

3.2 Surface Water Resources

3.2.1 Introduction

This chapter of the Raleigh and Heiden Properties Development DEIS describes existing stormwater characteristics associated with the project site, potential environmental impacts associated with changes in those characteristics due to site development, and identifies measures proposed to offset potential impacts associated with stormwater on and off the project site.

Increases in the volume and peak rates of stormwater discharge following development of the Raleigh and Heiden Properties Development, as well as erosion and sedimentation during construction, can impact receiving water resources and downstream properties. For these reasons, identifying and offsetting potential impacts associated with stormwater discharges from the property site is required.

3.2.2 Existing Conditions

The approximately 196.9 acre project site is located immediately east and west (on both sides) of the Sheldrake Stream. The undeveloped project site area is primarily covered by woodlands, with developed areas consisting of the Raleigh Hotel. The property on the western side of the Sheldrake Stream primarily drains to the east and the property on the eastern side of the Sheldrake Stream primarily drains to the west, with the entire property draining towards the Sheldrake Stream.

Encompassing approximately 22.9 miles, the Sheldrake Stream is part of the Middle Delaware River Watershed. The Sheldrake Stream ultimately drains to the Neversink River approximately 2 miles south of the project site. The Neversink River watershed encompasses some 435 square miles and the main flow begins just south of the border between Ulster and Sullivan counties, where the east and west branches of the Neversink River join near the hamlet of Clayville. It flows generally southeast through the mountains and is impounded in the Town of Neversink to form the Neversink Reservoir of the New York City Water Supply System. It flows through the Town of Fallsburg, Thompson, Forestburgh and Deerpark, joining the Delaware River at Port Jervis, at Tri-state Rock.

The New York State Department of Environmental Conservation (NYSDEC) has classified the Sheldrake Stream as primarily a Class B water body while the Neversink River is classified as a Class "B(t)" water body. The best usages of Class B waters are primary and secondary contact recreation and fishing. These waters are suitable for fish propagation and survival. The (t) designation indicates that the NYSDEC specification for dissolved oxygen for trout waters apply.

The project site is generally wooded except for the Raleigh Hotel resort facilities and former Heiden Hotel grounds, which consist of large lawns and miscellaneous bungalows. The project property along the westerly side of the Sheldrake Stream, comprising of approximately 144 acres, slopes and drains in an easterly direction to the stream. Of that 144 acres, approximately 32 acres at the northerly side included in development of Cluster 1, drains toward and through adjacent undeveloped private properties consisting of wooded areas and wetlands, which in turn drain to the Sheldrake Stream via a small, unnamed stream that runs past the northeast corner of the proposed Cluster 2.

The 52 acres situated along the easterly side of the stream also fronts on the stream and slopes and drains in a westerly direction directly into it.

There are currently no specific physical drainage structures on the project site to promote and facilitate proper runoff, just ditches, swales and similar channels to convey stormwater flow around any built up structures, hotel areas and sewage treatment facilities, to the stream. Therefore, no one or two significant stormwater discharge points or channels exist from the project site to the Sheldrake stream, but more of a series of numerous small watercourses discharging to the streambank.

Existing Stormwater Discharge Points

The Pre-Development Drainage Areas Map DA-1, included in the Stormwater Pollution Prevention Plan (SWPPP) in Appendix B, shows existing site conditions, topography and typical flow paths across the respective sub-basins of the project site and into the Sheldrake Stream, from both the easterly and westerly directions. As noted above, the relatively gentle and uniform slopes across the property toward the stream result in numerous small drainage sub-areas, most including a relatively minor ditch or swale, some of which intersect and combine with adjacent sub-area runoff channels to reach the stream. These channels are readily apparent on the 2 ft topographic contours indicated on the SWPPP drainage area maps.

The pre-development discharge rates are summarized in the SWPPP. The “Pondpack” modeling software by Haestad Methods, was used to model and assess the stormwater flows from the project site. Pondpack is a computer-aided design program for modeling the hydrology and hydraulics of stormwater runoff. It is based primarily on hydrology techniques developed by the United States Department of Agriculture, Soil Conservation Service (USDA, SCS) Technical Release 55 (TR-55) method combined with standard hydraulic calculations. The program was used to analyze the 2-year, 10-year, 25-year and 100-year, 24 hour design storms.

TR-55 is a computer-based program that is used for the generation and routing of runoff hydrographs, such as those developed for the Raleigh and Heiden Properties Development. The TR-55 program provides a hydraulic analysis of a watershed under its present conditions. The program utilizes the USDA SCS runoff equation to predict the peak rate of runoff as well as the total volume.

Existing Stormwater Quantity

Estimates of existing runoff quantity (peak discharge rates and volumes) generated by storm events up to, and including, the 100-year event were made using the noted methodology accepted by the NYSDEC. The estimates are included in the SWPPP (Appendix B of this document).

A SWPPP is a plan to reduce off site impacts associated with stormwater by controlling changes in runoff, and pollutants associated with runoff, during and after construction. The NYSDEC State Pollution Discharge Elimination System Stormwater General Permit for Construction Activities (GP-0-10-001) require SWPPPs for projects, such as the Raleigh and Heiden Properties Development, that disturb or expose one or more acres of soil during construction. To comply with GP-0-10-001, a SWPPP must include erosion and sediment controls and must identify measures to control changes in stormwater quantity and quality, which accomplish the following:

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- Reduce or eliminate erosion and the resulting sedimentation of surface waters during construction;
- Mitigate or eliminate the impact(s) that post development changes in stormwater, including any increases in pollutants in it, can have on the quality of receiving surface waters;
- Reduce post construction increases in the volume and rate of stormwater discharge during and after construction to prevent downstream erosion and flooding;
- Maintain stormwater controls during and after construction.

To be authorized under GP-0-10-001 to proceed with a project and discharge stormwater from a site, an "Operator" must submit a "Notice of Intent" to NYSDEC confirming that the SWPPP has been prepared in accordance with the terms of the General Permit.

The Raleigh and Heiden Properties Development SWPPP includes an analyses of the stormwater discharge rates and volumes for the 2, 10, 25 and 100 year, 24 hour storm events pursuant to the Final Scoping Document for this project, and is consistent with New York State regulations. Peak pre-development flows from the project site's existing on site drainage areas were calculated at each of the design points. These flows and volumes were based upon regional precipitation values identified within the TR-55 documentation.

Existing Stormwater Quality

There are no stormwater management facilities currently on the project site. The quality of runoff leaving the site during storm events at present is dictated by the quality of stormwater entering the site from the contributing drainage area, existing land use, site specific soils and vegetation, and any erosion that may occur on the site.

No data are available concerning the quality of stormwater currently discharging from the project site at any of the design points.

Flood Inundation Zone

Pleasure Lake Dam, NYS ID Dam No. 163-1597, is located north of the Raleigh and Heiden Properties Development on the Sheldrake Stream, a tributary of the Neversink River. This dam is owned and operated by the Fallsburg Fishing and Boating Club. The Pleasure Lake Dam is constructed as an earthfill embankment with a masonry gravity dam section. It is less than 40 feet high, 470 feet long, and has a crest width between 17 to 34 feet, with a reservoir volume of less than 1,000 acre-feet. The dam also includes an emergency spillway which is 25 feet long and 35 feet wide at the crest. Specific information on the dam is included in Appendix C, Emergency Action Plan – Pleasure Lake Dam.

The Pleasure Lake and Pleasure Lake Dam have a watershed of approximately 13.6 square miles in an area that is primarily comprised of undeveloped wooded areas, farmland, rural homesteads and golf courses within the hamlets of Loch Sheldrake and South Fallsburg. The downstream areas that would be affected by a dam failure would be south of the Thompsonville-Sheldrake (Ranch Road) Bridge, where many dwellings are located. Currently, the Raleigh and Heiden Properties Development site would not be adversely impacted because, there is no existing development within the area of inundation (as shown on Figure 3.2-1, Pleasure Lake Dam Inundation Area).

3.2.3 Potential Impacts

The Proposed Action would involve the temporary disturbance of 64.2 acres of the approximately 196.9 acre Raleigh and Heiden Properties site, for the construction of buildings, construction of parking areas, community facilities and stormwater management facilities.

The Proposed Action may result in stormwater related impacts including: sedimentation during construction, post development increases in pollutant loading in stormwater, post development flooding from increases in the volume of stormwater discharged, and bed and bank erosion in receiving watercourses resulting from increased stormwater discharge velocities.

As discussed in detail in Appendix B, the proposed stormwater treatment measures included in the SWPPP satisfy NYSDEC standards by including an Erosion and Sediment Control Plan and provisions for stormwater treatment to avoid potential impacts on receiving waters and downstream properties. State standards for water quality treatment, as set forth in NYSDEC GP-0-10-001, specifically require the water quality volume (WQv) to be calculated, and treated, in accordance with the recent NYSDEC Stormwater Management Design Manual, August 2010 (the Manual). The stormwater practices proposed for the Raleigh and Heiden Properties site have been designed in accordance with the Manual and satisfy New York State mandates to reduce post-construction flows to pre-construction levels.

Post-Development Runoff Quantity and Quality

Following construction, stormwater from the project site would be routed through stormwater management ponds and retention facilities and then ultimately enter the Sheldrake Stream. To offset potential impacts associated with stormwater runoff from the Raleigh and Heiden Properties site, a project specific SWPPP was developed in accordance with all applicable NYSDEC regulations and guidelines. Specific attention has been paid to generally maintaining existing site basin drainage divides, to attenuating post development increases in peak stormwater discharge rates and volumes, and to meet NYSDEC stormwater quality treatment criteria. All proposed treatment methods would comply with NYSDEC stormwater treatment criteria.

Runoff Quantity

Stormwater from the site would be collected and discharged to treatment basins that would control post-development flow rates to equal or be less than existing flow rates.

New York State stormwater sizing criteria, found in the Manual require the control of the peak of discharge from the 10-year storm to predevelopment rates for Overbank Flood (Q_p) control. The primary purpose of the overbank flood control sizing criterion is to prevent increases in the frequency and magnitude of out-of-bank flooding generated by urban development.

The criteria for the Extreme Storm (Q_f) in the Manual require the control of the peak discharge from the 100-year storm to pre-development rates, and the safe passage of the flows generated by a 100-year storm event. The intent of the Q_f is to prevent the increased risk of flood damage from large storm events, to maintain the boundaries of any pre-development 100-year floodplain, and to protect the physical integrity of stormwater management practices.

Runoff Quality

As discussed below, GP-0-10-001 further requires that the Water Quality Volume (WQv) be treated in order to provide pollutant removal. By meeting the WQv requirements for the proposed project through employment of detention ponds that are part of the SWPPP, the water quality objectives of the NYSDEC would be met.

The objective of the SWPPP is to control erosion and sedimentation during construction and to reduce post-development stormwater pollutant loadings to that of pre-development levels to the greatest extent practicable. This applies to all land areas for which the pervious service has been changed over pre-development conditions due to land clearing, land grading or construction.

The Manual was prepared, in part, to provide standards for the selection and design of stormwater management practices (SMPs) to be included in project specific SWPPPs to protect the waters of the State of New York from the impacts of urban stormwater runoff. The Manual establishes specifications and uniform criteria for the practices that are to be part of a SWPPP. As noted, the primary treatment of stormwater discharging from the project would be accomplished with stormwater basins that have been selected and designed in accordance with the Manual.

The primary SMPs designed by the project engineer and included in the Raleigh and Heiden Properties Development SWPPP (detention basins) were selected from the Manual and meet all State WQv requirements. These practices were designed to capture and treat 90 percent of the average annual stormwater runoff volume from the site. By treating the 90 percent volume, impacts associated with increases in pollutant loading would be satisfactorily offset.

Flood Inundation Zone Impacts

In an event of a catastrophic dam failure, the flood flow width centered on the Sheldrake Stream in the vicinity of the project site are shown on Figure 3.2-2 would vary from approximately 450 ft at the upstream side to in excess of 800 ft at the downstream, southerly side. An undeveloped "corridor" has been maintained along the stream between the proposed development Clusters 3 and 4 to insure no dwellings are situated within the limits of the inundation zone. Approximately 450 ft of the Cluster 3 roadway and 500 ft of the Cluster 4 roadway that lie closest to the Sheldrake Stream could be exposed to a short term high water condition immediately following a failure of the Pleasure Lake Dam. The only utilities potentially affected consist of one (1) proposed 8-inch diameter watermain and on (1) 4-inch diameter sewage forcemain, both buried at least four feet deep below the streambed between Clusters 3 and 4. Any damage to those lines is very unlikely. Additionally, proposed stormwater basin #3, located southeast of Cluster 3 lies within the dam inundation zone, with some basin berm erosion and outfall structure damage likely in the even of the dam failure, which could be readily repaired in a matter of days.

The above-noted information is based upon a dam break analysis and evaluation previously prepared by consultants for the dam's owner, The Fallsburg Fishing and Boating Club, which included preparation of the inundation area map along the Sheldrake Stream. This evaluation was required to comply with the NYSDEC Dam Safety and Flood Protection criteria, which included assessing dam failure at full pool (i.e. – maximum water elevation) conditions. Adding additional stormwater runoff flows from the Raleigh and Heiden Properties project site generated by proposed development to the dam break inundation map flow limits to evaluate if a higher or wider flood flow will occur is not necessary. Stormwater (SWPPP) regulations

mandate that the post-development discharge rates from the four (4) stormwater management basins not exceed the pre-development flow rates. Therefore, dam break flood flows along the Sheldrake Stream will not be affected whether the Raleigh and Heiden Properties project is built or not.

Only stream vicinity areas situated downstream of the project site will be adversely affected, generally from the Heiden Road-Ranch Road intersection bridge, where 4-5 dwellings exist, to its confluence with the Neversink River, then downriver where dwellings exist along the easterly bank as far south as NYS Route 17.

Sedimentation During Construction

Without adequate measures incorporated into the Proposed Action to offset potential impacts, the Project would have the potential to increase the volume and velocity of stormwater runoff from the site through land clearing and conversion of existing land forms into impervious surfaces and landscaped areas. If not controlled, these activities may lead to accelerated erosion and sedimentation during construction. Sedimentation of the receiving water bodies would result in decreased light penetration and nutrient enrichment, increased turbidity, increased transport of pollutants that are adsorbed to the sediment particles, and clogging of gills and filters in aquatic organisms. Accordingly, an Erosion and Sediment Control Plan, that includes construction phasing, has been included in the SWPPP attached in Appendix B.

The purpose of the Erosion and Sediment Control Plan is to minimize the erosion of disturbed soil and to prevent the migration of sediment into surface waters and off-site properties during construction and until the site has received final stabilization. The Erosion and Sediment Control Plan included with the SWPPP accomplishes that purpose through reductions in runoff velocities, limiting the area of disturbed soils at any one time, and rapid stabilization of disturbed soils.

3.2.4 Mitigation Measures

Soil Erosion Control Measures and Construction Phasing Plan

Both temporary and permanent erosion control facilities and activities would be applied over the duration of project related activities on the site. Implementation of the soil erosion control plan would be based on the latest New York State Standards and Specifications for Erosion and Sediment Control. All soil erosion and sedimentation control practices would be installed in accordance with GP-0-10-001.

As specified in the SWPPP, soil erosion and sedimentation measures, such as silt fencing, would be installed following a pre-construction conference with appropriate agency staff, and prior to any construction activities. In addition, the Applicant would engage a Certified Professional in Stormwater Quality/Erosion and Sediment Control, or equally qualified professional, to oversee implementation of the SWPPP, including its site specific Erosion and Sediment Control Plan component. Refer to the SWPPP in Appendix B of this DEIS, and accompanying Erosion and Sediment Control Plan sheets for erosion and sediment control practices to be implemented.

Implemented, monitored, and enforceable erosion and sediment controls specified in the SWPPP, would be utilized during the construction phase as the primary means of controlling

erosion and sedimentation. A construction phasing and sequencing plan is included in the Raleigh and Heiden Properties Development Erosion and Sediment Control Plan and incorporates both structural and nonstructural (i.e. operational) provisions. The goal of the plan is to minimize the potential for soil erosion from areas exposed during construction and prevent sediment from reaching the downgradient receiving waters, including the Shel Drake Stream.

Permanent methods of erosion control would be accomplished by diverting stormwater runoff from steep slopes, controlling or reducing stormwater runoff velocities and volumes, and installing vegetative and structural features which would act to stabilize soil surfaces. All of the permanent facilities would be selected from options which feature low-maintenance requirements and long-term exposure stability. Basin and swale BMP features are manmade and the result of years of engineering research and design as well as actual in-situ case histories. They function as "natural" removal systems which are featured to blend into the other proposed landscaped and natural features of the property.

Maintenance of Temporary and Permanent Stormwater Controls

Details of all temporary and permanent stormwater controls are shown on the project plans. A final construction sequence would also be provided to guide the contractor in the installation and maintenance of the temporary erosion control measures. NYSDEC SPDES General Permit GP-0-10-001 regulations require proper maintenance of the erosion control practices, and documentation in a Site Log Book to be kept onsite for the duration of the construction activities. Erosion and sediment control inspections would be conducted as required by GP-0-10-001 (a minimum of once a week, by a qualified professional).

During construction, all basins and sedimentation and erosion controls must be inspected on a weekly basis, in compliance with GP-0-10-001. Monitoring reports would be left at the site construction trailer for inspection and would be forwarded to the local jurisdictions if requested. These inspections include photo documentation of any erosion control device failure and correction as well as visual observations of stormwater leaving the site.

The Applicant would be responsible for ensuring all erosion and sediment control and stormwater management practices are properly installed and maintained. Responsible parties for the implementation and maintenance of each of the erosion control measures and stormwater facilities would be specifically identified and documented prior to construction activity.

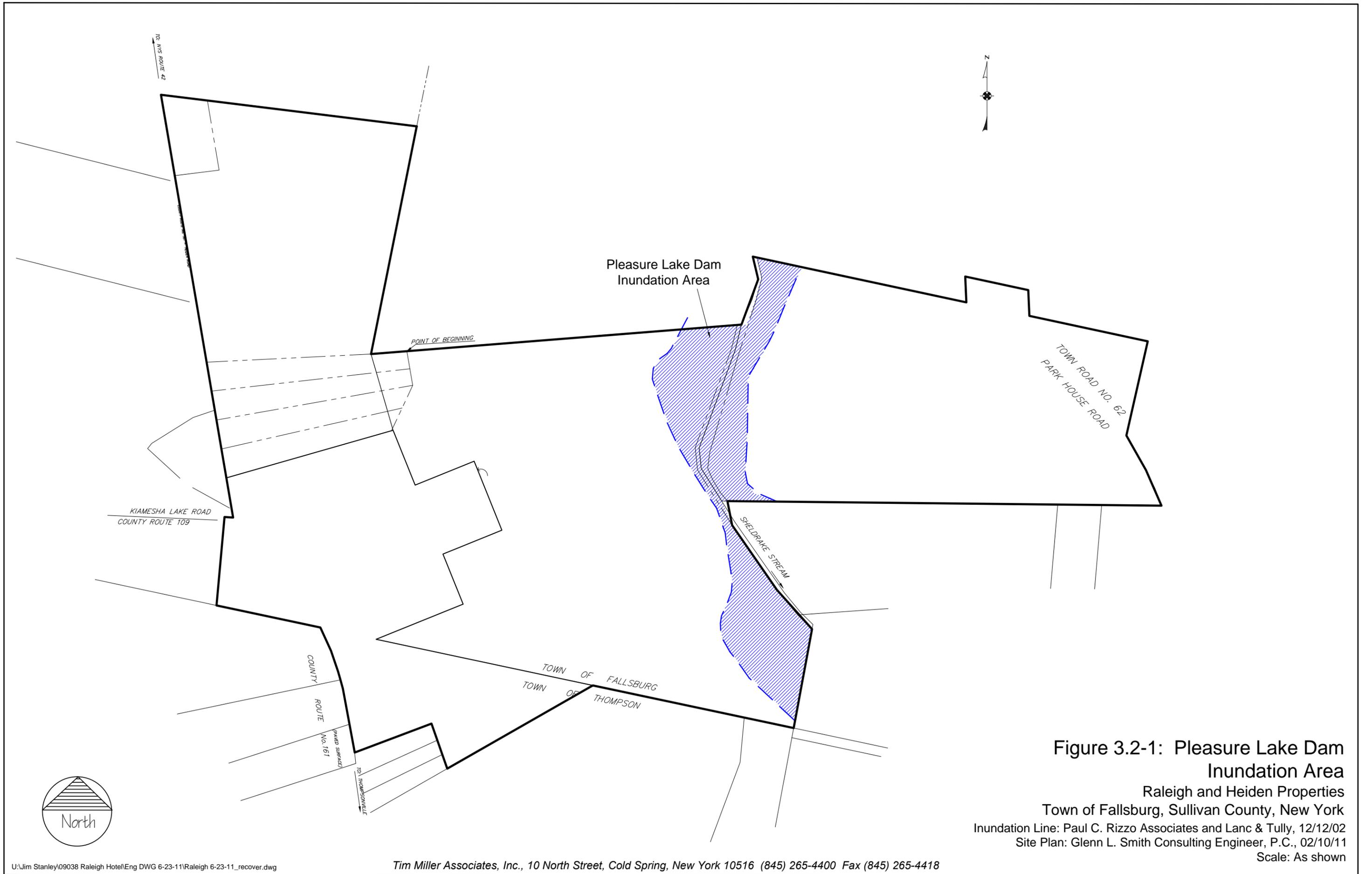
Flood Inundation Zone Mitigations

The Fallsburg Fishing and Boating Club has implemented an Emergency Action Plan (EMP) for the Pleasure Lake Dam NYS ID Dam No. 163-1597, included in Appendix C. Operations and/or maintenance of the Dam will be completed by Fallsburg Fishing and Boating Club personnel, who will observe unusual conditions with the dam such as signs of slope movements, depressions, sinkholes, sand boils, cracking of concrete surfaces, discharges, abnormal reservoir levels, or water overtopping the dam. This personal will report to the Dam Safety Official who will analyze the incoming information and will determine if an emergency situation exists.

If an emergency situation exists one of three classification conditions will be declared. They are as follows:

- **Condition Classification A, Dam Failure Warning** – This alert indicates that the Club has determined that there is no longer any time available to attempt corrective measures to prevent the dam failure. Emergency management agencies interpret this alert to mean that the Dam is failing and that immediate evacuation downstream of the dam, within the inundation areas, should be evacuated and road closure procedures should occur. The Club will create a command center and assign a team of maintenance and engineering personnel responsible for coordinating emergency action procedures and to provide assistance to emergency management agencies.
- **Condition Classification B, Dam Failure Watch** – This alert indicates when there is a potentially hazardous dam situation developing. This is determined if there is “some amount of time” available for further analysis and the possibility that the dam failure may not occur. Emergency agencies should interpret this alert to mean that the situation is sensitive and should continue to be evaluated to prevent injury and damage to downstream locations. The Club will create a command center on site and assign a team of maintenance and engineer personal to implement steps for the reduction or the elimination of the hazard potential.
- **Condition Classification C, Non Failure Emergency** – This alert indicates that there isn't a threat of dam failure but only that there is a situation of concern such as flooding. The Club will continue to monitor the situation with the dam and alert appropriate agencies as necessary.

The above actions serve as mitigation for the potential impacts to the residence located within the inundation zone. One well, Well-3, is also located within the inundation zone. This well will be properly sealed to prevent surface runoff to inundate the well head.



**Figure 3.2-1: Pleasure Lake Dam
Inundation Area**

Raleigh and Heiden Properties

Town of Fallsburg, Sullivan County, New York

Inundation Line: Paul C. Rizzo Associates and Lanc & Tully, 12/12/02

Site Plan: Glenn L. Smith Consulting Engineer, P.C., 02/10/11

Scale: As shown

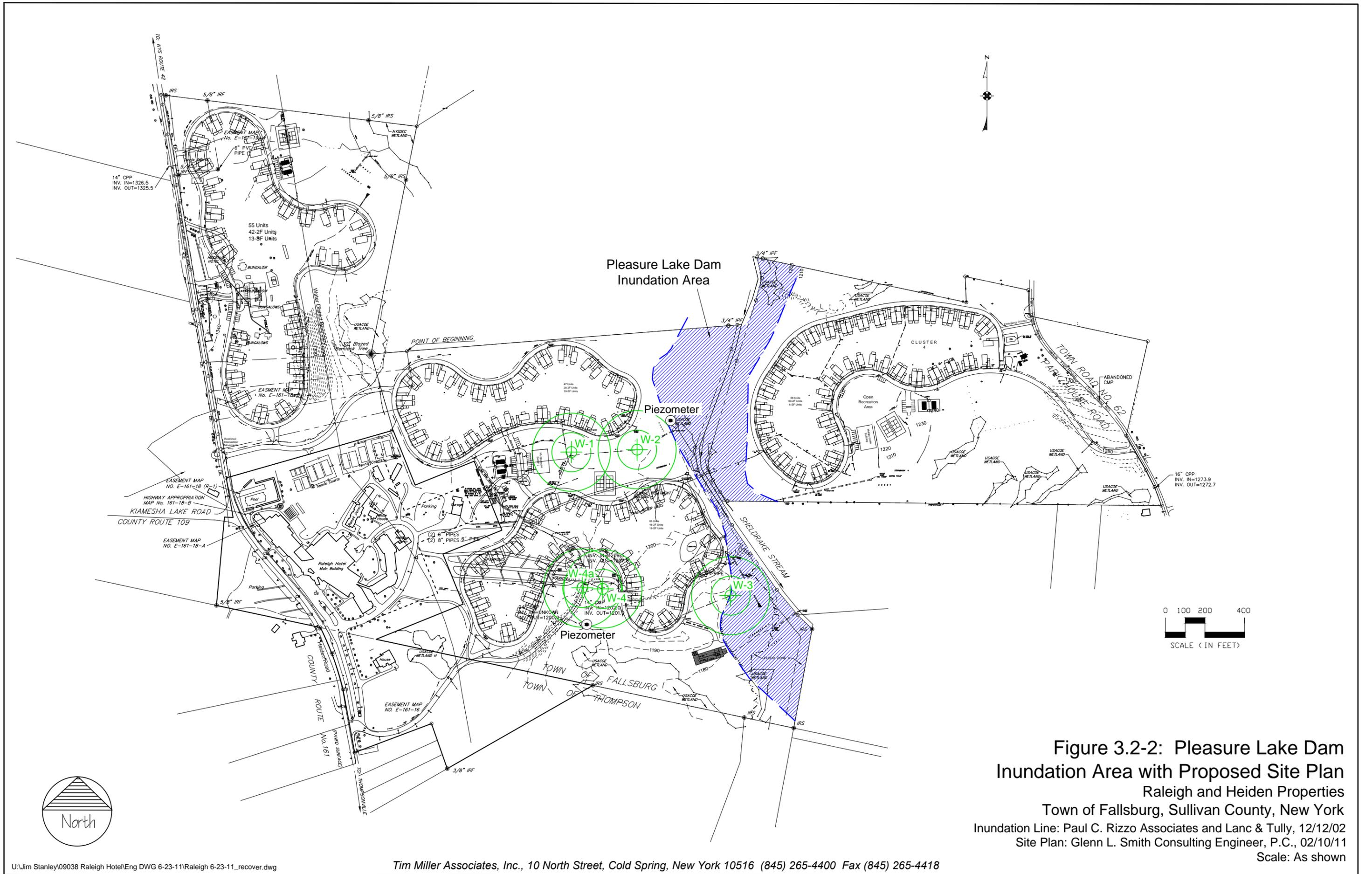


Figure 3.2-2: Pleasure Lake Dam Inundation Area with Proposed Site Plan
 Raleigh and Heiden Properties
 Town of Fallsburg, Sullivan County, New York
 Inundation Line: Paul C. Rizzo Associates and Lanc & Tully, 12/12/02
 Site Plan: Glenn L. Smith Consulting Engineer, P.C., 02/10/11
 Scale: As shown