	1.98
19	0.00	0.75	0.00	0.02	0.47	0.42	0.00	0.01	0.00	0.63	0.00	0.00
20	0.06	0.01	0.00	0.00	0.70	0.00	0.00	0.00	0.16	0.00	0.00	0.20
21	0.15	0.06	0.00	0.28	0.21	0.00	0.00	0.00	0.00	0.00	0.14	0.00
22	0.00	0.00	0.00	0.97	0.05	0.70	0.12	0.00	0.01	0.00	0.00	0.00
23	0.00	0.00	0.00	0.43	0.29	ND	0.00	0.00	0.00	0.00	0.00	0.04
24	0.00	0.00	0.00	0.10	0.97	0.02	0.00	0.98	0.12	0.00	0.00	0.00
25	0.00	0.04	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.01
26	1.04	0.50	0.07	0.00	0.26	0.66	0.00	0.00	0.10	0.00	0.24	0.00
27	0.02	0.00	0.00	0.05	0.00	0.07	0.77	0.00	0.32	0.00	0.40	0.01
28	0.00	0.48	1.50	0.00	0.00	0.07	0.09	0.00	0.00	0.00	0.00	0.01
29	0.00	0.02	0.01	0.00	0.01	0.01	0.10	0.21	0.01	0.00	0.01	0.02
30	0.00		0.11	0.06	0.00	0.17	0.64	0.02	0.00	0.00	0.21	0.08
31	0.93		0.01		0.00		0.22	0.01		0.00		1.25
Monthly Total	4.01	3.62	4.87	5.12	5.75	8.23	8.42	5.11	4.24	2.69	2.65	8.04
30-yr Avg	4.51	4.36	5.07	5.29	5.75	5.1	4.7	4.91	4.72	4.72	6	5.11

Total Precipitation Year 2000 = 62.75"
30-yr Avg. Total Yearly Precip. = 60.24"

ND = No Data
All measurements recorded in inches

TABLE 3 (cont.)
Slide Mountain Precipitation: January 2001 through December 2001

Belleayre Resort
Alpha Project No. 00109

STATION: SLIDE MOUNTAIN STATE: NY ID: 307799
LATITUDE: 42.02 deg LONGITUDE: -74.42 deg ELEVATION: 2649 ft

Day of Month	2001											
	January-01	February-01	March-01	April-01	May-01	June-01	July-01	August-01	September-01	October-01	November-01	December-01
1	0.02	0.05	0.01	0.01	0.00	0.00	0.92	0.00	0.50	0.00	0.02	1.75
2	0.00	0.00	0.11	0.08	0.00	1.35	0.17	0.00	0.00	0.00	0.00	0.00
3	0.00	0.09	0.05	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.04	0.00
4	0.00	0.00	0.01	0.00	0.00	0.04	0.01	0.85	0.00	0.00	0.00	0.00
5	0.03	0.22	0.39	0.00	0.00	0.00	0.38	0.61	0.39	0.00	0.06	0.00
6	0.22	0.45	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.15	0.00
7	0.00	0.10	0.15	0.22	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.02
8	0.00	0.00	0.00	0.23	0.00	0.00	0.20	0.00	0.00	0.03	0.00	0.00
9	0.15	0.13	0.20	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.35
10	0.04	0.20	0.46	0.21	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.03	0.11	0.08	0.66	0.00	0.00	0.00
12	ND	0.00	0.06	0.00	0.00	0.47	0.00	0.72	0.00	0.00	0.00	0.00
13	0.00	0.00	0.59	0.00	0.01	0.00	0.01	0.33	0.00	0.00	0.00	0.08
14	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.02	1.15	0.00	0.00	0.03
15	0.00	0.44	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.64	0.00	0.48
16	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.09	0.15	0.00	0.00	3.24	0.04	ND	0.00	0.13	0.00	0.01
18	0.03	0.01	0.27	0.00	0.12	0.01	0.08	0.22	0.00	0.03	0.00	0.72
19	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	
20	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.16	
21	0.17	0.00	0.00	0.04	0.00	0.79	0.00	0.14	2.05	0.02	0.02	
22	0.00	0.01	2.06	0.08	0.18	0.00	0.00	0.00	0.00	0.00	0.00	
23	0.00	0.15	0.08	0.00	0.99	0.02	0.00	0.00	0.00	0.05	0.00	
24	0.00	0.01	0.02	0.00	0.32	0.63	0.00	0.01	0.00	0.20	0.00	
25	0.01	0.34	0.22	0.00	0.00	0.00	0.00	0.00	2.26	0.12	0.08	
26	0.00	0.22	0.00	0.00	0.01	0.00	0.50	0.00	0.02	0.00	0.43	
27	0.02	0.00	0.01	0.00	0.90	0.00	0.19	0.00	0.00	0.01	0.00	
28	0.02	0.01	0.00	0.00	0.13	0.00	0.00	0.00	0.12	0.01	0.00	
29	0.00		0.00	0.00	0.20	0.00	0.00	0.16	0.11	0.00	0.09	
30	0.01		1.92	0.00	0.07	0.00	0.00	0.00	0.01	0.00	0.02	
31	0.70		0.50		0.04		0.00	0.00		0.00		
Monthly Total	1.69	2.52	8.29	0.87	2.97	7.11	2.75	3.40	7.30	1.46	1.07	3.44
30-yr Avg	4.51	4.36	5.07	5.29	5.75	5.1	4.7	4.91	4.72	4.72	6	5.11

Total Precipitation Year 2001 (through December 18, 2001) = 42.87"
30-yr Avg. Total Yearly Precip. = 60.24"

ND = No Data
All measurements recorded in inches

TABLE 4
Monthly and Annual Average Discharges on Esopus Creek at Gauge 01362198

Belleayre Resort
Alpha Project No. 00109

Updated 12/20/01

bold = less than tennant method of 30% of grand mean

SHANDAKEN STATION

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1963										**11.64**	191.42	185
1964	201.1	98.66	369.48	222.7	75.97	**25.73**	**10.8**	**6.25**	**4.21**	**4.18**	**5.69**	49.4
1965	57.97	138.7	74	230.37	98.81	**19.37**	**8.94**	**15.16**	**24.83**	73.48	**38.17**	78.5
1966	56.94	77.68	326.71	142.57	117	62.27	**17**	**7.55**	**13.63**	**26.55**	126.37	86.9
1967	130.55	111.61	118.65	338.37	176	52.23	**36.9**	**19.17**	**10.86**	43.06	120.67	196
1968	70.1	67.97	369.06	224.05	260	172	67.8	**18.52**	**11.99**	**11.36**	116.3	140
1969	91.42	73.11	109.16	427.2	167	90.17	195	86.26	**17.53**	**13.97**	189.23	135
1970	54.16	250.82	69.9	577.53	154	40.33	**27.6**	**21.87**	**23.13**	146.45	123.27	80.6
1971	62.77	133.54	222.61	420.57	254	40.37	**15.7**	43.35	114.37	60.48	81.3	299
1972	163.03	79.31	282.48	378.23	215	350	208	**33.81**	**12.19**	**29.05**	346.27	329
1973	188.67	219.59	244.33	306.41	327	369	126	**35.33**	**16.76**	**19.53**	55.1	509
1974	180.48	152.5	193.42	370.3	215	87.47	53.9	**34.03**	92.5	82.61	136.83	297
1975	179.23	200.14	257.65	266.13	218	119	82.3	47.26	80.93	166.48	153.4	122
1976	289.84	330	185.81	155.6	198	66.9	46.6	**34.9**	**18.63**	170.68	97.33	125
1977	29.39	63.32	552.9	330.47	216	54.9	**17**	**13.35**	96.86	369.74	313.57	233
1978	358.32	90.07	208.32	436.43	388	104	50.5	**28.9**	**18.6**	**34.52**	49.13	104
1979	358.13	84.68	531.16	233.57	205	84.6	**21.1**	**18.81**	113.2	204.55	234.83	105
1980	79.87	33.59	460.06	350.23	129	45.5	61.6	**11.61**	**6.01**	**9.28**	**30.4**	92.1
1981	19.42	358.21	95.29	137.5	232	51.1	64.9	**18.81**	**20.59**	70.39	88.1	72.6
1982	82.39	141.61	148.77	354.03	78.39	188	58.8	**14.17**	**14.88**	**12.07**	52.43	101
1983	133.84	229.79	399.39	524.1	202	101	**17.9**	**12.25**	**9.92**	**7.49**	56.93	316
1984	89.77	356.17	126.55	600.03	322	128	**25.2**	**18.65**	**14.61**	**10.3**	**22.01**	108
1985	47.32	80.89	146.65	127.07	92.71	46.27	**33.7**	**24.71**	68.36	86.32	197.5	150
1986	108.16	95.64	411.42	173.5	215	141	52.5	82.2	**15.06**	**20.16**	179	166
1987	60.16	**29.61**	301.23	683.5	67.3	**33.4**	54	50.9	213.23	207.97	145.8	112
1988	41.77	138.4	196.13	154.83	235	60.3	**37.3**	**25.1**	**17.33**			
mean (cfs)	125.39	145.424	256.05	326.61	194.327	101.316	55.642	28.9168	42.0084	75.692	126.04	167.684

grand mean (cfs) 137.1
30% grand mean (cfs) 41.1
Drainage Area (mi^2) 59.5
cfs/mi^2 2.30

Gauge move to Allaben beginning with October, 1988

ALLABEN STATION

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1988										**28.16**	239.7	63.13
1989	**40.65**	71.68	122.1	218.87	511.06	161.9	47.16	**20.35**	53.58	187.51	169	52.16
1990	135.58	279.4	223.06	214.47	301.68	61.6	**35**	78.35	**32.33**	113.45	232.1	257.2
1991	142.48	160.4	279.29	199.07	113.16	**24.87**	**11.81**	**11.99**	**9.28**	54.7	126.1	127
1992	132.71	56.31	243.19	286.43	132.19	199.7	47.87	49.94	**39.33**	**44.54**	205.8	146.8
1993	300.52	49.71	188.87	826.97	101.29	**27.6**	**10.43**	**6.639**	**12.31**	**22.69**	181.9	197
1994	104.58	117.9	252.81	656.97	109.06	53.03	**37.55**	69.45	68.8	69.48	75	192.7
1995	245.23	75.14	229.58	123.2	73.355	71.53	**19.55**	**11.94**	**10.08**	256.89	295.5	84.23
1996	557.06	193.59	184.58	369.37	282.35	126.1	211.8	51.74	72.67	311.61	274.4	485.7
1997	152.26	173	208.87	318.43	219.1	49.8	**18.39**	**14.43**	**33.97**	**18.52**	230.7	107.3
1998	368	119.8	404.42	291.1	399.68	274.4	118.3	**20.03**	**11.46**	**19.8**	**25.1**	**39.3**
1999	365	208	246	194	116	48.6	74.5	**17.3**	198	127	208	136
2000	75.8	194	417	331	217	315	128	102	**37.5**	**39.4**	48.8	252
2001	61.3	109	127	518.4	68.3	110.8	**29.9**	**10.5**	**20.2**	**15.4**	**14.7**	
mean (cfs)	206.24	139.072	240.52	349.87	203.402	117.302	60.789	35.743	46.1162	93.511	166.2	164.655

grand mean (cfs) 152.0
30% grand mean (cfs) 45.6
Drainage Area (mi^2) 63.7
cfs/mi^2 2.39

Weighted Average of Two Stations:

$$\frac{(2.3\text{cfs} \times 25\text{yrs}) + (2.39\text{cfs} \times 13\text{yrs})}{38 \text{ years}} = 2.33 \text{ cfs/mi}^2$$

TABLE 5
Ratio of Relative Contribution of
Crystal Spring Brook (Above Birch Creek) to Esopus Creek

Belleayre Resort
Alpha Project No. 00109

	Units	4/20/00	5/22/00	6/26/00	7/26/00	8/29/00	9/28/00	10/26/00	11/28/00	12/27/00
Crystal Spring Brook above Birch Creek	gallons/minute	6437	6032	5045	1866	1116	846	1473	1835	2827
Crystal Spring Brook above Birch Creek	cubic feet/sec	14.34	13.44	11.24	4.16	2.49	1.89	3.28	4.09	6.30
Esopus Creek	cubic feet/sec	240	296	180	75	55	25	51	66	141
Ratio of Crystal Spring Brook Flow (cfs) to Esopus Creek Flow (cfs)		0.060	0.045	0.062	0.055	0.045	0.075	0.064	0.062	0.045

	Units	1/30/01	2/28/01	3/29/01	4/25/01	5/30/01	6/29/01	8/30/01	10/1/01	12/14/01
Crystal Spring Brook above Birch Creek	gallons/minute	851	1699	1445	12156	1460	946	188	601	1080
Crystal Spring Brook above Birch Creek	cubic feet/sec	1.90	3.79	3.22	27.09	3.25	2.11	0.42	1.34	2.41
Esopus Creek	cubic feet/sec	50	102	134	271	148	57	11	25	53
Ratio of Crystal Spring Brook Flow (cfs) to Esopus Creek Flow (cfs)		0.038	0.037	0.024	0.100	0.022	0.037	0.038	0.054	0.045

DRY SEASON AVERAGE RATIO= 0.055 (July 2000 through November 2000, and August 2001 through December 2001)

NON-DRY SEASON AVERAGE RATIO = 0.047 (April 2000 through June 2000, and December 2000 through June 2001)

NM = Not Measured
NA = Not Available

TABLE 6
Monthly Silo A Spring Flow Measurements and
Ratio of Relative Contribution to Esopus Creek Flow

Belleayre Resort
Alpha Project No. 00109

	1/18/2000		3/2/2000		3/27/2000		4/20/2000		5/22/2000		6/26/2000		7/26/2000		8/29/2000		9/28/2000		10/26/2000		11/28/2000		12/27/2000	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio
Silo A	120	0.002	212	0.001	150	0.002	175	0.002	178	0.001	125	0.002	104	0.003	98	0.004	87	0.008	86	0.004	87	0.003	139	0.002
Esopus Creek	50,718		235,187		76,301		107,719		132,854		80,789		33,662		24,686		11,220		22,890		29,623		72,710	

	1/30/2001		2/28/2001		3/29/2001		4/25/2001		5/30/2001		6/29/2001		8/30/2001		10/1/2001		11/13/2001		12/14/2001		Average Ratio	
	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio	Flow	Ratio		
Silo A	109	0.005	113	0.003	106	0.002	167	0.001	93.5	0.001	93	0.004	69.5	0.014	73	0.007	69.3	0.009	79.7	0.003		
Esopus Creek	22,890		38,151		55,206		121,633		66,307		25,583		4,937		11,221		7,630		23,788		0.004	n=22

Average Ratio During Wet Periods = .0016 (April 2000 through June 2000, December 2000, and April 2001)
Average Ratio During Dry Season Months = .0061 (July 2000 through November 2000, and August 2001 through December 2001)
Average Ratio During Drought Months = 0.01 (August, through November, 2001)

Table 7
Surface Water Temperatures
Manual Readings

Belleayre Resort at Catskill Park
Alpha Project No. 00151-Task 2

LOCATION	10/26/00	11/28/00	12/27/00	1/31/01	2/9/01	2/16/01	2/23/01	2/28/01	3/9/01	3/16/01	3/23/01	3/29/01
CSB Above Birch Cr.	52	40	35	39.2	37.4	39.2	37.4	36.5	36.5	35.6	37.4	35
Birch Cr. Below CSB	54	40	34	37.4	33.8	35.6	33.8	34.7	36.5	35.6	37.4	37
Birch at Covered Bridge	52	42	34	37.4	35.6	35.6	35.6	36.5	36.5	35.6	37.4	34
Birch Cr. at Frisenda	52	41	35	39.2	35.6	37.4	35.6	35.6	37.4	35.6	38.3	36

LOCATION	4/6/01	4/16/01	4/25/01	5/30/01	6/28/01	7/31/01	8/30/01	9/27/01	10/31/01	11/28/01
CSB Above Birch Cr.	43.7	42.8	42	49	56	56	59	53	46	NM
Birch Cr. Below CSB	43.7	42.8	43	49	58	59	60	53	47	NM
Birch at Covered Bridge	43.7	42.8	42	53	63	68	64	55	49	44.6
Birch Cr. at Frisenda	42.8	42.8	46	46	52	62	63	52	50	NM

Notes: CSB = Crystal Spring Brook
All temperatures given in degrees Fahrenheit
NM = Not Measured

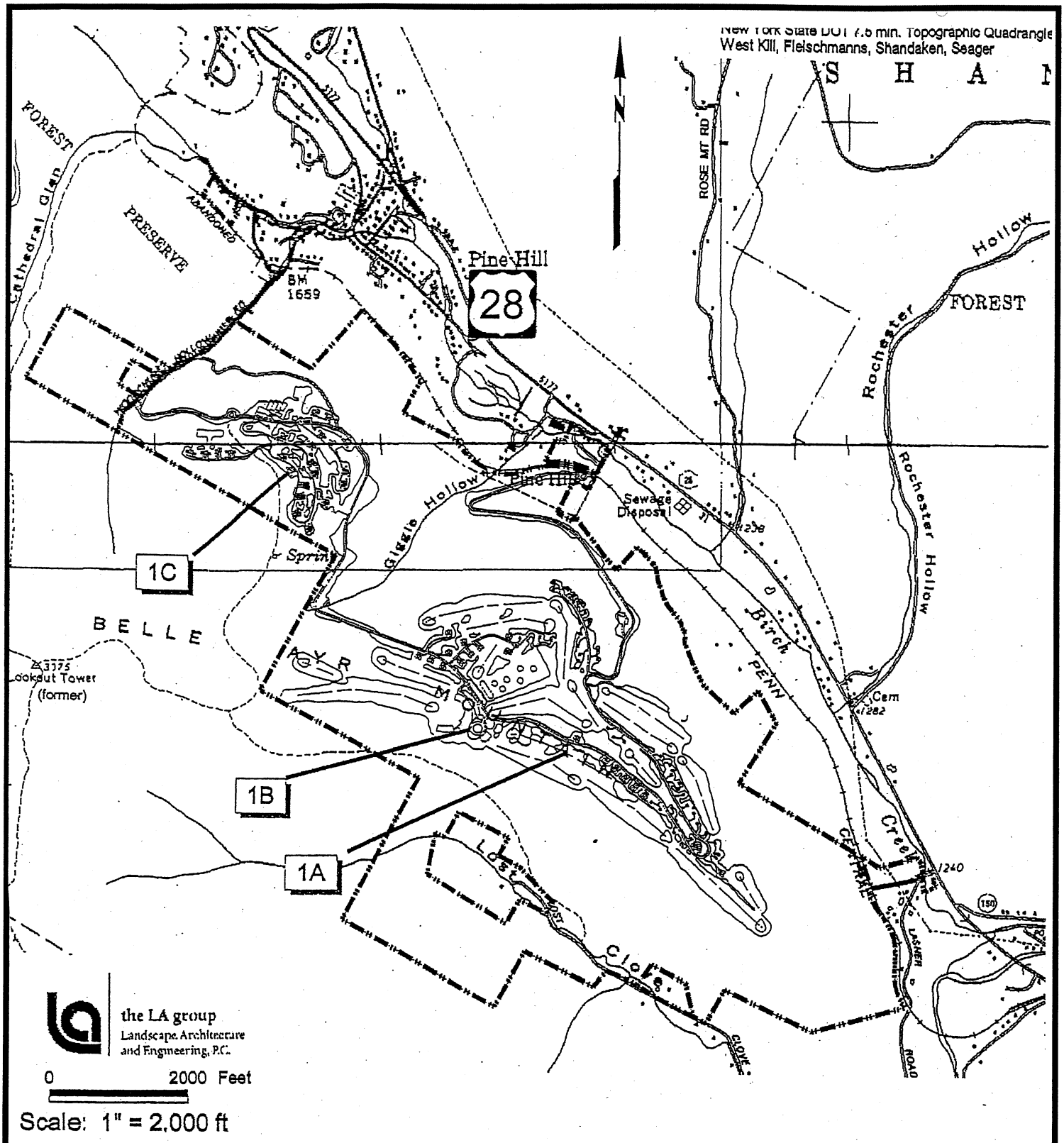
Table 8
Monthly Mean Water Temperatures

Belleayre Resort
Alpha Project No. 00151-Task 2

	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November
Railroad Spring	44.80	45.06	44.65	44.68	44.42	44.22	44.37	44.37	*46.00*	*46.00*	45.64	59.85	53.16	46.81	42.02
Silo B	43.92	44.04	43.93	44.07	43.92	43.92	43.92	43.92	*45.00*	*46.00*	45.27	45.56	45.85	45.58	45.34
CSB Above Birch Creek	--	43.05	40.97	*35.0*	*39.2*	**37.63**	**36.13**	**42.83**	*49.00*	*56.00*	55.60	60.03	54.50	47.87	42.58[P]
Birch Creek Below CSB	46.81	46.82	40.75	*34.0*	*37.4*	**34.48**	**36.63**	**43.17**	*49.00*	*58.00*	*59.00*	*60.00*	*53.00*	*47.00*	--
Birch Creek at Covered Bridge	51.64	48.68	40.99	*34.0*	*37.4*	**35.83**	**35.88**	**42.83**	51.17	54.89	60.38	60.26	55.64	49.88	45.25[P]
Birch Creek Below Treatment Plant	50.84	48.84	41.12	33.78	34.01	36.05[M]	**36.83**	**43.87**	51.53	55.31	60.66	63.92	57.67	49.90	44.06[P]

Notes:
M - Includes manual and data logger readings in a weighted average.
CSB - Crystal Spring Brook
Bold - Average based on weekly manual readings.
Italics - Average represents one manual measurement.
P - Represents a partial month of data logger readings

FIGURES



LEGEND

1A Big Indian Country Club and Golf Course
1B Big Indian Resort & Spa
1C Belleayre Highlands

Map adapted from The LA Group, P.C

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FIGURE 1
Big Indian Plateau Location Map

Belleayre Resort at Catskill Park
Pine Hill, New York

Alpha Project No. 00163

FILE: 00109-03.CNV

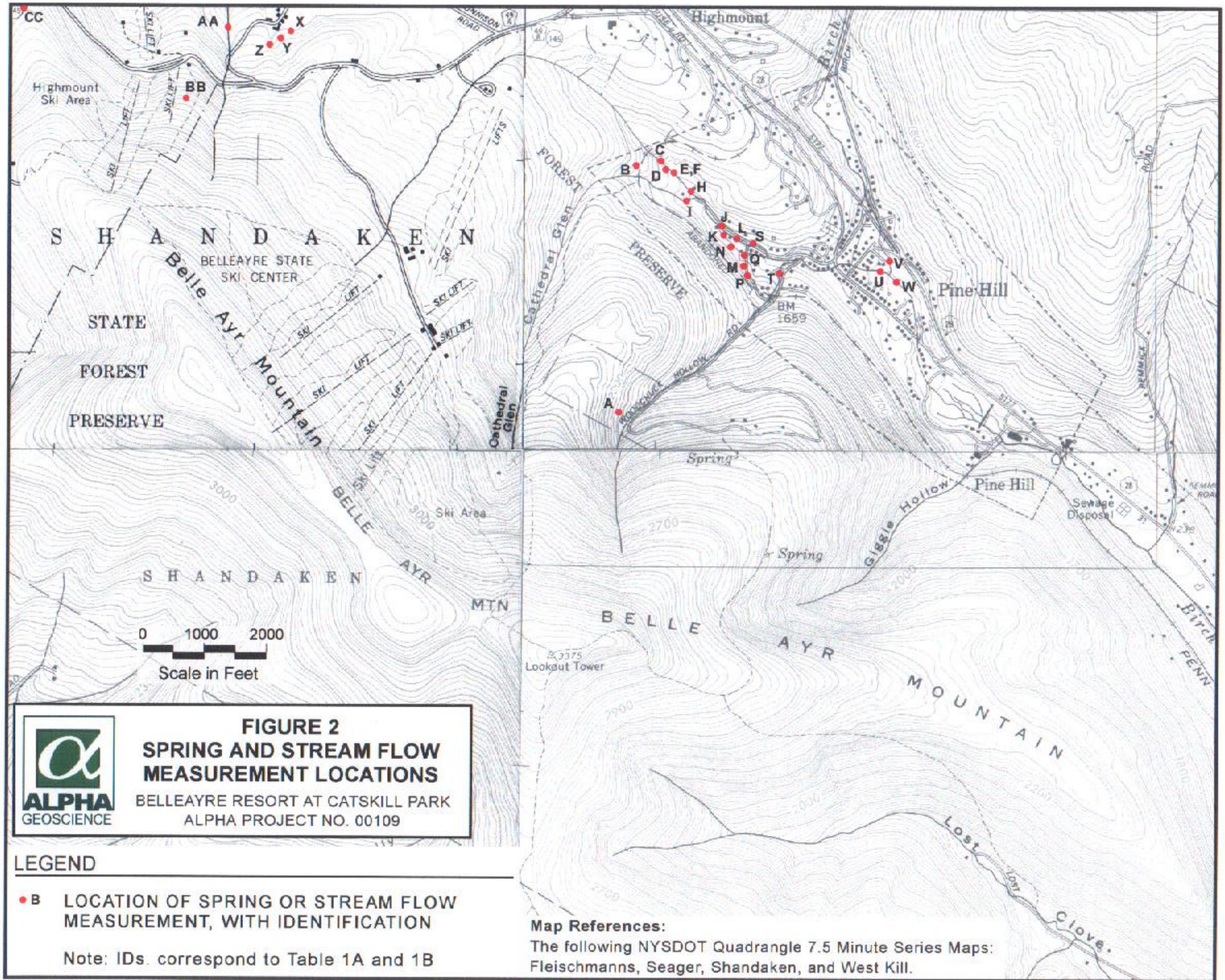


FIGURE 2
SPRING AND STREAM FLOW MEASUREMENT LOCATIONS
BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

ALPHA GEOSCIENCE

LEGEND

- B LOCATION OF SPRING OR STREAM FLOW MEASUREMENT, WITH IDENTIFICATION

Note: IDs. correspond to Table 1A and 1B

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps:
Fleischmanns, Seager, Shandaken, and West Kill.

FIGURE 3
Precipitation at Slide Mountain Station, NY ID 307799
January 2000 through November 2001

Belleayre Resort
Alpha Project No. 00109

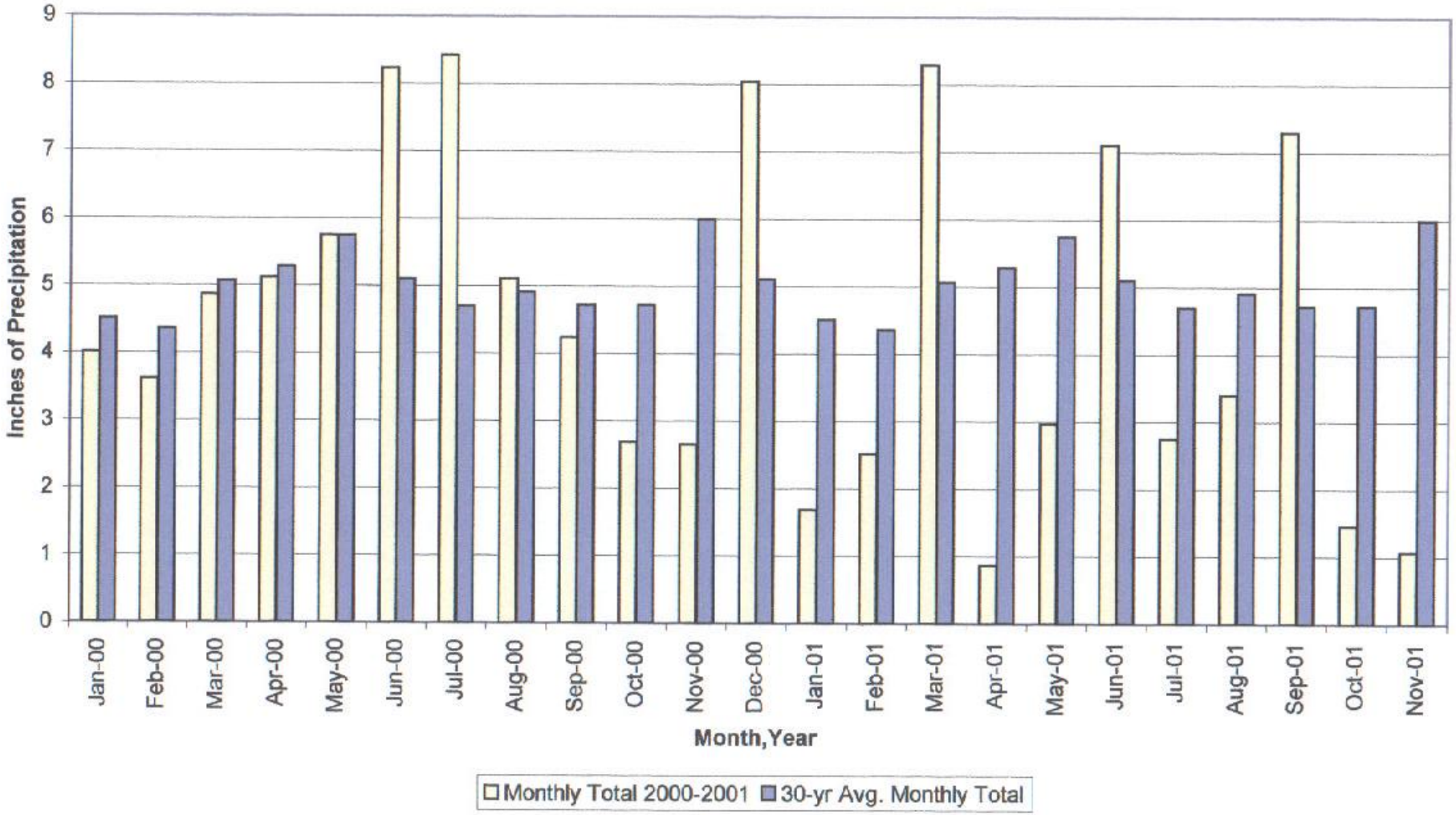
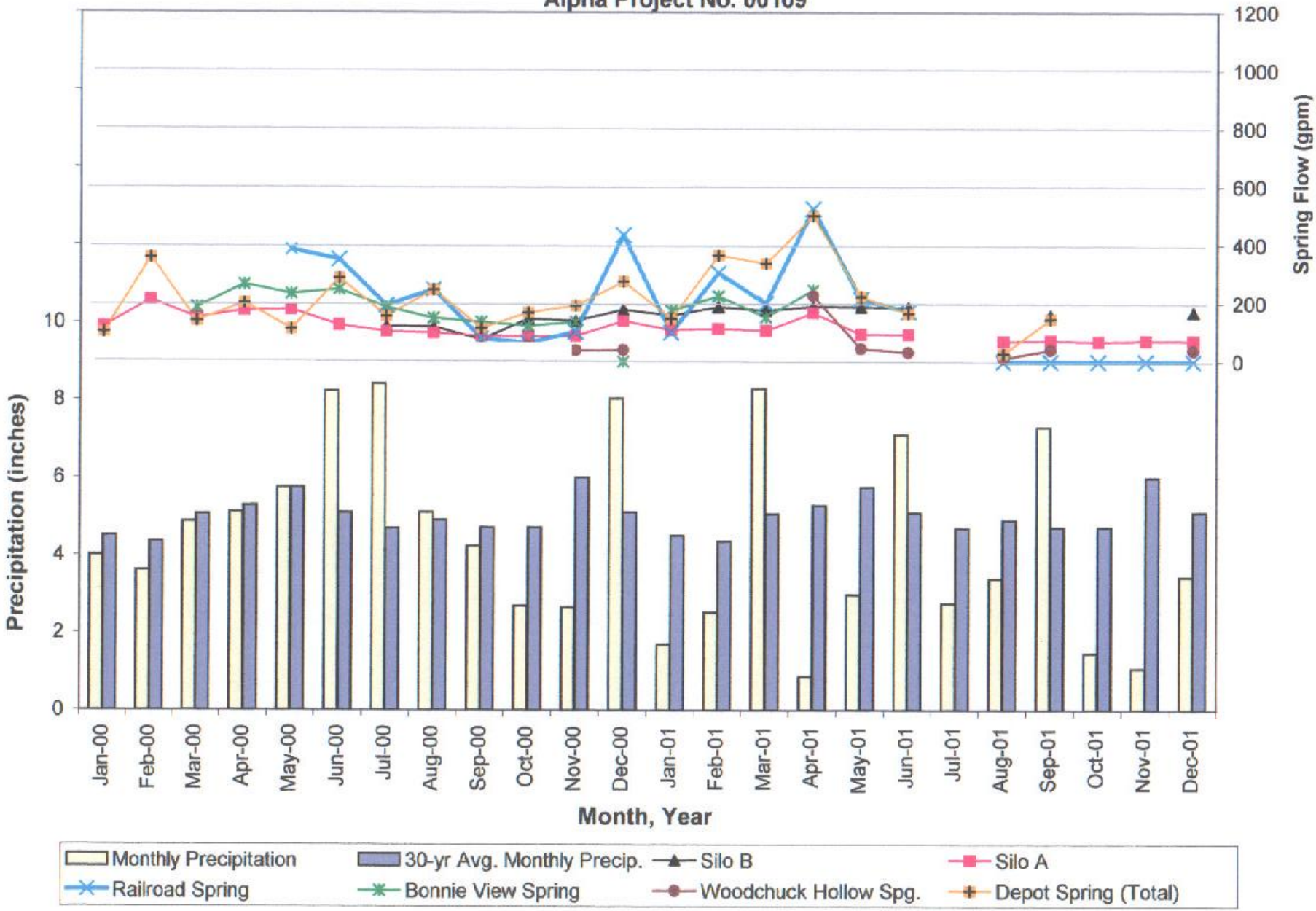
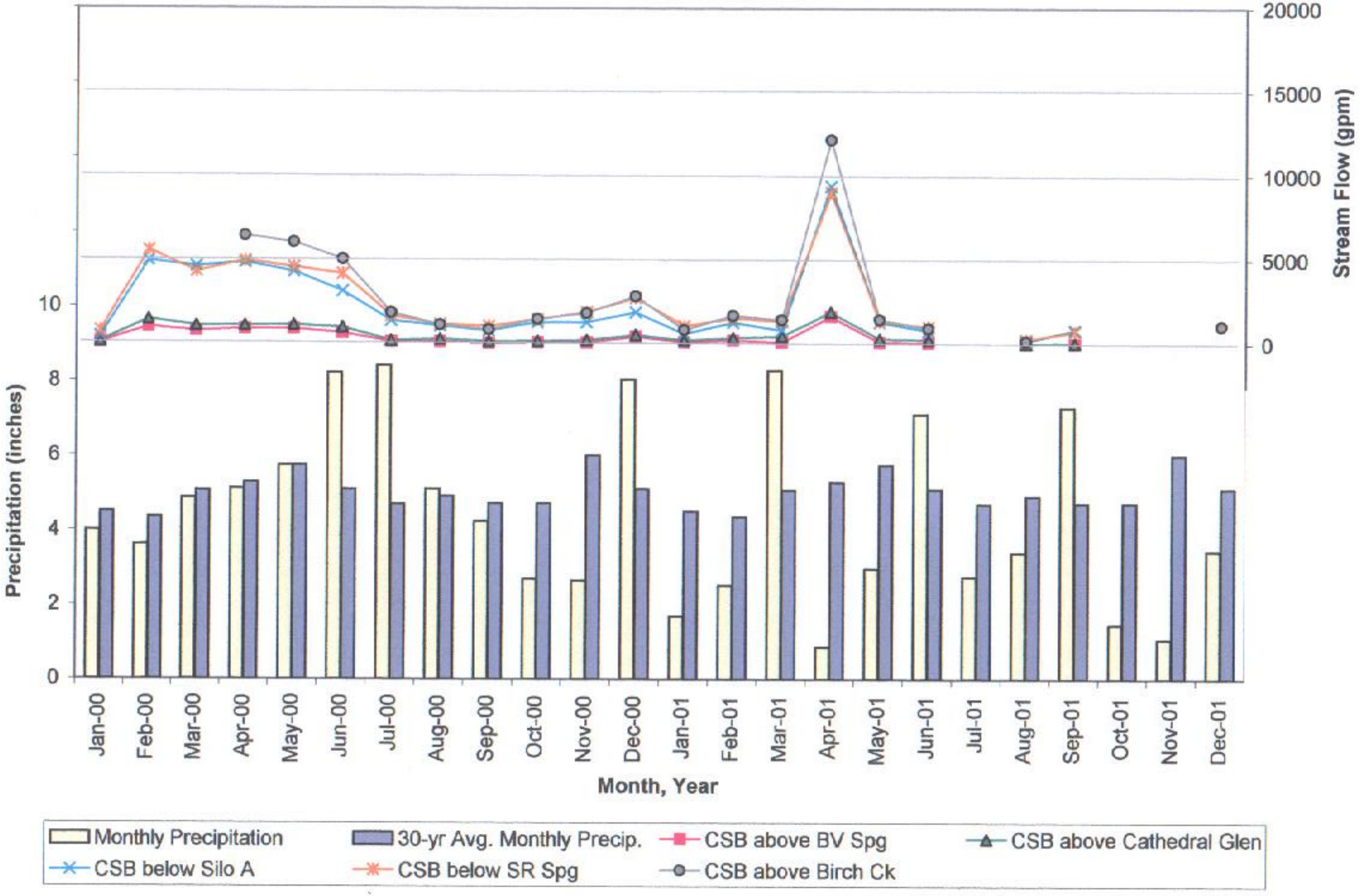


FIGURE 4
Precipitation vs Spring Flow
January 2000 through November 2001
Belleayre Resort
Alpha Project No. 00109



00109\Precip vs Flows(2)\Graph Precip vs Spring Flows

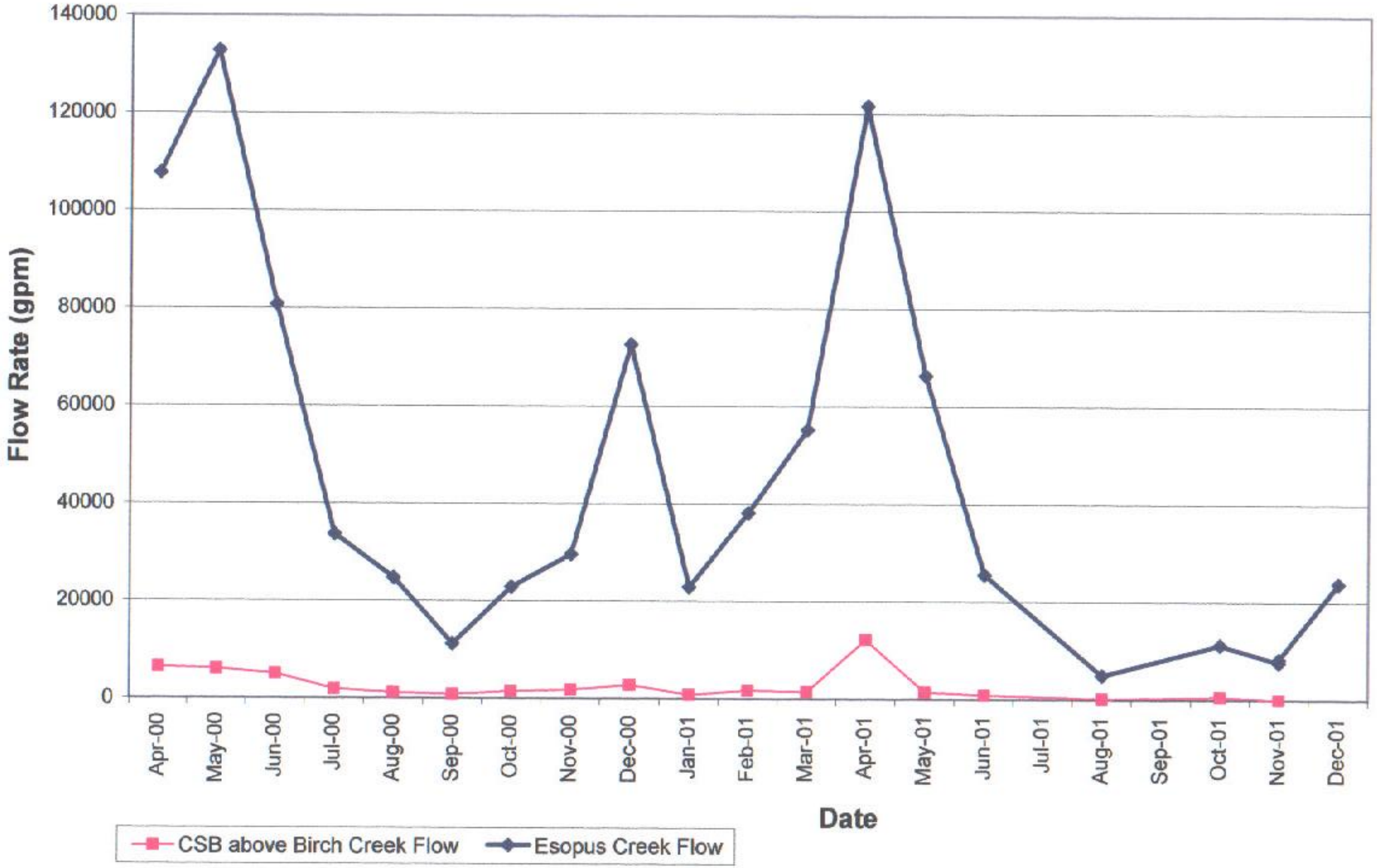
FIGURE 5
Precipitation vs Crystal Spring Brook Flow
January 2000 through November 2001
Belleayre Resort
Alpha Project No. 00109



00109\Precip vs Flows(2)\Graph Precip vs Xtl Spg Brook

FIGURE 6
CSB Flow vs. Esopus Creek Flow

Belleayre Resort
Alpha Project No. 00109



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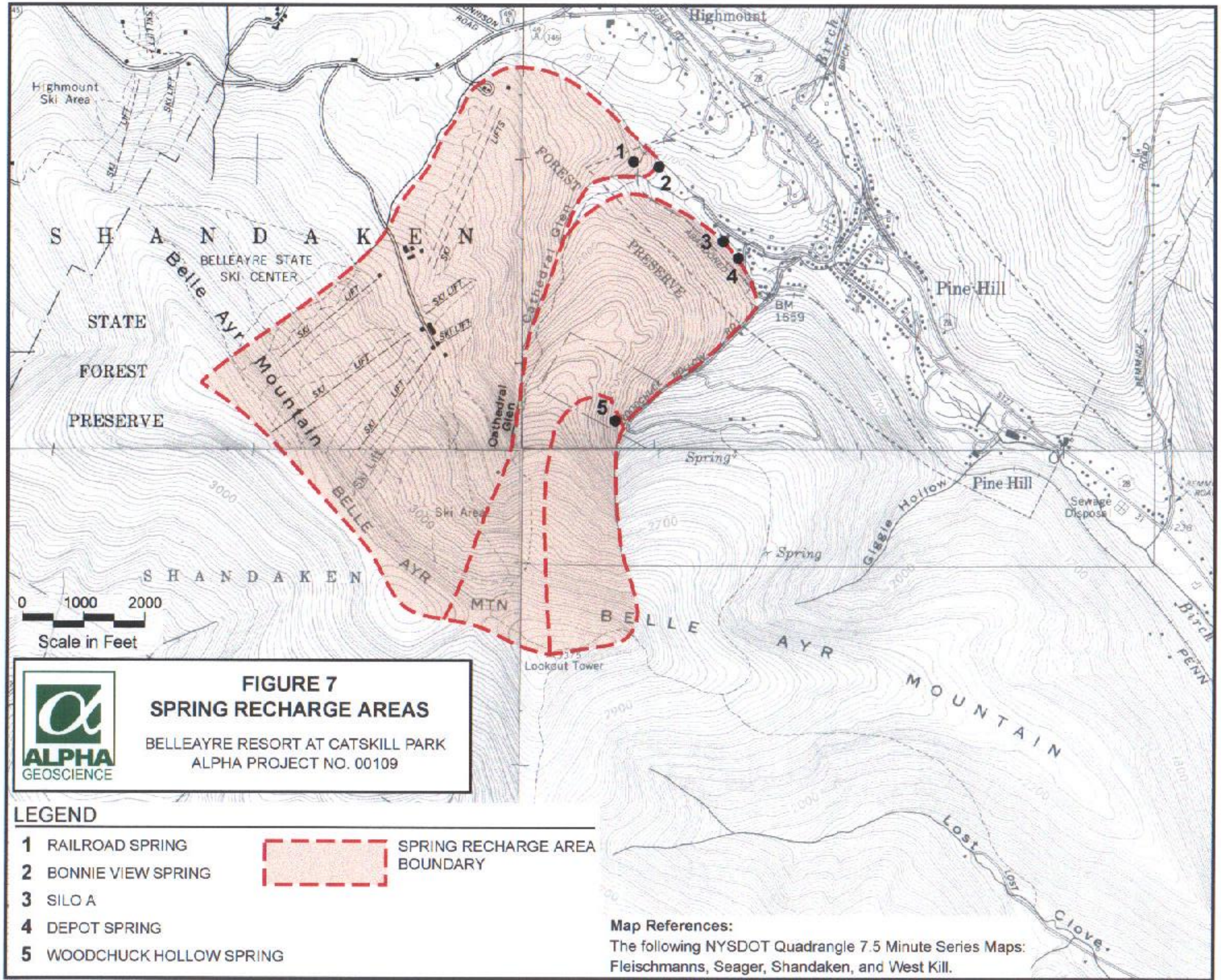

FIGURE 7
SPRING RECHARGE AREAS

BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

ALPHA GEOSCIENCE

LEGEND

1 RAILROAD SPRING
2 BONNIE VIEW SPRING
3 SILO A
4 DEPOT SPRING
5 WOODCHUCK HOLLOW SPRING

SPRING RECHARGE AREA BOUNDARY

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps: Fleischmanns, Seager, Shandaken, and West Kill.

00109-02.CNV

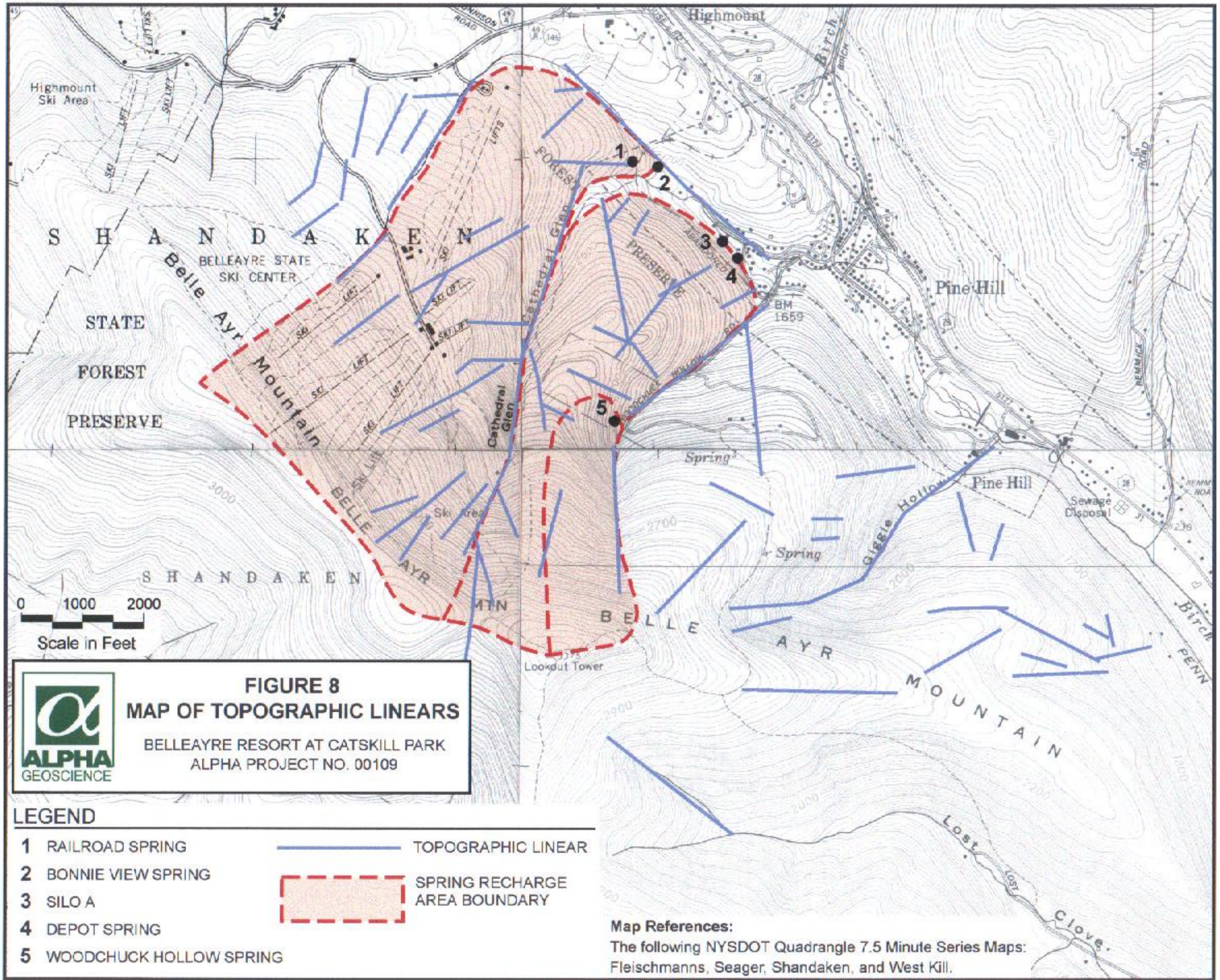

FIGURE 8
MAP OF TOPOGRAPHIC LINEARS

BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

ALPHA GEOSCIENCE

LEGEND

1 RAILROAD SPRING
2 BONNIE VIEW SPRING
3 SILO A
4 DEPOT SPRING
5 WOODCHUCK HOLLOW SPRING

TOPOGRAPHIC LINEAR

SPRING RECHARGE AREA BOUNDARY

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps:
Fleischmanns, Seager, Shandaken, and West Kill.

FILE: 00109-03.CNV

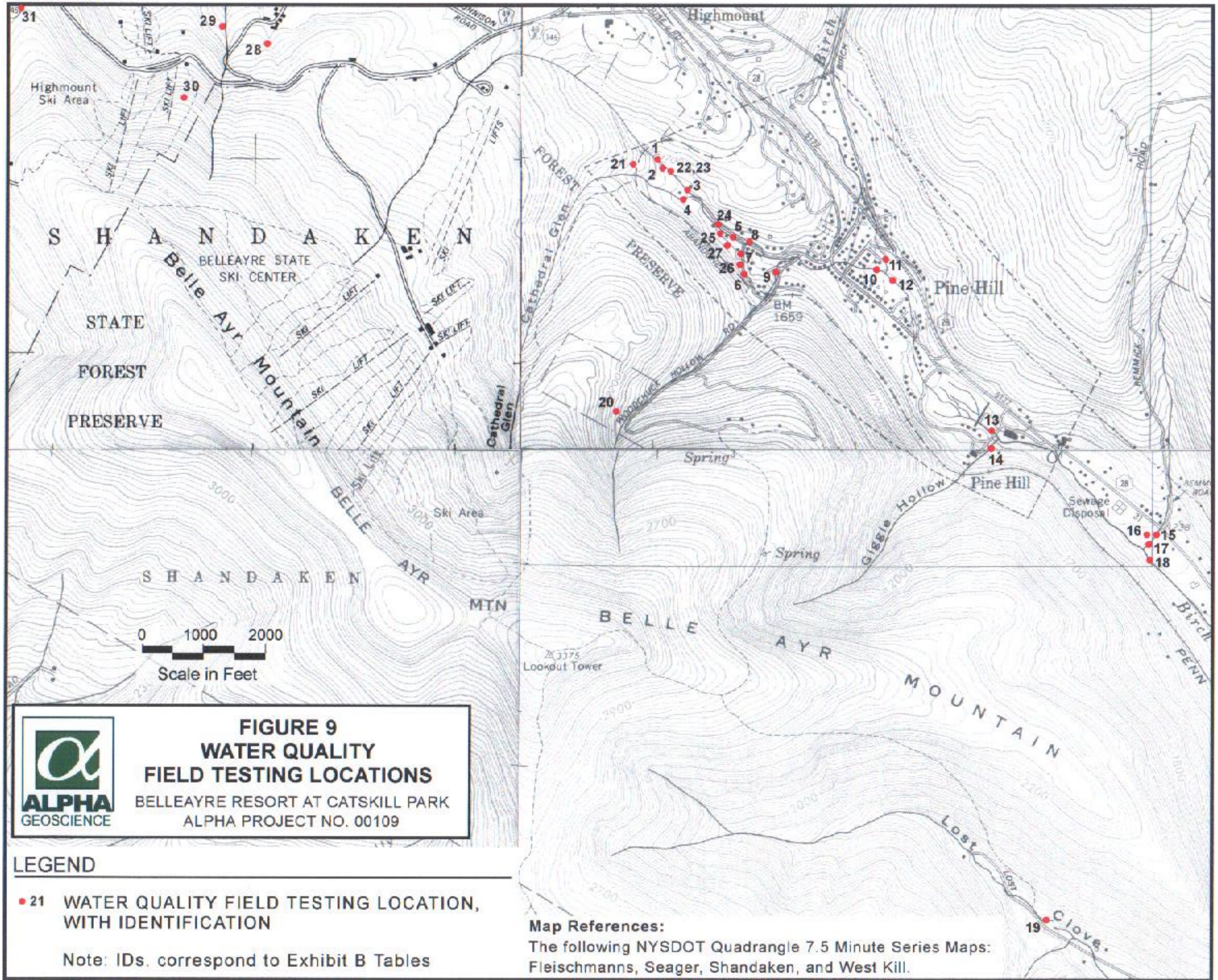

FIGURE 9
WATER QUALITY
FIELD TESTING LOCATIONS
BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

ALPHA GEOSCIENCE

LEGEND

- 21 WATER QUALITY FIELD TESTING LOCATION, WITH IDENTIFICATION

Note: IDs. correspond to Exhibit B Tables

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps:
Fleischmanns, Seager, Shandaken, and West Kill.

FILE: 00109-03.CNV

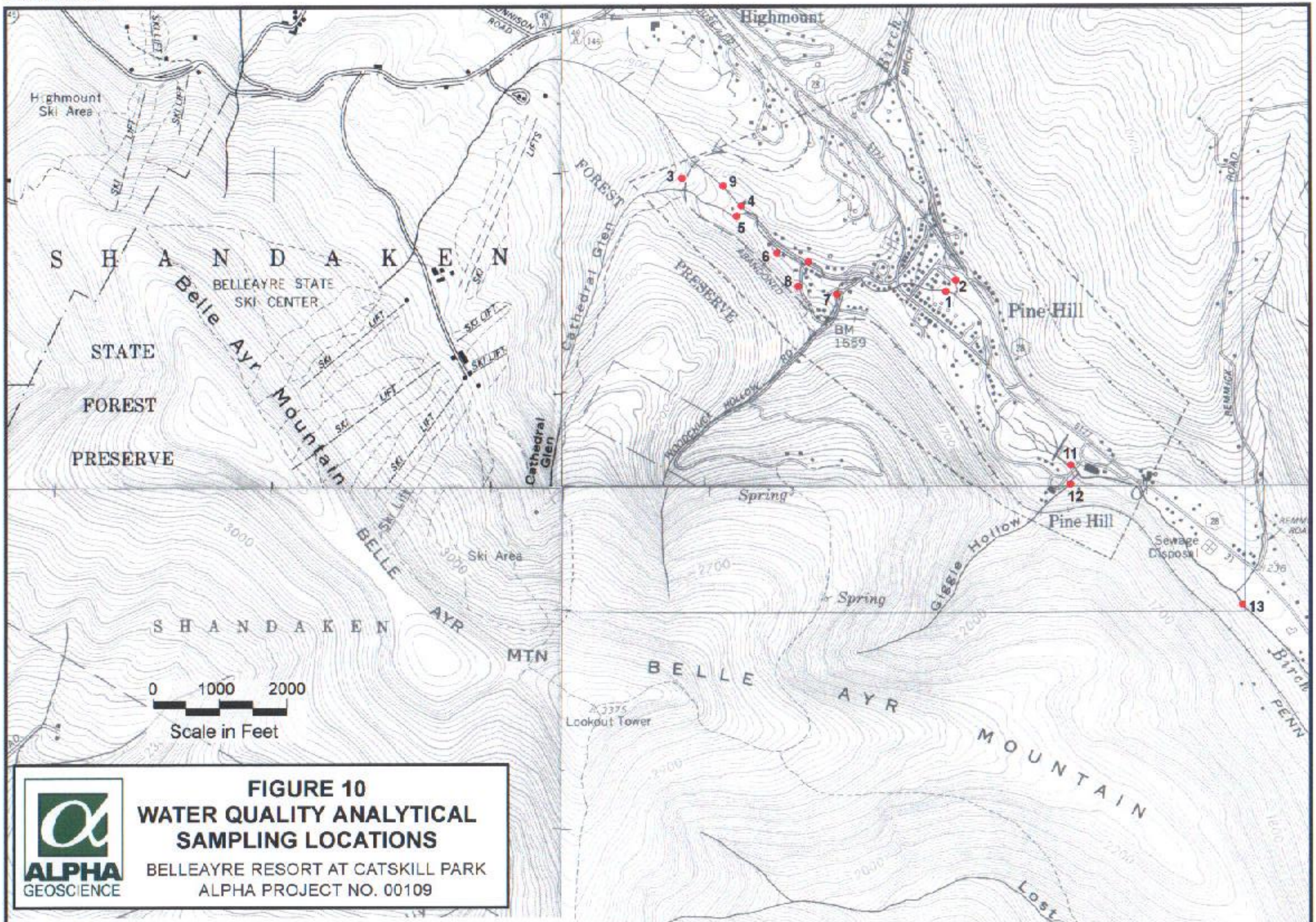

FIGURE 10
WATER QUALITY ANALYTICAL SAMPLING LOCATIONS
BELLEAYRE RESORT AT CATSKILL PARK
ALPHA PROJECT NO. 00109

ALPHA GEOSCIENCE

LEGEND

- 21 WATER QUALITY ANALYTICAL SAMPLING LOCATION, WITH IDENTIFICATION

Note: IDs. correspond to Exhibit C Tables

Map References:
The following NYSDOT Quadrangle 7.5 Minute Series Maps:
Fleischmanns, Seager, Shandaken, and West Kill.

EXHIBIT A

Water Budget Analysis

WATER BUDGET ANALYSIS

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mr. Tremper, New York 12457

December 2, 2002

ALPHA
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Geology

Hydrology

Remediation

Water Supply

Water Budget Analysis

Big Indian Plateau
Belleayre Resort at Catskill Park
Pine Hill, New York

Prepared for:

Crossroads Ventures LLC
P O Box 267
Mt. Tremper, New York 12457

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

December 2, 2002

TABLE OF CONTENTS

EXHIBITS

Exhibit A1: Soil Map Unit Areas-Existing Conditions

Exhibit A2: Development Areas-Future Conditions

Exhibit A3: Soil Map Unit Areas-Future Conditions

PLATES

Plate 1 Existing Soils Map

Plate 2 Post-Development Areas and Soils

1.0 INTRODUCTION

This report presents the findings of a water budget analysis that was completed for the Big Indian Plateau portion of the proposed Belleayre Resort at Catskill Park. The work was performed for Crossroads Ventures, L.L.C as part of their assessment of potential environment impacts associated with development of this portion of the overall project site. The portion of the project area is shown on Figure 1 and contains the proposed Big Indian Country Club and Golf Course, Belleayre Highlands, and the Big Indian Resort & Spa. The area covered by the water budget analysis is approximately 1232 acres. The western tip of the site, which consists of that portion of the site west of Woodchuck Hollow Road, was not included since that area will not be developed and is hydrogeologically separated from the main part of the site.

The purpose of the water budget analysis was to estimate the amount of infiltration to the ground water system under existing conditions and under post-development conditions at Big Indian Plateau (project area). This was accomplished by first evaluating the amount of infiltration to the ground water system under existing conditions and then estimating the change in total infiltration that will be brought about as the result of the post-development conditions. The water budget provides a mechanism of estimating infiltration by balancing the amount of precipitation with runoff, percolation to the subsurface and evapotranspiration (evaporation of the ground surface and transpiration by plants). This balance is dependent on those factors such as vegetation cover, soil type and land use which will change when development occurs. The change in pre-development (existing) and post-development infiltration rates was estimated to assess impacts by factoring in modifications to the land by development.

2.0 METHODS

2.1 Existing Conditions

The areas that were analyzed for the existing conditions water budget correspond to the mapped soil areas within the project area provided in the DEIS Section 3.6 and Appendix 12, "Soil Test Results". Plate 1 shows the existing soil types and the mapped units throughout the entire Big Indian Plateau

project area. Each of the mapped units were numbered for identification purposes and they are listed in Exhibit A1 with their corresponding soil type and calculated area. The areas of all the mapped units of the same soil type were then summed to arrive at a total area within the project area (Exhibit A1).

Water budget analyses were then completed for each soil type based on climatic data from the Slide Mountain Station and specific soil properties from the DEIS Appendix 12, "Soil Test Results", and the Soil Survey of Greene County, New York (USDA, 1993). The Slide Mt. weather station is the closest weather station to the project area with a thirty-year record of temperature and precipitation. Precipitation at the Slide Mountain station is likely to be more similar to the project area than any other NOAA station due to its proximity, comparable elevation and its similar physiographic setting. It is located 8.7 miles south-southeast of Pine Hill and at an elevation of 2649 feet AMSL. The vast majority of the Big Indian Plateau project area is situated above 2000 feet AMSL.

Information on physical properties of the soils was obtained from neighboring Greene County soil survey because the Ulster County soil survey is out of date. The soil type classifications presented in the DEIS Appendix 12 represent the modern classifications of the soils within the water budget area, therefore, the physical properties of the soil types can be obtained from any of the modern published soil surveys (See DEIS Section 3.6, "Soils" for more information).

The water budget analysis for each soil type within the project area and supporting information are summarized in Tables 1 through Table 11. Some soil types were lumped together for the water budget analysis based on their similar soil properties (e.g., VeC, VeD, and VeF).

2.2 Post-Development Conditions

The areas that were analyzed for the future (post-development) conditions are shown on Plate 2. The entire area to be developed was subdivided into three areas: Area I, Area II, and Area III (Plate 2). Area I consists of the non-wooded Big Indian Country Club golf course and driving range, and the Big Indian Resort & Spa grounds. Area II consists primarily of the non-wooded portions of the Belleayre Highlands, including the roads, buildings and tennis courts. Area III contains the Big Indian

Plateau access road corridor, the maintenance area, the club membership lodging units around the golf course, and the parking area off Lasher Road. The total area for each of development Areas I, II, and III was calculated, as was the total area of roads (asphalt) and buildings within each development area (Exhibit A2).

The future, undeveloped area outside of and not included in Areas I, II, and III comprises the majority of the land within the project area. This area also includes the larger, wooded portions between development Areas I, II, and III. The total area of each soil type outside of the development areas were determined for the post development phase. Some of the numbered, soil map units are expected to be truncated or divided by the proposed development of Areas I, II, and III. The numbering scheme used for the existing conditions soil map units is retained in Plate 2, but modified with additional, identifying numbers where necessary to reflect subdivisions of a particular map unit (e.g., 78 HvD becomes 78 HvD-1, 78 HvD-2, and 78 HvD-3). Some of the soil map units are not expected to have any changes in total area and are indicated by a hatch stippled pattern on Plate 2. The areas of all of the future conditions soil map units are included in Exhibit A3.

The water budget analyses for the future conditions soil types outside of Areas I, II, and III are the same as they were for the existing conditions (Tables 1 through13). Water budget analyses for post-development conditions within each of Areas I, II, and III are summarized in Table 13 through Table 15 and were completed based on climatic data and estimated soil properties. Several other key assumptions for the future, post-development water budget analyses are represented by the following bullets.

- The treated waste water from the proposed fill absorption beds is included as additional infiltration to Areas I, II and III. Delaware Engineering, P.C. (2001) indicates that 16 fill absorption beds are planned for Area I, four fill absorption beds are planned for Area II, and one fill absorption bed is planned for Area III.

- All of the precipitation on the buildings within Area I, excepting the hotel and clubhouse, is assumed to runoff the buildings and onto the soil where it becomes additional precipitation to

Area I. Seventy five percent of the precipitation on the roads and parking lots within Area I is assumed to leave the area as run off and is lost to the system; however, 25% of the precipitation on the Area I asphalt is assumed to stay within Area I and is factored in as additional precipitation to Area I.

- The Big Indian Resort & Spa, namely the hotel and clubhouse, will be constructed as multiple, landscaped, terraces. For water budget purposes, the hotel and clubhouse are included in the portion of Area I that is exclusive of roads and buildings. It is assumed that the roof terraces will act more like typical soil cover within Area I, rather than as typical buildings.

- The top soil that will be used in construction of the Big Indian Country Club golf course and driving range is assumed to be a sandy loam that will have an average thickness of eight inches. The average solum thickness (depth to root base) for these areas is expected to be approximately 12 inches once the course has fully developed.

- Treated waste water from four proposed fill absorption beds that are planned for the undeveloped lands outside Areas I, II, and III (Delaware, 2001) is included as additional infiltration to the affected soil type areas, as appropriate.

- The effects of the three proposed ponds east of the Big Indian Resort & Spa are also included in the water budget analysis. These ponds are assumed to have a silty clay bottom and are assumed to be full throughout the year.

- Irrigation water for the golf course is assumed to primarily originate from the irrigation water supply well R1, which is located outside of, and down gradient of, the project area. This well taps a bedrock aquifer in the Pine Hill valley (Birch Creek valley) and has a total depth of 224 feet. In order to maintain a conservative approach in estimating the potential change in infiltration to the ground water system, the positive effects of irrigation water surcharge on the golf course area (Area I) were not included in the water budget analyses for the post-development conditions (Table 13). The application of irrigation water throughout the golf

course, would theoretically meet the soil moisture demand of the grass within the golf course area (Area I); therefore, it is assumed that the irrigation water will be completely removed from the system through evapotranspiration. However, the addition of irrigation water will actually increase the amount of infiltration to the ground water system by negating the soil moisture deficit that normally occurs during the summer months when the golf course would be in full operation. The irrigation water, in reality, will act as a precipitation surcharge with a resulting increase in infiltration throughout the golf course areas. This precipitation surcharge was not included in the water budget analyses for the future conditions.

- Downward infiltration from the irrigation ponds was assumed to be non-existent due to the fact that the bottom of the irrigation pond will likely be covered with a geotextile or a clay liner.

3.0 RESULTS

3.1 Existing Conditions

The water budget analysis performed for the existing conditions indicates that the infiltration rate for the entire area covered by the water budget analysis (1232 acres) is approximately 1153 gallons per minute (gpm), which is equivalent to 0.94 gpm per acre. Table 16 summarizes the annual infiltration by soil type under existing conditions.

3.2 Post-Development Conditions

Table 17 summarizes the annual infiltration estimated for Areas I, II, and III, the ponds, and for each soil type within the future, undeveloped project area. The water budget analysis for the future, post-development conditions indicates that the infiltration rate for the entire area will be approximately 1263 gpm, which is equivalent to 1.03 gpm per acre. This increase (0.09 gpm per acre) with respect to existing conditions, represents a gain of 110 gpm to the ground water system over the entire 1232-acre site. Although the estimated increase in percolation to ground water is a positive characteristic, this change is relatively small when compared to the normal seasonal and yearly climate fluctuations.

The infiltration rate is estimated to be 0.98 gpm per acre without the water-recycling characteristics of the 25 proposed absorption fields that accompany the development.

4.0 CONCLUSIONS

A water budget analysis was completed for the Big Indian Plateau portion of the proposed Belleayre Resort at Catskill Park. The purpose of the water budget analysis was to estimate the amount of infiltration to the ground water system under existing conditions and after peak development of Big Indian Plateau. The results indicate that infiltration to the ground water system for the project area under existing conditions is approximately 0.94 gpm per acre. The results of the water budget completed under future, post-development conditions indicate that infiltration to the ground water system in the project area will be approximately 1.03 gpm per acre. This change indicates that there is an increase in infiltration to the ground water. This equates to a gain of approximately 110 gpm recharge to the ground water system, from the entire 1232-acre site. Infiltration to the ground water system in the project area will be approximately 0.98 gpm per acre without the water-recycling nature of the fill absorption beds. Golf course irrigation, which was considered but not incorporated into the water budget calculations, will have a net effect of an increase in infiltration to the ground water system, resulting in more ground water resources for the study area. The Big Indian Plateau development will not negatively impact the quantity of available water resources in the project area.

E:\projects\2002\02121-02140\02138-BIP Water Budget\Big Indian Plateau Water Budget-revised.wpd

REFERENCES

Broad, William A., 1993, Soil Survey of Greene County, New York, United States Department pf Agriculture, Soil Conservation Service in cooperation with the Cornell University Agricultural Experiment Station, 349 p.

Delaware Engineering, P.C., February 15, 2001, Draft Conceptual Design Report, Belleayre Ridge Wastewater Treatment and Disposal, 15 p.

TABLES

TABLE 1
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types EkC, EkD
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	5.32	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	5.32	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	5.32	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	5.32	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	5.32	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	4.61	-0.71	3.77	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	3.23	-1.38	4.20	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	2.64	-0.59	3.54	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	2.66	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	4.06	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	5.32	1.26	0.25	2.09
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	5.32	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.66
Total Percolation:	16.49
	60.24

TABLE 2
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type HrF
Alpha Project No. 00163

	Direct HaC Precip.	Add'l HaC Precip due to Runoff from Rock Outcrop	Total Precip. To Halcott (HaC)	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	2.25	6.76	0.00	0.40	2.71	4.06	4.06	0.00	1.43	0.00	0.00	4.06
February	4.36	2.18	6.54	0.00	0.40	2.62	3.92	3.92	0.00	1.43	0.00	0.00	3.92
March	5.07	2.53	7.60	0.00	0.40	3.04	4.56	4.56	0.00	1.43	0.00	0.00	4.56
April	5.29	2.64	7.93	1.01	0.40	3.17	4.76	3.75	0.00	1.43	0.00	1.01	3.75
May	5.75	2.87	8.62	2.65	0.40	3.45	5.17	2.52	0.00	1.43	0.00	2.65	2.52
June	5.10	2.55	7.65	3.81	0.40	3.06	4.59	0.78	0.00	1.43	0.00	3.81	0.78
July	4.70	2.35	7.05	4.61	0.40	2.82	4.23	-0.38	-0.38	0.98	-0.45	4.68	0.00
August	4.91	2.45	7.36	3.93	0.40	2.95	4.42	0.49	0.00	1.43	0.45	3.93	0.04
September	4.72	2.36	7.08	2.81	0.40	2.83	4.25	1.44	0.00	1.43	0.00	2.81	1.44
October	4.72	2.36	7.08	1.43	0.40	2.83	4.25	2.82	0.00	1.43	0.00	1.43	2.82
November	6.00	3.00	9.00	0.25	0.40	3.60	5.40	5.15	0.00	1.43	0.00	0.25	5.15
December	5.11	2.55	7.66	0.00	0.40	3.07	4.60	4.60	0.00	1.43	0.00	0.00	4.60

Average Annual Precipitation: 60.24 inches plus run-on from Rock Outcrop (30.12 inches) = 90.36 inches

Runoff :	36.14
Total AET:	20.57
Total Percolation:	33.65
PERC+AET+RUNOFF=	90.36

Note(s):
Total HrF area = 8,662,219 sq ft. , assumed to be 67% Halcott (HaC) and 33% Rock Outcrop.
HaC area = 5,774,812.7 sq ft
Rock Outcrop area = 2,887,406.3 sq ft (assume zero percolation)
Monthly rainfall on Rock Outcrop area assumed to runoff directly to Halcott (HaC) area as additional precipitation to Halcott area

TABLE 3
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type HvD
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	1.90	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	1.90	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	1.90	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	1.90	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	1.90	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.22	-0.68	3.74	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.45	-0.77	3.59	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.25	-0.20	3.15	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.27	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.67	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	1.90	0.23	0.25	3.12
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	1.90	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.63
Total Percolation:	17.52
	60.24

TABLE 4
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type LeB
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	3.20	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	3.20	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	3.20	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	3.20	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	3.20	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.89	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.85	-0.87	4.16	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	1.56	-0.20	3.64	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	2.05	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	3.20	0.82	1.43	1.05
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	3.20	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	3.20	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.76
Total Percolation:	22.41
	60.24

TABLE 5
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types LeC, LeD
Alpha Project No. 02138

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.20	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.20	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.20	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.20	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.20	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.48	-0.72	3.78	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.34	-1.14	3.96	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.98	-0.36	3.31	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	1.00	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.40	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.20	0.80	0.25	2.55
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.20	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.20
Total Percolation:	16.94
	60.24

TABLE 6
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type LeF
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.60	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.60	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.60	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.60	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.60	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.91	-0.69	3.75	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.69	-1.22	4.04	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	1.30	-0.39	3.34	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	1.32	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.72	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.60	0.88	0.25	2.47
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.60	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.28
Total Percolation:	16.87
	60.24

TABLE 7
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type TkB
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	2.88	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	2.88	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	2.88	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	2.88	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	2.88	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.68	-0.20	3.77	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.61	-1.07	4.36	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	1.34	-0.27	3.71	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	1.83	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	2.88	1.05	1.43	0.82
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	2.88	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	2.88	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.99
Total Percolation:	22.18
	60.24

TABLE 8
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type TkC
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.88	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.88	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.88	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.88	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.88	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.17	-0.71	3.77	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.10	-1.07	3.89	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.79	-0.31	3.26	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.81	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.21	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.88	0.67	0.25	2.68
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.88	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.07
Total Percolation:	17.08
	60.24

TABLE 9
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types VeC, VeD, VeF
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	3.50	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	3.50	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	3.50	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	3.50	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	3.50	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	2.78	-0.72	3.78	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	1.57	-1.21	4.03	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.79	-0.78	3.73	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.81	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	2.21	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	3.50	1.29	0.25	2.06
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	3.50	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	19.69
Total Percolation:	16.46
	60.24

TABLE 10
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types VhD, VhF
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.16	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.16	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.16	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.16	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.16	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.48	-0.68	3.74	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.63	-0.85	3.67	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.38	-0.25	3.20	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.40	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.80	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.16	0.36	0.25	2.99
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.16	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.76
Total Percolation:	17.39
	60.24

TABLE 11
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Type VyB
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.30	1.35	3.16	3.16	0.00	2.40	0.00	0.00	3.16
February	4.36	0.00	0.30	1.31	3.05	3.05	0.00	2.40	0.00	0.00	3.05
March	5.07	0.00	0.30	1.52	3.55	3.55	0.00	2.40	0.00	0.00	3.55
April	5.29	1.01	0.30	1.59	3.70	2.69	0.00	2.40	0.00	1.01	2.69
May	5.75	2.65	0.30	1.73	4.03	1.38	0.00	2.40	0.00	2.65	1.38
June	5.10	3.81	0.30	1.53	3.57	-0.24	-0.24	2.16	-0.24	3.81	0.00
July	4.70	4.61	0.30	1.41	3.29	-1.32	-1.56	1.16	-1.00	4.29	0.00
August	4.91	3.93	0.30	1.47	3.44	-0.49	-2.05	0.94	-0.22	3.66	0.00
September	4.72	2.81	0.30	1.42	3.30	0.49	0.00	1.43	0.49	2.81	0.00
October	4.72	1.43	0.30	1.42	3.30	1.87	0.00	2.40	0.97	1.43	0.90
November	6.00	0.25	0.30	1.80	4.20	3.95	0.00	2.40	0.00	0.25	3.95
December	5.11	0.00	0.30	1.53	3.58	3.58	0.00	2.40	0.00	0.00	3.58

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	18.07
Total AET:	19.91
Total Percolation:	22.26
	60.24

TABLE 12
WATER BUDGET DATA

Big Indian Plateau
Analysis for Soil Types VyC, VyD
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.40	1.80	2.71	2.71	0.00	2.40	0.00	0.00	2.71
February	4.36	0.00	0.40	1.74	2.62	2.62	0.00	2.40	0.00	0.00	2.62
March	5.07	0.00	0.40	2.03	3.04	3.04	0.00	2.40	0.00	0.00	3.04
April	5.29	1.01	0.40	2.12	3.17	2.16	0.00	2.40	0.00	1.01	2.16
May	5.75	2.65	0.40	2.30	3.45	0.80	0.00	2.40	0.00	2.65	0.80
June	5.10	3.81	0.40	2.04	3.06	-0.75	-0.75	1.69	-0.71	3.77	0.00
July	4.70	4.61	0.40	1.88	2.82	-1.79	-2.54	0.75	-0.94	3.76	0.00
August	4.91	3.93	0.40	1.96	2.95	-0.98	-3.52	0.49	-0.26	3.21	0.00
September	4.72	2.81	0.40	1.89	2.83	0.02	0.00	0.51	0.02	2.81	0.00
October	4.72	1.43	0.40	1.89	2.83	1.40	0.00	1.91	1.40	1.43	0.00
November	6.00	0.25	0.40	2.40	3.60	3.35	0.00	2.40	0.49	0.25	2.86
December	5.11	0.00	0.40	2.04	3.07	3.07	0.00	2.40	0.00	0.00	3.07

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.10
Total AET:	18.89
Total Percolation:	17.26
	60.24

TABLE 13
WATER BUDGET DATA: FUTURE CONDITIONS

Analysis for Soil Type Area I: Golf Course, Driving Range, Hotel
Big Indian Plateau
Alpha Project No. 00163

	Direct Area I Precip.	Add'l Area I Precip due to Runoff from Buildings	Add'l Area I Precip due to Runoff from Asphalt	Total Precip. To Area I	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.016	0.009	4.54	0.00	0.26	1.18	3.36	3.36	0.00	2.40	0.00	0.00	3.36
February	4.36	0.015	0.009	4.38	0.00	0.26	1.14	3.24	3.24	0.00	2.40	0.00	0.00	3.24
March	5.07	0.018	0.011	5.10	0.00	0.26	1.33	3.77	3.77	0.00	2.40	0.00	0.00	3.77
April	5.29	0.019	0.011	5.32	1.01	0.26	1.38	3.94	2.93	0.00	2.40	0.00	1.01	2.93
May	5.75	0.020	0.012	5.78	2.65	0.26	1.50	4.28	1.63	0.00	2.40	0.00	2.65	1.63
June	5.10	0.018	0.011	5.13	3.81	0.26	1.33	3.80	-0.01	-0.01	2.34	-0.06	3.86	0.00
July	4.70	0.017	0.010	4.73	4.61	0.26	1.23	3.50	-1.11	-1.12	1.42	-0.92	4.42	0.00
August	4.91	0.017	0.010	4.94	3.93	0.26	1.28	3.65	-0.28	-1.40	1.26	-0.16	3.81	0.00
September	4.72	0.017	0.010	4.75	2.81	0.26	1.23	3.51	0.70	0.00	1.96	0.70	2.81	0.00
October	4.72	0.017	0.010	4.75	1.43	0.26	1.23	3.51	2.08	0.00	2.40	0.44	1.43	1.64
November	6.00	0.021	0.012	6.03	0.25	0.26	1.57	4.46	4.21	0.00	2.40	0.00	0.25	4.21
December	5.11	0.018	0.011	5.14	0.00	0.26	1.34	3.80	3.80	0.00	2.40	0.00	0.00	3.80

Average Annual Precipitation: 60.24 inches plus run-on from Buildings(0.214 inches) and asphalt (.125 inches) = 60.58 inches

Runoff: 15.75
Total AET: 20.24
Total Percolation: 24.59
PERC+AET+RUNOFF= 60.58

Note(s):
Total Area I = 7,357,284 sq. ft. (excluding buildings and roads)
Building Area = 26136 sq ft (roofs)
Asphalt Area = 60984 sq ft
Monthly rainfall on Buildings (100%) and asphalt (25%) is assumed to runoff directly to Area I as additional precipitation to Area I
(75% of asphalt runoff considered lost to system)

TABLE 14
WATER BUDGET DATA: FUTURE CONDITIONS

Analysis for Soil Type Area II: Belleayre Highlands Development
Big Indian Plateau
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.34	1.53	2.98	2.98	0.00	2.52	0.00	0.00	2.98
February	4.36	0.00	0.34	1.48	2.88	2.88	0.00	2.52	0.00	0.00	2.88
March	5.07	0.00	0.34	1.72	3.35	3.35	0.00	2.52	0.00	0.00	3.35
April	5.29	1.01	0.34	1.80	3.49	2.48	0.00	2.52	0.00	1.01	2.48
May	5.75	2.65	0.34	1.96	3.80	1.15	0.00	2.52	0.00	2.65	1.15
June	5.10	3.81	0.34	1.73	3.37	-0.44	-0.44	2.10	-0.42	3.79	0.00
July	4.70	4.61	0.34	1.60	3.10	-1.51	-1.95	1.08	-1.02	4.12	0.00
August	4.91	3.93	0.34	1.67	3.24	-0.69	-2.64	0.81	-0.27	3.51	0.00
September	4.72	2.81	0.34	1.60	3.12	0.31	0.00	1.12	0.31	2.81	0.00
October	4.72	1.43	0.34	1.60	3.12	1.69	0.00	2.52	1.40	1.43	0.29
November	6.00	0.25	0.34	2.04	3.96	3.71	0.00	2.52	0.00	0.25	3.71
December	5.11	0.00	0.34	1.74	3.37	3.37	0.00	2.52	0.00	0.00	3.37

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	20.48
Total AET:	19.57
Total Percolation:	20.19
	60.24

TABLE 15
WATER BUDGET DATA: FUTURE CONDITIONS

Analysis for Soil Type Area III: Big Indian Plateau Development
Big Indian Plateau
Alpha Project No. 00163

	Precip.	PET	Runoff Coeff. (CR)	Runoff (RO) CR x Precip.	Infiltration (INF)	INF-PET	Σ Neg (INF-PET)	Soil Moisture Storage (ST)	Δ ST	AET	PERC
January	4.51	0.00	0.41	1.85	2.66	2.66	0.00	2.52	0.00	0.00	2.66
February	4.36	0.00	0.41	1.79	2.57	2.57	0.00	2.52	0.00	0.00	2.57
March	5.07	0.00	0.41	2.08	2.99	2.99	0.00	2.52	0.00	0.00	2.99
April	5.29	1.01	0.41	2.17	3.12	2.11	0.00	2.52	0.00	1.01	2.11
May	5.75	2.65	0.41	2.36	3.39	0.74	0.00	2.52	0.00	2.65	0.74
June	5.10	3.81	0.41	2.09	3.01	-0.80	-0.80	1.79	-0.73	3.74	0.00
July	4.70	4.61	0.41	1.93	2.77	-1.84	-2.64	0.81	-0.98	3.75	0.00
August	4.91	3.93	0.41	2.01	2.90	-1.03	-3.67	0.53	-0.28	3.18	0.00
September	4.72	2.81	0.41	1.94	2.78	-0.03	-3.70	0.51	-0.02	2.80	0.00
October	4.72	1.43	0.41	1.94	2.78	1.35	0.00	1.86	1.35	1.43	0.00
November	6.00	0.25	0.41	2.46	3.54	3.29	0.00	2.52	0.66	0.25	2.63
December	5.11	0.00	0.41	2.10	3.01	3.01	0.00	2.52	0.00	0.00	3.01

Average Annual Precipitation: 60.24

Note(s):

Total Runoff :	24.70
Total AET:	18.82
Total Percolation:	16.72
	60.24

TABLE 16
Water Contributions by Soil Type
Existing Conditions

Big Indian Plateau
Alpha Project No. 02138

Soil Type	% of Project Area	Acreage	Percolation Rate (in/yr)	Total Perc. Rate (gpm)	gpm/acre
EkC, EkD	0.004	4.6	16.49	3.9	0.85
HrF (rock outcrop)	0.054	66.4	---	---	---
HrF (HaC)	0.108	132.5	33.65	230.3	1.74
HvD	0.033	40.9	17.52	37.0	0.91
LeB	0.004	4.4	22.41	5.1	1.16
LeC, LeD	0.055	67.1	16.94	58.7	0.88
LeF	0.204	251.5	16.87	219.2	0.87
TkB	0.016	20.0	22.18	22.9	1.15
TkC	0.004	5.0	17.08	4.5	0.88
VeC, VeD, VeF	0.149	183.7	16.46	156.2	0.85
VhD, VhF	0.284	349.6	17.39	314.1	0.90
VyB	0.021	25.5	22.26	29.3	1.15
VyC, VyD	0.065	80.5	17.26	71.8	0.89
	1.000	1231.8		1153.0	

Percolation rate for Total Project Area = 0.94 gpm/acre

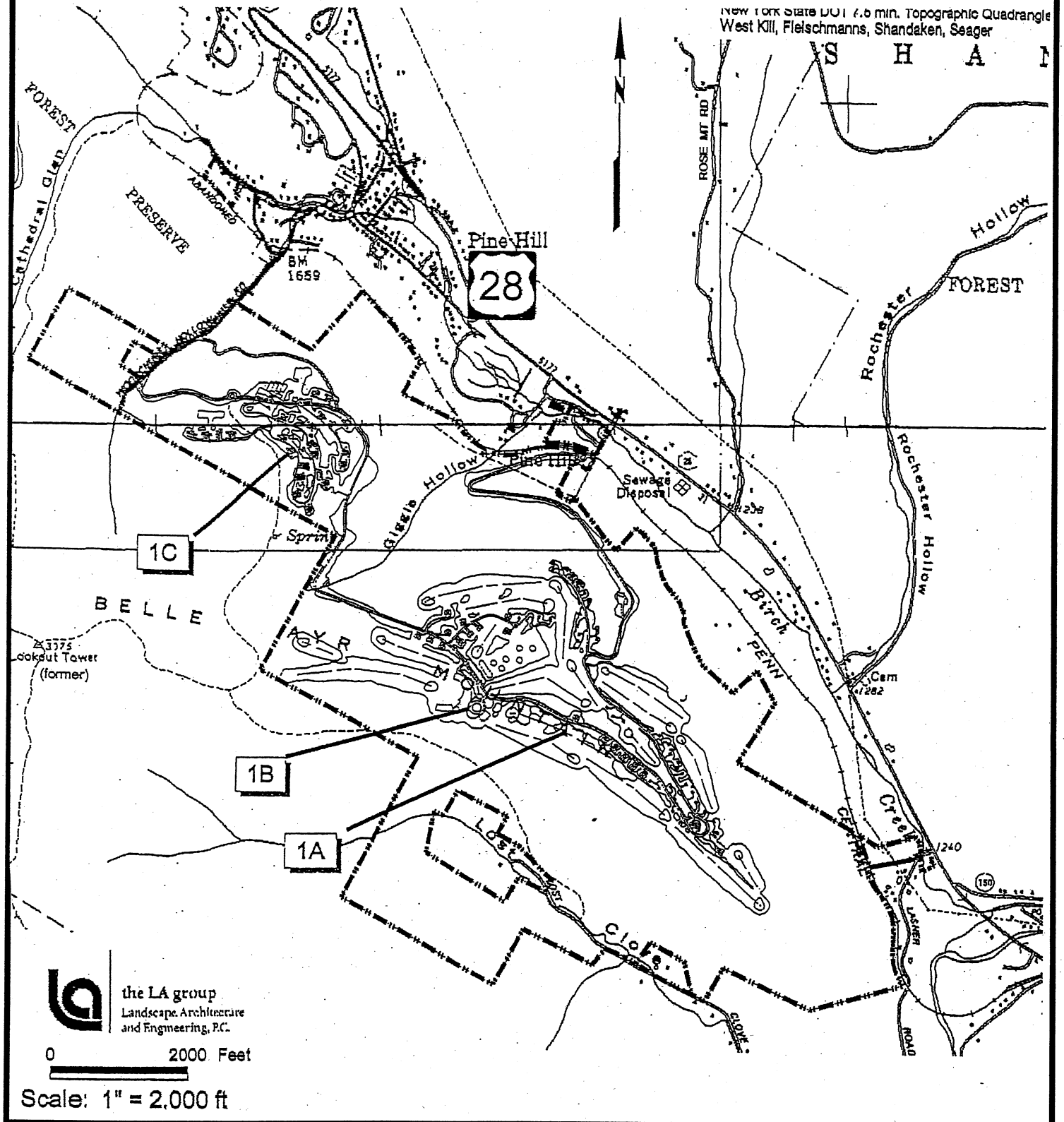
TABLE 17
Water Contributions by Soil Type
Future Conditions

Big Indian Plateau
Alpha Project No. 02138

Soil Type	% of Project Area	Acreage	Percolation Rate (in/yr)	Total Perc. Rate (gpm)	Treated Waste-water (gpm)	Total Perc Rate Plus Treated Wastewater (gpm)	gpm/acre	REMARKS
EkC, EkD	0.003	3.4	16.49	2.9		2.9	0.85	
HrF (rock outcrop)	0.044	54.1	---	---	---	---	---	
HrF (HaC)	0.088	108.2	33.65	188.1	---	188.4	1.74	
HvD	0.019	23.5	17.52	21.3	5.4	26.7	1.13	2 1/3 absorption beds in HvD
LeB	0.000	0.0	22.41	0.0	---	0.0	0.00	
LeC, LeD	0.014	16.7	16.94	14.6	---	14.6	0.87	
LeF	0.198	243.9	16.87	212.6	---	212.6	0.87	
TkB	0.015	18.0	22.18	20.6	---	20.6	1.14	
TkC	0.004	5.1	17.08	4.5	---	4.5	0.89	
VeC, VeD, VeF	0.137	168.1	16.46	142.9	---	142.9	0.85	
VhD, VhF	0.216	265.8	17.39	238.8	0.7	239.5	0.90	1 absorption bed in VhF
VyB	0.001	1.5	22.26	1.7	---	1.7	1.13	
VyC, VyD	0.018	21.7	17.26	19.3	1.5	20.8	0.96	2/3 absorption beds in VyC
Area I	0.135	166.5	24.59	211.5	41.7	253.2	1.52	16 absorption beds-Area I
Area II	0.061	75.0	20.19	78.2	9.6	87.8	1.17	4 absorption beds-Area II
Area III	0.044	54.2	16.72	46.8	0.1	46.9	0.87	1 absorption bed-Area III
buildings (Area I)	0.000	0.6	---	---	---	---	---	
asphalt (Area I)	0.001	1.4	---	---	---	---	---	
ponds	0.003	3.8	0	0.0	---	0.0	0.0	assume no infiltration beneath ponds
	1.000	1231.5		1203.9		1263.2		

Future Percolation rate for Total Project Area , with absorption fields = 1.03 gpm/acre
Future Percolation rate for Total Project Area , without absorption fields = 0.98 gpm/acre

FIGURE 1



LEGEND

1A Big Indian Country Club and Golf Course
1B Big Indian Resort & Spa
1C Belleayre Highlands

Map adapted from The LA Group, P.C

ALPHA GEOSCIENCE

FIGURE 1
Big Indian Plateau Location Map

Belleayre Resort at Catskill Park
Pine Hill, New York

Alpha Project No. 00163

EXHIBIT A1

Soil Map Unit Areas-Existing Conditions

EXHIBIT A1

Soil Map Unit Areas-Existing Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

Area ID	Soil Type	Total Area (ft2)
115	EkC	35,089
Total	**EkC**	**35,089**

Area ID	Soil Type	Total Area (ft2)
63	EkD	121,491
66	EkD	42,444
Total	**EkB**	**163,935**

Area ID	Soil Type	Total Area (ft2)
8	HrF	313026
9	HrF	832,643
10	HrF	10,181
39	HrF	2,813,010
40	HrF	270,285
41	HrF	850,855
42	HrF	796,032
43	HrF	263,363
44	HrF	149,075
45	HrF	645,980
46	HrF	833,590
47	HrF	670,050
48	HrF	59,093
49	HrF	155,036
Total	**HrF**	**8,662,219**

Area ID	Soil Type	Total Area (ft2)
74	HvD	40,990
75	HvD	123,856
76	HvD	201,996
78	HvD	160,135
79	HvD	77,418
80	HvD	1,174,228
Total	**HvD**	**1,778,623**

Area ID	Soil Type	Total Area (ft2)
68	LeB	131,292
83	LeB	28,984
85	LeB	31,042
Total	**LeB**	**191,318**

Area ID	Soil Type	Total Area (ft2)
67	LeC	273,119
103	LeC	162,472
104	LeC	106,329
106	LeC	298,352
108	LeC	41,348
117	LeC	2,789
121	LeC	186,165
Total	**LeC**	**1,070,574**

Area ID	Soil Type	Total Area (ft2)
7	LeD	914,862
81	LeD	103,618
116	LeD	139,849
119	LeD	377,442
122	LeD	314,757
Total	**LeD**	**1,850,528**

Area ID	Soil Type	Total Area (ft2)
24	LeF	872,126
25	LeF	122,169
26	LeF	1,350,184
27	LeF	1,770,285
28	LeF	16,942
29	LeF	2,295,035
30	LeF	1,174,601
31	LeF	3,353,129
Total	**LeF**	**10,954,471**

Area ID	Soil Type	Total Area (ft2)
36	TkB	159,207
37	TkB	97,452
38	TkB	613,494
Total	**TkB**	**870,153**

Area ID	Soil Type	Total Area (ft2)
32	TkC	56,897
33	TkC	69,452
34	TkC	82,806
35	TkC	10,996
Total	**TkC**	**220,151**

Area ID	Soil Type	Total Area (ft2)
72	VeC	17,785
73	VeC	303,306
Total	**VeC**	**321,091**

Area ID	Soil Type	Total Area (ft2)
62	VeD	413,936
64	VeD	297,858
65	VeD	64,291
Total	**VeD**	**776,085**

Area ID	Soil Type	Total Area (ft2)
69	VeF	5,852,186
70	VeF	178,378
71	VeF	877,904
Total	**VeF**	**6,908,468**

EXHIBIT A1

Soil Map Unit Areas-Existing Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

Area ID	Soil Type	Total Area (ft2)
50	VhD	85,343
51	VhD	245,762
52	VhD	11,740
53	VhD	149,545
54	VhD	491,430
55	VhD	87,575
56	VhD	874,544
57	VhD	108,318
58	VhD	127,398
59	VhD	103,513
60	VhD	160,231
61	VhD	193,021
77	VhD	203,425
113	VhD	741,172
114	VhD	791,586
Total	**VhD**	**4,374,603**

Area ID	Soil Type	Total Area (ft2)
11	VhF	1,363,575
12	VhF	426,446
13	VhF	1,680
14	VhF	334,698
15	VhF	284,736
16	VhF	61,153
17	VhF	217,432
18	VhF	125,461
19	VhF	4,860,762
20	VhF	1,623,344
21	VhF	200,409
22	VhF	675,787
23	VhF	677,936
Total	**VhF**	**10,853,419**

Area ID	Soil Type	Total Area (ft2)
82	VyB	55,628
84	VyB	119,049
86	VyB	40,886
87	VyB	40,374
88	VyB	78,455
89	VyB	48,693
90	VyB	81,977
91	VyB	642,737
Total	**VyB**	**1,107,799**

Area ID	Soil Type	Total Area (ft2)
92	VyC	115,527
93	VyC	55,352
94	VyC	42,529
95	VyC	33,937
96	VyC	82,367
97	VyC	32,951
98	VyC	212,928
99	VyC	96,515
100	VyC	114,116
101	VyC	13,139
102	VyC	102,671
105	VyC	234,120
107	VyC	244,164
109	VyC	79,892
110	VyC	62,602
111	VyC	103,994
112	VyC	68,152
118	VyC	17,260
Total	**VyC**	**1,712,216**

Area ID	Soil Type	Total Area (ft2)
1	VyD	62,884
2	VyD	205,193
3	VyD	70,487
4	VyD	216,063
5	VyD	792,005
6	VyD	346,700
120	VyD	100,441
Total	**VyD**	**1,793,773**

Total of all Soil Map Unit Areas = 53,644,515 sq ft (1231.5 acres)

EXHIBIT A2

Development Areas-Future Conditions

EXHIBIT A2

Development Areas-Future Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

Area ID	Acreage
Area I Golf & Hotel	**166.5**
Area I Buildings	**0.6**
Area I Roads/Parking	**1.4**
Area II	**75**
Buildings	5
Roads/Parking/Tennis	12.4
Non-Wooded (grassy)	57.6
Area III	**54.2**
Buildings	2.3
Roads/Parking	13.5
Non-Wooded (grassy)	38.4
Ponds	**3.8**

Total Development Area= **301.5**

EXHIBIT A3

Soil Map Unit Areas-Future Conditions

EXHIBIT A3

Soil Map Unit Areas-Future Conditions
Big Indian Plateau Water Budget
Alpha Project No. 02138

italics =change from existing conditions

Area ID	Soil Type	Total Area (ft^2)
115	*EkC*	*34,035*
Total	**EkC**	**34,035**

Area ID	Soil Type	Total Area (ft^2)
63	*EkD-1*	*28,192*
	EkD-2	*5,715*
	EkD-3	*41,347*
66	*EkD-1*	*30,731*
	EkD-2	*6,359*
Total	**EkD**	**112,344**

Area ID	Soil Type	Total Area (ft^2)
8	HrF	313,026
9	*HrF-1*	*181,166*
	HrF-2	*80,516*
	HrF-3	*7,187*
	HrF-4	*28,954*
	HrF-5	*29,847*
	HrF-6	*1,416*
	HrF-7	*14,671*
	HrF-8	*31,899*
	HrF-9	*46,043*
	HrF-10	*409*
10	HrF	10,181
39	HrF	2,813,010
40	*HrF*	*210,765*
41	*HrF*	*826,218*
42	*HrF-1*	*950*
	HrF-2	*18,317*
43	HrF	263,363
44	HrF	149,075
45	HrF	645,980
46	*HrF-1*	*129,757*
	HrF-2	*2,988*
	HrF-3	*521,627*
47	*HrF-1*	*430,803*
	HrF-2	*100,279*
48	HrF	59,093
49	HrF	155,036
Total	**HrF**	**7,072,576**

Area ID	Soil Type	Total Area (ft^2)
74	*HvD*	*14,723*
75	HvD	123,856
76	HvD	201,996
78	*HvD-1*	*4,134*
	HvD-2	*69,818*
	HvD-3	*1,472*
79	*HvD*	*0*
80	*HvD-2*	*19,419*
	HvD-3	*10,550*
	HvD-4	*344*
	HvD-5	*800*
	HvD-6	*2,762*
	HvD-7	*43,708*
	HvD-8	*6,177*
	HvD-9	*35,850*
	HvD-10	*55,182*
	HvD-11	*15,407*
	HvD-12	*3,354*
	HvD-13	*405,857*
	HvD-14	*2,012*
	HvD-15	*4,247*
	HvD-16	*248*
Total	**HvD**	**1,021,916**

Area ID	Soil Type	Total Area (ft^2)
68	*LeB*	*0*
83	*LeB*	*0*
85	*LeB*	*0*
Total	**LeB**	**0**

Area ID	Soil Type	Total Area (ft^2)
67	*LeC*	*0*
103	*LeC*	*3,284*
104	*LeC*	*183*
106	*LeC*	*105,228*
108	*LeC*	*0*
117	*LeC*	*0*
121	*LeC*	*0*
Total	**LeC**	**108,695**

EXHIBIT A3

Soil Map Unit Areas-Future Conditions
Belleayre Resort Water Budget
Alpha Project No. 00163

italics =change from existing conditions

Area ID	Soil Type	Total Area (ft^2)
7	*LeD-1*	*1,024*
	LeD-2	*8,795*
	LeD-3	*407,438*
81	*LeD-1*	*19,632*
	LeD-2	*45,198*
116	*LeD-1*	*90,932*
	LeD-2	*5,400*
119	*LeD-1*	*3,507*
	LeD-2	*12,388*
122	*LeD-1*	*4,674*
	LeD-2	*18,683*
Total	**LeD**	**617,671**

Area ID	Soil Type	Total Area (ft^2)
24	*LeF-1*	*1,773*
	LeF-2	*13,220*
	LeF-3	*806,909*
25	LeF	122,169
26	*LeF-1*	*441,363*
	LeF-2	*595,400*
	LeF-3	*33,093*
	LeF-4	*510*
27	LeF	1,770,285
28	LeF	16,942
29	LeF	2,295,035
30	LeF	1,174,601
31	LeF	3,353,129
Total	**LeF**	**10,624,429**

Area ID	Soil Type	Total Area (ft^2)
36	*TkB*	*91,340*
37	*TkB-1*	*29,523*
	TkB-2	*50,932*
38	TkB	613,494
Total	**TkB**	**785,289**

Area ID	Soil Type	Total Area (ft^2)
32	TkC	56,897
33	TkC	69,452
34	TkC	82,806
35	TkC	10,996
Total	**TkC**	**220,151**

Area ID	Soil Type	Total Area (ft^2)
72	VeC	17,785
73	VeC	303,306
Total	**VeC**	**321,091**

Area ID	Soil Type	Total Area (ft^2)
62	*VeD*	*413,132*
64	VeD	297,858
65	VeD	64,291
Total	**VeD**	**775,281**

Area ID	Soil Type	Total Area (ft^2)
69	*VeF-1*	*1,423,785*
	VeF-2	*3,178,734*
	VeF-3	*576,164*
	VeF-4	9,518
	VeF-5	57,159
70	*VeF-1*	*59,546*
	VeF-2	*37,638*
	VeF-3	*2,892*
71	VeF	877,904
Total	**VeF**	**6,223,340**

Area ID	Soil Type	Total Area (ft^2)
50	VhD	85,343
51	VhD	245,762
52	VhD	11,740
53	VhD	149,545
54	*VhD-1*	*328,375*
	VhD-2	*3,006*
	VhD-3	*49,117*
55	*VhD-1*	*39,596*
56	*VhD-1*	*21,750*
	VhD-2	*2,256*
	VhD-3	*3,311*
	VhD-4	*4,086*
	VhD-5	*145,408*
	VhD-6	*101,499*
	VhD-7	*3,694*
57	VhD	108,318
58	*VhD-1*	*0*
59	*VhD*	*0*
60	VhD	160,231
61	*VhD*	*167,980*
77	*VhD*	*989*
	VhD	*82,259*
	VhD	*1,721*
113	*VhD-1*	*188,627*
	VhD-2	*54,905*
	VhD-3	*68,694*
114	*VhD-1*	*30,727*
	VhD-2	*47,537*
	VhD-3	*7,693*
	VhD-4	*453*
Total	**VhD**	**2,114,622**

EXHIBIT A3

Soil Map Unit Areas-Future Conditions
Belleayre Resort Water Budget
Alpha Project No. 00163

italics =change from existing conditions

Area ID	Soil Type	Total Area (ft^2)
11	*VhF-1*	*805,119*
	VhF-2	*37,309*
	VhF-3	*321,338*
12	*VhF*	*378,497*
13	VhF	1,680
14	*VhF*	*330,192*
15	*VhF*	*261,695*
16	VhF	61,153
17	*VhF*	*192,153*
18	*VhF*	*16,156*
19	*VhF-1*	*621,343*
	VhF-2	*3,207,623*
	VhF-3	*58,793*
20	*VhF*	*1,616,913*
21	VhF	200,409
22	VhF	675,787
23	VhF	677,936
Total	**VhF**	**9,464,096**

Area ID	Soil Type	Total Area (ft^2)
82	*VyB*	*55,230*
84	*VyB*	*523*
86	*VyB*	*1,796*
87	*VyB*	*8,168*
88	*VyB*	*0*
89	*VyB*	*0*
90	*VyB*	*0*
91	*VyB*	*984*
Total	**VyB**	**66,701**

Area ID	Soil Type	Total Area (ft^2)
1	*VyD*	*59,207*
2	VyD	205,193
3	*VyD*	*0*
4	*VyD*	*70,127*
5	*VyD-1*	*7,884*
	VyD-2	*8,917*
	VyD-3	*21,118*
	VyD-4	*14,959*
	VyD-5	*9,348*
	VyD-6	*17,437*
	VyD-7	*3,607*
	VyD-8	*444*
	VyD-9	*25,243*
6	*VyD-1*	*4,861*
	VyD-2	*5,301*
	VyD-3	*3,406*
	VyD-4	*806*
120	*VyD*	*0*
Total	**VyD**	**457,858**

Area ID	Soil Type	Total Area (ft^2)
92	*VyC-1*	*13,721*
	VyC-2	*479*
	VyC-3	*196*
93	VyC	55,352
94	*VyC-1*	*806*
	VyC-2	*1,712*
	VyC-3	*4,901*
	VyC-4	*152*
95	*VyC*	*0*
96	*VyC-1*	*148*
	VyC-2	*3,736*
	VyC-3	*7,736*
97	*VyC*	*0*
98	*VyC-1*	*97,391*
	VyC-2	*10,041*
	VyC-3	*9,082*
	VyC-4	*227*
99	VyC	96,515
100	*VyC*	*27,552*
101	VyC	13,139
102	VyC	102,671
105	*VyC-1*	*12,423*
	VyC-2	*17,973*
	VyC-3	*161*
107	*VyC*	*2,165*
109	*VyC-1*	*1,947*
	VyC-2	*3,084*
110	*VyC*	*0*
111	*VyC*	*0*
112	*VyC*	*0*
118	*VyC*	*6,646*
Total	**VyC**	**489,956**

Total of all Soil Map Unit Areas = 40,510,051 ft^2 (930 Acres)

PLATES

PLATE 1
EXISTING CONDITIONS
SOIL MAP UNIT AREAS

BIG INDIAN PLATEAU
PINE HILL, NEW YORK

ALPHA GEOSCIENCE

PROJECT NO. 02138

LEGEND

VnC 98 — SOIL DELINEATION WITH SYMBOL AND ID NUMBER

N

GRAPHIC SCALE

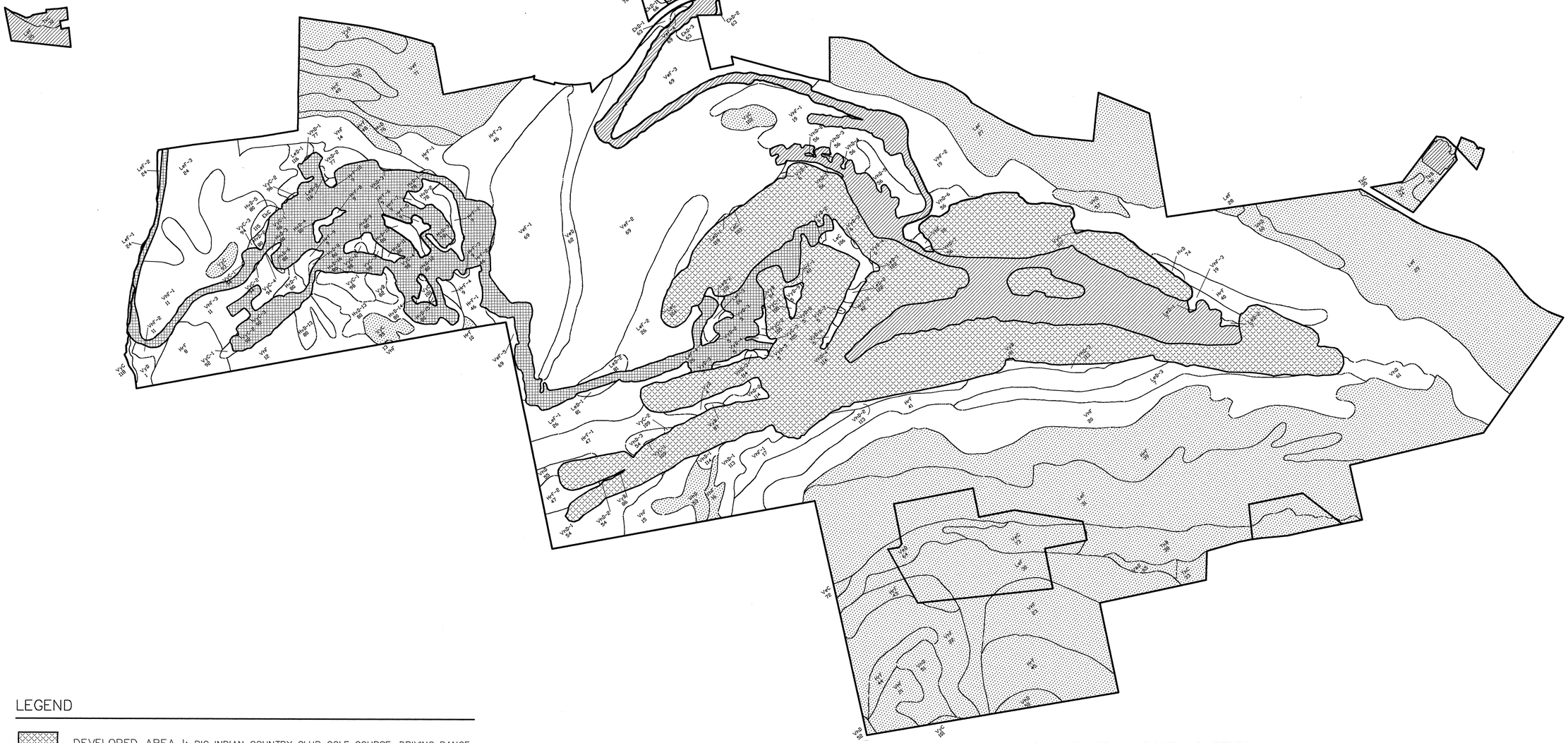
500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

BASE MAP REFERENCES:

BASE MAP AND SOIL OUTLINES PROVIDED BY THE LA GROUP.

BELLAYRE02-B.DWG



LEGEND

- DEVELOPED AREA I: BIG INDIAN COUNTRY CLUB GOLF COURSE, DRIVING RANGE, AND WINNISOOK LODGE GROUNDS (EXCLUDING POND AREAS)
- DEVELOPED AREA II: NON-WOODED BELLEAYRE HIGHLANDS AND ACCESS ROAD CORRIDOR (INCLUDING BUILDINGS, ROADS, AND TENNIS COURTS)
- DEVELOPED AREA III: BELLEAYRE RIDGE ACCESS ROAD CORRIDOR, MAINTENANCE AREA, AND HOUSING DEVELOPMENT AROUND GOLF COURSE (INCLUDING BUILDINGS AND ROADS)
- SOIL MAP UNITS THAT WILL NOT BE CHANGED BY DEVELOPMENT
- SOIL DELINEATION WITH SYMBOL AND ID NUMBERS

N

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

PLATE 2
POST-DEVELOPMENT CONDITIONS AREA IDENTIFICATION MAP

BIG INDIAN PLATEAU
PINE HILL, NEW YORK

ALPHA GEOSCIENCE

PROJECT NO. 02138

BASE MAP REFERENCES:

BASE MAP AND SOIL OUTLINES PROVIDED BY THE LA GROUP.

DEVELOPED AREAS I, II, AND III OUTLINED BY ALPHA GEOSCIENCE AND BASED ON MASTER PLAN MAP PROVIDED BY THE LA GROUP.

BELLAYRE 01-B.DWG

EXHIBIT B

Water Quality Field Testing

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: October 26&27, 2000
Field Personnel: Steve Trader & Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	10/26/2000	10:48	50	159.3	6.52	37	0.76	8.5
2	Bonnie View side ditch	10/26/2000	10:58	50	182.2	6.71	26	2.22	7.5
3	CSB-above Cathedral Glen Brook	10/26/2000	9:43	51	153.6	6.60	31	1.05	8.2
4	Cathedral Glen Brook-above CSB	10/26/2000	11:35	50	97.7	6.62	31	0.44	8.4
5	CSB-below Crystal Spg.	10/26/2000	13:00	52	93.3	NM	NM	0.35	8.4
6	Station Rd. ditch-above Station Rd. Spg	10/26/2000	13:50	48	39.4	6.24	51	0.44	8.0
7	Station Rd. ditch-below Station Rd. Spg	10/26/2000	14:02	49	57.6	6.58	46	1.36	9.8
8	CSB-below Station Rd. Spg.	10/26/2000	14:25	50	106.3	6.68	39	2.36	8.4
9	Bailey Brook (in Woodchuck Hollow)	10/26/2000	9:40	48	57.6	6.67	26	0.31	8.9
10	CSB-above Birch Creek	10/26/2000	15:22	52	98.5	6.76	NM	0.38	8.6
11	Birch Creek-above CSB	10/26/2000	15:10	54	87.0	6.49	NM	1.40	8.1
12	Birch Creek-below CSB	10/26/2000	15:40	54	66.5	6.61	NM	0.68	8.3
13	Birch Creek-Covered Bridge	10/27/2000	12:20	52	83.9	6.92	13	0.69	8.1
14	Giggle Hollow	10/27/2000	12:28	48	59.5	6.79	29	0.27	8.1
15	Rose Mt.Creek-above sewer outfall	10/27/2000	13:15	55	NM	6.82	21	NM	NM
16	Sewer Plant Outfall	10/27/2000	13:16	58	NM	NM	NM	NM	NM
17	Rose Mt.Creek-below sewer outfall	10/27/2000	13:05	55	114.5	6.95	5	0.45	8.2
18	Birch Creek - below Rose Mt. Creek	10/27/2000	12:55	52	85.1	6.84	19	1.23	10.6
19	Lost Clove	10/26/2000	16:35	51	144.2	6.61	45	0.23	8.3
20	Woodchuck Hollow Spring	10/26/2000	9:10	47	47.6	6.29	51	0.22	8.8
21	Railroad Spring	10/26/2000	10:07	48	173.5	6.20	69	0.25	8.1
22	Pine Hill H20 Supply Overflow	10/27/2000	--	NM	NM	NM	NM	NM	NM
23	Pine Hill H20 Supply	10/27/2000	11:13	46	144.5	6.44	59	0.57	8.3
24	Black ABS Pipe-above Crystal Spring	10/26/2000	13:30	50	69.8	6.66	30	0.13	8.1
25	Silo A	10/26/2000	13:17	46	123.5	6.48	37	0.18	9.9
26	Station Road Silo B 4" Pipe	10/26/2000	10:48	45	53.6	6.45	59	0.38	8.4
27	Station Rd. Silo B Overflow	10/26/2000	13:40	46	65.8	6.58	48	0.31	9.9
28	Wildacres #3 Spring	10/27/2000	13:40	47	80.0	6.60	33	0.72	8.7
29	Davenport Spring	10/27/2000	13:50	49	105.0	6.74	30	0.08	8.4
30	Highmount Spring	10/27/2000	14:35	48	68.0	6.40	44	0.47	8.5
31	Leach Spring	10/27/2000	14:15	47	57.7	6.39	44	1.13	8.8

REMARKS:
CSB=Crystal Spring Brook
All pH/ORP measurements recorded on 10-27-00
NM = Not Measured
Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: November 28, 2000
Field Personnel: Kevin Phelan, Steve Trader
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	11/28/2000	11:40	42	147.7	6.64	20	0.71	10.6
2	Bonnie View side ditch	11/28/2000	12:00	45	157.0	6.90	13	1.70	9.6
3	CSB-above Cathedral Glen Brook	11/28/2000	13:15	43	143.0	6.25	31	0.78	10.0
4	Cathedral Glen Brook-above CSB	11/28/2000	13:25	39	83.3	6.22	32	1.47	11.2
5	CSB-below Crystal Spg.	11/28/2000	14:05	40	93.5	6.35	32	1.66	10.4
6	Station Rd. ditch-above Station Rd. Spg	11/28/2000	14:20	43	59.8	6.37	24	0.67	8.1
7	Station Rd. ditch-below Station Rd. Spg.	11/28/2000	16:00	44	58.9	6.54	27	0.58	9.6
8	CSB-below Station Rd. Spg.	11/28/2000	16:05	40	78.9	6.61	12	0.70	10.8
9	Bailey Brook (in Woodchuck Hollow)	11/28/2000	9:35	39	42.8	7.06	4	0.62	11.0
10	CSB-above Birch Creek	11/28/2000	8:40	40	111.0	7.05	4	0.97	11.0
11	Birch Creek-above CSB	11/28/2000	8:20	39	80.5	6.92	12	0.94	10.8
12	Birch Creek-below CSB	11/28/2000	8:50	40	95.4	7.04	5	0.77	11.0
13	Birch Creek-Covered Bridge	11/28/2000	14:50	42	96.6	6.67	9	0.67	10.4
14	Giggle Hollow	11/28/2000	14:40	42	40.4	6.40	23	0.45	10.4
15	Rose Mt.Creek-above sewer outfall	11/28/2000	15:20	41	102.8	6.57	14	0.60	9.1
16	Sewer Plant Outfall	11/28/2000	15:15	48	445.0	6.64	11	0.96	7.4
17	Rose Mt.Creek-below sewer outfall	11/28/2000	15:10	43	99.4	6.47	19	0.59	9.2
18	Birch Creek - below Rose Mt. Creek	11/28/2000	15:05	41	106.5	6.75	4	1.29	10.5
19	Lost Clove	11/28/2000	15:35	42	44.1	6.68	7	0.29	10.4
20	Woodchuck Hollow Spring	11/28/2000	9:20	41	36.2	6.75	21	0.59	10.8
21	Railroad Spring	11/28/2000	11:30	45	145.9	6.55	33	0.41	9.5
22	Pine Hill H20 Supply Overflow	11/28/2000	11:15	46	140.5	6.22	52	0.38	10.8
23	Pine Hill H20 Supply	11/28/2000	12:05	45	147.5	6.06	60	0.43	8.9
24	Black ABS Pipe-above Crystal Spring	11/28/2000	13:50	47	64.5	6.22	33	0.47	9.0
25	Silo A	11/28/2000	13:35	45	126.0	6.14	37	0.38	9.7
26	Station Road Silo B 4" Pipe	11/28/2000	14:25	45	50.1	6.42	38	0.50	9.8
27	Station Rd. Silo B Overflow	11/28/2000	13:55	45	50.2	6.15	37	0.50	9.3
28	Wildacres #3 Spring	11/28/2000	10:50	45	89.7	6.95	9	0.47	9.2
29	Davenport Spring	11/28/2000	10:40	47	108.7	6.42	41	0.56	9.8
30	Highmount Spring	11/28/2000	10:15	41	58.6	6.96	10	3.33	10.4
31	Leach Spring	11/28/2000	9:55	40	42.5	6.78	19	0.50	10.5

REMARKS:
CSB=Crystal Spring Brook
NM = Not Measured
Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: December 27&28, 2000
Field Personnel: Kevin Phelan, Steve Trader
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	12/27/2000	9:10	35	123.4	6.48	14	4.00	11.7
2	Bonnie View side ditch	12/27/2000	9:05	44	109.1	5.91	47	1.24	11.6
3	CSB-above Cathedral Glen Brook	12/27/2000	9:40	37	117.5	6.36	21	1.51	11.7
4	Cathedral Glen Brook-above CSB	12/27/2000	9:45	37	105.2	6.60	5	2.03	11.9
5	CSB-below Crystal Spg.	12/27/2000	15:40	36	83.8	6.40 *	27 *	2.80	12.1
6	Station Rd. ditch-above Station Rd. Spg.	12/27/2000	10:15	43	40.1	6.18	32	0.33	10.3
7	Station Rd. ditch-below Station Rd. Spg.	12/27/2000	10:05	44	52.0	6.20	30	0.30	10.6
8	CSB-below Station Rd. Spg.	12/27/2000	10:30	38	84.4	6.28	25	1.07	11.5
9	Bailey Brook (in Woodchuck Hollow)	12/27/2000	10:45	37	51.3	6.37	20	1.10	11.6
10	CSB-above Birch Creek	12/27/2000	8:20	35	3.0	6.20	28	0.59	12.4
11	Birch Creek-above CSB	12/27/2000	8:10	34	60.5	6.07	36	0.57	12.2
12	Birch Creek-below CSB	12/27/2000	8:30	33	4.2	6.20	28	0.74	12.7
13	Birch Creek-Covered Bridge	12/27/2000	14:05	34	90.9	6.00 *	52 *	1.26	12.2
14	Giggle Hollow	12/27/2000	14:15	38	48.7	5.62 *	69 *	0.92	11.5
15	Rose Mt.Creek-above sewer outfall	12/27/2000	13:40	35	74.9	5.95 *	52 *	0.61	12.2
16	Sewer Plant Outfall	12/27/2000	13:35	40	362.0	6.80 *	7 *	0.13	10.8
17	Rose Mt.Creek-below sewer outfall	12/27/2000	13:30	35	64.7	6.63 *	14 *	1.30	12.5
18	Birch Creek - below Rose Mt. Creek	12/27/2000	13:15	35	75.6	6.43 *	28 *	37.60	12.4
19	Lost Clove	12/27/2000	7:40	35	32.8	5.82	52	1.17	12.2
20	Woodchuck Hollow Spring	12/28/2000	11:50	37	NM	5.85	58	NM	NM
21	Railroad Spring	12/27/2000	9:20	45	106.1	5.80 *	68 *	0.13	9.6
22	Pine Hill H20 Supply Overflow	12/27/2000	8:50	46	101.7	5.41	75	0.17	10.3
23	Pine Hill H20 Supply	12/27/2000	--	NM	NM	NM	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	12/27/2000	15:00	47	42.7	6.00 *	52 *	0.70	11.2
25	Silo A	12/27/2000	14:55	46	74.1	6.42 *	30 *	1.10	10.5
26	Station Road Silo B 4" Pipe	12/27/2000	10:20	45	37.5	5.68	60	0.13	10.2
27	Station Rd. Silo B Overflow	12/27/2000	15:15	44	10.9	6.08 *	48 *	0.16	11.1
28	Wildacres #3 Spring	12/27/2000	12:20	44	70.1	6.05	37	0.06	8.2
29	Davenport Spring	12/27/2000	11:55	43	43.7	6.03	37	0.06	8.2
30	Highmount Spring	12/27/2000	11:30	39	44.1	6.49	14	3.32	10.7
31	Leach Spring	12/27/2000	11:10	37	34.6	6.12	34	0.04	10.8

REMARKS:

Birch Creek at Frisenda residence is reddish brown and very turbid; source of turbidity and color is somewhere between the Covered Bridge

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

* = pH/ORP at the indicated locations was measured on 12/28/00

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: January 31, 2001
Field Personnel: Kevin Phelan, Steve Trader
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Hydac pH, Orion mV, DRT Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	1/31/2001	11:05	39.2	93.6	6.87	79.8	0.79	11.6
2	Bonnie View side ditch	1/31/2001	10:55	46.4	139.1	6.79	91.8	1.88	10.6
3	CSB-above Cathedral Glen Brook	1/31/2001	7:35	39.2	145.2	7.28	103.9	0.53	10.8
4	Cathedral Glen Brook-above CSB	1/31/2001	7:20	37.4	151.9	7.43	201.3	1.14	11.7
5	CSB-below Crystal Spg.	1/31/2001	8:40	39.2	140.3	6.40	197.3	0.48	11.4
6	Station Rd. ditch-above Station Rd. Spg	1/31/2001	--	-NO FLOW-					
7	Station Rd. ditch-below Station Rd. Spg.	1/31/2001	9:00	43.7	67.0	6.06	188.8	0.71	10.3
8	CSB-below Station Rd. Spg.	1/31/2001	11:30	41	141.3	6.41	125.3	6.15	11.6
9	Bailey Brook (in Woodchuck Hollow)	2/1/2001	12:50	35.6	13.2	NM	NM	NM	11.8
10	CSB-above Birch Creek	1/31/2001	15:15	39.2	187.5	6.46	NM	3.41	11.3
11	Birch Creek-above CSB	1/31/2001	15:35	37.4	321.0	7.50	NM	2.14	11.9
12	Birch Creek-below CSB	1/31/2001	15:45	38.3	262.0	7.62	NM	2.91	11.0
13	Birch Creek-Covered Bridge	1/31/2001	14:30	37.4	231.0	6.74	NM	7.20	11.7
14	Giggle Hollow	1/31/2001	14:45	39.2	63.0	6.64	NM	NM	10.7
15	Rose Mt.Creek-above sewer outfall	1/31/2001	14:15	39.2	188.4	6.71	204.0	2.24	11.9
16	Sewer Plant Outfall	1/31/2001	14:10	42.8	794.0	6.54	240.1	0.18	9.0
17	Rose Mt.Creek-below sewer outfall	1/31/2001	14:00	39.2	158.9	6.62	192.0	2.43	12.2
18	Birch Creek - below Rose Mt. Creek	1/31/2001	13:40	39.2	47.0	6.79	186.7	25.70	11.9
19	Lost Clove	1/31/2001	12:50	39.2	44.3	6.44	122.2	1.26	12.0
20	Woodchuck Hollow Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
21	Railroad Spring	1/31/2001	10:40	46.4	150.0	6.53	57.1	0.15	10.1
22	Pine Hill H20 Supply Overflow	1/31/2001	10:10	46.4	162.2	6.27	74.3	0.13	9.9
23	Pine Hill H20 Supply	1/31/2001	10:30	41	158.9	6.62	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	1/31/2001	8:05	45.5	67.2	6.67	151.1	0.12	9.7
25	Silo A	1/31/2001	7:55	46.4	149.8	6.65	105.6	0.10	10.8
26	Station Road Silo B 4" Pipe	1/31/2001	9:25	46.4	52.6	6.42	213.6	0.14	10.2
27	Station Rd. Silo B Overflow	1/31/2001	8:20	44.6	67.1	6.79	188.0	0.05	10.1
28	Wildacres #3 Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
29	Davenport Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
30	Highmount Spring	1/31/2001	--	NM	NM	NM	NM	NM	NM
31	Leach Spring	2/1/2001	14:55	35.6	58.6	NM	NM	NM	11.4

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

2/01/01 measurements: Spec. Cond. at Birch Creek-above CSB and at Birch Creek-Covered Bridge; D.O. at Railroad Spring and at CSB-Above Bonnie View Spring

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: February 28, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	2/28/2001	9:48	35.6	382.0	6.31	016	0.36	10.7
2	Bonnie View side ditch	2/28/2001	9:45	42.8	198.4	6.43	014	0.61	10.4
3	CSB-above Cathedral Glen Brook	2/28/2001	10:02	37.4	216.0	6.81	-008	0.78	10.1
4	Cathedral Glen Brook-above CSB	2/28/2001	10:05	35.6	128.5	7.04	-021	0.72	12.3
5	CSB-below Crystal Spg.	2/28/2001	10:40	36.5	28.2	6.59	001	0.48	11.3
6	Station Rd. ditch-above Station Rd. Spg	2/28/2001	10:50	41.9	56.7	7.03	-021	0.6	10.2
7	Station Rd. ditch-below Station Rd. Spg	2/28/2001	11:02	41.9	59.2	6.89	-012	1.08	10.1
8	CSB-below Station Rd. Spg.	2/28/2001	11:12	38.3	138.3	6.82	-009	0.52	11.5
9	Bailey Brook (in Woodchuck Hollow)	2/28/2001	11:45	37.4	66.7	7.19	-031	0.44	11.2
10	CSB-above Birch Creek	2/28/2001	16:35	36.5	101.6	6.98	-018	0.49	9.1
11	Birch Creek-above CSB	2/28/2001	16:45	34.7	84.2	6.95	-016	0.44	9.8
12	Birch Creek-below CSB	2/28/2001	16:50	33.8	24.5	6.93	-015	0.73	9.8
13	Birch Creek-Covered Bridge	2/28/2001	12:00	36.5	162.4	6.86	-011	0.73	11.9
14	Giggle Hollow	2/28/2001	12:05	36.5	37.1	6.87	-012	0.17	11.6
15	Rose Mt.Creek-above sewer outfall	2/28/2001	13:25	35.6	42.4	7.05	-021	0.32	12.8
16	Sewer Plant Outfall	2/28/2001	13:20	41.9	79.2	6.78	-007	1.58	10.1
17	Rose Mt.Creek-below sewer outfall	2/28/2001	13:10	34.7	32.4	6.99	-018	0.30	12.3
18	Birch Creek - below Rose Mt. Creek	2/28/2001	13:05	35.6	40.0	6.87	-012	5.49	12.6
19	Lost Clove	2/28/2001	8:00	35.6	45.5	6.98	069	0.50	12.3
20	Woodchuck Hollow Spring	2/28/2001	--	NM	NM	NM	NM	NM	NM
21	Railroad Spring	2/28/2001	9:30	44.6	191.9	6.97	-014	0.14	9.3
22	Pine Hill H20 Supply Overflow	2/28/2001	9:05	44.6	207.0	6.12	055	0.17	9.0
23	Pine Hill H20 Supply	2/28/2001	11:30	NM	NM	6.87	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	2/28/2001	10:20	46.4	65.7	6.71	-002	0.05	9.4
25	Silo A	2/28/2001	10:15	46.4	149.8	6.61	000	0.07	9.6
26	Station Road Silo B 4" Pipe	2/28/2001	10:55	44.6	57.8	6.64	000	0.21	9.8
27	Station Rd. Silo B Overflow	2/28/2001	10:25	42.8	60.1	6.64	000	0.11	9.9
28	Wildacres #3 Spring	2/28/2001	16:10	43.7	70.2	6.95	-016	0.2	7.9
29	Davenport Spring	2/28/2001	15:20	42.8	137.1	6.47	006	0.39	9.1
30	Highmount Spring	2/28/2001	--	NM	NM	NM	NM	NM	NM
31	Leach Spring	2/28/2001	14:55	38.3	15.2	6.92	-013	0.40	9.9

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: March 29, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense pH/ORP, LaMotte Turbidity

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	3/29/2001	9:50	37	226.0	6.39	012	0.03	9.3
2	Bonnie View side ditch	3/29/2001	9:55	45	144.5	6.20	020	1.25	10.9
3	CSB-above Cathedral Glen Brook	3/29/2001	10:17	40	110.4	6.22	019	0.55	10.5
4	Cathedral Glen Brook-above CSB	3/29/2001	10:12	37	103.5	6.31	014	0.68	11.5
5	CSB-below Crystal Spg.	3/29/2001	10:58	39	99.8	6.25	018	0.52	10.8
6	Station Rd. ditch-above Station Rd. Spg	3/29/2001	11:17	43	50	5.83	041	1.11	9.7
7	Station Rd. ditch-below Station Rd. Spg.	3/29/2001	11:10	44	55.0	6.55	001	0.39	10.0
8	CSB-below Station Rd. Spg.	3/29/2001	14:10	41	95.8	6.14	037	0.71	10.0
9	Bailey Brook (in Woodchuck Hollow)	3/29/2001	14:30	37	77.7	NM	NM	3.26	8.9
10	CSB-above Birch Creek	3/29/2001	8:58	35	157.2	6.65	-000	0.40	11.8
11	Birch Creek-above CSB	3/29/2001	8:50	37	144.5	6.74	-004	0.27	10.7
12	Birch Creek-below CSB	3/29/2001	8:45	34	161.1	6.72	-003	0.53	11.5
13	Birch Creek-Covered Bridge	3/29/2001	8:10	34	157.3	5.92	037	0.94	12.1
14	Giggle Hollow	3/29/2001	8:20	37	58.8	6.27	017	0.17	10.6
15	Rose Mt.Creek-above sewer outfall	3/29/2001	15:10	38	139.7	6.78	002	0.42	10.9
16	Sewer Plant Outfall	3/29/2001	15:05	44	708.0	6.60	011	0.15	10.6
17	Rose Mt.Creek-below sewer outfall	3/29/2001	15:00	38	138.0	6.61	011	0.59	11.2
18	Birch Creek - below Rose Mt. Creek	3/29/2001	14:55	36	160.1	6.68	008	4.17	11.3
19	Lost Clove	3/29/2001	7:40	38	41.0	6.05	034	0.30	11.6
20	Woodchuck Hollow Spring	3/29/2001	--	NM	NM	NM	NM	NM	NM
21	Railroad Spring	3/29/2001	9:35	45	234.0	6.12	028	0.17	8.8
22	Pine Hill H20 Supply Overflow	3/29/2001	10:00	44	145.5	5.92	040	0.01	8.6
23	Pine Hill H20 Supply	3/29/2001	--	NM	NM	NM	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	3/29/2001	10:50	46	31.0	6.22	019	0.01	9.3
25	Silo A	3/29/2001	10:45	45	93.7	6.22	020	0.03	9.5
26	Station Road Silo B 4" Pipe	3/29/2001	11:15	45	50.4	6.09	039	0.12	9.4
27	Station Rd. Silo B Overflow	3/29/2001	--	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	3/29/2001	13:30	43	99.5	6.14	038	0.02	8.6
29	Davenport Spring	3/29/2001	13:15	41	262	6.02	044	0.12	9.7
30	Highmount Spring	3/29/2001	--	NM	NM	NM	NM	NM	NM
31	Leach Spring	3/29/2001	11:45	36	38.4	6.44	007	0.04	10.5

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: April 25, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC S.C., Hanna D.O., Digi-sense ORP, LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	4/25/2001	10:22	43	165.7	6.8	-000	3.01	10.2
2	Bonnie View side ditch	4/25/2001	10:17	45	127.9	6.8	006	2.97	10.0
3	CSB-above Cathedral Glen Brook	4/25/2001	9:47	43	127.2	6.8	+000	2.66	10.0
4	Cathedral Glen Brook-above CSB	4/25/2001	9:42	41	49.2	6.7	-001	5.34	10.8
5	CSB-below Crystal Spg.	4/25/2001	10:58	42	64.4	6.8	019	4.78	10.2
6	Station Rd. ditch-above Station Rd. Spg	4/25/2001	14:20	45	51.7	6.8	NM	0.47	10.1
7	Station Rd. ditch-below Station Rd. Spg.	4/25/2001	13:55	45	103.5	6.8	NM	0.31	9.8
8	CSB-below Station Rd. Spg.	4/25/2001	14:10	44	75.5	6.8	NM	4.13	9.8
9	Bailey Brook (in Woodchuck Hollow)	4/25/2001	11:46	43	30.4	6.8	-001	1.04	11.8
10	CSB-above Birch Creek	4/25/2001	9:07	42	62.6	6.9	-016	3.36	10.8
11	Birch Creek-above CSB	4/25/2001	9:00	42	59.7	6.9	002	1.54	10.3
12	Birch Creek-below CSB	4/25/2001	9:12	43	59.4	6.8	010	1.52	10.4
13	Birch Creek-Covered Bridge	4/25/2001	8:00	42	78.8	6.7	-014	1.79	11.9
14	Giggle Hollow	4/25/2001	7:50	42	32.9	6.8	-011	0.48	11.0
15	Rose Mt.Creek-above sewer outfall	4/25/2001	18:15	46	52.3	6.8	NM	0.91	NM
16	Sewer Plant Outfall	4/25/2001	18:10	50	255.0	7.0	NM	0.25	NM
17	Rose Mt.Creek-below sewer outfall	4/25/2001	18:05	47	52.5	6.7	NM	0.64	NM
18	Birch Creek - below Rose Mt. Creek	4/25/2001	17:55	46	78.7	6.8	NM	3.21	NM
19	Lost Clove	4/25/2001	18:30	45	43.2	6.9	NM	0.43	NM
20	Woodchuck Hollow Spring	4/25/2001	11:15	44	20.9	6.9	002	0.29	9.4
21	Railroad Spring	4/25/2001	10:05	45	113.8	6.7	013	0.12	9.2
22	Pine Hill H20 Supply Overflow	4/25/2001	13:30	45	166.5	6.7	NM	0.15	9.2
23	Pine Hill H20 Supply	4/25/2001	13:10	45	176.1	7.0	007	0.09	9.2
24	Black ABS Pipe-above Crystal Spring	4/25/2001	10:45	47	40.6	6.7	025	0.21	9.6
25	Silo A	4/25/2001	10:40	45	66.1	6.8	011	0.57	9.6
26	Station Road Silo B 4" Pipe	4/25/2001	14:05	45	121.5	6.8	NM	0.29	9.9
27	Station Rd. Silo B Overflow	4/25/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	4/25/2001	16:40	43	29.5	6.7	NM	0.39	NM
29	Davenport Spring	4/25/2001	16:15	40	61.3	NM	NM	0.21	NM
30	Highmount Spring	4/25/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	4/25/2001	15:00	43	197.2	6.8	NM	0.13	NM

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: May 30, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	5/30/2001	10:15	46	164.5	6.8	NM	0.55	8.8
2	Bonnie View side ditch	5/30/2001	10:10	46	179.8	6.3	NM	2.36	8.6
3	CSB-above Cathedral Glen Brook	5/30/2001	10:45	48	168.9	6.7	NM	0.72	11.1
4	Cathedral Glen Brook-above CSB	5/30/2001	10:40	49	110.7	6.7	NM	0.55	8.8
5	CSB-below Crystal Spg.	5/30/2001	11:40	48	137	6.7	NM	0.63	8.6
6	Station Rd. ditch-above Station Rd. Spg	5/30/2001	11:30	No	Flow	NM	NM	NM	NM
7	Station Rd. ditch-below Station Rd. Spg.	5/30/2001	11:20	45	55.5	6.3	NM	0.84	8.7
8	CSB-below Station Rd. Spg.	5/30/2001	11:30	48	133.6	6.7	NM	2.17	8.4
9	Bailey Brook (in Woodchuck Hollow)	5/30/2001	9:15	48	119.9	6.7	NM	0.63	8.3
10	CSB-above Birch Creek	5/30/2001	12:55	49	237	6.8	NM	0.60	9.8
11	Birch Creek-above CSB	5/30/2001	12:45	50	90	6.9	NM	0.69	9.8
12	Birch Creek-below CSB	5/30/2001	13:05	49	190	6.8	NM	0.65	9.5
13	Birch Creek-Covered Bridge	5/30/2001	15:25	53	98.6	6.8	NM	1.20	9.6
14	Giggle Hollow	5/30/2001	15:15	46	37.5	6.7	NM	0.24	10.3
15	Rose Mt.Creek-above sewer outfall	5/30/2001	14:50	50	88.9	6.7	NM	0.75	9.2
16	Sewer Plant Outfall	5/30/2001	14:45	51	417	6.8	NM	0.83	4.8
17	Rose Mt.Creek-below sewer outfall	5/30/2001	14:35	50	85	6.7	NM	0.61	9.3
18	Birch Creek - below Rose Mt. Creek	5/30/2001	14:30	52	104.7	6.8	NM	1.47	9.2
19	Lost Clove	5/30/2001	15:50	50	30.9	6.5	NM	0.30	9.6
20	Woodchuck Hollow Spring	5/30/2001	8:50	47	39.9	6.2	NM	0.35	8.7
21	Railroad Spring	5/30/2001	9:50	46	195.8	6.2	NM	0.15	8.4
22	Pine Hill H20 Supply Overflow	5/30/2001	10:00	46	181.6	6.2	NM	0.01	8.3
23	Pine Hill H20 Supply	5/30/2001	9:40	48	252	6.8	NM	0.2	NM
24	Black ABS Pipe-above Crystal Spring	5/30/2001	11:10	47	200	6.2	NM	0.25	9.5
25	Silo A	5/30/2001	11:00	45	273	6.2	NM	0.05	9.0
26	Station Road Silo B 4" Pipe	5/30/2001	11:50	45	60.0	6.2	NM	0.42	10.5
27	Station Rd. Silo B Overflow	5/30/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	5/30/2001	14:10	45	81.7	6.2	NM	0.09	9.8
29	Davenport Spring	5/30/2001	14:00	43	132.7	6.3	NM	0.11	9.7
30	Highmount Spring	5/30/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	5/30/2001	13:20	46	38.3	6.4	NM	0.26	9.8

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: June 28, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	6/28/2001	8:30	53	177.7	6.9	NM	1.38	8.2
2	Bonnie View side ditch	6/28/2001	8:25	47	182.3	6.3	NM	1.91	8.9
3	CSB-above Cathedral Glen Brook	6/28/2001	8:50	51	175.5	6.8	NM	0.51	8.6
4	Cathedral Glen Brook-above CSB	6/28/2001	8:45	57	130.2	6.9	NM	0.47	6.9
5	CSB-below Crystal Spg.	6/28/2001	9:15	55	147.0	6.8	NM	0.56	8.4
6	Station Rd. ditch-above Station Rd. Spg	6/28/2001	9:25	53	55.4	6.7	NM	0.28	8.9
7	Station Rd. ditch-below Station Rd. Spg.	6/28/2001	9:20	46	50.1	6.1	NM	0.24	9.9
8	CSB-below Station Rd. Spg.	6/28/2001	9:35	55	143.1	6.8	NM	0.39	8.6
9	Bailey Brook (in Woodchuck Hollow)	6/28/2001	9:45	55	72.8	6.8	NM	0.64	8.4
10	CSB-above Birch Creek	6/28/2001	10:00	56	135.3	6.9	NM	0.32	8.7
11	Birch Creek-above CSB	6/28/2001	10:05	58	87.9	6.7	NM	0.53	9.0
12	Birch Creek-below CSB	6/28/2001	10:10	58	102.6	6.9	NM	0.49	8.9
13	Birch Creek-Covered Bridge	6/28/2001	10:30	63	118.8	6.9	NM	0.90	8.5
14	Giggle Hollow	6/28/2001	10:40	51	40.7	6.3	NM	0.06	9.4
15	Rose Mt.Creek-above sewer outfall	6/28/2001	11:10	60	122.6	6.8	NM	1.03	8.1
16	Sewer Plant Outfall	6/28/2001	11:05	63	453	6.8	NM	0.29	4.1
17	Rose Mt.Creek-below sewer outfall	6/28/2001	11:00	61	111.6	6.8	NM	0.54	8.4
18	Birch Creek - below Rose Mt. Creek	6/28/2001	10:55	62	117.2	7.0	NM	1.77	8.6
19	Lost Clove	6/28/2001	13:10	56	59.2	6.6	NM	0.15	9.6
20	Woodchuck Hollow Spring	6/28/2001	7:40	52	28.3	6.5	NM	0.30	7.8
21	Railroad Spring	6/28/2001	8:10	46	200	6.0	NM	0.02	8.7
22	Pine Hill H20 Supply Overflow	6/28/2001	8:15	47	196	6.1	NM	0.05	7.8
23	Pine Hill H20 Supply	6/28/2001	NM	NM	NM	NM	NM	NM	NM
24	Black ABS Pipe-above Crystal Spring	6/28/2001	9:10	49	46.2	6.0	NM	0.03	8.5
25	Silo A	6/28/2001	9:00	45	139.0	6.1	NM	0.47	8.5
26	Station Road Silo B 4" Pipe	6/28/2001	9:30	46	43.1	5.9	NM	0.20	8.5
27	Station Rd. Silo B Overflow	6/28/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	6/28/2001	12:35	46	120.6	6.2	NM	0.04	9.8
29	Davenport Spring	6/28/2001	12:20	46	123.7	6.0	NM	0.25	8.9
30	Highmount Spring	6/28/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	6/28/2001	11:30	50	33.9	6.3	NM	0.38	9.4

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: July 31, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	7/31/2001	8:40	52	167.1	6.9	NM	0.29	9.0
2	Bonnie View side ditch	7/31/2001	8:35	47	199	6.7	NM	1.51	9.4
3	CSB-above Cathedral Glen Brook	7/31/2001	8:50	50	184.3	6.9	NM	0.14	9.0
4	Cathedral Glen Brook-above CSB	7/31/2001	8:55	57	164.7	6.9	NM	0.40	9.4
5	CSB-below Crystal Spg.	7/31/2001	9:20	52	178.2	6.7	NM	0.26	9.1
6	Station Rd. ditch-above Station Rd. Spg	7/31/2001	10:08	DRY					
7	Station Rd. ditch-below Station Rd. Spg	7/31/2001	10:05	46	86.1	6.7	NM	0.38	10.7
8	CSB-below Station Rd. Spg.	7/31/2001	10:20	53	168.6	6.9	NM	0.22	10.0
9	Bailey Brook (in Woodchuck Hollow)	7/31/2001	10:25	56	105.8	7.0	NM	0.59	8.6
10	CSB-above Birch Creek	7/31/2001	10:50	56	162.4	7.1	NM	0.38	10.0
11	Birch Creek-above CSB	7/31/2001	10:58	59	130.5	7.0	NM	0.54	9.9
12	Birch Creek-below CSB	7/31/2001	10:45	59	106.6	7.0	NM	0.36	9.9
13	Birch Creek-Covered Bridge	7/31/2001	13:25	68	118.7	7.2	NM	1.22	10.3
14	Giggle Hollow	7/31/2001	13:17	54	34.3	6.9	NM	0.20	6.6
15	Rose Mt.Creek-above sewer outfall	7/31/2001	12:42	68	337	6.9	NM	0.34	10.1
16	Sewer Plant Outfall	7/31/2001	12:37	66	394	6.8	NM	1.92	4.7
17	Rose Mt.Creek-below sewer outfall	7/31/2001	12:30	67	438	7.0	NM	0.30	7.4
18	Birch Creek - below Rose Mt. Creek	7/31/2001	12:50	68	145.3	7.2	NM	2.35	10.5
19	Lost Clove	7/31/2001	14:20	56	40.2	6.7	NM	0.35	6.1
20	Woodchuck Hollow Spring	7/31/2001	7:50	54	33.4	6.0	NM	0.15	7.8
21	Railroad Spring	7/31/2001	8:15	47	200	6.1	NM	0.59	9.1
22	Pine Hill H20 Supply Overflow	7/31/2001	9:35	47	199	6.1	NM	0.32	10.8
23	Pine Hill H20 Supply	7/31/2001	9:40	48	250	6.9	NM	0.05	10.3
24	Black ABS Pipe-above Crystal Spring	7/31/2001	9:10	51	53.9	6.4	NM	0.29	9.6
25	Silo A	7/31/2001	9:05	46	152.6	6.2	NM	0.12	9.6
26	Station Road Silo B 4" Pipe	7/31/2001	10:10	46	68.2	6.2	NM	0.35	9.9
27	Station Rd. Silo B Overflow	7/31/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	7/31/2001	12:15	46	87.7	6.4	NM	0.38	7.7
29	Davenport Spring	7/31/2001	11:55	48	124.4	6.6	NM	0.09	9.6
30	Highmount Spring	7/31/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	7/31/2001	11:25	58	47.8	6.8	NM	0.11	7.0

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: August 30, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	8/30/2001	9:45	52	129.4	6.9	NM	0.26	9.0
2	Bonnie View side ditch	8/30/2001	9:40	51	190.5	6.8	NM	1.98	9.3
3	CSB-above Cathedral Glen Brook	8/30/2001	9:20	52	173.2	6.8	NM	0.27	7.4
4	Cathedral Glen Brook-above CSB	8/30/2001	9:25	58	154.3	7.0	NM	0.28	8.6
5	CSB-below Crystal Spg.	8/30/2001	10:30	52	127.9	6.8	NM	0.23	9.4
6	Station Rd. ditch-above Station Rd. Spg	8/30/2001	10:45	DRY					
7	Station Rd. ditch-below Station Rd. Spg.	8/30/2001	10:40	46	88.6	6.7	NM	0.96	11.7
8	CSB-below Station Rd. Spg.	8/30/2001	10:35	53	152.2	6.8	NM	0.22	11.8
9	Bailey Brook (in Woodchuck Hollow)	8/30/2001	9:05	57	110.3	7.0	NM	0.86	6.2
10	CSB-above Birch Creek	8/30/2001	13:25	59	147.9	7.1	NM	0.29	10.3
11	Birch Creek-above CSB	8/30/2001	13:20	61	105.7	7.0	NM	0.67	10.5
12	Birch Creek-below CSB	8/30/2001	13:30	60	122.9	7.1	NM	0.36	10.6
13	Birch Creek-Covered Bridge	8/30/2001	12:55	64	157.0	7.2	NM	1.86	10.0
14	Giggle Hollow	8/30/2001	13:05	57	55.1	6.5	NM	1.47	8.3
15	Rose Mt.Creek-above sewer outfall	8/30/2001	14:15	67	522	7.0	NM	0.37	14.0
16	Sewer Plant Outfall	8/30/2001	14:10	66	537	6.6	NM	0.34	5.9
17	Rose Mt.Creek-below sewer outfall	8/30/2001	14:00	67	493	7.0	NM	6.23	7.5
18	Birch Creek - below Rose Mt. Creek	8/30/2001	13:50	63	172.1	7.1	NM	1.60	10.0
19	Lost Clove	8/30/2001	7:45	DRY					
	Lost Clove Tributary (19)	8/30/2001	7:50	56	53.3	6.7	NM	0.40	8.1
20	Woodchuck Hollow Spring	8/30/2001	8:45	57	35.0	6.4	NM	0.42	7.1
21	Railroad Spring	8/30/2001	DRY						
22	Pine Hill H20 Supply Overflow	8/30/2001	DRY						
23	Pine Hill H20 Supply	8/30/2001	9:55	49	192.3	6.9	NM	0.31	9.9
24	Black ABS Pipe-above Crystal Spring	8/30/2001	10:25	56	51.2	6.7	NM	0.25	10.9
25	Silo A	8/30/2001	10:15	46	122.2	6.4	NM	0.06	9.3
26	Station Road Silo B 4" Pipe	8/30/2001	10:45	46	71.9	6.2	NM	0.38	11.5
27	Station Rd. Silo B Overflow	8/30/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	8/30/2001	11:55	49	99.2	6.8	NM	0.12	12.0
29	Davenport Spring	8/30/2001	11:40	53	120.0	6.7	NM	0.15	10.5
30	Highmount Spring	8/30/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	8/30/2001	11:15	62	49.2	7.0	NM	0.30	9.3

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

Number I.D.s refer to Figure 9

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: September 27, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	9/27/2001	11:50	50	217	7.0	NM	0.63	8.2
2	Bonnie View side ditch	9/27/2001	11:42	50	200	6.8	NM	3.78	8.3
3	CSB-above Cathedral Glen Brook	9/27/2001	11:05	50	219	6.8	NM	0.81	9.2
4	Cathedral Glen Brook-above CSB	9/27/2001	10:55	53	91.6	6.7	NM	54.2	8.8
5	CSB-below Crystal Spg.	9/27/2001	12:12	52	119	6.8	NM	36.0	8.4
6	Station Rd. ditch-above Station Rd. Spg	9/27/2001	12:30	DRY					
7	Station Rd. ditch-below Station Rd. Spg	9/27/2001	12:28	46	65.5	6.5	NM	1.75	9.3
8	CSB-below Station Rd. Spg.	9/27/2001	12:25	52	125.2	6.8	NM	32.5	8.5
9	Bailey Brook (in Woodchuck Hollow)	9/27/2001	10:50	51	110.6	6.8	NM	1.04	9.7
10	CSB-above Birch Creek	9/27/2001	13:55	53	114.1	6.9	NM	9.71	8.4
11	Birch Creek-above CSB	9/27/2001	14:00	53	141.4	6.9	NM	0.76	8.2
12	Birch Creek-below CSB	9/27/2001	13:45	53	127.5	6.8	NM	5.21	8.7
13	Birch Creek-Covered Bridge	9/27/2001	13:30	55	136.8	7.1	NM	0.22	7.4
14	Giggle Hollow	9/27/2001	13:20	49	45.4	6.7	NM	4.23	8.6
15	Rose Mt.Creek-above sewer outfall	9/27/2001	10:15	58	382	6.8	NM	1.16	5.7
16	Sewer Plant Outfall	9/27/2001	10:10	61	411	6.6	NM	0.44	5.0
17	Rose Mt.Creek-below sewer outfall	9/27/2001	9:55	59	356	6.9	NM	4.49	6.8
18	Birch Creek - below Rose Mt. Creek	9/27/2001	9:50	52	237	7.1	NM	3.21	9.5
19	Lost Clove	9/27/2001	9:30	51	48.4	6.6	NM	2.31	10.4
20	Woodchuck Hollow Spring	9/27/2001	10:30	50	38.8	6.4	NM	0.21	8.5
21	Railroad Spring	9/27/2001	11:35	DRY					
22	Pine Hill H20 Supply Overflow	9/27/2001	11:20	47	199	5.9	NM	0.40	9.8
23	Pine Hill H20 Supply	9/27/2001	11:25	48	271	7.0	NM	0.12	8.9
24	Black ABS Pipe-above Crystal Spring	9/27/2001	DRY						
25	Silo A	9/27/2001	12:05	47	206	6.0	NM	0.17	8.7
26	Station Road Silo B 4" Pipe	9/27/2001	12:30	46	53.6	6.4	NM	1.95	10.8
27	Station Rd. Silo B Overflow	9/27/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	9/27/2001	15:15	50	99.7	6.5	NM	0.28	8.8
29	Davenport Spring	9/27/2001	14:55	49	151.7	6.8	NM	0.24	10.3
30	Highmount Spring	9/27/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	9/27/2001	14:25	55	60.4	7.4	NM	0.30	5.4

REMARKS:
Elevated turbidity at ID #4, 5, 8, 10, and 12 apear to be derived from the active draining of the Belleayre Mountain Ski Area backup snowmaking pond.

CSB=Crystal Spring Brook

NM = Not measured

SURFACE WATER DATA FORM

ALPHA GEOSCIENCE
1071 Troy-Schenectady Road
Latham, New York 12110

Project Name: Belleayre Water Quality
Project No. 00151 - Task 2
Date: October 30, 2001
Field Personnel: Kevin Phelan
Measuring Devices: Thermometer, HYDAC SPC., Hanna D.O., LaMotte Turbidity, Hach pH

ID #	Location	Date	Time	Temp (°F)	Spec. Cond. (mS)	pH	ORP (mV)	Turbidity (NTUs)	D.O. (ppm)
1	CSB -above Bonnie View Spg.	10/30/2001	11:30	46	88.2	6.8	NM	0.45	8.9
2	Bonnie View side ditch	10/30/2001	11:25	NM	NM	NM	NM	NM	NM
3	CSB-above Cathedral Glen Brook	10/30/2001	11:50	47	208	6.8	NM	0.33	9.7
4	Cathedral Glen Brook-above CSB	10/30/2001	11:40	45	105.0	6.7	NM	0.58	10.5
5	CSB-below Crystal Spg.	10/30/2001	11:55	46	144.1	6.6	NM	0.78	10.4
6	Station Rd. ditch-above Station Rd. Spg	10/30/2001	11:05	DRY					
7	Station Rd. ditch-below Station Rd. Spg	10/30/2001	11:15	46	64.7	6.5	NM	4.53	10.3
8	CSB-below Station Rd. Spg.	10/30/2001	12:05	45	126.0	6.8	NM	0.57	10.6
9	Bailey Brook (in Woodchuck Hollow)	10/30/2001	10:45	44	109.7	6.8	NM	0.28	10.2
10	CSB-above Birch Creek	10/30/2001	13:50	46	121.5	6.9	NM	0.34	10.4
11	Birch Creek-above CSB	10/30/2001	13:50	47	120.2	6.7	NM	0.23	9.9
12	Birch Creek-below CSB	10/30/2001	13:45	47	118.1	6.9	NM	0.32	9.6
13	Birch Creek-Covered Bridge	10/30/2001	14:25	49	123.2	6.8	NM	0.52	9.4
14	Giggle Hollow	10/30/2001	14:15	43	39.2	6.7	NM	0.17	10.6
15	Rose Mt.Creek-above sewer outfall	10/30/2001	12:45	56	404	6.8	NM	0.64	7.1
16	Sewer Plant Outfall	10/30/2001	12:40	55	424	6.5	NM	0.61	5.6
17	Rose Mt.Creek-below sewer outfall	10/30/2001	12:35	56	387	6.7	NM	0.72	6.3
18	Birch Creek - below Rose Mt. Creek	10/30/2001	12:30	50	153.2	6.9	NM	1.43	10.0
19	Lost Clove	10/30/2001	14:45	48	46.3	6.7	NM	0.10	9.3
20	Woodchuck Hollow Spring	10/30/2001	10:55	44	33.7	6.3	NM	0.10	10.5
21	Railroad Spring	10/30/2001	11:20	DRY					
22	Pine Hill H20 Supply Overflow	10/30/2001	13:35	46	210	6.0	NM	0.07	9.9
23	Pine Hill H20 Supply	10/30/2001	11:12	46	270	6.9	NM	0.02	9.7
24	Black ABS Pipe-above Crystal Spring	10/30/2001	11:50	DRY					
25	Silo A	10/30/2001	11:55	46	182.5	6.2	NM	0.15	9.8
26	Station Road Silo B 4" Pipe	10/30/2001	11:10	45	55.7	6.6	NM	0.42	10.3
27	Station Rd. Silo B Overflow	10/30/2001	NM	NM	NM	NM	NM	NM	NM
28	Wildacres #3 Spring	10/30/2001	10:20	46	103.0	6.5	NM	0.15	10.4
29	Davenport Spring	10/30/2001	10:08	47	183.6	6.6	NM	0.10	9.7
30	Highmount Spring	10/30/2001	NM	NM	NM	NM	NM	NM	NM
31	Leach Spring	10/30/2001	9:45	46	40.7	6.8	NM	0.19	10.2

REMARKS:

CSB=Crystal Spring Brook

NM = Not measured

EXHIBIT C

Water Quality Analytical Results

Summary of Water Quality Analytical Results
Streams and Springs
October 27, 2000
Belleayre Resort

Alpha Project No. 00151

		1	2	3	4	5	6	7	8	9	10	11	12	13
Compound	Units	CSB[1] above Birch Creek	Birch Creek above CSB	Railroad Spring	CSB above Cathedral Glen Brook	Cathedral Glen Brook above CSB	Silo A	Bailey[2] Brook	Silo B 4" Pipe	Pine Hill H_2O Supply Overflow	Lost Clove Brook	Birch Creek at Covered Bridge	Giggle Hollow Brook	Birch Cr. Below Treatment Plant
		10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000	10/27/2000
E. Coli	/100 mls	4	0	0	0	0	0	4	0	0	0	2	0	1
Total Coliform	/100 mls	12	0	2	1	1	0	>60	0	25	1	2	1	1
B.O.D./5 Day	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chloride	mg/L	13	8.6	29	25	13	17	6.9	5.4	28	3.8	12	4	12
Nitrite as Nitrogen	mg/L	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Nitrate as Nitrogen	mg/L	0.31	0.14	0.47	0.3	0.36	0.4	0.14	0.37	0.47	0.19	0.21	0.4	0.28
Iron	mg/L	0.092	0.022	0.014	0.027	0.023	0.036	0.013	0.011	0.006	0.008	0.031	0.01	0.037
Sodium	mg/L	4.72	3.11	12	10.3	4.29	6.97	2.2	0.74	11	0.45	4.79	0.36	5.48
Total Phosphorous	mg/L	0.034	0.028	0.035	0.033	0.022	0.031	0.033	0.025	0.043	0.02	0.028	0.034	0.043
Total Dissolved Solids	mg/L	34	27	72	68	32	51	22	23	75	6.5	45	14	44
Total Suspended Solids	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Pesticides 8081	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

General Notes:
Analyses performed by Phoenix Environmental Laboratories, Inc.
ND = Not Detected
Number I.D.s refer to Figure 10

Notes:
1 CSB = Crystal Spring Brook
2 **Bailey Brook** is the name given here to the stream that runs down Woodchuck Hollow.

Summary of Water Quality Analytical Results
Streams and Springs
November 29, 2000
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1 CSB[1] above Birch Creek	2 Birch Creek above CSB	3 Railroad Spring	4 CSB above Cathedral Glen Brook	5 Cathedral Glen Brook above CSB	6 Silo A	7 Bailey[2] Brook	8 Silo B 4" Pipe	9 Pine Hill H_2O Supply Overflow	10 Lost Clove Brook	11 Birch Creek at Covered Bridge	12 Giggle Hollow Brook	13 Birch Cr. Below Treatment Plant
		11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000	11/29/2000
E. Coli	/100 mls	10	0	0	0	2	0	2	0	0	0	0	0	2
Total Coliform	/100 mls	10	>60	0	30	2	1	4	0	0	0	5	0	3
B.O.D./5 Day	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chloride	mg/L	9.8	6.3	22	20	8.7	14	5.5	<3	22	<3	8.5	<3	8.7
Nitrite as Nitrogen	mg/L	0.07	0.07	0.06	0.12	0.06	0.07	0.06	0.07	0.05	0.08	0.06	0.07	0.08
Nitrate as Nitrogen	mg/L	0.43	0.31	0.47	0.33	0.49	0.45	0.39	0.38	0.52	0.38	0.31	0.49	0.45
Iron	mg/L	0.016	0.01	0.007	0.01	0.031	0.008	0.037	0.008	0.007	0.006	0.031	0.012	0.03
Sodium	mg/L	4.5	3.4	11	10.1	3.8	6.7	2.2	0.8	11	0.5	4.5	0.4	5.3
Total Phosphorous	mg/L	0.041	0.039	0.037	0.04	0.039	0.047	0.032	0.05	0.048	0.035	0.047	0.047	0.039
Total Dissolved Solids	mg/L	43	29	71	54	38	57	33	20	68	26	59	65	48
Total Suspended Solids	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Pesticides 8081	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

General Notes:
Analyses performed by Phoenix Environmental Laboratories, Inc.
ND = Not Detected
Number I.D.s refer to Figure 10

Notes:
1 CSB = Crystal Spring Brook
2 **Bailey Brook** is the name given here to the stream that runs down Woodchuck Hollow.

Summary of Water Quality Analytical Results
Streams and Springs
January 31, 2001
Belleayre Resort

Alpha Project No. 00151

		1	10	11	13
Compound	Units	CSB above Birch Creek	Lost Clove Brook	Birch Creek Covered Bridge	Birch Cr. Below Treatment Plant
		1/31/2001	1/31/2001	1/31/2001	1/31/2001
E. Coli	/100 mls	Pos.	Pos.	0	Pos.
Total Coliform	/100 mls	Pos.	Pos.	Pos.	Pos.
B.O.D./5 Day	mg/L	<2	<2	<2	<2
Chloride	mg/L	25	<3	49	42
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.47	0.38	0.4	0.8
Iron	mg/L	0.042	0.012	0.091	0.468
Sodium	mg/L	8	0.6	18	16
Total Phosphorous	mg/L	0.02	0.01	0.01	0.03
Total Dissolved Solids	mg/L	55	13	88	90
Total Suspended Solids	mg/L	<5	<5	<5	13
Pesticides 8081	µg/L	ND	ND	ND	ND

General Notes:

CSB = Crystal Spring Brook
Pos. = Positive
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10

Summary of Water Quality Analytical Results
Streams and Springs
April 25, 2001
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1 CSB above Birch Creek	10 Lost Clove Brook	11 Birch Creek Covered Bridge	13 Birch Cr. Below Treatment Plant
		4/25/2001	4/25/2001	4/25/2001	4/25/2001
E. Coli	/100 mls	pos	neg	neg	neg
Total Coliform	/100 mls	pos	pos	pos	pos
B.O.D./5 Day	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	7.2	<3.0	6.5	5.8
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.54	0.64	0.49	0.5
Iron	mg/L	0.092	<0.002	0.042	0.034
Sodium	mg/L	3.14	0.44	3.21	2.76
Total Phosphorous	mg/L	0.031	0.031	0.027	0.032
Total Dissolved Solids	mg/L	40	27	33	37
Total Suspended Solids	mg/L	<5.0	<5.0	<5.0	<5.0
Pesticides 8081	µg/L	ND	ND	ND	ND

General Notes:

CSB = Crystal Spring Brook
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10
pos = positive
neg = negative

Summary of Water Quality Analytical Results
Streams and Springs
July 31, 2001
Belleayre Resort

Alpha Project No. 00151

		1	10	11	13
Compound	Units	CSB above Birch Creek	Lost Clove Brook	Birch Creek Covered Bridge	Birch Cr. Below Treatment Plant
		7/31/2001	7/31/2001	7/31/2001	7/31/2001
E. Coli	/100 mls	20	<10	40	30
Total Coliform	/100 mls	70	<10	40	50
B.O.D./5 Day	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	24	<3.0	16	16
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.42	0.4	0.24	0.66
Iron	mg/L	0.003	<0.002	0.074	0.041
Sodium	mg/L	11.1	1.23	8.53	10.4
Total Phosphorous	mg/L	<0.01	<0.01	<0.01	<0.01
Total Dissolved Solids	mg/L	88	26	53	75
Total Suspended Solids	mg/L	<5.0	<5.0	<5.0	<5.0
Pesticides 8081	µg/L	ND	ND	ND	ND

General Notes:

CSB = Crystal Spring Brook
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10

Summary of Water Quality Analytical Results
Streams and Springs
October 30, 2001
Belleayre Resort

Alpha Project No. 00151

Compound	Units	1 CSB above Birch Creek 10/30/2001	10 Lost Clove Brook 10/30/2001	11 Birch Creek Covered Bridge 10/30/2001	13 Birch Cr. Below Treatment Plant 10/30/2001
E. Coli	/100 mls	1	0	1	0
Total Coliform	/100 mls	2	2	1	15
B.O.D./5 Day	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	18	<3.0	19	20
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Nitrate as Nitrogen	mg/L	0.29	0.19	0.15	0.68
Iron	mg/L	0.007	0.005	0.028	0.026
Sodium	mg/L	7.7	1.02	9.23	10.8
Total Phosphorous	mg/L	0.03	0.02	0.02	0.03
Total Dissolved Solids	mg/L	64	99	92	86
Total Suspended Solids	mg/L	6	8	6	<5.0
Pesticides 8081	µg/L	NT	NT	NT	NT

General Notes:

CSB = Crystal Spring Brook
ND = Not Detected
Analyses performed by Phoenix Environmental Laboratories, Inc.
Number I.D.s refer to Figure 10
NT = Not Tested