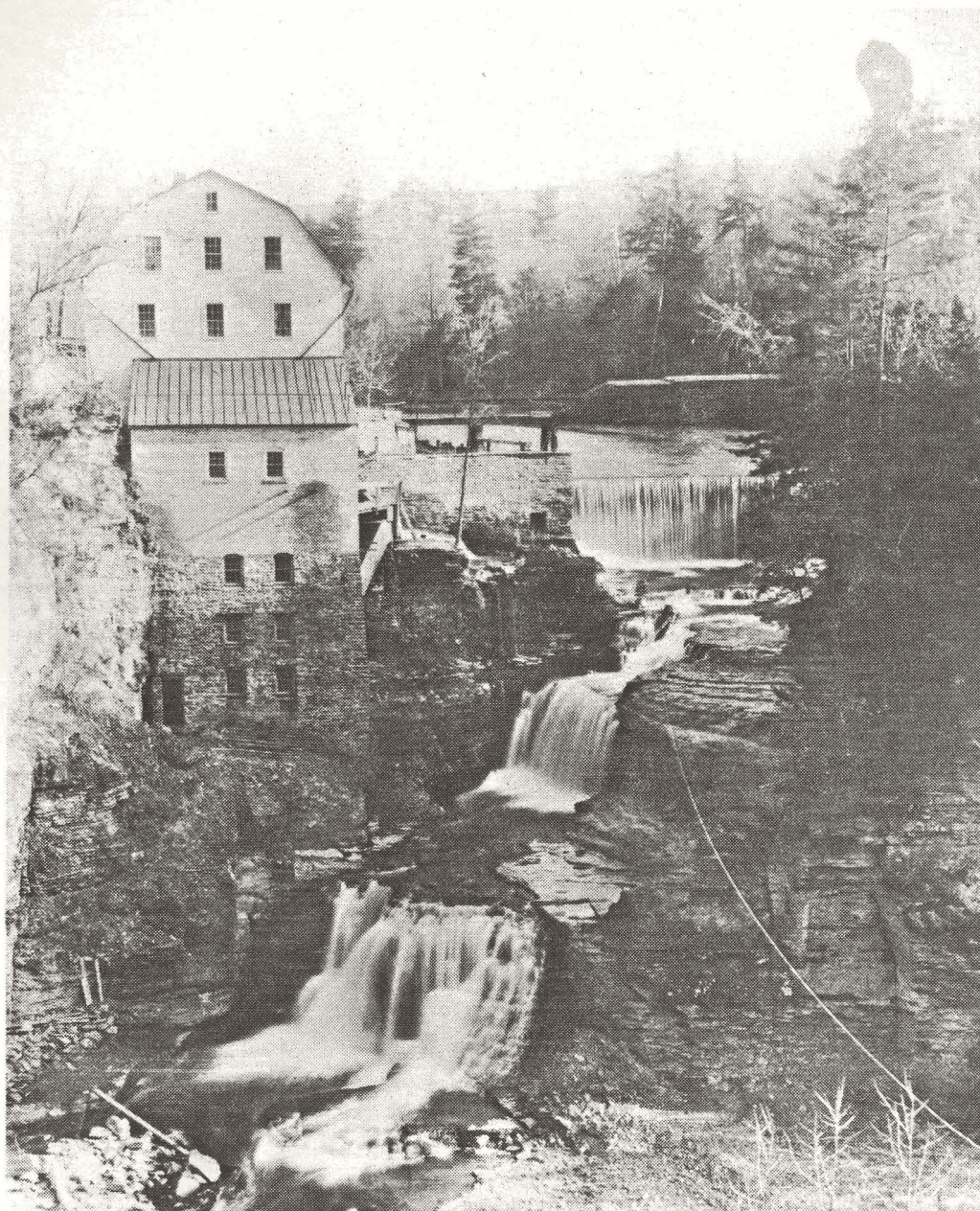

Supplemental Information Package
Van Natta Dam Water Power
Rehabilitation Project



City of Ithaca, New York
June 1989

Table of Contents

Application for Minor License (Exemption)

Response to Deficiencies

Order Granting Exemption From Licensing

Order Granting Extension of Time

Cultural Resources Management Plan

Engineering Report: Feasibility of Restoring Van
Natta Pumping Station

Photographs and Maps

EXHIBIT A - PROJECT DESCRIPTION AND MODE OF OPERATION

The following is a tabular description of the proposed project, appurtenant structures and facilities, power production, project costs, and a discussion relative to project economics. A narrative description of the proposed project can be found in Exhibit E. Project drawings showing the location of the powerhouse, turbines, headrace, tailrace, dam, and impoundment can be found in Exhibits F and G.

Generating Units:

Number of Generating Units:	1
Rated capacity:	400 kW
Rated output:	444 kVa
Rating:	3 Phase, 4,160 Volts, 60 Hertz

There are presently no provisions for future units.

Hydraulic Turbine:

One (1) horizontal Francis
500 mm runner diameter
Single regulated
Direct drive
Rated head 56.75 ft.
Rated discharge 100 cfs

Operation:

Manual or automatic run-of-the-river

EXHIBIT A
PROJECT DESCRIPTION &
MODE OF OPERATION

Estimated Average Monthly Flows and Annual Energy:

<u>Month</u>	<u>Avg. Monthly Flow (cfs)</u>	<u>Minus Environ. Maint. Flows (cfs)</u>	<u>Available Flow (cfs)</u>	<u>Avg. Net Head (ft.)</u>	<u>kW</u>	<u>Monthly kWh</u>
October	24	2	22	57.17	45	33,480
November	43	2	41	56.97	140	100,800
December	58	2	56	56.80	219	162,936
January	52	2	50	56.85	189	139,872
February	64	2	62	56.83	249	168,822
March	124	9	115	56.74	400	297,600
April	111	9	102	56.52	400	288,000
May	51	9	60	56.85	241	179,304
June	29	2	27	56.43	75	54,000
July	8	2	6	-	-	-
August	2	2	-	-	-	-
September	8	2	6	-	-	-
Estimated Average Annual Energy						1,424,814

June flow Nov. . 114 cfs x 0.6463 x 30 = 2,210 mg

Environmental Maintenance Flows:

Downstream spring fish passage = 9 cfs
Aesthetic flow of 4 cfs/12 hr. period (4/2) = 2 cfs

Net Head:

Average gross head (refer to Headwater - Tailwater Curves) in Appendix
Minus assumed 2 foot loss

Refer to Hydrology and Hydraulics found in Exhibit E

Estimated Average Head: 56.75

Impoundment:

Surface area 2.3 acres
Storage capacity 8.6 acre feet
Drainage Area 49 Square Miles

Hydraulic Capacity:

The proposed sigle regulated horizontal Francis is capable of operating in the range of 20 - 100 cfs, as can be seen in the table above, the efficiency decreases during low flow operation.

PROJECT FEATURES

Dam:

Constructed:	1907
Material:	Reinforced concrete
Length:	142 feet
Spillway Length:	115 feet
Height:	12 feet
Spillway Crest Elev.	502.5
Proposed Work:	Minor concrete repairs

Intake Structure:

Trashrack:	New 13' x 14'
Decking:	New wood planking
Gate:	New 8' x 8'
Proposed Work:	Modifications to existing intake structure

Existing Penstock:

Material:	Brick lined concrete capped
Diameter:	8 feet
Length:	58 feet
Proposed Work:	Minor brick and concrete repair Interface new penstock

New Penstock:

Material:	Steel
Diameter:	4 feet
Length:	67 feet
Proposed Work:	Remove existing 6' diameter steel penstock, interface new steel penstock into existing brick and concrete penstock. Support inside building to turbine inlet.

New Control Room:

Location:	Second level in building
Use:	Former turbine/generator room
Dimensions:	13' x 18'
Walls:	Field stone
Floor:	Concrete
Purpose:	To house new controls for turbine/generator
Proposed Work:	Demolish and remove an area of existing floor to accommodate new penstock and equipment access.

EXHIBIT A
PROJECT DESCRIPTION &
MODE OF OPERATION

New Turbine Generator Room:

Location:	Beginning of existing rock tunnel tailrace
Use:	Formerly used as tailrace
Dimensions:	16½' x 7'
Walls:	Front and sides (rock); back (new reinforced concrete)
Floor:	New reinforced concrete
Proposed Work:	Form and pour approximately 30 cu/yds. reinforced concrete to support new turbine/generator and encase draft tube

Transmission Line:

Distance from Building:	90' underground 20' overhead
Location of Interface:	Giles Street
Utility:	N.Y. State Electric and Gas Co.

EXHIBIT A
PROJECT DESCRIPTION &
MODE OF OPERATION

ESTIMATED COST OF PROJECT

COST ESTIMATE SUMMARY

	<u>Amount</u>	<u>Includes Item Nos. In Detailed Estimate</u>
1. Turbine/Generator Equipment	\$ 285,000	
2. Dam Repair	21,000	8
3. Civil Construction	206,100	1, 2, 3
4. Mechanical Construction	53,500	4a, 4b, 4c
5. Electrical Construction	71,000	4d
6. Architectural & Site Work	20,000	5, 9
7. Engineering/Construction Surveillance	165,000	
8. Start-Up/Test/Debugging	<u>15,500</u>	7
Subtotal	\$ 837,100	
9. Contingency Amount	83,700	
10. Interest During Construction	70,000	
11. Legal and Accounting	<u>30,000</u>	
TOTAL ESTIMATED PROJECT COST	\$1,020,800	

CONSTRUCTION COST ESTIMATE

September, 1984

	<u>Amount</u>
1. <u>Cofferdams, Dewatering, Desilting, Access:</u>	
a. Intake cofferdam	\$ 12,000
b. Tailrace exterior penstock area cofferdam	46,000
c. Access to penstock area, turbine room	15,000
2. <u>Demolition, Clearing, Construction Preparation:</u>	
a. Remove & dispose existing intake structure	5,500
b. Remove & dispose steel penstock section	1,500
c. Remove & dispose misc. debris and remnants in tailrace canal, and 1st level access area	12,000
d. Cut and remove concrete floor slab at access to turbine room	8,500
e. Cut new penstock entrance to powerhouse building	3,500
3. <u>Concrete, Steel, and Masonry:</u>	
a. Construct new intake with gate and trashrack	23,000
b. Repair existing brick lined penstock	4,000
c. Install and interface new 48" steel penstock in existing brick and concrete penstock - through building and to the turbine room	21,000
d. Repair tailrace tunnel turbine room, and control room areas	16,000
e. Repair former brick opening for steel penstock	2,000
f. Support floor slab for indoor transformer	3,500
g. Install embedded turbine parts, generator sole plate	5,600
h. Construct turbine/generator foundations	21,000

EXHIBIT A
PROJECT DESCRIPTION &
MODE OF OPERATION

4.	<u>Equipment Installation:</u>	
a.	Install turbine/generator set, switchgear, controls, transformer, protective relays, and metering	\$ 32,000
b.	Install mechanical systems:	9,500
	. Hydraulic operator	
	. Water cooling to bearings	
	. Headwater and tailwater transducers	
c.	Furnish and install:	12,000
	. HVAC	
	. Sump pumps	
d.	Furnish and install electrical systems:	71,000
	. Control and power wiring	
	. Station service, lighting, pumps, HVAC, lightning protection, alarms	
	. Transmission wiring and utility tie-in	
	. Transformer	
5.	<u>Miscellaneous Metals, Carpentry, Painting:</u>	10,000*
	. Access stairways, handrails, doors	
	. Painting	
6.	<u>Cofferdam Removal:</u>	6,000
7.	<u>Start-Up, Testing, Debugging:</u>	15,500
8.	<u>Dam Repair:</u> (Utilizing turbine to drawdown headwater)	21,000
9.	<u>Project Clean-Up, Architectural and Site Details:</u>	<u>10,000*</u>
	TOTAL CONSTRUCTION COST ESTIMATE	\$ 387,100

* (allowance)

EXHIBIT A
PROJECT DESCRIPTION &
MODE OF OPERATION

ANNUAL ESTIMATED PROJECT REVENUES AND AVOIDED COST LEGISLATION:

In determining the estimated annual revenue to be derived from the proposed Van Natta Hydro Development, it is necessary to review the current status of avoided cost legislation in the State of New York.

In 1980, New York State enacted legislation, similar to PURPA, to develop alternate energy sources by encouraging cogeneration and small hydroelectric facilities. The State law, as amended, further requires Electric Utilities to enter into long term contracts to purchase electricity from State qualifying facilities under terms that are "just and economically reasonable to the corporation's rate payers, non-discriminating to (State qualifying facilities) and (in furtherance of) the public policy" behind the legislation, but at a sales price not less than 6 centers per kilowatt hour.¹

Proceedings to implement the Federal and State legislation and regulations were held before a respondent Public Service Commission (PSC) and culminated in an opinion issued May 12, 1982. On September 9, 1982 Consolidated Edison Company of New York petitioned the Supreme Court - Appellate Division to review various aspects of the P.S.C.'s opinion.¹

On December 30, 1983, the Appellate Court rendered a decision which concluded that the New York legislation had in fact required the utilities to purchase electricity from a small power producers at a rate greater than the federally mandated rate. The Court also concluded that "to the extent that the State requirement of a 6 cents per kilowatt hour minimum purchase price conflicts with the Federal rule establishing a purchase price of avoided cost, the State requirement has been pre-empted and is invalid."¹

Following this action by the Appellate Court in December of 1983, there have been two forces at work to re-establish a standardized approach for small power producers intending to negotiate power sales contracts with New York utilities.

First, State Assemblyman, A. Orazio has introduced legislation to clarify the PSC's responsibility for setting long term avoided cost rates for electric utilities. This legislation was introduced in May of 1984, and should be acted upon in the current legislative session. A copy of that proposed legislation is attached.

Secondly, the New York Alliance for Hydroelectric Energy, Inc. (NYAHE) has undertaken their own efforts to obtain long run avoided costs from the Niagra Mohawk Power Corporation, through the P.S.C. On August 22nd, the final version of the long run rate settlement was reached, agreeing upon average avoided costs for 1985 through 2005, applicable to long term contracts between small power producers and Niagra Mohawk Power Corp.

While NYAHE does not intend to immediately pursue a similar rate case with the New York State Electric and Gas Company, the utility serving the Van Natta Project area, it is hoped that the P.S.C. may pursue this on their own initiative.

1 State of New York
Supreme Court
Appellate Division
Consolidated Edison Co. vs. public Service Commission of N.Y.
and Brooklyn Union Gas Co.
Case No. 44910. 11/22/83

EXHIBIT A
PROJECT DESCRIPTION &
MODE OF OPERATION

In conclusion, it is difficult at this time to predict the outcome of the presently proposed legislation and/or long term rate case for the project's avoided cost structure.

It is anticipated, however, that this issue would be resolved at the time that the F.E.R.C had made a decision on the approval of this project.

Based upon estimated project costs, a value of 7.16 cents per kilowatt hour would be necessary for a first year break-even operation. For comparative purposes, this would occur on Niagra Mohawk's Power System in 1989.

In the event that the estimated long run avoided costs for the NYSEG system fell below the value of 7.14 cents per kWh, the Applicant would then consider prudent engineering design measures to reduce project costs during the project's final design phase.

PURPOSE OF PROJECT

The rehabilitation of this project will mean the restoration and utilization of a valuable natural resource. It is anticipated that all of the power generated at the site will be sold directly to New York State Electric and Gas Co.

EXHIBIT E - ENVIRONMENTAL REPORT

PROJECT DESCRIPTION

The proposed Van Natta Water Power Rehabilitation Project is located on the Six Mile Creek, immediately downstream of the Giles Street Bridge, in the city of Ithaca, New York.

Historically, water provided power at Van Natta's pumping station from three separate sources: One source was from the upstream Sixty Foot Dam, where a 24 inch diameter pipe carried water for 9,400 feet to the pumping station. The second source was from the Thirty Foot Dam, where a 24 inch diameter pipe passed water for 5,050 feet to the pumping station. The third origin of water supply for power was from the Van Natta Dam located adjacent to the pumping station.

The proposed project is to rehabilitate and utilize the civil features associated with the later mentioned source of water supply from the Van Natta Dam.

These project features include an existing dam, intake structure, brick and concrete penstock, turbine/generator room, and a rock lined tunnel tailrace.

The existing dam was constructed of reinforced concrete and was built in 1907. The dam spans across the creek for a total length of 142 feet, at a spillway length of 115 feet, and at average height of 12 feet.

The existing east abutment of the dam located adjacent to the pumping station served as an intake to an 8 foot diameter brick lined concrete capped penstock. That existing penstock runs parallel to the existing building from the intake structure for a distance of approximately 58 feet. At the end of that brick and concrete penstock is an existing 5 foot diameter steel penstock, which is supported by an existing concrete column. That steel penstock has an overall length of 27 feet before entering the side of building.

Although the steel penstock and generating equipment inside the building have been removed, there is evidence that this penstock fed a turbine, which was located in the lower level of the building and then discharged water into an existing rock lined tunnel tailrace, which is located below.

This was one of the several turbines that harnessed the water power within the building. Another turbine/generator which was supplied with water from the upstream Thirty Foot Dam was located on an existing concrete floor approximately 28½ feet above the beginning of the rock tunnel tailrace floor. That pump turbine had a 18½ foot draft tube that extended from the turbine to below the tailwater. The existing rock tunnel tailrace located beneath the lowest level of the pumping station was cut out of the rock at average width of 7 feet. Located at the end of the tailrace tunnel is an existing 4 foot high concrete spillway which kept the tailwater in the tailrace tunnel at a constant elevation.

The proposed project will locate a new turbine/generator room directly below the existing pump turbine/generator room that was formerly provided with water from the upstream Thirty Foot Dam. The new turbine/generator room will be located in an area at the beginning of the existing rock tunnel tailrace. Flow to the new turbine will enter through a new trashrack gate structure to be located in front of the existing concrete intake structure. The water will then pass through the existing brick and concrete penstock and enter into a new 48 inch diameter steel penstock, which will be interfaced into the existing brick concrete penstock. The new 48 inch penstock will then turn to enter into the side of the building, where it will then run down inside the building and connect to the new turbine inlet. A new concrete floor will be required within the tailrace tunnel to support the new hydro generating equipment.

A portion of the existing concrete floor located directly above the new turbine/generator room, which formerly supported the former hydro generating equipment, will be removed to accommodate the new penstock and to provide access and installation of the new equipment below. The new switchgear and controls will be located on that level and the transformer will be located on the first floor of the pumping station.

The new 8.3 KV transmission line will exit the building near the entrance and run approximately 90' underground to a riser pole near the Giles Street Bridge. The new 20' length overhead line will then be interfaced with the existing utility overhead 8.3 KV transmission line at the bridge.

The proposed project will operate on a "Run of River" mode where all inflow will equal outflow. The proposed hydro generating equipment is capable of operating between a flow range of 20 cfs - 100 cfs at average net head of 56.75 feet at an installed capacity of 400 kw. When all incoming flow is less than 20 CFS the hydro station would not be operating and all incoming flow would pass over the spillway and down the rock steps. When flows are in excess of 100 CFS, these additional flows beyond 100 CFS would pass over the spillway and rock steps.

In addition, during the months of March, April, and May, a continuous flow of 9 cfs will be released over the spillway in order to provide for downstream passage of salmon in the spring. During the remaining months it is proposed to release 4 cfs over the spillway during daylight hours, in order to maintain the aesthetic value of the falls.

HYDROLOGY AND HYDRAULICS

The Six Mile Creek originates in the Yellow Barn State Forest, located in the central area of Tompkins County, New York. The creek flows in a meandering southerly direction through the Town of Slaterville Springs, where it then flows in a west-northwesterly direction through the City of Ithaca to its confluence with Cayuga inlet.

The watershed contributing to the creek is characterized by mostly undeveloped land consisting of open fields and woodlands. The primary drainage paths are generally flat (1.5 percent slope.) However, the adjacent hillsides have steep (9 percent) slopes. The hills that form the watershed divide are 1,021 to 1,521 feet above Cayuga Lake's surface elevation. There are a few small ponds and wetlands in lowland areas of the watershed.

An outline of the creek's drainage basin on a topographical map was obtained from U.S.G.S and can be found in the Appendix . The U.S.G.S. reported that the drainage area at the Sixty Foot Dam is 45.6 square miles, and 47 square miles at the Thirty Foot Dam. These numbers correspond with the drainage areas that the Army Corps developed during their Phase I Dam Inspection Report. Neither of the above agencies had determined the drainage area for the Van Natta Dam, therefore, interpolation was used to develop a drainage area of 49 square miles for that site.

Presently there are no hydrologic recording stations on the creek or any substantial historical flow data. U.S.G.S did measure flow during the summer of 1965, but they have no other records or knowledge of any existing data.

In order to determine the former and anticipated flows on the creek, flow data from streams with similar drainage basins were obtained from U.S.G.S.

As illustrated on the topographical map in the Appendix, Fall Creek and Cayuga Inlet are adjacent streams with basins sharing similar topography, geology and weather conditions. Although percolation and runoff do vary from basin to basin due to evaporation, soil composition and vegetation, the basin's proximities enable a justifiable comparison.

U.S.G.S. has gaging stations on both Fall Creek and Cayuga Inlet. Fall Creek Gaging Station is located just upstream of Beebe Lake, with a total drainage area of 126 square miles. The Cayuga Inlet gage is located downstream of Blakslee Hill Road, with a total drainage area of 35.2 square miles. The period of recorded data for Fall Creek gage is 1926-1981 and 1938-1980 for Cayuga Inlet.

For the purpose of this study the water years 1938-1980 from both gaging stations, were used to develop the flow projections at Six Mile Creek.

The average monthly flows for 42 years at both gages were multiplied by the drainage area ratios to reflect the expected flows for the Van Natta site on the Six Mile Creek. As illustrated from the table in the appendix, these two mean monthly expected flows were then averaged together. Although there will be some error in projecting the flows, it is expected that this averaging method will yield values that are within approximately 15% of the actual flows on the Six Mile Creek. These projected flows will be used in determining the quantity of inflow.

In January 1982, the City received their Water System Evaluation Report prepared by Malcolm Pirnie, Inc. That study reported the existing 24" water main intake at the Sixty Foot Dam to average 3.58 mgd (5.54 cfs) and a maximum monthly demand of 4.07 mgd (6.29 cfs) for the year 1981. The study projected an average demand for the year 2005 to be 4.18 mgd (6.47 cfs), and a maximum monthly demand of 4.60 mgd (7.1 cfs).

Assuming the expected average life of a hydro plant to be 50 years, the projected water demand for the City should be included in determining estimated future flows for hydro power. At Van Natta an overall 9 cfs was deducted, this deduction is illustrated on the estimated average monthly flow table in the Appendix.

In addition, a flow duration curve was then developed by adjusting drainage area ratios from the Fall Creek Flow Data and the Cayuga Inlet Data to the Six Mile Creek and then averaged. This curve can be found in the Appendix.

GEOLOGICAL RESOURCES

The Six Mile Creek watershed area is an important resource in the system of gorges that have come to be one of Ithaca's most noted features. Formed as a result of extensive glaciation during Pleistocene glacial advances, the Six Mile Creek gorge is a relatively unspoiled natural area of great visual beauty.

Located downstream of the Van Natta spillway, the water cascades over a series of natural rock steps for a distance of approximately 130 feet before entering an existing pool which is located at the end of the pumping station building and at the base of the last rock step. These rock ledge steps average in height of approximately four feet and their seams run perpendicular and parallel to the spillway.

These natural rock steps form the Creek's channel which gradually reduce in width of 34 feet at the base of the spillway to a width of 13 feet before diverting the flow into the pool.

Steep rock cliffs form the Creek's embankments for a distance of approximately 340 feet downstream of the pumping station. Boulders and rough cut sections of ledge are intermittently dispersed in this section of the Creek. An exception to the cliffs is a tongue of exposed rock which protrudes out into the Creek, and is located across from and immediately downstream of the pumping station and is referred to by local residents as the Old Indian Campground.

RECREATION

Several Citizen Committees currently share responsibility for maintaining trails, parking and picnic areas on Six Mile Creek in the vicinity of Van Natta's Dam.

Though readily accessible to both city and town residents - located a few blocks from the downtown area and wedged between two heavily populated residential neighborhoods - use of the Six Mile Creek watershed for the city water supply necessitates strict regulation of recreational use of the area. Many activities such as swimming, boating, camping and ice skating are prohibited. However, more passive recreational uses such as walking and nature study are permitted in designated areas; particularly around the Van Natta's Dam site.

Swimming: Although there are laws forbidding trespassing and swimming within this creek system, swimming is still a common activity, particularly in the impoundment formed by Thirty Foot Dam. Several youths have been seriously injured while diving from the surrounding cliffs, and local police have made numerous arrests in an effort to discourage these activities.

Hiking: Narrow paths may be found along the entire reach of Six Mile Creek from Sixty Foot Dam to Van Natta's Dam. These paths provide excellent hiking opportunities for recreation and nature observation. The abundant natural attributes combined with the flowing water of the Creek, make the gorge very popular with local naturalists.

The following activities have been conducted in portions of the gorge for several years:

- Public tours of the wildflower preserve by the city's Circle Greenway Committee
- Field trips by the Cayuga Bird Club and Cayuga Trails
- Grade school wildflower walks
- Cornell University research projects

In recent months, city Commissions have examined competing and compatible uses for the area, and have established measures for preserving and protecting priority uses of the watershed. The development of a Master Plan has been proposed for the gorge, and a Gorge Ranger has been hired to monitor use of the area. Plans are being developed to improve passive recreation in the Six Mile Creek gorge. These include the following:

1. Proposed designation of Six Mile Creek as a Critical Environmental Area pursuant to the State Environmental Quality Review Act.
2. Trail mapping by the City of Ithaca
3. Development of a wildflower guide for public distribution
4. Development of a brochure on use of the gorge, highlighting do's and don'ts
5. Lengthening the season of wildflower interest by introducing summer and autumn wildflowers
6. Establishment of a "Get Well Walk" allowing use of part of the trail system for recuperation
7. Development of a long term plan for care and interpretation of the wildflower preserve

FISH AND WILDLIFE

The stream and reservoir habitat above Van Natta's Dam is classed as a mixed coldwater/warmwater fishery. The New York State D.E.C. operates its fry stocking program for landlocked salmon in these upstream reaches. These salmon grow to smolts in upperstream and migrate downstream during spring and early summer, passing over the series of dams on Six Mile Creek to arrive at Cayuga Lake where they grow to maturity.

The upper reservoir area supports mostly warmwater fish species such as brown bullhead, largemouth bass, a variety of centrarchids and an occasional brown trout. These species are also likely to be found in the Thirty Foot Dam reservoir and in the Creek. The area below Van Natta's Dam serves as spawning habitat for rainbow trout and smallmouth bass.

Migration upstream occurs during the spring of each year. Upstream migration beyond the Van Natta's Dam is prevented, due to the falls and the absence of fish passage facilities at the Dam.

The following is a list of most resident fish species likely to be found in Six Mile Creek between Sixty Foot Dam reservoir furthest upstream, and the plunge pool below Van Natta's Dam. This list is based on D.E.C. fish surveys in 1955 and 1960.

longnose dace	mottled sculpin
blacknose dace	brown bullhead
white sucker	brown trout
creek chub	brook trout
common shiner	rainbow trout
cutlips minnow	largemouth bass
central stoneroller	smallmouth bass
various centrachids	

The high degree of isolation found in the Six Mile Creek gorge, due to its steep rock walls, provides excellent wildlife habitat. This is unique, considering the urban residential character of the surrounding area. There are numerous bird species which are resident or migratory transients to the gorge. These include robins, jays, grackles, tanagers, goldfinches, orioles, a variety of sparrows and woodpeckers, crows, hawks and owls. Ducks, herons, and egrets may also be found in some section of the creek and reservoirs. Mammalian forest and field species are also common to the area. Signs of white-tail deer are common. Raccoon, skunk, muskrat, mustelids and a variety of mice and other rodents are also likely to be found.

The U.S. Fish and Wildlife Service reports that although there may be occasional transient individuals present in the Six Mile Creek System, no federally listed or proposed endangered or threatened species are known to exist in the project area at this time. No critical habitats are present, though the area around and below Van Natta's Dam has been designated as a nature area by the City.

VEGETATIVE COVER

A great variety of wildflower and hardwood species exist in Six Mile Creek in the vicinity of the Van Natta's Dam. The Creek System supports a wildflower population that is believed to exhibit the greatest species diversity of any single area in the state. In 1970, the area was designated a wildflower preserve by the city and in 197, the Circle Greenway Committee was established to delineate paths and provide tours in the vicinities of intense wildflower growth.

The largest concentrations of wildflowers may be found between Thirty Foot Dam and Giles Street, located near Van Natta's Dam. The Indian campground, a high knoll directly across and slightly downstream of the Van Natta's Dam Pumphouse facility, is characterized by acid soils and the species which grow in such soil.

While no list of native floral species has ever been developed for the gorge, Flora of the Cayuga Lake Basin, a book published in 1920, makes many references to Six Mile Creek and provides an idea of what species existed in the area historically. The City of Ithaca has recently contracted the services of Dr. William Dress, professor emeritus of the Cornell University Herbarium, to develop a species accountant. This study effort is currently underway.

WATER QUALITY AND QUANTITY

The Six Mile Creek watershed area is the source of water supply for the City of Ithaca. The water is treated subsequent to filtering at the city's Water Filtration Plant to bring it up to State Health Department, E.P.A., and D.E.C. quality standards for drinking. The maximum capacity of the filtering system is seven million gallons of water per day. Presently, the average load drawn through the system (based on daily demand) is approximately 4.7 million gallons per day.

HISTORICAL AND ARCHAEOLOGICAL RESOURCES

The Indian Winter Campground, a tongue of exposed rock across the stream from the old powerhouse/pumphouse building, extends into Six Mile Creek immediately below the Van Natta's Dam. The campground is locally recognized as the historical winter dwelling place of the designated nature area.

The abandoned Van Natta's pumping station is located on Six Mile Creek at Giles Street near the city's Water Treatment Plant. The pump station was constructed in 1893, by a private water supplier. During the year 1904, the City of Ithaca acquired ownership of the water system by condemnation. The station housed ten pumps in a wood frame structure with a masonry veneer. Other additions were made to this structure.

In 190, new higher powered pumping machinery was bought and installed at Van Natta's to enable pumping, in greater quantities, to the hills, and in 1907, a new dam was built at Van Natta.

To acquire more storage capacity and save power, the 60 foot dam reservoir was constructed 1½ miles upstream of Van Natta's in 1911. A 24 inch pipe line was run to the filtration plant, and hydraulic turbines were installed in Van Natta's Pumping Station to make use of this water power for pumping filtered water. Three of the pumps were used as emergency standby to deliver raw water through a 20 inch main to the filtration plant. Seven pumps delivered water to the East Ithaca and Mitchell Street Service Areas. All pumps have since been removed. Though long abandoned, the Van Natta's structure appears to be dry and sound. The proposed rehabilitation of the generating facility would utilize much of the existing civil works. Located in the appendix is a copy of the history of Ithaca's water and sewer systems.

EXPECTED ENVIRONMENTAL IMPACTS FROM THE CONSTRUCTION AND
AND OPERATION OF THE PROJECT:

The construction and operation of the project as proposed should have negligible environmental impacts upon the surrounding area. Approved porta-dams will be installed at the headrace and tailrace to isolate construction activities from the river.

Exterior construction will be limited to the intake rehabilitation work, interfacing and installing new penstock and installation and interconnection of the new transmission line.

The existing pumphouse will be utilized so that other construction will be limited to interior work. There will be no installation of flashboards. Therefore, water levels in the impoundment will be unaffected by the impoundment or upstream of the project.

Removal of any old generating equipment of potential historical interest will be recorded, and reported to the New York Historic Preservation Commission.

Operating as a run-of-the-river project, negligible storage capacity of the impoundment area will be utilized. There will be no water level fluctuations and, through constant recirculation of the impoundment, no measurable increases in water temperature are expected. Also, there will be no pollutant discharges from the facility so that eutrophication will not be enhanced as a result of project operations, and no releases of toxic substances will occur.

The lower reaches of the Six Mile Creek are periodically ponded during the summer months, due to reduced flows and the municipal water demands of the City. Removal of water at the upstream Sixty Foot Dam eliminates flow over the dam and downstream to the Thirty Foot Dam and Van Natta's Dam. The impact of this ponding to aquatic habitat is not known, but must be significant. The critical flow period for this section of Six Mile Creek occurs during the downstream migration of Atlantic salmon smolts. Sufficient flow over the dams is required at this time to pass the smolts over the dam without injury. The majority of the salmon migration takes place during the months of March, April, and May. Therefore the migration is usually completed before flow is eliminated over the Sixty Foot Dam.

The New York D.E.C. minimum flow recommendation for the Ithaca Falls Hydroelectric Project, located nearby on Fall Creek, requires a continuous flow of 10 cfs for downstream fish passage until studies of injuries or mortalities with passage over Ithaca Falls can be determined at this flow. Mitigative measures, such as notching the dam above the plunge pool or a higher minimum flow, may be required if mortalities are excessive.

It was learned during the preliminary consultation with the New York D.E.C. that the 85% exceedence value from the flow duration curve can be used as an estimate for minimum flows. This flow equals to 9 cfs for the Six Mile Creek. Although the actual minimum flow requirement may be more or less depending upon New York D.E.C.'s determination of specific needs of the stream system, this flow of 9 cfs was utilized.

The major fisheries concern, expressed by both the U.S. Fish and Wildlife Service and the New York D.E.C. Division of Fish and Wildlife, have been the maintenance of stream habitat and the provision of sufficient flows over the three dams in the project area to permit downstream passage of Atlantic salmon smolts without injury. The New York D.E.C. salmon stocking program on Six Mile Creek is subject to fluctuations in the availability of fry from year to year, therefore, the stocking of fry and subsequently the migration of smolts may be intermittent in future years. However, it is expected that mitigative measures for hydroelectric development will be required on an annual basis to accommodate all future stocking efforts by D.E.C. The two major fisheries constraints affecting hydroelectric development on Six Mile Creek are; 1) the entrainment of salmon smolts and resident fish by intake structures and the potential turbine related mortalities that may result, and 2) the provision of sufficient minimum flow for habitat maintenance and safe passage of smolts over the three dams. These two constraints will be discussed separately.

Entrainment: Salmonid mortalities related to turbine passage have been researched under a number of hydraulic head, flow, and equipment variations. However, preconstruction mortality estimates are difficult to assess, due to the variability of site specific conditions. It is recommended where practical, that in addition to trashracks, a screening device be installed at the intake to prevent entrainment of fish through the turbines. The City municipal water intake at the Sixty Foot Dam presently has a 2" mesh screen for this purpose. Some fish still succeed in entering the intake and are trapped at the water treatment plant. Each of the three alternatives under study will require plans for installation and maintenance of fish screens at the intakes, with a maximum mesh size of 2", and a potential 1" mesh requirement if the D.E.C. determines the need for a smaller mesh size.

Maintenance Flows: An intermediate minimum flow will be released in order to provide for downstream passage of salmon in the spring, and also to provide flows to the Van Natta Falls for aesthetics. The recommended minimum flow of 9 cfs would be required for approximately three months of the year, 24 hours/day to provide safe passage for salmon over the falls.

The existing rock lined tailrace tunnel exits the pumping station at a location immediately adjacent to the last natural rock step downstream of the spillway. Therefore, during normal operating conditions, the water surface elevation at the existing pool, located at the base of the last rock step will remain at its natural elevation. It is therefore unlikely that 9 cfs would be required year round for habitat maintenance, since there would be negligible loss of aquatic habitat. In addition, in order to maintain the aesthetic value of the falls when viewed from the Indian Winter Campground, a lesser minimum flow of 4 cfs could be passed over the falls during daylight hours for this purpose.

AGENCIES CONTACTED:

Steps taken by the Applicant in consulting with Federal, State, and local agencies regarding the proposed project.

On July 31, 1984, the following agencies were forwarded the Project Description, Environmental Report, photographs and Project Drawings.

Department of the Interior
National Park Service

Department of the Interior
Office of Environmental Project Review

U.S. Fish & Wildlife Service
Endangered Species Specialist

N.Y. Department of Environmental Conservation
Fish and Wildlife

N.Y. Dept. of Environmental Conservation
Division of Regulatory Affairs

New York Historic Preservation
Parks and Recreation

New York State Office of
Parks and Recreation

On August 16, 1984, Mr. Edward Miller from the N.Y. Department of Environmental Conservation contacted the Applicant's Consultant. It was requested that an additional 12 copies of the Project Description, Environmental Report, and Drawings be forwarded to him for distribution within the N.Y. Department of Environmental Conservation.

A letter was forwarded to the Army Corps of Engineers on September 19, 1984, informing them that the Applicant for Project #6843 was preparing a Minor License Application. In addition they were informed that they will be provided a copy of the Application upon completion for their determination as to the requirements for a 404 Permit prior to construction.

Correspondence was received from the Department of the Interior Fish and Wildlife Service, Cortland, N.Y. on September 20, 1984. After reading their response, Mr. Lou Rzepka from U.S.F.S. was contacted regarding the contents of their response. Mr. Rzepka explained that their generic concerns for hydro power were listed and that they will respond to their specific concerns upon receiving the completed License Application.

Mr. Edward Miller from New York D.E.C. was contacted September 21, 1984, as to the status of D.E.C.'s comments on the proposed project.

Mr. Miller explained that the upstream salmon stocking program is presently inactive however, there are plans to reactivate the hatchery and restore the salmon stocking program. He went on to explain that there will be a minimum flow requirement to provide downstream passage, however that quantity of flow has not been determined at the present time. He also recommended the inspection of the existing trashrack/fish diverter structure design at the nearby Tripphammer Falls to reduce entrainment.

Mr. Miller suggested that the Applicant request the 401 Water Quality Certification from D.E.C. In addition, he suggested that D.E.C. be provided with 15 copies of the License Application prior to the Public Notice Period.

Mr. Miller anticipated sending D.E.C.'s comments to the Consultant with 7 - 10 days. Upon receiving their comments, the original and fourteen copies will be forwarded to F.E.R.C.

Copies of all correspondence, to date, can be found at the end of Exhibit E.

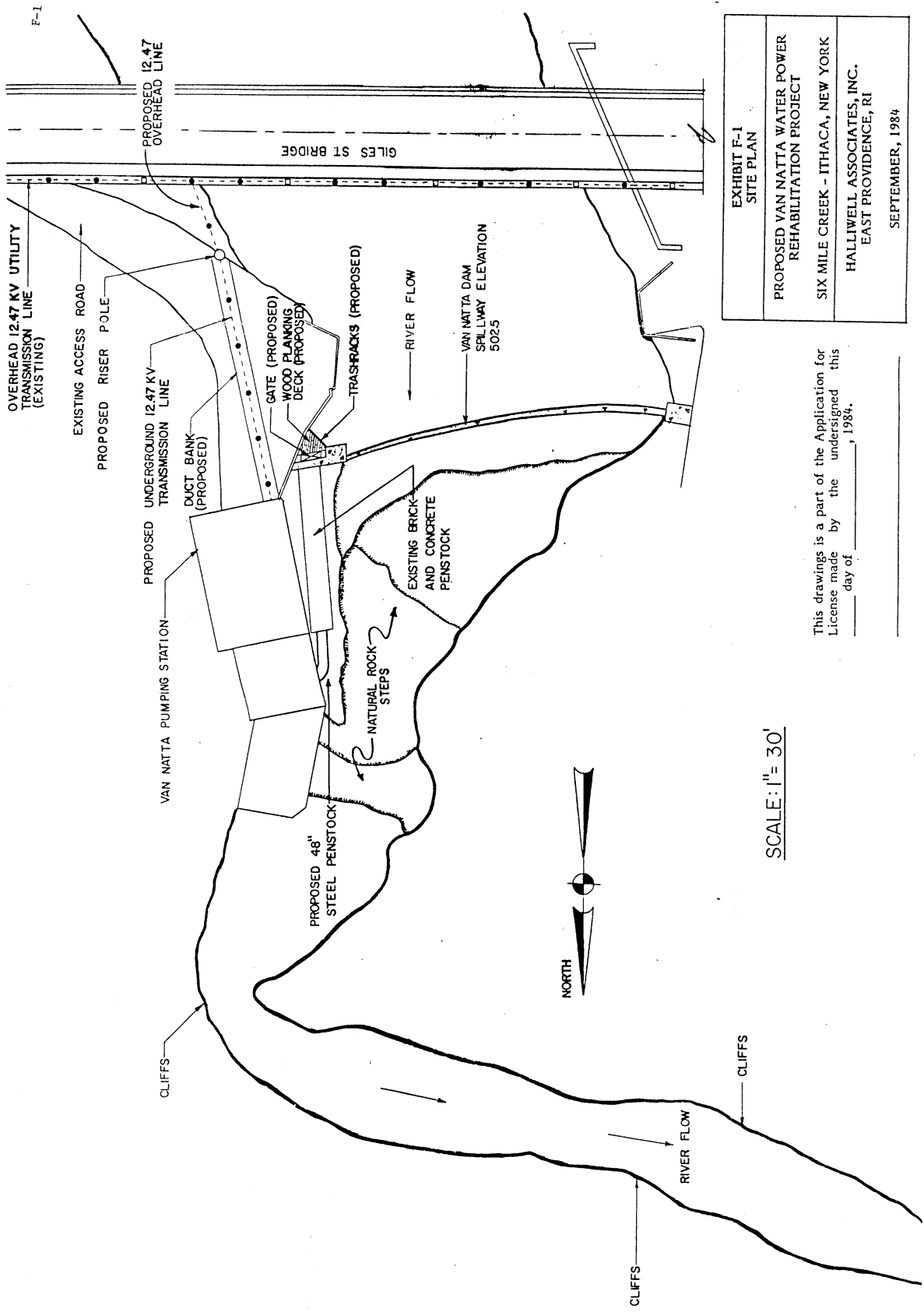


EXHIBIT F-1 SITE PLAN
PROPOSED VAN NATTA WATER POWER REHABILITATION PROJECT
SIX MILE CREEK - ITHACA, NEW YORK
HALLIWELL ASSOCIATES, INC. EAST PROVIDENCE, RI
SEPTEMBER, 1984

This drawings is a part of the Application for License made by the undersigned this _____ day of _____, 1984.

SCALE: 1" = 30'

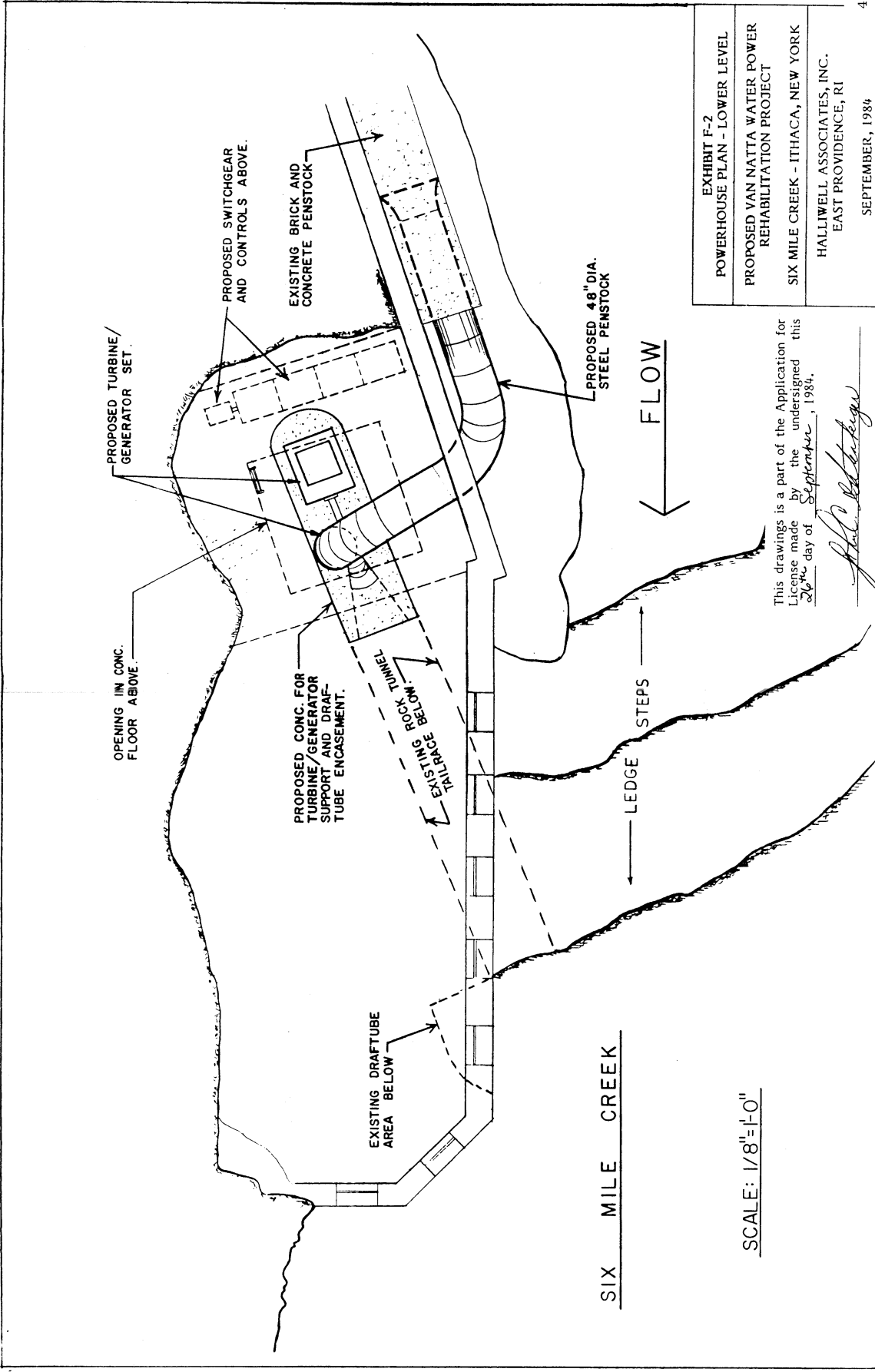


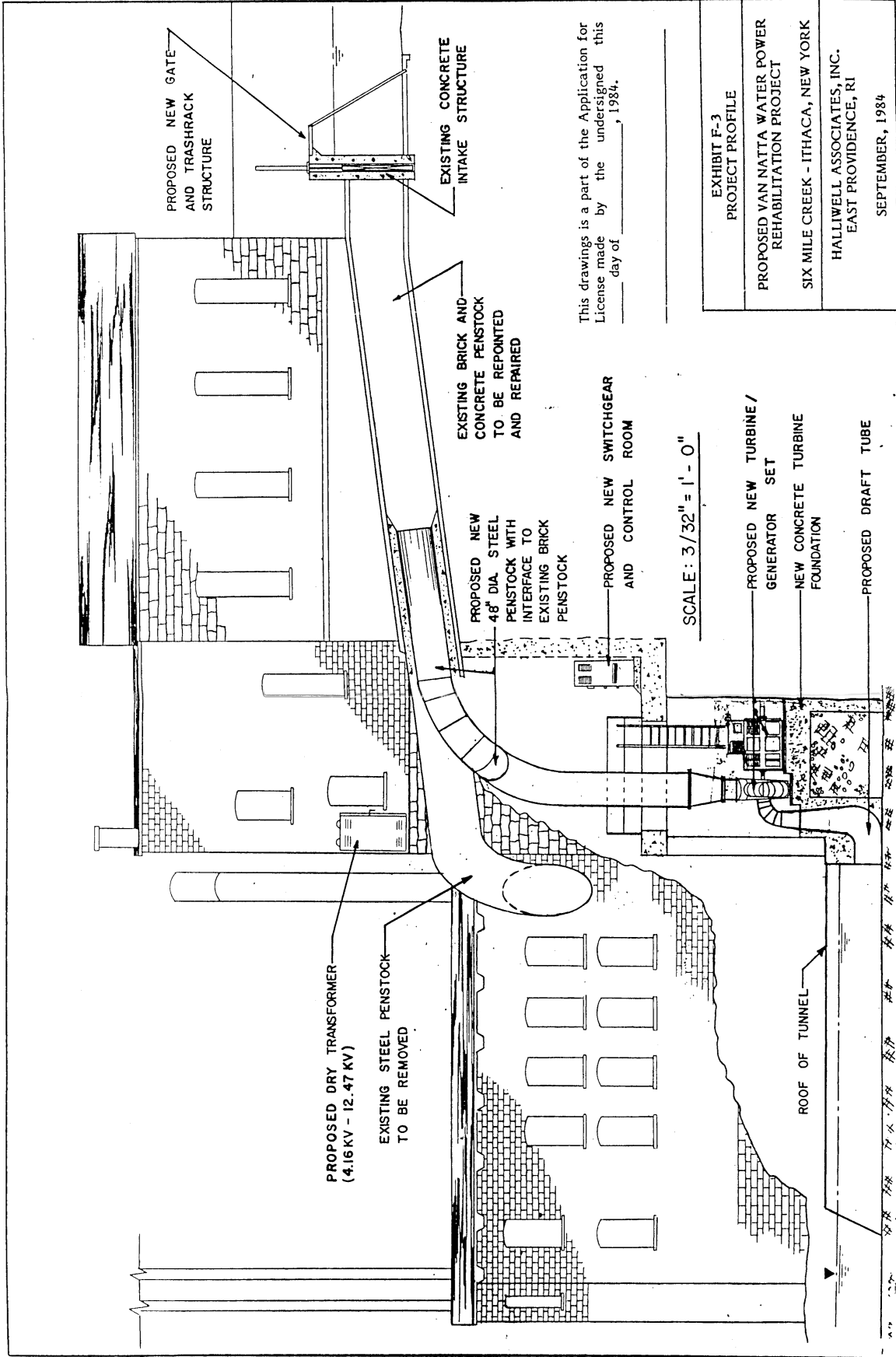
EXHIBIT F-2 POWERHOUSE PLAN - LOWER LEVEL
PROPOSED VAN NATTA WATER POWER REHABILITATION PROJECT
SIX MILE CREEK - ITHACA, NEW YORK
HALLIWELL ASSOCIATES, INC. EAST PROVIDENCE, RI
SEPTEMBER, 1984

This drawings is a part of the Application for License made by the undersigned this 26th day of September, 1984.

[Signature]

SCALE: 1/8"=1'-0"

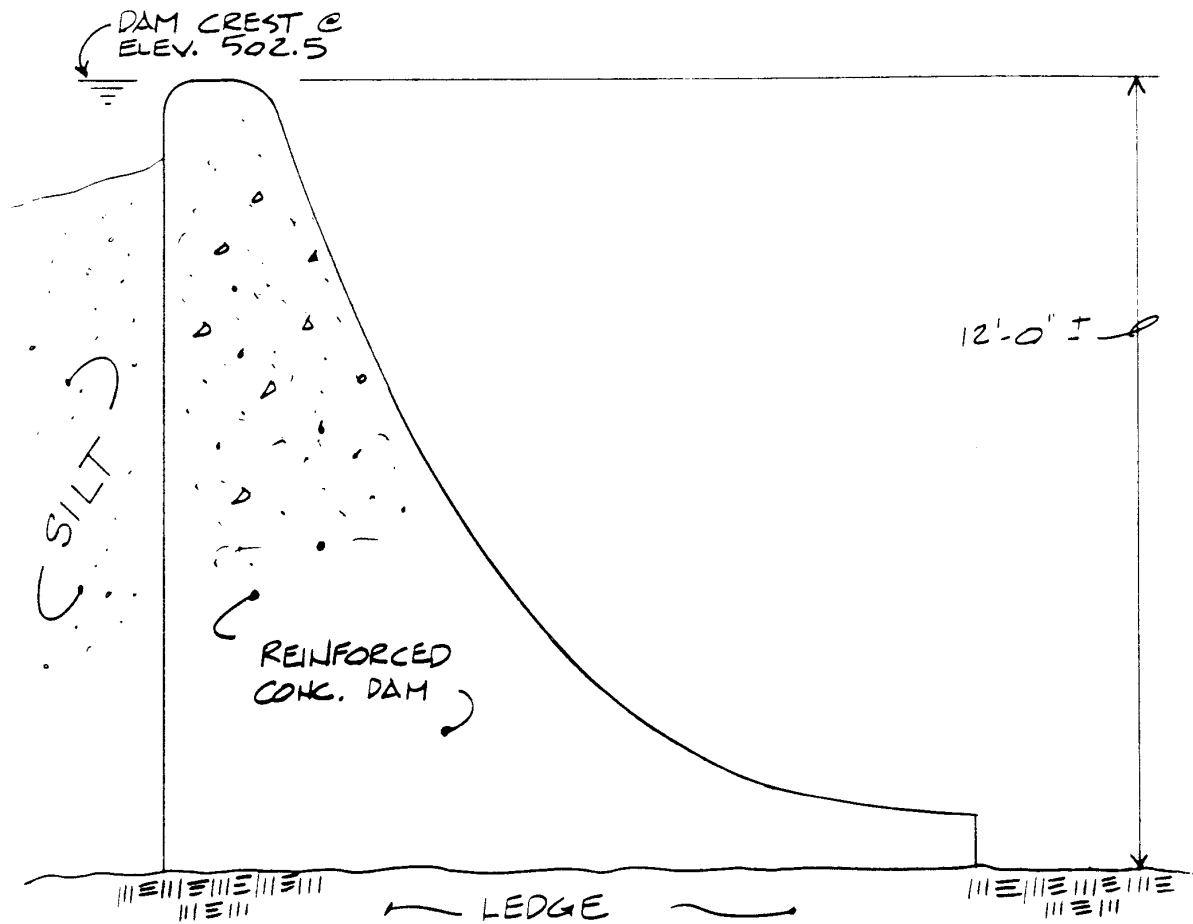
SIX MILE CREEK



This drawings is a part of the Application for License made by the undersigned this _____ day of _____, 1984.

SCALE: 3/32" = 1' - 0"

EXHIBIT F-3 PROJECT PROFILE
PROPOSED VAN NATTA WATER POWER REHABILITATION PROJECT
SIX MILE CREEK - ITHACA, NEW YORK
HALLIWELL ASSOCIATES, INC. EAST PROVIDENCE, RI
SEPTEMBER, 1984



SECTION THRU DAM 3/8" = 1'-0"

This drawing is a part of the Application for Licence made by the undersigned this _____ day of _____, 1985.

EXHIBIT F-4 SECTION THRU DAM
PROPOSED VAN NATTA WATER POWER REHABILITATION PROJECT
SIX MILE CREEK - ITHACA, NEW YORK
HALLIWELL ASSOCIATES INC. EAST PROVIDENCE, R.I.
FEBRUARY 1985