EMERALD RIDGE SUBDIVISION
DRAFT ENVIRONMENTAL IMPACT STATEMENT

VOLUME II

Proposed Action: 25 Lot Single Family Residential Subdivision

Marsh Hill Road
TOWN OF PUTNAM VALLEY, PUTNAM COUNTY, NEW YORK
Tax Map Numbers: Section 84, Block 01. Lots 5, 10.1, 10.2 and 10.3

Project Sponsor: VS CONSTRUCTION CORP.
37 Croton Dam Road, Ossining, NY 10562
Attention: Val Santucci
(914) 739-7362

Lead Agency: TOWN OF PUTNAM VALLEY PLANNING BOARD
265 Oscawana Lake Road
Putnam Valley, New York 10579
Contact: Billy Lee Crowder
Planning Board Chairman
(845) 526-3740

PLANNING CONSULTANT
Tim Miller Associates, Inc.
10 North Street, Cold Spring, New York 10516
Attn: Josh Moreinis, AICP, PP
(845) 265-4400

PROJECT ENGINEER
Cronin Engineering, P.E., P.C.
The Lindy Building, Suite 200
2 John Walsh Boulevard
Peekskill, New York 10566
Attn: Keith Staudohar
(914) 736-3664

Lead Agency Acceptance Date: June 5, 2006
Date of Public Hearing: July 31, 2006

Comments will be accepted by the Planning Board for 30 calendar days
from the first filing of the Notice of Completion or 14 calendar days
following the close of the public hearing, whichever is later

June 5, 2006

LIST OF CONSULTANTS

Contributors to this document include the following:

Lead Agency: TOWN OF PUTNAM VALLEY PLANNING BOARD
265 Oscawana Lake Road
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EMERALD RIDGE SUBDIVISION
TOWN OF PUTNAM VALLEY, PUTNAM COUNTY, NEW YORK
Draft Environmental Impact Statement

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Correspondence
(including all SEQR Documentation)

TIM
MILLER
ASSOCIATES, INC.

10 North Street, Cold Spring, New York 10516 *Phone (845) 265-4400* *Fax (845) 265-4418*

August 20, 2004

Mr. John Zarcone, Chairman
Putnam Valley Planning Board
Putnam Valley Town Hall
Oscawana Lake Road
Putnam Valley, New York 10579

Re: Marsh Hill Road, a.k.a., Emerald Ridge Project

Dear Mr. Zarcone:

Per our discussions on Monday night, I enclose a Part II EAF and a Part III discussion relating to the environmental issues associated with this matter. It is our understanding that the Town intends to adopt a Positive Declaration on this project and request that the applicant prepare a focused Environmental Impact Statement.

The suggested Part II and Part III indicates those areas where potential large impacts may occur and areas where no impacts would be expected to occur. I trust that this will satisfy the Board's information requirements as you move forward with the Positive Declaration.

We request that you adopt such Positive Declaration at your next meeting and set a date for potential Scoping. Towards this end we are providing you with a Draft Scoping Outline for your consideration, also enclosed.

Kindly advise if you have any questions.

Sincerely,

Tim Miller

Tim Miller, AICP
President
TIM MILLER ASSOCIATES, INC.

TEM/dbd

c: V. Santucci
D. Steinmetz
Chazen
K. Standohar

Part 2 – PROJECT IMPACTS AND THEIR MAGNITUDE

Responsibility of Lead Agency

General Information (Read Carefully)

- In completing the form, the reviewer should be guided by the question: Have my responses and determinations been reasonable? The reviewer is not expected to be an expert environmental analyst.
- The **Examples** provided are to assist the reviewer by showing types of impacts and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site other examples and/or lower thresholds may be appropriate for a Potential Large Impact response, thus requiring evaluation in Part 3.
- The impacts of each project, on each site, in each locality, will vary. Therefore, the examples are illustrative and have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.
- The number of examples per question does not indicate the importance of each question.
- In identifying impacts, consider long term, short term and cumulative effects.

Instructions (Read Carefully)

a. Answer each of the 20 questions in PART 2. Answer **Yes** if there will be any impact.
b. **Maybe** answers should be considered as **Yes** answers.
c. If answering **Yes** to a question then check the appropriate box (column 1 or 2) to indicate the potential size of the impact. If impact threshold equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than examples, check column 1.
d. Identifying that an impact will be potentially large (column 2) does not mean that it is also necessarily **significant**. Any large impact must be evaluated in PART 3 to determine significance. Identifying an impact in column 2 simply asks that it be looked at further.
e. If reviewer has doubt about size of the impact then consider the impact as potentially large and proceed to PART 3.
f. If a potentially large impact checked in column 2 can be mitigated by change(s) in the project to a small to moderate impact, also check the **Yes** box in column 3. A **No** response indicates that such a reduction is not possible. This must be explained in Part 3.

IMPACT ON LAND	1 Small to moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change
1. Will the proposed action result in a physical change to the project site? ☐ NO ■ YES			
Examples that would apply to column 2			
• Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.	☐	■	☐ Yes ☐ No
• Construction on land where the depth to the water table is less than 3 feet.	☐	☐	☐ Yes ☐ No
• Construction of paved parking area for 1,000 or more vehicles	☐	☐	☐ Yes ☐ No
• Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.	☐	☐	☐ Yes ☐ No
• Construction that will continue for more than 1 year or involve more than one phase or stage.	■	☐	☐ Yes ☐ No
• Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e., rock or soil) per year.	☐	☐	☐ Yes ☐ No
• Construction or expansion of a sanitary landfill.	☐	☐	☐ Yes ☐ No
• Construction in a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts: **Temporary construction disturbance prior to stabilization with pavement and permanent landscaped areas.**	☐	■	☐ Yes ☐ No
2. Will there be an effect to any unique or unusual land forms found on the site? (i.e., cliffs, dunes, geological formations, etc.) ■ NO ☐ YES			
• Specific land forms:	☐	☐	☐ Yes ☐ No

IMPACT ON WATER	1 Small to moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change
3. Will proposed action affect any water body designated as protected (under Articles 15, 24, 25 of the Environmental Conservation Law, ECL) ☐ NO ■ YES			
Examples that would apply to column 2			
• Developable area of site contains a protected water body.	☐	☐	☐ Yes ☐ No
• Dredging more than 100 cubic yards of material from channel of a protected stream.	☐	☐	☐ Yes ☐ No
• Extension of utility distribution facilities through a protected water body.	☐	☐	☐ Yes ☐ No
• Construction in a designated freshwater or tidal wetland.	☐	☐	☐ Yes ☐ No
• Other impacts: **Potential small amount of disturbance in wetland buffer areas for installation of septics.**	☐	■	☐ Yes ☐ No
4. Will proposed action affect any non-protected existing or new body of water? ■ NO ☐ YES			
Examples that would apply to column 2			
• A 10% increase or decrease in the surface area of any body of water or more than a 10 acre increase or decrease.	☐	☐	☐ Yes ☐ No
• Construction of a body of water that exceeds 10 acres of surface area.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No
5. Will proposed action affect surface or groundwater quality or quantity? ☐ NO ■ YES			
Examples that would apply to column 2			
• Proposed action will require a discharge permit. **(SPDES for Construction Activities)**	■	☐	☐ Yes ☐ No
• Proposed action requires use of a source of water that does not have approval to serve proposed (project) action.	☐	☐	☐ Yes ☐ No
• Proposed action quires water supply from wells with greater than 45 gallons per minute pumping capacity.	☐	☐	☐ Yes ☐ No
• Construction or operation causing any contamination of a water supply system.	☐	☐	☐ Yes ☐ No
• Proposed action will adversely affect groundwater.	☐	☐	☐ Yes ☐ No
• Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.	☐	☐	☐ Yes ☐ No
• Proposed action would use water in excess of 20,000 gallons per day	☐	☐	☐ Yes ☐ No
• Proposed action will likely cause siltation or other discharge into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.	☐	☐	☐ Yes ☐ No
• Proposed action will require the storage of petroleum or chemical products greater than 1,100 gallons.	☐	☐	☐ Yes ☐ No
• Proposed action will allow residential uses in areas without water and/or sewer services.	☐	☐	☐ Yes ☐ No
• Proposed action locates commercial and/or industrial uses which may require new or expansion of existing waste treatment and/or storage facilities.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No
6. Will proposed action alter drainage flow or patterns, or surface water runoff? ☐ NO ■ YES			
Examples that would apply to column 2			
• Proposed action would change flood water flows.	☐	☐	☐ Yes ☐ No

	1 Small to moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change
• Proposed action may cause substantial erosion.	☐	☐	☐ Yes ☐ No
• Proposed action is incompatible with existing drainage patterns.	☐	☐	☐ Yes ☐ No
• Proposed action will allow development in a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts: **A stormwater management plan will be required.**	☐	■	☐ Yes ☐ No

IMPACT ON AIR

7. Will proposed action affect air quality? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• Proposed action will induce 1,000 or more vehicle trips in any given hour	☐	☐	☐ Yes ☐ No
• Proposed action will result in the incineration of more than 1 ton of refuse per hour.	☐	☐	☐ Yes ☐ No
• Emission rate of total contaminants will exceed 5 lbs. Per hour or a heat source producing more than 10 million BTU's per hour.	☐	☐	☐ Yes ☐ No
• Proposed action will allow an increase in the amount of land committed to industrial use.	☐	☐	☐ Yes ☐ No
• Proposed action will allow an increase in the density of industrial development within existing industrial areas.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON PLANTS AND ANIMALS

8. Will proposed action affect any threatened or endangered species? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• Reduction of one or more species listed on the New York or Federal list, using the site, over or near site or found on the site.	☐	☐	☐ Yes ☐ No
• Removal of any portion of a critical or significant wildlife habitat.	☐	☐	☐ Yes ☐ No
• Application of pesticide or herbicide more than twice a year, other than protected stream.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

9. Will proposed action substantially affect non-threatened or non-endangered species? ☐ NO ■ YES

Examples that would apply to column 2

	1	2	3
• Proposed action would substantially interfere with any resident or migratory fish, shellfish or wildlife species.	☐	☐	☐ Yes ☐ No
• Proposed action requires the removal of more than 10 acres of mature forest (over 100 years of age) or other locally important vegetation.	☐	☐	☐ Yes ☐ No
• Other impacts: **Project will reduce area of natural habitat.**	☐	■	☐ Yes ☐ No

IMPACT ON AGRICULTURAL LAND RESOURCES

10. Will the proposed action affect agricultural land resources? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• The proposed action would sever, cross or limit access to agricultural land includes cropland, hayfields, pasture, vineyard, orchard, etc.).	☐	☐	☐ Yes ☐ No

	1 Small to moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change
• Construction activity would excavate or compact the soil profile of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would irreversibly convert more than 10 acres of agricultural land or, if located in an Agricultural District, more than 2.5 acres of agricultural land.	☐	☐	☐ Yes ☐ No
• The proposed action would sever disrupt or prevent installation of agricultural land management systems (e.g., subsurface drain lines, outlet ditches, strip cropping); or create a need for such measures (e.g. cause a farm field to drain poorly due to increased runoff)	☐	☐	☐ Yes ☐ No
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No
IMPACT ON AESTHETIC RESOURCES			
11. Will the proposed action affect aesthetic resources? ■ NO ☐ YES (if necessary, use the Visual EAF Addendum in Section 617.20, Appendix B.) **Examples** that would apply to column 2			
• Proposed land uses, or project components obviously different from or in sharp contrast to current surrounding land use patterns, whether man-made or natural.	☐	☐	☐ Yes ☐ No
• Proposed land uses, or project components visible to users of aesthetic resources which will eliminate or significantly reduce their enjoyment of the qualities of that resource.	☐	☐	☐ Yes ☐ No
• Project components that will result in the elimination or significant screening of scenic views known to be important to the area.	☐	☐	☐ Yes ☐ No
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No
IMPACT ON HISTORIC AND ARCHAEOLOGICAL RESOURCES			
12. Will the proposed action impact any site or structure of historic, prehistoric or paleontological importance? ☐ NO ☐ YES **Examples** that would apply to column 2			
• Proposed action occurring wholly or partially within or substantially contiguous to any facility or site listed on the Sate or National Register of Historic places.	☐	☐	☐ Yes ☐ No
• Any impact to an archaeological site or fossil bed located within the project site.	☐	☐	☐ Yes ☐ No
• Proposed action will occur in an area designated as sensitive for archaeological sites on the NYS Site Inventory.	☐	☐	☐ Yes ☐ No
• Other impacts: **To be determined.**	☐	☐	☐ Yes ☐ No
IMPACT ON OPEN SPACE AND RECREATION			
13. Will proposed action affect quantity or quality of existing or future open spaces or recreational opportunities? ■ NO ☐ YES **Examples** that would apply to column 2			
• The permanent foreclosure of a future recreational opportunity.	☐	☐	☐ Yes ☐ No
• A major reduction of an open space important to the community.	☐	☐	☐ Yes ☐ No
• Other impacts: ______________________	☐	☐	☐ Yes ☐ No

	1 Small to moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change

IMPACT ON CRITICAL ENVIRONMENTAL AREAS

14. Will proposed action impact the exceptional or unique characteristics of a critical environmental area (CEA) established pursuant to subdivision 6 NYCRR 617.14(g)? ■ NO ☐ YES
List the environmental characteristics that caused the designation of the CEA.

Examples that would apply to column 2

	1	2	3
• Proposed action to locate within the CEA?	☐	☐	☐ Yes ☐ No
• Proposed action will result in a reduction in the quantity of the resource.	☐	☐	☐ Yes ☐ No
• Proposed action will result in a reduction in the quality of the resource.	☐	☐	☐ Yes ☐ No
• Proposed action will impact the use, function or enjoyment of the resource.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON TRANSPORTATION

15. Will there be an effect to existing transportation systems? ☐ NO ■ YES

Examples that would apply to column 2

	1	2	3
• Alteration of present patterns of movement of people and/or goods.	☐	☐	☐ Yes ☐ No
• Proposed action will result in major traffic problems.	☐	☐	☐ Yes ☐ No
• Other impacts: **An existing Town road would be improved as part of project. Project will generate approximately 26 AM Peak Hour trips and approximately 30 PM Peak Hour trips and a traffic study will be required.**	☐	■	☐ Yes ☐ No

IMPACT ON ENERGY

16. Will proposed action affect the community's sources of fuel or energy supply? ■ NO ☐ YES

Examples that would apply to column 2

	1	2	3
• Proposed action will cause a greater than 5% increase in the use of any form of energy in the municipality.	☐	☐	☐ Yes ☐ No
• Proposed action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences or to serve a major commercial or industrial use.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

	1 Small to moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change
NOISE AND ODOR IMPACTS			
17. Will there be objectionable odors, noise or vibration as a result of the proposed action? ■ NO ☐ YES			
Examples that would apply to column 2			
• Blasting within 1,500 feet of a hospital, school or other sensitive facility.	☐	☐	☐ Yes ☐ No
• Odors will occur routinely (more than one hour per day).	☐	☐	☐ Yes ☐ No
• Proposed action will produce operating noise exceeding the local ambient noise levels for noise outside of structures.	☐	☐	☐ Yes ☐ No
• Proposed action will remove natural barriers that would act as a noise screen.	☐	☐	☐ Yes ☐ No
• Other impacts: **Need for blasting is undetermined at this time.**	☐	☐	☐ Yes ☐ No
IMPACT ON PUBLIC HEALTH			
18. Will proposed action affect public health and safety? ■ NO ☐ YES			
Examples that would apply to column 2			
• Proposed action may cause a risk of explosion or release of hazardous substances (i.e. oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there may be a chronic low level discharge or emission.	☐	☐	☐ Yes ☐ No
• Proposed action may result in the burial of "hazardous wastes" in any form (i.e. toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc.)	☐	☐	☐ Yes ☐ No
• Storage facilities for one million or more gallons of liquefied natural gas or other flammable liquids.	☐	☐	☐ Yes ☐ No
• Proposed action may result in the excavation or other disturbance within 2,000 feet of a site used for the disposal of solid or hazardous waste.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No
IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD			
19. Will proposed action affect the character of the existing community? ☐ NO ■ YES			
Examples that would apply to column 2			
• The permanent population of the city, town or village in which the project is located is likely to grow by more than 5%.	☐	☐	☐ Yes ☐ No
• The municipal budget for capital expenditures or operating services will increase by more than 5% per year as a result of this project.	☐	☐	☐ Yes ☐ No
• Proposed action will conflict with officially adopted plans or goals.	☐	☐	☐ Yes ☐ No
• Proposed action will cause a change in the density of land use.	☐	☐	☐ Yes ☐ No
• Proposed action will replace or eliminate existing facilities, structures or areas of historic importance to the community.	☐	☐	☐ Yes ☐ No
• Development will create a demand for additional community services (e.g. schools, police and fire, etc.)	☐	■	☐ Yes ☐ No
• Proposed action will set an important precedent for future projects.	☐	☐	☐ Yes ☐ No
• Proposed action will create ~~or eliminate~~ employment.	■	☐	☐ Yes ☐ No
• Other impacts: **Project will introduce approximately 87 new residents including approximately 21 new school-age children and will affect community services.**	☐	☐	☐ Yes ☐ No

20. Is there, or is there likely to be, public controversy related to potential adverse environmental impacts? ☐ NO ☐ YES **Unknown**

If any action in Part 2 is identified as a potential large impact or if you cannot determine the magnitude of impact, proceed to Part 3

PART 3 - EVALUATION OF THE IMPORTANCE OF IMPACTS

Prepared by the Applicant

1.0 INTRODUCTION

Overview

This Environmental Assessment Form (EAF) examines the potential environmental effects expected to result from construction of Emerald Ridge, a proposed 24-unit single-family home subdivision on approximately 85.5 acres of land in the Town of Putnam Valley, Putnam County, New York. The subject site is located on Marsh Hill Road near the southwestern corner of the Town of Putnam Valley.

The proposed use is an allowed use in the existing R-2 district and is consistent with the Town's 1990 Master Plan, which designates this site for Conservation Development at a density of 3-5 acres per dwelling unit. The overall density of the proposed subdivision is approximately 3.5 dwellings units per acre.

The project sponsor, VS Construction Corp., has prepared Parts 1, 2 and 3 of the EAF as part of an application for Subdivision Approval to the Town of Putnam Valley for this development. This Part 3 discusses the various impact issues identified in Part 2. This Part 3 is being used to identify environmental areas of concern that will be examined in a Draft Environmental Impact Statement (DEIS) to be prepared for this project.

Site Location and Description

The project site is comprised of a nearly 50-acre western portion designated as Parcel A and comprised of Tax Map 84, Block 01, Lot 5, and an approximately 35-acre eastern portion comprised of Tax Map 84, Block 01, Lots 10.1, 10.2 and 10.3.

The irregularly-shaped project site is located near the Town's southern boundary and border with Westchester County. The subject site contains approximately 1,600 feet of frontage on the east side of Marsh Hill Road, beginning approximately 500 feet north of Peekskill Hollow Road, to the east of Oscawana Lake Road. Lake Peekskill and the Town of Philipstown are located approximately 2,000 feet and 6,000 feet west of the site, respectively.

The subject site contains sloping land that ranges from a low point of approximately 280 feet on the southwestern edge of the site to high points in the central and northern portions of the site that rise to elevations of as high as approximately 422 feet. There are approximately 5.1 acres of Town regulated wetlands present on the site, and approximately 0.8 acres of New York State DEC wetlands present on the site.

An existing two-story stone dwelling is located near the southwestern corner of the site. Land uses in the vicinity of the project site include wooded land to the north and east and single family homes to the west and south, with lands of Brookfalls Cottages located adjacent to the south. There are no cultural resources located on, or adjacent to the subject site that are listed on the State or National Registers of Historic Places.

2.0 DESCRIPTION OF THE PROJECT

The subdivision plan for Emerald Ridge illustrates the layout of the proposed project. An existing stone residence located on the project site is proposed to remain, with an expanded septic area. This home and the remainder of the 24 homes in the Emerald Ridge subdivision will comply with applicable zoning and subdivision regulations. All lots will have frontages of 200 feet or more, front and rear yards greater than 50 feet, and side yards of greater than 40 feet. All homes will be served by individual wells and septics. Lot sizes range from just over two acres in size to just over six acres in size, and all lots contain the required buildable area of at least 30,000 square feet.

Stormwater runoff is proposed to be accommodated by a series of open water quality detention basins. The largest of these is proposed to be located on Lot #22 in the northern-central portion of the site (Parcel A). Two smaller basins are proposed near the eastern edges of the site (also Parcel A) on Lot #1 and Lot #17.

Access

Access to the site is from Marsh Hill Road. Roadway improvements include the proposed widening of Marsh Hill Road to 22 feet wide along the existing approximately 1,600-foot length of the roadway that abuts the project site. An additional 4,600-foot looped roadway is to be constructed to a width of 22 feet, extending north and east of the existing terminus of Marsh Hill Road. Four of the proposed residences are to be located in the interior portion of the looped roadway on Parcel B. A 25-foot wide easement along the eastern side of Lot #14 is proposed to connect the looped roadway to the Brookfalls Cottages property to the south. A 450-foot long cul de sac extends to the east of the loop roadway and provides access to four of the proposed homes.

Construction

Construction of the proposed project will occur in a single phase. Construction will begin with roadways and utility infrastructure at the site entrance. Construction of on-site roadways, infrastructure and homes is expected to be completed within between 24 and 30 months.

SUPPLEMENTAL NARRATIVE TO PART 3 - ENVIRONMENTAL ASSESSMENT FORM

IMPACT ON LAND

The project site consists of mostly undeveloped land, with one existing residence present. The site contains grades in excess of 15 percent and is approximately 90 percent wooded. Grading and recontouring of soils will be necessary for the construction of roads, individual home sites, driveways, and septic areas.

Development of the project site will result in grading and disturbance of approximately two thirds of the approximately 77 acres of wooded land on the site. The following table indicates preliminarily the estimated changes in site coverage to various categories of land cover currently present on the site.

Approximate Change in Site Cover (Acres)			
Land Cover	**Existing**	**Post-Development**	**Change**
Wooded Areas	77.0	52.6	-24.4
Wetlands	5.9	5.9	0.0
Unvegetated	1.3	0.5	-0.8
Impervious / Pavement and Buildings	0.3	5.6	5.3
Lawns, Landscaping, Water Quality	1.0	20.9	19.9
Source: Cronin Engineering, PE PC, 2004.			

Impacts to steep slopes are directly related to the potential for soil erosion during construction. Following construction, soil erosion from the property is expected to be minimal since the developed areas will be stabilized with lawns and landscaping and stormwater management features will be fully functional.

Construction on steep slopes is unavoidable. However, the roadway system has been designed to follow existing topography in order to minimize disturbance to steep slope areas. The proposed homes would be built into the slope to minimize impacts and the amount of cut and fill that would be required. A Major Grading Permit would be required from the Town for construction of the project.

No blasting is anticipated for construction of the proposed project. However, specific depth to bedrock is unknown at this time. If it is determined that blasting is needed during the course of construction, blasting will be conducted in compliance with all applicable Town codes and regulations. If blasting is necessary, it would be conducted by a licensed and insured blasting contractor. It is expected that the Town will require a detailed evaluation of potential impacts on topography, slopes and soils through further SEQRA review.

Erosion Control

The temporary effects of sedimentation on surface water quality may occur as a result of soil erosion during the construction of the proposed project and its appurtenances. Potential effects of sedimentation and excess runoff are expected to be addressed through effective stormwater management practices and said mitigation will be outlined in greater detail in a focused DEIS.

IMPACT ON WATER

The project site is separated from Peekskill Hollow Brook by Peekskill Hollow Brook Road. The site contains four wetland areas, including one New York State DEC wetland in its northeastern corner.

Stormwater Drainage

A portion of the project site contains a Flood Hazard Area (100 Year Flood Plain). The proposed project includes measures to manage stormwater to minimize the potential for flooding and to improve the water quality of the post-development stormwater. Three water quality detention basins are proposed. These facilities are expected to improve the quality of the stormwater, consistent with New York State DEC design requirements. A New York State General Stormwater Permit will be required from New York State DEC.

A Stormwater Pollution Prevention Plan will be prepared to address the stormwater improvements, erosion and sediment control standards and post construction maintenance requirements. This plan will be examined in a DEIS.

Groundwater

The proposed residences are to be served by individual wells and septics. The project is not expected to result in significant groundwater withdrawal impacts. Well testing that conforms with Putnam County Department of Health standards will be conducted and the results will be described in the DEIS.

Wetlands

The layout of the proposed house sites and site infrastructure has been designed to avoid impacts to wetlands and 100-foot wetland offset areas to the maximum extent possible. Limits of disturbance for the septic areas for Lots #9, #20 and #23 overlap with Town wetland buffers for two wetlands located on the western and central portions of the site. The centrally located Town wetland buffer may be slightly impacted by disturbance as a result of construction of the proposed roadway.

A Town Wetland Permit will be required for these proposed impacts. The DEIS will address potential wetland effects.

IMPACT ON AIR

Construction and operation of the proposed project would not trigger any thresholds that would result in large impacts to air quality.

IMPACT ON PLANTS AND ANIMALS

The project will remove approximately 24.4 acres of natural vegetation. Potential effects to plants and animals and the biodiversity of the site will be examined in a DEIS.

IMPACT ON AGRICULTURAL LAND RESOURCES

The subject property is not in agricultural use or located in an agricultural district. There would be no impacts are anticipated to agricultural land resources.

IMPACT ON AESTHETIC RESOURCES

The proposed low density residential use is consistent with the scale of uses in the surrounding area. No impacts to aesthetic resources are anticipated.

IMPACT ON HISTORIC AND ARCHEOLOGICAL RESOURCES

Potential effects on historic and archeological resources will be examined, if warranted per New York State Office of Parks Recreation and Historic Preservation comments.

IMPACT ON OPEN SPACE AND RECREATION

The project site is currently vacant, or in residential use (one existing dwelling), and is not used as open space, or for recreation by the community. Thus, no impacts to open space or recreational resources are anticipated. Recreational demand created by the new subdivision will be examined under the subject Impact on Growth and Character of Community or Neighborhood.

IMPACT ON CRITICAL ENVIRONMENTAL AREAS

No Critical Environmental Area is designated on the project site. Therefore, no impacts are anticipated.

IMPACT ON TRANSPORTATION

The proposed project will result in an increase in traffic on local roads. The greatest number of vehicular trips expected to be generated by the proposed project during the AM peak hour is estimated to total 26 vehicles. Peak PM period site generated traffic is estimated to total 30 trips. Effects on existing levels of service will be examined in the DEIS.

IMPACT ON ENERGY

Construction and operation of this facility will consume fossil fuels and electricity to a small extent relative to available resources. These impacts are not expected to adversely affect the community's sources of fuel and energy supply.

IMPACT ON NOISE AND ODOR

Construction and operation of this facility will result in a small increase in ambient noise levels in the immediate vicinity of the site consistent with residential neighborhoods. Construction noise will occur and will be short-term in nature.

The need for blasting will be examined. Construction-related noise impacts will be examined in the DEIS. Odors will not occur routinely and no impacts are anticipated.

IMPACT ON PUBLIC HEALTH

The proposed project will not involve the storage or use of "hazardous" wastes or substances or result in disturbance to same. Thus, no impacts are anticipated.

IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD

The proposed development consists of 24 single-family residences. Once fully occupied, the project is expected to house a population of approximately 87 persons, based on standard demographic multiplier rates for four-bedroom single family homes in the Northeast region found in the Urban Land Institute's 1994 *Development Impact Assessment Handbook*. Approximately 21 school age children are expected to eventually reside at Emerald Ridge. These new residents and school age children would generate additional demand for community services and would increase enrollment in the local school district. The effects of the additional population on community services will be examined in a DEIS.

STATE ENVIRONMENTAL QUALITY REVIEW
POSITIVE DECLARATION OF SIGNIFICANCE

Notice of Intent to Prepare a Draft Environmental Impact Statement

Emerald Ridge Subdivision

October 18, 2004

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

The Town of Putnam Valley Planning Board, as Lead Agency, has determined that the proposed action described below may have a significant effect on the environment and a Draft Environmental Impact Statement (DEIS) will be prepared.

Name of Action/Project:	Emerald Ridge Subdivision
Name of Applicant:	VS Construction Corp.
SEQR Status:	Unlisted
Scoping:	Yes

If yes, indicate how scoping will be conducted:

A public scoping session will be held at the Town of Putnam Valley Town Hall, 265 Oscawana Lake Road, Putnam Valley, New York 10579 on November 15, 2004 at 5:30 PM. The public scoping session will be noticed in the Environmental Notice Bulletin and the Putnam County News and Recorder at least 14 days in advance of this hearing date. Public comment will be accepted at the scoping session relating to all issues to be addressed in the DEIS.

Description of Action:

The Town of Putnam Valley Planning Board has received an application to permit a 24 lot subdivision on 85.5 (+/-) acres of land. The project site is located on Marsh Hill Road in the Moderate Density Residence (R-2) Zoning Districts. This application also includes a lot line change, which will allow approximately 35 (+/-) acres of land to be transferred from Brookfalls Cottages, Inc. to the applicant, VS Construction Corp.

The proposed action includes the above-described application, as well as all local, regional and state approvals necessary to authorize the development of the site in accordance with the proposed development plans.

Location of Action:	Marsh Hill Road
Town/Municipality:	Town of Putnam Valley
County:	Putnam
Street Address:	N/A
Tax Map Parcel:	84.-1-5 84.-1-10.1 84.-1-10.2 84.-1-10.3

Size of Parcel: Total of 85.5 (+/-) acres

Reasons Supporting this Positive Declaration:

The Planning Board has compared the proposed action with the Criteria for Determining Significance in 6 NYCRR 617.7 and identified several potentially large impacts, including, but not limited to, potential impacts on land disturbance, impacts to surface and groundwater resources, impacts involving stormwater management, biodiversity, transportation, and impacts on the growth and character of the community and neighborhood.

THIS POSITIVE DECLARATION WAS AUTHORIZED AT A MEETING OF THIS AGENCY HELD ON OCTOBER 18, 2004.

10/18/04

Date

Chairman

TOWN OF PUTNAM VALLEY

PLANNING BOARD

265 Oscawana Lake Road
Putnam Valley, NY 10579-2004

(845)526-3740; Fax: (845)526-3307
E-mail planning@putnamvalley.com

October 18, 2004

POSITIVE DECLARATION OF SIGNIFICANCE
MAJOR SUBDIVISION (R-2)
VS CONSTRUCTION CORP - "EMERALD RIDGE"
MARSH HILL ROAD
TM: 84.-1-5, 84.-1-10.1/2/3
FILE: 84./604/905

WHEREAS, the Putnam Valley Planning Board has received an application, known as Emerald Ridge Subdivision, to permit the development of 24 single-family homes on 85.5 acres of land; and

WHEREAS, a secondary application for a lot line change has been submitted which will allow for the transfer of approximately 35 (+/-) acres of land from Brookfalls Cottages, Inc. to the applicant, VS Construction Corp; and

WHEREAS, the lands to be acquired from Brookfalls Cottages, Inc. will contain 11 of the 24 homes proposed; and

WHEREAS, the subject property is located on Marsh Hill Road and is designated as parcel numbers 84.-1-5, 84.-1-10.1, 84.-1-10.2, and 84.-1-10.3 on the Town Tax Map; and

WHEREAS, the proposed subdivision is a permitted use within the Moderate Density Residence (R-2) Zoning District; and

WHEREAS, the proposed action has been determined to be an Unlisted Action, pursuant to the New York State Environmental Quality Review Act (SEQRA) 6 NYCRR, Part 617.4; and

WHEREAS, on August 2, 2004 the Planning Board declared themselves Lead Agency for the coordinated SEQRA review of this Unlisted Action.

NOW, THEREFORE, BE IT RESOLVED, on motion by Eugene Yetter, Jr. seconded by Richard Tully, the Planning Board of the Town of Putnam Valley hereby issues the attached Positive Declaration of Significance requiring a Draft Environmental Impact Statement (DEIS) be prepared in accordance with the State Environmental Quality Review Act (SEQRA); and

BE IT FURTHER RESOLVED THAT, on November 15, 2004 at 5:30 PM the Planning Board will hold a public scoping session at the Town of Putnam Valley Town Hall, 265 Oscawana Lake Road, Putnam Valley, New York to accept public comment on the proposed scope of the DEIS.

	Yea	Nay	Abstentions	Absent
John M. Zarcone, Jr., Chairman	X			
Michael J. Raimondi, Jr., Secretary				X
Richard Tully	X			
Thomas Patterson				X
Eugene T. Yetter, Jr.	X			
Bruce E. White				X

By: ____________________

FINAL SCOPING DOCUMENT
EMERALD RIDGE SUBDIVISION
TOWN OF PUTNAM VALLEY, PUTNAM COUNTY, NEW YORK

Adopted: February 7, 2005

INTRODUCTION

This Scoping Document is intended to serve as the foundation for the identification of all potentially significant adverse impacts and appropriate mitigation measures pertinent to the proposed action. It is also intended to eliminate consideration of any impacts that are irrelevant or non-significant.

PROJECT DESCRIPTION

The applicant, 37 Croton Dam Road Corp., is proposing a 24-unit single-family detached residential subdivision to be located on Marsh Hill Road in the unincorporated Town of Putnam Valley, Putnam County, New York. The Subdivision Plan proposes 23 new residences with one existing residence to remain. The project also includes a lot line change, which will allow approximately 35 (+/-) acres of land to be transferred from Brookfalls Cottages, Inc. to the applicant. The project site is approximately 85.5 acres in size and is identified as Section 84, Block 01, Lots 5, 10.1, 10.2 and 10.3 on the Town of Putnam Valley Tax Map.

GENERAL GUIDELINES FOR THE DEIS

The applicant will prepare a site-specific Draft Environmental Impact Statement (DEIS) addressing all items described in this Scoping Document.

The DEIS will assemble relevant and material facts, evaluate reasonable alternatives, and be analytical but not encyclopedic. It will also be clearly and concisely written in plain language that can be easily read and understood by the public. Highly technical material will be summarized and, if it must be included in its entirety, it will be referenced in the DEIS and included in an appendix.

The DEIS will be written in the third person without use of the terms I, we, and our. Narrative discussions will be accompanied to the greatest extent possible by illustrative tables and graphics. All graphics will clearly identify the project area. The DEIS will group each issue identified into one Existing Conditions, Potential Impacts, and Mitigation Measures section to permit efficient review. Footnotes will be used as the form of citing references. All assertions will be supported by evidence. Opinions of the applicant that are unsupported by evidence will be identified as such.

Full-scale Subdivision Plans and Site Development Plans are to be included within the DEIS as an appendix and reduced copies of pertinent Subdivision Plan and Site Development Plan sheets shall be included in the text of the DEIS. The documents shall contain, as attachments, plans, reports, and studies meeting prevailing federal, state and Town criteria with respect to all disciplines of study as well as Town subdivision plan criteria.

DEIS Cover Sheet. The cover sheet will include the title of the project, project location, contact person, name, address, and telephone number of the Lead Agency, name, address, and telephone number of the preparer, acceptance date of the DEIS, date of public hearing, deadline by which comments on the DEIS are due, and a statement that comments may be submitted up to ten days following the close of the public hearing.

DEIS Table of Contents. The table of contents will include a list of all appendices, tables, figures, maps, charts, and any items that may be submitted under a separate cover. All pertinent State Environmental Quality Review Act (SEQRA) documentation shall be included as appendices to the DEIS, including but not limited to the Full Environmental Assessment Form (EAF), Circulation Notice, Positive Declaration of Significance, Final Scoping Document, correspondence received from the public scoping session, and letters from Involved and Interested Agencies. All correspondence relating to the issues addressed in the DEIS, such as technical studies and reports, shall also be included in the appendices.

CHAPTER 1: EXECUTIVE SUMMARY

A. **Description of the Proposed Action.** This section will include a description of the project location, parcel identification numbers, acreage, any easements affecting the site, existing zoning, existing site character, proposed lot line change, and a description of the proposed layout.

B. **Potential Significant Impacts.** A summary of the potential impacts of the proposed action.

C. **Proposed Mitigation Measures.** A summary of the proposed mitigation measures.

D. **Project Alternatives Considered.** A summary of the alternatives will be provided.

CHAPTER 2: INTRODUCTION

A. **Site Location.** A description of the regional and local location of the site shall be presented.

B. **Site History.** Discussion of the prior use of the site and a discussion of existing deeds, covenants, and restrictions on the subject property.

C. **Description of Action.** A detailed description of the proposed action will be provided, including:

- Identification of the base zoning district and existing land uses for the project site and adjoining properties.
- Discussion of the compatibility of the proposed land use with the character and development trends in the adjoining area.
- Discussion of vehicular access, internal roads, circulation, on- and off-street parking, driveway layout, and pedestrian routes.
- Discussion of the proposed lot line change and its effect on the adjoining property with regards to existing easements.
- Description of the layout of the proposed lots.
- Description of proposed homes and architecture, including a description of the size of the homes, typical colors and materials used (3 different style homes will be provided).
- Discussion of the various types and relative amounts of impervious surfaces on the site.
- Discussion of the number of bedrooms per dwelling unit.
- Discussion of the degree of uniformity or variety of design between different dwelling units.
- Description of the proposed infrastructure and utilities.
- Description of proposed landscaping and natural vegetation to be retained.
- Description of proposed lighting (if any).

D. **Phasing and Construction Schedule.**

- A discussion of the proposed phasing of on-site and off-site construction, construction schedules, expected year of project completion, construction access routes, type of construction, hours of construction, and the location of construction vehicles and parking during construction.
- Construction techniques will be discussed, including methods of grading, blasting (if necessary), and material storage.

- The relative timing for the start and completion of key milestone tasks such as site clearing, grading, infrastructure, foundations, and site amenities.

E. **Purpose/Need/Public Benefit.** The applicant's goals and objectives will be discussed along with the socioeconomic benefits offered under the project, including tax revenues for the Town, School District, and other taxing jurisdictions.

F. **Approvals, Reviews, and Permits.**

- List and describe all required approvals, reviews, and permits required, by agency, to implement the proposed action together with the status of each application.
- List all Involved and Interested Agencies for DEIS distribution.

<u>Involved Agencies</u>

- Town of Putnam Valley Planning Board
- Town of Putnam Valley Town Board
- Putnam County Department of Health
- Putnam County Department of Highways and Facilities
- Town of Putnam Valley Highway Department
- New York State Department of Environmental Conservation (NYSDEC)
- US Army Corps of Engineers (ACOE)

<u>Interested Agencies</u>

- Town of Putnam Valley Town Engineer
- Town of Putnam Valley Town Attorney
- Town of Putnam Valley Town Planner
- Town of Putnam Valley Building and Zoning Inspector
- Town of Putnam Valley Wetlands Inspector
- Putnam Valley Volunteer Fire Department
- Putnam Valley Volunteer Ambulance Corps
- Putnam Valley School District
- Putnam Valley Environmental Commission
- Putnam Valley Advisory Board of Architectural and Community Appearance
- Putnam County Soil and Water Conservation District
- Putnam County Planning Department
- City of Peekskill City Planner
- Putnam Valley Library

Other Required Filings

- Environmental Notice Bulletin
- Commissioner of the NYSDEC

CHAPTER 3: EXISTING ENVIRONMENTAL CONDITIONS, POTENTIAL IMPACTS, AND MITIGATION

This section of the DEIS will identify the existing environmental conditions, potential impacts of the action, and proposed mitigation measures as appropriate for each of the major issues identified in this Scoping Document. Sufficient detail should be provided so that reviewers are able to gain an understanding of current conditions and impacts. A special effort should be made to explain technical information in lay language with supporting tables and maps.

The format or organization of this section will include the following subsection headings for each topic or impact issue:

Existing Conditions
Potential Impacts
Mitigation Measures

This format provides for a more meaningful presentation of the environmental issues that allows the reader to focus on individual impact issues.

A. Geology and Soils

1. Existing Geology and Soil Conditions.

- Identification and evaluation of hydric and non-hydric soils according to the United States Department of Agriculture Putnam County Soil Survey. The identified soils will be verified by a qualified professional via ten selective soil tests.
- The identification and location of existing prominent and/or unique features, including large rock outcrops and vernal pools (if any).
- Identification and location of slopes ranging from 0-10%, 10-15%, 15-20%, and greater than 20%. Slope descriptions will include a listing of the slopes as a percentage of the total site area (pre-development).

- An evaluation of the constraints imposed by existing soils, geology, and topographic conditions, including the limitations of and suitability for construction of dwellings, driveways, plantings, and stormwater control structures.
- A table will be created identifying the construction limitations, permeability, and seasonal high water table for each on-site soil.

2. Potential Impacts to Geology and Soils.

- A discussion of the proposed Grading Plan. This discussion will include an estimate of the proposed cut and fill projections and discussion of whether or not blasting is necessary. If cut and fill projections cannot be balanced on the site, the anticipated volume of earth/rock to be imported to, or exported from, the site shall be defined. A discussion of the number of truck trips associated with such import/export shall be estimated, and the anticipated routing of such truck trips will be identified.
- If necessary, the anticipated location and potential impacts of blasting will be identified.
- Potential soil erosion impacts and estimated quantities and locations of increased long-term erosion will be identified. The effects of construction on soils will be identified.
- A discussion of the amount of impervious surface created and discussion of the potential impacts associated with the development of impervious surfaces. The applicant will provide a ratio comparing impervious surfaces to lot size.
- Slope descriptions will include a listing of the slopes as a percentage of the total site area (post-development).

3. Proposed Mitigation Measures.

- A summary of the Soil Erosion and Sediment Control Plan (SESCP) prepared in conformance with the most recent version of the New York Guidelines for Erosion and Sediment Control and the New York State Stormwater Design Manual. The SESCP will be included in the appendix of the DEIS.
- A discussion of construction methods and Best Management Practices that will be employed to reduce erosion and control off-site sedimentation.
- Discussion of the establishment of clearing and grading limit lines for site development.

- If blasting is necessary, a Blasting Mitigation Plan will be prepared and included in the appendix of the DEIS. This Plan will include measures to be implemented to protect existing structures and nearby residential groundwater wells and septic systems.

B. Surface Water Resources

1. Existing Surface Water Resources.

- A Wetland Delineation Report will be prepared for local, state, and federal on-site wetlands. Wetlands and watercourses will be described including function and values (using Magee, 1998, A Rapid Procedure for Assessing Wetlands Functional Capacity) and a description of the soils, hydrology, and vegetation will be provided.
- A table summarizing each wetland and its function and value will be prepared.
- The identification and classification of on-site and adjacent streams and wetlands will be provided.
- The extent of all wetlands and watercourses will be illustrated on a site map and described in text.
- The Peekskill Hollow Brook, Oscawana Brook, and the City of Peekskill Watershed will be identified on a map and described.
- A discussion of any mapped Federal Emergency Management Agency (FEMA) floodplains and floodways.

2. Potential Surface Water Impacts.

- A discussion of the potential impacts to wetlands due to recharging, change in run-off conditions, or change in long-term use of the site.
- Calculation of the area of proposed wetland and wetland buffer disturbance (if any).
- Potential impacts identified in the Wetland Delineation Report will be provided.
- Monitoring wells will be installed within wetlands and at locations of proposed stormwater facilities to determine potential impacts on wetland hydrology and potential ground water impacts from the proposed development. The number and location of wells will be determined by the Town of Putnam Valley Wetland Inspector. Baseline data shall be collected monthly and a summary report will be summarized in text and provided in the appendix of the DEIS.

- A table will be presented that demonstrates how the project will comply with criteria outlined within the Wetlands and Watercourse Overlay District.
- Potential impacts to the Peekskill Hollow Brook, the Oscawana Brook, and the City of Peekskill Watershed will be discussed.

3. Proposed Mitigation Measures.

- Proposed mitigation or restoration of wetlands and watercourses, including any permits required.

C. Groundwater Resources

1. Existing Groundwater Resources.

- A description of the existing groundwater conditions including the presence, quality, quantity, extent, and present use and rate of withdrawal of groundwater resources, including seasonal variations and fluctuations.
- Discussion of existing recharge rates and bedrock fractures.
- A discussion of the locations of groundwater resources including any aquifers and recharge areas.
- Discussion of any existing on-site wells.
- A description of off-site wells on adjacent properties or as determined by the Town's Hydrogeologist.

2. Potential Groundwater Impacts.

- An estimate of the water demand for the entire project will be included, and the location and characteristics of the proposed individual wells (e.g. well type, depth, pumping capacity, etc.) will be described.
- A discussion of potential impacts on groundwater recharge and to groundwater quality and quantity.
- Evaluation of anticipated water withdrawal versus rate of recharge.
- Description of the anticipated amount of water consumption per household.
- Discussion of compliance with §165-26D(1)(b)(2) of the Zoning Code regarding groundwater recharge calculations.
- Three to four wells will be drilled and pump-tested to ascertain yields. Well selection will occur in consultation with the Town's Consulting Hydrologist and the Putnam County Department of Health. The water supply testing shall be carried out in

accordance with New York State and Putnam County Department of Health standards and recommendations from the Town's Consulting Hydrologist.

- Monitoring of adjoining wells will be conducted in accordance with recommendations provided by Town consultants and the Putnam County Department of Health.

3. Proposed Mitigation Measures.

- As necessary or required.

D. Stormwater

1. Existing Stormwater Conditions.

- A description of pre-development conditions, including on-site and off-site watershed mapping, hydrologic characteristics of the watershed, drainage patterns, and identification and classification of on-site streams and wetlands. The Peekskill Hollow Brook and the City of Peekskill Watershed will be identified and described.
- A discussion of the existing stormwater patterns and run-off quantities for 24-hour, 1, 2, 10, 25, and 100 year storm events using site specific run-off coefficients.
- A discussion of the existing stormwater quality.

2. Potential Stormwater Impacts.

- An evaluation of potential impacts associated with anticipated changes in surface water and run-off quantity and quality, both on-site and off-site.
- A description of post-development conditions, including watershed mapping, stormwater quality, total volume of run-off, and peak discharge rates for 24-hour, 1, 2, 10, 25, and 100 year storm events.
- Potential impacts to the Peekskill Hollow Brook and the City of Peekskill Watershed will be identified.
- An analysis of post-development stormwater run-off quality using appropriate techniques. Calculations will be prepared in conformance with the New York State Stormwater Design Manual and in compliance with the NYSDEC SPDES permit GP-02-01. A certified licensed NYS Professional Engineer will prepare this analysis.

- A discussion of the ability of the on-site and off-site receiving surface water bodies to assimilate additional runoff.
- A discussion of the potential impacts (if any) to wetlands and watercourses due to recharging, change in run-off conditions, or change in long-term use of the site.
- Identification of all existing drainage basins, including a graphic illustrating the boundaries of the drainage basins, shall be provided on pre- and post-development drainage maps.
- Field test results will be provided and discussed for each stormwater management facility (deep hole tests, percolation tests, etc.).
- Discussion of the ownership and long-term maintenance and management of the stormwater basins.
- Discussion of the limitations on the use of herbicides and pesticides.

3. Proposed Mitigation Measures.

- A Full Stormwater Pollution Prevention Plan (SWPPP) will be prepared in conformance with the New York State Stormwater Design Manual and GP-02-01 and will address quantitative and qualitative mitigation measures.
- Discussion of the Soil Erosion and Sediment Control Plan prepared in conformance with the New York Guidelines for Erosion and Sediment Control and GP-02-01, which will include phasing and compliance with a maximum of 5 acres of disturbance at one time.

E. Wastewater

1. Existing Wastewater Conditions.

- Description of the on-site soils and lack of a public sewer system.

2. Potential Wastewater Impacts.

- Projected wastewater generation.
- The applicant will illustrate the proposed locations of the sanitary sewage disposal systems in relation to the on-site wells and wells of adjoining properties.
- Field test results will be provided and discussed (deep hole tests, percolation tests, etc.).

- A discussion of the potential impacts to the Peekskill Hollow Brook and the City of Peekskill Watershed if the subsurface sewage treatment systems (SSTS) fail.

3. Proposed Mitigation Measures.

- As necessary or required.

F. Vegetation and Wildlife

1. Existing Vegetative and Wildlife Conditions.

- A review of the NYSDEC Natural Heritage Program files and the U.S. Fish and Wildlife Services database will be conducted and results discussed.
- A field survey and Ecological Assessment Report will be completed to determine baseline information on ecology and potential ecological impacts on biodiversity. Target groups to be surveyed include currently listed rare, threatened, and endangered species that are on-site or in close proximity to the site and all species of all mammals, birds (breeding birds), reptiles, and amphibians.
- A discussion of the vegetative communities (both wetland and upland) on the site, including location, extent, acreage, dominant species, and age. Vegetative groups to be surveyed include trees, shrubs, wildflowers and grasses, grass-like plants, and any unusual plant communities. Special emphasis of the survey will be to document endangered, threatened, and special concern species of flora and fauna.
- Surveys to be completed must be performed at the appropriate time of year (to be determined in consultation with the Town Wetlands Inspector) and must follow accepted time frames, study methods, and accepted protocols, and must be completed by a qualified consultant with specific expertise. Generic surveys without proper protocol, necessary time frames, and survey methods are not considered acceptable. Probable species lists will be provided only by qualified experts to serve as a guide and supplement to on-site field inventory data and to assist with summarizing baseline information important for management recommendations regarding flora and fauna.
- The Ecological Assessment Report will include study methods, the time of year inventories were completed, qualifications of the individuals performing the studies, species lists, habitats, and plant communities present.

- A Tree Plan will be prepared and will provide the location, size, and approximate number of trees with a diameter of 6"at breast height within the area of disturbance.
- The applicant will provide habitat assessment methodology, including criteria used for assessing forest composition. Basic census analysis should include density, frequency, and coverage. A summary report shall be submitted on forest community characteristics.

2. Potential Vegetative and Wildlife Impacts.

- Discussion of the amount of existing vegetative cover likely to be removed or modified and the nature of such modification (e.g. pavement, landscaping, etc.) due to the proposed action.
- The potential impacts associated with a reduction of existing vegetative cover and existing habitats will be assessed from the perspective of soil erosion, evapotranspiration, precipitation recharge and providing food and cover for wildlife.
- A Tree Plan will be prepared and potential impacts discussed within this section.
- Discussion of the Croton to Hudson Biodiversity Plan from the Metropolitan Conservation Alliance as it relates to the proposed development.
- Discussion of potential impacts identified in the Ecological Assessment Report.
- Potential impacts to on-site wetlands, the Peekskill Hollow Brook, and the City of Peekskill Watershed.

3. Proposed Mitigation Measures.

- Potential conservation easements, wildlife crossings, tree and understory preservation, replanting native species and establishment of wildlife corridors, as well as timing of construction to avoid impacts on breeding and migration will be considered.

G. Traffic and Transportation

1. Existing Traffic and Transportation Conditions.

- Description of the surrounding road network (generally within ½ mile of Marsh Hill Road).
- Existing streets generally within ½ mile of Marsh Hill Road will be inventoried to determine street width, speed limits,

prevailing speeds, number of travel lanes, sight distance measurements at intersections with restrictive conditions, traffic control devices, signs, and markings.

- A description of all available data from the Putnam County Department of Highways and Facilities and the Town of Putnam Valley.
- Discussion of any existing trails, bikeways or sidewalk systems that are on or in close proximity to the site.
- Turning movement traffic counts will be completed at the following intersections during the weekday AM and PM Peak Hours:
    - Peekskill Hollow Road/Marsh Hill Road.
    - Peekskill Hollow Road/Oscawana Lake Road.
    - Peekskill Hollow Road/Old Turnpike Road.
    - Peekskill Hollow Road/Foothill Road.

2. Potential Impacts to Traffic and Transportation.

- A Traffic Impact Study (TIS) will be completed and described within this section; the TIS will be included in the appendix. This study will evaluate existing traffic conditions compared to conditions that would be anticipated from the implementation of the proposed action.
- Discussion of safety concerns regarding large trucks and school buses turning onto Marsh Hill Road and their ability to make such a turn without crossing the centerline.
- Existing traffic volumes will be projected to a future design year for the proposed project based on historical data. Estimates of traffic from other existing developments will be identified and added to the projected traffic volumes.
- Estimates of the expected project-generated traffic volumes will be developed based on other existing developments that are similar to the proposed development and from information published by the Institute of Transportation Engineers (ITE). The project-generated traffic volumes will be added to the roadway system based on an expected arrival/departure distribution. The arrival/departure distributions will be developed based on review of existing traffic volumes.
- A capacity analysis will be conducted for "Existing," "Build," and "No-Build" conditions in accordance with the procedures outlined in the 2000 Highway Capacity Manual and/or SYNCHRO to determine levels of service and operating conditions at each of the above-mentioned intersections.

- The proposed project-generated traffic volumes will be added to the design year "No-Build" traffic volumes to obtain the "Build" traffic volumes for each of the intersections identified above.
- Sight distances at the site entrance and conformance of these distances to published standards (e.g., American Association of State Highway and Transportation Officials, AASHTO) will be evaluated.
- The routes, frequency, and duration of construction vehicle traffic will be identified and impacts on traffic operation and impacts to surrounding residential areas will be evaluated.
- Potential impacts associated with the existing on-site trail system will be discussed.
- Discussion of impacts associated with the single means of access proposed for the site.
- The applicant will evaluate the cumulative potential traffic impacts of the proposed project and other projects being proposed in Putnam Valley or projects that have been approved but are not occupied (project list to be provided by the Putnam Valley Planning Department upon request).
- The applicant will discuss the potential impacts resulting from the improvement of Marsh Hill Road on undeveloped properties with frontage on Marsh Hill Road. The applicant will calculate the potential number of lots associated with undeveloped lands on Marsh Hill Road and estimate the total trip ends. The applicant will provide sketch plans illustrating the potential build-out of vacant lands with frontage on Marsh Hill Road.

3. Proposed Mitigation Measures.

- Mitigation in the form of recommendations for roadway and intersection improvements, traffic controls, signal modification, and timing revision. Future monitoring shall be discussed. The need for sidewalks within the proposed development will be discussed.

H. Land Use and Zoning

1. Existing Land Use and Zoning Conditions.

- Discussion of the Putnam Valley Zoning Regulations, Putnam Valley Subdivision Regulations, <u>Putnam Valley 1990 Master Plan</u>, the <u>Putnam Valley Comprehensive Plan Amendment/Housing Plan</u>, <u>Croton-to-Highlands Biodiversity Plan</u>, <u>Vision 2010-Guiding Putnam into the Next Decade</u>, and the Putnam County Groundwater Protection and Utilization Plan. If the Comprehensive Plan Amendment/Housing Plan is not finalized prior to the adoption of the scope, the applicant will not be required to study this report in the DEIS.

- Discussion of the affected Environmental Management Districts located in the Town of Putnam Valley.
- Discussion of the zoning district(s) affecting the project site.
- Discussion of existing lot line configuration.

2. Potential Impacts to Land Use and Zoning.

- Discussion of the project's consistency with the Putnam Valley Zoning Regulations, Putnam Valley Subdivision Regulations, Putnam Valley 1990 Master Plan, the Putnam Valley Comprehensive Plan Amendment/Housing Plan, Croton-to-Highlands Biodiversity Plan, Vision 2010-Guiding Putnam into the Next Decade, and the Putnam County Groundwater Protection and Utilization Plan. If the Comprehensive Plan Amendment/Housing Plan is not finalized prior to the adoption of the scope, the applicant will not be required to discuss the projects consistency with this report in the DEIS.
- Discussion of compliance with the rules and regulations of affected Environmental Management Districts.
- Discussion of the proposed lot line change and continued consistency with the appropriate zoning and subdivision regulations.

3. Proposed Mitigation Measures.

- This section will include a discussion of any applicable and appropriate mitigation measures.

I. Police, Fire, and Emergency Medical Services

1. Existing Police, Fire and Emergency Medical Services.

- A discussion of the applicable county, state, and local facilities, station locations, staffing, and schedule of patrol activities in the project area. Information will be based on personal communications with service providers and review and confirmation of available pertinent literature.
- A discussion of current staffing, number and type of apparatus, average response time to the site, and existing water supply.

2. Potential Impacts to Police, Fire and Emergency Medical Services.

- A discussion of the project's impact to county, state, and local services, including impact on staffing and response times.
- Potential impacts associated with the site's one means of access.
- The applicant will identify the means of water supply available to the Fire Department.

3. Proposed Mitigation Measures. (As necessary).

J. Historic and Archeological Resources

1. Existing Historic and Archeological Resources.

- The applicant will request information from the Office of Parks, Recreation, and Historic Preservation (OPRHP).
- An examination of the existing cultural resources to determine the potential for historic and prehistoric activity on the site. A Phase 1A Cultural Resource Survey will be completed and included in the appendix of the DEIS, if necessary a Phase 1B Cultural Resource Report will be prepared.
- The applicant will contact the Putnam Valley Town Historian to determine if there are any known locally sensitive historic resources located on or in close proximity to the site.

2. Potential Impacts to Historic and Archeological Resources.

- A discussion of the potential impacts identified in the Phase 1A Cultural Resource Survey, and if required, the Phase 1B Cultural Resource Report.

3. Proposed Mitigation Measures.

- If necessary, a plan to implement mitigation measures as needed or required by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) will be prepared.

K. Visual Resources

1. Existing Visual Conditions.

- Description and photographic documentation of visual conditions of the site and surrounding areas.

- Existing view corridors to the site.
- Description of on-site stonewalls.

2. **Potential Visual Impacts.**

- The applicant will provide a two mile viewshed map using Geographic Information Systems or equivalent computer software. The viewshed map will clearly illustrate locations where the site may be potentially visible from. The viewshed map will illustrate existing topography (USGS), public parks and bike trails, public thoroughfares, sites listed on the NYS or National Registers of Historic Places, libraries, schools, municipal buildings and public recreational facilities. The viewshed map will be presented to the Planning Board prior to the submission of the DEIS and the Planning Board will determine the appropriate locations for visual simulations (if any).
- If required as a result of the viewshed map, a Visual Impact Analysis will be provided and will include photo simulations comparing existing and proposed leaf-off conditions from critical receptor locations, as assigned by the Planning Board. Graphical analysis of altered views utilizing sight line diagrams, elevations, and cross-sections, which show the relationship and potential visual impacts of the proposed project to the surrounding area. A visual inventory will be completed during the winter months to provide an analysis of the site without leaf cover.
- As part of the Visual Impact Analysis (if required), a balloon will be flown to the highest roofline(s). Photographs from areas assigned by the Planning Board will be taken of the proposed project site as well as additional locations in the surrounding areas where the balloon indicates a structure will be visible.
- Architectural elevations/renderings will be provided for each of the housing types.
- Discussion of how existing stonewalls will be preserved and used on-site.

3. **Proposed Mitigation Measures.** (As necessary).

L. Fiscal and Economic Impacts

1. Existing Fiscal and Economic Conditions.

- Description of existing taxes and revenues generated to all affected taxing districts.
- Description of existing municipal costs related to the site.

2. Potential Fiscal and Economic Impacts.

- A discussion of the projected costs and revenues associated with the project utilizing the methodology identified in The New Practitioner's Guide to Fiscal Impact Analysis prepared by the Center for Urban Policy Research will be prepared for each taxing jurisdiction. The assumptions on which costs and revenues are based shall be clearly presented and, where appropriate, high and low ranges discussed.
- Potential additional costs associated with providing community services versus revenue generated for all affected taxing entities.
- Discussion of anticipated price range.
- Discussion of the anticipated municipal costs related to the maintenance of Marsh Hill Road.
- Discussion of potential changes to the value of adjoining properties as a result of the proposed development.

3. Proposed Mitigation Measures. (As necessary).

M. Cumulative Impacts

1. Existing Conditions.

- Upon request, the Town of Putnam Valley Planning Department will provide a list of projects proposed or already approved but not yet constructed, for the project area that will be considered in the analysis of off-site impacts.

2. Potential Impacts.

- An evaluation of the cumulative potential impacts of the proposed project and projects being proposed in the development area on streams and tributaries, stormwater, groundwater, wetlands, wildlife, vegetation, traffic, schools, utilities, and emergency services.

- The applicant will discuss the potential impacts resulting from the improvement of Marsh Hill Road on undeveloped properties with frontage on Marsh Hill Road. The applicant will provide a sketch plan illustrating the potential build out of undeveloped parcels with frontage on Marsh Hill Road.

3. **Proposed Mitigation Measures.** (As necessary).

CHAPTER 4: ALTERNATIVES

1. The "No-Action" alternative as required under 6 NYCRR 617.9.b.5.

2. A Cluster Subdivision Plan not exceeding the density provided in the Conventional Subdivision Plan with lots not exceeding 1 acre.

3. A conventional subdivision plan with Marsh Hill Road constructed to meet the current standards for a new subdivision road.

CHAPTER 5: SIGNIFICANT ADVERSE UNAVOIDABLE IMPACTS

A discussion of the adverse environmental impacts identified in Chapter 3 that can be expected to occur regardless of the mitigation measures proposed. The applicant will provide quantitative descriptions of the impacts to these resources along with qualitative descriptions.

CHAPTER 6: IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Identification of the natural and human resources identified in Chapter 3 that will be consumed, converted, or made unavailable for future use. The applicant will provide quantitative descriptions of the impact to these resources along with qualitative descriptions.

CHAPTER 7: GROWTH INDUCING ASPECTS

A discussion of potential growth inducing aspects as a result of the proposed project.

CHAPTER 8: USE AND CONSERVATION OF ENERGY

Discussion of the energy sources to be used, anticipated levels of energy consumption, and any applicable energy conservation measures proposed.

CHAPTER 9: APPENDIX

9.1 Correspondence (including all SEQR documentation)
9.2 Wetland Delineation Report
9.3 Ecological Assessment Report
9.4 Stage 1A Cultural Resource Survey
9.5 Stage 1B Cultural Resource Report (if required)
9.6 Visual Impact Analysis
9.7 Traffic Impact Study
9.8 Blasting Mitigation Plan (if required)
9.9 Stormwater Pollution Prevention Plan
9.10 Soil Erosion and Sediment Control Plan
9.11 Landscaping Plan
9.12 Tree Plan
9.13 Additional Engineering Drawings

TOWN OF PUTNAM VALLEY

PLANNING BOARD

Tax Map #: 84-1-5
PARTS OF 84-1-10.1, 10.2, 10.3

File # ____________

The undersigned hereby apply (applies) for approval in accordance with Article 16 of Town Law of the State of New York and the regulations of the Town of Putnam Valley.

X Subdivision

Size of Parcel: 84-1-5 49.9 Ac / PARTS OF 84-1-10.1, 10.2, ± 35.5 Ac

No. of Lots: 24

__ Change of Lot Line

Area to be exchanged ____________

Name of Proposed Project: EMERALD ~~CHASE~~ RIDGE
Location Address: MARSH HILL ROAD / PEEKSKILL HOLLOW ROAD
Specify whether on a State, County or Town Road TOWN
Indicate closest intersection and in what direction MARSH HILL ROAD @ PEEKSKILL HOLLOW ROAD
Indicate zoning district in which the property is located R-2
The land is held by the owner under deed recorded in the Putnam County Clerk's Office as
Liber ______ Page ______ On: ________ ;Liber ______ Page ______ On: ________
✓ Attach copy of deed(s)
Is applicant the owner, the contract -vendee or the agent? OWNER 84-1-5, C.V. PARTS OF 84-1-10.1, 10.2, 1[illegible]
Are there any liens or encumbrances against the land? NO
If so, describe ____________
Are there any wetlands, streams or is the parcel subject to flooding? YES
If yes, describe TOWN WETLANDS, PORTION OF STATE WETLAND ML-3
Are there any existing structures? YES How many? 1 What type? RESIDENCE
Are any of them going to remain? YES If so, how many? THE RESIDENCE
Name of proposed streets, roads, if any TBD
To be approved by the Planning Board

THE UNDERSIGNED HEREBY AGREE(S) TO COMPLY WITH ALL THE RULES AND PROVISIONS OF THE TOWN OF PUTNAM VALLEY.

SIGNED: [signature]
ADDRESS: 37 CROTON DAM ROAD, OSSINING NY
TELEPHONE: 914-739-7362
DATED: 06.01.04

SIGNED: ____________
ADDRESS: ____________
TELEPHONE: ____________
DATED: ____________

PLANNING BOARD

CITY OF PEEKSKILL
CITY HALL

840 MAIN STREET
PEEKSKILL, NEW YORK 10566

(914) 737-3400
FAX NO. 914-737-2688

November 19, 2004

Mr. John Zarcone, Jr., Chairman
Town of Putnam Valley Planning Board
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, New York 10579-2004

Re: **Emerald Ridge Subdivision**
Scoping Session – Draft Environmental Impact Statement (DEIS)
Proposed 25 single-family detached residential subdivision

Dear Mr. Zarcone:

The City of Peekskill is in receipt of the Notice of Scoping Session and the Draft Scoping Document for Emerald Ridge Subdivision dated October 18, 2004. The City of Peekskill is very interested in receiving a copy of the Draft Environmental Impact Statement (DEIS) for the proposed Emerald Ridge Subdivision and preparing a complete detailed review. The City would like to reserve the right to review and comment on the DEIS for the proposed Emerald Ridge Subdivision in the future.

Staff from the Department of Planning, Development and Code Assistance has reviewed the Draft Scoping Document and offer the following comments:

1. <u>List of Involved/Interested Agencies:</u>

<u>On page 1, Interested Agencies and Individuals,</u> the City of Peekskill Water Department should be listed as the Interested Agency.

2. <u>Executive Summary:</u>

<u>On page 3, under Executive Summary,</u> a discussion of the potential impacts and any proposed mitigation measures regarding the City of Peekskill Watershed should be outlined and summarized.

3. Site Location and Description:

On page 3, Description of the Proposed Action, under Sub Section A, Site Location and Description, the boundaries of and the overall characteristics of the City of Peekskill Watershed need to be identified and studied.

4. Environmental Setting , Impacts, Mitigation:

On page 4, Environmental Setting, Impacts, Mitigation, a discussion and description of all existing watercourses and tributaries to the Peekskill Hollow Brook and the City's Watershed needs to be included under the following subsection headings: Existing Conditions, Potential Impacts and Mitigation Measures.

In addition, the City requests that the following are added to *Subsection B, Surface Water Resources:*

1. The City requests that under Subsection 1, the Peekskill Hollow Brook, the Oscawana Brook and the City's Watershed are identifying and described;
2. The City requests that under *Subsection 2,* a discussion of the potential impacts to the Peekskill Hollow Brook, the Oscawana Brook and the City's Watershed be made a part of the specific drainage basin description;
3. The City requests that under *Subsection 3 and 4,* a discussion of mitigation measures for all potential impacts identified to the Peekskill Hollow Brook, the Oscawana Brook, and the City of Peekskill Watershed are discussed in the proposed Stormwater Pollution Prevention Pollution Plan.

5. Wastewater / Sewage Disposal:

On page 6, Wastewater / Sewage Disposal, a discussion of the potential impacts to the Peekskill Hollow Brook and the City's Watershed if the Subsurface Sewage Treatment Systems (SSTS) fail, specifically any SSTS near Wetland B, needs to be included in this section. All mitigation measures need to be identified and discussed.

6. Terrestrial and Aquatic Ecology:

On page 7, Terrestrial and Aquatic Ecology, subsection 3, Wetlands, a discussion of all potential impacts and mitigation measures to Wetland B, Peekskill Hollow Brook, and the City's Watershed needs to be included.

7. Unavoidable Adverse Impacts:

On page 8, Unavoidable Adverse Impacts, the City requests that a sentence or two is added to this section of the Scoping Document describing what will be identified and discussed in this section.

8. Alternatives:

On page8, Alternatives, discusses two alternatives to the proposed layout, "No Action," and "Alternative Roadway Layout." Is the "Cluster Alternative" still being proposed?

9. Irreversible and Irretrievable Resources:

On page 9, Irreversible and Irretrievable Resources, the City requests that a sentence or two is added to this section of the Scoping Document describing and identifying the resources that will be made unavailable for future use.

10. Growth Inducing Aspects:

On page 9, Growth Inducing Aspects, the City requests that a sentence or two is added to this section of the Scoping Document describing the potential growth-inducing aspects generated and any possible mitigation measures.

11. Appendices:

On page 9, Appendices, the City requests that the following items are added to the proposed Appendices List:

1. Copies of official correspondence from both Involved and Interested Agencies;
2. Copies of all official correspondence related to issues discussed in the Scoping Document and the DEIS;
3. Copies of all revised technical studies, in their entirety;
4. The proposed site plans including any plans detailing mitigation measures;
5. All plans should be appended to the DEIS.

Thank you in advance for the opportunity to participate in the review of the Draft Scoping Document for the proposed Emerald Ridge Subdivision. Please feel free to contact me at 914-734-4212 should you wish to discuss the concerns of the City of Peekskill.

Sincerely,

Anthony J. Ruggiero

Anthony J. Ruggiero
Assistant City Planner

cc: Daniel W. Fitzpatrick, ICMA-CM, AICP, City Manager
Brian Havranek, Director of Planning, Development and Code Assistance
Scott Kavana, Water Superintendent
Vince Powell, Assistant Water Superintendent

Joel Mandelbaumn
39-49 46 Street
Sunnyside, NY 11104
(718) 361-8154

Mr. John Zarcone, Jr.
Chair, Planning Board
Putnam Valley, NY 10579

November 24, 2004

Enclosed is a copy of a letter I have sent to the Town Planner extending my remarks at the November 15 meeting involving the scoping of Emerald Ridge.

I am grateful to you for conducting the meeting so fairly and effectively.

Sincerely yours,

Joel Mandelbaum

Joel Mandelbaum
39-49 46th Street
Sunnyside, NY 11104
(718) 361-8154

Mr. Jan Johannesen
Town Planner
Putnam Valley, NY

November 24, 2004

I wish to add these written comments concerning the proposed Emerald Ridge Development to my spoken remarks at the November 15 meeting.

As I said at the meeting, I assumed some development of the land adjoining mine to be inevitable, and I regarded the specific plans as generally tactful as long as the quantity of flow and purity of my well water would not be impacted.

I assumed that the prevailing attitude at the meeting would be staunchly pro-growth, and was pleasantly surprised to find numerous people expressing concern over possible adverse impact from the development. I was particularly gratified at the attention given to the Impact on the quality of water flowing into Peekskill Hollow Brook, since virtually every drop of pollution which would flow from Emerald Ridge into the brook would cross my property en route. I was particularly surprised at the uncontradicted testimony that the impact of the increased large-family population would cost the schools more than the taxes generated by the houses would bring in. I had assumed that the schools were underutilized and that the town desired a large influx of pupils and rate-payers.

Why had I assumed this? Because the tax assessment policy penalizes empty acreage and rewards "productive" land development. When the current tax assessment methods were put into effect several years ago and I appealed what seemed to me a very high valuation of my simple summer cottage, I was told that my house was valued at very little indeed, but my 18 acres were worth a small fortune and justified the high tax assessment. This policy made very clear to me, as I'm sure it did to others, that the town saw no public utility in the retention of undeveloped acres and wished to have them filled as quickly as possible. Until the November 15th meeting, I simply assumed unquestioningly that this must indeed be the town's wishes, and have made no effort to appeal my taxes again.

This can be put into perspective another way. In the distant past, when taxes were much lower and the cost of land less, it was not uncommon that guests to our house would comment to my parents and later to me that if we ever wanted to sell our house, to let them know: they would love to have it for themselves. That has not happened at all lately. Instead we get several calls a year from total strangers who have never even seen the house, who inquire about our willingness to sell our land for development.

This letter is being written only because the overall impression drawn from the comments and the general atmosphere of the November 15th meeting has led me to believe that perhaps the town is not as favorably disposed to suburbanization as its tax assessment policies had indicated. If that is so, I would urge you and the others involved in planning the future of Putnam Valley to consider changes in the tax assessment method making it less costly to retain undeveloped acreage. In my own case it seems quite clear that when I die (I am now 72 years old) or sooner if the cost of retaining the land becomes insuperable, my 18 acres will pass on to some developer and half a dozen houses will be built on it. Is this the best possible outcome for the future of the town? If not, could not some mix of tax-abatement with voluntary easements on the future use of the land succeed in this and other cases in keeping the quasi-rural character of significant portions of the town?

Thanking you for taking the time to read and consider this, I am,

Sincerely yours,

Joel Mandelbaum

Joel Mandelbaum
Local Address: 95 Peekskill Hollow Road
Copies to the Chairman of the Town Planning Board and to the Town Assessor.

Dawn Powell, D.C.
185 Lake Drive
Lake Peekskill, New York 10537

RECEIVED
NOV 29 2004
PLANNING BOARD

November 28, 2004

Hand delivered

Putnam Valley Planning Board
Chairman, John Zarcone, Jr.
265 Oscawana Lake Road
Putnam Valley, New York 10579

Public Comment
Draft Scoping Document
Emerald Ridge Subdivision

Dear Sirs:

Because of the sensitivity of this site, it should have already been designated by the town as unbuildable. The redesign of the site has avoided state wetlands, but still impacts them, and has not avoided town wetlands at all. There should be no building or construction impact on any of these wetlands. Wetlands cannot be reconstructed and these areas are necessary for habitat, biodiversity, and watershed protection. Discuss all future ramifications of this environmental destruction.

The slope and the proposed road entering the site will pose difficulty and increased expense for the town. Discuss economic mitigation.

The length of the road does not conform to existing codes. Submit a proposal that conforms to town codes.

Define unbuildable acreage. Conform remaining property to existing codes. Delineate all impervious surfaces proposed. Determine future impact on storm water drainage and watershed. Discuss mitigation.

Discuss mitigation of increased tax burden to current town residents and future negative impact on property values. Discuss demographic changes created by increased tax burden.

(page 2, Powell, Emerald Ridge Subdivision)

Sumps are not environmentally sound storm water management in wetlands and watershed areas. Discuss alternative mitigation. Discuss remediation for existing wells and septic systems affected.

Identify trees that cannot be removed according to town law. Discuss measures for protection.

All septic systems should be aerated and include mandatory maintenance contracts to protect the watershed.

List of involved agencies and individuals should include all neighboring properties.

Respectfully submitted,

Dawn V. Powell DC

Dawn V. Powell DC

RIVERKEEPER

RECEIVED
NOV 29 2004
PLANNING BOARD

November 29, 2004

Via Facsimile (845) 526-3307 & U.S. Mail

Hon. John M. Zarcone, Chairman
Town of Putnam Valley Planning Board
Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

Re: **Comments on Draft Scoping Outline for the Emerald Ridge Subdivision**

Dear Mr. Zarcone and Honorable Members of the Putnam Valley Planning Board:

Below please find Riverkeeper's scoping comments for the proposed Emerald Ridge subdivision located in the Town of Putnam Valley, NY (the "proposed project"). Riverkeeper is a not-for-profit environmental organization dedicated to protecting the Hudson River, its tributaries, and the New York City drinking water supply watershed. Because the proposed project is located near both the sensitive NYC water supply watershed, which is part of an unfiltered drinking water system for over nine million New Yorkers, and the already-stressed Peekskill Hollow Brook watershed, which is a tributary to the Hudson River that provides the primary source of drinking water for thousands of residents in Peekskill and Cortlandt and a backup supply for Buchanan, we offer the following comments on the project's Draft Scope, to ultimately aid in preparation of the draft environmental impact statement (DEIS).

To avoid repeating our general comments on these types of developments in the same geographic area, we kindly refer the Board to scoping comments submitted by Riverkeeper on other recent applications, such as the Indian Hill single family residential.

Specific concerns for this particular proposal are:

Natural Resources

The discussion of wetlands delineation and potential impacts of the proposed project must address whether the alteration of storm flow configuration or the addition of impervious surfaces will impair the ability of the wetlands to continue functioning at its pre-development level. The vegetation discussion should include a description of vegetative species presence and abundance, age, size, distribution, dominance, community type, productivity, and value as habitat for wildlife.

Stormwater Management

Potential impacts from pre- and post-pollutant loadings require accurate baseline water quality surveys before construction begins in order to facilitate accurate stormwater impact modeling during the project design stage.

The DEIS should include a discussion of the specific stormwater management practices to be implemented in the proposed project. These practices should be selected and made available for public review before the project is approved, and the applicant should be required to demonstrate that the project will be sized in accordance with its capability to manage stormwater runoff before proceeding to the construction phase.

The significant addition of impervious surfaces and the alteration of project site contours with this project may attend severe water quality impacts. The applicant should be required to provide a detailed discussion of the amount of impervious surface to be added by the proposed construction. This should include locations of impervious coverage, total area of coverage, extent of existing impervious coverage within the affected basins, impact on nearby waterbodies and an analysis of suitable alternatives, including various methods of reducing impervious coverage such as stacked parking, pervious pavement, and rooftop amenities.

The DEIS should include a discussion of proposed changes to existing drainage patterns after site regrading, including short- and long-term impacts of changes in on- and off-site hydrology. The applicant also should address potential downgrade flooding including stormwater runoff to contiguous properties.

Secondary Growth Aspects

SEQRA requires that an applicant examine "reasonably related short-term and long-term impacts, cumulative impacts, and other associated environmental impacts." 6 N.Y.C.R.R. § 617.9(b)(5)(iii)(a). Thus, the DEIS must address the cumulative impacts from the proposed project along with those from all additional projects located within the NYC and Peekskill Hollow Brook watersheds that are currently before the Planning Board.

Land Use & Zoning – Local & Regional Plans

In addition to the Town of Putnam Valley Comprehensive Plan, listed in the draft scoping outline, the applicant should evaluate the proposed project in light of the Town of Putnam Valley Croton Plan. The applicant should also evaluate the proposed project in light of the recommendations made in the Croton-to-Highlands Biodiversity Plan[1] prepared by the Metropolitan Conservation Alliance with the collaboration and support of the towns of Cortlandt, New Castle, Putnam Valley, and Yorktown.

Riverkeeper appreciates the opportunity to submit comments on the draft scoping outline for the proposed project. We anticipate the Planning Board's deliberate and informed consideration of this complex proposal, and the array of issues related to it. If I may provide any clarification regarding these comments, or additional information, please contact me at 845-424-4149 (ext. 222), or at the address provided above.

Sincerely,

Victor M. Tafur

Victor Tafur
Staff Attorney

[1] *See* MILLER AND KLEMENS, CROTON-TO-HIGHLANDS BIODIVERSITY PLAN: BALANCING DEVELOPMENT AND THE ENVIRONMENT IN THE HUDSON RIVER ESTUARY CATCHMENT (Metropolitan Conservation Alliance, Wildlife Conservation Society 2004).

PUTNAM COUNTY
OFFICE OF THE SHERIFF
AND
CORRECTIONAL FACILITY
THREE COUNTY CENTER
CARMEL, NEW YORK 10512

54010

DONALD B. SMITH
Brigadier General, U.S. Army (Ret.)
SHERIFF

TELEPHONE
(845) 225 - 4300

PETER H. CONVERY
UNDERSHERIFF

March 10, 2005

Ms. Janell Herring
Tim Miller Associates, Inc.
10 North Street
Cold Spring, New York 10516

RE: EMERALD RIDGE DEVELOPMENT

Dear Ms. Herring:

In response to your letter dated March 9, 2005, the Putnam County Sheriff's Department, along with the New York State Police, provides primary police services to the entire town of Putnam Valley including the Emerald Ridge Development.

The Sheriff's Department has a minimum of one patrol assigned to the Putnam Valley area 24 hours a day. The closest car concept is utilized in response to 911 emergency calls; either the Putnam County Sheriff's patrol unit or the New York State Police patrol unit would be dispatched.

The Putnam County Sheriff's Department has 83 full time law enforcement officers. The service ratio is one deputy to 1,200 persons. Our headquarters is located at Three County Center, Carmel, New York, with a substation located at Oregon Corners in Putnam Valley.

The approximate response time of responding units is anywhere from 5 minutes to 30 minutes depending on the location of the patrol unit in relation to the call for service. We do not anticipate a great impact to the Putnam County Sheriff's Department in providing police protection to the future residents of the Emerald Ridge Development. However, with Putnam County being one of the fastest growing counties in New York State, the collective impact of many new developments on law enforcement would most certainly require more law enforcement resources in future years.

I hope the above information is helpful to your project. Should you need any additional information, please do not hesitate to contact me or Captain William H. Schallock, who heads our Road Patrol Division, at (845) 225-7505.

Sincerely,

Donald B. Smith
Sheriff

DBS/chh

Tim Miller Associates Incorporated
10 North Street,
Cold Spring, New York 10516

Stephen L. Andersen
Putnam Valley Town Hall,
265 Oscawana Lake Road,
Putnam Valley, New York
10579
May 18, 2005

Dear Mr. Moreinis;

I've examined the property listed on our text maps as 84-1-5 and can find nothing of historically sensitive nature. The first house on the left going up Marsh Road, according to an 1876 map, was E. Lockwood. The property originally belonged to a Mr. Sherwood in the 1890's. Marsh Road got its name from Dorothy Alberta Marsh, who sold the property in 1936 to Sylvia Collman. The stone house on the property was built in 1936, and the big room in the house was dedicated to all the religions of the world, according to Virginia Smith, who was a young girl who used to clean the house for Mrs. Collman.

Sincerely yours,

Stephen L. Andersen

Stephen L. Andersen,
Putnam Valley Town Historian

625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.

December 7, 2004

Tina Wang
Tim Miller Associates
10 North Street
Cold Spring, NY 10516

COPY

Dear Ms. Wang:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Emerald Ridge Residential Development - 85 acres, area as indicated on the map you provided, located in the Town of Putnam Valley, Putnam County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

The presence of rare species may result in this project requiring additional permits, permit conditions, or review. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environment impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,
Betty Ketcham jp
Betty A. Ketcham, Information Services
NY Natural Heritage Program

Encs.
cc: Reg. 3, Wildlife Mgr.

Natural Herit Report on Rare Species and Ecologic ommunities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

~This report contains **SENSITIVE** information that may not be released to the public without permission from the NY Natural Heritage Program.
~Refer to the User's Guide for explanations of codes, ranks and fields.
~Location maps for certain species and communities may not be provided if 1) the species is vulnerable to disturbance, 2) the location and/or extent is not precisely known, and/or 3) the location and/or extent is too large to display.

VASCULAR PLANTS

Hydrangea arborescens — Office Use

Wild Hydrangea	**NY Legal Status:**	Endangered	**NYS Rank:**	Imperiled	4515
	Federal Listing:		**Global Rank:**	Demonstrably secure	
	Last Report:	1896-08-21	**EO Rank:**	Historical, no recent information	
	County:	Orange, Putnam			
	Town:	Highlands, Carmel, Kent, Philipstown, Putnam Valley			
	Location:	Highlands			
	Directions:				
	General Quality and Habitat:				

1 Records Processed

RESOLUTION OF THE TOWN OF PUTNAM VALLEY PLANNING BOARD

INTENT TO BE LEAD AGENCY

Emerald Ridge Subdivision

June 21, 2004

WHEREAS, the Planning Board of the Town of Putnam Valley has received an application to permit the development of a 24 lot single-family subdivision on 85.5 acres of land; and

WHEREAS, the subject property is located on Marsh Hill Road and is designated as parcel numbers 84.-1-5, 84.-1-10.1, 84.-1-10.2, and 84.-1-10.3 on the Town Tax Map; and

WHEREAS, the proposed subdivision is a permitted use within the Moderate Density Residence (R-2) Zoning Districts; and

WHEREAS, the proposed action will require permits and approvals from local, regional, and state agencies prior to implementation of the proposed action; and

WHEREAS, the proposed action has been determined to be an Unlisted Action, pursuant to the New York State Environmental Quality Review Act (SEQRA) 6 NYCRR Part 617.4.

NOW, THEREFORE, BE IT RESOLVED THAT, pursuant to the applicable standards of SEQRA 6 NYCRR Part 617.6, the Putnam Valley Planning Board concludes that it is the appropriate agency to serve as Lead Agency for the coordinated environmental review of the proposed Unlisted Action; and

BE IT FURTHER RESOLVED, that the Putnam Valley Planning Board hereby authorizes circulation of the Lead Agency Agreement Notice to the other Involved Agencies, indicating the Planning Board's intention to serve as Lead Agency, including the application, location map, and Part 1 of the Full Environmental Assessment Form (EAF); and

BE IT FURTHER RESOLVED, on motion by Thomas Patterson, seconded by Richard Tully, the Planning Board of the Town of Putnam Valley hereby declares its intent to be Lead Agency for the coordinated SEQRA evaluation of this Unlisted Action.

	Yea	Nay	Abstentions
John M. Zarcone, Jr., Chairman	X		
Michael J. Raimondi, Jr., Secretary	X		
Richard Tully	X		
Thomas Patterson	X		
Eugene T. Yetter, Jr.	X		
Bruce E. White			Not Present

Town of Putnam Valley Planning Board
Unlisted Action - Coordinated Environmental Review

NOTICE TO INVOLVED AGENCIES
DECLARATION OF INTENT TO BE LEAD AGENCY

Emerald Ridge Subdivision

Date: 06-30-04

PLEASE TAKE NOTICE, that on June 21, 2004 the Putnam Valley Planning Board declared its intent to serve as Lead Agency for a coordinated environmental review of the proposed Type 1 Action described below. This notice is being issued pursuant to Part 617.6 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law to designate a Lead Agency.

PROPOSED ACTION AND SITE LOCATION

The Town of Putnam Valley Planning Board has received an application to permit a 24 lot subdivision on 85.5 (+/-) acres of land. The project site is located on Marsh Hill Road in the Moderate Density Residence (R-2) Zoning District. The site is designated as parcel numbers 84.-1-5, 84.-1-10.1, 84.-1-10.2, and 84.-1-10.3 on the Town Tax Map.

SEQRA CLASSIFICATION AND IDENTIFIED INVOLVED AGENCIES

The proposed action has been classified as an Unlisted Action, pursuant to the New York State Environmental Quality Review Act (SEQRA), Part 617. The following potential Involved and Interested Agencies have been identified:

INVOLVED AGENCIES

- Town of Putnam Valley Town Board
- Putnam County Department of Health
- Putnam County Department of Highways and Facilities
- Town of Putnam Valley Highway Department
- New York State Department of Environmental Conservation (NYSDEC)
- US Army Corps of Engineers (ACOE)

INTERESTED AGENCIES & INDIVIDUALS

- Town of Putnam Valley Town Engineer
- Town of Putnam Valley Building Inspector
- Town of Putnam Valley Wetlands Inspector
- Putnam Valley Volunteer Fire Department
- Putnam Valley Volunteer Ambulance Corps
- Putnam Valley School District

- Putnam Valley Environmental Commission
- Putnam Valley Advisory Board on Architectural and Community Appearance
- Putnam County Soil and Water Conservation District
- Putnam County Department of Planning
- City of Peekskill

LEAD AGENCY DESIGNATION

Under the applicable standards of SEQRA, 6 NYCRR Part 617.6(b), the Putnam Valley Planning Board has concluded that it is the appropriate agency to serve as Lead Agency for the coordinated environmental review of the proposed action.

This notification along with a copy of the application, location map, and Part 1 of the Full Environmental Assessment Form (EAF), will be sent to all Involved Agencies. Each agency will be requested by the Town of Putnam Valley to fill out the attached consent form. However, if any Involved Agency does not agree that the Putnam Valley Planning Board should be designated as the Lead Agency, it may follow the procedures set forth in SEQRA 6 NYCRR Part 617.6(b)(5). Responses should be sent to the contact person listed below, who may be contacted for further information.

Ms. Laura Lussier, Planning Department
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, NY 10579
Phone: (845) 526-3740 FAX: (845) 526-3307

The Planning Board of the Town of Putnam Valley asks that each Involved Agency fill out the attached ***"Lead Agency Agreement"*** notice either consenting or not consenting to the Putnam Valley Planning Board serving as Lead Agency. Please return the completed form within 30 days of the date on which it was mailed.

IF YOU DO NOT RESPOND WITHIN 30 DAYS, IT WILL BE INTERPRETED AS CONSENT THAT THE TOWN OF PUTNAM VALLEY PLANNING BOARD SERVE AS LEAD AGENCY. YOU WILL CONTINUE TO BE NOTIFIED OF SEQRA DETERMINATIONS AND HEARINGS AND COPIES OF ALL ENVIRONMENTAL DOCUMENTS WILL BE MADE AVAILABLE TO YOU.

TOWN OF PUTNAM VALLEY PLANNING BOARD
COORDINATED ENVIRONMENTAL REVIEW

RESONSE TO REQUEST THAT THE PUTNAM VALLEY PLANNING BOARD SERVE AS LEAD AGENCY REGARDING THE ABOVE ACTION

On behalf of ____,
(INSERT NAME OF AGENCY)
I acknowledge receipt of the Lead Agency notice on the above referenced matter, which was mailed on ________________________.

The above named Involved Agency hereby:

(Please Check One)

( ) **AGREES** that the Putnam Valley Planning Board serve as Lead Agency for the coordinated environmental review of the proposed action and requests that the undersigned continue to be notified of all filings and hearings on this matter.

( ) **DOES NOT AGREE** to the Town of Putnam Valley Planning Board serving as Lead Agency and wishes that ________________________________ serve as Lead Agency. *To contest Lead Agency designation, the undersigned intends to follow the procedures in accordance with SEQRA 6 NYCRR Part 617.6(b)(5).*

( ) **TAKES NO POSITION** on Lead Agency designation.

DATED: ________________________________

Please return within 30 days of the mailing of this correspondence. In addition, please specify the jurisdiction that your agency has over this project and what issues you believe are relevant for inclusion in any Draft Environmental Impact Statement (DEIS) prepared in connection with this project.

RETURN TO: Ms. Laura Lussier, Planning Department
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, NY 10579
Phone: (845) 526-3740 FAX: (845) 526-3307

______________________ Print Name	______________________ Title
______________________ Signature	______________________ Date

RESOLUTION OF THE TOWN OF PUTNAM VALLEY PLANNING BOARD

RESOLUTION DECLARING LEAD AGENCY

Emerald Ridge Subdivision

August 2, 2004

WHEREAS, the Putnam Valley Planning Board has received an application to permit the development of 24 single-family homes on 85.5 acres of land; and

WHEREAS, the subject property is located on Marsh Hill Road and is designated as parcel numbers 84.-1-5, 84.-1-10.1, 84.-1-10.2, and 84.-1-10.3 on the Town Tax Map; and

WHEREAS, the proposed subdivision is a permitted use within the Moderate Density Residence (R-2) Zoning District; and

WHEREAS, the proposed action has been determined to be an Unlisted Action, pursuant to the New York State Environmental Quality Review Act (SEQRA) 6 NYCRR, Part 617.4; and

WHEREAS, on June 21, 2004, the Planning Board declared its intent to be Lead Agency for the coordinated SEQRA review of this Unlisted Action; and

WHEREAS, on June 21, 2004 the Planning Board authorized the circulation of the Lead Agency Agreement to the Involved Agencies, indicating the Planning Board's intention to serve as Lead Agency, including circulating the application, location map, and Part 1 of the Full Environmental Assessment Form (EAF); and

WHEREAS, after 30 days of mailing the Lead Agency Agreement, no Involved Agency objected to the Planning Board acting as Lead Agent.

NOW, THEREFORE, BE IT RESOLVED, on motion by Richard Tully, seconded by Thomas Patterson, the Planning Board of the Town of Putnam Valley hereby declares itself Lead Agency for the coordinated SEQRA evaluation of the proposed residential subdivision.

	Yea	Nay	Abstentions
John M. Zarcone, Jr., Chairman	X		
Michael J. Raimondi, Jr., Secretary	X		
Richard Tully	X		
Thomas Patterson	X		
Eugene T. Yetter, Jr.			
Bruce E. White	X		

TOWN OF PUTNAM VALLEY

JOHN M. ZARCONE, JR.
Chairman
MICHAEL J. RAIMONDI, JR.
Secretary
THE CHAZEN COMPANIES
Town Planner
INSITE ENGINEERING
Town Engineer

PLANNING BOARD

265 Oscawana Lake Road
Putnam Valley, NY 10579-2004

(845)526-3740; Fax: (845)526-3307
E-mail planning@putnamvalley.com

MEMBERS
RICHARD TULLY
THOMAS PATTERSON
EUGENE T. YETTER, JR.
BRUCE E. WHITE
(Ad hoc)
LAURA L. LUSSIER
Clerk

October 18, 2004

POSITIVE DECLARATION OF SIGNIFICANCE
MAJOR SUBDIVISION (R-2)
VS CONSTRUCTION CORP - "EMERALD RIDGE"
MARSH HILL ROAD
TM: 84.-1-5, 84.-1-10.1/2/3
FILE: 84./604/905

WHEREAS, the Putnam Valley Planning Board has received an application, known as Emerald Ridge Subdivision, to permit the development of 24 single-family homes on 85.5 acres of land; and

WHEREAS, a secondary application for a lot line change has been submitted which will allow for the transfer of approximately 35 (+/-) acres of land from Brookfalls Cottages, Inc. to the applicant, VS Construction Corp; and

WHEREAS, the lands to be acquired from Brookfalls Cottages, Inc. will contain 11 of the 24 homes proposed; and

WHEREAS, the subject property is located on Marsh Hill Road and is designated as parcel numbers 84.-1-5, 84.-1-10.1, 84.-1-10.2, and 84.-1-10.3 on the Town Tax Map; and

WHEREAS, the proposed subdivision is a permitted use within the Moderate Density Residence (R-2) Zoning District; and

WHEREAS, the proposed action has been determined to be an Unlisted Action, pursuant to the New York State Environmental Quality Review Act (SEQRA) 6 NYCRR, Part 617.4; and

WHEREAS, on August 2, 2004 the Planning Board declared themselves Lead Agency for the coordinated SEQRA review of this Unlisted Action.

NOW, THEREFORE, BE IT RESOLVED, on motion by Eugene Yetter, Jr. seconded by Richard Tully, the Planning Board of the Town of Putnam Valley hereby issues the attached Positive Declaration of Significance requiring a Draft Environmental Impact Statement (DEIS) be prepared in accordance with the State Environmental Quality Review Act (SEQRA); and

BE IT FURTHER RESOLVED THAT, on November 15, 2004 at 5:30 PM the Planning Board will hold a public scoping session at the Town of Putnam Valley Town Hall, 265 Oscawana Lake Road, Putnam Valley, New York to accept public comment on the proposed scope of the DEIS.

	Yea	Nay	Abstentions	Absent
John M. Zarcone, Jr., Chairman	X			
Michael J. Raimondi, Jr., Secretary				X
Richard Tully	X			
Thomas Patterson				X
Eugene T. Yetter, Jr.	X			
Bruce E. White				X

By: ______________________

STATE ENVIRONMENTAL QUALITY REVIEW
POSITIVE DECLARATION OF SIGNIFICANCE

Notice of Intent to Prepare a Draft Environmental Impact Statement

Emerald Ridge Subdivision

October 18, 2004

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

The Town of Putnam Valley Planning Board, as Lead Agency, has determined that the proposed action described below may have a significant effect on the environment and a Draft Environmental Impact Statement (DEIS) will be prepared.

Name of Action/Project:	Emerald Ridge Subdivision
Name of Applicant:	VS Construction Corp.
SEQR Status:	Unlisted
Scoping:	Yes

If yes, indicate how scoping will be conducted:

A public scoping session will be held at the Town of Putnam Valley Town Hall, 265 Oscawana Lake Road, Putnam Valley, New York 10579 on ______________, 2004 at ________PM. The public scoping session will be noticed in the Environmental Notice Bulletin and the Putnam County News and Recorder at least 14 days in advance of this hearing date. Public comment will be accepted at the scoping session relating to all issues to be addressed in the DEIS.

Description of Action:
The Town of Putnam Valley Planning Board has received an application to permit a 24 lot subdivision on 85.5 (+/-) acres of land. The project site is located on Marsh Hill Road in the Moderate Density Residence (R-2) Zoning Districts. This application also includes a lot line change, which will allow approximately 35 (+/-) acres of land to be transferred from Brookfalls Cottages, Inc. to the applicant, VS Construction Corp.

The proposed action includes the above-described application, as well as all local, regional and state approvals necessary to authorize the development of the site in accordance with the proposed development plans.

Location of Action:	Marsh Hill Road
Town/Municipality:	Town of Putnam Valley
County:	Putnam
Street Address:	N/A
Tax Map Parcel:	84.-1-5 84.-1-10.1 84.-1-10.2 84.-1-10.3

Size of Parcel: Total of 85.5 (+/-) acres

Reasons Supporting this Positive Declaration:

The Planning Board has compared the proposed action with the Criteria for Determining Significance in 6 NYCRR 617.7 and identified several potentially large impacts, including, but not limited to, potential impacts on land disturbance, impacts to surface and groundwater resources, impacts involving stormwater management, biodiversity, transportation, and impacts on the growth and character of the community and neighborhood.

THIS POSITIVE DECLARATION WAS AUTHORIZED AT A MEETING OF THIS AGENCY HELD ON OCTOBER 18, 2004.

________________________ ________________________

Date **Chairman**

<u>For Further Information:</u>

Contact Person: Ms. Laura Lussier, Planning Department
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, NY 10579
Phone: (845) 526-3740 FAX: (845) 526-3307

A copy of this notice is being sent to:

<u>INVOLVED AGENCIES:</u>

Putnam Valley Town Board
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

Putnam County Department of Health
1 Geneva Road
Brewster, NY 10509

Mr. Harold J. Gary, Commissioner
Putnam County Highway and Facilities
842 Fair Street
Carmel, NY 10512

Mr. Earl Smith, Highway Superintendent
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

New York State Department of Environmental Conservation (NYSDEC), Region 3
21 South Putt Corners Road
New Paltz, NY 12561

<u>INTERESTED AGENCIES AND INDIVIDUALS:</u>

Mr. William A. Zutt, Esq.
Bolger Hinz & Zutt, P.C.
PO Box 8
11 Oscawana Lake Rd.
Putnam Valley, NY 10579

Mr. Bill Brickelmaier, P.E., Town Engineer
Insite Engineering
3 Garrett Place Carmel, NY 10512

Mr. Jan Johannessen, Town Planner
The Chazen Companies
21 Fox Street
Poughkeepsie, NY 12601

Stephen W. Coleman, Town Wetland Inspector
3 Aspen Court
Ossining, NY 10562

Mr. Irv Sevelowitz
Putnam Valley Building and Zoning Inspector
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

Putnam Valley School District
Mr. Gary Tutty, Superintendent
146 Peekskill Hollow Road
Putnam Valley, NY 10579

Chief Charles Eberhardt
Putnam Valley Volunteer Fire Department
P.O. Box 21
12 Canopus Hollow Road
Putnam Valley, NY 10579

Putnam Valley Volunteer Ambulance Corps
218 Oscawana Lake Road (or PO Box 141)
Putnam Valley, NY 10579

Putnam Valley Environmental Commission
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

Putnam Valley Advisory Board on Architectural and Community Appearance
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

Ms. Carole P. Hughes-DiMarco, Town Clerk
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

Putnam County Soil and Water Conservation District
841 Fair Street
Carmel, NY 10512

Putnam County Planning & Development Department
841 Fair Street
Carmel, NY 10512

Mr. Anthony Ruggiero, Assistant City Planner
City of Peekskill Water Supply Department
City Hall
840 Main Street
Peekskill, NY 10566

Other required filings:

New York State Department of Environmental Conservation
Environmental Notice Bulletin
625 Broadway
Albany, NY 12233-1750

Erin Crotty, Commissioner
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-1750

<u>Other parties requesting copies of Positive Declaration:</u>

<u>Library</u>

Putnam Valley Library
30 Oscawana Lake Rd.
Putnam Valley, NY 10579

Rec'd at P.B. mtg 11-15-04

STEPHEN W. COLEMAN
ENVIRONMENTAL CONSULTING, LLC

Environmental Planning & Site Analysis
Wetland Mitigation & Restoration Plans
Wetland Delineation & Assessment
Natural Resource Management
Pond & Lake Management
Wildlife & Plant Surveys
Breeding Bird Surveys
Landscape Design

November 13, 2004

Mr. John Zarcone, Chairman
Members of the Planning Board
Town of Putnam Valley
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Review of Proposed Scope – Emerald Ridge Subdivision

Dear Chairman Zarcone and Members of the Planning Board:

I have completed my review of the proposed scope for the DEIS. Based upon this review, I offer the following comments regarding the Scope document:

1. Under Section E, the following should be added:

    a. A comprehensive natural resource inventory will be completed of the property to determine baseline information on potential ecological impacts on Biodiversity.

    b. Target groups to be surveyed include mammals, birds (breeding birds), reptiles and amphibians.

    c. Vegetative groups to be surveyed include trees, shrubs, wildflowers and grasses and grass-like plants, and any unusual plant communities. Special emphasis of survey should be to document endangered, threatened and special concern species of flora and fauna.

    d. Surveys to be completed must be performed at appropriate time of year, should follow accepted time frames, study methods, and accepted protocols, and need to be completed by qualified consultants with specific expertise. (Generic surveys without proper protocol, necessary time frames, and survey methods, are not considered an acceptable practice). Probable species lists should be provided only by qualified experts to serve as a supplement to on-site field inventory data, and to assist with summarizing baseline information important for management recommendations, regarding flora and fauna".

3 ASPEN COURT, OSSINING, NY 10562 • 914-494-5544/FAX 914-762-5260 •Steve.Coleman8@verizon.net

e. Habitat Assessment Methodology that includes criteria to be used for assessing forest composition. Basic census analysis should include density, frequency, coverage and biomass measures. Summary report to be submitted on forest community characteristics.

f. A detailed summary report to be submitted that includes study methods, time of year that inventories completed, qualifications of individuals who performed studies, species lists, habitats, and plant communities present.

2. Under Section E. Wetlands, add the following:

   a. Monitoring wells to be installed within wetland and locations of proposed stormwater facilities to determine potential impacts on wetland hydrology and potential ground water impacts from proposed development. Baseline data to be collected monthly and summary report provided as part of DEIS.

   b. A table should be presented that demonstrates how project will comply with criteria outlined within Wetlands and Watercourse Overlay District.

This completes my comments at this time. The majority of my prior comments have been incorporated into the proposed Scope. Please advise whether you require additional information or have any questions.

Sincerely,

Stephen W. Coleman

Stephen W. Coleman
Wetlands Inspector
Town of Putnam Valley
SWC/tbh

3 ASPEN COURT, OSSINING, NY 10562 • 914-494-5544/FAX 914-762-5260 •Steve.Coleman8@verizon.net

NOV 29
PLANNING BOARD

CITY OF PEEKSKILL
CITY HALL

840 MAIN STREET
PEEKSKILL, NEW YORK 10566

(914) 737-3400
FAX NO. 914-737-2688

November 19, 2004

Mr. John Zarcone, Jr., Chairman
Town of Putnam Valley Planning Board
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, New York 10579-2004

Re: **Emerald Ridge Subdivision**
Scoping Session – Draft Environmental Impact Statement (DEIS)
Proposed 25 single-family detached residential subdivision

Dear Mr. Zarcone:

The City of Peekskill is in receipt of the Notice of Scoping Session and the Draft Scoping Document for Emerald Ridge Subdivision dated October 18, 2004. The City of Peekskill is very interested in receiving a copy of the Draft Environmental Impact Statement (DEIS) for the proposed Emerald Ridge Subdivision and preparing a complete detailed review. The City would like to reserve the right to review and comment on the DEIS for the proposed Emerald Ridge Subdivision in the future.

Staff from the Department of Planning, Development and Code Assistance has reviewed the Draft Scoping Document and offer the following comments:

1. <u>List of Involved/Interested Agencies:</u>

<u>On page 1, Interested Agencies and Individuals,</u> the City of Peekskill Water Department should be listed as the Interested Agency.

2. <u>Executive Summary:</u>

<u>On page 3, under Executive Summary</u>, a discussion of the potential impacts and any proposed mitigation measures regarding the City of Peekskill Watershed should be outlined and summarized.

3. Site Location and Description:

On page 3, Description of the Proposed Action, under Sub Section A, Site Location and Description, the boundaries of and the overall characteristics of the City of Peekskill Watershed need to be identified and studied.

4. Environmental Setting, Impacts, Mitigation:

On page 4, Environmental Setting, Impacts, Mitigation, a discussion and description of all existing watercourses and tributaries to the Peekskill Hollow Brook and the City's Watershed needs to be included under the following subsection headings: Existing Conditions, Potential Impacts and Mitigation Measures.

In addition, the City requests that the following are added to *Subsection B, Surface Water Resources:*

1. The City requests that under *Subsection 1,* the Peekskill Hollow Brook, the Oscawana Brook and the City's Watershed are identifying and described;
2. The City requests that under *Subsection 2,* a discussion of the potential impacts to the Peekskill Hollow Brook, the Oscawana Brook and the City's Watershed be made a part of the specific drainage basin description;
3. The City requests that under *Subsection 3 and 4,* a discussion of mitigation measures for all potential impacts identified to the Peekskill Hollow Brook, the Oscawana Brook, and the City of Peekskill Watershed are discussed in the proposed Stormwater Pollution Prevention Pollution Plan.

5. Wastewater / Sewage Disposal:

On page 6, Wastewater / Sewage Disposal, a discussion of the potential impacts to the Peekskill Hollow Brook and the City's Watershed if the Subsurface Sewage Treatment Systems (SSTS) fail, specifically any SSTS near Wetland B, needs to be included in this section. All mitigation measures need to be identified and discussed.

6. Terrestrial and Aquatic Ecology:

On page 7, Terrestrial and Aquatic Ecology, subsection 3, Wetlands, a discussion of all potential impacts and mitigation measures to Wetland B, Peekskill Hollow Brook, and the City's Watershed needs to be included.

7 Unavoidable Adverse Impacts:

On page 8, Unavoidable Adverse Impacts, the City requests that a sentence or two is added to this section of the Scoping Document describing what will be identified and discussed in this section.

8. Alternatives:

On page8, Alternatives, discusses two alternatives to the proposed layout, "No Action," and "Alternative Roadway Layout." Is the "Cluster Alternative" still being proposed?

9. Irreversible and Irretrievable Resources:

On page 9, Irreversible and Irretrievable Resources, the City requests that a sentence or two is added to this section of the Scoping Document describing and identifying the resources that will be made unavailable for future use.

10. Growth Inducing Aspects:

On page 9, Growth Inducing Aspects, the City requests that a sentence or two is added to this section of the Scoping Document describing the potential growth-inducing aspects generated and any possible mitigation measures.

11. Appendices:

On page 9, Appendices, the City requests that the following items are added to the proposed Appendices List:

1. Copies of official correspondence from both Involved and Interested Agencies;
2. Copies of all official correspondence related to issues discussed in the Scoping Document and the DEIS;
3. Copies of all revised technical studies, in their entirety;
4. The proposed site plans including any plans detailing mitigation measures;
5. All plans should be appended to the DEIS.

Thank you in advance for the opportunity to participate in the review of the Draft Scoping Document for the proposed Emerald Ridge Subdivision. Please feel free to contact me at 914-734-4212 should you wish to discuss the concerns of the City of Peekskill.

Sincerely,

Anthony J. Ruggiero

Anthony J. Ruggiero
Assistant City Planner

cc: Daniel W. Fitzpatrick, ICMA-CM, AICP, City Manager
Brian Havranek, Director of Planning, Development and Code Assistance
Scott Kavana, Water Superintendent
Vince Powell, Assistant Water Superintendent

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4

Joel Mandelbaumn
39-49 46 Street
Sunnyside, NY 11104
(718) 361-8154

Mr. John Zarcone, Jr.
Chair, Planning Board
Putnam Valley, NY 10579

November 24, 2004

Enclosed is a copy of a letter I have sent to the Town Planner extending my remarks at the November 15 meeting involving the scoping of Emerald Ridge.

I am grateful to you for conducting the meeting so fairly and effectively.

Sincerely yours,

Joel Mandelbaum

Joel Mandelbaum
39-49 46[t] Street
Sunnyside, NY 11104
(718) 361-8154

Mr. Jan Johannesen
Town Planner
Putnam Valley, NY

November 24, 2004

I wish to add these written comments concerning the proposed Emerald Ridge Development to my spoken remarks at the November 15 meeting.

As I said at the meeting, I assumed some development of the land adjoining mine to be inevitable, and I regarded the specific plans as generally tactful as long as the quantity of flow and purity of my well water would not be impacted.

I assumed that the prevailing attitude at the meeting would be staunchly pro-growth, and was pleasantly surprised to find numerous people expressing concern over possible adverse impact from the development. I was particularly gratified at the attention given to the impact on the quality of water flowing into Peekskill Hollow Brook, since virtually every drop of pollution which would flow from Emerald Ridge into the brook would cross my property en route. I was particularly surprised at the uncontradicted testimony that the impact of the increased large-family population would cost the schools more than the taxes generated by the houses would bring in. I had assumed that the schools were underutilized and that the town desired a large influx of pupils and rate-payers.

Why had I assumed this? Because the tax assessment policy penalizes empty acreage and rewards "productive" land development. When the current tax assessment methods were put into effect several years ago and I appealed what seemed to me a very high valuation of my simple summer cottage, I was told that my house was valued at very little indeed, but my 18 acres were worth a small fortune and justified the high tax assessment. This policy made very clear to me, as I'm sure it did to others, that the town saw no public utility in the retention of undeveloped acres and wished to have them filled as quickly as possible. Until the November 15th meeting, I simply assumed unquestioningly that this must indeed be the town's wishes, and have made no effort to appeal my taxes again.

This can be put into perspective another way. In the distant past, when taxes were much lower and the cost of land less, it was not uncommon that guests to our house would comment to my parents and later to me that if we ever wanted to sell our house, to let them know: they would love to have it for themselves. That has not happened at all lately. Instead we get several calls a year from total strangers who have never even seen the house, who inquire about our willingness to sell our land for development.

This letter is being written only because the overall impression drawn from the comments and the general atmosphere of the November 15th meeting has led me to believe that perhaps the town is not as favorably disposed to suburbanization as its tax assessment policies had indicated. If that is so, I would urge you and the others involved in planning the future of Putnam Valley to consider changes in the tax assessment method making it less costly to retain undeveloped acreage. In my own case it seems quite clear that when I die (I am now 72 years old) or sooner if the cost of retaining the land becomes insuperable, my 18 acres will pass on to some developer and half a dozen houses will be built on it. Is this the best possible outcome for the future of the town? If not, could not some mix of tax-abatement with voluntary easements on the future use of the land succeed in this and other cases in keeping the quasi-rural character of significant portions of the town?

Thanking you for taking the time to read and consider this, I am,

Sincerely yours,

Joel Mandelbaum

Joel Mandelbaum
Local Address: 95 Peekskill Hollow Road

Copies to the Chairman of the Town Planning Board and to the Town Assessor.

RECEIVED
NOV 29 2004
PLANNING BOARD

Dawn Powell, D.C.
185 Lake Drive
Lake Peekskill, New York 10537

November 28, 2004

Hand delivered

Putnam Valley Planning Board
Chairman, John Zarcone, Jr.
265 Oscawana Lake Road
Putnam Valley, New York 10579

Public Comment
Draft Scoping Document
Emerald Ridge Subdivision

Dear Sirs:

Because of the sensitivity of this site, it should have already been designated by the town as unbuildable. The redesign of the site has avoided state wetlands, but still impacts them, and has not avoided town wetlands at all. There should be no building or construction impact on any of these wetlands. Wetlands cannot be reconstructed and these areas are necessary for habitat, biodiversity, and watershed protection. Discuss all future ramifications of this environmental destruction.

The slope and the proposed road entering the site will pose difficulty and increased expense for the town. Discuss economic mitigation.

The length of the road does not conform to existing codes. Submit a proposal that conforms to town codes.

Define unbuildable acreage. Conform remaining property to existing codes. Delineate all impervious surfaces proposed. Determine future impact on storm water drainage and watershed. Discuss mitigation.

Discuss mitigation of increased tax burden to current town residents and future negative impact on property values. Discuss demographic changes created by increased tax burden.

(page 2, Powell, Emerald Ridge Subdivision)

Sumps are not environmentally sound storm water management in wetlands and watershed areas. Discuss alternative mitigation. Discuss remediation for existing wells and septic systems affected.

Identify trees that cannot be removed according to town law. Discuss measures for protection.

All septic systems should be aerated and include mandatory maintenance contracts to protect the watershed.

List of involved agencies and individuals should include all neighboring properties.

Respectfully submitted,

Dawn V. Powell DC

Dawn V. Powell DC

RIVERKEEPER

RECEIVED
NOV 29 2004
PLANNING BOARD

November 29, 2004

Via Facsimile (845) 526-3307 & U.S. Mail

Hon. John M. Zarcone, Chairman
Town of Putnam Valley Planning Board
Town Hall
265 Oscawana Lake Road
Putnam Valley, NY 10579

Re: **Comments on Draft Scoping Outline for the Emerald Ridge Subdivision**

Dear Mr. Zarcone and Honorable Members of the Putnam Valley Planning Board:

Below please find Riverkeeper's scoping comments for the proposed Emerald Ridge subdivision located in the Town of Putnam Valley, NY (the "proposed project"). Riverkeeper is a not-for-profit environmental organization dedicated to protecting the Hudson River, its tributaries, and the New York City drinking water supply watershed. Because the proposed project is located near both the sensitive NYC water supply watershed, which is part of an unfiltered drinking water system for over nine million New Yorkers, and the already-stressed Peekskill Hollow Brook watershed, which is a tributary to the Hudson River that provides the primary source of drinking water for thousands of residents in Peekskill and Cortlandt and a backup supply for Buchanan, we offer the following comments on the project's Draft Scope, to ultimately aid in preparation of the draft environmental impact statement (DEIS).

To avoid repeating our general comments on these types of developments in the same geographic area, we kindly refer the Board to scoping comments submitted by Riverkeeper on other recent applications, such as the Indian Hill single family residential.

Specific concerns for this particular proposal are:

Natural Resources

The discussion of wetlands delineation and potential impacts of the proposed project must address whether the alteration of storm flow configuration or the addition of impervious surfaces will impair the ability of the wetlands to continue functioning at its

25 Wing & Wing • Garrison, NY 10524-9910 • 845 424 4149 • fax: 845 424 4150 • www.riverkeeper.org

pre-development level. The vegetation discussion should include a description of vegetative species presence and abundance. age, size, distribution, dominance, community type, productivity, and value as habitat for wildlife.

Stormwater Management

Potential impacts from pre- and post-pollutant loadings require accurate baseline water quality surveys before construction begins in order to facilitate accurate stormwater impact modeling during the project design stage.

The DEIS should include a discussion of the specific stormwater management practices to be implemented in the proposed project. These practices should be selected and made available for public review before the project is approved, and the applicant should be required to demonstrate that the project will be sized in accordance with its capability to manage stormwater runoff before proceeding to the construction phase.

The significant addition of impervious surfaces and the alteration of project site contours with this project may attend severe water quality impacts. The applicant should be required to provide a detailed discussion of the amount of impervious surface to be added by the proposed construction. This should include locations of impervious coverage, total area of coverage, extent of existing impervious coverage within the affected basins, impact on nearby waterbodies and an analysis of suitable alternatives, including various methods of reducing impervious coverage such as stacked parking, pervious pavement, and rooftop amenities.

The DEIS should include a discussion of proposed changes to existing drainage patterns after site regrading, including short- and long-term impacts of changes in on- and off-site hydrology. The applicant also should address potential downgrade flooding including stormwater runoff to contiguous properties.

Secondary Growth Aspects

SEQRA requires that an applicant examine "reasonably related short-term and long-term impacts, cumulative impacts, and other associated environmental impacts." 6 N.Y.C.R.R. § 617.9(b)(5)(iii)(a). Thus, the DEIS must address the cumulative impacts from the proposed project along with those from all additional projects located within the NYC and Peekskill Hollow Brook watersheds that are currently before the Planning Board.

Land Use & Zoning – Local & Regional Plans

In addition to the Town of Putnam Valley Comprehensive Plan, listed in the draft scoping outline, the applicant should evaluate the proposed project in light of the Town of Putnam Valley Croton Plan. The applicant should also evaluate the proposed project in light of the recommendations made in the Croton-to-Highlands Biodiversity Plan[1] prepared by the Metropolitan Conservation Alliance with the collaboration and support of the towns of Cortlandt, New Castle, Putnam Valley, and Yorktown.

Riverkeeper appreciates the opportunity to submit comments on the draft scoping outline for the proposed project. We anticipate the Planning Board's deliberate and informed consideration of this complex proposal, and the array of issues related to it. If I may provide any clarification regarding these comments, or additional information, please contact me at 845-424-4149 (ext. 222), or at the address provided above.

Sincerely,

Victor M. Tafur

Victor Tafur
Staff Attorney

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[1] *See* MILLER AND KLEMENS, CROTON-TO-HIGHLANDS BIODIVERSITY PLAN: BALANCING DEVELOPMENT AND THE ENVIRONMENT IN THE HUDSON RIVER ESTUARY CATCHMENT (Metropolitan Conservation Alliance, Wildlife Conservation Society 2004).

S

TOWN OF PUTNAM VALLEY

JOHN M. ZARCONE
Chairman
MICHAEL J. RAIMONDI
Vice Chairman
THE CHAZEN COMPANIES
Town Planner
INSITE ENGINEERING
Town Engineer

PLANNING BOARD
265 Oscawana Lake Road
Putnam Valley, NY 10579-2004

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THOMAS PATTERSON
Secretary
RICHARD TULLY
EUGENE T. YETTER, JR.
JOSEPH C. BECERRA
(Adhoc)
LAURA L. LUSSIER
Clerk

February 7, 2005

ADOPTION OF FINAL SCOPING DOCUMENT
EMERALD RIDGE SUBDIVISION/LOT LINE CHANGE
MARSH HILL ROAD
TM: 84.-1-5, 84.-1-10.1/2/3
FILE: 84./604/905

WHEREAS, the Putnam Valley Planning Board has received an application, known as Emerald Ridge Subdivision, to permit the development of 24 single-family homes on 85.5 acres of land; and

WHEREAS, a secondary application for a lot line change has been submitted which will allow for the transfer of approximately 35 (+/-) acres of land from Brookfalls Cottages, Inc. to the applicant; and

WHEREAS, the proposed action has been determined to be an Unlisted Action, pursuant to the New York State Environmental Quality Review Act (SEQRA) 6 NYCRR, Part 617.4; and

WHEREAS, on August 2, 2004 the Planning Board declared themselves Lead Agency for the coordinated SEQRA review of this Unlisted Action.

WHEREAS, on October 18, 2004 the Putnam Valley Planning Board issued a Positive Declaration of Significance requiring a Draft Environmental Impact Statement (DEIS) be prepared in accordance with the State Environmental Quality Review Act (SEQRA); and

WHEREAS, on November 15, 2004 a public scoping session was held to allow for public comment on the Draft Scoping Document; and

WHEREAS, the Planning Board provided a 10 day written comment period on the Draft Scoping Document and responses were submitted to the Planning Department; and

WHEREAS, appropriate revisions were made to the Draft Scoping Document based on the public scoping session and written responses.

NOW, THEREFORE, BE IT RESOLVED THAT, on motion by Thomas Patterson, seconded by Eugene T. Yetter, the Planning Board of the Town of Putnam Valley hereby adopts the Final Scoping Document dated February 7, 2005 subject to minor revisions as discussed at the February 7, 2005 Planning Board meeting.

By: ______________________

TOWN OF PUTNAM VALLEY

JOHN M. ZARCONE
Chairman
MICHAEL J. RAIMONDI
Vice Chairman
THE CHAZEN COMPANIES
Town Planner
INSITE ENGINEERING
Town Engineer

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THOMAS PATTERSON
Secretary
RICHARD TULLY
EUGENE T. YETTER, JR.
JOSEPH C. BECERRA
(Adhoc)
LAURA L. LUSSIER
Clerk

August 22, 2005

RECEIPT OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
VS CONSTRUCTION CORP – "EMERALD RIDGE"
MARSH HILL ROAD
TM: 84.-1-5, 84.-1-10.1/2/3

WHEREAS, the applicant is proposing a 25-Lot subdivision and lot line change within the Moderate Density Residence (R-2) Zoning District; and

WHEREAS, the proposed action has been determined to be an Unlisted Action, pursuant to the New York State Environmental Quality Review Act (SEQRA) 6 NYCRR, Part 617.4; and

WHEREAS, on October 18, 2004, the Planning Board issued a Positive Declaration of Significance, requiring the applicant to prepare a Draft Environmental Impact Statement (DEIS).

NOW THEREFORE BE IT RESOLVED THAT, on motion by Richard Tully, seconded by Joseph C. Becerra and carried, the Planning Board hereby acknowledges receipt of the DEIS; and

BE IT FURTHER RESOLVED THAT, in accordance with 6 NYCRR Part 617.9(a)(2), the Planning Board shall determine the completeness of the DEIS within 45 days (October 6, 2005), unless such time period is extended by mutual consent of the Planning Board and the applicant.

	Yea	Nay	Abstention	Absent
John M. Zarcone, Jr., Chairman	X			
Michael J. Raimondi, Jr., Vice Chairman				X
Thomas Patterson, Secretary				X
Richard Tully	X			
Eugene T. Yetter, Jr.				X
Joseph C. Becerra	X			

By: ______________________
John M. Zarcone, Jr.

TOWN OF PUTNAM VALLEY

PLANNING BOARD

265 Oscawana Lake Road
Putnam Valley, NY 10579-2004
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January 23, 2006

MAJOR SUBDIVISION-R2
LOT LINE CHANGE
VS CONSTRUCTION CORP "EMERALD RIDGE"
MARSH HILL ROAD
TM: 84.-1-5 AND P/O 84.-1-10.1, 10.2 AND 10.3
FILE: 84./604/905 AND 904

Michael Raimondi recused himself.

WHEREAS, additional time would be needed by the Planning Board and the Town Consultants to review the Draft Environmental Impact Statement and the Board asked the applicant for a thirty (30) day , which the applicant agreed to;

NOW THEREFORE BE IT RESOLVED THAT, on motion Eugene Yetter, seconded by Tom Carano and carried to have a thirty day extension for the review of the Draft Environmental Impact Statement;

TOM CARANO	AYE
EUGENE YETTER	AYE
CHAIRMAN CROWDER	AYE

WHEREAS, the Planning Board realized soon after that more time was needed for said review and proceeded to ask the applicant for an additional thirty (30) days, which the applicant has agreed to;

BE IT FURTHER RESOLVED THAT, on motion Eugene Yetter, seconded by Tom Carano and carried to amend the thirty (30) day extension to sixty (60) days.

TOM CARANO	AYE
EUGENE YETTER	AYE
CHAIRMAN CROWDER	AYE

Billy L. Crowder
BY: BILLY L. CROWDER

cc: Cronin Engineering

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Capital District Office
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Orange County Office
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North Country Office
Phone: (518) 812-0513

August 26, 2005

Ms. Ruth L. Pierpont
New York State Office of Parks, Recreation, and Historic Preservation (OPRHP)
Peebles Island, PO Box 189,
Waterford, New York 12188-0189

Re: Emerald Ridge Subdivision
Putnam Valley, Putnam County, New York
Project Number: 04PR06174

Dear Ms. Pierpont:

The Putnam Valley Planning Board is in receipt of a Draft Environmental Impact Statement (DEIS) for a 25-Lot subdivision on 85.5 (+/-) acres of land located on Marsh Hill Road, adjacent to Peekskill Hollow Road, in the Town of Putnam Valley.

The Planning Board has required the applicant to prepare a Phase 1A Cultural Resource Survey (enclosed). Said Survey has been prepared by Stephen J. Oberon, Columbia Heritage, Ltd., and is dated May 2005. The attached Survey recommends the completion of a Phase 1B Survey, which will be forwarded to you upon its receipt.

The proposed subdivision will likely require a NYSDEC Freshwater Wetlands Permit. Although the site contains wetlands regulated by U.S. Army Corps of Engineers, disturbance to these wetlands is not proposed.

Neither the Planning Board nor their consultants will be providing a technical review of the Phase 1A and Phase 1B Surveys; therefore, the Planning Board wishes to initiate the consultation of the Office of Parks, Recreation, and Historic Preservation; the adopted scoping document is attached for your use. Please provide your comments directly to the Planning Board at the following address:

Ms. Laura Lussier, Planning Board Clerk
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, NY 10579
Phone: (845) 526-3740 FAX: (845) 526-3307

If you have any questions or concerns, please contact me directly at (845) 486-1520.

Sincerely

Jan K. Johannessen
Town Planner

Enclosure

cc: Putnam Valley Planning Board (via fax 845-526-3307)
William A. Zutt, Esq. (via fax 845-528-2566)
Stephen Coleman, Wetlands Inspector (via fax 914-762-5260)
William J. Brickelmaier, III, P.E. (via fax 845-225-9717)
Josh Morcinis, AICP, PP (via fax 265-4418)

JM - VAL - 4.6

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04/010

September 21, 2005

COPY

Josh A. Moreinis, AICP, PP
Tim Miller Associates
10 North Street
Cold Spring, New York 10516

Re: Emerald Ridge DEIS

Dear Josh:

I, along with the Town Engineer, Town Wetlands Consultant, and Town Hydrogeologist, are in the process of reviewing the DEIS for the Emerald Ridge Subdivision. Although we will provide detailed comments at the October 17, 2005 Planning Board meeting, we have found the DEIS to be incomplete with respect to the Final Scoping Document; this letter shall serve as the Planning Board's formal determination of completeness.

The Planning Board formally acknowledged receipt of the DEIS on August 22, 2005 and in accordance with 6 NYCRR Part 617.9(a)(2), the Planning Board must determine the completeness of the document with 45 days of its receipt (on or before October 6, 2005). Please note that the Planning Board had originally intended to make this determination at the October 3, 2005 Planning Board meeting; however, the meeting has been reschedule to October 17, 2005, which is technically outside of the 45 day review period.

If you have any questions or concerns, please contact me directly at 845-486-1520.

Sincerely

Jan K. Johannessen
Town Planner

cc: Putnam Valley Planning Board (via fax 526-3740)
William A. Zutt, Esq. (via fax 845-528-2566)
Stephen Coleman, Wetlands Inspector (via fax 914-762-5260)
William J. Brickelmaier, III, P.E. (via fax 845-225-9717)
William A. Canavan, CPG (via fax 914-276-2664)
Keith Staudohar (via fax 914-736-3693)

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October 13, 2005

Mr. John Zarcone, Chairman
and Members of the Planning Board
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Emerald Ridge Draft Environmental Impact Statement, 1st review
Tax ID: 84.-1-5/10.1/10.2/10.3
Job Number: 10424.05

Dear Chairman Zarcone and Members of the Planning Board:

On behalf of the Planning Board, The Chazen Companies (TCC) has reviewed the following documents:

- Emerald Ridge Subdivision Draft Environmental Impact Statement (Vol. 1 & 2), prepared by Tim Miller Associates, Inc., dated August 16, 2005.

- Subdivision and Development Approval Plan for Emerald Ridge, prepared by Cronin Engineering P.E. P.C., dated June 1, 2005.

The Draft Environmental Impact Statement (DEIS) prepared by Tim Miller Associates, dated August 16, 2005, has been reviewed for completeness. The Planning Board acknowledged receipt of the DEIS on August 22, 2005. TCC has used the Final Scoping Document, adopted February 7, 2005, to ascertain whether this document is complete with respect to its scope and content for the purposes of commencing public review.

Based on a review of the submitted documents, the DEIS has been found incomplete and it is recommended that the document not be accepted for public comment at this time. It is recommended that the applicant be directed to respond to the following comments:

Executive Summary

1. Page 1-1, 2nd paragraph – This paragraph should indicate that the project was originally scoped for 24 lots (23 units) and provide an explanation as to why the lot count has increased.

2. Page 1-2, general comment – The layout/format of this section should be identical to that provided in Section 1.3, Proposed Mitigation Measures.

3. Page 1-2, general comment The applicant should identify the potential impacts associated with the lot line adjustment, specifically to the existing easements associated with Brookfalls Cottages Inc.

4. Page 1-2, 1st full paragraph – The applicant should identify the existing length of Marsh Hill Road, the length of the proposed extension, and total proposed length of Marsh Hill Road.

5. Page 1-2, 3rd full paragraph – The applicant should identify the total amount of wetland buffer disturbance.

6. Page 1-2, general comment – Although mitigation is provided, there appears to be no discussion of impacts associated with stormwater.

7. Page 1-3, general comment – The applicant should indicate that the tax revenue generated from the project will not cover municipal costs.

8. Page 1-3, last paragraph - The applicant should indicate that a major grading permit will be required from the Planning Board and indicate conformance with Chapter 155 of the Town Code.

9. Page 1-4, 1st full paragraph -- The applicant should indicate that a wetlands permit will be required from the Putnam Valley Planning Board. In addition, the applicant should indicate conformance with Chapter 144 of the Town Code and provide mitigation for buffer disturbance.

10. Page 1-4, 4th full paragraph – The "Watershed Protection Overlay District" should be changed to the "Ground and Surface Water Protection District."

11. Page 1-7, 2nd paragraph – This statement is not true and should be revised.

12. Page 1-7, 3rd paragraph – The applicant should indicate that the total buildout of pending Planning Board projects would result in 247 new homes

and approximately 864 persons. The applicant should provide information on the potential cumulative impacts associated with this growth and development with respect to streams and tributaries, stormwater, groundwater, wetlands, wildlife, vegetation, traffic, fiscal, schools, utilities, and emergency services.

13. Page 1-7, last paragraph – The applicant should indicate if the cluster alternative would eliminate the need for the proposed lot line adjustment.

14. Page 1-8, first full paragraph – The DEIS text states that the Cluster Alternative would reduce the amount of impervious surfaces by more than 3 acres compared to the proposed action; however, the table on the same page indicates a reduction in impervious surface area of only 0.69 acres.

15. Page 1-10, first sentence – "Cluster Layout" should be changed to "Code Compliant Marsh Hill Road Alternative."

Project Description

1. General comment – The DEIS refers to and describes Parcels A, B, and C. It would be helpful to provide a map showing these parcels; Figure 2-1 should identify the parcels as A, B, and C.

2. Page 2-2, general comment – The DEIS describes the existing zoning and land use of the project site, but does not describe surrounding zoning districts as required by the Final Scoping Document.

3. Page 2-3, 3rd full paragraph, and elsewhere in DEIS – The DEIS describes that Marsh Hill Road will be widened to 22 feet; however, the existing width of the road is not provided.

4. Page 2-3, last paragraph – The applicant should identify the need and intent of the proposed 25-foot access easement.

5. Page 2-4, general comment – The applicant should adequately identify the various types and relative amounts of impervious surfaces on-site (pre- and post-construction).

6. Page 2-4, 1st paragraph – The applicant should discuss the implications of the lot line adjustment on the lands of Brookfalls Cottages Inc., specifically relating to existing easements.

7. Page 2-4, last paragraph – The applicant should note that detail floor plans and architectural elevations are required to be submitted with the Development Approval Plan and will be required during the planning process.

8. Page 2-5, 2nd full paragraph – The applicant should revise the size of the underground storage tank.

9. Page 2-5, 4th full paragraph – The applicant should note that a landscaping plan will be required in conjunction with the Development Approval Plan. The applicant should provide a description of proposed landscaping and vegetation to be retained as required by the Final Scope.

10. Page 2-5, 3rd paragraph – Figure 3.4-3 illustrates five proposed stormwater basins; this discrepancy should be resolved.

11. Page 2-8, 4th paragraph – The calculation of net revenues generated by the proposed project is incorrect. Section 3.12 (Fiscal and Economic Impacts) identifies the net increase in tax revenue from project development as $479,291, which appears to be correct. In addition, the project revenue does not appear to be seven times the revenue currently generated by the property.

12. Page 2-9, 3rd paragraph The Planning Board will also review the application in accordance with Development Approval Plan requirements.

13. Page 2-9, general comment – The list of Involved and Interested Agencies is not accurate and is incomplete. In addition, the applicant has not included all of the approvals required by the Planning Board.

Geology and Soils

1. Page 3.1-7, 1st full paragraph – The applicant has identified that approximately 4,200 cubic yards of material will need to be removed via blasting, but has not identified the associated impacts of blasting to surrounding property owners, infrastructure, and utilities.

2. Page 3.1-7, general comment · The applicant has determined that the project will involve 11,000 cubic yards of cut and 4,650 cubic yards of fill. The applicant has not provided information relating to where extra material will be transported to, the amount of truck trips involved, and their anticipated routing.

3. Page 3.1-7, general comment - As required by the Final Scope, the applicant should determine the percentage of on-site slopes (0-10%, 10-15%, 15-20%, and 20% and greater) remaining on-site (post-development).

4. Page 3.1-9, last two paragraphs – The applicant should submit a detailed blasting mitigation plan as per the Final Scoping Document. The applicant has indicated that subsurface investigations will be conducted prior to construction to determine the extent of rock removal. Subsurface investigation should take place during the SEQRA process to adequately determine potential impacts and required mitigation.

Surface Water Resources

1. Page 3.2-1, heading – The title of this section should be "Surface Water Resources."

2. Page 3.2-1, Table 3.2-1 – The Table should be revised to include a 7th column titled "Permit Required." The applicant should indicate the required permits to be obtained (if any).

3. Page 3.2-1, Figure 3.2-1 – A legend should be provided indicating what the shaded green sections represent; it is likely that these areas denote proposed changes to the NYSDEC maps.

4. Page 3.2-2, first paragraph – The text should clarify whether Wetland B is hydrologically connected to the Peekskill Hollow Brook.

5. Page 3.2-9, 1st full paragraph – The Scope requires a map illustrating the locations of the Peekskill Hollow Brook watershed, the Oscawana Brook watershed, and the City of Peekskill watershed; this map has not been provided.

6. Page 3.2-9, 4th full paragraph – Per the Final Scope, the acreage/square footage of wetland buffer disturbance should be provided.

7. Page 3.2-9, 5th full paragraph – The DEIS does not explicitly discuss impacts to Peekskill Hollow Brook, Oscawana Brook, and the City of Peekskill watershed.

8. Page 3.2-10, general comment – The applicant should provide mitigation measures for proposed buffer disturbance and for those areas where the limits of disturbance are in close proximity to wetland buffer areas.

9. General comment -- The DEIS does not provide a table that demonstrates how the project will comply with criteria outlined in Chapter 165-24, as required by the Final Scoping Document.

Stormwater

1. Page 3.4-2, last paragraph and elsewhere throughout this section – Per the Final Scoping Document, the DEIS should include runoff calculations for the 24-hour storm event and the 25-year storm event.

2. General comment - The applicant should identify potential impacts and associated mitigation measures relating to the proximity of the stormwater basins to proposed residences.

3. General comment – It does not appear that the applicant has discussed field test results as required by the Final Scope.

4. Page 3.4-3, top of page – The numbering of the drainage areas is off; drainage area B2 should be #2, and so on.

5. Page 3.4-3, bottom of page – "26 single family homes" should be changed to "24 single family homes."

6. Page 3.4-4, first full paragraph – The DEIS text refers to four stormwater management basins, but Figure 3.4-3, to which the text refers, shows five stormwater management basins.

7. Page 3.4-4, 2nd full paragraph – The last word of this paragraph should be changed from "practices" to "basins."

8. Page 3.4-4, Table 3.4-2 – This table should include proposed peak rates of runoff for 24-hour and 25-year storm events.

9. Page 3.4-5, Table 3.4-3 – The post-development runoff rates for design point B4 are higher than the pre-development runoff rates.

10. Page 3.4-5, third paragraph – This paragraph should include a brief description/summary of quality control measures that are specified in the SWPPP, or at least refer the reader to the mitigation measures section for more details.

11. Page 3.4-6, 3rd and 4th paragraphs – This section could be made clearer. Only four of the five stormwater management basins are described, and only two of the drainage basins are described. It would help if there was a methodical presentation of each drainage basin, along with the stormwater management basin that will capture and treat its runoff, or in the case where there is no stormwater management basin, a discussion of why one is not needed.

12. Page 3.4-7, general comment – Per the Final Scoping Document, the DEIS should mention that the project will comply with the 5-acre maximum disturbance area during construction that is required under GP-02-01.

13. Page 3.4-8, last paragraph – Additional information is required relating to the maintenance responsibilities of the stormwater basins, confirmation that the Town will accept maintenance responsibilities, creation of stormwater districts, and longevity of said facilities.

Vegetation and Wildlife

1. General comment – The applicant should identify if Figure 3.6-2 should be used as a location map for both vegetation and habitat. The names of vegetation types and habitat types are not consistently used within the text and on Figure 3.6.2. This section could be reorganized for clarity, clearly separating vegetation, habitat and wildlife.

2. General comment – The applicant has not identified the approximate age of on-site vegetation as required by the Final Scope.

3. General comment – The applicant has not provided source information from the U.S. Fish and Wildlife Service as required by the Final Scope.

4. Page 3.6-1, 4th paragraph – This sentence states that there are two vegetation types on-site, yet lists and describes three (mature hardwood forest, mature evergreen forest, and forested wetland). The names of vegetation types should be used consistently throughout this section.

5. Page 3.6-3, Table 3.6-2 – This table should be modified to include the quantity of remaining trees (post-construction).

6. Page 3.6-3, last paragraph – The word "size" should be changed to "site."

7. Page 3.6-4, Table 3.6-3 – The applicant should indicate that lf = linear feet.

8. Page 3.6-6, 1st full paragraph – The location of stonewalls should be described and a figure illustrating their location should be provided.

9. Page 3.6-7 & 8, Table 3.6-4 – Habitat types are not consistently named.

10. Page 3.6-8 & 3.6-9, bottom/top of pages – The sentences in these paragraphs are not ordered properly; they are not clear as they presently read. In addition, the applicant has indicated that ten site visits have been completed, but only provides six dates.

Traffic and Transportation

1. 3.7.1 Existing Traffic and Transportation Conditions

   The existing conditions section should identify the centerline pavement markings at key locations, such as in the vicinity of Peekskill Hollow Road and Marsh Hill Road, since passing/no-passing zones reflect existing sight lines and safety issues can arise when vehicles cross roadway centerlines. Similarly, given the varying grades and curvatures of the area roadways, more information should be provided concerning warning and regulatory signs and their adequacy for each noted roadway. For instance, there are very unique warning signs on Peekskill Hollow Road near the site. Additionally, significant traffic generators in the area should be noted and located to provide a better overall sense of the area and any potential issues.

   There is a signal at the intersection of Peekskill Hollow Road and Oscawana Road, but no information is given describing either the intersection geometry or the signal parameters. The studied non-signalized intersections are also not described relative to conditions, including sight lines.

2. 3.7.2 Prevailing Speeds

   Given the significant non-compliance with the posted speed limit on Peekskill Hollow Road, are there recommendations which can be made based on these observations? Please confirm locations where speed samples were taken and other relevant statistical factors (ten-mile pace, percentile exceeding posted, etc.) This information needs to be explored relative to identifying and/or improving operating conditions.

3. 3.7.3 Accident Data

The accident data is limited to County Road 21, Peekskill Hollow Road; additional data on County Road 20, Oscawana Road, should be included. It is not essential to include the state highways given their volumes and locations, but the other local roads should be addressed relative to their accident history if such data is available. The Scoping Document indicates that a description of all existing and available data from Putnam County and the Town of Putnam Valley Highway Departments be provided.

For Peekskill Hollow Road, six of the nine accidents occurred at the signalized intersection with Oscawana Road. Although this may not be an unusual number, there is no discussion of patterns or signal factors (clearance times, non-exclusive movements) which may provide insight into why these are occurring and if mitigation is possible. More of a narrative discussion would be appropriate.

4. 3.7.4 Level of Service Criteria

It should be noted that the NYSDOT accepts SYNCHRO capacity analysis and other formats. There is no preferred or required methodology; the use of HCS is acceptable.

5. 3.7.5 Existing Levels of Service

Reference to Table 3.7-6 should be Table 3.7-5.

6. 3.7.6 Future No-Build Traffic: Network and Volumes

The cumulative impact narrative would be enhanced if "major" is defined in the text rather than just as a footnote to Table 3.7-6.

The seven projects for which a surcharge of volume is added to the network are highlighted in Appendix G, Table G-1; however, it would be beneficial if the surcharge volumes were depicted on a separate Figure to ascertain the impact by intersection location. Without this graphic representation separate from the No-Build figure, which includes the 2% background growth, there is no easy way to locate the surcharge volumes.

7. 3.7.7 No-Build Level of Service

Table 3.7-7 summarizes the No-Build LOS results. There is only one change in LOS which is marked with an asterisk, but the asterisk is not explained in the Table.

8. 3.7.8 Potential Impacts to Traffic and Transportation

The proposed road improvements should address any sight line improvements which will occur from the redesigned Marsh Hill Road intersection with Peekskill Hollow Road. Within Section 3.7, more attention should be given to the potential bus activity that may occur within the development, given concerns regarding access, especially for large vehicles.

9. 3.7.10 Future Build Condition

In order to summarize and show the comparison of LOS results in the existing, no-build, and build scenarios, it would be helpful to have one table showing the comparison. Three tables now contain that information, Table 3.7-5, Table 3.7-7, and Table 3.7-10.

10. 3.7.11 Sight Distance

Reference is made to Table 3.7-12, which should be Table 3.7-11.

AASHTO is used as a reference for sight line explanations; however, the reference to 14.5 feet off the edge of pavement for measuring intersection sight distance is overly restrictive considering the reconfiguration of an existing intersection and existing roadways. The Policy and Standards for the Design of Entrances to State Highways allows some discretion (stop bar location, point of maximum sight line, etc.) as does the NYSMUTCD (authorized by section 52 of the NYS Highway Law and the NYS V&T law). With that said, the statement that the stopping sight distance (SSD) requirements are met for 55 mph speeds is not correct. Approximately 495 feet is needed (looking to the east from Marsh Hill Road) and only 355 feet is achieved; looking west, adequate SSD is available at 530 feet.

Relative to intersection SD, the statement that SD to the west is sufficient for 50 mph is also incorrect since the requirement is 555 feet and the available distance is 530 feet. The relationship to the posted speed or the operating speed (assuming the radar was taken in this area) is not addressed, nor is the intersection SD non-compliance to the east due to the horizontal curve of

Peekskill Hollow Road. The MUTCD provides possible mitigation for these types of circumstances, but no reference of existing signage or possible mitigation is provided.

11. 3.7.12 Construction Traffic

Under the construction operations discussion, the need for both the import and export of soil material should be better explained. Is the onsite material unsuitable, and thus suitable material needs to be brought in?

The applicant should provide additional information relating to the phasing of the project. The applicant should clarify that the construction entrance will be completed first, in order to mitigate traffic and construction activity.

12. 3.7.14 Site Access

Please confirm that the reference to "...will allow for a separation of eastbound and westbound movements, provided by a paved island..." refers to the ingress versus egress movements for Marsh Hill Road.

Emergency service to the new homes is problematic, especially for large (fire truck, water tankers, etc.) vehicles. Careful consideration of advance planning for incidents must be provided through intensive communication and coordination with EMS services. See additional comments under Police, Fire, and Emergency Services.

Land Use and Zoning

1. Page 3.8-1, 4th paragraph – This sentence should be revised to state, "there are no historic buildings, sites, or districts, on or adjacent to the subject site that are listed on the State or National Register;" the lack of cultural resources has yet to be determined.

2. Page 3.8-1, 5th paragraph – The applicant should indicate that Lot C is in the CC-1 Zoning District.

3. Page 3.8-2, general comment – Provisions for senior citizen multifamily residences have been recently repealed; this use should be removed.

4. Page 3.8-3, Table 3.8-1 – This table should be reviewed for accuracy; several of the requirements are either mislabeled or missing entirely. The table

should note that 15,000 sq. ft. of contiguous building area is required for each lot.

5. Page 3.8-3, general comment – The applicant should provide a description of the minimum building area required under §165-15 of the Zoning Code. The applicant should include the calculation used in determining building area and indicate if all of the proposed lots conform.

6. Page 3.8-3, general comment – A Development Approval Plan is required under §165-16 of the Zoning Code. The applicant should discuss this provision and indicate if the submitted plans meet its requirements.

7. Page 3.8.3, general comment – As the Planning Board has requested to review a cluster subdivision plan as an alternative, the provisions of §165-17 should be discussed.

8. Page 3.8.3, general comment – The applicant should discuss Article VA, "Tree Protection," and the submitted tree plan.

9. Page 3.8-4, 4th full paragraph – Information in this paragraph is inaccurate and should be revised.

10. Page 3.8-7, general comment – The applicant should provide information relating to the required well permits.

11. Page 3.8-7, Subsection A – The applicant should note that septic systems associated with the construction of new single-family homes on lots larger than 1.5 acres are excluded from this requirement.

12. Page 3.8-7, 1st and 2nd full paragraphs - The proposed project will not require an Environmental Management District permit; therefore, these paragraphs should be removed and replaced with a paragraph explaining that said permit is not required.

13. Page 3.8-9, 5th paragraph – Additional information is required relating to the lot line adjustment and its affect on the existing easements in place on the lands of Brookfalls Cottages Inc.

14. Page 3.8-9, last paragraph – The proposed development may be consistent with existing patterns of development in Town; however, development along Marsh Hill Road is minimal.

Police, Fire, and Emergency Medical Services

1. Page 3.9-1, 3rd paragraph – The DEIS should provide the staffing levels for the County Sheriff's Putnam Valley substation.

2. Page 3.9-1, 4th paragraph – The DEIS should identify how far the Brewster Barracks is from the project site.

3. Page 3.9-2, 2nd full paragraph – It would be clearer if the text stated that trucks from Station #1 enter Marsh Hill Road from the other direction (west) and therefore are not affected by the angle of the intersection with Peekskill Hollow Road; this is stated on page 3.9-4.

4. Page 3.9-2, last paragraph – The DEIS should identify how far the Ambulance Corps Headquarters is from the project site and provide the anticipated response time; the Ambulance Corps Headquarters is not shared with the Fire Department.

5. Page 3.9-3, Table 3.9-1 – The table should include another column listing the distance from each facility to the project site.

6. Page 3.9-3, 1st and 3rd paragraphs – The distances from Putnam Hospital Center and the Hudson Valley Hospital Center to the project site should be identified.

7. Page 3.9-4, 2nd full paragraph – The applicant has previously provided a sheriff to citizen ratio as provided in the ULI's 1994 Development Impact Assessment Handbook; the approximate shortfall of officers should be provided.

8. Page 3.9-5, 3rd full paragraph – The applicant should confirm the number of hydrants to be installed; it appears that only five are illustrated on the Subdivision Plan.

9. Page 3.9-5, 3rd full paragraph – The applicant should indicate if the Putnam Valley Fire Department has been contacted regarding the proposed fire suppression system. The Fire Department should confirm that the proposed system is acceptable and meets their needs.

10. Page 3.9-5, 3rd full paragraph – The applicant should discuss the ultimate ownership and maintenance responsibilities of the water storage tank and hydrant system.

11. Page 3.9-5, 3rd full paragraph – Mitigation measures relating to the improvements to the intersection of Peekskill Hollow Road and Marsh Hill Road should be provided.

Historical and Archaeological Resources

1. Page 3.10-2, last paragraph – The first sentence should be revised to say, "There are no standing structures on the project site and no structures within the viewshed that meet the requirements for inclusion on the National Register of Historic Places; thus, there will be no impact on historical structures."

2. Page 3.10-3, 2nd paragraph - The Planning Board will not consider the DEIS complete until both the Phase 1A and Phase 1B Surveys have been provided for review; this sentence should be deleted.

3. General comment - The applicant should provide additional information relating to on-site stonewalls (existing conditions, potential impacts, and mitigation).

4. General comment - Neither the Planning Board nor their consultants will be providing a technical review of the Phase 1A and Phase 1B Surveys. The Planning Board has initiated consultation with the Office of Parks, Recreation and Historic Preservation (OPRHP). Upon receipt of original bound copies of the Phase 1A and Phase 1B Surveys, the Planning Board will forward these documents, along with a copy of the subdivision plans, to OPRHP for review and comment.

Visual Resources

1. General comment – Per the Final Scoping Document, the DEIS should provide photos of surrounding land uses, a description of existing view corridors, and a description of on-site stone walls.

2. Page 3.11-1, general comment – A figure should be added that illustrates the location of existing stone walls on the project site.

3. Page 3.11-2, general comment – Photosimulations of the project site from the four identified locations the site may be visible from should be provided.

4. Page 3.11-1, 3rd paragraph – The DEIS text should clarify that there were 15 potential critical receptor locations identified.

5. Page 3.11-2, general comment – The applicant should provide additional information relating to the architecture of the proposed residences. The applicant should indicate whether the available dwellings are limited to the four models provided in the DEIS and provide proposed color schemes, building material (outside only), and gross floor area.

6. Figures 3.11-2 and 3.11-3 - The applicant should provide front, rear, and side elevations (colored renderings preferred). Each drawing should include a scale and indicate approximate length, width, and height.

7. Page 3.11-4, heading – Section 3.10.3 should be renumbered to 3.11.3.

Fiscal and Economic Impacts

1. General comment - The DEIS should clearly state where the budgetary information comes from and how it was obtained (e.g., 2005-2006 Town budget was obtained from the Town Assessor's office, etc). The DEIS should also include a copy of the Town budget and School District budget in the appendices.

2. General comment - The Final Scoping Document required the use of *The New Practitioner's Guide to Fiscal Impact Analysis*, but throughout the DEIS the demographic multipliers used are from the ULI Handbook.

3. General comment - The DEIS should provide more descriptive text to explain and define concepts like assessed valuation and taxable valuation.

4. Page 3.12-1, Table 3.12-1 – There should be an explanation for the asterisk next to "Current Assessed Value" and "Current Taxable Value."

5. Page 3.12-1, last paragraph – The net property taxes presented for Lot A and Lot B do not match those presented in Table 3.12-2.

6. Page 3.12-2, last paragraph – The average cost per pupil figure presented in this paragraph ($8,510) does not match the figure presented on page 3.12-4 ($19,102). There is also no source presented for the figure of $8,510 to indicate what the figure is based on. The total School District budget and enrollment should be presented in this paragraph, as is done for Town funds.

7. Page 3.12-3, 1st paragraph – The total population of the proposed project would be 87 people, not 80 people as the DEIS states (3.6248 people/unit x 24 units = 87 people).

8. Page 3.12-3, 2nd paragraph – The assessed value of the project is incorrect. The DEIS should also explain that the properties in Putnam Valley are re-assessed each year at full market value (100% equalization rate).

9. Page 3.12-3, Table 3.12-3 – The figures presented in the table will need to be revised based on an assessed value of $15,600,000. Also, the table should provide an explanation for the single and double asterisks presented in the second and fourth columns, respectively.

10. Page 3.12-4, 3rd paragraph – The Town costs presented in this paragraph will need to be revised based on 87 people, not 80 people. In addition, the costs as they are currently presented ($60,390) are greater than the tax revenues from the project site ($60,315) and thus would not be covered by revenues, in contrast to what the DEIS states. With revised costs based on 87 residents, this deficiency will be even greater.

11. Page 3.12-4, 4th paragraph – Although minor, the number of students generated from the proposed project will be just under 21 pupils, not just under 20 as the DEIS states. Therefore, the total cost of the students and resulting surplus in tax revenues will need to be revised.

12. Page 3.12-5, last paragraph – Tax revenues generated from the project site will not cover municipal cost; this needs to be addressed.

Cumulative Impacts

1. Page 3.13-1, 1st paragraph – With the proposed project and all other planned and pending development in Putnam Valley, there will be a total of 247 new homes, not 246 new homes.

2. Page 3.13-2, 1st and 2nd paragraphs – The number of proposed units should be corrected from 23 to 24.

3. Page 3.13.-2, 2nd paragraph -- The number of pending units should total 247 units, not 246; the approximate number of persons should be modified.

4. Page 3.13-3, last paragraph – The applicant should provide additional information relating to the cumulative traffic impacts of pending Planning Board applications to streets and key intersections in proximity to the project area. It appears that the applicant has only addressed the impacts associated with the potential buildout of Marsh Hill Road.

5. Page 3.13-4, general comment – The applicant should provide information relating to cumulative fiscal impacts.

6. Page 3.13-4, 1st paragraph - The applicant should provide the multiplier used in determining the total number of school children. The applicant should provide School District boundary lines on Figure 3.7-5 to identify pending projects that will not influence the School District.

7. Page 3.13-4, 2nd paragraph – Given the lack of infrastructure in Town, future development will not likely tie in to municipal water and sewer services. The applicant appears to be determining cumulative water and sewage impacts based on a town-wide municipal water system, based on 247 units. It would be more practical to determine water and sewage impacts in the area of the proposed development (i.e. wells that will be drawing water out of the same aquifer). Anticipated water and sewage usage should be based on data provided by Putnam County.

8. Page 3.13-5, 2nd paragraph – See above comment.

9. Page 3.13-5, Figure 3.13-1 – The Marsh Hill Buildout Analysis should be overlaid on an aerial photograph and should include parcel ownership, lot area, and frontage.

Significant Adverse Unavoidable Impacts

1. No comments on this section.

Irreversible and Irretrievable Commitment of Resources

1. Page 6-1, 4th paragraph – This section states that the total market value of the project will be $17,500,000; this differs from the figure presented in Section 3.12, Fiscal and Economic Impacts.

Growth Inducing Impacts

1. General comment – This section should be edited slightly to reflect the changes in the fiscal section, in that tax revenues will not be sufficient to cover municipal costs and could affect community services.

Appendices

1. The applicant has not provided all relevant correspondence and SEQRA documentation.

General DEIS Comments

1. The applicant has indicated that the Putnam Valley Elementary School is currently at capacity; therefore, additional information pertaining to potential impacts to the School District should be provided. The DEIS should be revised to include a separate School section, which analyzes the existing conditions (environment, facility capacities, uses and locations of District Buildings, status of any school expansion plans), potential impacts (estimated number of public school children by grade, associated impacts, projected costs and revenues, etc.), and proposed mitigation measures (if any).

2. The applicant has identified the need for blasting. Additional information relating to the extent and location of blasting activities, results of subsurface investigation, as well as detailed information relating to potential impacts and mitigation is required; the submitted blasting mitigation plan is not acceptable.

3. The applicant should provide information relating to the accessibility of Marsh Hill Road during construction. The applicant should confirm that both existing homeowners on Marsh Hill Road and emergency service vehicles will have uninterrupted access throughout the constructions process.

Subdivision Plan Review

A technical review of the preliminary subdivision plans will be conducted upon determination of the proposed layout, lot count, and submission of a revised DEIS. After a review of the submitted plans, I offer the following general comments:

1. According to §56-5C of the Subdivision Regulations, a dead-end street shall not exceed 1,200 feet. The existing length of Marsh Hill Road is approximately 1,910 linear feet. The proposed extension of Marsh Hill Road, including the main loop, exceeds 3,000 linear feet. The length of the dead-end street is being further exacerbated by an extension off the main loop, ending in a cul-de-sac (approximately 475 linear feet). In an effort to reduce the length of the dead-end street and to reduce the noncompliance with §56-5C, it is recommended that the proposed cul-de-sac providing access to Lots 9, 10, 11, and 12 be eliminated. In addition, the applicant has indicated that the

construction of the cul-de-sac and the development of Lots 9, 11, and 12 will require blasting.

2. It is the intent of the Zoning Ordinance to locate buildings, driveways, and site amenities primarily within the buildable area. The Planning Board should note that the proposed dwellings on Lots 7, 23, and 24 and the proposed septic systems on Lots 4, 10, and 25 are completely outside the buildable area. The Planning Board may wish to request a layout in which all dwellings and septic systems are primarily within the buildable area.

3. The Planning Board should note that the interior lots proposed within the loop road (Lots 24 and 25) appear to be particularly constrained. The applicant has indicated that blasting will be required to develop these lots; however, the extent of blasting is not known at this time. The proposed dwelling and driveway are located entirely outside the buildable area on Lot 24 and the septic system is located outside the buildable area on Lot 25. Further investigation is required to determine the adequacy of this portion of the site for development.

4. The applicant is proposing to remove all trees within the areas of disturbance, a practice that is not generally accepted by the Planning Board. The submitted Tree Plan does not illustrate the proposed lot configuration, dwelling, driveway, septic location, or proposed grading. It is likely that a large amount of trees could be saved if the applicant was to consider tree protection on a lot-by-lot basis. As currently proposed, approximately 27.5 acres of land or 32.2% of the site will be clear-cut. It is recommended that a revised Tree Plan be prepared, illustrating proposed site improvements and trees to be saved within the areas of disturbance.

5. The applicant has provided driveway profiles for Lots 1, 2, 3, 4, and 6. It is recommended that driveway profiles be provided for Lots 10, 14, 21, 22, 23, and 24.

6. Although some grading is provided, proposed grading should be illustrated for all dwellings, driveways, and septic locations, as well as other site amenities.

7. The existing and proposed metes and bounds should be provided on the Subdivision Plat. Future submissions should be signed and sealed by a Licensed Land Surveyor (Donnelly Land Surveying, P.C.).

8. The applicant should address wetland buffer disturbance on Lots 5, 6, 9, 20, 21, and 23.

9. The applicant has indicated that Wetlands C and D were validated by the NYSDEC on August 4, 2004; proof of validation should be provided to the Planning Board for review.

10. The Subdivision Plat does not accurately identify or illustrate the proposed lot line realignment. In addition, the applicant should submit a contract of sale or letter from Brookfalls Cottages Inc. indicating that the lands to be acquired by the applicant are authorized to be included in the subdivision.

11. The applicant should identify the need for the proposed 25' access easement shown between Lots 15 and 16.

12. The Existing Slopes Map should be revised for clarity purposes; it is difficult to distinguish the various slope categories. In addition, the Plan should illustrate the proposed lot layout, dwelling and driveway location, and buildable area.

13. The buildable area is difficult to interpret; a different, more pronounced line type should be used and the applicant should identify the calculated buildable area for each lot. The buildable area should be shown on Sheets SP-3.2 through SP-3.5.

14. It appears that the applicant has calculated the gross lot area, not the net lot area. The Bulk Zoning Table should be revised to include net lot area, open area, and height.

15. Although the provided side yard exceeds the minimum requirement, the side yard setback line on Lot 8 is inaccurate.

16. The Planning Board has requested a cluster layout as an alternative; however, full size drawings have not been submitted (11"x17" submitted with DEIS). The applicant should provide a cluster layout at a scale of 1"=100 feet. It should be noted that the submitted cluster plan includes substantial disturbance to on-site wetlands. It is recommended that a cluster layout be submitted with no wetland disturbance, as was achieved for the conventional layout.

17. The Planning Board has requested an alternative plan illustrating Marsh Hill Road constructed to meet the current standards for a new subdivision

road. Although an 11"x17" map has been provided with the DEIS, the applicant should provide engineering drawings at a scale of 1" = 50 feet. If the proposed lot configuration would not change as a result of reconstruction of Marsh Hill Road, a lot layout is not required to be submitted with this alternative.

18. It is recommended that the Planning Board meet with or write to the Chief of the Putnam Valley Fire Department to discuss the adequacy, maintenance, and location of the underground water tank and hydrant system.

This information is based on my review of the project plans and DEIS. Additional review comments will be provided throughout the process as the application is evaluated. It is recommended that written responses to these comments be provided with any future submittals.

Sincerely,

Jan K. Johannessen
Town Planner

cc: William A. Zutt, Esq. (via fax 845-528-2566)
Irv Sevelowitz, Code Enforcement Officer (via fax 526-8806)
Stephen Coleman, Wetlands Inspector (via fax 914-762-5260)
William J. Brickelmaier, III, P.E. (via fax 845-225-9717)
William Canavan (via fax 914-276-2664)
William Fitzpatrick, P.E.
Josh Moreinis, AICP, PP (via fax 265-4418)
Keith Staudohar (via fax 914-736-3693)

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STEPHEN W. COLEMAN
ENVIRONMENTAL CONSULTING, LLC

Environmental Planning & Site Analysis
Wetland Mitigation & Restoration Plans
Wetland Delineation & Assessment
Natural Resource Management
Pond & Lake Management
Wildlife & Plant Surveys
Breeding Bird Surveys
Landscape Design

October 15, 2005

COPY

Mr. John Zarcone, Chairman
Members of the Planning Board
Town of Putnam Valley
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Emerald Ridge Draft Environmental Impact Statement

Materials Reviewed:

- Emerald Ridge Subdivision DEIS, vol. 1 & 2, prepared by Tim Miller Associates, Inc. dated 08-16-05.
- Subdivision and Development Approval Plan for Emerald Ridge as prepared by Cronin Engineering, P.E.P.C., dated 06-01-05.

I have completed a review of pertinent sections of the Draft EIS and offer the following comments:

Surface Water Resources:

1. The jurisdictional boundaries of all wetlands should be properly shown on all plans and text. Letters from NYSDEC, USACOE and other agencies should be provided that document agreement or validation of boundaries.
2. The wetland functional assessment should be expanded to include a table that summarizes the details of assessment and a corresponding map prepared that identifies and classifies wetlands by type shows floodplains, and location of watersheds and sub-basins within watersheds.
3. Data from monitoring wells should be summarized and correlate hydrological relationships of wetland areas.

Vegetation and Wildlife:

1. The applicant submitted as an appendix a Biodiversity and Habitat Assessment Report. The Report although helpful, does not comply with the recommendations and specific protocol outlined in the approved Scoping Document. The Town of Putnam Valley has adopted a specific protocol for conducting Biodiversity Studies and Assessments. The protocol has not been followed and therefore, the section documenting existing biodiversity of the property is incomplete, and any impacts can only be speculated.

2. I recall that the Planning Board went to great efforts to have the protocols established as part of the approved Scope. I question why these guidelines were not adhered to. It does a great disservice to the quality of the data and existing conditions –flora and fauna that may be present on the parcel.

3. The protocol established recommended guidelines for when field surveys should be completed. For example, the bird survey completed by the applicant was performed in July, which is after the breeding season. The data gathered does not provide much useful information other than species sighted on a given time slot.

4. The DEIS relies upon probable lists and information that is not very site specific and should be supplemented with good field data performed according to approved protocols.

5. The classification of vegetative types should be matched to a site map and the attributes of each community consistent throughout the text. Species lists of each plant community type should be provided as part of the review.

6. Some of the wetland resources present on the parcel consist of vernal pool habitats. The protocol for conducting studies of reptile and amphibian surveys was not followed and hence, it is very difficult to ascertain project impacts without first having good field data that substantiates existing species and habitat qualities and interactions. I personally observed environmentally sensitive species that were not included in the DEIS - such as wood frogs, spring peepers, spotted salamanders and box turtles. Recommended standards for protecting vernal pool habitat and species can be as much as 750 feet from existing vernal pool areas. This is one of the reasons for having site-specific field information performed by qualified individuals. Detailed field surveys by qualified, trained herpetologists are required to assess impacts to vernal pool species and habitat needs.

7. The DEIS does not address specific recommendations outlined in the Croton to Hudson Biodiversity Reports or guidelines for protecting Vernal Pool Breeding Habitat.

8. The proposed plan and alternative layouts do not appear to create any functional habitat or open space corridors for wildlife movement. Proposed road layouts intersect with habitats and may block passage and attractiveness of site for resident wildlife species.

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9. The proposed DEIS does not address the importance of adjacent properties and corridors. This property is part of a large corridor and the proposed layouts will result in extensive fragmentation of the forest communities.

10. Mitigation measures are not well developed within the DEIS and should be developed further after more thorough detailed field studies have been completed of the site. Once this data is gathered and analyzed, the proposed subdivision layout may need to be modified to take more specific biodiversity data into consideration.

This completes my preliminary comments at this time. Please let me know if you have questions or require additional information.

Sincerely,

Stephen W. Coleman

Stephen W. Coleman
SWC/tbh

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HydroEnvironmental
SOLUTIONS, INC.

October 17, 2005

Mr. John Zarcone and Members of the Planning Board
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, New York 10579

RE: Emerald Ridge DEIS – Review
Tax ID: 84-1-5/10.1/10.2/10.3
Job Number: 10424.05

Dear Chairman Zarcone and Members of the Planning Board:

On behalf of the Planning Board, HydroEnvironmental Solutions, Inc. (HES) has reviewed the following sections of the Draft Environmental Impact Statement (DEIS) for the above referenced project:

- Section 3.1: Geology and Soils
- Section 3.3: Groundwater Resources
    - Appendix I: Well Test Report

Based on a review of the above referenced sections, HES offers the following comments:

Section 3.1: Geology and Soils

If blasting is required as stated in the DEIS, on-site and off-site seismic monitoring should be completed as required in the SEQR process. HES is also in agreement with Chazen Companies that subsurface investigations to determine depth and amount of bedrock to be removed should be completed as part of the SEQR process prior to construction. Additionally, the Applicant should collect background groundwater samples from select on-site and off-site supply wells before and after blasting to ensure that no impacts have occurred. The selected wells should be sampled for the following potability parameters: total coliform, pH, turbidity, color, odor, hardness, iron, and manganese.

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Section 3.3: Groundwater Resources

Appendix I: Well Test Report

HES has reviewed Section 3.3: "Groundwater Resources", and the affiliated "Three Well Pumping Test Report" Dated July 2005. The pumping test results indicate that adequate groundwater is available beneath the site for individual supply wells during normal and extreme drought conditions from a water budget standpoint. Similarly, pumping three on-site wells simultaneously demonstrated that adequate supply was available from the three wells with no detrimental off-site impacts, and that during the test, more water was pumped (greater than 12,000 gallons per day {gpd}) than will be required for the entire 25 lot proposed subdivision.

No estimates of groundwater use during the irrigation season (June to September) are provided in the report or the groundwater section in general. The pumping test report states that 67.5 gpd per household will be lost from the overall available groundwater budget. This water loss number is grossly conservative for the irrigation season when water loss to the system will be significantly higher. As such, HES recommends that the Applicant provide the Town with estimates of water use and loss during the irrigation season based on the best available data. Additionally, HES recommends that an off-site groundwater monitoring plan be implemented during the irrigation season for a period of several years after all of the homes are completed and the individual supply wells and associated sprinkler systems are operational. A long term monitoring plan during the irrigation season will ensure that no adverse impacts occur to the bedrock aquifer beneath the subject site and surrounding existing properties.

As the town hydrogeologist, HES believes that the above outlined comments on the DEIS should be addressed accordingly. Please contact me at (914) 276-2560 if you have any additional questions.

Very truly yours,
HydroEnvironmental Solutions, Inc.

William A. Canavan, CPG
President

cc: Jan K. Johannessen, The Chazen Companies
Steve Coleman, Environmental Consulting, LLC
Bill Brickelmaier, P.E., Insite Engineering
Josh Moreinis, Tim Miller Associates
Keith Staudohar, Cronin Engineering
File: HES DOCUMENTS\Jobs\PUTNAM VALLEY\Emerald Ridge\CommentsDEISLtr.doc

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INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

November 30, 2005

Town of Putnam Valley Planning Board
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, New York 10549

Via Fax (845) 526-3307 (Planning Board Office)
Via Fax (845) 526-4992 (Planning Board Chairman)

RE: Emerald Ridge Subdivision
Marsh Hill Road
Tax Map Nos. 84-1-5, 10.1, 10.2 and 10.3

Dear Chairman Zarcone and Members of the Board:

Our office has received and reviewed the following sections of the Draft Environmental Impact Statement, dated August 16, 2005, prepared by Tim Miller Associates, Inc. for the above referenced subdivision:

- 2.5 Phasing and Construction Schedule
- 3.1 Geology and Soils
- 3.4 Stormwater
- 3.5 Wastewater
- 3.7 Traffic and Transportation
- Appendix J Stormwater Pollution Prevention Plan

Based on our review we offer the following comments:

Section 2.5 Phasing and Construction Schedule

1. It appears that the work associated with the construction to Marsh Hill Road and the subdivision will not be phased. Based on the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit for Stormwater Discharge GP-02-01 and the final scoping document a construction phasing plan describing the intended construction sequence should be added to the Draft Environmental Impact Statement (DEIS). Also, no more than five (5) acres of soil shall be disturbed at any one time during construction without prior written approval from the NYSDEC. It is stated in the Notice of Intent (NOI) in Appendix B of the Stormwater Pollution Prevention Plan that more than 5 acres of disturbance will occur at one time. If this is the case, permission should be obtained from the NYSDEC and submitted for review and added to the DEIS.
2. The location of the construction vehicle access and parking during construction should be discussed in the DEIS per the final scoping document.
3. The construction techniques should be discussed in the DEIS as well as material storage per the final scoping document.
4. Reference to the Town Design Engineer and Engineer on page 2-6 should be corrected to state Town Engineer and Design Engineer.

Section 3.1 Geology and Soils

1. The property boundary should be clearly shown on Figure 3.1-1 Existing Soils Map and Figure 3.1-2 Existing Slopes Map.

2. The soil boundaries shown on Figure 3.1-1 Existing Soils Map do not appear to be consistent with the slopes and wetlands. The final scoping document require that a qualified professional verify the soil boundaries via ten selected soil tests. It is recommended that the existing soil map be revised accordingly and the results of the soil tests be added to the DEIS.
3. The property boundary should be clearly shown on Figure 3.1-3 Proposed Slopes Disturbance Map.
4. The erosion control and slope protection reference should reference the New York Standards and Specification for Erosion & Sediment Control 2005. This reference should be revised throughout the DEIS.
5. While it is stated that the onsite soils have similar 'K' factors the actual factors are not identified. It is recommended that the DEIS be revised to include a discussion of the actual 'K' factors and the potential impacts. The final scoping document required that potential soil erosion impacts and estimated quantities and location of increase long term erosion be identified, which also should be added to the DEIS.
6. Figure 3.1-4 Grading Plan for Infrastructure should also include the Marsh Hill Road improvements and stormwater management basins.
7. It is recommended that a detailed phasing plan be prepared that limits disturbed areas to a maximum of 5 acres at any one time for the duration of the construction portion of the project (this should include all lot construction). The plan should provide sufficient detail in order to assess earthwork (cut/fill volumes) within each phase. NYSDEC SPDES Permit GP-02-01 only authorizes up to 5 acres of disturbance at any one time without written approval from the NYSDEC.
8. The reference to silt fencing to be used to physically define the limits of work should be changed to orange construction fence. Orange construction fence is far more visible and appropriate for the purpose.

Section 3.4 Stormwater

1. Reference to Appendix H Stormwater Pollution Prevention Plan on page 3.4-2 should be changed to Appendix J.
2. The overall property boundary should be clearly shown on Figures 3.4-1, 3.4-2, and 3.4-3. These figures should be revised for clarity and should clearly show the general stormwater runoff directions in both the existing and proposed conditions. The figures as currently presented are hard to read and require significant reference to the text and other figures within the DEIS to understand.
3. The contributing areas to the proposed stormwater basins should be clearly shown on Figures 3.4-2 and Figure 3.4-3.
4. Page 3.4-5 states that "Fertilizer and pesticide, use when applied in accordance with the manufacturer's guidelines, are not anticipated to have an impact on water resources". Page 3.4-7 indicates that pesticides and herbicides are prohibited. This should be clarified in the DEIS.
5. On Page 3.4-5 it's stated "it is expected that there will be no impacts to either onsite or downstream waters if the basins are properly constructed and maintained long term". This conclusion is based on the fact that the project will meet the current NYSDEC requirements for stormwater management. Compliance with the NYSDEC requirements does not necessarily ensure that there will be no impacts. In fact, the NYSDEC design manual for stormwater management only indicates limited pollution removal efficiencies of stormwater practices. The fact that the site is an undisturbed woodland proposed to be developed with 24 new houses will likely cause impacts. These impacts should be further discussed in the DEIS.
6. The stormwater management proposed for the project relies significantly on infiltration, which is favorable stormwater management technique, however

infiltration is prone to easy clogging and quick failure without proper routine maintenance. The fact that the proposed stormwater management facilities will require routine maintenance to function as designed warrants discussion of the detailed maintenance requirements and party responsible for maintenance in the DEIS.

7. Page 3.4-4 indicates that the post-development peak flows will be reduced to a rate of flow equal to or less thon that which runs off the project area in its present condition. This is inconsistent with the Table 3.4-3 as well as statements made within Appendix J "Stormwater Pollution Prevention Plan". Subcatchment B4 proposes an increase in peak flow in the post-development condition. This subcatchment discharges to the Peekskill Hollow Brook however a majority of the upper portion of this subcatchment discharges to Wetland "B" first. It appears that Wetland "B" in the proposed condition will have an increase in the peak flow and volume of stormwater discharged to it. This should be addressed in the DEIS and the inconsistencies should be corrected.

8. Widespread use of "dry swales" are proposed to provide water quality treatment for stormwater runoff from the individual lots. The NYSDEC identifies this as an acceptable practice to provide water quality treatment, however many of the locations proposed do not seem practical. In many locations the swales are proposed in the front or rear yards immediately adjacent to the proposed residences. The aesthetic impacts, long term maintenance requirements and responsibilities, and viability of the dry swales should be addressed in the DEIS.

9. The final scoping document required field testing for each proposed stormwater management facility. Review of Appendix E "Stormwater Soils Data" of Appendix J "Stormwater Pollution Prevention Plan" of the DEIS indicates that the deep test holes performed for four out of five of the basins were not excavated to the required depth. For the infiltration basins the excavations should have been conducted to a minimum of 3' below the bottom of the basin and for the extended detention basins the excavation should have been conducted at a minimum to 1' below the bottom of the basin. Infiltration basin 4A was excavated to 9.5' while the bottom of the basin is proposed in a 11.5' of cut. Therefore, the basin should have been excavated to a minimum of 14.5' (11.5' + 3') in order to determine if the proposed practice is feasible. For infiltration basins 2 and 3 the excavation was conducted to approximately the proposed bottom of the basin and therefore should have been conducted an additional 3' in depth in order to determine the feasibility of these practices. Extended detention basin 4B is proposed in a maximum cut of 13', while the excavation was only conducted to 7'.

10. It appears that several of the required elements as stated in the New York State Stormwater Management Design Manual have not been included with the proposed stormwater management facilities. Some of these details can be addressed during the Development Approval Plan review of the project, however some (buffers, safety bench, aquatic bench, micropools, maintenance access) may affect the overall disturbance necessary for the practice which may affect the layout as well as wetland buffer impacts.

11. It is not clear if stormwater runoff from all disturbed areas is proposed to be treated as required by the NYSDEC SPDES General Permit GP-02-01. It is recommended that a figure be added to the DEIS which clearly shows that all stormwater runoff from disturbed areas is treated as required.

E. Wastewater

1. The reference to the results of the deep hole and percolation testing results and locations on page 3.5-2 should be revised. It's suggested that a summary be added to the DEIS rather than just referring to the plans.

Section 3.7 Traffic and Transportation

1. The final scoping document required a discussion of safety concerns regarding large trucks and school buses turning onto Marsh Hill Road and their ability to make the turn without crossing the centerline. Page 3.7-11 includes a simple statement that "the proposed Marsh Hill Road improvement measures have been designed to address the safety concerns of large trucks and school buses allowing them to turn right onto Marsh Hill Road without crossing the centerline of Peekskill Hollow Road". It is suggested that the proposed path of such a vehicle be added to Figure 3.7-8 of the DEIS to clearly demonstrate this vehicular movement. The DEIS should also address the proposed vertical alignment of the intersection and that these type of vehicles will be able to negotiate the steep grade change.
2. The intersection improvements at Marsh Hill Road and Peekskill Hollow Road propose a retaining wall in a proposed cut section with an existing steep slope and a wall above. It's not clear the proposed retaining wall can be constructed within the existing Town road right of way without disturbing the adjacent property to the north. This should be addressed in the DEIS.
3. The proposed widening of Marsh Hill Road in the vicinity of the intersection with Peekskill Hollow Road proposes the widening of the Marsh Hill Road right of way to the south onto Lot "C". The DEIS indicates that the applicant intends to purchase this property. The status of this purchase should be identified as it is critical to the project. In addition, the proposed right of way widening onto Lot "C" appears to decrease the setback of the existing dwelling from the property line which may require a variance. This should be addressed in the DEIS.

This completes our comments on the portions of the DEIS that we were asked to review. Our office will provide detailed technical comments during review of the Development Approval Plan and Major Grading Permit applications. Should you have any questions or comments concerning the above, please feel free to contact our office.

Very truly yours,

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

By: ______________________
William J. Brickelmaier, III, P.E.
Senior Project Engineer, Associate

WJB/mdm/amh

Enclosure

cc: William A. Zutt, Esq., Via Fax: 845-528-2566
Irv Sevelowitz, Building Inspector, Via Fax: 845-526-8806
Jan Johannesson, Town Planner, Via Fax: 845-454-4026
Steve Coleman, Wetlands Inspector, Via Fax: 914-762-5260
William Canavan, Hydro Environmental Solutions, Inc., Via Fax: 914-276-2664
Josh Morenis, Tim Miller Associates, Via Fax: 845-265-4418
Keith Staudohar, Cronin Engineering P.E., Via Fax: 914-736-3693

Insite File No. 92107.232

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jm/hke

December 15, 2005

Ms. Ruth L. Pierpont
New York State Office of Parks, Recreation, and Historic Preservation (OPRHP)
Peebles Island, PO Box 189,
Waterford, New York 12188-0189

Re: Emerald Ridge Subdivision
Putnam Valley, Putnam County, New York
Project Number: 04PR06174

Dear Ms. Pierpont:

The Putnam Valley Planning Board is in receipt of a Draft Environmental Impact Statement (DEIS) for a 25-Lot subdivision on 85.5 (+/-) acres of land located on Marsh Hill Road, adjacent to Peekskill Hollow Road, in the Town of Putnam Valley.

The Planning Board has required the applicant to prepare a Phase 1 Cultural Resource Survey (enclosed). Said Survey has been prepared by Stephen J. Oberon, Columbia Heritage, Ltd., and is dated September 2005.

Neither the Planning Board nor their consultants will be providing a technical review of the attached report; therefore, the Planning Board wishes to initiate the consultation of the Office of Parks, Recreation, and Historic Preservation. The adopted scoping document is attached for your use. Please provide your comments directly to the Planning Board at the following address:

Ms. Laura Lussier, Planning Board Clerk
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, NY 10579
Phone: (845) 526-3740 FAX: (845) 526-3307

If you have any questions or concerns, please contact me directly at (845) 486-1520.

Sincerely

Jan K. Johannessen
Town Planner

Enclosure

cc: Putnam Valley Planning Board (via fax 845-526-3307)
William A. Zutt, Esq. (via fax 845-528-2566)
Stephen Coleman, Wetlands Inspector (via fax 914-762-5260)
William J. Brickelmaier, III, P.E. (via fax 845-225-9717)
Josh Moreinis, AICP, PP (via fax 265-4418)

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

January 24, 2006

Tina Wang
Tim Miller Associates
10 North Street
Cold Spring, New York 10516

Re: <u>SEQRA</u>
Emerald Ridge Development
Marsh Hill Road
Putnam Valley, Putnam County
04PR06174

Dear Ms. Wang:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Parks, Recreation and Historic Preservation Law, Section 14.09.

Based upon this review, it is the OPRHP's opinion that your project will have No Impact upon cultural resources in or eligible for inclusion in the State and National Registers of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Ruth L. Pierpont

Ruth L. Pierpont
Director

RLP:bsa

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February 23, 2006

Mr. Billy L. Crowder, Chairman
and Members of the Planning Board
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Emerald Ridge Draft Environmental Impact Statement, 2nd review
Tax ID: 84.-1-5/10.1/10.2/10.3
Job Number: 10424.05

Dear Chairman Crowder and Members of the Planning Board:

On behalf of the Planning Board, The Chazen Companies (TCC) has reviewed the following documents:

- Emerald Ridge Subdivision Draft Environmental Impact Statement (Vol. 1 & 2), prepared by Tim Miller Associates, Inc., last revised December 21, 2005.

- Subdivision and Development Approval Plan for Emerald Ridge, prepared by Cronin Engineering P.E. P.C., last revised December 9, 2005.

The Draft Environmental Impact Statement (DEIS) prepared by Tim Miller Associates, last revised December 21, 2005, has been reviewed for completeness. TCC has used the Final Scoping Document, adopted February 7, 2005, and our previous comment letter dated October 13, 2005 to ascertain whether this document is complete with respect to its scope and content for the purposes of commencing public review.

The Planning Board should note that certain sections of the DEIS specifically related to engineering and wetland/biodiversity issues have not been reviewed by this office.

Based on a review of the submitted documents, the DEIS has been found incomplete and it is recommended that the document not be accepted for public comment at this time. It is recommended that the applicant be directed to respond to the following comments:

1. Cover page: The Planning Board Chairman's name should be revised.

2. Page 1-2, last paragraph – Although a minor discrepancy, the total area of disturbance is not consistently identified.

3. Page 1-3, 1st full paragraph – The Town's Wetland Inspector does not typically issue Wetland Permit Waivers for actions that require Planning Board Approval. This section should be revised to indicate that the proposed buffer disturbance will require a Wetlands Permit from the Planning Board and that said disturbance will be reviewed in accordance with Chapter 144 of the Town Code. Although the amount of buffer disturbance is relatively minimal, it is anticipated that the Wetlands Inspector will require mitigation.

4. Page 1-5, 4th full paragraph - The applicant should reference that conditional final approval was granted to Brookfalls Cottages, Inc. on October 17, 2005.

5. Page 1-6, last paragraph – The applicant should clearly state that the estimated municipal and school taxes from the proposed project will not be sufficient to completely cover the cost of providing these services to the future residents. The shortfall in municipal tax revenues ($30,591) and in school tax revenues ($100,155) should be obvious to the reader.

6. Page 1-7, last paragraph – The applicant has not provided wetland buffer mitigation as requested; the applicant should confirm with the Town Wetlands Inspector that said mitigation is not required.

7. Page 1-11, 1st paragraph – The applicant should clearly state that the estimated municipal and school taxes from the proposed project will not be sufficient to completely cover the cost of providing these services to the future residents. The shortfall in municipal tax revenues ($30,591) and in school tax revenues ($100,155) should be obvious to the reader.

8. Page 1-13, 2nd full paragraph – Although a minor discrepancy, the DEIS text states that Cluster Alternative #1 will reduce the amount of impervious surfaces by .69 (+/-) acres; however, Table 1-1 indicates a .74 (+/-) acre reduction.

9. Figure 2-6, and elsewhere in the DEIS – It does not appear that the "existing rock outcropping" layer is turned on.

10. Page 2-4, 4th paragraph – The number of existing dwellings sharing access on Brookfalls Court should be revised from four to three dwellings. The applicant states that the proposed action will not affect access to any of the existing homes within Brookfalls Cottages; the applicant should make reference to the existing access easements associated with Brookfalls Cottages and their potential impact to the proposed project.

11. Page 2-5, last paragraph - The applicant has provided architectural elevations (front and rear) for three of the potential house styles. The submitted elevations provide little detail and no scale. The Planning Board should determine the level of detail required and note that Site Development Plan Approval requires the submission of detailed elevations and floor plans. The photographs of typical dwellings constructed by VS Construction Corp are helpful; however, I believe the dwelling located on Mill Street is a renovation and is not representative of the proposed action.

12. Page 2-6, 4th full paragraph – The applicant has indicated that landscaping to be incorporated on each of the lots will be determined as each lot is built. In previously approved subdivisions, the Planning Board has requested these plans as part of the review process. The Planning Board should determine if landscaping plans should be submitted for review. At a minimum, it is recommended that street trees be provided along the extension of Marsh Hill Road.

13. Page 2-6, 5th full paragraph – The applicant has indicated that a sign indicating the name of the development will be installed on the traffic island. The traffic island should be free of obstructions to allow for larger delivery trucks and emergency vehicles to drive over the island if need be. As there are dwellings located on Marsh Hill Road that are not apart of this subdivision and as signs indicating the name of a development generally detract from the continuity of residential neighborhoods, it is recommended that the Planning Board prohibit the proposed sign.

14. Page 2-7, 3rd paragraph – The applicant indicates that trees to be preserved in the field will be flagged. The Planning Board typically requires the applicant to flag the trees to be removed trees to be

removed; the applicant should change the word "preserved" to "removed."

15. Page 2-8, 2nd full paragraph - This paragraph should be revised to indicate that trees to be removed will be clearly marked.

16. Page 2-8, 1st paragraph – The applicant should provide information relating to the accessibility of Marsh Hill Road during construction. The applicant should specifically identify measures used to allow both existing homeowners on Marsh Hill Road and emergency vehicles uninterrupted access throughout the construction process.

17. Page 2-9, 4th paragraph – The applicant makes reference to a Town Blasting Permit; I do not believe such a permit exists.

18. Page 2-9, 5th paragraph – The hours of operation identified in this paragraph do not correspond to those identified in Appendix 0. The hours in which blasting can be conducted should be revised to 8am-5pm, Monday through Friday.

19. Page 2-9, last paragraph – This paragraph should be revised to indicate the purpose and need for the project relative to the Town of Putnam Valley; references to affordable housing should be removed.

20. Page 2-10, 1st paragraph – This paragraph is not relevant to this section and should be deleted.

21. Page 2-10, 2nd paragraph – This paragraph is inaccurate; the proposed action will have a negative fiscal impact on the Town and School District.

22. Page 2-10, last paragraph - This paragraph is not relevant to this section and should be deleted.

23. Page 2-11 – The first sentence of the first paragraph should be deleted; a Major Grading Permit is required from the Planning Board; Site Plan approval is not required; the Town Board should be listed as an Involved Agency as should the Building Department; the site is not located in the NYCDEP watershed and it is not understood why the NYCDEP is listed as an Interested Agency; the Interested Agency list should be expanded upon to include the Putnam Valley Fire Department, the Ambulance Corps, the Environmental Commission, and the Advisory Board on Architectural and Community Appearance (ABACA).

24. Page 3.1-3, 1st paragraph – The location of mapped Chatfield-Charlton complex (CsD) soils should include the entrance to the site (Marsh Hill Road).

25. Page 3.1-6, 2nd paragraph – The number of proposed stormwater basins should be revised from four to five.

26. Page 3.1-6, 3rd paragraph - The applicant should provide the average area of disturbance per lot.

27. Page 3.1-6, last paragraph – The applicant should indicate that improvements to Marsh Hill Road will take place within mapped Chatfield-Charlton complex (CsD) soils. Given the limitations of this soil type, the applicant should identify potential impacts.

28. Page 3.1-7, 1st paragraph – This paragraph should reference the reader to Figure 3.1-3, not Figure 3.1-2. According to this Figure, the percentage of soils to be disturbed on slopes of 15% or greater is 12.5%, not less than 5% as the applicant has indicated.

29. Page 3.1-7 – 8,620 cubic yards should be changed to 8,630 cubic yards.

30. Page 3.1-7, 3rd paragraph - To avoid confusion, the applicant should identify the capacity (cubic yards) of a 10 wheel and 18 wheel truck. Given the constraints of Marsh Hill Road and the poor maneuverability of an 18 wheel truck, the applicant should determine if the use of an 18 wheel truck is practical.

31. Page 3.1-7, 3rd paragraph – The applicant should identify if any off-site fill will be brought on-site; if off-site fill is anticipated, the applicant should identify where the fill is coming from and how many truck trips would be required.

32. Page 3.1-7, 4th paragraph – Although identified in Appendix O, the anticipated truck routing should be described in this paragraph. In addition, the applicant should identify how many truck trips are anticipated each day and how long it will take to remove 8,630 cubic yards of cut.

33. Page 3.1-7, last paragraph –The applicant has indicated that 14,683 cubic yards of rock will be removed via blasting. The applicant has previously identified that the entire project will require 19,410 cubic

yards of cut. This paragraph should identify that the 76% of the total cut will be removed via blasting.

34. Page 3.2-10 and elsewhere in the DEIS – According to seconday source mapping, the Peekskill Hollow Brook has a C(t) classification/standard.

35. Page 3.2-12, last paragraph – The applicant is not providing mitigation for the proposed buffer disturbance; the Wetlands Inspector should confirm that mitigation is not necessary as indicated by the applicant.

36. Page 3.4-5, 1st paragraph – Although comments have been provided, the Putnam County Department of Highways and Facilities has not approved this proposal as indicated by the applicant.

37. Page 3.4-4 – As previously requested, the applicant should address visual impacts and safety concerns associated with the proximity of the stormwater basins to proposed residences and Town road.

38. Page 3.4-5, 1st paragraph – The applicant should identify if the proposed drainage improvements along Peekskill Hollow Road will be affected by the County's improvements to Peekskill Hollow Road.

39. Page 3.4-6, 1st paragraph – Ideally, post-development rates of runoff should equal or be less than pre-development rates; the Town Engineer should determine if the post-development conditions of drainage area B4 is acceptable.

40. Page 3.4-9, 6th full paragraph - It is recommended that landscaping and/or split-rail fencing be provided to address visual and safety concerns relating to the stormwater basins.

41. Page 3.6-1 and elsewhere in this section – The names of the vegetation types are not consistently used within the text and on Figure 3.6-2.

42. Page 3.6-4, 3rd paragraph – The applicant states: "while all trees within the limits of disturbance are marked as "to be removed" on the tree plan, it is the applicant's intent to preserve as many trees on the site as possible. The applicant proposes to meet with the Code Enforcement Officer and Town Planner prior to the issuance of a Building Permit for each proposed lot to determine if any specimen trees, outside the proposed driveway, house and septic locations can be preserved.

The Planning Board should determine whether the submitted tree plan should be revised to illustrate trees that could be saved within the limits of disturbance, or whether this should be determined on-site prior to the issuance of a building permit, as proposed by the applicant.

The phasing plan indicates that approximately five lots will be cleared at each stage; therefore meeting with the applicant to determine which trees could be saved prior to the issuance of each Building Permit does not appear to be practical. The applicant will not be required to submit individual Site Development Plans for each lot; therefore, it will be difficult to enforce alterations from the originally approved tree plan.

As mentioned above, the applicant is proposing to remove all trees within the limits of disturbance. It should be noted that the Putnam County Department of Health requires trees to be removed within the expansion area if fill is required. The applicant has indicated that fill is only required on Lots 8, 9, 11, 12, 22, 23, and 25; therefore, there is an opportunity to save the trees within the expansion areas on the remaining 17 lots.

43. Page 3.6-11, 2nd paragraph – It does not appear that the applicant has conclusively confirmed the absence of the Indian bat, a Federally-listed endangered species. The applicant indicates that the U.S. Fish and Wildlife Service's standard recommendation to avoid any potential for directly killing Indiana Bats is to clear all potential roost trees between October 1st and March 30th; however, the applicant does not indicate if this mitigation measure will be implemented and how the time constraint will affect the overall construction schedule.

44. Page 3.6-12, 2nd paragraph – "Yorktown" should be changed to "Putnam Valley," if still applicable.

45. Page 3.6-14 – The applicant should provide a summary paragraph indicating the potential on-site occurrence of the Bog Turtle, Indiana Bat, Eastern Box Turtle, Eastern Hognose Snake, Worm Snake, Marbled Salamander, and Blue Spotted Salamander.

46. Page 3.6-18 – Potential impacts should be provided for those species identified above.

47. Page 3.6-19 – The applicant should indicate if mitigation measures recommended by the USFWS will be implemented.

48. Page 3.7-2, 3rd full paragraph – The orientation of Peekskill Hollow Road in relation to Oscawana Lake Road and the Taconic State Parkway should be clarified (i.e. "Peekskill Hollow Road travels in a northeast direction from Oscawana Lake Road to the…"

    It should be verified whether the referenced school is the Putnam Valley High School as stated or the Middle School as listed by other sources.

    The signal at Peekskill Hollow Road and Oscawana Road must, for safety of operation, consist of a minimum of two phases as confirmed by the reference to "a 4 second clearance interval between phases." Also, it is not clear if pedestrian phasing and/or indications are associated with the pedestrian crosswalks and if so whether this phasing is concurrent with or exclusive of the vehicular phasing.

49. Page 3.7-2, 4th full paragraph – The designation of the nearby school should be verified.

50. Page 3.7-4, 1st paragraph – The discussion of the resulting "short" 40 mph road segment should be expanded to quantify its length and address its contribution or non-contribution to the non-compliance with the posted speed limit. A specific recommendation regarding the removal or retention of this "short" 40 mph road segment should be included.

51. Page 3.7-5, 2nd paragraph – It is appropriate to reference the recommendation from 3.7.2 Prevailing Speeds.

52. Page 3.7-7, 2nd paragraph – reference to Table 3.7-6 has been amended to read Table 3.7-5. The individual sheets of Appendix F have no labeling relating them to the index provided.

53. Page 3.7-10 - The individual sheets of Appendix F have no labeling relating them to the index provided.

54. Page 3.7-12, 2nd paragraph – The applicant should identify if improvements to Peekskill Hollow Road, as proposed by the County, would impact the intersection of Peekskill Hollow Road and Marsh Hill Road. The applicant should provide some detail regarding proposed improvements in the project area, potential impacts, and anticipated County construction schedule. The applicant should specifically identify how far sidewalks are proposed to extend from Oregon Corners, if at all.

55. Page 3.7-12, 3rd paragraph – The applicant should indicate if a bus turning right onto Marsh Hill Road would cross the double yellow line.

56. Page 3.7-12, last paragraph – We believe School bus activity, in this instance, to be more appropriately classified as regular rather than "occasional."

57. Page 3.7-15 - LOS results for existing, no-build, and build scenarios remain in three separate tables. The individual sheets of Appendix F have no labeling relating them to the index provided.

58. Page 3.7-17, 4th paragraph – Since Peekskill Hollow Road provides the only vehicular access to Marsh Hill Road and hence to the project site, it is unclear as to the meaning of the statement; ".... most construction trips would travel to and from the site via Peekskill Hollow Road." If the intent is, as it should be, to exclude construction traffic from local Town roads other than Marsh Hill Road then specific language to this effect should be included.

59. Page 3.7-18, 4th paragraph – The Town's Director of Parks and Recreation has indicated to the Applicant's consultants that the on-site trail system extends to the Town Park and indicated that a connection from the proposed Town Road to the existing trail system would be favorable. Although, the applicant states that unauthorized use of on-site trails will be discontinued as a result of this project, the applicant should consider providing the easement to allow for the continued/future use of the on-site/off-site trails.

60. Page 3.7-19 - It is appropriate to include the recommendation from 3.7.2 Prevailing Speeds under this section.

61. Page 3.8-3 – The applicant should provide the calculation used to determine minimum building area and indicate that all proposed lots will conform. Likewise, the applicant should provide the calculation used for determining open area and indicate conformance.

62. Page 3.8-3 – As the Planning Board has requested to review a cluster subdivision plan as an alternative, a discussion of and compliance with §165-17 should be provided.

63. Page 3.8-3 – A Development Approval Plan is required under §165-16 of the Zoning Code. The Applicant should discuss this provision and indicate if the submitted plans conform.

64. Page 3.8-7, 3rd full paragraph – The applicant identifies the required permits from the Putnam County Health Department, but not the required well permits from the Town of Putnam Valley (see §165-26G of the Zoning Code).

65. Page 3.8-7, 4th full paragraph – The applicant accurately identifies the required report to be prepared by a consulting forester or certified arborist; this report should be prepared and included in the appendix.

66. Page 3.8-8, last paragraph – According to §56-5C of the Subdivision Regulations, a dead-end street shall not exceed 1,200 linear feet. The purpose of such a regulation is to limit the number of dwellings on dead-end streets and thus prevent unsafe emergency access situations and manage traffic flows. In the R-2 Zoning District, a 1,200 foot long road would result in a maximum of 12 lots; the applicant is proposing 25. The applicant should specifically identify the total length of Marsh Hill Road (including the secondary cul-de-sac) post-construction.

67. Page 3.8-9, 5th paragraph – The applicant previously provided recommendations identified in the Putnam County Groundwater Protection and Utilization Plan (see page 3.8-5). Of particular interest is the recommended prohibition of lawn irrigation systems that utilize groundwater. The applicant should identify if lawn irrigation systems are proposed, and if they are, explain their impact to groundwater supply within Section 3.3 of the DEIS. In addition, the applicant should identify compliance with the remaining applicable recommendations.

68. Page 3.9-5, last paragraph – The number of fire hydrants provided is inconsistently identified.

69. Page 3.10-1 – On December 15, 2005, TCC sent the submitted Phase 1 Cultural Resource Report to the Office of Parks, Recreation, and Historic Preservation (OPRHP) for their review and requested all comments be submitted to the Planning Board directly; I have not yet received correspondence confirming that this report has been reviewed and is satisfactory.

70. Figure 3.11-11 – The residence on Mill Street was recently renovated; this should not be considered as a typical residence built by the applicant.

71. Page 3.11-1, last paragraph – The DEIS text should clarify that there were 15 potential critical receptor locations identified.

72. Page 3.11-2, general comment – The photographs indicated in this section are not accurately referenced.

73. Page 3.11-4, 1st full paragraph – The applicant indicates that proposed homes may be visible from this location. As this location is distant from the project site, the Planning Board should determine if a photosimulation is required as per the Final Scope.

74. Section 3.12, general comment - The DEIS should state more clearly that the estimated municipal and school taxes from the proposed project will not be sufficient to completely cover the cost of providing these services to the future residents. The shortfall in municipal tax revenues ($30,591) and in school tax revenues ($100,155) should be clearly identified.

75. Page 3.12-1, last paragraph – The property taxes identified for Parcels A and B in this paragraph do no correspond to the numbers identified in Table 3.12-2 ($27,312.96 and $27,688.20 versus $17,727.77 and $17,973.24). The text identifies that the tax figures are based on 2004 tax bills, while the Table sources 2005 tax rates. The Applicant should clarify why two different sources are being used and utilize 2005 tax bills if available.

76. Page 3.12-1, last paragraph and elsewhere in this section – The property taxes are referred to as "net" annual taxes. Except for where there is a comparison between existing taxes and futures taxes (net increase) or between future tax revenues and municipal costs (net revenue), the term "net" should not be used.

77. Table 3.12-2 – There appears to be an error in the tax rate for the Fire District. In addition, it would be helpful to add a column which lists the total taxes for each taxing jurisdiction. This will make it easier to follow the discussion in the subsequent paragraph.

78. Page 3.12-2, last paragraph – The Town's budget is broken down by General Fund, Highway Fund, and Fire District; however, Tables 3.12-2 and 3.12-3 only identify Town property taxes and Fire District taxes. This information should be presented consistently throughout the section.

79. Page 3.12-4, general comment - The proposed project's costs and net revenues should be presented in a table to make the analysis easier to understand. An example of such a table is provided below for reference (some of the numbers may differ from the DEIS section due to rounding).

Taxing District	Total Budget	Town Population	Per Capita Cost	Project-Generated Population	Projected Municipal Cost	Project-Generated Net Revenue	Projected Shortfall
Town	$ 7,377,534	10,686	$ 690	97 People	$ 66,930	$ 36,566	($ 30,364)
Fire District	$ 693,240	10,686	$ 65	97 People	$ 6,305	$ 6,065	($ 240)
Total Municipal	$ 8,070,774	10,686	$ 755	97 People	$ 73,235	$ 42,631	($ 30,604)
School District	$ 24,204,360*	10,686	$12,476	30 Students	$ 374,280	$ 274,125	($100,155)
* Portion of total school budget that could be affected by the increase in students from the proposed project.							

80. Page 3.12-5, second paragraph - The estimated net increase in school tax revenues generated by the proposed project is approximately 10 times the amount generated by the existing site, not by Parcel A.

81. Page 3.12-5, last paragraph – The municipal cost of the project for the Town Highway Fund is incorrect; it should be $24,638, not $34,638. The total municipal cost of the project should likewise be adjusted from $83,222 to $73,222.

82. Page 3.12-6, first paragraph – Explain how the number of public school student was derived (i.e. 7% private school).

83. Page 3.12-7 - The mitigation measures section incorrectly states that tax revenues from the proposed project will offset all municipal costs except for those of the school district. This should be corrected and the shortfall in municipal revenues should be identified.

84. Page 3.12-7, general comment – The applicant and Planning Board should note that the proposed project would be fiscally positive to the School District if all dwellings consisted of three bedrooms and the market value/ assessed value remained the same.

85. Appendix A – This section should include the following documents:
   - Intent to be Lead Agency resolution and agreement notices.

- Lead Agency resolution.
- Minutes from the scoping session and all written comments received.
- Resolution adopting Final Scoping Document.
- Resolution of receipt of DEIS.
- Resolution granting 60-day extension for Town review.
- Correspondence from the Town Planner, Town Engineer, Town Wetlands Inspector, Town Hydrogeologist, and all Involved and Interested Agencies.

86. Appendix E – The applicant should provide the location under each photograph.

87. Appendix O, Rock Removal and Blasting Program, page 5 – I do not believe the Town has a Blasting Permit; numbers 6 and 7 should be revised if appropriate; number 10 should include Saturday. The Applicant should specifically state that prior to any blasting, the contractor will contact the Putnam Valley Building Department.

Conventional Subdivision Plan Review

1. The submitted plans appear to be consistent with DEIS and are at a level of detail acceptable for preliminary approval; however, prior to a comprehensive review of the subdivision plans, it is recommended that the Planning Board confirm that the proposed layout is acceptable.

The Planning Board should note that the time periods for review of the preliminary plat begin upon the filing of a DEIS notice of completion. Within 62 days of the filing of the notice of completion, the Planning Board must hold a public hearing for both the preliminary plat and the DEIS. The FEIS must be provided within 45 days of the close of the public hearing and within 30 days of the filing of the FEIS, the Planning Board must issue its findings statement and make its decision on the preliminary plat.

This information is based on my review of the project plans and DEIS. Additional review comments will be provided throughout the process as the application is evaluated. It is recommended that written responses to these comments be provided with any future submittals.

Sincerely,

Jan K. Johannessen
Town Planner

cc: William A. Zutt, Esq. (via fax 845-528-2566)
Irv Sevelowitz, Code Enforcement Officer (via fax 526-8806)
Todd Atkinson (via fax 914-232-6827)
Bruce Barber (via fax 914-962-0330)
William Canavan (via fax 914-276-2664)
Josh Moreinis, AICP, PP (via fax 265-4418)
Keith Staudohar (via fax 914-736-3693)

Putnam Valley Volunteer Fire Department Inc.

P.O. Box 21 • Putnam Valley, NY 10579

House Phone
Station # 1 845-526-2879
Station # 2 845-528-4440

Fax
Station # 1 845-526-2881
Station # 2 845-528-2504

In Case of Emergency Dial 911

12/08/05

To Whom It May Concern:

I met with Cronin Engineering about the Emerald Ridge Development located of Marsh Hill Rd. in Putnam Valley and the Department feels the proposed plans with the additional hydrant (near Peekskill Hollow Rd.) at the end of the hydrant line and moving the supply hydrant to the same side as the 10,000 gallon water tank will meet the needs of the Putnam Valley Fire Department to provide fire protection to this development.

Sincerely,

Michael [signature]

Chief of Department
Michael Koenig

HAROLD J. GARY
COMMISSIONER

Tel. (845) 878-6331
Fax (845) 878-3260

DEPARTMENT OF HIGHWAYS & FACILITIES

December 19, 2005

Keith Staudohar
Project Engineer
Cronin Engineering, P.E., P.C.
The Lindy Building, Suite 200
2 John Walsh Blvd.
Peekskill, NY 10566

Re: Emerald Ridge Subdivision
Peekskill Hollow Road (C.R. #21)

Dear Mr. Staudohar:

We have reviewed Cronin's Drawing SP-3.5 "Subdivision and Development Approval Plan" and have the following comments:

Drainage

The concept of installing a new storm sewer along the north side of Peekskill Hollow Road to convey the project's stormwater directly to Peekskill Hollow Creek is acceptable to this Department. The elimination of the two culverts under Peekskill Hollow Road that will result from the new sewer will be beneficial to the owners onto whose properties these culverts now discharge.

The placement of the sewer and drainage structures must be coordinated with the proposed edge of pavement of Peekskill Hollow Road, which will vary slightly from the existing edge of pavement under our planned road project.

We would like a copy of any drainage calculations that were done to verify that the proposed 24" HDPE pipe will convey all the stormwater from Marsh Hill Road as well as adjoining tributary land.

The developer will be solely responsible for supplying all materials for and installing the new sewer along Peekskill Hollow Road. The County cannot participate in this effort, as this work, if installed as part of our future federal-aid project, would be largely paid for without the expenditure of County funds.

We would like to ensure that discharge from the end section does not flow onto private property (TM 84-1-7, #95 Peekskill Hollow Road), but rather is channeled directly to Peekskill Hollow Creek. A stone-lined ditch would be acceptable.

Keith Staudohar
12/19/05
Page 2

Intersection

The intersection improvements at Peekskill Hollow Road and Marsh Hill Road are acceptable to this Department.

We have a concern about the long term durability of pavers on the island proposed for the intersection. We feel this will be a maintenance problem for the County and/or the Town. However, we will reserve judgment until we see details and specifications for the paver island.

We will require a profile of the first 50 feet of Marsh Hill Road before granting a permit.

Right of Way

We will require the developer to convey land along Peekskill Hollow Road to accommodate our proposed road improvements. The boundary of this dedication will be coordinated with the design of our highway improvement project. You should be aware that this project may require the removal of the stone wall in front of the house on Lot "C", and its possible replacement with a short retaining wall.

Permit

The developer will still need to obtain a Highway Work Permit from this Department before any work begins. This will require the submittal of an application, permit fee, security bond, right of way dedication, and proof of contractor's insurance.

Very truly yours,

Harold J. Gary
Commissioner

Mark B. Rosa

by: Mark B. Rosa, P.E.
Supervisor, Planning & Design

cc: Emma Kounine
Brent Howard, Barton & Loguidice
Paul Lynch, Putnam Engineering
Putnam Valley Planning Board
Val Santucci

Putnam Valley Volunteer Fire Department Inc.

P.O. Box 21 • Putnam Valley, NY 10579

House Phone
Station # 1 845-526-2879
Station # 2 845-528-4440

Fax
Station # 1 845-526-2881
Station # 2 845-528-2504

In Case of Emergency Dial 911

12/08/05

To Whom It May Concern:

I met with Cronin Engineering about the Emerald Ridge Development located of Marsh Hill Rd. in Putnam Valley and the Department feels the proposed plans with the additional hydrant (near Peekskill Hollow Rd.) at the end of the hydrant line and moving the supply hydrant to the same side as the 10,000 gallon water tank will meet the needs of the Putnam Valley Fire Department to provide fire protection to this development.

Sincerely,

Michael

Chief of Department
Michael Koenig

VALS./TC... Josh - Chris - A6

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

04/01/ M

August 19, 2005

COPY

Mr. Christon Robbins
Tim Miller Associates, Inc.
10 North Street
Cold Spring, NY 10516

Dear Mr. Robbins:

This responds to your July 8, 2005, letter requesting information on the presence of endangered or threatened species in the vicinity of the proposed 85.5-acre Emerald Ridge Development at Marsh Hill Road in the Town of Putnam Valley, Putnam County, New York.

There is potential for the Federally- and State-listed endangered Indiana bat (*Myotis sodalis*) to occur within the proposed project area, which is approximately 16 miles from known roosts and approximately 37 miles from known hibernacula in Ulster County. Please see the enclosed fact sheet on Indiana bats for further information.

In addition to the Indiana bat, the proposed project is in the vicinity of historic bog turtle (*Clemmys muhlenbergii*) sites. The bog turtle is Federally-listed as threatened and State-listed as endangered. Please see the enclosed fact sheet on bog turtles for further information.

Except for the potential for Indiana bat, bog turtle, and occasional transient individuals, no other Federally-listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project area. In addition, no habitat in the project area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally-listed and proposed endangered and threatened species in New York* is available for your information. If the proposed project is not completed within one year from the date of this letter, we recommend that you contact us to ensure that the listed species presence/absence information for the proposed project is current.

The above comments pertaining to endangered species under our jurisdiction are provided as technical assistance pursuant to the ESA. This response does not preclude additional U.S. Fish and Wildlife Service (Service) comments under other legislation.

As stated above, the Indiana bat and bog turtle are listed as endangered by the State of New York. Additional information regarding the project should be coordinated with both this office and with the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC contact for the Endangered Species Program is Mr. Peter Nye, Endangered Species Unit, 625 Broadway, Albany, NY 12233 (telephone: [518] 402-8859).

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate NYSDEC regional office(s)* and the New York Natural Heritage Program Information Services.*

Since wetlands, ponds, and/or streams may be present, you may want to utilize the National Wetlands Inventory (NWI) maps* as an initial screening tool. However, they may or may not be available for the project area. Please note that while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Online information on the NWI program and digital data can be downloaded from Wetlands Mapper, http://wetlands.fws.gov/mapper_tool.htm.

Work in certain waters of the United States, including wetlands and streams, may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without recommending additional permit conditions, or recommend denial of the permit depending upon potential adverse impacts on fish and wildlife resources associated with project construction or implementation. The need for a Corps permit may be determined by contacting the appropriate Corps office(s).* In addition, should any part of the proposed project be authorized, funded, or carried out, in whole or in part, by a Federal agency, such as the Corps, further consultation between the Service and that Federal agency pursuant to the ESA may be necessary.

Thank you for your time. If you require additional information please contact Robyn Niver at (607) 753-9334. Future correspondence with us on this project should reference project file 52016.

Sincerely,

for David A. Stilwell
Field Supervisor

*Additional information referred to above may be found on our website at: http://nyfo.fws.gov/es/section7.htm

Enclosures

cc: NYSDEC, New Paltz, NY (Attn: S. Joule)
NYSDEC, Albany, NY (Endangered Species; Attn: P. Nye)
NYSDEC, Albany, NY (Natural Heritage)
COE, New York, NY

Indiana Bat Project Review Fact Sheet
New York Field Office
August 2005

The following fact sheet is intended to provide information to assist with the review of projects which occur within the likely range of the Indiana bat (*Myotis sodalis*) within the State of New York. The Indiana bat is Federally- and State-listed as an endangered species. You have received this Fact Sheet because the U.S. Fish and Wildlife Service (Service) has determined that a proposed project which you are associated with is located in an area which we believe has the potential for Indiana bat presence. Additional information on the proposed project (*e.g.*, size, level of impact, habitat) will help us to further examine the likelihood of Indiana bat presence within the proposed project area and potential for Indiana bats to be adversely impacted by the proposed project.

The Indiana bat is known to winter in six counties in New York State. While the Service has learned a great deal about the wintering population with standardized biennial counts organized by the New York State Department of Environmental Conservation (NYSDEC) Endangered Species Unit, we are continuing to study Indiana bat migratory patterns and summer habitat use within the State.

In the Northeast, multiple State and Federal agencies are investigating Indiana bat movements; the most recent studies of bats from hibernacula in Essex and Ulster Counties, New York, provide additional information. In the spring of 2002 through 2005, the NYSDEC successfully tracked female Indiana bats from their hibernacula in Essex, Ulster, and Jefferson Counties to their spring roosts, distances up to approximately 40 miles, however they are capable of flying distances much greater than that.

The Indiana bat typically hibernates in caves/mines in the winter and roosts under bark or in tree crevices in the spring, summer and fall. Suitable potential summer roosting habitat is characterized by trees (dead, dying, or alive) or snags, greater than or equal to 5 inches diameter breast height (d.b.h.) with exfoliating or defoliating bark, or containing cracks or crevices that could potentially be used by Indiana bats as a roost. However, maternity colonies generally use trees greater than or equal to 9 inches d.b.h. Overall, structure appears to be more important than a particular tree species or habitat type. Females appear to be more habitat specific than males presumably because of the warmer temperature requirements associated with gestation and the rearing of young. As a result, they are generally found at lower elevations than males may be found. Roosts are warmed by direct exposure to solar radiation, thus trees exposed to extended periods of direct sunlight are preferred over those in shaded areas. As larger trees afford a greater thermal mass for heat retention, they appear to be preferred over smaller trees. Additional information on potentially suitable summer habitat can be found on our website at http://nyfo.fws.gov/es/ibatdraft99.pdf.

Streams, associated floodplain forests, and impounded water bodies (ponds, wetlands, reservoirs, etc.) provide preferred foraging habitat for Indiana bats, some of which may fly up to 2-5 miles from upland roosts. Indiana bats also forage within the canopy of upland forests, over clearings with early successional vegetation (*e.g.*, old fields), along the borders of croplands, along wooded fencerows, and over farm ponds in pastures (U.S. Fish and Wildlife Service 1999). While Indiana bats appear to forage in a wide variety of habitats, they seem to tend to stay fairly close to tree cover.

To determine whether the proposed project site may provide roosting or foraging habitat for the Indiana bat, please read through the following questions:

1. Are there forested (upland or wetland) habitats present within the entire proposed project area?
- If no, no further coordination regarding the Indiana bat is necessary at this time.
- If yes, proceed to Step 2.

2. Does the proposed project involve any disturbance of forested (upland or wetland) habitat or any mine(s)/cave(s) that could serve as a hibernaculum?
- If no, no further coordination regarding the Indiana bat is necessary at this time.
- If yes, the project site should be evaluated and described by a qualified person as to the presence, amount, and distribution of suitable summer roosting/maternity and foraging habitat and any information on caves/mines should be provided.

The type of information that would be helpful to include in any evaluation are:
- a detailed project description,
- a map (and summary table) of the proposed project area with coarse habitat cover types (*e.g.*, emergent wetland, open field) in acres
- a summary table of the proposed amount of disturbance to each habitat type
- an overlay of new construction on the habitat map
- a description of the forested habitat onsite, including the type of forest (*e.g.*, oak-hickory), approximate stand age, and presence of dead or live trees with split branches or trunks or exfoliating bark
- photographs representative of all cover types on the site and encompassing views of the entire site
- a topographic map with the project area identified

Staff from our office may be available to assist with an initial site visit to determine whether additional detailed habitat analyses or surveys for Indiana bats will continue to be recommended, however, due to current workload, it may be months before a site visit is possible.

Should potential habitat be present and proposed for disturbance, the Service (and/or applicant or involved Federal agency) will need to determine the likelihood of Indiana bat presence (see discussion of mistnetting below) and evaluate the potential impacts of the proposed project on the Indiana bat.

We do have some recommendations to minimize the likelihood of adverse impacts that we can provide at this early stage should you wish to incorporate them into your project. Our standard recommendation to avoid any potential for directly killing Indiana bats is to conduct clearing of potential roost trees from October 1 through March 30 (when >5 miles from an hibernaculum); when <5 miles from an hibernaculum we recommend conducting clearing from November 15 to April 15. In many cases, where habitat is of low quality/quantity, seasonal cutting may be sufficient to avoid impacts to the species. Also, there may be cases when we believe the likelihood of impacts is low regardless of when tree removal occurs. Please note that the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) does not prohibit the clearing of trees and the Service's primary goal is not the protection of every tree. However, the ESA <u>does</u> prohibit the "take" (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct) of Federally-listed species, such as the Indiana bat, and our recommendations are intended to help applicants and Federal agencies avoid or minimize the risk of "taking" an Indiana bat.

In addition to having concerns about direct impacts to Indiana bats, we are also concerned about the cumulative loss of habitat for the species. Therefore, we recommend protecting potential Indiana bat habitat within proposed projects to the greatest extent possible. In some cases, especially in areas where significant quantity/quality of Indiana bat habitat is present and proposed to be impacted, mist net or other surveys may be warranted to determine if bats are present onsite. Due to the limited time frame when bat surveys can be completed (see http://nyfo.fws.gov/es/ibatdraft99.pdf for recommended protocols), it is strongly recommended that the applicant contact the Service as early as possible in the project planning to determine if surveys or additional avoidance and/or minimization measures will be necessary to avoid project delays. If netting is conducted at a site, we encourage the attachment of radio transmitters on any captured Indiana bats to help understand how the proposed project site is being used by Indiana bats.

The project's environmental documents should identify project activities that might result in adverse impacts to the Indiana bat or their habitat. Information on any potential impacts and the results of any recommended habitat analyses or surveys for the Indiana bat should be provided to this office and they will be used to evaluate potential impacts to the Indiana bat or their habitat, and to determine the need for further coordination or consultation pursuant to the ESA.

References:

U.S. Fish and Wildlife Service. 1999. Agency Draft Indiana Bat (*Myotis sodalis*) Revised Recovery Plan. Fort Snelling, MN: U.S. Department of the Interior, Fish and Wildlife Service, Region 3. 53 p.

Bog Turtle Project Review Fact Sheet
New York Field Office
August 2005

The following fact sheet is intended to provide information to assist with the review of projects which occur within the likely range of the bog turtle (*Clemmys muhlenbergii*) within the State of New York. The bog turtle is Federally-listed as threatened and State-listed as an endangered species. You have received this Fact Sheet because the U.S. Fish and Wildlife Service (Service) has determined that a proposed project which you are associated with is located in an area which we believe has the potential for bog turtle presence. Additional information on the proposed project (*e.g.*, size, level of impact, habitat) will help us to further examine the likelihood of bog turtle presence within the proposed project area and potential for bog turtles to be adversely impacted by the proposed project.

Bog turtles prefer open canopy wetlands with soft, saturated soils such as fens or sedge meadows fed by seeps and springs of cold groundwater that has been in contact with calcium-rich bedrock or soils. In New York, bog turtles are very often found in or near rivulets having deep mucky substrate, but where above-surface water depths are very shallow – usually only a few inches deep at most. Plant species commonly associated with bog turtle habitats include tamarack (*Larix laricina*), cinquefoil (*Potentilla* spp.), alders (*Alnus* spp.), willows (*Salix* spp.), sedges (*Carex* spp.), sphagnum moss (*Sphagnum* sp.), jewelweed (*Impatiens capensis*), rice cut-grass (*Leersia oryzoides*), tearthumb (*Polygonum sagittatum*), arrow arum (*Peltandra virginica*), red maple (*Acer rubrum*), skunk cabbage (*Symplocarpus foetidus*), rushes (*Juncus* spp.), and bulrushes (*Scirpus* spp.).

The Service recommends that an evaluation be completed of any existing wetland habitat that would be disturbed, directly or indirectly, by the project, and its potential to support the bog turtle (Phase 1 survey). Information on surveys can be found at http://nyfo.fws.gov/es/btsurvey.pdf

The Service and NYSDEC should be sent a copy of the Phase 1 survey results for review and comment including a USGS topographic map indicating location of site; project design map, including location of wetlands and streams; color photographs of the site; surveyors name; date of visit; opinion on potential/not potential habitat; description of the hydrology, soils, and vegetation.

If the Phase 1 survey identifies any wetlands with potentially suitable habitat, an evaluation is needed to determine whether the proposed project will completely avoid all direct and indirect effects to the wetlands, in consultation with the Service and the NYSDEC. Information to assist with the evaluation of potential impacts on bog turtles can be found in Appendix A - Bog Turtle Conservation Zones of the Bog Turtle (*Clemmys muhlenbergii*) Northern Population Recovery Plan (U.S. Fish and Wildlife Service 2001) which can be found at http://nyfo.fws.gov/es/btconszone.pdf. If impacts cannot be avoided, a Phase 2 survey should be completed. The purpose of the Phase 2 survey is to determine the likely presence of bog turtles at the site in potentially suitable habitat. Please see detailed instructions regarding survey protocols at http://nyfo.fws.gov/es/btsurvey.pdf. Also, please contact this office before conducting any Phase 2 surveys.

The project's environmental documents should identify project activities that might result in adverse impacts to the bog turtle or their habitat. Information on any potential impacts and the results of any recommended habitat analyses or surveys for the bog turtle should be provided to this office and they will be used to evaluate potential impacts to the bog turtle or their habitat, and to determine the need for further coordination or consultation pursuant to the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

References:

U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

OFFICE OF PARKS, RECREATION, HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643

January 24, 2006

Tina Wang
Tim Miller Associates
10 North Street
Cold Spring, New York 10516

Re: SEQRA
Emerald Ridge Development
Marsh Hill Road
Putnam Valley, Putnam County
04PR06174

Dear Ms. Wang:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Parks, Recreation and Historic Preservation Law, Section 14.09.

Based upon this review, it is the OPRHP's opinion that your project will have No Impact upon cultural resources in or eligible for inclusion in the State and National Registers of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Ruth L. Pierpont

Ruth L. Pierpont
Director

RLP:bsa

Earl Smith
Highway Superintendent

Gary Wulfhop
Deputy Highway Superintendent

Joseph Hertelendy
General Foreman

Margaret Bradley
Senior Clerk

Catherine Cobb
Part-time Clerk

265 Oscawana Lake Road
Putnam Valley, NY 10579

(845) 526-3333 phone
(845) 526-4729 fax

E-MAIL ADDRESS:
HIGHWAY@PUTNAMVALLEY.COM

HOURS OF OPERATION:
7:00 AM – 3:30 PM

MONDAY THRU FRIDAY

Town of Putnam Valley Highway Department

April 12, 2006

MEMORANDUM

TO: Mr. Bill Crowder
Members of the Planning Department

FROM: Earl Smith

RE: Marsh Hill subdivision

I have no problem with Santucci Construction Corp. putting in a retaining wall at the entrance to Marsh Hill Road as long as it conforms to an engineer's specifications.

Sincerely,

Earl Smith

Earl Smith

ES:mab

Cornerstone
ASSOCIATES

April 7, 2006

To: Planning Board

From: Bruce Barber BB
Town Wetland Inspector

Re: Emerald Ridge Subdivision DEIS
Review for Completeness

Dear Chairman Crowder and Member of the Planning Board:

As per your request, I have reviewed the following documents in order to determine their completeness relative to the Final Scoping Document adopted by the Planning Board on February 7, 2005:

1. Emerald Ridge Subdivision DEIS. Volumes I and II, prepared by Tim Miller Associates, dated March 14, 2006

2. Plans entitled; 'Subdivision and Development Approval Plan for Emerald Ridge sheets:

    - CS (rev 3-8-06)
    - NS (rev 12-9-05)
    - EX-1.1, 1.2 (rev 12-9-05)
    - PT-2.1, 2.2 (rev 3-8-06)
    - SP-3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7 (rev 3-8-06)
    - PR-4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 (rev 12-9-05)
    - UD-5.1, 5.2, 5.3, 5.4 (rev 12-9-05)
    - ER-6.1, 6.2, 6.3, 6.4 (rev 3-8-06) 6.5 6.6, 6.7 (rev 12-9-05)
    - TP-7.1, 7.2, 7.3 (rev 3-8-06)
    - DS-8.1, 8.2 (rev 12-9-05)
    - CL-9.1, 9.2 (12-9-05)

Based upon my review of the above documents and the Final Scoping Document, I recommend that the Planning Board find the DEIS incomplete. Below please find general comments pertaining to the DEIS followed by specific comments. Please

1770 CENTRAL STREET · YORKTOWN HEIGHTS, NY 10598
Telephone: 914.962.7733 Fax: 914.962.0330

note that comment has not been made on the substantive information contained in the DEIS.

<u>GENERAL COMMENTS: Follow the numbering and pages of the Town of Putnam Valley February 7, 2005 scoping document.</u>

1. **Putnam Valley Scoping Document: "C: Description of Action", page 3** Discussion of the proposed lot line change and its effect on the adjoining property with regards to existing easements".

   Adjoining lots "B" and "C" are part of this DEIS and are proposed to be altered as part of this action. Consideration to the effects of the action on the remainder lot "B", changes to lot "C" and impacts as a result of the modifications to existing components of Marsh Hill Road have not been discussed.

2. **Putnam Valley Scoping Document: "B: Surface Waters", page 7**: The identification and classification of on-site and adjacent streams and wetlands will be provided.

   The wetland delineation is incomplete. The wetland delineation as shown in the DEIS appears to be inconsistent with the hydric soil (Leicester B soil type) determination which should form the edge of the wetland as per Town of Putnam Valley Town Code Chapter 144. Watercourse connection from wetland "B" to the Peekskill Hollow Brook is not shown on maps or considered. Consideration of adjacent wetlands such as NYSDEC wetlands concurrent with wetlands "C" and "D" have not been shown or discussed.

3. **Putnam Valley Scoping Document: "Potential Surface Water Impacts", page 7:** Monitoring wells will be installed within wetlands and at locations of proposed stormwater facilities to determine potential impacts on wetland hydrology and potential ground water impacts from the proposed development. The number and location of wells will be determined by the Town of Putnam Valley Wetland Inspector. Baseline data shall be collected monthly and a summary report will be summarized in text and provided in the appendix of the DEIS.

   The study was incomplete as of the date of this DEIS and data has not been submitted. A letter should be included from the prior wetland inspector indicating that piezometers have been installed in accordance with his direction.

4. **Putnam Valley Scoping Document: Potential Ground Water Impacts, page 8:** "Three to four wells will be drilled and pump-tested to ascertain yields. Well selection will occur in consultation with the Town's Consulting Hydrologist and the Putnam County Department of Health. The water supply testing shall be

carried out in accordance with the New York State and Putnam County Department of Health standards and recommendations from the Town's Consulting Hydrologist".

The following documents that were to be attached in Appendix I: "Well Test Report" were absent in the DEIS:

Figures
Well Completion Reports
Water Quality (II-A)
Water Quality (II-B)
Water Quality (II-C)

The DEIS does not contain sufficient information to evaluate why elevated arsenic levels were found in well TW-1 on one test but then a subsequent test found arsenic levels to be absent in this well.

5. **Putnam Valley Scoping Document: "Wastewater", page 10.**

This chapter (DEIS table of contents, chapter 3.5) was not included in the DEIS. The chapter should be provided for review.

6. **Putnam Valley Scoping Document: "Vegetation and Wildlife", page 11.** Surveys to be completed must be performed at the appropriate time of year (to be determined in consultation with the Town Wetlands Inspector) and must follow accepted time frames, study methods, and accepted protocols, and must be completed by a qualified consultant with specific expertise. Generic surveys without proper protocol, necessary time frames, and survey methods are not considered acceptable. Probable species lists will be provided only by qualified experts to serve as a guide and supplement to on-site field inventory data and to assist with summarizing baseline information important for management recommendations regarding flora and fauna.

DEIS does not include this information the above information in the format requested. There is no documentation regarding consultation with the Town Wetland Inspector.

Additionally, the US Fish and Wildlife letter of August 19, 2005 lists the Indiana Bat (*Myotis sodalist)* to potentialy occur within the project area and the project area is in the vicinity of historic Bog turtle (*Clemmys muhlenbergii)* sites. Both species are listed by NYS as endangered. The Indiana Bat is federally listed as endangered and the Bog Turtle is federally listed as threatened. Only NYSDEC certified professionals may conduct surveys for these species. The applicant has not provided information that they are certified. The possible presence of these species is significant. If they are located on the site, habitat avoidance or mitigation plans will be required which may result in the need to alter the design of this project.

SPECIFIC COMMENTS: Follow the numbering system of the DEIS document.

1.0 Executive Summary: A table should be provided with the following information: Each lot under review (A, B, C), the current ownership of each lot, the size before and after of each lot and easements on each lot as applicable. The summary is not clear as to how the assemblage will be effectuated. The applicant should document the agreements with Brookfield Cottages, Inc, and the owner of parcel 'C' and the post development effect on the remainder parcels should be analyzed. As the owner of Brookfield Cottages is proposing a subdivision to provide access to the existing homes, consideration of the application(s) in total is necessary to avoid possible segmentation. Provide documentation that all property owners have authorized applicant to prepare DEIS and all SEQRA documents on their behalf. As Marsh Hill Road is to be widened, discuss all additional acquisitions (fee or easement) necessary to accomplish the increased dimensions. Additionally, applicant should document the benefit to the Town of Putnam Valley regarding the assumption of maintenance and other requirements of Marsh Hill Road as a dedicated Town road and any associated costs.

1.2.1: Applicant must cite the most currently, acceptable erosion and sediment control and stormwater management manuals.
1.2.2: Wetland buffer impact in DEIS text is not consistent with plan (Sheet SP-3.1). Stormwater basin is located on Lot #1, wetland disturbance listed as 3,234 square feet in table. Applicant must demonstrate that culvert and stormwater discharge pipe installation thar results in permanent buffer size reduction does not negatively impact wetlands. This summary should also discuss the results of functional evaluations of the pre and post construction wetlands and wetland buffers not just the change in pre and post construction size of these areas. Additionally, there is no discussion regarding the potential post construction hydrological isolation of the wetlands and changes in period hydrographs/water budgets. The location of the vernal pools should be detailed. Site is located within proximal landscape to large wetland system that tracks northeasterly towards Kramers Pond Road. Section should provide synopsis of landscape effects of subject development to regional natural resources.
1.2.3: Detail how groundwater "estimates" were developed by providing information on factual, investigative techniques that were used in the analysis. Detail the ability of the soils and geology to accept leachate from septic systems without risking potable water conditions in the aquifer or negatively effecting wetlands.
1.2.4: Describe standards used to develop SWPPP. There is lack of detail with respect to actual impacts due to change in pre and post construction hydrology especially with respect to the on-site wetlands and wetland buffers and base and peak flows in the Peekskill Hollow Brook. Develop post construction curve numbers.
1.2.5: Statements such as: "not expected to create a potential impact to Peekskill Hollow Brook…" are unacceptable. Please provide definitive information. Will they or will they not impact Peekskill Hollow Brook? How was this determined?

1.2.6: Statements such as: "…..possible blasting completed, conditions are expected to stabilize" are not acceptable. What are the temporary impacts, will pre-construction wildlife levels be the same, will extirpation occur, will the landscape position of this site be impacted? How will the post construction fragmentation of this site effect wildlife? Why is a conservation easement not placed on wetland 'A"?

1.3.1 Does erosion and sediment control plan conform to NYSDEC standards?
1.3.2: The source of the wetland hydrology requires study and analysis. The installation of cross over piping under the proposed roads is part of a conveyance system and does not insure hydrological maintenance or connectivity of the wetlands. Due to a lack of this analysis, substantial avoidance and/or mitigation may be necessary to insure the long-term survival of the wetlands and insure that there are no negative impacts to the Peekskill Hollow Brook. The applicant should detail the impacts to wetland buffer "B" so that either impact avoidance, or appropriate mitigation if avoidance is not possible, may be considered.
1.3.4: Provide information regarding maintenance responsibilities and cost of maintenance to the proposed storm water infrastructure.
1.3.6: Site development will result in habitat fragmentation with loss of native species connection between the wetlands. Statements in this section remain unsupported until satisfactory completion and analysis of the habitat and biodiversity study.

2.4: Lot line change: provide impacts to remainder parcels.
2.4: Subdivision Layout: Impact to wetland buffer on Lot 20 is not consistent with other areas of report or the plans. Provide rationale for exclusion of wetland "A" from conservation easement.
2.4 Infrastructure: five stormwater basins are described. Fifth basin is located on Lot "C". The inclusion of Lots B and C and the impacts to their remainders are necessary to insure complete impacts of the proposed development. What is the water source for the proposed fire fighting system?
2.4: Landscaping: Due to the location in the overlay zone, what landscaping provisions will be made, and what information will be provided to purchasers to insure that fertilizers, etc. will not be used? Will infrastructure plantings be guaranteed? Provide lighting plan.
2.5: Construction sequencing: Indicate whether more than five non-contiguous acres will be exposed at any time. Provide satisfactory construction time line (CPM or other) as part of sequencing plan using proposed 2009 build out date. Indicate that construction will not start until Town receives NOI from NYSDEC. Provide total amount of disturbance in each of six proposed phases (include individual house lot disturbance in calculation). Provide inspection schedule, reporting requirement and the use of an erosion and sediment control inspector to monitor work and report to Town and NYSDEC. Provide information as to how pre blasting conditions at surrounding homes will be documented. How will dust be controlled? Has the Town of Yorktown granted a permit (if required) to bring material to Curry Street?

2.6: Purpose and Need: Quantify shortfall to the Town and Putnam Valley Central School District. Provide details of potential shortfall if property values decline and residents successfully appeal assessments.
2.7: Interested parties: All of the involved and interested agencies provided in scope have not been listed in the DEIS.

3.1.1 Soils: Provide map documenting location and type of ten selective soil tests. Provide qualifications of soils professional. Provide map depicting location of rock outcrops and vernal pools. A clear delineation of the Leicester loam (LeB) soils is necessary on plan page EX-1.1 as these soils are classified as hydric soils under the Town of Putnam Valley Town Code (Chapter 144) and therefore should be included as wetland area. Page EX-1.1 appears to indicate that the LeB soils extend beyond the limits of the shown wetland border. Therefore, the wetland border requires adjustment to include all LeB soils. A complete analysis of the additional measures required during construction due to severely constrained soils is necessary.
3.1.2: Potential Impacts: report does not reference NY Guidelines for Erosion and Sediment Control or the NYS Stormwater Design Manual design sources.
3.1.2 Slopes impacts: language such as:" This potential impact will be mitigated by avoiding such disturbance as much as practical…..", is not acceptable. Provide details of the impacts and the proposed actual mitigation measures.
3.1.2 Soils impacts: provide breakdown of permanent impervious surface areas. Discuss potential impacts.
3.1.2: Geology impacts: identify site specific geological and hydrogeological conditions, fractures and fissures, on the site which may be impacted by the substantial proposed blasting/rock removal program. Discuss potential impacts to surrounding wells.
3.1.3: Soil Erosion and Sediment Control Plan: provide complete SWPPP plan including consideration for any impaired receiving waters, pre and post construction water quality issues including pollutant loading (including thermal), provide information regarding how highly erodable, steep slope areas will be addressed during construction, provide calculations for pre and post construction stormwater quantity through the 100 year storm. Provide text, assumptions and calculations. Provide information regarding the treatment of soil exposed during the months of October through March. Provide pre construction baseline data of the chemical and physical characteristics of the Peekskill Hollow Brook at outfall areas. Include photographs and text.

3.2.1: Vernal pools mentioned in several areas of the report are not identified in Table 3.2-1. Additionally, LeB soils located in the soils section of the report do not appear to be reflected in the final wetland delineation. All vernal pools and hydric soils areas should be included and reflected as jurisdictional wetlands. The response to the applicants' request for verification of Federally jurisdictional wetlands must be submitted before the wetlands delineation can be considered to be completed. The identified "intermittent watercourse" noted from the south end of wetland B should also be shown as a jurisdictional wetland with accompanying buffer or detailed explanation should be provided as to why it does not meet the definition of an intermittent watercourse found in Chapter 144 of the Town Code and should not be regulated. Applicant should use pre and post construction hydrographs to determine if proposed changes to the site will result in modifications to the water budget of the wetlands. It should be determined if the existing wetlands have hydrological connections. Additionally, the applicant should provide information regarding how off-site wetlands connect to the subject wetlands and how flow from these wetlands to the Peekskill Hollow Brook may be unaltered from pre construction conditions (ie: describe how the present road conditions will not result in hydrological isolation of the wetlands). Provide verification that additional NYSDEC wetland/buffer on this site has not been included in the recent state wetland mapping revisions.

3.2-1 Describe methods, duration and dates of the evaluation of the wetlands as vernal pools. Include map in DEIS showing location of piezometers. Piezometer analysis and also wetland biodiversity are incomplete. Provide complete data regarding drawdown testing and wetland water levels on all test dates. Applicant indicates that the watershed that drains through the subject site exceeds 145.8 with site topographic changes from 420 feet to 170 feet. An individual map of the watershed which depicts flow through the site should be included in the DEIS. A complete analysis of the post construction impacts to this flow should be included in the DEIS. The applicant indicates that mitigation is not necessary as there is little impact to the wetland and wetland buffer. The applicant has only considered the size of the wetland intrusion and must consider impacts to wetland hydrology, connectivity, habitat fragmentation and storm water attenuation.

3.3.1 DEIS indicates that there are 4.03 persons per 4 bedroom house which does not agree with the well consultants report of 6 persons per house. Applicant should also comment on the elevated arsenic levels found in Well TW-1 which was initially present but then on subsequent testing was absent. Figures and appendices including well completion reports and water quality reports of Appendix I, Well Report, were missing from the DEIS and should be included.

3.4: Provide additional information regarding assumptions and calculations of curve numbers. Provide information regarding cold weather performance standards. Provide maintenance schedule of stormwater infrastructure, projected cost and responsibility. Has this cost been included in the cost of community services if the infrastructure is to be maintained by the Town? Drainage basin B4 post construction rates of runoff exceed pre construction rates of runoff. Explain more fully the concept of "staggering" peak flow rate discharges from other on-site drainage areas. Applicant is required by NYSDEC to address and document the analysis on water quantity controls which were not implemented on the fourth order stream. Applicant is to discuss post construction recharge changes to the on-site wetlands. Applicant is to include field tests for each stormwater facility. Provide complete discussion of on-site waste water treatment and field test information.

3.6 Rare and Endangered Species: the applicant has not included information provided by US Fish and Wildlife with respect to the Indiana Bat and Bog Turtle. Bog turtle studies must be conducted by a NYS certified professional. Tree survey should identify trees that may be protected within the limit of disturbance for habitat and aesthetic purposes. Regional landscape conditions should discuss the pre construction role of the subject site in providing range area and habitat niches as well as serving as a part of an unfragmented habitat corridor and connection to NYSDEC wetlands to the north and the Peekskill Hollow Brook to the south. The habitat assessment and biodiversity survey should be completed as part of the DEIS not the FEIS as information contained in this study may shape and effect the subdivision. The applicant has identified habitat on the site which potentially supports listed species (page 3.6-12) but has not submitted appropriate survey dates or techniques to identify same. As a result, the survey does not comport with the adopted Town of Putnam Valley biodiversity policy and protocols. Applicant should comment on maintenance of a 100' vernal pool buffer as it does not support the upland habitat of vernal pool species. Applicant should provide a table of anticipated, possible species, field methods, times and days in which site investigations are required and were conducted, field location of the site studies and findings. Although applicant supplies some dates of field inspection, no other specific information is included. Copies of all field notes should be included in the DEIS. Ecological Assessment Report reports conducting bird surveys on only one day and after the date in which breeding birds may be expected to be on the site. Show point locations of all bird surveys.

Please be advised that the above represents the incompleteness of the DEIS relative to the adopted scoping document. The substantive data and conclusions have not been commented on.

Cc: Town Planner, Town Engineer, Environmental Commission, Building Inspector

04010

CRONIN ENGINEERING, P.E., P.C.
The Lindy Building, Suite 200, 2 John Walsh Blvd., Peekskill, New York 10566
Tel. (914) 736-3664 • Fax. (914) 736-3693

April 12, 2006

Mr. Billy L. Crowder, Chairman
Town of Putnam Valley Planning Board
Town of Putnam Valley
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Santucci Lot Line Change
TMD# 83.20-1-25 & TMD# 84-1-5
Marsh Hill Road & Peekskill Hollow Road, Putnam Valley, NY

Dear Chairman Crowder & Members of the Planning Board:

Find enclosed the following information for the above referenced project.

1. Four (4) Application Form
2. Application fee of $300

As discussed with the Town Planner, additional items, which are typically submitted with the application (i.e. deed, plans, survey, etc.), have been previously submitted in conjunction with the Emerald Ridge Subdivision.

This project proposes to change the lot lines that adjoin tax map parcel 83.20-1-25, 84-1-5, both of which are owned by Mr. Val Santucci, and the Marsh Hill Road right-of-way. The proposed lot line change will result in a transfer of +/-2.99 acres of land from Lot 84-1-5 to Lot 83.20-1-25 and a transfer of +/-0.0995 acres of land from Lot 83.20-1-25 to the Town of Putnam Valley's Marsh Hill Road right-of-way.

Should you have any questions or require additional information, please contact me at the above number. Thank you for your time and consideration in this matter.

Respectfully submitted,

James C. Annicchiarico
Project Engineer

enclosures

cc: *(via facsimile)*
Val Santucci, V.S. Construction Corp., Property Owner/Applicant (TMD #83.20-1-25 & 84-1-5)
David Steinmetz, Esq., Zarin & Steinmetz
Josh Moreinis, AICP, Tim Miller Associates, Inc.
Jan Johannessen, AICP, The Chazen Companies
William Zutt, Esq, Bolger, Hinz & Zutt
File: *Emerald Ridge,Lot Line Change,Letter,04-12-06.doc*

TO 845 265 4418

TOWN OF PUTNAM VALLEY PLANNING BOARD

Section 1 – To be Completed by Planning Department Staff

_____ Site Plan File Number__________ Date__________

_____ Subdivision File Number__________ Date__________

_____ Site Development Plan File Number__________ Date__________

X Lot Line Change File Number__________ Date__________

_____ Special Use Permit File Number__________ Date__________

_____ Major Grading Permit File Number__________ Date__________

Section 2 – To be Completed by Applicant

1. Tax Identification Number(s): 83.20-1-25 & 84-1-5
2. Name of Project: SANTUCCI LOT LINE ADJUSTMENT
3. Project Location: MARSH HILL RD & PEEKSKILL HOLLOW RD
4. Nearest Intersection: MARSH HILL RD & PEEKSKILL HOLLOW RD
5. Zoning District(s): R-2 (MODERATE DENSITY)
6. Name of Owner: VALERIO SANTUCCI (VS CONSTRUCTION CORP)

   Address: 37 CROTON DAM RD, OSSINING, NY 10562

   Phone Number: 914-739-7362 Fax: 914-739-7156
7. Name of Applicant (if different): SAME AS ABOVE

   Address: —

   Phone Number: — Fax: —

8. Name of Engineer/~~Architect~~: CRONIN ENGINEERING, PE, PC

Address: 2 JOHN WALSH BLVD, PEEKSKILL, NY 10566

Phone Number: 914-736-3664 Fax: 914-736-3693

Section 3 – To be Completed by Applicant

1. Number of Lots Existing: 2
2. Number of Lots Proposed: 2
3. Is a Special Use Permit required? NO

   If so, What Type: N/A

4. Were any Variances Previously Granted? NO
5. Will the Project Require a Variance? YES

   If so, Explain: FRONT YARD SETBACK VARIANCE

6. Total Land Area: 52.33 ACRES
7. Is the Site Currently Vacant? NO
8. Number of Structures Existing On-Site: 83.20-1-25 = 1 84-1-5 = 1
9. Number of Structures Proposed: 0 (24 IN CONJUNCTION W/ EMERALD RIDGE SUBDIVISION)
10. Type of Structures Proposed: [redacted] N/A (RESIDENTIAL - IN CONJUNCTION W/ EMERALD RIDGE SUBDIVISION)
11. Number of Existing Parking Spaces: N/A
12. Number of Proposed Parking Spaces: N/A
13. Are there Wetlands, Watercourses, or Waterbodies On-Site? YES

    If so, Describe: TOWN REGULATED WETLANDS ON 83.20-1-25

14. Has a Wetlands Application Been Filed? NO

15. Are There Floodplains or Floodways On-Site? NO

If so, Describe: N/A

16. Are There Slopes On-Site That Exceed 20%? YES

If so, Describe: (SEE SLOPE INFO FOR EMERALD RIDGE SUBDIVISION)

17. Is the Site Located in a Town Regulated Environmental Management District? (See Sections 165-24, 165-25, 165-26 of the Zoning Code) YES

GROUND & SURFACE WATER PROTECTION (GWP) DISTRICT

If so, Describe: WETLANDS (W) OVERLAY, HILLSIDE MANAGEMENT (HM) DISTRICT

18. What is the Total Area of Disturbance? 0 acres

19. How Much Earth will be Removed from the Site? 0 Cubic Yards

20. How Much Earth will be Brought onto the Site? 0 Cubic Yards

21. Will Blasting be Necessary? NO

22. Has the applicant filed an application with the Putnam County Department of Health? NO

23. Has the applicant received approval from the Putnam County Department of Health? NO

24. What other approvals/permits are required? (ZBA, Town Highway, NYSDEC, ACOE, County Highway, etc.). ZBA

THE *Chazen* COMPANIES

Facsimile Transmission

To: Laura Lussier, Planning Board Clerk

Company: Town of Putnam Valley Planning Board

Cc:

William A. Zutt, Esq. (via fax 845-528-2566)
Irv Sevelowitz, Code Enforcement Officer (via fax 526-8806)
Todd Atkinson (via fax 914-232-6827)
Bruce Barber (via fax 914-962-0330)
William Canavan (via fax 914-276-2664)
Josh Moreinis, AICP, PP (via fax 265-4418)
Keith Staudohar (via fax 914-736-3693)

Date: April 13, 2006

Fax No: 526-3307

Regarding: Emerald Ridge

From: Jan K. Johannessen

Company: The Chazen Companies – Dutchess County Office

Phone No: (845) 486-1520 Fax No: (845) 454-4026

Number of Pages (Including this page) 6

Approximate Time of Transmission 3:30pm

Dutchess County Office:

21 Fox Street
Poughkeepsie, NY 12601
Phone: (845) 454-3980 Fax: (845) 454-4026

Web: www.chazencompanies.com

Orange County Office:
Phone: (845) 567-1133 Fax: (845) 567-1925

Capital District Office:
Phone: (518) 235-8050 Fax: (518) 235-8051

North Country Office:
Phone: (518) 812-0513 Fax: (518) 812-2205

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Capital District Office
Phone: (518) 235-8050

Orange County Office
Phone: (845) 567-1133

21 Fox Street, Poughkeepsie, New York 12601
Phone: (845) 454-3980 Fax: (845) 454-4026
Web: www.chazencompanies.com

North Country Office
Phone: (518) 812-0513

April 13, 2006

Mr. Billy L. Crowder, Chairman
and Members of the Planning Board
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Emerald Ridge Draft Environmental Impact Statement, 3rd Review
Tax ID: 84.-1-5/10.1/10.2/10.3
Job Number: 10424.05

Dear Chairman Crowder and Members of the Planning Board:

On behalf of the Planning Board, The Chazen Companies (TCC) has reviewed the following documents:

- Emerald Ridge Subdivision Draft Environmental Impact Statement (Vol. 1 & 2), prepared by Tim Miller Associates, Inc., last revised March 14, 2006.

The Draft Environmental Impact Statement (DEIS) prepared by Tim Miller Associates, last revised March 14, 2006, has been reviewed for completeness. TCC has used the Final Scoping Document, adopted February 7, 2005, and our previous comment letters, dated October 13, 2005 and February 23, 2006, to ascertain whether this document is complete with respect to its scope and content for the purposes of commencing public review.

The Planning Board should note that certain sections of the DEIS specifically related to engineering and wetland/biodiversity issues have not been technically reviewed by this office; it is understood that the Town Engineer and Town Wetlands Inspector will address these issues.

Based on a review of the submitted documents, the DEIS has been found to be incomplete. The following items should be addressed prior to the issuance of a Notice of Completion/Notice of Public Hearing and the circulation of the DEIS and the project drawings to the Involved and Interested Agencies:

1. General Comment – It appears that Lot C is not being included as part of the proposed action. As the applicant is proposing stormwater management facilities on Lot C and as Lot C was purchased by the applicant to obtain the required right-of-way width to facilitate the proposed subdivision, it is appropriate to include this lot as part of the action.

   It should be noted that Lot C was not owned by the applicant during the scoping process for this project; therefore, the proposed lot line realignment between Lots A and C was not addressed in the final scoping document.

   The applicant should complete the requisite application form for the proposed lot line realignment between Lots A and B, update the project area (87.72 acres), and revise the appropriate maps throughout the DEIS. As the proposed lot line realignment will be included as part of the proposed action, a determination from the Zoning Board of Appeals cannot be issued until the Planning Board has adopted its Findings Statement. The applicant had previously identified the Zoning Board of Appeals as an Involved Agency.

2. General Comment – The applicant should confirm that the proposed 26.6 acres of disturbance includes improvements along Marsh Hill Road, improvements on Lot C, and improvements along Peekskill Hollow Road. The total area of disturbance is inconsistently identified throughout the DEIS.

3. General Comment – As discussed with the project engineer, the applicant should confirm the adequacy of the proposed 10,000 gallon water storage tank. The applicant should provide supporting calculations and fire flow standards. The project engineer also discussed the possibility of providing a wet system, as opposed to the currently proposed dry system. The DEIS and project drawings should be revised, if necessary.

4. Page 2-12 – The City of Peekskill City Planner, Putnam Valley Library and Putnam Valley School District should be added to the list of Interested Agencies.

5. Page 3.1-7, 4th Paragraph - The applicant should identify where the gravel, sand, etc. is being imported from; transportation routes should be provided.

6. Pages 3.1-7 and 3.1-8 – This section should be reviewed for consistency, accuracy, and clarity. The applicant identifies the total cut to be 19,410 cubic yards and indicates that 14,683 cubic yards will be removed via blasting; however, the fifth paragraph on Page 3.1-7 indicates that 45% of the total cut

will be generated from blasting. This discrepancy should be resolved and the applicant should define "expansion factor."

7. Page 3.1-8 (and elsewhere in the DEIS) - This section should be revised to indicate that blasting will only be conducted between the hours of 8AM and 5PM, Monday through Friday.

8. Page 3.2-10, 1st and 2nd Paragraphs – It does not appear that the Class of the Peekskill Hollow Brook is being consistently identified.

9. Figure 3.6-2 - The Legend should be revised to identify the three general vegetation types identified on Page 3.6-1 (Successional Northern Hardwood Forest, Hemlock Northern Hardwood Forest, and Palustrine Forested Wetlands).

10. Page 3.6-4, 3rd Paragraph – The applicant indicates that the amount of disturbance currently proposed is less than that indicated on Figure 2-6. If Figure 2.6 is not accurate and does not reflect the 26.6 total acres of disturbance, Figure 2-6 should be revised.

    The Planning Board has determined that the submitted tree plan is adequate for DEIS completeness; however, this paragraph should indicate that a more detailed tree plan, illustrating trees to be saved within the areas of disturbance and trees to be planted, will be submitted prior to Preliminary Subdivision Approval.

11. Page 3.6-20, last paragraph – It is inappropriate to identify and map potential roost trees and proposed mitigation measures in accordance with the U.S. Fish and Wildlife Service after SEQRA is complete; this paragraph should be revised.

12. 3.8-2, 1st paragraph – Additional text is required to confirm conformance with §165-17 of the Zoning Code.

13. Appendix A should include the latest correspondence from the Town's consultants.

14. The Cultural Resource Survey found in Appendix D is outdated and does not include the Phase 1B Site Identification Report.

15. Appendix I is missing certain referenced Figures and reports.

16. The zoning charts provided in Appendix S do not entirely confirm conformance with the cluster regulations; notes 1-5 should be proven out.

Upon the receipt and review of a revised DEIS, this office will prepare a Notice of Completion/Notice of Public Hearing. The applicant will be responsible for circulating the DEIS and Notice of Completion/Notice of Public Hearing to the Involved and Interested Agencies, the New York State Department of Environmental Conservation (NYSDEC), the Putnam Valley Library, the Town Supervisor, and anyone else requesting a copy of the DEIS; proof of mailing shall be provided to the Planning Board Clerk. This office will provide the necessary documentation to the Environmental Notice Bulletin (ENB) and it is assumed that the Planning Board Clerk will provide the required information to the newspaper, which is required to be published at least 14 days prior to the public hearing. In accordance with 6 NYCRR Part 617.9(a)(4)(ii), the public hearing shall commence no less than 15 calendar days or no more than 60 calendar days after the filing of the Notice of Completion.

In accordance with 6 NYCRR Part 617.9(a)(4)(iii), comments will be received and considered by the Lead Agency for no less than 30 calendar days from the first filing and circulation of the Notice of Completion, or no less than 10 calendar days following the date of the public hearing, whichever is later.

This information is based on my review of the DEIS. Additional review comments will be provided throughout the process as the application is evaluated. Any comments relating to the Preliminary Subdivision Plans will be provided during the public hearing process. It is recommended that written responses to these comments be provided with any future submittals.

Sincerely,

Jan K. Johannessen
Town Planner

cc: William A. Zutt, Esq. (via fax 845-528-2566)
Irv Sevelowitz, Code Enforcement Officer (via fax 526-8806)
Todd Atkinson (via fax 914-232-6827)
Bruce Barber (via fax 914-962-0330)
William Canavan (via fax 914-276-2664)
Josh Moreinis, AICP, PP (via fax 265-4418)
Keith Staudohar (via fax 914-736-3693)

J. ROBERT FOLCHETTI & ASSOCIATES, L.L.C.
ENGINEERING / PLANNING / SURVEYING

April 13, 2006

Town of Putnam Valley Planning Board
Mr. Billy L. Crowder, Chairman
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: VS Construction, Emerald Ridge <u>DEIS 1st Review</u>
Tax ID#: 84.-1-5 and PO 84.-1-10.1, 10.2 and 10.3
JRFA Job #03500408

Dear Chairman Crowder and Members of the Board:

Our office has received and reviewed the following documents submitted for the above referenced project as prepared by Tim Miller Associates, Inc. and Cronin Engineering P.E., P.C.:

- Emerald Ridge Subdivision Draft Environmental Impact Statement (Vol. 1 & 2), prepared by Tim Miller Associates, Inc., last revised March 14, 2006.
- Subdivision and Development Approval Plan for Emerald Ridge, prepared by Cronin Engineering P.E. P.C., last revised March 8, 2006.

Our office has reviewed the following sections of the Draft Environmental Impact Statement:

- 1.0 Executive Summary
- 2.0 Project Description
- 3.1 Geology and Soils
- 3.2 Surface Water Resources
- 3.3 Groundwater Resources
- 3.4 Stormwater
- 3.5 Wastewater
- 3.13 Cumulative Impacts
- 4.0 Alternatives

Based on our review of the submitted documents, we offer the following comments, which may warrant discussion with the applicant and/or action by the Board:

Chapter 1.0: Executive Summary

Section 1.0 Executive Summary

1.2.1 Geology, Soils and Topography – The erosion control and slope protection reference note should reference the New York State Standards and Specification for Erosion and Sediment Control 2005.

1.2.2 Surface Water Resources–As a result of the proposed wetland buffer impact to the buffer of Wetland B, mitigation measures should be considered.

Chapter 2.0: Introduction

Section 2.2 Site Location and Character

Figure 2.1-a: Site Location Map – The Tax Map Designation Chart shown on the drawing CS: Cover Sheet of Subdivision and Development Approval Plan for Emerald Ridge, should be included on Figure 2.1-a.

Section 2.4 Description of Proposed Action

First paragraph – The project disturbance area should match the disturbance area stated in Table 3.1-2.

Access - Figure 2-7: Marsh Hill Road Improvement Plan should be revised for clarity. Notes as currently presented are difficult to read. A property boundary line type should be added to the legend shown. A survey of the Marsh Hill Right of Way should be provided.

Lot Line Change – The existing restriction concerning the transfer of land from Brookfalls Cottages, Inc. to the Emerald Ridge project site should be stated under the Site History section.

Architecture – The applicant is referring to Chapter 11 for three potential house styles. According to the Final Scoping Document, February 7, 2005, detailed floor plans for the proposed houses should be provided.

Landscaping – A landscaping plan for street trees along the extension of Marsh Hill Road should be submitted to the Planning Board for review.

Figures 2-8, 2-9, and 2-10: The proposed typical Landscape Plans should be revised for clarity. A legend symbol representing the existing trees should be added to the legend shown.

Section 2.5 Phasing and Construction Schedule

According to the Final Scoping Document, February 7, 2005, construction techniques should be discussed in the DEIS.

Construction Sequencing – The Applicant indicates that trees to be preserved in the field will be marked. According to the Town code of the Town of Putnam Valley, Chapter 161, §161-7, each tree to be removed has to be designated as it is stated under this section.

Section 2.7 Reviews and Approvals

The list of all Involved and Interested Agencies should correspond to the list stated in the Final Scoping Document, February 7, 2005. According to the Final Scoping Document, February 7, 2005, status for each application should be stated in this section.

Chapter 3.0: Existing Environmental Conditions, Potential Impacts, and Mitigation

Section 3.1 Geology and Soils

3.1.1 – Existing Geology and Soil Conditions – According to the Final Scoping Document, February 7, 2005 a soil subsurface investigation should be performed via ten selective soil tests. This requirement has been met through the completion of over 60 deep hole tests to meet Putnam County Board of Health SSDS requirements. A copy of the geotechnical engineering report should be included in the DEIS.

3.1.2 – Potential Impacts – Slopes Impacts – Area of Slope Disturbance Analysis Data Chart, shown on Figure 3.1-3, should be revised to match the data shown in Table 3.1-2. 3A

3.1.2 – Potential Impacts – Geology Impacts – A percentage of blasting in relation to the total cut proposed should be indicated. The hours of blasting operation identified in this section should correspond to those identified in Appendix 0.

3.1.3 – Proposed mitigation Measures – Blasting Mitigation Plan - The hours of blasting operation identified in this section should correspond to those identified in Appendix 0.

Section 3.2 Surface Water Resources

3.2.1 – Existing Conditions – Peekskill Hollow Brook Watershed – Figure 3.2-4: Watershed Boundary Emerald Ridge Subdivision DEIS – The existing waterways (Peekskill Hollow Brook and Oscawana Brook) should be more clearly presented on this figure.

3.2.3 – Mitigation Measures - As a result of the proposed wetland buffer impact to the buffer of Wetland B, mitigation measures should be considered.

Section 3.4 Stormwater

Figure 3.4-1 Drainage Basins – Existing Conditions – Legend symbols should match the symbols shown on the drawing.

3.4.2 – Table 3.4-2 - Peak rate of runoff for drainage basin B4, for a 100-year storm should match a value presented in Table 3.4-3. A figure which clearly shows that all stormwater runoff from disturbed areas will be treated should be added to the DEIS.

3.4.3 – Mitigation Measures – There is a reference in the text to a stormwater basin landscaping plan, Figure 3.4-4, which is not provided. A detailed maintenance plan for the proposed stormwater management facilities and personnel responsible for maintenance should be included in the DEIS.

Appendix J " Stormwater Pollution Prevention Plan" - Table 2 - Post Development Peak Discharges, on page 11, should match the Table 3.4-3 Summary of Existing vs. Proposed Peak Rates of Runoff, presented in section 3.4.2 Potential Impacts, Volume I. All Appendices and Figures of Appendix J " Stormwater pollution Prevention Plan", that are stated in the text, were not included in the copy of the DEIS submitted to JRFA. All proposed stormwater pipe capacities should be checked with calculations presented in the DEIS. It appears that some of the proposed stormwater pipes will have velocities greater than 15 ft/sec, in which case special provisions shall be made to protect against displacement by erosion and impact. As it is proposed, as the part of the mitigation package, that two existing culverts will be abandoned, and the stormwater will be rerouted along the north side of Peekskill Hollow Road to Peekskill Hollow Brook, a drawing showing the proposed stormwater drainage along this section of Peekskill Hollow Road with accompanying stormwater calculations should be included in the DEIS, as requested by the Department of Highways and Facilities, in the letter dated December 19, 2005.

Section 3.5 Wastewater

Section 3.5 Wastewater information was not included in the revised DEIS.

Chapter 4.0: Alternatives

Engineering data was not provided for any of the alternatives. Engineering data should be provided for alternatives the planning board would like to review more in depth.

Miscellaneous

The 10,000 gallon water storage tank installed at the cul-de-sac should be resized to provide 400 gpm of flow for a duration of one hour. The proposed dry hydrant system should be changed to a wet hydrant system.

This information is based on my review of the documents submitted. Additional review comments may be provided throughout the process as the application is evaluated. Please provide written responses to these comments with any future submittals.

Should you have any questions or comments, please feel free to contact our office.

Sincerely,

Todd W. Atkinson
Town Planning Board Engineer

TWA/jac

cc: William A. Zutt, Esq. (via fax 845-528-2566)
Jan K. Johannessen (via fax 845-454-4026)
Bruce Barber (via fax 914-962-0330)
Irv Sevelowitz (via fax 845-526-8806)
Earl Smith (via fax 845-526-4729)
Applicant

MEMO

To: Val Santucci
From: Stephen W. Coleman
Date: April 18, 2006
Re: Marsh Hill – comments from Bruce Barber re-wetland delineation

As per your request, you asked about the prior wetland delineation that was completed for the Emerald Ridge property. When I performed wetland delineations for the Town of Putnam Valley, I based the delineation on the presence of hydric soils, wetland vegetation,and the presence of wetland hydrology. This method followed the federal definition for wetland delineations. Hydric soils were taken into consideration in determining the respective wetland boundaries.

According to the question that was raised by Bruce Barber regarding the hydric soil map designation. I was aware of the maps provided by the Town and did review these maps and also the Soil Survey Maps for Westchester and Putnam Counties for this property. These maps are general reference maps that show approximate soil types, they usually do not show survey-located boundaries of specific soil groups or type. In my experience, the location of soils in the field, compared to filed maps, is often quite variable – hence, the reason for following the federal guidelines and looking at dominance of all three parameters – soils, vegetation and hydrology in the field.

At the time of my delineation, I was confident that the wetland flagging represented the respective wetland boundary based upon the above parameters. The Planning Board adopted the wetland delineation as accurate, and the delineation I performed was the basis for the submitted subdivision plans and layouts.

Please let me know if you require any additional information.

S. W. Coleman

3 ASPEN COURT, OSSINING, NY 10562 • 914-494-5544/FAX 914-762-5260 •Steve.Coleman8@verizon.net

STEPHEN W. COLEMAN
ENVIRONMENTAL CONSULTING, LLC

Environmental Planning & Site Analysis
Wetland Mitigation & Restoration Plans
Wetland Delineation & Assessment
Natural Resource Management
Pond & Lake Management
Wildlife & Plant Surveys
Breeding Bird Surveys
Landscape Design

June 3, 2006

Mr. Steve Marino
Tim Miller Associates, Inc.
10 North Street
Cold Spring, New York 10516

Re: Emerald Ridge – confirmation of piezometers within wetland areas

As per your request, this letter is to confirm that I had previously requested the specific locations of piezometers to be installed in the wetlands identified on the Emerald Ridge property. The location of the piezometers were survey located, and the location as shown on the survey confirms the recommended placement in the field. My field notes indicated that I also inspected the locations after they were installed by your office. As noted, I have not reviewed any of the field measurements for the individual piezometers.

I hope this clarifies the question of the location and installation of the piezometers in the field at the proposed Emerald Ridge Subdivision.

Please let me know if you have questions or require additional information.

Sincerely,

Stephen W. Coleman

Stephen W. Coleman
SWC/tbh

3 ASPEN COURT, OSSINING, NY 10562 • 914-494-5544/FAX 914-762-5260 •Steve.Coleman8@verizon.net

04/10
5/11

THE Chazen COMPANIES

Facsimile Transmission

To:	Laura Lussier, Planning Board Clerk
Company:	Town of Putnam Valley Planning Board
Cc:	William A. Zutt, Esq. (845-528-2566) Todd Atkinson (914-232-6827) Irv Sevelowitz (845-526-8806) Bruce Barber (914-962-0330) William Canavan (914-276-2664) Josh Moreinis, AICP, PP (265-4418) Keith Staudohar (914-736-3693) David Steinmetz, Esq. (914-683-5490)
Date:	June 2, 2006
Fax No:	526-3307
Regarding:	Emerald Ridge

From:	Jan K. Johannessen
Company:	The Chazen Companies – Dutchess County Office
Phone No:	(845) 486-1520 Fax No: (845) 454-4026

Number of Pages (Including this page) 6

Approximate Time of Transmission: 4PM

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Orange County Office
Phone: (845) 567-1133

Web: www.chazencompanies.com

June 2, 2006

Mr. Billy L. Crowder, Chairman
and Members of the Planning Board
Town of Putnam Valley Planning Board
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Emerald Ridge Draft Environmental Impact Statement, 4th Review
Tax ID: 84.-1-5/10.1/10.2/10.3
Job Number: 10424.05

Dear Chairman Crowder and Members of the Planning Board:

On behalf of the Planning Board, The Chazen Companies (TCC) has reviewed the following documents:

- Emerald Ridge Subdivision Draft Environmental Impact Statement (Vol. 1 & 2), prepared by Tim Miller Associates, Inc., last revised April 28, 2006.

The Draft Environmental Impact Statement (DEIS) prepared by Tim Miller Associates, last revised April 28, 2006, has been reviewed for completeness. TCC has used the Final Scoping Document, adopted February 7, 2005, and our previous comment letters, dated October 13, 2005, February 23, 2006, and April 13, 2006 to ascertain whether this document is complete with respect to its scope and content for the purposes of commencing public review. Although certain substantive comments and concerns will be required to be addressed in the Final Environmental Impact Statement (FEIS), the DEIS has been found to be complete.

A Notice of Completion/Notice of Public Hearing has been prepared by this office and is attached for your approval. The applicant will be responsible for circulating the DEIS and Notice of Completion/Notice of Public Hearing in accordance with 6NYCRR 617.12(B). This office will provide the necessary documentation to the Environmental Notice Bulletin (ENB) and it is assumed that the Planning Board Clerk will provide the required information to the newspaper, which is required to be published at least 14 days prior to the public hearing. In accordance with 6

NYCRR Part 617.9(a)(4)(ii), the public hearing shall commence no less than 15 calendar days or no more than 60 calendar days after the filing of the Notice of Completion.

If you have any questions, please do not hesitate to call.

Sincerely,

Jan K. Johannessen
Town Planner

Attachment

cc: William A. Zutt, Esq. (via fax 845-528-2566)
Irv Sevelowitz, Code Enforcement Officer (via fax 526-8806)
Todd Atkinson (via fax 914-232-6827)
Bruce Barber (via fax 914-962-0330)
William Canavan (via fax 914-276-2664)
Josh Moreinis, AICP, PP (via fax 265-4418)
Keith Staudohar (via fax 914-736-3693)
David S. Steinmetz, Esq. (via fax 914-683-5490)

Cornerstone
ASSOCIATES

May 30, 2006

To: Planning Board

From: Bruce Barber
Town Wetland Inspector

RE: **Emerald Ridge Subdivision**
Marsh Hill Road
Tax Map: Section 84 Block 1 Lots 5, 10.1, 10.2, 10.3 and 25

Dear Chairman Crowder and Members of the Planning Board:

Please be advised that I have reviewed the following documents submitted by the applicant:

- Draft Environmental Impact Statement, Volumes I and II prepared by Tim Miller Associates dated April 28, 2006..

I offer the following comments:

The above referenced iteration does address the majority of the questions that were raised in my memo dated April 7, 2006. Based upon my review however, the following items remain open as referenced from the April 7, 2006 memo:

General Comments:

2. The wetland delineation should be completed prior to acceptance of the FEIS and public hearing not prior to completion of the SEQRA process as indicated in the DEIS.

3. The DEIS does not contain information that the location of the monitoring wells was determined by the Town Wetlands Inspector.

4. Information regarding the reason for the arsenic levels in the two tests at well TW-1 has not been supplied.

6. The rationale for determining what species will be studied on this site was incomplete. Complete information on the habitat types on the property and all threatened, endangered and special concern species that may be found in these habitats should be provided. Additionally, what was the analysis used to determine what threatened, endangered and special concern species would be studied on this site and which species need not be studied. A table of comparison including mammals, birds, amphibians, reptiles and plants should be provided. Additionally, documentation from NYSDEC regarding the acceptance of the consultants' qualifications has not been provided.

Specific Comments:

1.0 Table has not been provided.
1.2.2: Landscape effects of the proposed development have not been analyzed.
1.2.3: Details regarding groundwater estimation and potential impacts to potable water and wetlands has not been provided.
1.2.6: Conservation easement on wetland A should be shown on all maps.
2.4: Details regarding information to be provided to homeowners with respect to the overlay zone has not been provided.
2.5: Items not addressed.
3.1.2: Geological information including any fractures and fissures has not been provided.
3.3.1: Correction of discrepancy was not located.
3.4: Analysis regarding impacts to downstream properties regarding stormwater quantity exceeding pre-construction levels has not been provided.
3.6: Regional/landscape analysis has not been provided. Preservation of vernal pools using a 100' buffer has not been addressed. See #6, General Comments above.

Please be advised that the above comments address the DEIS information regarding completeness only. Substantive review will be conducted following compilation of the FEIS.

TO: Chairman Billy Crowder, Town of Putnam Valley Planning Board
FROM: Josh Moreinis, AICP, PP
DATE: June 1, 2006
RE: Emerald Ridge DEIS Revisions per Bruce Barber Comment Memorandum

Following is an annotated version of Bruce Barber's Emerald Ridge DEIS comment memorandum of May 30, 2006 that provides indication of how we will be responding to the comments. As discussed with Bruce today, our responses are shown in bold italics below.

Annotated Memorandum:

May 30, 2006

To: Planning Board

From: Bruce Barber
Town Wetland Inspector

RE: **Emerald Ridge Subdivision**
Marsh Hill Road
Tax Map: Section 84 Block 1 Lots 5, 10.1, 10.2, 10.3 and 25

Dear Chairman Crowder and Members of the Planning Board:

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- Draft Environmental Impact Statement, Volumes I and II prepared by Tim Miller Associates dated April 28, 2006.

I offer the following comments:

The above referenced iteration does address the majority of the questions that were raised in my memo dated April 7, 2006. Based upon my review however, the following items remain open as referenced from the April 7, 2006 memo:

General Comments:

2. The wetland delineation should be completed prior to acceptance of the FEIS and public hearing not prior to completion of the SEQRA process as indicated in the DEIS.

The statement on page 3.2 that "Additional soil surveys will be completed prior to final design and completion of the SEQRA process to determine if there are areas where hydric soils may exist without a dominance of hydrophytic vegetation" will be revised to state that this will be done "prior to acceptance of the FEIS."

3. The DEIS does not contain information that the location of the monitoring wells was determined by the Town Wetlands Inspector.

A map showing the monitoring well locations was included in the DEIS. A statement will be added clarifying that "monitoring well locations were selected through consultation with the Town's Consulting Hydrologist and the Putnam County Department of Health."

4. Information regarding the reason for the arsenic levels in the two tests at well TW-1 has not been supplied.

The following text will be added to the Groundwater Chapter of the DEIS: "Arsenic is a natural compound of granitic metamorphic rocks. In all likelihood the relatively high turbidity and probable color in a newly completed drilled well may have given a false positive reading. When the well is ready for use, it will be equipped with a permanent pump until it produces clear water free of turbidity and color. It will then be analyzed again for arsenic. The Putnam County Department of Health will not let a certificate of occupancy be issued until the well is compliant with the drinking water standard for arsenic, which is 10 parts per billion."

6. The rationale for determining what species will be studied on this site was incomplete. Complete information on the habitat types on the property and all threatened, endangered and special concern species that may be found in these habitats should be provided. Additionally, what was the analysis used to determine what threatened, endangered and special concern species would be studied on this site and which species need not be studied. A table of comparison including mammals, birds, amphibians, reptiles and plants should be provided. Additionally, documentation from NYSDEC regarding the acceptance of the consultants' qualifications has not been provided.

This information can be found in the DEIS, and will be further described as part of the FEIS. DEIS page 3.6-13 lists the three categories of species indicated above. Page 3.6-14 indicates which of these species are not likely to use this habitat and why. As indicated, there are five species that will be studied in more detail in the biodiversity study. The species are listed on page 3.6-13. Table 3.6-5 provides information on specific species and habitat requirements. Table 3.6-4a provides information on the schedule and methodology for the continuing biodiversity study. The DEIS states why certain species were eliminated from consideration, e.g., 'Tiger Salamander are confined to Eastern Long Island.' The DEIS analysis resulted in five State-listed species with high potential for using the site. Specific surveys are being conducted as part of a continuing biodiversity study, which is being prepared for the FEIS.

Qualifications of the participating consultants will be added in an Appendix for NYSDEC review.

Specific Comments:

1.0 Table has not been provided.

This info is presented in a chart on the Cover Sheet of the attached drawings. This information is also on the lot line adjustment map (PT-2.1).

1.2.2: Landscape effects of the proposed development have not been analyzed.

The following text will be added to the DEIS to Executive Summary section 1.2.6, which addresses the issue of landscape effects: "The subject site is part of a continuous wooded area that extends from Peekskill Hollow Road north, east and west of the property. The habitat on the subject site and adjacent areas consist primarily of upland hardwood forest with stream corridors and forested, scrub/shrub and emergent wetlands. The proposed project will result in the loss of approximately 26.6 acres of the roughly 77 acres of forested habitat on-site and among the hundreds of acres of contiguous adjacent habitat off-site. Long term impacts to wildlife species on this site as a result of the project relate to fragmenting of the existing closed canopy of the site and the disturbance of possible wildlife corridors.

Although some existing pathways through the area proposed for disturbance will be disrupted or lost, all resident wildlife will continue to access all of the wetland habitat on the site by passing through areas of undisturbed habitat (corridors) to the north, west and east of the property. As a result of the proposed development plan and the implementation of conservation easements, all existing habitat types on the project site will be remain accessible to wildlife through areas of undisturbed habitat.

In addition, areas between houses will remain undisturbed wherever possible, thereby affording species more tolerant of disturbance and development the ability to travel between remaining suitable habitat. These routes would require landbound wildlife to cross the lightly used residential road. Use of the habitat within the proposed cul-de-sacs and areas to be cleared for house and infrastructure construction will be permanently lost to forest interior species but will be used by those species able to adjust to the type of anthropogenic impacts resulting from the proposed development."

1.2.3: Details regarding groundwater estimation and potential impacts to potable water and wetlands has not been provided.

This information is found in DEIS Appendix I will be referenced in Section 1.2.3.

1.2.6: Conservation easement on wetland A should be shown on all maps.

The text of the DEIS includes a statement that Wetland A is to be covered by a conservation easement. A statement will be added to the DEIS indicating that maps reflecting the Applicant's proposal for the Wetland A conservation easement will be included in the FEIS.

2.4: Details regarding information to be provided to homeowners with respect to the overlay zone has not been provided.

Details regarding information to be provided to homeowners on the prohibition on use of fertilizers and pesticides pursuant to the Groundwater Protection Overlay District will be provided in the FEIS.

2.5: Items not addressed.

- ***Text will be added to the DEIS section to indicate that no more than five contiguous acres will be exposed at any one time during construction, and that construction will not start until the Town receives an NOI from the Applicant.***
- ***A timeline for construction will be provided in the FEIS.***
- ***Construction techniques and sequencing are described in Drawing Number ER-6.7 that accompanied the DEIS. The level of disturbance is broken down by phase and by groupings of proposed residences on Drawing ER-6.7. The amount of disturbance for each individual house will be provided in a table in the FEIS.***
- ***The Project engineer is a certified Erosion and Sediment Control Professional.***
- ***The construction schedule will be based on the construction phasing as indicated on Drawing ER-6.7.***
- ***The Blasting Report found in the DEIS Appendix provides blasting protocols***

3.1.2: Geological information including any fractures and fissures has not been provided.

The following text will be added to Chapter 3.1 of the DEIS to address this comment: "No testing for the presence of fractures or fissures has been conducted. Four demonstration wells were drilled at random locations approved by the Department of Health and all four wells produced satisfactory yields with no evidence of downstream impacts to neighboring wells."

3.3.1: Correction of discrepancy was not located.

Different household population multipliers referenced in this comment were used due to the differing purposes of the studies that they were used for.

3.4: Analysis regarding impacts to downstream properties regarding stormwater quantity exceeding pre-construction levels has not been provided.

The following text will be added to Chapter 3.2 of the DEIS to address this comment:

According to the project engineer, no downstream flooding impacts are anticipated as a result of the slight increase in post-construction stormwater quantity. Analysis will be provided in the FEIS to demonstrate this."

3.6: Regional/landscape analysis has not been provided. Preservation of vernal pools using a 100' buffer has not been addressed. See #6, General Comments above.

Info regarding regional landscape position and potential impacts is provided on pages 3.6-18, 3.6-19 and 3.6-20, among other references. The biodiversity study to be included in the FEIS will further evaluate this issue. Vernal pools will be evaluated further in the FEIS based on the conclusions of the biodiversity study.

Please be advised that the above comments address the DEIS information regarding completeness only. Substantive review will be conducted following compilation of the FEIS.

We note that the substantive review of the DEIS will be required prior to preparation of an FEIS.

Cc: ***Bruce Barber***
Jan Johannessen
Val Santucci
Keith Staudohar
David Steinmetz, Esq.
Putnam Valley Planning Board

June 4, 2006

TO: Josh Moreinis, AICP, PP
FROM: Bruce Barber, Town of Putnam Valley Wetland Inspector
RE: Emerald Ridge DEIS, revisions.

Hi Josh:

I spoke to Bill Zutt yesterday after he had a chance to review this document. He offered some suggestions which are shown as *italicized and underlined.* I also spoke to Jan this morning and went over same.

TO: Chairman Billy Crowder, Town of Putnam Valley Planning Board
FROM: Josh Moreinis, AICP, PP
DATE: June 1, 2006
RE: Emerald Ridge DEIS Revisions per Bruce Barber Comment Memorandum

Following is an annotated version of Bruce Barber's Emerald Ridge DEIS comment memorandum of May 30, 2006 that provides indication of how we will be responding to the comments. As discussed with Bruce today, our responses are shown in bold italics below.

Annotated Memorandum:

May 30, 2006

To: Planning Board

From: Bruce Barber
Town Wetland Inspector

RE: **Emerald Ridge Subdivision**
Marsh Hill Road
Tax Map: Section 84 Block 1 Lots 5, 10.1, 10.2, 10.3 and 25

Dear Chairman Crowder and Members of the Planning Board:

Please be advised that I have reviewed the following documents submitted by the applicant:

- Draft Environmental Impact Statement, Volumes I and II prepared by Tim Miller Associates dated April 28, 2006.

I offer the following comments:

The above referenced iteration does address the majority of the questions that were raised in my memo dated April 7, 2006. Based upon my review however, the following items remain open as referenced from the April 7, 2006 memo:

General Comments:

2. The wetland delineation should be completed prior to acceptance of the FEIS and public hearing not prior to completion of the SEQRA process as indicated in the DEIS.

The statement on page 3.2 that "Additional soil surveys will be completed prior to final design and completion of the SEQRA process to determine if there are areas where hydric soils may exist without a dominance of hydrophytic vegetation" will be revised to state that this will be done "prior to acceptance of the FEIS."

Statement should read: The wetland delineation will be completed in compliance with methodology indicated in Chapter 144 of the Town of Putnam Valley Town Code. The wetland delineation must be completed prior to public hearing and acceptance of the FEIS.

3. The DEIS does not contain information that the location of the monitoring wells was determined by the Town Wetlands Inspector.

A map showing the monitoring well locations was included in the DEIS. A statement will be added clarifying that "monitoring well locations were selected through consultation with the Town's Consulting Hydrologist and the Putnam County Department of Health."

4. Information regarding the reason for the arsenic levels in the two tests at well TW-1 has not been supplied.

The following text will be added to the Groundwater Chapter of the DEIS: "Arsenic is a natural compound of granitic metamorphic rocks. In all likelihood the relatively high turbidity and probable color in a newly completed drilled well may have given a false positive reading. When the well is ready for use, it will be equipped with a permanent pump until it produces clear water free of turbidity and color. It will then be analyzed again for arsenic. The Putnam County Department of Health will not let a certificate of occupancy be issued until the well is compliant with the drinking water standard for arsenic, which is 10 parts per billion."

Statement should read: The Town of Putnam Valley will require certification from the Putnam County Department of Health prior to the issuance of a building permit that all well water standards including arsenic levels are in compliance with the Putnam County Health Code.

6. The rationale for determining what species will be studied on this site was incomplete. Complete information on the habitat types on the property and all threatened, endangered

and special concern species that may be found in these habitats should be provided. Additionally, what was the analysis used to determine what threatened, endangered and special concern species would be studied on this site and which species need not be studied. A table of comparison including mammals, birds, amphibians, reptiles and plants should be provided. Additionally, documentation from NYSDEC regarding the acceptance of the consultants' qualifications has not been provided.

This information can be found in the DEIS, and will be further described as part of the FEIS. DEIS page 3.6-13 lists the three categories of species indicated above. Page 3.6-14 indicates which of these species are not likely to use this habitat and why. As indicated, there are five species that will be studied in more detail in the biodiversity study. The species are listed on page 3.6-13. Table 3.6-5 provides information on specific species and habitat requirements. Table 3.6-4a provides information on the schedule and methodology for the continuing biodiversity study. The DEIS states why certain species were eliminated from consideration, e.g., 'Tiger Salamander are confined to Eastern Long Island.' The DEIS analysis resulted in five State-listed species with high potential for using the site. Specific surveys are being conducted as part of a continuing biodiversity study, which is being prepared for the FEIS.

Qualifications of the participating consultants will be added in an Appendix for NYSDEC review.

Specific Comments:

1.0 Table has not been provided.

This info is presented in a chart on the Cover Sheet of the attached drawings. This information is also on the lot line adjustment map (PT-2.1).

1.2.2: Landscape effects of the proposed development have not been analyzed.

The following text will be added to the DEIS to Executive Summary section 1.2.6, which addresses the issue of landscape effects: "The subject site is part of a continuous wooded area that extends from Peekskill Hollow Road north, east and west of the property. The habitat on the subject site and adjacent areas consist primarily of upland hardwood forest with stream corridors and forested, scrub/shrub and emergent wetlands. The proposed project will result in the loss of approximately 26.6 acres of the roughly 77 acres of forested habitat on-site and among the hundreds of acres of contiguous adjacent habitat off-site. Long term impacts to wildlife species on this site as a result of the project relate to fragmenting of the existing closed canopy of the site and the disturbance of possible wildlife corridors.

Although some existing pathways through the area proposed for disturbance will be disrupted or lost, all resident wildlife will continue to access all of the wetland habitat on the site by passing through areas of undisturbed habitat (corridors) to the north, west and east of the property. As a result of the proposed development plan and the

implementation of conservation easements, all existing habitat types on the project site will be remain accessible to wildlife through areas of undisturbed habitat *(contingent upon pending wetland delineation and biodiversity study which were incomplete at the time of writing).*

In addition, areas between houses will remain undisturbed *(as per approved plan)* ***thereby affording species more tolerant of disturbance and development the ability to travel between remaining suitable habitat. These routes would require landbound wildlife to cross the lightly used residential road. Use of the habitat within the proposed cul-de-sacs and areas to be cleared for house and infrastructure construction will be permanently lost to forest interior species but will be used by those species able to adjust to the type of anthropogenic impacts resulting from the proposed development."***

1.2.3: Details regarding groundwater estimation and potential impacts to potable water and wetlands has not been provided.
This information is found in DEIS Appendix I will be referenced in Section 1.2.3.

1.2.6: Conservation easement on wetland A should be shown on all maps.

The text of the DEIS includes a statement that Wetland A is to be covered by a conservation easement. A statement will be added to the DEIS indicating that maps reflecting the Applicant's proposal for the Wetland A conservation easement will be included in the FEIS *prior to acceptance of the FEIS and public hearing thereof.*.

2.4: Details regarding information to be provided to homeowners with respect to the overlay zone has not been provided.

Details regarding information to be provided, *the format of the information and method of dissemination* ***to homeowners on the prohibition on use of fertilizers and pesticides pursuant to the Groundwater Protection Overlay District will be provided in the FEIS.***

2.5: Items not addressed.

- ***Text will be added to the DEIS section to indicate that no more than five contiguous acres will be exposed at any one time during construction, and that construction will not start until the Town receives an NOI from the Applicant.***
- ***A timeline for construction will be provided in the FEIS.***
- ***Construction techniques and sequencing are described in Drawing Number ER-6.7 that accompanied the DEIS. The level of disturbance is broken down by phase and by groupings of proposed residences on Drawing ER-6.7. The amount of disturbance for each individual house will be provided in a table in the FEIS.***
- ***The Project engineer is a certified Erosion and Sediment Control Professional.***
- ***The construction schedule will be based on the construction phasing as indicated on Drawing ER-6.7.***
- ***The Blasting Report found in the DEIS Appendix provides blasting protocols***

3.1.2: Geological information including any fractures and fissures has not been provided.

The following text will be added to Chapter 3.1 of the DEIS to address this comment: "No testing for the presence of fractures or fissures has been conducted. Four demonstration wells were drilled at random locations approved by the Department of Health and all four wells produced satisfactory yields with no evidence of downstream impacts to neighboring wells."

3.3.1: Correction of discrepancy was not located.

Different household population multipliers referenced in this comment were used due to the differing purposes of the studies that they were used for.

3.4: Analysis regarding impacts to downstream properties regarding stormwater quantity exceeding pre-construction levels has not been provided.

The following text will be added to Chapter 3.2 of the DEIS to address this comment: According to the project engineer, no downstream flooding impacts are anticipated as a result of the slight increase in post-construction stormwater quantity. Analysis will be provided in the FEIS <u>prior to acceptance and public hearing</u> ***to demonstrate this."***

3.6: Regional/landscape analysis has not been provided. Preservation of vernal pools using a 100' buffer has not been addressed. See #6, General Comments above.

Info regarding regional landscape position and potential impacts is provided on pages 3.6-18, 3.6-19 and 3.6-20, among other references. The biodiversity study to be included in the FEIS will further evaluate this issue. Vernal pools will be evaluated further in the FEIS based on the conclusions of the biodiversity study.

Please be advised that the above comments address the DEIS information regarding completeness only. Substantive review will be conducted following compilation of the FEIS.

We note that the substantive review of the DEIS will be required prior to preparation of an FEIS.

Cc: Bruce Barber
Jan Johannessen
Val Santucci
Keith Staudohar
David Steinmetz, Esq.

Appendix B

Wetland Delineation Report

STEPHEN W. COLEMAN
ENVIRONMENTAL CONSULTING, LLC

Environmental Planning & Site Analysis
Wetland Mitigation & Restoration Plans
Wetland Delineation & Assessment
Natural Resource Management
Pond & Lake Management
Wildlife & Plant Surveys
Breeding Bird Surveys
Landscape Design

April 19, 2004

Keith Staudohar
Cronin Engineering P.E. P.C.
The Lindy Building, Suite 200
2 John Walsh Boulevard
Peekskill, NY 10566

Re: Marsh Hill Road, Proposed Subdivision, tax map #'s 84-1-5, 84-1-10.1, 84-1-10.2, 84-1-10.3 – wetland delineation

Dear Keith:

The wetlands on the subject parcel were flagged during April 03, 2004 according to criteria outlined in Chapter 144 of the Town Code of the Town of Putnam Valley. Sequentially numbered flags were placed along the wetland/upland boundary of the wetland areas identified on the subject parcel as listed below. The specific wetland flag numbers should be survey located by a licensed land surveyor and placed on the proposed Site Plan for the subject parcel. Attached are sketch plans that show the approximate wetlands boundary. Please contact me if you have questions or require additional information.

Wetland Flag numbers:

A1 to A21
B1 to B47
C1 to C24
D1 to D17

Sincerely,

Stephen W. Coleman

Stephen W. Coleman
Town of Putnam Valley Wetlands Inspector
SWC/tbh
Cc: Planning Board
Building Department

3 ASPEN COURT, OSSINING, NY 10562 • 914-494-5544/FAX 914-762-5260 •Steve.Coleman8@verizon.net

WETLAND A

WETLAND B

WETLAND C

WETLAND D

1.0 GENERAL GUIDANCE ON DEVELOPMENT OF THE RAPID ASSESSMENT PROCEDURE

OVERVIEW

Wetland function assessment has been a controversial subject since the inception of wetland protection statutes in the 1960s. Local, state and federal wetland protection laws and regulations protect wetlands because they provide functions which result in societal values. It can be said that it is the wetland's functions that are protected, not necessarily the wetland itself. Scientific identification of these functions and understanding the processes that occur in wetlands which give rise to functions is an ongoing process. Further field research is needed in order to quantitatively identify wetland processes and functions.

The wetland assessment procedure presented in this document has two primary applications. The first is as a template, which is a step by step process that can be used to develop assessment procedures for various regions of the country. The format used shares similarities with assessment methods having simple linear, additive rule based models such as Golet (1978) and Hollands and Magee (1985). It can be understood and applied by individuals who work in government agencies and consulting firms, those individuals who perform the vast majority of wetland function assessments. The time required to derive a functional capacity index for eight functions is on the order of two to three hours per wetland. Because of the timeliness with which assessments can be performed, this tool can be used for assessing functional capacity in a watershed or larger landscape context. The landscape level wetland function assessment procedure recently developed by Fugro East, Inc. (1995) for the State of Maryland is very similar to this template. When supported by adequate data from reference wetlands, this template can also be used to build regional hydrogeomorphic (HGM) models.

The second application for the procedure is assessment of wetland functional capacity in the glaciated northeast and midwest. This procedure was initially developed for this region and can be used as it is presented to assess functional capacity for each of eight functions for depressional, slope, lacustrine fringe, extensive peatland, flat and riverine wetlands. The conditions for the variables in the assessment models for this procedure are based on values derived from the literature, assessment data from over 1000 individual assessments performed throughout the glaciated northeast and midwest and the experience and professional judgement of the authors and various contributors. In the future, as data from reference wetlands become available, the variable conditions can be modified to more nearly reflect empirical rather than theoretical values. Over time, as more and more reference becomes established, this procedure can be continuously upgraded while providing an immediately available assessment tool for the interim.

It is important to recognize that this procedure is not HGM. HGM has been under development since at least 1991. The U.S. Army Engineer Waterways Experiment Station (WES) has been the primary sponsor. Other agencies which have been involved include the Environmental Protection agency (EPA), Natural Resources Conservation Service

1.1 DEVELOPMENT OF THE PROCEDURE

In May 1991, a meeting of wetlands researchers from throughout the continental U.S. convened at Stone Mountain, Georgia under the auspices of the U.S. Army Engineer Waterways Experiment Station (WES) to begin laying the groundwork for a nationwide functional assessment procedure. Owing to the primary role of geomorphology and hydrology in determining the physical, chemical and biological characteristics of wetlands, it was determined that classification and assessment of wetlands would be based on hydrogeomorphology. It was also concluded that the hydrogeomorphic wetland classification would be based on a modification of the Cowardin system (1979) and on recent work on hydrogeomorphic wetland classification by Brinson (1993). An outcome of the meeting at Stone Mountain was the identification of 12 functional wetland types based on hydrogeomorphology. These types included:

1. blanket bog
2. raised bog
3. ground water depression
4. ground water slope
5. surface water depression
6. surface water slope
7. high gradient channel
8. low gradient channel
9. lake flood plain
10. stream flood plain
11. channel fringe
12. lake fringe

These 12 functional wetland types were then reduced in number, based on commonalities between types, giving rise to seven hydrogeomorphic wetland categories. These categories are 1) depressional, 2) slope, 3) lacustrine fringe, 4) extensive peatland, 5) flat, 6) riverine and 7) coastal fringe. Although many different kinds of wetlands occur throughout the continental U.S., the vast majority, if not all, are represented in one of the above categories. This work provided the foundation for both the HGM approach and this procedure.

The procedure presented in this document was originally developed under contract to WES during 1993-95. During the initial stages of the project it was intended that this work would culminate in an HGM procedure for the glaciated northeast and midwest. As the work progressed, however, the requirement to establish reference wetlands became an integral part of how HGM came to be defined. At the same time it became clear that

- Another advantage of rule-based modeling is that it encourages thoughtful consideration of model construction without becoming preoccupied with the mathematics and computational details.

- In constructing the models as part of this procedure, every attempt has been made to match the model to its purpose and to the quality of available information, and to design models that strike a balance between being simple to the point of triviality and too complex to be useful.

- This procedure is expedient, user friendly and has a high degree of repeatability. It is capable of incorporating the best available information and has the flexibility to accommodate new data or program requirements.

- An index, termed a functional index, is generated for each function, which indicates the potential degree (capacity) to which the wetland performs the function; this index is only compared with functional indices of other wetlands within the same HGM class and region.

The procedure has been developed initially for the 1) depressional, 2) slope, 3) lacustrine fringe, 4) extensive peatland, 5) flat, and 6) riverine HGM classes for the glaciated northeast and midwest region by the authors. This region was selected because all six of the freshwater HGM classes are represented there. Ultimately, this procedure can be modified for each class, as necessary, to make it applicable to each of six other broadly defined regions in the continental United States: 1) the Central Region, 2) the Southeast Region, 3) the Northern Plains Region, 4) the Southern Plains Region, 5) the Northwest Region, and 6) the Southwest Region (Figure 1.1-1), by experts in those regions.

The boundaries for these regions were derived from ecoregion divisions described by Bailey (1976) and natural regions described by Hunt (1974). The authors distinguished among ecoregions using composite ecosystem information (Bailey 1976: land surface form, climate and vegetation; and Hunt 1974: primarily land-form structure, but also expressing characteristic climate, vegetation, soils, water, and other resources). The authors recognize the need for different resource management strategies within ecoregions. Cowardin et al. (1979) also applied the concept of regionalization to wetland management, citing benefits in planning, resource inventory, and interpretation.

The seven hydrogeomorphic regions were delineated along ecoregion boundaries. An exception is the Glaciated Northeast and Midwest Region where the boundary bisects several ecoregions. The approximate southern limit of the Wisconsin glaciation was used to define the southern boundary and the line where evapotranspiration equals precipitation was used to define the western boundary, which roughly corresponds to the transition from forest to prairie. Each hydrogeomorphic region also contains several ecoregions.

As this procedure is modified for other regions of the country, the treatment for each major region should be designed to accommodate most of the variability in each HGM class. However, the treatment for each class and region will likely need to be modified over time and perhaps subregionalized as exceptions are discovered and as reference data become available.

During September 1992, a second meeting of wetland researchers from throughout the country convened at Jamestown, North Dakota under the auspices of WES to discuss definitions for HGM categories, relevant functions and functional indicators (wetland features having predictive values for functional capacity). Up to 15 functions were identified as potentially significant for the six HGM classes. This list has been reduced to eight principal functions based on commonalities for the six HGM classes (see Section 1.3). The list of applicable functions and their specific definitions may vary among HGM classes in other regions of the country.

Functional indicators have been identified for each of the functions. In this procedure, these functional indicators are termed variables, and the range of conditions under which the variables occur are termed variable conditions.

A two-part sheet is used to inventory the wetland (Section 2.8); the first part characterizes the HGM class and includes data entry spaces for categories such as hydrology, soils and vegetation. The second part is used to record variables and variable conditions remotely, using aerial photos, maps and other existing sources, and in the field. The inventory sheet contains all the variables that are relevant for all of the functions. Information from the inventory sheets, when properly compiled and indexed, can contribute to a reference data set, or to functional profiles for the HGM classes.

There is one model for each function, each comprised principally of variables, variable conditions and relative weights for the variable conditions. Certain HGM classes may not serve certain functions or may provide a very limited level of function.

The rule based approach was used in weighting the variable conditions based upon the potential degree to which they influence function. The weights and ranges assigned

Describe the Region
(including HGM classes in the region)

↓

Develop a General Profile for Each HGM Class

↓

Develop a List of Functions

↓

Develop a Functional Profile for Each HGM Class

↓

List the Relevant and Appropriate Variables for Each Function

↓

Describe Each of the Variables

↓

Prepare Rationale for Model Development

↓

Develop an Inventory Sheet

↓

Develop a Model for Each Function

↓

Modify Procedure for Other Regions

↓

Central	Southeast	Northern Plains	Southern Plains	Northwest	Southwest	Glaciated Northeast/ Midwest

↓

Apply Procedure to Case Studies in Several Regions

↓

Fine Tune Procedure Based on Case Study Results

Figure 1.1-2. Process used to develop the functional assessment procedure for a given region.

1.1.2 Applications and Limitations of the Procedure

This procedure was designed for use by a two person team of experienced wetland scientists, one with a soils/hydrology background and the other competent in plant identification and ecology. The members of the team must be capable of reading a topographic map and must have sufficient experience to apply proper judgement in assigning variable conditions. Most of the data must be obtained in a field visit to the wetland, although some information can be obtained from topographic maps and aerial photos.

The functional indices generated by the models serve to identify the level of function provided by a given HGM wetland class based on the magnitude of the score derived by the model user relative to the range of possible scores for a given model. Comparisons with other wetlands in the same HGM class can be made based on the relationship between the functional index for the wetland being evaluated and functional assessment data from other wetlands. Impacts to functions can be assessed by reevaluating the wetland under the impact scenario based on changes to less favorable variable conditions. Mitigation goals can be defined by examining the combination of variable conditions that yields a high functional index; these variable conditions may serve as the design standards for a wetland restoration or creation.

Because of time and budget constraints, there was no opportunity to perform case studies on reference wetlands or to perform extensive reviews of the literature to provide a more substantive basis for the variable conditions and ranges used in the models. As discussed in the following section, the conditions and ranges are based on professional experience of the regional experts and data from several thousand wetlands assessed throughout the region.

As discussed above, this procedure can be used as it is presented to assess functional capacity in the glaciated northeast and midwest or the structure can be used as a template and modified for other regions and subregions using one of the approaches for establishing reference data discussed in Section 1.1.3.

1.1.3 Use of Reference Wetland Data in Developing the Procedure

To develop this procedure, reference data were used to establish wetland processes and functions, and to identify the variables and range of variable conditions which give rise to functional capacity. In the past, most wetland assessment procedures have been based upon a combination of wetland functions and societal values, established by statutes which were written by legislators, environmentalists and informed lay persons. These earlier procedures have been based on existing literature and basic concepts of engineering, hydrology and ecology rather than upon research directed toward developing a reference data base in order to establish functions,

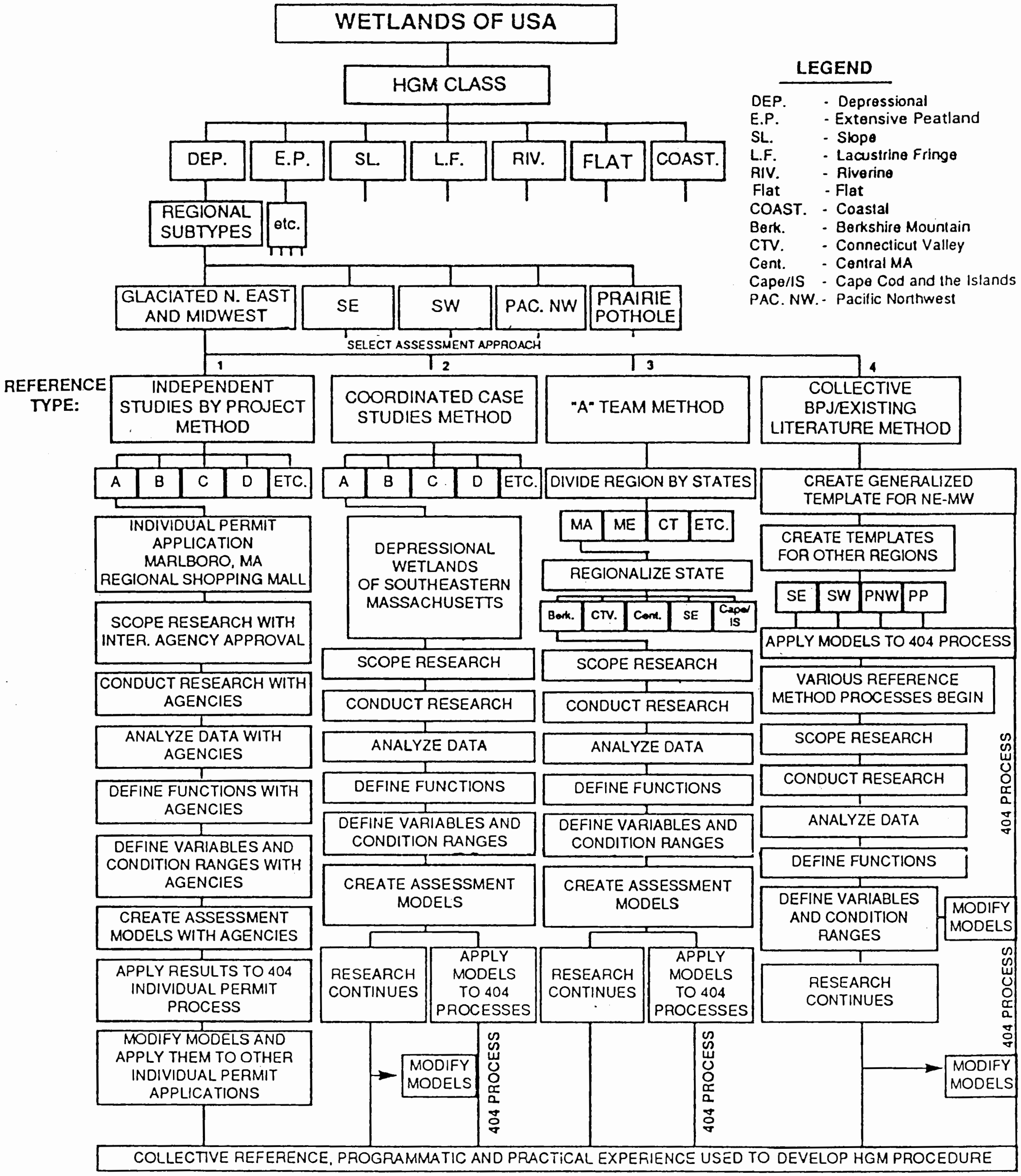

Figure 1.1.3a. Wetland Function Assessment Flow Chart.

existing literature and individual wetland assessments); this is the approach that was applied in developing this procedure for the glaciated northeast and midwest region. Figure 1.1.3a, Reference type 4, illustrates the flow path used for this approach. Figure 1.1.3b illustrates how this approach for obtaining reference data could be applied to other regions of the USA.

The reference for this approach was based first on established basic principles of engineering, hydrology and ecology. For example, the Storm and Flood Water Storage function and its assessment model variables are founded on basic flood storage modeling principles, established in the hydraulic engineering literature and basic textbooks. Specific studies of the flood storage functions of wetlands in the region (e.g., U.S. Army Corps of Engineers, 1971, flood storage function of wetlands in the Charles River and Blackstone River basins) supports this basic understanding of this function.

The authors have been working intensively in the wetlands of the region since 1975. They and the combined wetland staffs of ENSR (formerly IEP) and Normandeau Associates (a total of over 100 wetland scientists) have performed thousands of site specific and regional wetland assessments since 1975. These have included large, area-wide studies (IEP, 1975, Concord, MA, Normandeau and IEP, 1982, Crandon, Wisconsin; IEP, 1988 Rhode Island Wetland Data Base) for local and state government agencies, and thousands of site specific studies for private parties as part of local, state and federal permitting actions (Normandeau wetland functional assessment data base containing results from over 1,000 individual assessments). This work has been combined with the work of Dr. Frank Golet, University of Rhode Island, who reviewed an earlier version of this document and added his professional judgement, based upon the reference given to him by his numerous investigations (Golet, et. al., 1993 Community Profile of Red Maple Swamps of the Glaciated Northeast) and those of his students.

While some of this data is not published in classical reference data set format it is available for review and use. It has provided the authors the ability to establish practicable variables and ranges of variable conditions that can be assessed in the field, and has allowed the authors to assign weights to those ranges. As the procedure is used, it is expected that the glaciated Northeast/Midwest region may be subregionalized, and the procedure modified to meet recognized regional variations. As classical reference data is generated from HGM efforts in the glaciated Northeast/Midwest, the results can be integrated into the procedure and the models modified accordingly.

The fourth approach for obtaining reference data works best in regions of the country having a high degree of wetland protection at the local, state and federal levels. In portions of the glaciated Northeast and Midwest, such as New England, New York and Wisconsin, this kind of protection has existed since the late 1960s, which has resulted in the performance of a large number of studies for permitting actions, which, in turn, has generated a large quantity of reference data. In areas of the country having weaker wetland legislation, available data may be much less extensive.

WETLAND INVENTORY DATA

Project Number: MARSH HILL- EMERALD RIDGE **Date:** 7/20/05

Wetland Number: C – ML-3

Aerial Photo Numbers: ______

USGS Quadrangle: MOHEGAN LAKE

Field Investigators: STEVE MARINO, PWS

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage
Depressional	100%
Slope	____
Flat	____
Extensive Peatland	____
Lacustrine Fringe	____
Riverine	____

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	____
Deciduous	
Broad-leaved	30%
Needle-leaved	____
Scrub Shrub	
Evergreen	
Broad-leaved	____
Needle-leaved	____
Deciduous	
Broad-leaved	____
Needle-leaved	____
Emergent Wetland	
Persistent	10%
Non-persistent	____
Aquatic Bed	____
Total	____

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☑
- Sandy ☑
- Silty ☐
- Clayey ☐

GEOLOGY

Surficial:

Bedrock:

Comments: VERNAL POOL - LARGE AREAS NOT VEGETATED DUE TO SEASONAL INUNDATION

PLANT SPECIES

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
CAREX CRINITA						✓							✓
VACCINIUM CORYMBOSUM						✓					✓		
ACER RUBRUM						✓			✓				
LINDERA BENZOIN								✓				✓	
BETULA NIGRA								✓		✓			
CLETHRA ALNIFOLIA						✓					✓		
AMELANCHIER SPP							✓				✓		
ILEX VERTICILLATA							✓				✓		
SWAMP MILKWEED							✓						✓
FERN —						✓							✓

OW	Obligate Wetland	COM	Common
FW	Facultative Wetland	OCC	Occasional
F	Facultative	C	Canopy
FU	Facultative Upland	S	Sapling
OU	Obligate Upland	TS	Tall Shrub
DOM	Dominant	LS	Low Shrub
		H	Herb

PRE-EMPTIVE STATUS

- ____ Public ownership
- ____ Wildlife management area
- ____ Fisheries management area
- ____ Designated State or Federal protected wetland
- ____ Documented habitat for state or federal listed species
- ____ Regionally scarce wetland category
- ____ Historic/archaeologic area

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

Size:
- [x] Small (<10 acres)
- [ ] Medium (10-100 acres)
- [ ] Large (>100 acres)

Wetland Juxtaposition:
- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below
- [ ] Other Wetlands Nearby but not Connected
- [ ] Wetland Isolated

Fire Occurence and Frequency:
- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-caused; Predictable
- [ ] Human-caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

Regional Scarcity:
- [ ] Not Scarce (>5% of total wetland area of region)
- [x] Scarce (<5% of total wetland area of region)

Watershed Land Use:
- [ ] > 50% urbanized
- [ ] 25-50% urbanized
- [x] 0-25% urbanized

HYDROLOGIC VARIABLES

Surface Water Level Fluctuation of Wetland:
- [x] High Fluctuation
- [ ] Low Fluctuation
- [ ] Never Inundated

Frequency of Overbank Flooding:
- [ ] Return Interval > 5 yrs.
- [ ] Return Interval 2-5 yrs.
- [ ] Return Interval 1-2 yrs.
- [x] No Overbank Flooding

pH:
- [ ] Acid <5.5
- [x] Circumneutral 5.5-7.4
- [ ] Alkaline >7.4
- [ ] No Water

Surficial Geologic Deposit Under Wetland
- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

Wetland Land Use:
- [ ] High Intensity (ie. agriculture)
- [ ] Moderate Intensity (ie. forestry)
- [x] Low Intensity (ie. open space)

Wetland Water Regime:
- [ ] Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- [x] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:
- [ ] High Gradient >2%
- [x] Low Gradient <2%

Degree of Outlet Restriction:
- [x] Restricted Outflow
- [ ] Unrestricted Outflow
- [ ] No Outflow

Ratio of Wetland Area to Watershed Area:
- [x] High >10%
- [ ] Low <10%

Microrelief of Wetland Surface:
- [ ] Pronounced >45 cm
- [x] Well Developed 15-45 cm
- [ ] Poorly Developed <15 cm
- [ ] Absent

Inlet/Outlet Class:
- [ ] No Inlet/No Outlet
- [x] No Inlet/Intermittent Outlet
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/ Intermittent Outlet
- [ ] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- [x] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [ ] Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- [ ] Piez. Surface Above or at Substrate elev.
- [ ] Piez. Surface below Substrate elev.
- [x] Not Available

Evidence of Sedimentation:
- [x] No Evidence Observed
- [ ] Sediment Observed on Wetland Substrate
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:
- [x] No Seeps or Springs
- [ ] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- [ ]

Histosol:
- [ ] Fibric
- [ ] Hemic
- [ ] Sapric

Mineral Hydric Soil:
- [ ] Gravelly
- [x] Sandy
- [ ] Silty
- [ ] Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- [ ]

Dominant Wetland Type:
- [ ] Forested - Evergreen - Needle-leaved
- [ ] Forested - Deciduous - Broad-leaved
- [ ] Forested - Deciduous - Needle-leaved
- [ ] Scrub Shrub - Evergreen - Broad-leaved
- [ ] Scrub Shrub - Evergreen - Needle-leaved
- [ ] Scrub Shrub - Deciduous - Broad-leaved
- [ ] Scrub Shrub - Deciduous - Needle-leaved
- [ ] Emergent - Persistent
- [x] Emergent - Non-persistent
- [ ] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types
- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [ ] 2
- [x] 1

Evenness of Distribution
- [ ] Even Distribution
- [ ] Moderately Even Distribution
- [ ] Highly Uneven Distribution

Vegetation Density/Dominance:
- [ ] Sparse (0-20%)
- [x] Low Density (20-40%)
- [ ] Medium Density (40-60%)
- [ ] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetative Interspersion:
- [ ] High (small groupings, diverse and interspersed)
- [ ] Moderate (broken irregular rings)
- [x] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers
- [ ] 6 or > (actual #)
- [x] 5
- [ ] 4
- [ ] 3
- [ ] 2
- [ ] 1

% Cover
1. submergents:
2. floating:
3. moss-lichen:
4. short herb:
5. tall herb:
6. dwarf shrub:
7. short shrub:
8. tall shrub:
9. sapling:
10. tree:

Plant Species Diversity:
- [ ] Low 1-2 plots sampled
- [ ] Medium 3-4 plots sampled
- [x] High 5 or more plots sampled

Proportion of Animal Food Plants:
- [x] Low (5-25% cover)
- [ ] Medium (25-50% cover)
- [ ] High (>50% cover)

Cover Distribution:
- [ ] Continuous Cover
- [ ] Small Scattered Patches
- [x] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:
- [ ] Abrundant (>50 of wetland surface)
- [x] Moderately Abrundant (25-50% of surface)
- [ ] Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- [ ] 26-75% Scattered or Peripheral
- [ ] >75% Scattered or Peripheral
- [ ] <25% Scattered or Peripheral
- [x] 100% Cover or Open Water

Stream Sinuosity:
- [ ] Highly Convoluted (index 1.50 or >)
- [ ] Moderately Convoluted (index 1.25-1.50)
- [ ] Straight/Slightly Irreg. (index) 1.10-1.25

N/A

Presence of Islands:
- [ ] Several to Many
- [x] One or Few
- [ ] Absent

2.9.1 Modification of Ground Water Discharge

VARIABLES	CONDITIONS HGM TYPES:	D	S	R	F
		WEIGHTS			
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	18	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, intermittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, temporarily flooded, saturated	1	0	1	1

(continued)

2.9.1 Modification of Ground Water Discharge (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	WEIGHTS D	S	R	F
• Soil Type	• histosol		3	3	3	3
	• mineral hydric soil		1	1	1	1
		Total Score:	1			
		Model Range:	3-18	2-15	3-15	3-18
		Functional Capacity Index:	Total Score / 18	/ 15	/ 15	/ 18
		Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

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Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 Modification of Ground Water Recharge

VARIABLES	CONDITIONS	HGM TYPES:	WEIGHTS D	L	EP	R	F
Indicators of Disfunction							
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet		0				0
• Nested Piezometer Data	• discharge condition		0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface		0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs		0	0	0	0	0

(continued)

2.9.2 Modification of Ground Water Recharge (Continued)

VARIABLES	CONDITIONS	D	L	EP	R	F
	HGM TYPES:	WEIGHTS				
Direct Indicators of Function						
• Inlet/Outlet Class	• perennial inlet/no outlet	21				21
• Nested Piezometer Data	• recharge condition	21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	21				21
Primary Variables						
• Microrelief of Wetland Surface	• Poorly Developed	3	3	1	3	3
	• Absent	3	3	1	3	3
	• Well Developed	2	2	2	2	2
	• Pronounced	1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet	3	0	0	0	3
	• All Other Classes	0	0	0	0	0
• pH	• Acid	3	3	3	3	3
	• Circumneutral	2	2	2	2	2
	• Alkaline	1	1	1	1	1
	• No water present	0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till	3	1	1	1	3
	• Low Permeability Stratified Deposits	2	2	2	2	2
	• High Permeability Stratified Deposits	1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation	3	3	0	3	3
	• Low Fluctuation	2	2	0	2	2
	• Never Inundated	1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated	3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded	1	1	0	1	1
• Soil Type	• Gravelly or Sandy Mineral Hydric	3	3	0	3	3
	• Silty or Clayey Mineral Hydric	2	2	0	2	2
	• Sapric Histosol	1	1	0	1	1
	• Fibric or Hemic Histosol	0	0	3	0	0
	Total Score:	16				
	Model Range:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	Total Score / 21	/ 18	/ 12	/ 18	/ 21
	Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

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Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
• Dead Woody Material	• abundant		3	3	3	3	3	3
	• moderately abundant		2	2	2	2	2	2
	• sparse		1	1	1	1	1	1
	• absent		0	0	0	0	0	0
		Total Score:	21					
		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
		Functional Capacity Index:	Total Score / 27	— / 21	— / 21	— / 12	— / 24	— / 30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

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2.9.4 Modification of Stream Flow

(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	6
Low	1	x	High	3	=	3
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:

Model Range: 1-9

Functional Capacity Index: Total Score / 9

Index Range: 0.11-1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	evidence of sedimentation	18	15	12	12	12	18
Primary Variables							
• Wetland Land Use	• low intensity	3	3	3	3	3	3
	• moderate intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow	3	0	0	0	0	3
	• no outlet	2	0	0	0	0	2
	• unrestricted outflow	1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet	3	3	0	0	0	3
	• intermittent outlet	2	2	0	0	0	2
	• perennial outlet	1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland	3	3	3	3	3	3
	• scrub-shrub	2	2	2	2	2	2
	• emergent wetland	2	2	2	2	2	2
	• aquatic bed	1	0	0	0	0	0
	• no vegetation	0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover	3	3	3	3	3	3
	• growing in small scattered patches	2	2	2	2	2	2
	• one or more large patches	1	1	1	1	1	1
	• solitary scattered stems	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• histosol or clayey soil	3	3	3	3	3	3
	• silty soil	2	2	2	0	2	2
	• sandy or gravelly soil	1	1	1	0	1	1
	Total Score:	12					
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Functional Capacity Index:	Total Score / 18	/ 15	/ 12	/ 12	/ 12	/ 18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

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2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
Indicators of disfunction	no outlet		0	0		0		0
Direct Indicators of Function	none							
Primary Variables								
• Wetland Land Use	• moderate intensity		3	3	3	3	3	3
	• low intensity		2	2	2	2	2	2
	• high intensity		1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow		3	0	0	0	0	3
	• restricted outflow		1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet		3	3	0	0	0	3
	• intermittent outlet		1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated		3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded		1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high		3	3	3	3	3	3
	• medium		2	2	2	2	2	2
	• sparse/low		1	1	1	1	1	1
	• no vegetation		0	0	0	0	0	0
• Soil Type	• mineral hydric soil		3	3	3	3	3	3
	• histosol		1	1	1	1	1	1
		Total Score:	11					
		Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
		Functional Capacity Index:	Total Score / 18	— / 15	— / 12	— / 10	— / 12	— / 18
		Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

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2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
	• layers poorly distinguishable (<25% cover)	1
	• no vegetation	0

(continued)

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna (Continued)

VARIABLES	CONDITIONS	WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	3
	• >75% scattered or peripheral	2
	• <25% scattered or peripheral	1
	• 100% cover or open water	1
	• no vegetation	0
• Size	• large (>100 acres)	3
	• medium (10-100 acres)	2
	• small (<10 acres)	1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below	3
	• other wetlands within 400 m but not connected	1
	• wetland isolated	0

Slope Wetlands:

Model Range: 4-33

Functional Capacity Index = Total Score / 33

Index Range: 0.12-1.0

All Other HGM Types:

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Total Score: 26

Model Range: 4-36

Functional Capacity Index = Total Score / 36

Index Range 0.11-1.0

WETLAND INVENTORY DATA

Project Number: 'B' MARSH HI[illegible] ROAD **Date:** 7/20/05

Wetland Number: WETLAND 'B'

Aerial Photo Numbers: ______

USGS Quadrangle: [illegible] LAKE

Field Investigators: STEVE MAC[illegible], [illegible]

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage	
	______	Depressional
	[illegible]	Slope
	[illegible]	Flat
	______	Extensive Peatland
	______	Lacustrine Fringe
	______	Riverine

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	[illegible]
Deciduous	
Broad-leaved	[illegible]
Needle-leaved	______
Scrub Shrub	
Evergreen	
Broad-leaved	______
Needle-leaved	______
Deciduous	
Broad-leaved	______
Needle-leaved	______
Emergent Wetland	
Persistent	______
Non-persistent	______
Aquatic Bed	______
Total	______

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☑
- Silty ☐
- Clayey ☐

GEOLOGY

Surficial:

Bedrock:

Comments: ______

PLANT SPECIES

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
AMER[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CINNAMON [illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
POISON IV[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
MEA[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
HOR[illegible]	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

OW Obligate Wetland; FW Facultative Wetland; F Facultative; FU Facultative Upland; OU Obligate Upland; DOM Dominant; COM Common; OCC Occasional; C Canopy; S Sapling; TS Tall Shrub; LS Low Shrub; H Herb

PRE-EMPTIVE STATUS

- ______ Public ownership
- ______ Wildlife management area
- ______ Fisheries management area
- ______ Designated State or Federal protected wetland
- ______ Documented habitat for state or federal listed species
- ______ Regionally scarce wetland category
- ______ Historic/archaeologic area

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

Size:
- [x] Small (<10 acres)
- [ ] Medium (10-100 acres)
- [ ] Large (>100 acres)

Wetland Juxtaposition:
- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below
- [ ] Other Wetlands Nearby but not Connected
- [ ] Wetland Isolated

Fire Occurence and Frequency:
- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-caused; Predictable
- [ ] Human-caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

Regional Scarcity:
- [x] Not Scarce (>5% of total wetland area of region)
- [ ] Scarce (<5% of total wetland area of region)

Watershed Land Use:
- [ ] > 50% urbanized
- [ ] 25-50% urbanized
- [x] 0-25% urbanized

HYDROLOGIC VARIABLES

Surface Water Level Fluctuation of Wetland:
- [ ] High Fluctuation
- [ ] Low Fluctuation
- [x] Never Inundated

Frequency of Overbank Flooding:
- [ ] Return Interval > 5 yrs.
- [ ] Return Interval 2-5 yrs.
- [x] Return Interval 1-2 yrs.
- [ ] No Overbank Flooding

pH:
- [ ] Acid <5.5
- [x] Circumneutral 5.5-7.4
- [ ] Alkaline >7.4
- [ ] No Water

Surficial Geologic Deposit Under Wetland
- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

Wetland Land Use:
- [ ] High Intensity (ie. agriculture)
- [ ] Moderate Intensity (ie. forestry)
- [x] Low Intensity (ie. open space)

Wetland Water Regime:
- [ ] Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- [x] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:
- [ ] High Gradient >2%
- [x] Low Gradient <2%

Degree of Outlet Restriction:
- [ ] Restricted Outflow
- [x] Unrestricted Outflow
- [ ] No Outflow

Ratio of Wetland Area to Watershed Area:
- [x] High >10%
- [ ] Low <10%

Microrelief of Wetland Surface:
- [ ] Pronounced >45 cm
- [x] Well Developed 15-45 cm
- [ ] Poorly Developed <15 cm
- [ ] Absent

Inlet/Outlet Class:
- [ ] No Inlet/No Outlet
- [x] No Inlet/Intermittent Outlet
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/ Intermittent Outlet
- [ ] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- [ ] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [x] Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- [ ] Piez. Surface Above or at Substrate elev.
- [ ] Piez. Surface below Substrate elev.
- [x] Not Available

Evidence of Sedimentation:
- [x] No Evidence Observed
- [ ] Sediment Observed on Wetland Substrate
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:
- [ ] No Seeps or Springs
- [x] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- [ ]

Histosol:
- [ ] Fibric
- [ ] Hemic
- [ ] Sapric

Mineral Hydric Soil:
- [ ] Gravelly
- [x] Sandy
- [ ] Silty
- [ ] Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- [ ]

Dominant Wetland Type:
- [ ] Forested - Evergreen - Needle-leaved
- [x] Forested - Deciduous - Broad-leaved
- [ ] Forested - Deciduous - Needle-leaved
- [ ] Scrub Shrub - Evergreen - Broad-leaved
- [ ] Scrub Shrub - Evergreen - Needle-leaved
- [ ] Scrub Shrub - Deciduous - Broad-leaved
- [ ] Scrub Shrub - Deciduous - Needle-leaved
- [ ] Emergent - Persistent
- [ ] Emergent - Non-persistent
- [ ] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types
- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [ ] 2
- [x] 1

Evenness of Distribution
- [ ] Even Distribution
- [ ] Moderately Even Distribution
- [x] Highly Uneven Distribution

Vegetation Density/Dominance:
- [ ] Sparse (0-20%)
- [ ] Low Density (20-40%)
- [ ] Medium Density (40-60%)
- [x] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetative Interspersion:
- [ ] High (small groupings, diverse and interspersed)
- [ ] Moderate (broken irregular rings)
- [x] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers
- [ ] 6 or > (actual #)
- [ ] 5
- [x] 4
- [ ] 3
- [ ] 2
- [ ] 1

% Cover
1. submergents:
2. floating:
3. moss-lichen:
4. short herb:
5. tall herb:
6. dwarf shrub:
7. short shrub:
8. tall shrub:
9. sapling:
10. tree:

Plant Species Diversity:
- [ ] Low 1-2 plots sampled
- [ ] Medium 3-4 plots sampled
- [x] High 5 or more plots sampled

Proportion of Animal Food Plants:
- [ ] Low (5-25% cover)
- [x] Medium (25-50% cover)
- [ ] High (>50% cover)

Cover Distribution:
- [ ] Continuous Cover
- [x] Small Scattered Patches
- [ ] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:
- [ ] Abrundant (>50 of wetland surface)
- [x] Moderately Abrundant (25-50% of surface)
- [ ] Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- [ ] 26-75% Scattered or Peripheral
- [x] >75% Scattered or Peripheral
- [ ] <25% Scattered or Peripheral
- [ ] 100% Cover or Open Water

Stream Sinuosity:
- [x] Highly Convoluted (index 1.50 or >)
- [ ] Moderately Convoluted (index 1.25-1.50)
- [ ] Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- [ ] Several to Many
- [x] One or Few
- [ ] Absent

2.9.1 Modification of Ground Water Discharge

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	S	R	F
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezo-metric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	18	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, inter-mittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, tempo-rarily flooded, saturated	1	0	1	1

(continued)

2.9.1 Modification of Ground Water Discharge (Continued)

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	S	R	F
• Soil Type	• histosol	3	3	3	3
	• mineral hydric soil	1	1	1	1
	Total Score:		6		
	Model Range:	3-18	2-15	3-15	3-18
6/15	Functional Capacity Index:	Total Score / 18	— / 15	— / 15	— / 18
	Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 Modification of Ground Water Recharge

VARIABLES	CONDITIONS HGM TYPES:	WEIGHTS D	L	EP	R	F
Indicators of Disfunction						
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet	0				0
• Nested Piezometer Data	• discharge condition	0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface	0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs	0	0	0	0	0

(continued)

2.9.2 Modification of Ground Water Recharge (Continued)

VARIABLES	CONDITIONS	HGM TYPES: D	L	EP	R	F
		WEIGHTS				
Direct Indicators of Function						
• Inlet/Outlet Class	• perennial inlet/no outlet	21				21
• Nested Piezometer Data	• recharge condition	21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	21				21
Primary Variables						
• Microrelief of Wetland Surface	• Poorly Developed	3	3	1	3	3
	• Absent	3	3	1	3	3
	• Well Developed	2	2	2	2	2
	• Pronounced	1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet	3	0	0	0	3
	• All Other Classes	0	0	0	0	0
• pH	• Acid	3	3	3	3	3
	• Circumneutral	2	2	2	2	2
	• Alkaline	1	1	1	1	1
	• No water present	0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till	3	1	1	1	3
	• Low Permeability Stratified Deposits	2	2	2	2	2
	• High Permeability Stratified Deposits	1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation	3	3	0	3	3
	• Low Fluctuation	2	2	0	2	2
	• Never Inundated	1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated	3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded	1	1	0	1	1
		—	—	—	—	—
• Soil Type	• Gravelly or Sandy Mineral Hydric	3	3	0	3	3
	• Silty or Clayey Mineral Hydric	2	2	0	2	2
	• Sapric Histosol	1	1	0	1	1
	• Fibric or Hemic Histosol	0	0	3	0	0
	Total Score:					
	Model Range:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	Total Score / 21	18	12	18	21
	Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	D	S	L	EP	R	F
	HGM TYPES:	WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
• Dead Woody Material	• abundant		3	3	3	3	3	3
	• moderately abundant		2	2	2	2	2	2
	• sparse		1	1	1	1	1	1
	• absent		0	0	0	0	0	0
			—	—	—	—	—	—
		Total Score:		15				
		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
15/21		Functional Capacity Index:	Total Score / 27	— / 21	— / 21	— / 12	— / 24	— / 30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

2.9.4 Modification of Stream Flow

(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	6
Low	1	x	High	3	=	3
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:	
Model Range:	1-9
Functional Capacity Index:	Total Score / 9
Index Range:	0.11-1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES: WEIGHTS D	S	L	EP	R	F
Indicators of disfunction	none						
Direct Indicators of Function	evidence of sedimentation	18	15	12	12	12	18
Primary Variables							
• Wetland Land Use	• low intensity	3	3	3	3	3	3
	• moderate intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow	3	0	0	0	0	3
	• no outlet	2	0	0	0	0	2
	• unrestricted outflow	1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet	3	3	0	0	0	3
	• intermittent outlet	2	2	0	0	0	2
	• perennial outlet	1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland	3	3	3	3	3	3
	• scrub-shrub	2	2	2	2	2	2
	• emergent wetland	2	2	2	2	2	2
	• aquatic bed	1	0	0	0	0	0
	• no vegetation	0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover	3	3	3	3	3	3
	• growing in small scattered patches	2	2	2	2	2	2
	• one or more large patches	1	1	1	1	1	1
	• solitary scattered stems	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• histosol or clayey soil	3	3	3	3	3	3
	• silty soil	2	2	2	0	2	2
	• sandy or gravelly soil	1	1	1	0	1	1
	Total Score:		11				
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Functional Capacity Index:	Total Score / 18	/ 15	/ 12	/ 12	/ 12	/ 18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

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2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	no outlet	0	0		0		0
Direct Indicators of Function	none						
Primary Variables							
• Wetland Land Use	• moderate intensity	3	3	3	3	3	3
	• low intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow	3	0	0	0	0	3
	• restricted outflow	1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet	3	3	0	0	0	3
	• intermittent outlet	1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• medium	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• mineral hydric soil	3	3	3	3	3	3
	• histosol	1	1	1	1	1	1
	Total Score:		14				
	Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
	Functional Capacity Index:	Total Score / 18	_ / 15	_ / 12	_ / 10	_ / 12	_ / 18
	Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

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2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation

(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	0
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity • medium diversity • low diversity	5 3 1
•	Vegetation Density/Dominance	• high/very high • medium • sparse/low	5 3 1
•	Wetland Juxtaposition	• connected upstream and downstream • connected above or below • other wetlands nearby but not connected (400 m or closer) • isolated	5 3 1 0
		Total Score:	11
		Model Range:	2-15
		Functional Capacity Index:	= Total Score / 15
		Index Range:	0.13-1.0

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2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
	• layers poorly distinguishable (<25% cover)	1
	• no vegetation	0

(continued)

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna (Continued)

VARIABLES	CONDITIONS	WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	3
	• >75% scattered or peripheral	2
	• <25% scattered or peripheral	1
	• 100% cover or open water	1
	• no vegetation	0
• Size	• large (>100 acres)	3
	• medium (10-100 acres)	2
	• small (<10 acres)	1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below	3
	• other wetlands within 400 m but not connected	1
	• wetland isolated	0

Slope Wetlands:		All Other HGM Types:	Total Score:	22
Model Range:	4-33	22/36	Model Range:	4-36
Functional Capacity Index =	Total Score / 33		Functional Capacity Index =	Total Score / 36
Index Range:	0.12-1.0		Index Range	0.11-1.0

WETLAND INVENTORY DATA

Project Number: MARSH HILL ROAD **Date:** 7/20/05

Wetland Number: WETLAND 'A'

Aerial Photo Numbers: ______

USGS Quadrangle: MOHEGAN LAKE

Field Investigators: STEVE MARINO, FWS

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage	
	100%	Depressional
	____	Slope
	____	Flat
	____	Extensive Peatland
	____	Lacustrine Fringe
	____	Riverine

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	____
Deciduous	
Broad-leaved	100%
Needle-leaved	____
Scrub Shrub	
Evergreen	
Broad-leaved	____
Needle-leaved	____
Deciduous	
Broad-leaved	____
Needle-leaved	____
Emergent Wetland	
Persistent	____
Non-persistent	____
Aquatic Bed	____
Total	____

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☑
- Silty ☐
- Clayey ☐

GEOLOGY

Surficial:

Bedrock:

Comments: ______

PLANT SPECIES

	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
FERN -	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
ILEX VERTICIL	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
SMILAX	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
PIN OAK	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
RED MAPLE	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
AMER ELM	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CAREX CRINITA	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
SENSITIVE FERN	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CAREX STRICTA	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
SYMPLOCARPUS	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
LINDERA BENZ...	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

OW	Obligate Wetland	COM	Common
FW	Facultative Wetland	OCC	Occasional
F	Facultative	C	Canopy
FU	Facultative Upland	S	Sapling
OU	Obligate Upland	TS	Tall Shrub
DOM	Dominant	LS	Low Shrub
		H	Herb

PRE-EMPTIVE STATUS

- ____ Public ownership
- ____ Wildlife management area
- ____ Fisheries management area
- ____ Designated State or Federal protected wetland
- ____ Documented habitat for state or federal listed species
- ____ Regionally scarce wetland category
- ____ Historic/archaeologic area

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

Size:
- [x] Small (<10 acres)
- [ ] Medium (10-100 acres)
- [ ] Large (>100 acres)

Wetland Juxtaposition:
- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [ ] Only Connected Below
- [ ] Other Wetlands Nearby but not Connected
- [x] Wetland Isolated

Fire Occurence and Frequency:
- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-caused; Predictable
- [ ] Human-caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

Regional Scarcity:
- [ ] Not Scarce (>5% of total wetland area of region)
- [x] Scarce (<5% of total wetland area of region)

Watershed Land Use:
- [ ] > 50% urbanized
- [ ] 25-50% urbanized
- [x] 0-25% urbanized

HYDROLOGIC VARIABLES

Surface Water Level Fluctuation of Wetland:
- [x] High Fluctuation
- [ ] Low Fluctuation
- [ ] Never Inundated

Frequency of Overbank Flooding:
- [ ] Return Interval > 5 yrs.
- [ ] Return Interval 2-5 yrs.
- [ ] Return Interval 1-2 yrs.
- [x] No Overbank Flooding

pH:
- [ ] Acid <5.5
- [x] Circumneutral 5.5-7.4
- [ ] Alkaline >7.4
- [ ] No Water

Surficial Geologic Deposit Under Wetland
- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

Wetland Land Use:
- [ ] High Intensity (ie. agriculture)
- [ ] Moderate Intensity (ie. forestry)
- [x] Low Intensity (ie. open space)

Wetland Water Regime:
- [ ] Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- [x] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:
- [ ] High Gradient >2%
- [x] Low Gradient <2%

Degree of Outlet Restriction:
- [ ] Restricted Outflow
- [ ] Unrestricted Outflow
- [x] No Outflow

Ratio of Wetland Area to Watershed Area:
- [x] High >10%
- [ ] Low <10%

Microrelief of Wetland Surface:
- [ ] Pronounced >45 cm
- [x] Well Developed 15-45 cm
- [ ] Poorly Developed <15 cm
- [ ] Absent

Inlet/Outlet Class:
- [x] No Inlet/No Outlet
- [ ] No Inlet/Intermittent Outlet
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/ Intermittent Outlet
- [ ] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- [x] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [ ] Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- [ ] Piez. Surface Above or at Substrate elev.
- [ ] Piez. Surface below Substrate elev.
- [x] Not Available

Evidence of Sedimentation:
- [x] No Evidence Observed
- [ ] Sediment Observed on Wetland Substrate
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:
- [x] No Seeps or Springs
- [ ] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- [ ]

Histosol:
- [ ] Fibric
- [ ] Hemic
- [ ] Sapric

Mineral Hydric Soil:
- [ ] Gravelly
- [x] Sandy
- [ ] Silty
- [ ] Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- [ ]

Dominant Wetland Type:
- [ ] Forested - Evergreen - Needle-leaved
- [x] Forested - Deciduous - Broad-leaved
- [ ] Forested - Deciduous - Needle-leaved
- [ ] Scrub Shrub - Evergreen - Broad-leaved
- [ ] Scrub Shrub - Evergreen - Needle-leaved
- [ ] Scrub Shrub - Deciduous - Broad-leaved
- [ ] Scrub Shrub - Deciduous - Needle-leaved
- [ ] Emergent - Persistent
- [ ] Emergent - Non-persistent
- [ ] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types
- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [ ] 2
- [x] 1

Evenness of Distribution
- [ ] Even Distribution
- [ ] Moderately Even Distribution
- [ ] Highly Uneven Distribution

Vegetation Density/Dominance:
- [ ] Sparse (0-20%)
- [ ] Low Density (20-40%)
- [ ] Medium Density (40-60%)
- [x] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetative Interspersion:
- [ ] High (small groupings, diverse and interspersed)
- [ ] Moderate (broken irregular rings)
- [x] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers
- [ ] 6 or > (actual #)
- [x] 5
- [ ] 4
- [ ] 3
- [ ] 2
- [ ] 1

% Cover
1. submergents:
2. floating:
3. moss-lichen:
4. short herb:
5. tall herb:
6. dwarf shrub:
7. short shrub:
8. tall shrub:
9. sapling:
10. tree:

Plant Species Diversity:
- [ ] Low 1-2 plots sampled
- [x] Medium 3-4 plots sampled
- [ ] High 5 or more plots sampled

Proportion of Animal Food Plants:
- [x] Low (5-25% cover)
- [ ] Medium (25-50% cover)
- [ ] High (>50% cover)

Cover Distribution:
- [x] Continuous Cover
- [ ] Small Scattered Patches
- [ ] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:
- [ ] Abrundant (>50 of wetland surface)
- [x] Moderately Abrundant (25-50% of surface)
- [ ] Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- [ ] 26-75% Scattered or Peripheral
- [ ] >75% Scattered or Peripheral
- [ ] <25% Scattered or Peripheral
- [x] 100% Cover or Open Water

Stream Sinuosity:
- [ ] Highly Convoluted (index 1.50 or >)
- [ ] Moderately Convoluted (index 1.25-1.50)
- [ ] Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- [ ] Several to Many
- [x] One or Few
- [ ] Absent

2.9.1 Modification of Ground Water Discharge

VARIABLES	CONDITIONS HGM TYPES:	D	S	R	F
		WEIGHTS			
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezo-metric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	18	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, inter-mittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, tempo-rarily flooded, saturated	1	0	1	1

(continued)

2.9.1 Modification of Ground Water Discharge (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	WEIGHTS D	S	R	F
• Soil Type	• histosol		3	3	3	3
	• mineral hydric soil		1	1	1	1
			—	—	—	—
		Total Score:				
		Model Range:	3-18	2-15	3-15	3-18
		Functional Capacity Index:	Total Score / 18	— / 15	— / 15	— / 18
		Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

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Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 Modification of Ground Water Recharge

VARIABLES	CONDITIONS	HGM TYPES:	WEIGHTS D	L	EP	R	F
Indicators of Disfunction							
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet		0				0
• Nested Piezometer Data	• discharge condition		0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface		0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs		0	0	0	0	0

(continued)

2.9.2 Modification of Ground Water Recharge (Continued)

VARIABLES	CONDITIONS / HGM TYPES:	D	L	EP	R	F
		WEIGHTS				
Direct Indicators of Function						
• Inlet/Outlet Class	• perennial inlet/no outlet	21				21
• Nested Piezometer Data	• recharge condition	21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	21				21
Primary Variables						
• Microrelief of Wetland Surface	• Poorly Developed	3	3	1	3	3
	• Absent	3	3	1	3	3
	• Well Developed	2	2	2	2	2
	• Pronounced	1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet	3	0	0	0	3
	• All Other Classes	0	0	0	0	0
• pH	• Acid	3	3	3	3	3
	• Circumneutral	2	2	2	2	2
	• Alkaline	1	1	1	1	1
	• No water present	0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till	3	1	1	1	3
	• Low Permeability Stratified Deposits	2	2	2	2	2
	• High Permeability Stratified Deposits	1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation	3	3	0	3	3
	• Low Fluctuation	2	2	0	2	2
	• Never Inundated	1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated	3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded	1	1	0	1	1
• Soil Type	• Gravelly or Sandy Mineral Hydric	3	3	0	3	3
	• Silty or Clayey Mineral Hydric	2	2	0	2	2
	• Sapric Histosol	1	1	0	1	1
	• Fibric or Hemic Histosol	0	0	3	0	0
	Total Score:	16				
	Model Range:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	Total Score / 21	/ 18	/ 12	/ 18	/ 21
	Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

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Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
• Dead Woody Material	• abundant		3	3	3	3	3	3
	• moderately abundant		2	2	2	2	2	2
	• sparse		1	1	1	1	1	1
	• absent		0	0	0	0	0	0
		Total Score:	23					
23/27		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
		Functional Capacity Index:	Total Score / 27	21	21	12	24	30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

2.9.4 Modification of Stream Flow

(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	6
Low	1	x	High	3	=	3
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:

Model Range: 1-9

Functional Capacity Index: Total Score / 9

Index Range: 0.11-1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES: WEIGHTS D	S	L	EP	R	F
Indicators of disfunction	none						
Direct Indicators of Function	evidence of sedimentation	18	15	12	12	12	18
Primary Variables							
• Wetland Land Use	• low intensity	3	3	3	3	3	3
	• moderate intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow	3	0	0	0	0	3
	• no outlet	2	0	0	0	0	2
	• unrestricted outflow	1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet	3	3	0	0	0	3
	• intermittent outlet	2	2	0	0	0	2
	• perennial outlet	1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland	3	3	3	3	3	3
	• scrub-shrub	2	2	2	2	2	2
	• emergent wetland	2	2	2	2	2	2
	• aquatic bed	1	0	0	0	0	0
	• no vegetation	0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover	3	3	3	3	3	3
	• growing in small scattered patches	2	2	2	2	2	2
	• one or more large patches	1	1	1	1	1	1
	• solitary scattered stems	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• histosol or clayey soil	3	3	3	3	3	3
	• silty soil	2	2	2	0	2	2
	• sandy or gravelly soil	1	1	1	0	1	1
	Total Score:	15					
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Functional Capacity Index:	Total Score / 18	/ 15	/ 12	/ 12	/ 12	/ 18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

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2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
Indicators of disfunction	no outlet		0	0		0		0
Direct Indicators of Function	none							
Primary Variables								
• Wetland Land Use	• moderate intensity		3	3	3	3	3	3
	• low intensity		2	2	2	2	2	2
	• high intensity		1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow		3	0	0	0	0	3
	• restricted outflow		1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet		3	3	0	0	0	3
	• intermittent outlet		1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated		3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded		1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high		3	3	3	3	3	3
	• medium		2	2	2	2	2	2
	• sparse/low		1	1	1	1	1	1
	• no vegetation		0	0	0	0	0	0
• Soil Type	• mineral hydric soil		3	3	3	3	3	3
	• histosol		1	1	1	1	1	1
		Total Score:	13					
		Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
		Functional Capacity Index:	Total Score / 18	— / 15	— / 12	— / 10	— / 12	— / 18
		Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

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2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation
(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	0
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity	5
		• medium diversity	3
		• low diversity	1
•	Vegetation Density/Dominance	• high/very high	5
		• medium	3
		• sparse/low	1
•	Wetland Juxtaposition	• connected upstream and downstream	5
		• connected above or below	3
		• other wetlands nearby but not connected (400 m or closer)	1
		• isolated	0
		Total Score:	9 ~~11~~
		Model Range:	2-15
		Functional Capacity Index:	= Total Score / 15
		Index Range:	0.13-1.0

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2.9.8 Contribution to Abundance and Diversity of Wetland Fauna
(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
		1
	• layers poorly distinguishable (<25% cover)	0
	• no vegetation	0

(continued)

2.9.8 Contribution to Abundance and Diversity of Wetland Fauna (Continued)

VARIABLES	CONDITIONS	WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	3
	• >75% scattered or peripheral	2
	• <25% scattered or peripheral	1
	• 100% cover or open water	1
	• no vegetation	0
• Size	• large (>100 acres)	3
	• medium (10-100 acres)	2
	• small (<10 acres)	1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below	3
	• other wetlands within 400 m but not connected	1
	• wetland isolated	0

Slope Wetlands:		All Other HGM Types:	
		Total Score:	22
Model Range:	4-33	Model Range:	4-36
Functional Capacity Index =	Total Score / 33	Functional Capacity Index =	Total Score / 36
Index Range:	0.12-1.0	Index Range	0.11-1.0

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WETLAND INVENTORY DATA

Project Number: MARSH [illegible] **Date:** 7/20/05

Wetland Number: 'D' ML-2

Aerial Photo Numbers:

USGS Quadrangle: MOHEGAN [illegible]

Field Investigators: STEVE MALLOD FWS

PART 1 - CHARACTERIZATION of WETLAND

SURFACE WATER FLOW VECTORS

Condition	Percent/Acreage	
	100%	Depressional
		Slope
		Flat
		Extensive Peatland
		Lacustrine Fringe
		Riverine

PLANT SPECIES

Species	OW	FW	F	FU	OU	DOM	COM	OCC	C	S	TS	LS	H
F[illegible]						✓							
ILEX VERT.							✓						
RED MAPLE						✓							
AM. ELM							✓						
CAREX [illegible]							✓						
[illegible]								✓					
[illegible]								✓					
CAREX STRICTA								✓					
SYMPLOCARPUS								✓					
[illegible]								✓					
ROYAL FERN								✓					

OW	Obligate Wetland	COM	Common
FW	Facultative Wetland	OCC	Occasional
F	Facultative	C	Canopy
FU	Facultative Upland	S	Sapling
OU	Obligate Upland	TS	Tall Shrub
DOM	Dominant	LS	Low Shrub
		H	Herb

VEGETATION TYPES

Type	Percent/Acreage
Forested Wetland	
Evergreen	
Needle-leaved	
Deciduous	
Broad-leaved	50%
Needle-leaved	
Scrub Shrub	
Evergreen	
Broad-leaved	
Needle-leaved	
Deciduous	
Broad-leaved	
Needle-leaved	
Emergent Wetland	
Persistent	✓ 50%
Non-persistent	
Aquatic Bed	
Total	

SOIL TYPES

Histosol
- Fibric ☐
- Hemic ☐
- Sapric ☐

Mineral Hydric Soil
- Gravelly ☐
- Sandy ☑
- Silty ☐
- Clayey ☐

GEOLOGY

Surficial:

Bedrock:

Comments:

PRE-EMPTIVE STATUS

____ Public ownership

____ Wildlife management area

____ Fisheries management area

____ Designated State or Federal protected wetland

____ Documented habitat for state or federal listed species

____ Regionally scarce wetland category

____ Historic/archaeologic area

WETLAND INVENTORY DATA (continued)

PART 2 - CHARACTERIZATION of MODEL VARIABLES

LANDSCAPE VARIABLES

Size:
- [x] Small (<10 acres)
- [ ] Medium (10-100 acres)
- [ ] Large (>100 acres)

Wetland Juxtaposition:
- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below
- [ ] Other Wetlands Nearby but not Connected
- [ ] Wetland Isolated

Fire Occurence and Frequency:
- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-caused; Predictable
- [ ] Human-caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

Regional Scarcity:
- [ ] Not Scarce (>5% of total wetland area of region)
- [x] Scarce (<5% of total wetland area of region)

Watershed Land Use:
- [ ] > 50% urbanized
- [ ] 25-50% urbanized
- [x] 0-25% urbanized

HYDROLOGIC VARIABLES

Surface Water Level Fluctuation of Wetland:
- [x] High Fluctuation
- [ ] Low Fluctuation
- [ ] Never Inundated

Frequency of Overbank Flooding:
- [ ] Return Interval > 5 yrs.
- [ ] Return Interval 2-5 yrs.
- [ ] Return Interval 1-2 yrs.
- [x] No Overbank Flooding

pH:
- [ ] Acid <5.5
- [x] Circumneutral 5.5-7.4
- [ ] Alkaline >7.4
- [ ] No Water

Surficial Geologic Deposit Under Wetland
- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

Wetland Land Use:
- [ ] High Intensity (ie. agriculture)
- [ ] Moderate Intensity (ie. forestry)
- [x] Low Intensity (ie. open space)

Wetland Water Regime:
- [ ] Wet: Perm Flooded, Intermittently Exposed, Semiperm. Flooded
- [x] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:
- [ ] High Gradient >2%
- [x] Low Gradient <2%

Degree of Outlet Restriction:
- [x] Restricted Outflow
- [ ] Unrestricted Outflow
- [ ] No Outflow

Ratio of Wetland Area to Watershed Area:
- [x] High >10%
- [ ] Low <10%

Microrelief of Wetland Surface:
- [ ] Pronounced >45 cm
- [x] Well Developed 15-45 cm
- [ ] Poorly Developed <15 cm
- [ ] Absent

Inlet/Outlet Class:
- [ ] No Inlet/No Outlet
- [x] No Inlet/Intermittent Outlet
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/ Intermittent Outlet
- [ ] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:
- [x] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [ ] Not Available

Relationship of Wetlands' Substrate Elevation to Regional Piezometric Surface:
- [ ] Piez. Surface Above or at Substrate elev.
- [ ] Piez. Surface below Substrate elev.
- [x] Not Available

Evidence of Sedimentation:
- [x] No Evidence Observed
- [ ] Sediment Observed on Wetland Substrate
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:
- [x] No Seeps or Springs
- [ ] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:
- [ ]

Histosol:
- [ ] Fibric
- [ ] Hemic
- [ ] Sapric

Mineral Hydric Soil:
- [ ] Gravelly
- [x] Sandy
- [ ] Silty
- [ ] Clayey

VEGETATION VARIABLES

Vegetation Lacking:
- [ ]

Dominant Wetland Type:
- [ ] Forested - Evergreen - Needle-leaved
- [x] Forested - Deciduous - Broad-leaved
- [ ] Forested - Deciduous - Needle-leaved
- [ ] Scrub Shrub - Evergreen - Broad-leaved
- [ ] Scrub Shrub - Evergreen - Needle-leaved
- [ ] Scrub Shrub - Deciduous - Broad-leaved
- [ ] Scrub Shrub - Deciduous - Needle-leaved
- [ ] Emergent - Persistent
- [ ] Emergent - Non-persistent
- [ ] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types:
- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [x] 2
- [ ] 1

Evenness of Distribution:
- [ ] Even Distribution
- [x] Moderately Even Distribution
- [ ] Highly Uneven Distribution

Vegetation Density/Dominance:
- [ ] Sparse (0-20%)
- [ ] Low Density (20-40%)
- [x] Medium Density (40-60%)
- [ ] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetative Interspersion:
- [ ] High (small groupings, diverse and interspersed)
- [ ] Moderate (broken irregular rings)
- [x] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers:
- [ ] 6 or > (actual #)
- [x] 5
- [ ] 4
- [ ] 3
- [ ] 2
- [ ] 1

% Cover
1. submergents:
2. floating:
3. moss-lichen:
4. short herb:
5. tall herb:
6. dwarf shrub:
7. short shrub:
8. tall shrub:
9. sapling:
10. tree:

Plant Species Diversity:
- [ ] Low 1-2 plots sampled
- [x] Medium 3-4 plots sampled
- [ ] High 5 or more plots sampled

Proportion of Animal Food Plants:
- [x] Low (5-25% cover)
- [ ] Medium (25-50% cover)
- [ ] High (>50% cover)

Cover Distribution:
- [ ] Continuous Cover
- [ ] Small Scattered Patches
- [x] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:
- [ ] Abrundant (>50 of wetland surface)
- [x] Moderately Abrundant (25-50% of surface)
- [ ] Low Abrundance (0-25% of surface)

Interspersion of Cover and Open Water:
- [ ] 26-75% Scattered or Peripheral
- [ ] >75% Scattered or Peripheral
- [ ] <25% Scattered or Peripheral
- [x] 100% Cover or Open Water

Stream Sinuosity:
- [ ] Highly Convoluted (index 1.50 or >)
- [ ] Moderately Convoluted (index 1.25-1.50)
- [ ] Straight/Slightly Irreg. (index) 1.10-1.25

Presence of Islands:
- [ ] Several to Many
- [ ] One or Few
- [x] Absent

2.9.1 Modification of Ground Water Discharge

VARIABLES	CONDITIONS HGM TYPES:	D	S	R	F
		WEIGHTS			
Indicators of Disfunction					
• Inlet/Outlet Class	• perennial inlet/no outlet	0	0	0	0
• Nested Piezometer Data	• recharge condition	0	0	0	0
• Relationship to Regional Piezo-metric Surface	• wetland substrate elevation above piezometric surface	0	0	0	0
Direct Indicators of Function					
• Presence of Springs and Seeps	• evidence of perennial seeps or springs	18	15	15	18
• Nested Piezometer Data	• discharge condition	18	15	15	18
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface	18	15	15	18
• Inlet/Outlet Class	• no inlet/perennial outlet	18	15	15	18
Primary Variables					
• Microrelief of Wetland Surface	• pronounced	3	3	3	3
	• well developed	2	2	2	2
	• poorly developed	1	1	1	1
	• absent	0	0	0	0
• Inlet/Outlet Class	• perennial inlet/perennial outlet	3	3	0	3
	• intermittent inlet/perennial outlet	2	2	0	2
	• all other classes	0	0	0	0
• pH	• alkaline	3	3	3	3
	• circumneutral	2	2	2	2
	• acid	0	0	0	0
	• no water present	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• high permeability stratified deposits	3	3	3	3
	• low permeability stratified deposits	2	2	2	2
	• glacial till	1	1	1	1
• Wetland Water Regime	• wet; permanently flooded, intermittently exposed, semipermanently flooded	3	0	3	3
	• drier; seasonally flooded, temporarily flooded, saturated	1	0	1	1

(continued)

2.9.1 Modification of Ground Water Discharge (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	R	F
			WEIGHTS			
• Soil Type	• histosol		3	3	3	3
	• mineral hydric soil		1	1	1	1
			—	—	—	—
		Total Score:				
		Model Range:	3-18	2-15	3-15	3-18
		Functional Capacity Index:	Total Score / 18	— / 15	— / 15	— / 18
		Index Range:	0.19-1.0	0.16-1.0	0.22-1.0	0.19-1.0

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Note: This model can be applied to both year long and seasonal discharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a discharge mode for roughly half the year.

2.9.2 Modification of Ground Water Recharge

VARIABLES	CONDITIONS	HGM TYPES:	D	L	EP	R	F
			WEIGHTS				
Indicators of Disfunction							
• Inlet/Outlet Class	• no inlet/perennial outlet; intermittent inlet/perennial outlet		0				0
• Nested Piezometer Data	• discharge condition		0	0	0	0	0
• Relationship to Regional Piezometric Surface	• wetland substrate elevation above or at piezometric surface		0	0	0	0	0
• Presence of Seeps and Springs	• presence of seeps or springs		0	0	0	0	0

(continued)

			WEIGHTS				
VARIABLES	**CONDITIONS**	**HGM TYPES:**	**D**	**L**	**EP**	**R**	**F**
Direct Indicators of Function							
• Inlet/Outlet Class	• perennial inlet/no outlet		21				21
• Nested Piezometer Data	• recharge condition		21				21
• Relationship to Regional Peizometeric Surface	• wetland substrate elevation below piezometric surface		21				21
Primary Variables							
• Microrelief of Wetland Surface	• Poorly Developed		3	3	1	3	3
	• Absent		3	3	1	3	3
	• Well Developed		2	2	2	2	2
	• Pronounced		1	1	3	1	1
• Inlet/Outlet Class	• Perennial Inlet/Intermittent Outlet		3	0	0	0	3
	• All Other Classes		0	0	0	0	0
• pH	• Acid		3	3	3	3	3
	• Circumneutral		2	2	2	2	2
	• Alkaline		1	1	1	1	1
	• No water present		0	0	0	0	0
• Surficial Geologic Deposit Under Wetland	• Glacial Till		3	1	1	1	3
	• Low Permeability Stratified Deposits		2	2	2	2	2
	• High Permeability Stratified Deposits		1	3	3	3	1
• Surface Water Level Fluctuation of the Wetland	• High Fluctuation		3	3	0	3	3
	• Low Fluctuation		2	2	0	2	2
	• Never Inundated		1	1	0	1	1
• Wetland Water Regime	• Drier: Seasonally Flooded, Temporarily Flooded, Saturated		3	3	0	3	3
	• Wet: Permanently Flooded, Intermittently Exposed, Semipermanently Flooded		1	1	0	1	1
• Soil Type	• Gravelly or Sandy Mineral Hydric		3	3	0	3	3
	• Silty or Clayey Mineral Hydric		2	2	0	2	2
	• Sapric Histosol		1	1	0	1	1
	• Fibric or Hemic Histosol		0	0	3	0	0
16/21		Total Score:	16				
		Model Range:	4-21	4-18	2-12	4-18	4-21
		Functional Capacity Index:	Total Score / 21	18	12	18	21
		Index Range:	0.19-1.0	0.22-1.0	0.16-1.0	0.22-1.0	0.19-1.0

Note: This model should be applied to both year long and seasonal recharge wetlands.

If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half the year.

2.9.3 Storm and Flood-Water Storage

VARIABLES	CONDITIONS	HGM TYPES: D	S	L	EP	R	F
		WEIGHTS					
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables							
• Inlet/Outlet Class	• perennial inlet/intermittent outlet	3	3	0	0	0	3
	• intermittent inlet/intermittent outlet	2	2	0	0	0	2
	• no inlet/intermittent outlet	1	1	0	0	0	1
	• non inlet/perennial outlet	1	1	0	0	0	1
	• intermittent inlet/perennial outlet	1	1	0	0	0	1
	• perennial inlet/perennial outlet	1	1	0	0	0	1
• Degree of Outlet Restriction	• restricted	3	0	0	0	0	3
	• unrestricted	0	0	0	0	0	0
• Basin Topographic Gradient	• low gradient	3	3	0	3	3	3
	• high gradient	1	1	0	0	1	1
• Wetland Water Regime	• Drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	• Wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
• Surface Water Level Fluctuation of the Wetland	• high fluctuation	3	0	3	0	3	3
	• low fluctuation	2	0	2	0	2	2
	• never inundated	0	0	0	0	0	0
• Ratio of Wetland Area to Watershed Area	• large	3	3	3	0	3	3
	• small	1	1	1	0	1	1
• Microrelief of Wetland Surface	• pronounced	3	3	3	3	3	3
	• well developed	2	2	2	2	2	2
	• poorly developed	1	1	1	1	1	1
	• absent	0	0	0	0	0	0
• Frequency of Overbank Flooding	• overbank flooding absent	0	0	0	0	0	0
	• return interval of >5 yrs	0	0	1	0	1	1
	• return interval of 2-5 yrs	0	0	2	0	2	2
	• return interval of 1-2 yrs	0	0	3	0	3	3
• Vegetation Density/Dominance	• high/very high	3	3	3	3	3	3
	• moderate	2	2	2	2	2	2
	• sparse/low	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0

(continued)

2.9.3 Storm and Flood-Water Storage (Continued)

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
			WEIGHTS					
• Dead Woody Material	• abundant		3	3	3	3	3	3
	• moderately abundant		2	2	2	2	2	2
	• sparse		1	1	1	1	1	1
	• absent		0	0	0	0	0	0
		Total Score:	22					
		Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
		Functional Capacity Index:	Total Score / 27	/ 21	/ 21	/ 12	/ 24	/ 30
		Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

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2.9.4 Modification of Stream Flow
(This model is identical for all HGM types)

VARIABLES	CONDITIONS	WEIGHTS
Indicators of Disfunction	no outlet	0
Direct Indicators of Function	none	

Primary Variables

Storm and Flood Water Storage Function Model Score			Modification of Groundwater Discharge Function Model Score			
High*	3	x	High	3	=	9
Mod	2	x	High	3	=	6
Low	1	x	High	3	=	3
High	3	x	Mod	2	=	6
Mod	2	x	Mod	2	=	4
Low	1	x	Mod	2	=	2
High	3	x	Low	1	=	3
Mod	2	x	Low	1	=	2
Low	1	x	Low	1	=	1

Total Score:	
Model Range:	1-9
Functional Capacity Index:	Total Score / 9
Index Range:	0.11-1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

2.9.5 Modification of Water Quality

VARIABLES	CONDITIONS	HGM TYPES: WEIGHTS D	S	L	EP	R	F
Indicators of disfunction	none						
Direct Indicators of Function	evidence of sedimentation	18	15	12	12	12	18
Primary Variables							
• Wetland Land Use	• low intensity	3	3	3	3	3	3
	• moderate intensity	2	2	2	2	2	2
	• high intensity	1	1	1	1	1	1
• Degree of Outlet Restriction	• restricted outflow	3	0	0	0	0	3
	• no outlet	2	0	0	0	0	2
	• unrestricted outflow	1	0	0	0	0	1
• Inlet/Outlet Type	• no outlet	3	3	0	0	0	3
	• intermittent outlet	2	2	0	0	0	2
	• perennial outlet	1	1	0	0	0	1
• Dominant Wetland Type	• forested wetland	3	3	3	3	3	3
	• scrub-shrub	2	2	2	2	2	2
	• emergent wetland	2	2	2	2	2	2
	• aquatic bed	1	0	0	0	0	0
	• no vegetation	0	0	0	0	0	0
• Cover Distribution	• forming a continuous cover	3	3	3	3	3	3
	• growing in small scattered patches	2	2	2	2	2	2
	• one or more large patches	1	1	1	1	1	1
	• solitary scattered stems	1	1	1	1	1	1
	• no vegetation	0	0	0	0	0	0
• Soil Type	• histosol or clayey soil	3	3	3	3	3	3
	• silty soil	2	2	2	0	2	2
	• sandy or gravelly soil	1	1	1	0	1	1
	Total Score:	13					
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Functional Capacity Index:	Total Score / 18	/ 15	/ 12	/ 12	/ 12	/ 18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

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2.9.6 Export of Detritus

VARIABLES	CONDITIONS	HGM TYPES:	D	S	L	EP	R	F
		WEIGHTS						
Indicators of disfunction	no outlet		0	0		0		0
Direct Indicators of Function	none							
Primary Variables								
• Wetland Land Use	• moderate intensity		3	3	3	3	3	3
	• low intensity		2	2	2	2	2	2
	• high intensity		1	1	1	1	1	1
• Degree of Outlet Restriction	• unrestricted outflow		3	0	0	0	0	3
	• restricted outflow		1	0	0	0	0	1
• Inlet/Outlet Class	• perennial outlet		3	3	0	0	0	3
	• intermittent outlet		1	1	0	0	0	1
• Wetland Water Regime	• drier: seasonally flooded, temporarily flooded, saturated		3	3	3	0	3	3
	• wet: permanently flooded, intermittently exposed, semipermanently flooded		1	1	1	1	1	1
• Vegetation Density/Dominance	• high/very high		3	3	3	3	3	3
	• medium		2	2	2	2	2	2
	• sparse/low		1	1	1	1	1	1
	• no vegetation		0	0	0	0	0	0
• Soil Type	• mineral hydric soil		3	3	3	3	3	3
	• histosol		1	1	1	1	1	1
		Total Score:	12					
		Model Range:	5-18	4-15	3-12	2-10	3-12	5-18
		Functional Capacity Index:	Total Score / 18	— / 15	— / 12	— / 10	— / 12	— / 18
		Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0

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2.9.7 Contribution to Abundance and Diversity of Wetland Vegetation

(This model is identical for all HGM types)

VARIABLES		CONDITIONS	WEIGHTS
Indicators of Disfunction		no vegetation	0
Direct Indicators of Function		none	
Primary Variables			
•	Plant Species Diversity	• high diversity	5
		• medium diversity	3
		• low diversity	1
•	Vegetation Density/Dominance	• high/very high	5
		• medium	3
		• sparse/low	1
•	Wetland Juxtaposition	• connected upstream and downstream	5
		• connected above or below	3
		• other wetlands nearby but not connected (400 m or closer)	1
		• isolated	0
		Total Score:	9
		Model Range:	2-15
		Functional Capacity Index:	= Total Score / 15
		Index Range:	0.13-1.0

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2.9.8 Contribution to Abundance and Diversity of Wetland Fauna

(This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply))

VARIABLES	CONDITIONS	WEIGHTS
Direct Indicators of Disfunction	none	
Direct Indicators of Function	none	
Primary Variables		
• Watershed Land Use	• low intensity (0-25% urbanized)	3
	• moderate intensity (25-50% urbanized)	2
	• high intensity (>50% urbanized)	1
• Wetland Land Use	• low intensity	3
	• moderate intensity	2
	• high intensity	1
• Wetland Water Regime	• wet: permanently flooded, intermittently exposed, semipermanently flooded	3
	• drier: seasonally flooded, temporarily flooded, saturated	1
• Microrelief of Wetland Surface	• pronounced	3
	• well developed	2
	• poorly developed	1
	• absent	0
• Number of Wetland types and Relative Proportions	• 5 or more types	3
	• 3-4 types	2
	• 1-2 types	1
	• no vegetation	0
	• even distribution	3
	• moderately even distribution	2
	• highly uneven distribution	1
	• no vegetation	0
• Vegetation Interspersion	• high interspersion	3
	• moderate interspersion	2
	• low interspersion	1
	• no vegetation	0
• Number of Layers and Percent Cover	• 5 or more layers	3
	• 3-4 layers	2
	• 1-2 layers	1
	• no vegetation	0
	• layers well developed (>50% cover)	3
	• layers with moderate cover (26-50% cover)	2
		1
	• layers poorly distinguishable (<25% cover)	0
	• no vegetation	0

(continued)

2.9.8 <u>Contribution to Abundance and Diversity of Wetland Fauna</u> (Continued)

VARIABLES	CONDITIONS	WEIGHTS
• Interspersion of Vegetation Cover and Open Water	• 26-75% scattered or peripheral	3
	• >75% scattered or peripheral	2
	• <25% scattered or peripheral	1
	• 100% cover or open water	1
	• no vegetation	0
• Size	• large (>100 acres)	3
	• medium (10-100 acres)	2
	• small (<10 acres)	1
• Wetland Juxtaposition	• other wetlands within 400 m and connected above or below	3
	• other wetlands within 400 m but not connected	1
	• wetland isolated	0

Slope Wetlands:		All Other HGM Types:	Total Score:	23
Model Range:	4-33		Model Range:	4-36
Functional Capacity Index =	Total Score / 33		Functional Capacity Index =	Total Score / 36
Index Range:	0.12-1.0		Index Range	0.11-1.0

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Appendix C

Ecological Assessment Report

<u>Emerald Ridge Bird Survey – 2005</u>

Introduction

A Field survey using point count methods to identify bird species present on the site of the proposed Emerald Ridge subdivision was conducted in early July 2005. The property, which comprises the project site, is located on approximately 85.5 acres of land, located at the end of Marsh Hill Road near Peekskill Hollow Road in the Town of Putnam Valley, Putnam County, New York. The results of the one-day survey are summarized below.

Survey Methodology

Tim Miller Associates, Inc., conducted a bird survey on 11 July 2005 to identify avian species using the project site. Based on existing ecological community data from the previous site visits as well as knowledge of bird survey techniques, eight (8) survey points were selected throughout the site. These points were chosen to provide data that would represent bird use in all ecological community types found on the project site.

During the survey, point counts were performed at nine (9) point locations, one more than originally planned. The extra survey point was added to increase the probability of observing additional bird species. At each of the data collection points, bird surveys were conducted over a fifteen-minute interval. The surveyor recorded all birds heard and/or seen during the point counts. As the surveyor traveled between point locations and through the different habitats incidental observations were made to increase the probability of observing additional bird species. The additional data gathered while walking over the site was added to the overall list of observed species. Birds observed carrying nesting materials and/or food, building nests, etc. were documented as these activities indicate probable and/or confirmed breeding species. Birds on the wing were also included in the counts as "Flyby" to indicate that these individuals were passing overhead.

Each point location was assigned a consecutively numbered label (BS-#1 through BS-#9). Flags were hung to mark the locations of the points for use in future surveys. Each flag was marked with the alphanumeric code assigned to the associated survey point.

The survey on July 11th commenced at 6:00 AM and continued until 11:00 AM. During future surveys, it is recommended that the points be visited in the reverse order (BS-#9 to BS-#1). Doing so will provide bird observation data at all sites during the early morning hours/shortly after dawn. This is the best time of the day to observe birds, as many species tend to get much quieter or cease to call as late morning/mid-day approaches. Weather on the date of the survey was relatively fair with overcast skies and temperatures in the high sixties to the high seventies.

In addition to bird surveys, incidental wildlife observations were recorded. These observations were made during all official surveys as well as while traveling between survey points.

Observations

Birds

A total of 28 (twenty eight) bird species were identified either on, adjacent to, or "flying by" the project site during the one-day survey. A list of these species is attached at the end of this report. Species were identified by their calls and/or visual observation. This typically results in the recording of a higher number of birds that are more vocal and have a loud call (e.g. Red-eyed Vireo and Ovenbird) and a lower number of those that are not as vocal and/or have softer calls (e.g. Cedar Waxwings). Vocal birds may also be counted in habitats they do not typically use because their calls can carry for long distances making it difficult to accurately place their location.

None of the birds identified during the survey is listed by the New York State Department of Environmental Conservation (NYSDEC) as protected. According to the USFWS website of listed threatened and endangered species, none of the observed species are afforded protection at the federal level.

Breeding bird activity was noted when observed. Activities that confirm breeding including adult birds carrying food for young were documented during the survey. Behavior that indicates breeding is probable or confirmed in a particular area was also noted when observed. Probable breeding behaviors observed included pairs of adults identified in or adjacent to acceptable breeding habitat. Confirmed breeding behavior observed was limited to the adults carrying food for young. Refer to the attached species list for information on species displaying either confirmed or probable breeding behavior on the Emerald Ridge Project Site. Additional species are expected to breed on the site however observations during this one-day field effort confirming this case were not made.

Habitats

The attached table lists the 28 (twenty eight) species identified during the surveys and contains information on the habitat(s) where each species was observed. The habitats identified on or immediately adjacent to the property are as follows: Second Growth Woods (SGW), Hemlock-Northern Harwood Forest (HHF), Successional Old Field (SOF), Vernal Pool, and Forested Wetland (FW). At least one point count was performed in or adjacent to each of these habitats. In the habitats that are relatively small in size (vernal pools), a number of the birds identified by call may have been using the surrounding habitats.

A majority of the bird species observed (fifteen) were identified in and around the Successional Old Field habitat and in the Second Growth Wood areas. The interface between open space and forest (edge habitat) surrounding the SOF area can be considered a separate habitat type. These fringe communities typically provide good habitat for many bird species and likely contributed to the diversity seen in this habitat type. Unlike forested areas, open spaces also allow the surveyor the opportunity to easily count birds that are not calling. Therefore, the ease with which birds can be identified visually in open areas may also have contributed to the high bird counts in this habitat type. The relatively large number of points located in the forested areas could have contributed in part to the number of species identified in this habitat type.

The small size of the remaining habitat types was likely a contributing factor in the low species counts (five to six species each). As noted previously with small sized habitats, it is possible that some of the species recorded in these areas may have been using the resources in the larger surrounding communities.

Wildlife

Incidental wildlife observations were made during of the bird survey. No official procedures were involved with the gathering of this data. Observed species was limited to the following: American Bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans*), eastern chipmunk (*Tamias striatus*), and white-tailed deer (*Odocoileus virginianus*).

Breeding Bird Atlas

The New York State Breeding Bird Atlas is a comprehensive, statewide bird survey that documents the breeding birds identified by trained volunteers in three-mile square blocks. The most recent surveys (2000 through 2004) have been completed and data is being compiled for inclusion in the final report to be released in 2005. The listings include data on the breeding behavior observed, the year the bird(s) was observed and the state protection status.

The Emerald Ridge project site falls within two Breeding Bird Atlas Blocks (5857B and 5957A) (NYSDEC 2005). The list of breeding birds observed in the earlier block has yet to be compiled for the most recent surveys but is available from the 1980 to 1985 survey. The breeding bird list for the later block is available from the recent 2000 to 2004 surveys but is considered "interim data" until released officially as part of the final report. Both are included attached herein. It is important to note that birds will choose to breed in the habitat most suitable to their species. Therefore, the listing of a particular bird in a block does not mean that species will breed everywhere in that block. The list for each block will include a greater number of breeding birds than will utilize any given site within that block.

Reference:

New York State Department of Environmental Conservation (NYSDEC). 2005. NYS Breeding Bird Atlas website http://www.dec.state.ny.us/apps/bba/results/.

Birds observed during 11 July 2005 field survey at the proposed Emerald Ridge Project Site.

Common Name	Scientific Name	Habitat - Breeding Behavior
American Crow	*Corvus brachyrhynchos*	SOF - In trees along edge of habitat, HHF - Flyby, VP - Flyby
American Goldfinch	*Carduelis tristis*	Flyby SOF
American Robin	*Turdus migratorius*	SOF, SGW, OA, FW
Black-and-white Warbler	*Mniotilta varia*	SGW
Black-capped Chickadee	*Parus atricapillus*	SOF - In tree along edge of habitat, SGW, HHF, FW, OA, VP
Blue Jay	*Cyanocitta cristata*	SOF - Calling from edge of field, SGW, FW
Cedar Waxwing	*Bombycilla cedrorum*	SOF
Downy Woodpecker	*Picoides pubescens*	SGW, OA
Eastern Phoebe	*Sayorinus phoebe*	SOF - Calling from edge of habitat,
Eastern Wood-Peewee	*Contopus virens*	SGW, OA
Gray Catbird	*Dumetella carolinensis*	SOF - Calling from edge of habitat and with berries in mouth, SGW
Hairy Woodpecker	*Picoides villosus*	VP - In adjacent woods, SGW, FW
House Finch	*Carpodacus mexincanus*	SOF - In trees along edge of habitat near garage
House Wren	*Troglodytes aedon*	SOF - In trees along edge of habtiat near garage
Northern Cardinal	*Cardinalis cardinalis*	SOF - Male calling from tees along edge of habitat, SGW
Northern Flicker	*Colaptes auratus*	Flyby SOF
Ovenbird	*Seiurus aurocapillus*	SGW, VP - In adjacent woods
Red-eyed Vireo	*Vireo olivaceus*	SGW
Red-winged Blackbird	*Agelaicus phoeniceus*	HHF - Off in distance, VP - Flyby
Scarlet Tanager	*Piranga olivacea*	SOF - Calling from trees along edge of habitat, HHF, OA - Pair observed
Tree Swallow	*Tachycineta bicolor*	Flyby SGW
Tufted Titmouse	*Parus bicolor*	SGW - w/food or nesting materials in mouth, VP - In tree along edge of habitat
Turkey Vulture	*Cathartes aura*	Flyby SOF
Warbling Vireo	*Vireo gilvus*	OA
White-breasted Nuthatch	*Sitta carolinensis*	SOF - Calling from trees along edge of habitat, FW
Wild Turkey	*Meleagris gallopavo*	SGW - Feathers found
Wood Thrush	*Hylocichla mustelina*	SGW - Several calling, FW
Yellow Warbler	*Dendroica petechia*	SOF - In trees along edge of habitat near garage

HHF = Hemlock-Northern Harwood Forest
OA = Open Area (along dirt access road)
SOF = Successional Open Field
SGW = Second Growth Woods
FW = Forested Wetland (Wetland B)
VP = Vernal Pool

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Breeding Codes

More information from this division:

Breeding Bird Atlas Home Page
Volunteer Information Page

The New York State Breeding Bird Atlas uses three categories to record breeding behavior: Possible (PO), Probable (PR), and Confirmed (CO). Within each of these categories are Breeding Codes that describe the breeding behavior. These codes are listed in order of increasing certainty.

	Possible Breeding (PO)
X	Species observed in possible nesting habitat, but no other indication of breeding noted; singing male(s) present (or breeding calls heard) in breeding season.
	Probable Breeding (PR)
S	Singing male present (or breeding calls heard).
P	Pair observed in suitable habitat in breeding season.
T	Bird (or pair) apparently holding territory. In addition to territorial singing, chasing of other individuals of same species often marks a territory.
D	Courtship and display, agitated behavior or anxiety calls from adults suggesting probable presence nearby of a nest or young; well-developed brood-patch or cloacal protuberance on trapped adult. Includes copulation.
N	Visiting probable nest site. Nest building by wrens and woodpeckers. Wrens may build many nests. Woodpeckers, although they usually drill only one nest cavity, also drill holes just for roosting.
B	Nest building or excavation of a nest hole.
	Confirmed Breeding (CO)
DD	Distraction display or injury-feigning. Agitated behavior and/or anxiety calls are

	Probable-D.
UN	Used nest found. Caution: These must be carefully identified if they are to be counted as evidence. Some nests (e.g. Baltimore Oriole) are persistent and very characteristic. Most are difficult to identify correctly.
FE	Female with egg in the oviduct (by bird bander).
FL	Recently fledged young (including downy young of precocious species - waterfowl, shorebirds). This code should be used with caution for species such as blackbirds and swallows, which may move some distance soon after fledging. Recently fledged passerines are still dependent on their parents and are fed by them.
ON	Adult(s) entering or leaving nest site in circumstances indicating occupied nest. NOT generally used for open nesting birds. It should be used for hole nesters only when a bird enters a hole and remains inside, makes a change-over at a hole, or leaves a hole after having been inside for some time. If you simply see a bird fly into or out of a bush or tree, and do not find a nest, the correct code would be Probable-N.
FS	Adult carrying fecal sac.
FY	Adult(s) with food for young. Some birds (gulls, terns, and raptors) continue to feed their young long after they are fledged, and even after they have moved considerable distances. Also, some birds (e.g. terns) may carry food over long distances to their young in a neighboring block. Be especially careful on the edge of a block. Care should be taken to avoid confusion with courtship feeding (Probable-D).
NE	Identifiable nest and eggs, bird setting on nest or egg, identifiable eggshells found beneath nest, or identifiable dead nestling(s). If you find a cowbird egg in a nest, it is NE for Cowbird, and NE for the identified nest's owner.
NY	Nest with young. If you find a young cowbird with other young, it is NY for cowbird and NY for identified nest owner.

This page was last modified on December 4, 2000

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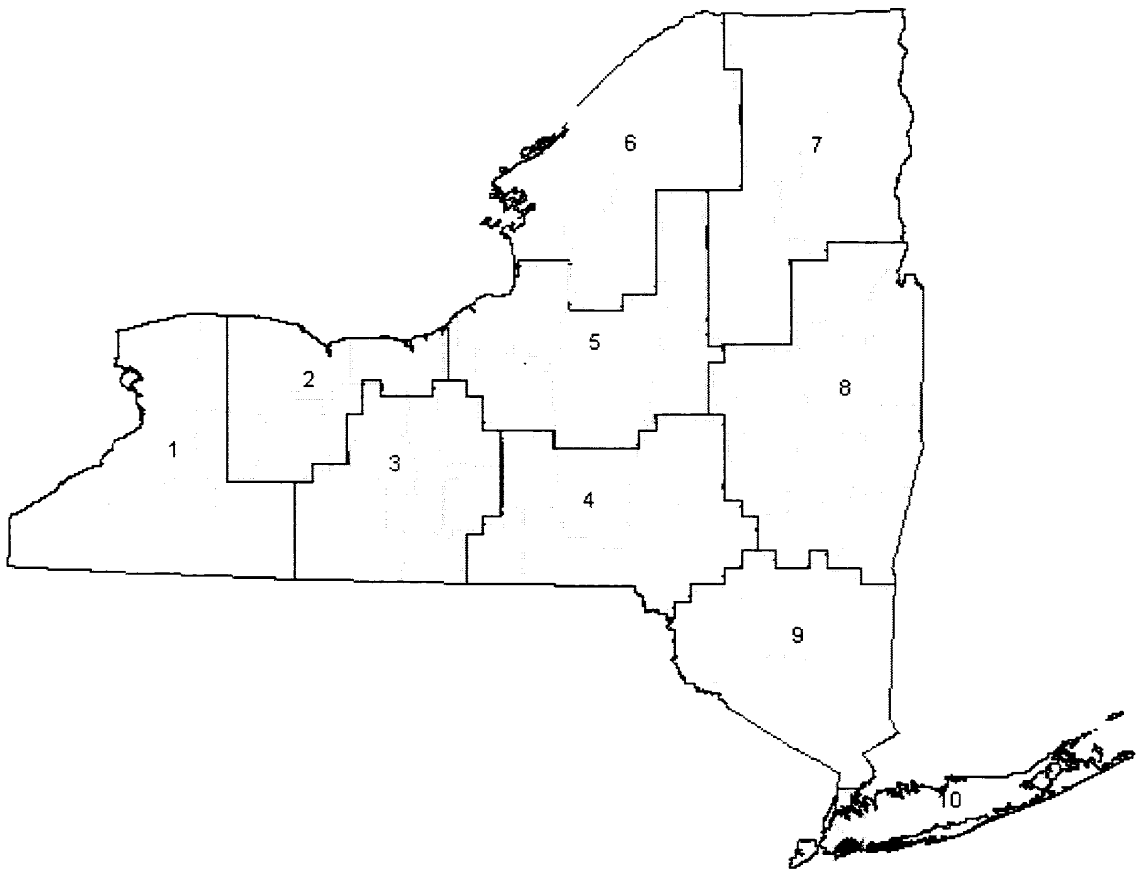
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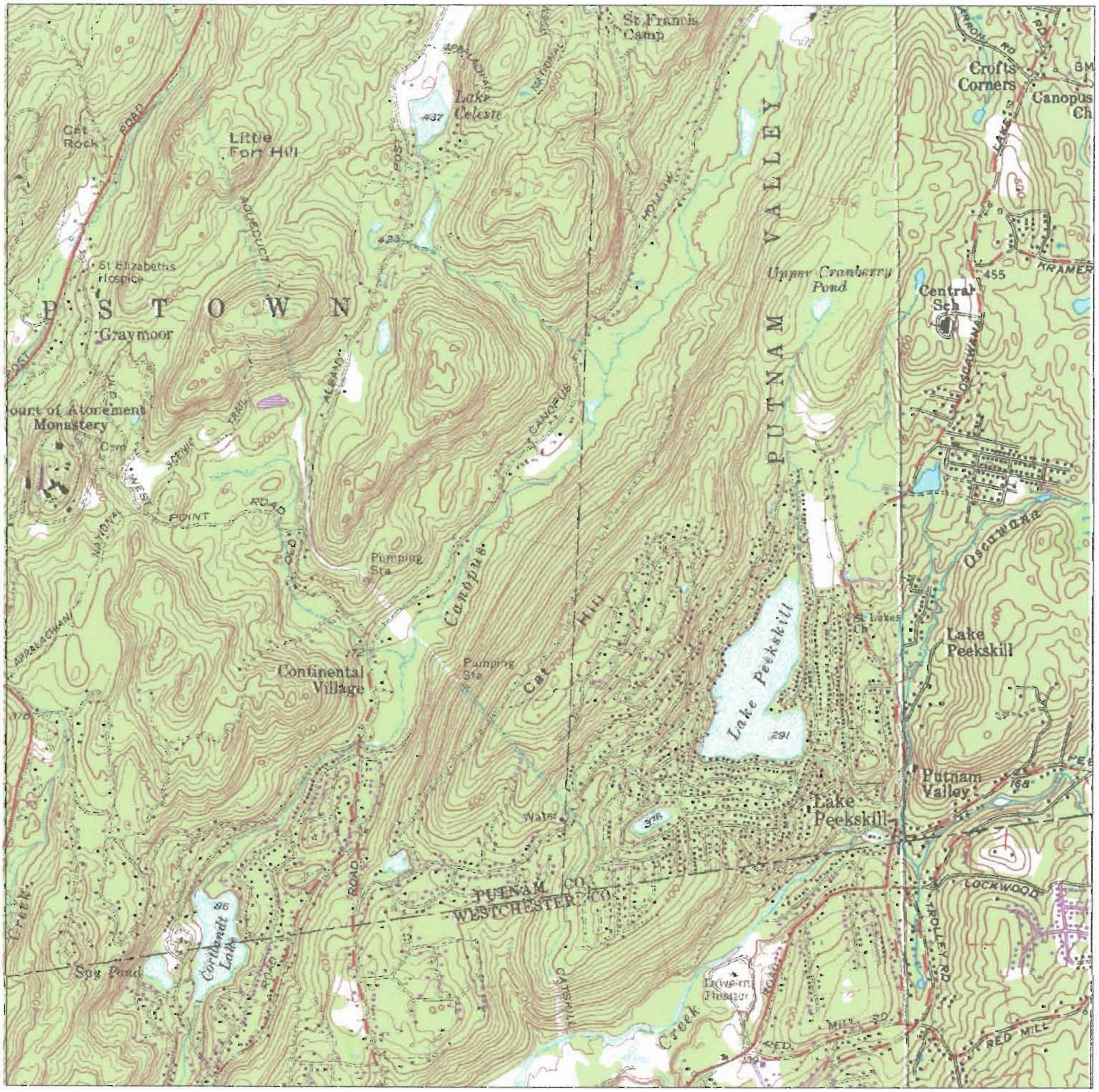
Breeding Bird Atlas Block 5857B



1 Mile

Scale is approximately 1:25,000, but may vary on your printer.

New York State Department of
Environmental Conservation

NYS Breeding Bird Atlas

ATLAS 2000

Atlas Results

Species List Inquiry

Enter a block number to see the list of species that have been reported. Choose from the current or historic atlases.

There are no records for block 5857B.

Block Number:
Current: 2000-2005
Historic: 1980-1985

Submit

Download and print a correction form to submit changes to *your* data.

Species Distribution Maps

Taxonomic Order	1980-1985	2000-2004
Alphabetic Order	1980-1985	2000-2004
Compare Maps	Tax Order	Alpha Order

Great Blue Heron
Photo by Valerie Freer

PLEASE NOTE:

The data on this website concerning the presence or absence of breeding birds in New York State are interim data. While the planned five years of data collection have been completed (2000-2004), we are now undertaking final review of

Block Status Inquiry

Assigned Atlas Blocks: Map

Enter a block number to see whether it is assigned, unassigned or complete.

Block Number:

Submit

Regional Progress Maps

Click on the Breeding Bird Atlas region to view a progress map.

Region 1	Region 2	Region 3	Region 4
Region 5	Region 6	Region 7	Region 8
Region 9		Region 10	

Lookup a Block Number

Search the Field Maps

Atlas Statistics

Total Records:	483981
Registered Volunteers:	1498
Active Volunteers:	1150
No. Breeding Species:	251
Number of Species Per Block:	Map

the entire dataset; all records available for viewing here are subject to revision or deletion until this process has been completed.

For this reason, the Department cannot provide a definitive statement concerning the absence of breeding activity for a certain species in a particular area of the state. The Department can only provide a listing of species known to be breeding or suspected of breeding in certain areas of the state. Parties using these data for environmental review purposes do so at their own risk. For more information, please contact the Project Coordinator at: fwbba@gw.dec.state.ny.us.

New York State Department of
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NYS Breeding Bird Atlas

ATLAS 2000

1980-1985

Navigation Tools
Perform Another Search Sort by Field Card Order Sort by Taxonomic Order

Block 5857B Summary	
Total Species:	74
Possible:	8
Probable:	15
Confirmed:	51

Click on column heading to sort by that category.

Common Name	Scientific Name	Behavior Code	Date	NY L Sta
Turkey Vulture	*Cathartes aura*	X1	1984	Protect
Canada Goose	*Branta canadensis*	FL	1983	Game S
Wood Duck	*Aix sponsa*	FL	1984	Game S
American Black Duck	*Anas rubripes*	FL	1984	Game S
Mallard	*Anas platyrhynchos*	FL	1984	Game S
Red-tailed Hawk	*Buteo jamaicensis*	X1	1983	Protect
American Kestrel	*Falco sparverius*	P2	1984	Protect
Killdeer	*Charadrius vociferus*	P2	1984	Protect
Spotted Sandpiper	*Actitis macularia*	FL	1984	Protect
Rock Pigeon	*Columba livia*	FL	1984	Unprote
Mourning Dove	*Zenaida macroura*	FY	1983	Protect

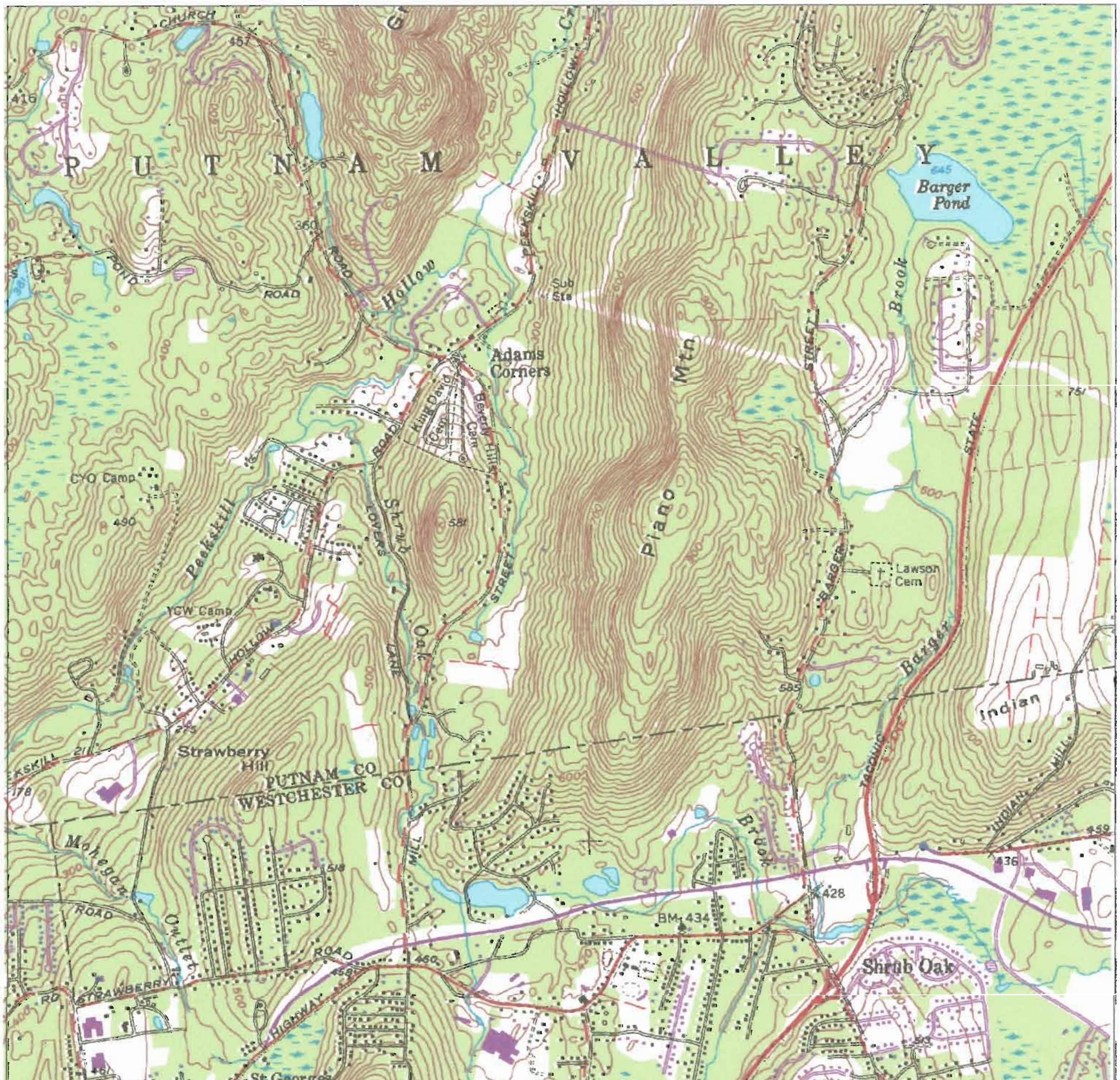
Yellow-billed Cuckoo	*Coccyzus americanus*	X1	1982	Protect
Eastern Screech-Owl	*Megascops asio*	X1	1983	Protect
Chimney Swift	*Chaetura pelagica*	ON	1982	Protect
Ruby-throated Hummingbird	*Archilochus colubris*	X1	1984	Protect
Belted Kingfisher	*Ceryle alcyon*	S2	1984	Protect
Red-bellied Woodpecker	*Melanerpes carolinus*	FL	1985	Protect
Downy Woodpecker	*Picoides pubescens*	FY	1984	Protect
Hairy Woodpecker	*Picoides villosus*	P2	1984	Protect
Northern Flicker	*Colaptes auratus*	ON	1982	Protect
Eastern Wood-Pewee	*Contopus virens*	S2	1984	Protect
Willow Flycatcher	*Empidonax traillii*	S2	1984	Protect
Least Flycatcher	*Empidonax minimus*	S2	1984	Protect
Eastern Phoebe	*Sayornis phoebe*	NE	1983	Protect
Great Crested Flycatcher	*Myiarchus crinitus*	S2	1984	Protect
Eastern Kingbird	*Tyrannus tyrannus*	FY	1984	Protect
Yellow-throated Vireo	*Vireo flavifrons*	FY	1984	Protect
Warbling Vireo	*Vireo gilvus*	FY	1984	Protect
Red-eyed Vireo	*Vireo olivaceus*	FY	1984	Protect
Blue Jay	*Cyanocitta cristata*	FY	1984	Protect
American Crow	*Corvus brachyrhynchos*	P2	1984	Game S
Tree Swallow	*Tachycineta bicolor*	FL	1984	Protect
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	P2	1984	Protect
Bank Swallow	*Riparia riparia*	NE	1984	Protect
Barn Swallow	*Hirundo rustica*	NY	1983	Protect
Black-capped Chickadee	*Poecile atricapillus*	FL	1982	Protect
Tufted Titmouse	*Baeolophus bicolor*	FL	1982	Protect
White-breasted Nuthatch	*Sitta carolinensis*	FY	1984	Protect
Brown Creeper	*Certhia americana*	X1	1982	Protect

Carolina Wren	*Thryothorus ludovicianus*	S2	1984	Protect
House Wren	*Troglodytes aedon*	NE	1983	Protect
Veery	*Catharus fuscescens*	S2	1982	Protect
Wood Thrush	*Hylocichla mustelina*	FY	1984	Protect
American Robin	*Turdus migratorius*	NY	1983	Protect
Gray Catbird	*Dumetella carolinensis*	FY	1983	Protect
Northern Mockingbird	*Mimus polyglottos*	FY	1984	Protect
Brown Thrasher	*Toxostoma rufum*	FY	1984	Protect
European Starling	*Sturnus vulgaris*	FY	1983	Unprote
Cedar Waxwing	*Bombycilla cedrorum*	S2	1983	Protect
Blue-winged Warbler	*Vermivora pinus*	FY	1984	Protect
Yellow Warbler	*Dendroica petechia*	FY	1983	Protect
Chestnut-sided Warbler	*Dendroica pensylvanica*	S2	1984	Protect
Prairie Warbler	*Dendroica discolor*	X1	1984	Protect
Black-and-white Warbler	*Mniotilta varia*	FY	1984	Protect
American Redstart	*Setophaga ruticilla*	FY	1984	Protect
Worm-eating Warbler	*Helmitheros vermivorus*	FY	1984	Protect
Ovenbird	*Seiurus aurocapilla*	FY	1984	Protect
Louisiana Waterthrush	*Seiurus motacilla*	S2	1984	Protect
Common Yellowthroat	*Geothlypis trichas*	FY	1984	Protect
Scarlet Tanager	*Piranga olivacea*	NE	1984	Protect
Eastern Towhee	*Pipilo erythrophthalmus*	FY	1983	Protect
Chipping Sparrow	*Spizella passerina*	FY	1984	Protect
Field Sparrow	*Spizella pusilla*	FL	1983	Protect
Song Sparrow	*Melospiza melodia*	FY	1984	Protect
Northern Cardinal	*Cardinalis cardinalis*	FY	1983	Protect
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	FL	1982	Protect
Indigo Bunting	*Passerina cyanea*	FY	1982	Protect

Red-winged Blackbird	*Agelaius phoeniceus*	FY	1983	Protect
Common Grackle	*Quiscalus quiscula*	FY	1984	Protect
Brown-headed Cowbird	*Molothrus ater*	X1	1982	Protect
Baltimore Oriole	*Icterus galbula*	FY	1983	Protect
House Finch	*Carpodacus mexicanus*	FL	1983	Protect
American Goldfinch	*Carduelis tristis*	FY	1984	Protect
House Sparrow	*Passer domesticus*	FL	1983	Unprote

Current Date: 7/6/2005

Breeding Bird Atlas Block 5957A



1 Mile

Scale is approximately 1:25,000, but may vary on your printer.

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NYS Breeding Bird Atlas

ATLAS 2000

2000-2005

Navigation Tools
Perform Another Search
Show All Records
Sort by Field Card Order
Sort by Taxonomic Order
View 1985 Data

Block 5957A Summary	
Total Species:	54
Possible:	8
Probable:	21
Confirmed:	25

Click on column heading to sort by that category.

Common Name	Scientific Name	Behavior Code	Date	NY Legal Status	Vol
Turkey Vulture	*Cathartes aura*	X1	6/20/2004	Protected	BBL
Canada Goose	*Branta canadensis*	FL	6/20/2004	Game Species	BBL
Wood Duck	*Aix sponsa*	FL	6/20/2004	Game Species	BBL
Mallard	*Anas platyrhynchos*	FL	6/20/2004	Game Species	BBL
Broad-winged Hawk	*Buteo platypterus*	X1	6/20/2004	Protected	BBL
Red-tailed Hawk	*Buteo jamaicensis*	S2	7/16/2004	Protected	BBL
	Meleagris			Game	

Wild Turkey	*gallopavo*	FL	6/20/2004	Species	BBL
Spotted Sandpiper	*Actitis macularia*	X1	6/20/2004	Protected	BBL
Rock Pigeon	*Columba livia*	N2	6/20/2004	Unprotected	BBL
Mourning Dove	*Zenaida macroura*	FL	6/20/2004	Protected	BBL
Red-bellied Woodpecker	*Melanerpes carolinus*	FL	7/16/2004	Protected	BBL
Downy Woodpecker	*Picoides pubescens*	FL	7/16/2004	Protected	BBL
Northern Flicker	*Colaptes auratus*	X1	6/20/2004	Protected	BBL
Eastern Phoebe	*Sayornis phoebe*	T2	7/16/2004	Protected	BBL
Great Crested Flycatcher	*Myiarchus crinitus*	X1	7/16/2004	Protected	BBL
Eastern Kingbird	*Tyrannus tyrannus*	T2	7/16/2004	Protected	BBL
Yellow-throated Vireo	*Vireo flavifrons*	X1	6/20/2004	Protected	BBL
Warbling Vireo	*Vireo gilvus*	T2	6/20/2004	Protected	BBL
Red-eyed Vireo	*Vireo olivaceus*	S2	7/16/2004	Protected	BBL
Blue Jay	*Cyanocitta cristata*	FL	7/16/2004	Protected	BBL
American Crow	*Corvus brachyrhynchos*	FL	6/20/2004	Game Species	BBL
Tree Swallow	*Tachycineta bicolor*	FL	7/16/2004	Protected	BBL
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	ON	6/20/2004	Protected	BBL
Barn Swallow	*Hirundo rustica*	FY	7/16/2004	Protected	BBL
Black-capped Chickadee	*Poecile atricapillus*	FL	7/16/2004	Protected	BBL
Tufted Titmouse	*Baeolophus bicolor*	FL	7/16/2004	Protected	BBL

White-breasted Nuthatch	*Sitta carolinensis*	S2	7/16/2004	Protected	BBL
Carolina Wren	*Thryothorus ludovicianus*	D2	6/20/2004	Protected	BBL
House Wren	*Troglodytes aedon*	FL	7/16/2004	Protected	BBL
Eastern Bluebird	*Sialia sialis*	FL	7/16/2004	Protected	BBL
Veery	*Catharus fuscescens*	FY	6/20/2004	Protected	BBL
Wood Thrush	*Hylocichla mustelina*	D2	7/16/2004	Protected	BBL
American Robin	*Turdus migratorius*	FY	6/20/2004	Protected	BBL
Gray Catbird	*Dumetella carolinensis*	FY	6/20/2004	Protected	BBL
Northern Mockingbird	*Mimus polyglottos*	D2	7/16/2004	Protected	BBL
European Starling	*Sturnus vulgaris*	FL	7/16/2004	Unprotected	BBL
Cedar Waxwing	*Bombycilla cedrorum*	X1	7/16/2004	Protected	BBL
Yellow Warbler	*Dendroica petechia*	S2	7/16/2004	Protected	BBL
Chestnut-sided Warbler	*Dendroica pensylvanica*	S2	7/16/2004	Protected	BBL
Ovenbird	*Seiurus aurocapilla*	X1	6/20/2004	Protected	BBL
Common Yellowthroat	*Geothlypis trichas*	T2	6/20/2004	Protected	BBL
Scarlet Tanager	*Piranga olivacea*	T2	6/20/2004	Protected	BBL
Chipping Sparrow	*Spizella passerina*	FY	7/16/2004	Protected	BBL
Song Sparrow	*Melospiza melodia*	FL	7/16/2004	Protected	BBL
Northern	*Cardinalis*	P2	6/20/2004	Protected	BBL

Cardinal	*cardinalis*				
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	P2	6/20/2004	Protected	BBL
Indigo Bunting	*Passerina cyanea*	T2	6/20/2004	Protected	BBL
Red-winged Blackbird	*Agelaius phoeniceus*	T2	6/20/2004	Protected	BBL
Common Grackle	*Quiscalus quiscula*	FL	6/20/2004	Protected	BBL
Brown-headed Cowbird	*Molothrus ater*	D2	6/20/2004	Protected	BBL
Baltimore Oriole	*Icterus galbula*	T2	6/20/2004	Protected	BBL
House Finch	*Carpodacus mexicanus*	FL	7/16/2004	Protected	BBL
American Goldfinch	*Carduelis tristis*	P2	6/20/2004	Protected	BBL
House Sparrow	*Passer domesticus*	FY	7/16/2004	Unprotected	BBL

Current Date: 7/6/2005

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NYS Breeding Bird Atlas

ATLAS 2000

1980-1985

Navigation Tools
Perform Another Search Sort by Field Card Order Sort by Taxonomic Order View 2000 Data

Block 5957A Summary	
Total Species:	83
Possible:	7
Probable:	20
Confirmed:	56

Click on column heading to sort by that category.

Common Name	Scientific Name	Behavior Code	Date	NY Le Stat
Green Heron	*Butorides virescens*	X1	1981	Protected
Turkey Vulture	*Cathartes aura*	X1	1982	Protected
Canada Goose	*Branta canadensis*	P2	1981	Game Spe
Wood Duck	*Aix sponsa*	P2	1981	Game Spe
American Black Duck	*Anas rubripes*	P2	1982	Game Spe
Mallard	*Anas platyrhynchos*	FL	1982	Game Spe
Broad-winged Hawk	*Buteo platypterus*	P2	1980	Protected
Red-tailed Hawk	*Buteo jamaicensis*	NE	1980	Protected
Ruffed Grouse	*Bonasa umbellus*	FL	1980	Game Spe

Killdeer	*Charadrius vociferus*	X1	1982	Protected
Spotted Sandpiper	*Actitis macularia*	X1	1981	Protected
American Woodcock	*Scolopax minor*	NE	1981	Game Spe
Mourning Dove	*Zenaida macroura*	NE	1980	Protected
Black-billed Cuckoo	*Coccyzus erythropthalmus*	D2	1981	Protected
Yellow-billed Cuckoo	*Coccyzus americanus*	FY	1982	Protected
Eastern Screech-Owl	*Megascops asio*	S2	1980	Protected
Great Horned Owl	*Bubo virginianus*	S2	1980	Protected
Whip-poor-will	*Caprimulgus vociferus*	S2	1981	Protected Special Co
Chimney Swift	*Chaetura pelagica*	ON	1980	Protected
Belted Kingfisher	*Ceryle alcyon*	ON	1981	Protected
Downy Woodpecker	*Picoides pubescens*	ON	1980	Protected
Hairy Woodpecker	*Picoides villosus*	ON	1980	Protected
Northern Flicker	*Colaptes auratus*	FS	1980	Protected
Pileated Woodpecker	*Dryocopus pileatus*	ON	1981	Protected
Eastern Wood-Pewee	*Contopus virens*	P2	1980	Protected
Least Flycatcher	*Empidonax minimus*	P2	1980	Protected
Eastern Phoebe	*Sayornis phoebe*	NE	1980	Protected
Great Crested Flycatcher	*Myiarchus crinitus*	P2	1980	Protected
Eastern Kingbird	*Tyrannus tyrannus*	FL	1981	Protected
Yellow-throated Vireo	*Vireo flavifrons*	P2	1980	Protected
Warbling Vireo	*Vireo gilvus*	NE	1981	Protected
Red-eyed Vireo	*Vireo olivaceus*	NE	1980	Protected
Blue Jay	*Cyanocitta cristata*	FL	1980	Protected
American Crow	*Corvus brachyrhynchos*	FL	1980	Game Spe

Tree Swallow	*Tachycineta bicolor*	ON	1980	Protected
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	NE	1980	Protected
Bank Swallow	*Riparia riparia*	ON	1980	Protected
Barn Swallow	*Hirundo rustica*	NE	1980	Protected
Black-capped Chickadee	*Poecile atricapillus*	FY	1982	Protected
Tufted Titmouse	*Baeolophus bicolor*	FL	1980	Protected
White-breasted Nuthatch	*Sitta carolinensis*	FL	1980	Protected
Carolina Wren	*Thryothorus ludovicianus*	X1	1980	Protected
House Wren	*Troglodytes aedon*	ON	1980	Protected
Blue-gray Gnatcatcher	*Polioptila caerulea*	P2	1981	Protected
Veery	*Catharus fuscescens*	NE	1981	Protected
Wood Thrush	*Hylocichla mustelina*	NY	1980	Protected
American Robin	*Turdus migratorius*	NY	1980	Protected
Gray Catbird	*Dumetella carolinensis*	NY	1980	Protected
Northern Mockingbird	*Mimus polyglottos*	NE	1980	Protected
Brown Thrasher	*Toxostoma rufum*	NY	1980	Protected
European Starling	*Sturnus vulgaris*	NY	1981	Unprotect
Cedar Waxwing	*Bombycilla cedrorum*	X1	1982	Protected
Blue-winged Warbler	*Vermivora pinus*	FY	1980	Protected
Brewster's Warbler	*Vermivora pinus x V. chrysoptera*	FY	1980	Protected
Yellow Warbler	*Dendroica petechia*	FY	1981	Protected
Chestnut-sided Warbler	*Dendroica pensylvanica*	FY	1980	Protected
Black-throated Green Warbler	*Dendroica virens*	FY	1980	Protected
Prairie Warbler	*Dendroica discolor*	FY	1980	Protected
Black-and-white Warbler	*Mniotilta varia*	S2	1982	Protected

American Redstart	*Setophaga ruticilla*	S2	1981	Protected
Worm-eating Warbler	*Helmitheros vermivorus*	FY	1983	Protected
Ovenbird	*Seiurus aurocapilla*	NE	1980	Protected
Louisiana Waterthrush	*Seiurus motacilla*	T2	1980	Protected
Common Yellowthroat	*Geothlypis trichas*	NY	1980	Protected
Hooded Warbler	*Wilsonia citrina*	FY	1983	Protected
Scarlet Tanager	*Piranga olivacea*	NE	1980	Protected
Eastern Towhee	*Pipilo erythrophthalmus*	NE	1980	Protected
Chipping Sparrow	*Spizella passerina*	X1	1982	Protected
Field Sparrow	*Spizella pusilla*	NE	1980	Protected
Song Sparrow	*Melospiza melodia*	FY	1981	Protected
Swamp Sparrow	*Melospiza georgiana*	FY	1981	Protected
Northern Cardinal	*Cardinalis cardinalis*	NY	1980	Protected
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	NE	1980	Protected
Indigo Bunting	*Passerina cyanea*	DD	1980	Protected
Bobolink	*Dolichonyx oryzivorus*	P2	1980	Protected
Red-winged Blackbird	*Agelaius phoeniceus*	NY	1980	Protected
Eastern Meadowlark	*Sturnella magna*	P2	1980	Protected
Common Grackle	*Quiscalus quiscula*	NY	1982	Protected
Brown-headed Cowbird	*Molothrus ater*	P2	1982	Protected
Baltimore Oriole	*Icterus galbula*	NY	1980	Protected
House Finch	*Carpodacus mexicanus*	FY	1982	Protected
American Goldfinch	*Carduelis tristis*	P2	1981	Protected
House Sparrow	*Passer domesticus*	FY	1982	Unprotect

Current Date: 7/6/2005

Biodiversity and Habitat Assessment

Proposed Emerald Ridge Residential Subdivision
Marsh Hill Road

Town of Putnam Valley
Putnam County, New York

Prepared for:

VS Construction Corp.
37 Croton Dam Road
Ossining, NY 10562

Prepared by:

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

July, 2005

Introduction

Tim Miller Associates was retained by the project sponsor to conduct a Biodiversity and Habitat Assessment for the proposed Emerald Ridge residential subdivision on Marsh Hill Road in the Town of Putnam Valley in Putnam County. The applicant is submitting a DEIS in support of this proposal.

Site evaluations for vegetation, wildlife and habitat potential were conducted by Steve Marino, PWS and staff at Tim Miller Associates, Inc., Environmental Planners. Mr. Marino is a certified Professional Wetland Scientist, with a degree in Biology and over 18 years of experience in the assessment of wetlands and terrestrial ecology.

Mr. Marino and Tim Miller Associates staff and consultants have recently completed a number of wildlife, habitat and biodiversity studies in southern New York. Field observation methods used on the Emerald Ridge site included establishment of transects through the site for wildlife observation, observation of biological indices (scat, prints, carcasses, etc.) and prolonged observation of several areas of the site. Site surveys did not include trapping, mist netting or other means of live animal collection. Surveys were conducted over a five month period beginning in March of 2005. More than 40 field hours were spent performing surveys for general and specific wildlife and plant species.

Mr. Marino employed a series of random/zig-zag transects with observation, listening, and/or ground searches being conducted as site specific features changed along the walking transect route (i.e. open, upland hardwood forest slopes to bottomland forested wetland, to stream corridor to scrub shrub wetland, to overgrown orchard and meadow, etc.).

The random nature of these transects allowed Mr. Marino to observe and actively investigate features of interest along the way. This tactic also allowed data to be collected from greater variety of micro-habitats, there-by imparting an unbiased impression of the diversity of natural habitats on the site. Field notes were taken before, during and upon completion of each site visit documenting animals observed, site vegetation, and apparent ecological functions observed in various parts of the site (stormwater storage, herpetile habitats, herpetile breeding opportunities, song bird habitats, raptor nesting, nutrient filtration, stream flow augmentation, sediment retention, etc.)

Based on available aerial photography, the site has been relatively undisturbed and maintaining the same cover types since at least the early 1970's. Recent aerial photography shows the existing site and surrounding properties. The property is part of a contiguous, relatively undisturbed woodland that extends north and west to Town owned property and east and west to other undeveloped lands. This land is all forested and similar to the subject site in cover type. All of this land is undeveloped and is expected to remain that way for the foreseeable future.

General Vegetation Types

There are two general vegetation types present on the property: successional hardwood forest and mature evergreen forest. Areas of wooded wetlands are included within the sucessional forest areas as described below.

Successional Northern Hardwood Forest

Successional deciduous forest covers most of the property. The majority of the woodland is best described as "succesional northern hardwoods" (New York Natural Heritage Program, 1990). This association is dominated by red maple (Acer rubrum) and gray birch (Betula populifolia), and includes a significant number of American beech (Fagus grandifolia), tulip poplar (Liriodendron tulipifera), black cherry (Prunus serotina), yellow birch (Betula lutea), and shagbark hickory (Carya ovata). The shrub and herb strata includes spicebush (Lindera benzoin), bittersweet (Celastrus scandens), poison ivy (Toxicodendron radicans), garlic mustard (Alliaria petiolata) and honeysuckle vines (Lonicera sp). These understory layers are not well-developed below the closed canopy of the hardwoods in these areas. Based on site observations, there is a significant deer presence on this site, and the lack of well developed herb and shrub layers is likely the result of deer grazing.

In those areas of the site where shallow depth to bedrock is encountered, the dominant tree species are red oak, yellow birch and beech.

In the southern part of the site, west of an existing wetland corridor, is an area that is currently used as a house site with maintained lawn. This portion of the site creates edge habitat that is not otherwise available on the property, and provides a niche for species that are well adapted to suburban environments. This area includes a variety of native as well as introduced landscape species.

The successional forest areas contain mature tree species (beech, oaks, hickory) that provide mast for deer and other mammals, and cover in the upper canopy and in standing dead trees. The proximity of some of the forest areas to existing wetlands provides additional benefit to wildlife by offering a regular water source and additional forage opportunities. There is generally a lack of significant understory and thickets within these woods, but some of these areas do exist in isolated pockets. These areas are valuable for use as cover for some smaller ground-based creatures.

A few of the species observed on the site require closed canopy forest for nesting. Ovenbird, veery and hermit thrush were identified as bird species that typically utilize woodland habitat. The ovenbird, which builds nests on the ground in dense wooded areas, was heard in the northwestern corner of the site.

This habitat type is also valuable as being part of a continuous woodland with undeveloped land to the north.

Hemlock Northern Hardwood Forest

Portions of the northeast corner of the property are dominated by eastern hemlock (Tsuga canadensis) and represent a different cover type than the rest of the property. This areas is consistent with the Natural Heritage designation for "hemlock northern hardwood forest." Approximately eight acres of the site are hemlock forest. Red maple and black birch are also observed in this canopy. The soils in this area are acidic and very stony, resulting in a different species composition. There is very little in the way of understory in this area due to the density of the evergreen canopy. Starflower, wood fern, Christmas fern and wood sorrel are in the herbaceous layer, although the groundcover is very sparse.

These areas of dense evergreens are used as cover for many of the same species (i.e., wild turkey) that utilize the more open deciduous woodlands of the site. Some specialist species that prefer this cover type and may also utilize the site include black throated green warbler, pileated woodpecker and Acadian flycatcher, although none of these species were observed during numerous site walks.

Wetlands

Four wetland areas were observed on the site, three of which are similar in size and landscape position in the northern portion of the site. A fourth, larger wetland corridor is located in the southern part of the site east of Marsh Hill Road.

Wooded Swamp

The largest wetland on the site is located east of the existing residence, and includes a drainage corridor that ultimately drains to the Peekskill Hollow Brook. This wetland is densely vegetated, with several vegetative layers, periodic open areas and braided channels conveying storm flows and groundwater discharge from north to south. American elm, tulip poplar, pin oak and red maple are the dominant tree species. Vegetation species in the herbaceous layer include skunk cabbage, jewelweed, halberd leaved tearthumb, bedstraw, poison ivy, meadow rue and sensitive and cinnamon ferns. Spicebush, barberry and hornbeam are the dominant shrubs and small trees.

Of the larger species likely to use the site, deer and raccoon are known to utilize Wetland B and its stream corridors. Signs of both species were distributed throughout the site.

The wooded swamp also is likely to provide habitat for a number of other animal species. This wetland provides cover, food and nesting sites for numerous species, typical of other large wetland tracts in Putnam County. This habitat type is not regionally unique to this site; it is available associated with other large wetlands located west, northwest and northeast of this site.

Stream Corridors

One stream corridor drains this property through the wooded swamp. The corridor provides intermittent and perennial flow when not frozen, and varies in width from two to five feet in meandering channels. The stream channel has a stony substrate, and in some areas is flanked by stone walls that provide additional habitat. Small reptiles and amphibians living within the stream corridors (red-backed and two-lined salamanders have been observed) offer additional food source to some of the larger omnivorous mammals that may be present (i.e., raccoons, fox, skunk), and the undeveloped nature of the watershed draining to the central wetland/watercourse system ensures good water quality both for the semi-aquatic species and the larger mammals that feed on them. Tree coverage provides shade for both watercourses and moderates temperature fluctuations. Although no fish species have been observed on site, moderation of stream temperatures by the adjacent vegetation is important to fish survival in downstream areas.

Vernal Pools

Located within the three wetlands in the northern part of the site are areas that appear to exhibit vernal pool hydrology. Due to the seasonal inundation of the majority of the wetland, these open areas are generally unvegetated, with thick leaf litter on the surface. Small New York ferns are the dominant groundcover in this wetland, but only small patchy areas are vegetated. There are several treed islands within the wetland. Common wetland species include highbush blueberry, red maple, spicebush, fringed sedge, summersweet, winterberry holly, and a few swamp milkweed. Outside of these "pool" areas, vegetation is dominated by red maple, green ash, American elm, spicebush, winterberry and tussock sedge.

Effective vernal pool habitats are generally small in size, and have seasonal hydrology. The pool begins to flood in late fall/early winter, and remain wet until mid-summer. This cycle is very important for several reasons.

The seasonal nature of this hydrology, where there are annual dry periods in the late summer and fall, prevents the establishment of fish populations that would prey on the eggs of the amphibian species that choose to breed here. These species include the ambystomid or mole salamanders (Jefferson, blue spotted and yellow spotted salamanders) and several frog species (particularly wood frog and green frog).

The length of the season is also very important. As mentioned above, too long a season may result in the establishment of a fish population that would eat all eggs and/or the hatched larvae. Too short a season could result in drying of the pool before the larvae have developed to a stage that is terrestrial enough to survive.

Natural Heritage's "Ecological Communities of New York State" describes this community type as a vernal pool. This ecological community is distributed throughout New York State and is ranked as "apparently secure" globally and "apparently secure" in New York State, though there is some concern about a relatively low number of known occurrences or "limited acreage" remaining (ranking of G4 and S3S4).

Stone Walls

There are numerous stone walls distributed throughout the property. These stone walls offer nesting and cover area for a variety of species, including snakes, small mammals (chipmunks, mice, rabbits, voles, etc.) and various amphibian species. Newts and salamanders are particularly likely to find suitable habitat within the stone walls within or near wetlands and watercourses. Insect and worm populations that are likely to live within the walls provide a food base for many of these creatures.

Species identified on the attached list also include a number of species that were observed during field surveys. A variety of small terrestrial animals have been sighted on the project site during the course of over 10 site visits in all seasons, including three days dedicated specifically to wildlife and bird observation. These surveys were conducted in clear weather on March 17 and 29, May 19, and July 11 and 20, 2005, and in various weather conditions. Amphibian breeding surveys were conducted in rainy weather on the night of April 15, 2005. These small animals include rabbits, raccoons, squirrels, chipmunks, and various amphibians. Deer also utilize the property. The project site is used by numerous species of birds, particularly those utilizing the closed canopy that exists.

Rare or Unusual Plant Species

The New York State Natural Heritage Program identified a New York State endangered plant as being know to occur on or within the project site. Wild hydrangea (Hydrangea arborescens) was last reported in the area in 1896, and was known at that time to exist in Orange and Putnam Counties.

Wild hydrangea requires moist woodland conditions, most typically with acidic soil conditions but is occasionally found on calcareous slopes. The flowers of the wild hydrangea are conspicuous, very similar in appearance to the hydrangea commonly available for residential landscaping, and so is easy to identify in the field. All observations made during April to July of 2005 included surveys for wild hydrangea, but none have been found to date. Based on the age of this known record, it appears that wild hydrangea may be extirpated from this part of New York State.

Observed and Expected Wildlife List Marsh Hill Road	
Mammals	
white-tail deer*	Odocoileus virginianus
coyote	Canis latrans
raccoon*	Procyon lotor
red fox	Vulpes vulpes
gray fox	Urocyon cinereoargenteus
opossum	Didelphis virginiana
eastern chipmunk*	Eutamias sp.
gray squirrel*	Sciurus carolinensis
red squirrel	Tamiasciurus hudsonicus
flying squirrel	Glaucomys volans
cottontail rabbit*	Sylvilagus floridanus
striped skunk*	Mephitis mephitis
white-footed mouse	Peromyscus leucopus
New York weasel	Mustela frenata
deer mouse	Peromyscus maniculatus
house mouse	Mus musculus
meadow vole	Microtus pennsylvanicum
starnosed mole	Codylura cristata
eastern mole	Scalopus aquaticus
woodchuck	Marmota monax
short-tailed shrew	Blarina brevicanda
common shrew	Sorex cinereus
little brown bat	Myotis lucifugus
red bat	Lasiurus borealis
Reptiles	
garter snake	Thamnophis sirtalis
milk snake	Lampropeltis triangulum
hognose snake	Heterodon pletyrhinos
brown snake	Storeria dekayi
ringneck snake	Diadophis punctatus
eastern racer	Coluber constrictor
copperhead	Agkistrodon contortrix
box turtle	Terrapene carolina
painted turtle	Chrystemys picta
Amphibians	
red-backed salamander*	Plethodon cinereus
two-lined salamander*	Eurycea bislineata
four-toed salamander	Hemidactylium scutatum
slimy salamander	Plethodon glutinosus

spotted salamander	Ambystoma maculatum
newt*	Notophthalmus viridescens
American bullfrog	Rana catesbeiana
American toad*	Bufo americanus
gray treefrog	Hyla versicolor
wood frog*	Rana sylvatica
green frog*	Rana clamitans
spring peepers*	Hyla crucifer
pickerel frog	Rana palustris
Birds	
turkey*	Meleagris galloparvo
ruffed grouse	Bonasa umbellus
wood thrush*	Hylocichla mustelina
hermit thrush*	Hylocichla guttata
pileated woodpecker	Dryocopus pileatus
hairy woodpecker*	Picoides villosus
downy woodpecker*	Picoides pubescens
yellow shafted flicker*	Colaptes auratus
ovenbird*	Seiurus aurocapillus
yellow-billed cuckoo	Coccyzus americanus
red-tailed hawk*	Buteo jamaicensis
robin*	Turdus migratorius
catbird*	Dumetella carolinensis
mockingbird	Mimus polyglottos
flycatchers	Empidonax sp.
eastern phoebe*	Sayornis phoebe
common yellowthroat	Geothlypis trichas
American redstart	Setophaga ruticella
red-eyed vireo*	Vireo olivaceus
veery	Hylocichla fuscescens
crow*	Corvus brachyrhynchos
blue jay*	Cyanocitta cristata
scarlet tanager*	Piranga olivacae
cedar waxwing*	Bombycilla cedrorum
eastern wood peewee*	Contopus virens
house finch*	Carpodacus mexicanus
house wren*	Troglodytes aedon
red-winged blackbird	Agelaicus phoeniceus
tree swallow*	Tachycineta bicolor
tufted titmouse*	Parus bicolor
warbling vireo*	Vireo gilvus
yellow warbler*	Dendroica petechia
black and white warbler*	Mniotilta varia
American goldfinch*	Carduelis tristis
cardinal*	Cardinalis cardinalis
chipping sparrow	Spizella passerina

towhee	Pipilo erythrophthalmus
junco*	Junco hyemalis
mourning dove	Zenaida macroura
chickadee*	Parus spp.
white breasted nuthatch*	Sitta carolinensis
turkey vulture*	Cathartes aura
E. screech owl	Otus asio
great horned owl	Bubo virginianus

**** Species observed during site surveys***
Sources: Tim Miller Associates, Inc., 2005, Westchester County, 1987. Croton-to-Highlands Biodiversity Plan, 2004.

Attachment

Interim Report

Nonpoint Source Implementation Of The Phase II Phosphorus TMDLs In The New York City Watershed

RECEIVED
AUG 5 2005

March 2002

Prepared in accordance with the New York City Watershed Memorandum of Agreement (January 1997).

New York State Department of Environmental Conservation

Division of Water

PREFACE

This report represents the next step in the implementation process for phosphorus load reductions in the New York City (NYC) Watershed. It has been prepared in accordance with the NYC Watershed Memorandum of Agreement (MOA, January 1997) and focuses on nonpoint source (NPS) implementation efforts that can contribute to the attainment of Phase II Phosphorus Total Maximum Daily Loads (TMDLs).

The report provides a snapshot of the current status of implementation programs, projects and activities and next steps toward a final implementation plan. It has been released as "Interim" since it does not include all of the specific implementation components outlined in the MOA and expanded upon in the U.S. Environmental Protection Agency's (EPA's) October 16, 2000 implementation strategy letter.

The New York State Department of Environmental Conservation (DEC) remains committed to the development of a final implementation plan. The Phase II Phosphorus TMDLs identified eight NYC reservoirs as water quality limited and needing nonpoint (NPS) reductions. These reservoirs are in the Croton portion of the City's watershed and are located east of the Hudson River . Thus, the timing of the final implementation plan will depend on the findings and completion of Croton Planning in Putnam and Westchester Counties, as well as the implementation of Phase II Stormwater Regulations and continued monitoring in the Croton Watershed.

In light of the above, the DEC recommends the establishment of an institutional framework to coordinate, track and assist in the development of individual basin plans as described in the EPA's October16, 2000 letter. Over the next several months, the DEC will develop a process on how to proceed and will consult with the Watershed Protection and Partnership Council (WPPC).

It is important that key components to the development of an implementation plan, such as Croton Planning and Phase II Stormwater Regulations implementation, remain on schedule. Additionally, a long-term emphasis needs to be placed on ambient monitoring to assess the effectiveness of applied best management practices (BMPs) and water quality improvements in individual basins. The specifics of nonpoint source implementation that are unavailable at this point in time should evolve from the efforts above. In summary, these include:

- identification of BMPs specific to each reservoir basin to meet TMDLs and achieve downstream standards;
- a list of municipal entities designated by Phase II Stormwater Regulations;
- quantification of upstream, additional load reductions, above those to meet the TMDL for that waterbody and necessary to achieve downstream standards;
- a description of implementation mechanisms;
- the time frame for implementing the actions;
- funding sources for implementation; and,
- a plan for evaluating/monitoring plan effectiveness.

We look forward to the continued support of all involved agencies and watershed stakeholders as the TMDL implementation process progresses.

ACKNOWLEDGMENTS

Several agencies and many people have contributed to the development of this Nonpoint Source (NPS) Implementation Report. The New York State Department of Environmental Conservation (NYSDEC) would like to take this opportunity to say "Thank You".

The Total Maximum Daily Load (TMDL) Work Group, composed of scientists and engineers from the New York City Department of Environmental Protection (NYCDEP), the U.S. Environmental Protection Agency (USEPA), and the New York State Department of Environmental Conservation (NYSDEC) have provided input, comments and technical guidance for this report. Special thanks to Dr. Kimberlee Kane of the NYCDEP and Ms. Maureen Krudner of the USEPA for their assistance.

Additionally, several people contributed to specific portions of the report:

- Sabrina Charney - Westchester County Department of Planning
- Gerry Chartier & Tom Boekeloo - NYSDEC, Nonpoint Source Management Section
- Pat Ferracane - NYSDEC, Region #3 (Tarrytown, NY)
- John Lynch - Putnam County Department of Planning
- Ken Markussen - NYSDEC, Division of Water
- Howard Pike - NYSDEC, Division of Water

Also, thanks to Barbara J. Crier for typing and formatting this report.

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1. INTRODUCTION

1.1 Report Background

The New York City (NYC) Watershed Memorandum of Agreement (MOA) prescribed a multi-step process for Phosphorus Total Maximum Daily Load (TMDL) development in the Watershed. Article VI, Section 162(h)(v) provides for the continuance of this process with the Nonpoint Source (NPS) Implementation of Phase II TMDLs as follows:

"Within six months of receiving a report (April 2001) [1] identifying potential management practices for nonpoint source pollution, the New York State Department of Environmental Conservation (NYSDEC) shall work jointly with the New York City Department of Environmental Protection (NYCDEP) and shall identify potential nonpoint source management practices it will implement and recommend potential nonpoint source management practices to be implemented by other parties. NYSDEC shall provide a description and a schedule of the implementation mechanisms."

Additionally, in its October 16, 2000 letter to the NYSDEC, the U.S. Environmental Protection Agency (USEPA) recommended several components for inclusion in the NPS Implementation Reports and related programs. These recommendations were related to a number of topics including better quantification of phosphorus load reductions, NPS management practices and implementation mechanisms and the time frame and funding sources for implementation. In summary, the EPA letter provided some guidance for the development of the NPS Reports and the importance of stakeholder involvement in the implementation process.

Based on the MOA directive above and EPA's October 16, 2000 letter, the focus of this report is to continue the process of outlining the strategy for achieving the load allocations (LAs) for watershed TMDLs.

1.2 TMDL/MOA Overview

Phase I TMDLs/WLAs/LAs for the Croton and Catskill-Delaware Watersheds were approved by the USEPA in April of 1997. The Phosphorus TMDL development process continued in Phase II with several enhancements over Phase I. These are outlined beginning on page two of NYSDEC's Phase II

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[1] Nonpoint Source Implementation of the Phase II TMDLs (April 2001).

TMDL document.[2] Dated June, 2000, the Phase II Phosphorus TMDLs were ultimately approved by EPA in October, 2000. The Phase II TMDLs identified eight Croton reservoirs as water quality limited. Each of these waterbodies is located east of the Hudson River and requires nonpoint source reductions of phosphorus loads. The eight reservoirs are part of the Croton Watershed as illustrated in Figure 1.1.

EPA's approval initiated the development of NPS Implementation Reports as directed by the MOA. The first of these reports was issued in April, 2001 by NYCDEP along with NYSDEC. This second report is the next step in the NPS Implementation process.

1.3 Other Considerations

This report will pull together pertinent information from several programs and activities. These include: the Phase II Phosphorus TMDLs for the New York City Watershed, NYCDEP's March 1999 TMDL Related Reports and its Croton Watershed Strategy, New York State's Nonpoint Source Management Program, Croton Planning for Putnam and Westchester Counties, NYSDEC's Phase II Stormwater Program, including efforts by the Center for Watershed Protection and projects funded by Safe Drinking Water Act (SDWA) and Water Resources Development Act (WRDA).

In spite of the above programs and ongoing activities that relate to NPS implementation efforts, there are limitations to what can be incorporated at this time. For example:

a. The time frame for the completion of this report does not coincide with the completion of the many ongoing activities, planning efforts and their prospective findings. Croton Plans for Putnam and Westchester Counties are scheduled for release in May 2002 and final agreement in November 2002. Also, the New York City Watershed Project (Information Technology) presented in Section 3.1.4 is scheduled for completion in the Spring of 2003.

b. Various data and information gaps in the implementation process have been identified. These include: an integrated, GIS-based water quality data management program; a flexible, adaptive GIS land use database; a modeling support tool-set consisting of modules to support terrestrial modeling (GWLF and the Upstate Freshwater

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[2] NYSDEC Phase II Phosphorus Total Maximum Daily Loads For Reservoirs In The New York City Watershed (June 2000).

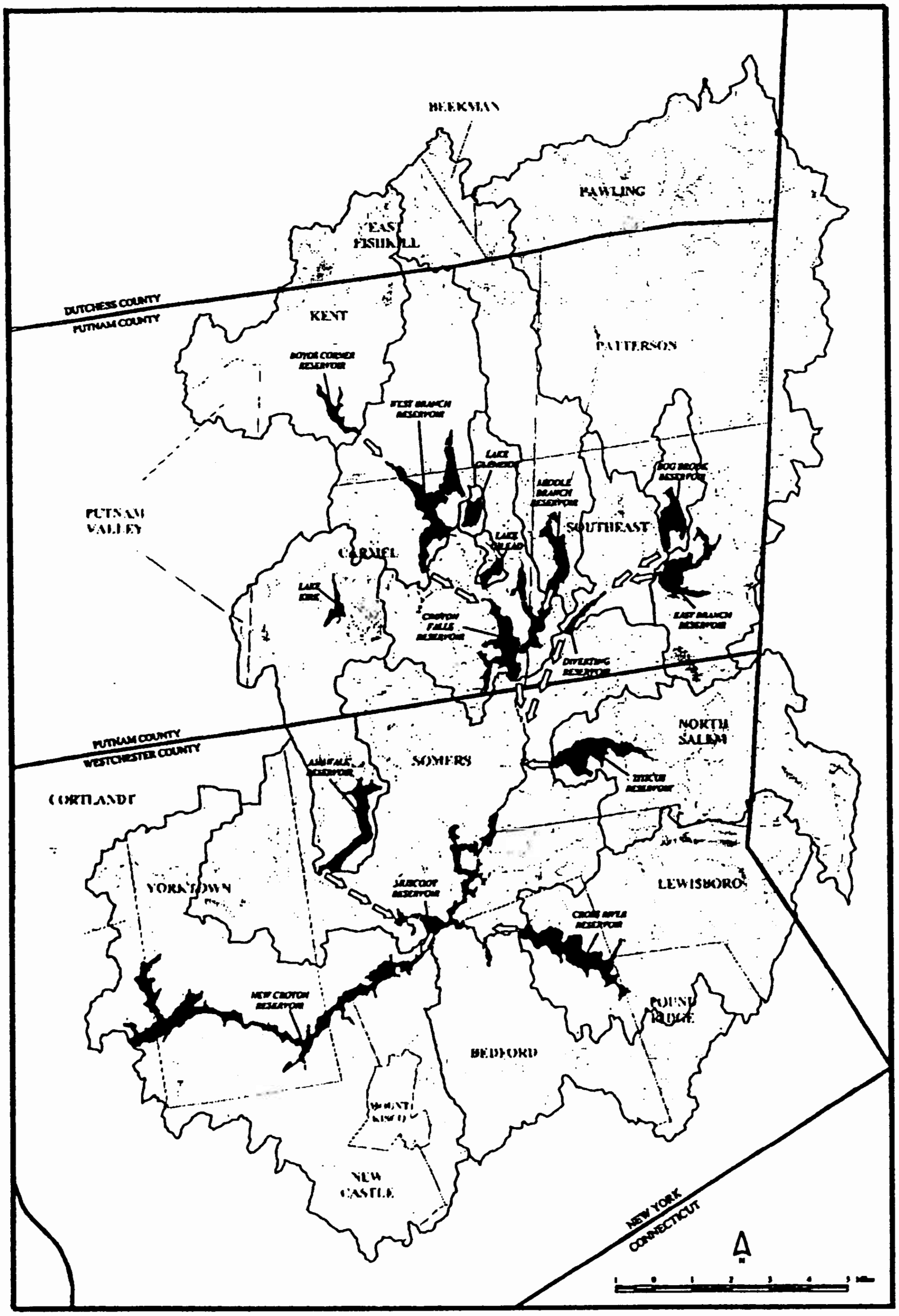

Figure 1.1. Map of the Croton Watershed.

Institute's (UFI's) reservoir model for phosphorus; improved user access to such data, information and models.

c. Relating the necessary upstream NPS phosphorus reductions to the attainment of downstream, in-reservoir phosphorus standards - numerically, among municipal boundaries and geographical boundaries - is incomplete. Section 3 discusses various implementation programs including the need to develop more specific information on NPS pollutant sources of phosphorus and the associated local capacity to take targeted actions that allow for the most efficient opportunities to reduce phosphorus loads.

d. Practices that are needed to control many NPS cannot be identified for specific locations at this time. These decisions ultimately are best linked to local decision-making processes as specific practices are defined and scheduled for implementation.

2. TMDL Background

2.1 Summary of Phase II TMDL Process

The Clean Water Act [CWA §303(D) 33 U.S.C.A §1313(D)] requires states to develop TMDLs for water quality limited waters, or those waterbodies that do not attain water quality standards after the application of technology-based controls. Such waterbodies are listed in New York State's 303(d) list which is derived from the Priority Waterbody List (PWL). NYSDEC has identified New York City Watershed reservoirs as priority waters for TMDL development for phosphorus in the 1994, 1996 and 1998 303(d) listings as required by the Clean Water Act.

Phase II Phosphorus TMDLs for each NYC reservoir represent the reservoir's phosphorus loading capacity. The TMDL is the sum of the point source wasteload allocations (WLAs) and the nonpoint source load allocations (LAs) plus a margin of safety (MOS) to account for the uncertainty in the relationship between the phosphorus loads and the reservoir's water quality.

NYCDEP has contributed significantly to the Phase II TMDL development process. The following three reports, each dated March 1999, can be found on NYCDEP's Website (http://www.ci.nyc.ny.us/htm/dep/tmdl/html).

1. Methodology for calculating Phase II Total Maximum Daily Loads (TMDLs) of Phosphorus for the New York City Drinking Water Reservoirs.

2. Proposed Phase II Phosphorus TMDL Calculation Reports for Each Reservoir.

3. Development of a Water Quality Guidance Value for Phase II Total Maximum Daily Loads (TMDLs) in the New York City Reservoirs.

These reports contain information on the following:

« phosphorus source modeling

« impact estimates of wastewater treatment plant upgrades

« basin/reservoir status with respect to the critical phosphorus load

« information and recommendations for a water supply-based criteria number for phosphorus

« land use information and related nonpoint source phosphorus loads

« Proposed Phase II TMDL calculations for each reservoir, including initial wasteload allocations (WLAs) and load allocations (LAs)

2.2 <u>Phase II TMDL Results</u>

NYSDEC's June 2000 TMDL Document contains Phase II TMDL results in a couple of different formats. Pages 21-45 cover each of New York City's 19 reservoirs with a summary write-up based on information in NYCDEP's Phosphorus TMDL Calculations Reports (3/99). Additionally, there are a number of tables that help summarize results. Table 2.1 of the April 2001 NPS Report also provides a TMDL summary.

Phosphorus Sources

Throughout the TMDL process in the NYC Watershed both point and nonpoint sources of phosphorus have been modeled. Point sources include discharges from wastewater treatment plants in the Watershed and carryover phosphorus loads from upstream reservoirs. Nonpoint source phosphorus loads are a function of land use activities, phosphorus export coefficients and the modeling. The land use categories were: urban, forest, agriculture and water. Septic systems with 100 feet of a stream or reservoir were also included as sources of phosphorus.

Point Source Reductions of Phosphorus

The New York City Watershed Rules and Regulations contain requirements for upgrading wastewater treatment plants in the Watershed to tertiary treatment with phosphorus removal. SPDES permit modifications to reflect this are in place and plant upgrades are underway. This will result in a significant reduction in point source phosphorus loads to the reservoirs. DEP's TMDL modeling calculations reflect these point source reductions since the wasteload allocations (WLAs) assume full compliance with the Watershed Regulations.

Nonpoint Sources

Table 4 from DEC's June 2000 TMDL document has been expanded in the tables below with additional information about nonpoint source phosphorus loads for water quality limited reservoirs in the Croton Watershed. Additionally, primary land use activities that relate to NPS phosphorus loads have been identified by area and estimated load contribution. The significance of this information directly relates to the remaining phosphorus reductions needed for water quality limiting reservoirs after point source loads are in conformance with New York City Watershed Rules and Regulations.

Table 2.1 presents land use information for each of the 12 Croton Watershed Reservoirs. As indicated in the Phase II TMDL Methodology Document (March 1999), the land use data is the same as that used for the Phase I TMDLs. It is derived from satellite data (LANDSAT TM) at a 28.5m resolution. Composites of 1987, 1988 and 1990 scenes were used for the East of Hudson region. It should be noted that much of the Forest and Open Space land area is actually low density residential which can present opportunities for phosphorus reductions. Currently, NYSDEC, USEPA and the NYCDEP are working together to develop improved land use coverages. This ongoing project is presented in detail in Section 3.1.4 and Appendix B.

The first eight reservoirs listed in Table 2.1 are water quality limited for phosphorus. The next four are not. It can be seen that nearly 75% of the land area in the Croton Watershed is considered forest. Approximately 11% of the area falls into the urban category. This information is important when examining where NPS phosphorus reductions can be attained.

Table 2.2 expands further on the nonpoint source information base. Here, approximate NPS phosphorus loads are tabulated as a function of land use export coefficient (Methodology Document of March 1999) for each land use category. This tabulation does not take into account upstream load contributions of phosphorus from upstream reservoirs. The loads here are calculated from land use activity within each listed reservoir basin.

Examination of this information leads to several conclusions:

1. While forested area represents nearly three quarters of the Croton's land use activity, its phosphorus load contribution is only about 20% of the total.

2. Clearly urban areas yield most of the NPS phosphorus load at nearly 60% and would seemingly present the most opportunity for load reductions.

3. Water and septic categories are relatively small contributors of phosphorous.

4. For three reservoirs: Amawalk, Middle Branch and Titicus, a reasonable reduction of NPS urban phosphorus load would meet the necessarily identified reductions in the TMDL.

5. When comparing the other five water quality limited reservoirs' urban phosphorus loads with the remaining phosphorus reductions needed it becomes obvious that substantial NPS reductions are needed to meet the TMDLs. In the East Branch, Muscoot and New Croton Basins, more than 60% reduction in urban NPS loads is needed. In Croton Falls and Diverting, the necessary phosphorus reduction significantly exceeds the urban NPS load. This means that the reductions must come from sources in addition to in-basin urban NPS.

6. The remaining four reservoirs in the Croton Watershed are not water quality limited for phosphorus and are not significant contributors of phosphorus to downstream reservoirs. The exception to this is Cross River's urban load at nearly 600 kg/yr.

The next table presented here, Table 2.3, provides an additional column of information, the calculated phosphorus loading contributed by upstream lakes or reservoirs. On the listing of eight WQL reservoirs, this upstream source of phosphorus ranges from zero or insignificant to very significant. The "daisy-chain" effect of interconnected reservoirs was discussed in Section 4.2.3 of the first NPS Report (April 2001). The list of WQL reservoirs can be rearranged in increasing order of upstream phosphorus load contributions to numerically follow this chain.

From: Interim Report March 2002 Nonpoint Source Implementation of Phase II TMDLS

While Titicus Reservoir receives no upstream lake/reservoir phosphorus loading, the next three reservoirs (Amawalk, East Branch and Middle Branch) each have upstream lakes contributing to their phosphorus load.

These are: Lake Mahopac to the Amawalk, Peach and Putnam Lakes to East Branch Reservoir, and Lake Carmel to the Middle Branch. These upstream lakes are areas where opportunities exist for phosphorus reductions particularly in the urban and septic categories. The most significant of these loads is the upstream load from Lake Carmel to the Middle Branch Reservoir, estimated at 528 kg/yr.

Table 2.1
Croton Watershed Reservoirs
(Located East of Hudson)
Land Use Area (Hectares)

Reservoir	*Forest*	*Urban*	*Open/Ag*	*Water*	*Total*	*Phase II TMDL Phosphorus Reduction [3] (kg/yr)*
Amawalk	3,409	852	616	856	5,733	122
Croton Falls	2,921	531	215	474	4,141	885
Diverting	1,234	545	67	99	1,945	983
East Branch	15,545	1,738	2,386	902	20,571	993
Middle Branch	7,001	806	420	514	8,741	204
Muscoot	13.533	3,170	1,713	646	19,062	2,058
New Croton	11,161	2,059	1,116	1,047	15,383	1,356
Titicus	4,347	676	869	371	6,263	140
TOTALS FOR EIGHT WQL RESERVOIRS	59,151	10,377	7,402	4,909	81,839	6,741
% EACH LAND USE	(72.3)	(12.7)	(9.0)	(6.0)		
Bog Brook	603	131	64	160	958	
Boyd's Corners	7,199	92	192	539	8,022	
Cross River	6,574	657	727	696	8,654	
West Branch	4,164	196	180	598	5,138	
TOTALS FOR NON-WQL RESERVOIRS	18,540	1,076	1,163	1,993	22,772	
% EACH LAND USE	(81.4)	(4.7)	(5.1)	(8.8)		
TOTALS - ALL CROTON WATERSHED RESERVOIRS	77,691	11,453	8,565	6,902	104,611	
% LAND USE	(74.2)	(11.0)	(8.2)	(6.6)		

[3] After Wastewater Treatment Plant Upgrades are achieved.

Table 2.2 Croton Watershed Reservoirs (Located East of Hudson) NPS Phosphorus Loads (kg/yr) By Land Use And Export Coefficients Calculation							
Reservoir Name	*Phase II TMDL Phosphorus Reduction [3] (kg/yr)*	*Forest (0.05)*	*Urban (0.9)*	*Open/Ag (0.3)*	*Water (0.1)*	*Septic [4]*	*Total*
Amawalk	(122)	170	767	185	86	83	1,291
Croton Falls	(885)	146	478	65	47	43	779
Diverting	(983)	62	491	20	10	24	607
East Branch	(993)	777	1,564	716	90	171	3,318
Middle Branch	(204)	350	725	126	51	18	1,270
Muscoot	(2,058)	677	2,853	514	65	227	4,336
New Croton	(1,356)	558	1,853	335	105	168	3,019
Titicus	(140)	217	608	261	37	96	1,219
TOTALS FOR WQL RESERVOIRS		2,957	9,339	2,222	491	830	15,839
("P" % EACH USE)		(18.7)	(59.0)	(14.0)	(3.1)	(5.2)	
Bog Brook		30	118	19	16	4	187
Boyd's Corners		360	83	58	54	80	635
Cross River		329	591	218	70	186	1,394
West Branch		208	176	54	60	63	561
TOTALS FOR NON-WQL RESERVOIRS		927	968	349	200	333	2,777
% EACH LAND USE		(33.3)	(34.9)	(12.6)	(7.2)	(12)	

[3] After Wastewater Treatment Plant Upgrades are achieved.

[4] Kg/yr Septic Phosphorus Load from NYCDEP Reservoir Reports.

"P" NPS LOAD TOTALS % ALL CROTON WATERSHED RESERVOIRS		3,884 (20.9)	10,307 (55.4)	2,571 (13.8)	691 (3.7)	1,163 (6.2)	18,616

Clearly, the next four reservoirs listed (Croton Falls, Diverting, Muscoot and New Croton) receive significant portions of their phosphorus loadings from upstream sources. The long-term key to meeting reservoir phosphorus criteria there rests in the reduction of these loadings. This will necessitate efficient, targeted actions, best management practices and programs as well as local stakeholder involvement in the process.

Table 2.3
Upstream Phosphorus Loads

Reservoir	*Upstream Phosphorus Loading (kglyr)*	*Phase II TMDL Phosphorus Reduction [3] (kglyr)*
Titicus	0	140
Amawalk	80	122
East Branch	189	943
Middle Branch	528	204
Croton Falls	1,083	885
Diverting	2,618	983
Muscoot	5,579	2,058
New Croton	9.108	1,356

3. Implementation of Phase II Phosphorus TMDLs - Programs

Background

In April 2001, the NYCDEP and the NYSDEC jointly issued a report which identified potential management practices and programs for controlling nonpoint source pollution. If implemented, these practices and programs would provide reasonable assurances toward attaining nonpoint source phosphorus reductions identified in Phase II TMDLs.

3 After Wastewater Treatment Plant Upgrades are achieved.

A recurring theme in discussions held leading up to the preparation of this second report has been that the report should be specific in its recommendations where possible and focus on the processes of implementation. Such "processes" to be considered include:

- incorporating ongoing programs and projects
- coordination among various stakeholders and their programs
- problem identification and prioritization
- improved NPS data base and analysis
- funding sources and implementation schedules

As indicated in the April 2001 NPS Report, existing programs that may impact nonpoint sources of phosphorus must be assessed. There are numerous State, City, County and Local program activities that will need to be evaluated relative to their impact on identified nonpoint source phosphorus reductions. Are these programs sufficient or will they require modifications or additions to accommodate TMDL implementation? Obviously, program assessment and coordination will be key to implementation efforts.

3.1 New York State NPS Programs

In accordance with Section 319 of the Clean Water Act, the NYSDEC has prepared a Nonpoint Source Assessment and a Nonpoint Source Management Program. The Nonpoint Source Assessment was initially completed in 1988 and approved by the EPA on July 1989. An update of this Assessment has been prepared every two years. The latest assessment is in the 1996 Priority Waterbodies List. Since then, the Department has published the PWL assessment information on a 5-year rotating schedule established as part of a Comprehensive Assessment Strategy. The strategy is fully described in the October 2000 NPS Management Program, Appendix D. The Nonpoint Source Management Program was approved by the EPA in January 1990. The Management Plan was updated and approved by the EPA in October 2000. Copies of the Management Program are available from Gerry Chartier (grchart@gw.dec.state.ny.us) (518) 402-8244.

New York State's Nonpoint Source Management Program is charged with the control, reduction or treatment of polluted runoff through the implementation of structural, operational or vegetative management practices. The New York State Department of Environmental Conservation (NYSDEC) works with the New York Nonpoint Source Coordinating Committee (NYNPSCC) to administratively coordinate various state agencies and other interested partners having regulatory, outreach, incentive-based, or funding programs that foster installation of management practices for any of the identified sources of nonpoint pollution threatening or impairing the waters of New York. Local implementation and statewide coordination and evaluation are conducted on a watershed basis.

Nonpoint source pollution usually is best prevented or remediated by employing one or more management practices. A management practice is a means of preventing or reducing the availability, release or transport of substances which adversely affect surface and groundwaters. It is a practice used to prevent or reduce the impact of nonpoint pollutants usually from a specific source category. Appendix E of the NPS Management Plan describes four statewide workgroups addressing six of New York's priority source categories through project recommendations, management practice updating, policy recommendations and information exchange and distribution.

New York has developed a series of ten Management Practices Catalogues each containing management practices for a particular source category. For this list of tested and approved practices, the best practice should be selected and used by individuals of groups wherever needed to diminish the impact of nonpoint source pollution. They can be used without a formal planning process or without an identification of a specific problem. They make good environmental sense. Use of appropriate management practices helps build environmental responsibility. A summary of management practices by land use was provided in the April 2001 NPS Report. The complete catalogues are also available from Gerry Chartier.

NYSDEC has a New York City Watershed Data Management and Software Tool Development Project that will develop an integrated high resolution GIS data base with a suite of management tools integral to the database that will be used to map and model the NYC Watershed. The data and tool suite is to be internet accessible. It is our intent to use the NYC Watershed project as a template for other watersheds in the state. One result of many will be a better capability to target management practices for greater effectiveness. This work should be completed by the Spring of 2003. See full project description in Section Appendix B.

Coastal NPS Pollution Control Program

The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) included a section devoted to coastal nonpoint pollution control, now known as Section 6217. This federal legislation requires New York and about 30 other states and territories with approved coastal management programs to develop and implement programs to control nonpoint pollution to restore and protect coastal waters. The Croton Watershed falls within the geographic scope of 6217.

The central purpose of Section 6217 is to strengthen the links between federal and state coastal zone management and water quality programs. Another purpose is to enhance state and local efforts to manage land use activities that degrade coastal waters and coastal habitats.

At the federal level, the program is administered jointly by EPA and the National Oceanic and Atmospheric Administration (NOAA), respectively, the federal water quality and coastal management agencies. This approach is echoed at the state level, where DEC and the Department of State's (DOS) Division of Coastal Resources are jointly responsible for program development and implementation. The two agencies entered into a partnership (through a Memorandum of Understanding) to develop New York State's Coastal Nonpoint Pollution Program Document. New York received conditional approval on November 18, 1997. Several NPS pollution control strategies were submitted to EPA/NOAA since then; the last in December 2001. The strategies describe how DEC and DOS programs address the conditions necessary for full program approval.

The EPA and NOAA guidance lists 57 management measures in six source categories. DEC and DOS have determined, after a review of existing programs, that about two-thirds of these management measures are already in place in New York State. Such programs as waste oil recycling and wetland protection programs already achieve many of the goals of the 6217 program. Given the wide range of programs and agencies involved in nonpoint pollution management in New York, DEC and DOS have purposely decided to build on existing programs wherever possible when implementing the 6217 program.

3.1.1. Phase II Stormwater Regulations and Their Implementation in Putnam and Westchester Counties

Introduction

DEC is evaluating the geographic scope of permit issuance for municipal separate storm sewer systems and to expand the permit requirement for construction activities in Westchester and Putnam Counties. This is due to the implementation of the Federal Phase II Stormwater Regulation and the Phase II Total Maximum Daily Loads (TMDL).

3.1.1.a Federal Phase II Stormwater Regulations

Background and Designation Criteria

On October 29, 1999, USEPA issued its Phase II Stormwater Regulations. The Phase II regulations require certain municipal separate stormwater sewer systems (MS4s) and construction activities to apply for Clean Water Act permits and to implement stormwater discharge management controls.

Municipal Separate Sewer Systems

Most of Westchester and Putnam Counties are categorically covered by EPA's Phase II Rule as urbanized areas. All MS4s in areas designated as urbanized will be required to have a permit no later than March of 2003. The permit will require that all MS4s develop and implement a stormwater management program which includes at least the following six (6) minimum control measures:

- Public Education and Outreach
- Public Participation/Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post Construction Runoff Control
- Pollution Prevention/Good Housekeeping

The following towns, and any municipal stormwater systems within them, are categorically covered:

Carmel	Putnam County
Kent	Putnam County
Patterson	Putnam County
Phillipstown	Putnam County
Putnam Valley	Putnam County
Bedford	Westchester County
Cortlandt	Westchester County
Eastchester	Westchester County
Greenburgh	Westchester County
Harrison	Westchester County
Mamaroneck	Westchester County
Mount Pleasant	Westchester County
New Castle	Westchester County
North Castle	Westchester County
Ossining	Westchester County
Pelham	Westchester County
Pound Ridge	Westchester County
Rye	Westchester County
Somers	Westchester County
Yorktown	Westchester County

In addition to requiring permits in the "urbanized areas," the federal Phase II regulation provides that DEC may require permits if discharges from an MS4 "cause or have the potential to cause, an adverse impact on water quality."

The regulation suggests criteria for these discharges including:

« discharge to sensitive waters
« high population density;
« high growth or growth potential;
« contiguity to an urbanized area;
« significant contributor of pollutants to waters of the United States; and
« ineffective control of water quality concerns by other programs.

DEC believes that MS4 discharges in Westchester and Putnam Counties may meet these criteria.

Small Construction Activities (Statewide)

The Phase II regulations also expand the permit requirement to small construction activities, automatically designating as a small construction activities land disturbances of equal to or greater than one and less than five acres. (Land disturbances of greater than five acres are regulated under the Phase I rule.) DEC will develop specific requirements for Stormwater controls on Phase II construction activities.

DEC is reviewing whether to use the existing Phase I general permit for construction activities as a guide for the Phase II permits. A stormwater pollution prevention plan would likely need to be developed for each construction site greater than one acre. It is also possible that the construction activity general permit may need to include some conditions that are geographically specific for construction activities in watersheds that need stormwater controls for phosphorous.

3.1.1.b **Enhanced Stormwater Management**

In order to determine the best way to assure more protection from stormwater discharges in Westchester and Putnam Counties, DEC has engaged the services of the Center for Watershed Protection (CWP). CWP has considerable experience developing watershed specific programs for the control of stormwater runoff, and conducting local stormwater program reviews for communities in Massachusetts, Ohio, Maryland and Virginia.

The Center will:

- Review existing stormwater programs and policies in Westchester and Putnam Counties;

- Review management measures employed elsewhere to protect water supply watersheds;

- Evaluate alternatives and make recommendations to control pollutants from existing development;

- Evaluate alternatives and make recommendations for controlling pollutants from new development;

- Evaluate alternatives and make recommendations for controlling sediment discharge from small construction sites.

- Review existing stormwater programs and policies in Westchester and Putnam Counties; and

- Meet with and solicit input from stakeholders to discuss its review and evaluation.

Based upon this information, DEC will develop a specific plan to implement the Phase II Stormwater Regulations in Westchester and Putnam Counties. This may include the designation of all the area in the East of Hudson Watershed area or Counties located as an "urbanized area" requiring a permit for municipal separate storm sewers (MS4s) and the development of special permit conditions for the MS4s and construction permits.

SCHEDULE

An initial meeting has been held with CWP to begin work. A meeting was held with Westchester and Putnam Counties to discuss the implementation of the Phase II TMDLs and Phase II Stormwater Permits. CWP has met with environmental stakeholders to gain a better understanding of their views on stormwater controls in the Westchester and Putnam Counties. CWP will make final recommendations by June 2002. It is anticipated that DEC will fully develop a plan for the implementation of stormwater permits by December 31, 2002 and begin the process of implementing the program in January 2003.

3.1.2 Safe Drinking Water Act and Water Resources Development Act Projects

Several projects that are funded by SDWA and WRDA are presented in detail in Appendix A. They relate directly or indirectly to phosphorus water quality concerns in the Croton Watershed and can help provide opportunities for phosphorus load reductions. These projects are associated with the following activities:

« Wetlands Mapping and Assessment

- « Educational Outreach
- « BMP Assessment
- « Phosphorus Management
- « Monitoring and Modeling
- « Community Involvement and Stewardship
- « Enhancement Program for Land Use Planning and Zoning Regulations
- « Stormwater Management Facilities Evaluation
- « Sewer System and Wastewater Treatment Facility Projects
- « Agricultural NPS Assessment
- « Croton Stormwater Conveyance and Implementation Projects
- « Agricultural BMP Implementation

From the standpoint of program integration and coordination, it is important that the products of these, and all projects in the Croton Watershed, be accessible to Putnam and Westchester Counties. Existing implementation mechanisms need to be utilized and new implementation mechanisms need to be developed to link Croton Planning to ongoing projects.

3.1.3 NYSDEC Region 3

The DEC's Region 3 Office is involved with several NPS programs which may directly or indirectly reduce NPS phosphorus loads in the Croton Watershed. These include:

1. Stormwater Enforcement Initiative - Since January 2001, the Region has implemented an enhanced Stormwater Enforcement Initiative designed to assure compliance with the SPDES General Permit for Stormwater Discharges from Construction Activity and the NYCDEP Watershed Rules and Regulations for stormwater. The Initiative, which is implemented through a coordinated effort with NYCDEP, includes site monitoring and formal enforcement actions for noncompliance. Department Consent Orders, designed to penalize violators and achieve site compliance, are developed for all projects found to be in violation. By assuring compliance with the Department's and NYCDEP's stormwater management requirements, phosphorous loads associated with stormwater run off from construction activity will be significantly reduced.

2. Westchester County Stormwater Advisory Committee - Regional DOW staff are participants in the Stormwater Advisory Committee, which was formed by the Westchester County Legislature. The Committee's purpose is to identify regulatory, educational, and technical issues the County, and its communities, will need to address to upgrade existing local stormwater control programs. Identifying local stormwater management program needs, and developing

solutions, will reduce NPS phosphorus loads from existing and future development areas.

3. Education - Regional staff participate in the delivery of educational programs designed to increase the public's awareness of water quality issues associated with stormwater runoff. The educational programs include problem identification, potential solutions, and funding programs/sources. An increase awareness of stormwater quality impacts and their solutions will generate public resolve to mitigate adverse stormwater impacts, including the reduction of phosphorous loads to the NYC Water Supply Watershed.

4. Coordinated NPS Control Efforts - Through participation in County programs, such as County Water Quality Coordinating Committees, Regional staff assist in the development and implementation of efforts to coordinate NPS runoff projects with Federal, State, County, local municipalities, and private environmental organizations.

5. Funding - Regional staff assist municipalities in the identification of NPS water quality issues and potential solutions, and sources available to secure funding for corrective measures.

3.1.4 New York City Watershed Data Management and Software Tools Development Project

This project is funded by the EPA and the DEC and utilizes SDWA funds. It will develop an integrated high resolution GIS data base with a suite of management tools integral to the database that will be used to map and model the NYC Watershed. The data and tool suite is to be internet accessible. It is the DEC's intent to use the NYC Watershed project as a template for other watersheds in the state. This work should be completed by the Spring of 2003. A complete write-up of this project is presented in Appendix B.

Project Summary Watershed protection requires the cooperation of the Federal, State and local governments. Non-point source pollutant mitigation is highly dependant on land use changes and/or the modification of land use practices. Changing the behavior of local people for the benefit of the quality of our water resources is extremely difficult. Sweeping regulatory edicts targeted at local governments and property owners based on generally suspected water quality limiting land use practices will not work. We need to build local capacity to use and understand the importance of the land use practices on water quality. To do that we need to have a level of sophistication that can identify specific pollutant sources and the means to reduce the sources of pollutant loading. This will allow targeted actions to be considered and enacted with the cooperation of the local governments.

The goal of this project is to develop an improved Information Technology framework to better assess both the East of Hudson (EOH) and West of

Hudson (WOH) regions of the New York City (NYC) Watershed. In particular, there is a significant requirement in demonstrating the relative progress towards achieving the goals stated in the 1997 Watershed Memorandum of Agreement (MOA). It is the overall objective of this project to complement the existing New York City Department of Environmental Protection's watershed planning and management program by developing higher resolution data, improving the technological tools to make the program more effective and efficient and by developing a common Geographic Information System to leverage the capability of the watershed program.

This project has the following five key objectives:

1. Develop an integrated, GIS-based, water quality data management tool set for improved watershed management for the NYC Watershed.

2. Develop a flexible, adaptive GIS database framework which has the capability to integrate a variety of existing geospatial data.

3. Develop a semi-automated modeling support tool set that would consist of a modules to support the terrestrial model (GWLF), and Upstate Freshwater Institute's (UFI's) reservoir model.

4. Based upon a set of priorities established by NYSDEC and NYCDEP, develop scenario support tool set to address Stormwater Best Management Practices (BMPs), phosphorous loads, land acquisition, stewardship, and stream bank restoration programs.

5. Develop a capability to allow different levels of user access to other interested agencies, including NYSDEC, USEPA, local government as well as selected non-governmental organizations.

3.2 New York City Department of Environmental Protection Programs

The April 2001 NPS Implementation Report detailed the various NYCDEP implementation programs and efforts that are underway. These include: the Wastewater Treatment Plant Upgrade Program, the Watershed Agricultural Program, Water Quality Investment Funds, Watershed Protection and Partnership Programs, Watershed Rules and Regulations, Filtration Avoidance Determination, Croton Process Studies, the Croton Watershed Strategy and Croton System Special Studies.

Information relating to the above programs can be found in Sections 3 and 5 of the April Report. This can be accessed at DEP's website (http://www.ci.nyc.ny.us/html/dep) under TMDL Reports

Additionally, NYCDEP is directly involved with many of the Programs and Projects summarized in this Section of the Report. The individual write-ups indicate DEP's active role.

3.3 New York City Watershed Partnership Program - Croton Planning

The New York City Watershed Partnership Program was formed by Executive Order in October 1997. It has introduced a number of initiatives to create partnerships to protect and enhance water quality. The Watershed Protection and Partnership Council (WPPC) has been formed as a permanent, regional forum to aid in the long-term protection of drinking water quality and the economic viability of watershed communities.

Most of the Watershed Partnership Programs have been funded by New York City and include projects such as infrastructure improvements, environmentally sound development, wastewater treatment plant upgrades, sewer extensions, septic system rehabilitation/replacement, stormwater retrofits or new stormwater controls and stream corridor protection. As part of the partnership program, a Croton Watershed Protection Plan is being developed by Putnam and Westchester Counties. One of the goals of Croton Planning is to improve water quality in the Croton Watershed thereby assisting in the attainment of water quality standards including phosphorus.

3.3.1 Putnam County Croton Plan

Activities Completed to Date

Putnam County's Croton Plan began on November 7, 1997 with the signing of an Intermunicipal Agreement (IMA) between Putnam County and the Putnam municipalities in the New York City watershed. The IMA determined that the Putnam Croton Plan would be produced jointly by the County and the watershed municipalities. NYCDEP is a partner in plan preparation and the NYSDOH is available for consultation.

In 1998, the County produced a resource document and prepared a planning analysis of regulatory impacts on current municipal master plans and zoning ordinances. The planning analysis will serve as an appendix in the completed Croton Plan. From 1998 to the present, each municipality has been working on their Croton Plans. All six municipalities have completed drafts. Two of the six municipalities have final drafts.

Ongoing Activities/Projects

Four municipalities are in the process of working on responses to comments received from drafts. The County is in the process of drafting a summary section, which will highlight municipal findings and recommendations. In four of the six municipalities, master plan and zoning ordinance revisions have been completed or are in progress. The towns of Carmel and Patterson have adopted new master plans. The towns of Southeast and Putnam Valley have master plan revisions in progress. Carmel and Putnam Valley have zoning ordinance revisions in progress. Kent will likely begin master plan and zoning ordinance revisions in 2002. Patterson and Southeast will likely begin zoning ordinance revisions in 2002. No master plan or zoning ordinance changes are anticipated in Brewster in the next few years.

Aside from master plan and zoning ordinance work, which will incorporate recommendations from municipal Croton Plans, work will be done by various municipalities on other environmental ordinances. Additionally, land use planning work will be supplemented by land acquisitions and projects related to wastewater and stormwater improvements.

Schedules

Putnam's Croton Plan is scheduled for release in May 2002. Final agreement on the plan is scheduled for November 2002. Between May and November, there will be a public comment period.

Funding Sources

Funding for water quality improvement projects and land acquisition may come from the East of Hudson Water Quality Investment Program and other sources such as the Clean Water/Clean Air Bond Act. Local funds will be the likely source for municipal land use planning activities. In terms of project funding, a dedicated source of funds is needed. Reliance for project funding should not be on competitive grants or loans that fund multi-purpose program categories.

Opportunities for NPS BMPs And/or Other Load Reduction Strategies for Phosphorus at the County/local Level:

Opportunities for load reduction strategies have been identified in the Croton Plan. Strategies include both specific problem remediation, control of potential future problems, and policy recommendations. Opportunities for load reduction will seek to maximize the use of existing programs and fill gaps with future programs. Land acquisition, revised land use regulations, and specific project implementation will be mixed with the county's existing Lake Management Program, land acquisition program, Agricultural Environmental Management Program, and Groundwater Assessment Program.

Mechanisms for Implementation

Mechanisms for land use regulation and existing program implementation are in place through local planning and zoning boards. Mechanisms for new program implementation will need to be developed and will depend on program responsibility, project location, and funding source. At this time, it is anticipated that a county level coordinating committee will be needed. It is also anticipated that additional staff may be needed at the county and/or municipal level.

Coordination with NYCDEP and NYSDEC

Coordination will occur as needed. The primary coordination functions will be determining project priority, funding, and monitoring for project impact.

3.3.2 Westchester County Croton Watershed Protection Programs

Croton Planning

In the Spring of 1998, the ten Westchester County Croton Watershed Communities of Bedford, Cortlandt, Lewisboro, Mt. Kisco, New Castle, North Castle, North Salem, Pound Ridge, Somers and Yorktown passed municipal resolutions to cooperate with Westchester County and develop the Croton Watershed Water Quality Protection Plan (the Croton Plan) as outlined in the Rules and Regulations to Protect New York City's Drinking Water Supply.

Scope of the Croton Plan

In December 1998, the Work Plan for the Development of the Comprehensive Croton System Water Quality Protection Plan in Westchester County was developed. The Work Plan outlined various studies which would achieve the goals of the Croton Plan.

The following information provides a summary of the various components of the Croton Plan expected to be complete by May 2002.

Land Use Summary

A Land Use Summary will provide an overview of land use in the Croton Watershed both on a municipal basis and from a watershed perspective. The foundation of the land use summary is a watershed land use classification system that was developed to address the "environmental condition" of properties within the Croton Watershed. The watershed classification system was created to define land use as it relates to water quality (i.e. the pollutant potential of differing land uses). Each parcel of land within the Croton Watershed was classified into a category where a "pollutant loading" coefficient could be associated with the parcel. This approach allows for distinction of land use by the uses potential environmental impact. In addition, production of this report includes detailed geographic information system datalayers of tax parcel mapping, land use and zoning.

County and Local Ordinance Review

The Rules and Regulations to Protect New York City's Drinking Water Supply are only one level of land use control in the Croton Watershed. Each of the Croton Watershed municipalities, including Westchester County, have their own local controls that shape development and protect the environment. An analysis of the level of protection that these ordinances provide for the watershed and the way that they shape new development within each of the communities is nearing completion.

A comparison of the protection standards set forth in New York City's Rules and Regulations is also nearing completion.

Determining the Impact of Local Environmental Controls and NYCDEP's Rules and Regulations (Build-Out Analysis)

The Rules and Regulations to Protect New York City's Drinking Water Supply may have implications on the way that Westchester County's communities are growing, developing and sustaining themselves. Some of the controls found within the Rules and Regulations to Protect New York City's Drinking Water Supply may conflict with the way a municipality envisions its growth through existing local land use controls (master plans and zoning) and other local ordinances. Currently an analysis is being conducted to determine the amount of development that can be expected to occur within a municipality and to identify the development potential of parcels that may be impacted by the Rules and Regulations to Protect New York City's Drinking Water Supply.

Municipal Housekeeping Practices

Westchester County surveyed each of the Croton Watershed municipalities regarding the type of housekeeping practices (street sweeping, recycling, catch basin cleaning, etc.) that they employed. The results of the survey led to a focused approach regarding road and stormwater infrastructure maintenance because it was an area of most concern to the municipalities, as well as an area where the most significant potential changes could occur to improve water quality. Summarizing the survey results along with other related information into a road and highway practices report is currently underway.

Water Resource Condition Report

A compilation of existing water quality information regarding the seven watershed drainage basins, such as known water quality problems and existing water chemistry, is nearing completion. This report serves as the water quality baseline for recommendations made within the Croton Plan.

Point Source Pollution

Information regarding point sources of pollution in the watershed was collected during the data collection phase for the Water Resource Conditions Report. SPDES permit sites, hazardous waste sites and solid waste sites have been mapped in each of the subwatershed areas. The Sewage Diversion Study identified 30 wastewater treatment plants and 31 "focus areas" (areas where septic problems are suspected or anticipated due to density of development) which are part of the mapping information for this report. Discussions and mitigation strategies for leaking underground storage tanks and septic problem areas are underway. Developing mitigation strategies for the remaining point sources of pollution (WWTPs, hazardous waste sites, etc.) goes beyond Westchester County's level of authority because these point sources of pollution are regulated by New York State.

Surface Waters

As part of the Croton Streamwalk program, Municipal Action Teams (local committees established to assist with the planning process) received information regarding "priority areas" as identified in the Water Quality Conditions Report. Priority areas consist of streams where known or suspected water quality impairments exist. In addition, areas where there is insufficient information to make a water quality determination are noted. The Municipal Action Teams organized Streamwalk Volunteers. Westchester County held training seminars for Streamwalk Volunteers in throughout June, July and August 2001. Volunteers were asked to walk stream segments between June and September. Given the dry weather conditions, the streamwalk was extended through November 2001. Once the surveys are complete (expected in early January 2002), County staff will verify the impairments. General restoration recommendations and cost estimates will be made based on the impairments at each site. Restoration priorities will be identified based on the location of the impairment in the watershed, the suspected water quality impact of the impairment, as well as the number of impairments identified within each town and within each subwatershed. Detailed implementation schedules and associated timelines will be determined as part of project implementation, not as part of the planning process.

Groundwater Resources

A majority of the population within the Croton Watershed maintains private wells for drinking water. Given the prevalence of well usage, Westchester County has developed a groundwater study to inventory existing groundwater information and determine future directions based on the assessment of existing information.

Stormwater

Westchester County received a Water Resources Development Act grant award to map and assess the stormwater conveyance system in the Croton Watershed. This study is currently underway. The study, while scheduled to be complete after the Croton Plan is completed, will provide the Croton Watershed municipalities with a stormwater guidance manual and detailed information regarding stormwater restoration in a demonstration watershed.

Watershed Stakeholders

Residents, business people, not-for-profit organizations, etc. each have a stake in the environmental conditions of the watershed. In January, a web-based Croton Watershed Organizational Directory will be available on the Westchester County Web Site.

Watershed Education and Outreach

Westchester County, working with the watershed municipalities, developed education priorities regarding water quality protection. This information is being compiled into an education and outreach plan including education messages; target audiences and implementation strategies that each municipality and the County will commit to implement after the Croton Plan is agreed to.

Other Water Quality Initiatives

Westchester County is working to protect its water resources. The following countywide water quality initiatives and special studies have been established in 2001:

« Westchester County developed a water quality awareness campaign with "Chester the Trout" who delivers and promotes a water quality message to "Keep Westchester's Water H_2OK". Chester can be found on Westchester County's water quality website at www.westchestergov.com/waterquality.

« A joint executive/legislative Stormwater Advisory Committee (SWAC) was established. In addition to the SWAC's exploration of stormwater issues throughout Westchester County, a Stormwater Management Study of the Croton Watershed was initiated. This study, focusing on the Hallocks Mill Brook, will lead to the development of a land use and watershed protection guide for municipal officials

« The Westchester County Septic Service Contractor Licensing Program was developed to assure consistent and adequate septic system installation and maintenance. In addition, this program includes the development of a database to track septic permitting and maintenance activity.

« To protect agricultural land throughout Westchester County, the County, with State approval, established a county-wide Agricultural Protection District.

« Westchester County began working with the DEC to establish a Volunteer Citizen's Monitoring Program which will involve training County volunteers to monitor water quality in their backyards and report their findings on a web-based database.

« Westchester County conducted three Watershed Education Symposia. The Watershed Symposium involved participation from 18 schools throughout Westchester. The Watershed Symposia is an annual conference where students gather to discuss water quality, watersheds and land use decision-making.

4. Implementation of Phase II Phosphorus TMDLs-Actions to be Taken

4.1 Background

As indicated earlier, the MOA has prescribed a multi-step process for Phosphorus TMDL development in the NYC Watershed. This includes an implementation process that requires NYSDEC to identify potential NPS practices and programs that will be implemented by DEC and other parties.

4.2 Actions NYSDEC Will Implement

1. NYSDEC will continue implementing the Statewide Nonpoint Source Management Program which was updated in October 2000.

2. NYSDEC will continue to implement all elements of its approved Coastal Nonpoint Source Management Program. This program includes all of the Croton Watershed.

3. New York State will continue to provide funding to encourage the implementation of nonpoint source management practices. Funding priority is given to the implementation of NPS management practices that are in watersheds with approved TMDLs such as the Croton Watershed.

4. New York State will implement Phase II Stormwater regulations in the Croton Watershed as well as General SPDES Permit conditions.

5. New York State will continue to work with NYC, USEPA and all affected parties to fully implement the NYC Watershed Agreement. New York State remains committed to the implementation of the Watershed Agreement. This commitment involves the expenditure of more than $53 Million over a 15 year period. Program committments are summarized throughout this report and are geared toward the protection of the City's water supply and the economic vitality of upstate watershed communities.

6. When identified as lead agency, New York State should utilize the State Environmental Quality Review Act (SEQRA) to:

   « Consider the potential for Phosphorus loading of a proposed project in its early stages, and when necessary, require an Environmental Impact Study (EIS) to address water quality.

   « Address stormwater issues associated with a proposed project.

   « Evaluate compliance with the phosphorus TMDLs in the Croton Watershed.

7. NYSDEC will continue to work with USEPA and NYCDEP on the New York City Watershed Data Management and Software Tool Development Project.

   This project is viewed as a significant component of nonpoint source implementation efforts in the Watershed. It includes the following key objectives:

   « Improved Information Technology by developing GIS-based water quality management tool set for improved watershed management in the NYC Watershed.

   « Develop flexible, adaptive GIS-based database.

   « Develop modeling support tool set.

   « Develop tool set able to address Stormwater Best Management Practices (BMPs), phosphorus loads, etc.

   « Develop capability for different levels of user access.

8. NYSDEC will continue to work on projects funded by the SDWA and WRDA. These projects are described in detail in Appendix A.

9. New York State has revised the general stormwater permit for industrial categories and will continue to implement the industrial general permit program. The general permit for construction activities is in the process of being revised as part of the Phase II Stormwater Permit Program.

4.3 Actions Recommended To Be Taken By Others To Implement Phase II Phosphorus TMDLs

4.3.1 The USEPA should:

1. Reauthorize the Clean Water Act. There is a need to reauthorize the CWA to focus more on nonpoint source concerns and to provide adequate funding to the states and local municipalities to implement water quality programs. Specifically, there is a need to increase the federal government's contribution to clean water. Including: reauthorize Title VI of the State Revolving Fund Program and increase funding to two billion dollars annually; Authorization for state program grants under section 106 should be increased to 400 million dollars; funding for the Nonpoint Source Program should be authorized at 300 million dollars annually. Meanwhile EPA should continue Clean Water Act Implementation.

2. Provide continuous funding for SDWA and WRDA projects including monitoring.

3. Continue with its evaluation and reauthorization processes for the New York City Watershed Filtration Avoidance Determination (FAD).

4. Finalize regulations for TMDLs and provide guidance that addresses the role of watershed planning in TMDL implementation.

4.3.2 **New York City should:**

1. Fully implement all elements of the NYC Watershed Agreement;

2. Continue FAD development;

3. Continue with its Croton Watershed Strategy and Process Studies;

4. Work with USEPA and NYSDEC on the Watershed Data Management and Software Tools Development Project. The improved information base and models resulting from this project is expected to play an integral part in targeted phosphorus reduction implementation opportunities;

5. Continue to implement its Watershed Protection and Partnership Programs through funding, technical expertise and coordination;

6. Continue its water quality monitoring and assessment programs. These efforts are key to understanding, on a system-wide basis, the impacts of NPS implementation projects.

7. Implement the findings of NYCDEP's 1997 report entitled, "Croton Water Supply System - Extended Special Study Program". The report specifically recommends the restoration of wetlands and construction of extended detention ponds as best management practices (BMPs) to reduce phosphorus loads within the Croton System.

8. When identified as lead agency, New York City should utilize the State Environmental Quality Review Act (SEQRA) to:

   « Consider the potential for Phosphorus loading of a proposed project in its early stages, and when necessary, require an Environmental Impact Study (EIS) to address water quality.

   « Address stormwater issues associated with a proposed project.

   « Evaluate compliance with the phosphorus TMDLs in the Watershed.

4.3.3 Actions To Be Taken By Local Government

4.3.3.a. Putnam County should:

1. Continue with the local master planning, zoning ordinance and land use planning efforts as they are integral to phosphorus loading controls.

2. Continue to utilize local planning and zoning boards as mechanisms for land use controls, particularly as they relate to NPS phosphorus loads.

3. Explore the development of County Level Coordinating Committee for Croton Planning Projects and Actions.

4. Act as a facilitator to utilize the outputs of the Information Technology Project (3.1.4.) And communicate and distribute the project's management tools to local decision makers.

5. Use funding provided by New York City as a part of the Water Quality Investment Program to help implement projects to reduce nonpoint source phosphorus loads in the Croton Watershed.

6. Consider implementation of the findings of NYCDEP's 1997 report for the Croton Water Supply System referenced above, and its specific BMP recommendations.

7. When identified as lead agency, Putnam County should utilize the State Environmental Quality Review Act (SEQRA) to:

   « Consider the potential for Phosphorus loading of a proposed project in its early stages, and when necessary, require an Environmental Impact Study (EIS) to address water quality.

   « Address stormwater issues associated with a proposed project.

   « Evaluate compliance with the phosphorus TMDLs in the Croton Watershed.

8. Complete Croton Planning as scheduled for November 2002.

4.3.3.b. Westchester County should:

1. Continue Croton Planning including efforts relating to the following components: Land use summary; County and local ordinance review; build-out analysis; survey of municipal housekeeping practices; water quality streamwalk program; stormwater assessment study; watershed education and outreach,

2. Continue stormwater advisory committee (SWAC) efforts working toward the development of a land use and watershed protection guide for municipal officials.

3. Continue County-wide programs and awareness campaigns relating to septic systems, agricultural protection and water quality monitoring.

4. Act as a facilitator to utilize the outputs of the Information Technology Project (3.1.4.) And communicate and distribute the project's management tools to local decision makers.

5. Use funding provided by New York City as a part of the Water Quality Investment Program to implement projects to reduce nonpoint source phosphorus loads in the Croton Watershed.

6. Consider implementation of the findings of NYCDEP's 1997 report for the Croton Water Supply System referenced above, and its specific BMP recommendations.

7. When identified as lead agency, Westchester County should utilize the State Environmental Quality Review Act (SEQRA) to:

   « Consider the potential for Phosphorus loading of a proposed project in its early stages, and when necessary, require an Environmental Impact Study (EIS) to address water quality.

   « Address stormwater issues associated with a proposed project.

   « Evaluate compliance with the phosphorus TMDLs in the Croton Watershed.

8. Complete Croton Planning as scheduled for November 2002.

4.4 Implementation Schedule

The Phase I version of this report provided a schedule for the implementation of activities and recommendations. These scheduled efforts have been tracked and updated as follows:

IMPLEMENTATION SCHEDULE (September 1998)			
Action	***Responsible Party***	***Target Date***	***Action Date***
Complete Statewide NPS Management Program Update	NYSDEC	12/98	10/00
Complete Actions for Full Approval of NYS's NPS Program	NYSDEC NYSDOS	12/99	10/00
Implement All Elements of Approved NPS and Coastal NPS Management Programs	NYSDEC NYSDOS Local Governments	Continuous Ongoing	Continuous Ongoing
Provide Funding for Implementation of NPS Management Practices	NYS NYC Local Governments	Annually	Annually
Revise and Update General Stormwater Permits	NYSDEC	12/98	Phase II Stormwater Regulations
Fully Implement NYC Watershed Agreement	USEPA NYS NYC Local Governments	Ongoing	Ongoing
Reauthorize CWA	Federal Government	1999	2002
Promulgate Phase II Stormwater Regulations	USEPA	1999	10/99
Develop Comprehensive Croton System Water Quality Protection Plan	Putnam Co. Westchester Co.	To Be Determined	Draft: 5/02 Final: 11/02
Fund Projects to Implement NPS Projects in Croton Watershed	Putnam Co. Westchester Co.	Upon Completion of Croton WQ Protection Plan	Upon Completion of Croton WQ Protection Plan
Complete Phase II Methodology	NYCDEP NYSDEC USEPA	7/98	3/99
Develop Phase II TMDLs	NYSDEC NYCDEP	9/99	6/00
Approve Phase II TMDLs	USEPA	10/99	10/00
Issue Report Identifying Potential Management Practices for Phase II	NYCDEP NYSDEC	9/99	4/01
Issue Report Identifying Potential Management Practices To Be Implemented	NYSDEC	3/00	3/02

Building on the schedule above, more recent implementation actions can be added.

IMPLEMENTATION SCHEDULE (December 2001)		
Action	***Responsible Party***	***Target Date***
Complete NYC Watershed Data Management and Software Tool Development Project	USEPA NYSDEC	Spring 2003
Implement Phase II Stormwater Regulations in Putnam and Westchester Counties	Plan for Permits MS4's Permitted	1/02 3/03
Center for Watershed Protection Recommendations	CWP	6/02
Continue to Monitor and Assess NYC Watershed Reservoir System	NYCDEP	Ongoing

5. Implementation Mechanisms and Next Steps

Section 3 of this Report identified numerous program activities and projects that are achieving NPS phosphorus reductions or are working toward phosphorus reduction strategies in the Croton Watershed. Examples of implementation mechanisms that are already in-place include:

- environmental education work shops - where information and training on programs and practices can be disseminated.

- wastewater treatment plant construction to eliminate septic system problems - where nonpoint source loadings from failing onsite wastewater treatment systems can be eliminated.

- advisory committees - such as Westchester County's stormwater advisory committee can facilitate the upgrading of local stormwater control programs.

- local planning and zoning boards - that can utilize information on nonpoint sources when making land use decisions and where appropriate, land use regulations can be put in place.

Consideration should be given to establishing an institutional framework for the Croton Watershed, in order that implementation will proceed in an effective manner. The DEC will consult with the Watershed Protection and Partnership Council regarding how to proceed with this.

When implementing the actions necessary to achieve the NPS reductions identified in the TMDL it is important to recognize that beyond the individual reservoir reductions, in many situations there also is a need to consider reductions that contribute to achieving downstream goals.

5.1 Watershed Approach

In EPA's Phase II TMDL approved letter of October 17, 2000 a table labeled "Attachment A" was included. It addressed six of the water quality limited basins in the Croton Watershed that receive significant phosphorus loads from upstream waterbodies. The right-hand column presented herein lists preliminary upstream reduction estimates for upstream basins by reservoir system. These reduction amounts can be found in the April 2001 NPS Report and are in addition to those identified in each TMDL. The magnitude of these numbers helps put in perspective, the tasks at-hand with regard to NPS implementation.

The following items are important to implementing NPS load reductions in the Croton Watershed:

1. Improved, more detailed land use information and modeling such that implementation can be specifically targeted, prioritized and efficient.

2. A coordinating effort to facilitate NPS implementation efforts with a focus on the Croton Watershed.

3. Program Coordination and Integration - the ability to continue and sustain the implementation process and connect it to the results of Croton Planning by Putnam and Westchester Counties.

4. Local involvement in the phosphorus reduction process translating reservoir basin reduction needs to the Town level and beyond.

5. DEC's program to implement Phase II Stormwater Regulations in Putnam and Westchester Counties.

6. The continuation and refinement of a monitoring program to assess the progress of implementation efforts.

7. The possible development of task forces by topic to facilitate implementation (Urban Stormwater, Highway Runoff/Deicing, Agriculture/Open Space).

8. The ability to reassess phosphorus TMDLs where appropriate based on additional data and improved models.

The above elements can be viewed as next steps in the implementation process. NPS programs and projects must continue as identified so that progress can be made toward effective implementation and the attainment of water quality standards.

"Attachment A"

Six of the water quality-limited basins in the Croton Watershed receive significant loads from upstream waterbodies. In addition to in-basin nonpoint source reductions, NYSDEC has identified reduction in nonpoint sources of phosphorus in upstream basins as possible management options to achieve necessary load reductions in water quality-limited basins. In upstream water quality-limited basins, additional reductions beyond those needed to achieve their TMDLs may be needed to meet the necessary load reductions in downstream basins. Upstream basins that meet water quality standards may also require nonpoint source reductions for downstream reservoirs to achieve TMDLs.

Water Quality-Limited Reservoir	Required NPS Reductions (kg/yr)	Upstream Basins Potentially Requiring Additional Reductions to Meet Downstream TMDLs (kg/yr) [5]	
New Croton	1356	Muscoot	893
Muscoot	2058	Cross River *	206
		Amawalk	123
		Titicus	207
		Croton Falls	546
		Diverting	552
Croton Falls	885	Middle Branch	199
		Diverting	633
		West Branch *	N/A
Middle Branch	204	Lake Carmel	N/A
Diverting	983	Bog Brook *	94
		East Branch	1022
East Branch	993	Putnam Lake *	N/A
		Peach Lake	N/A

[5] Preliminary Upstream Reduction Estimates based on following factors: additional amounts listed are subsequent to 25% NPS phosphorus reduction already applied to each of the six WQL reservoir basins and include upstream reservoir retention factors for phosphorus per April 2001 NPS Report.

* Not currently water quality-limited.

5.2 **Monitoring and Evaluation**

As programs and projects are completed and best management practices are applied, there will be an need for monitoring data, its analysis and the evaluation of NPS implementation efforts.

The best way to do this is a system-wide assessment, based on endpoint monitoring (reservoir or downstream), to document improvements in water quality due to the application of phosphorus load reduction measures.

NYCDEP should continue to monitor and model water quality in its reservoirs. DEP maintains a comprehensive monitoring program which is necessary to assess the impacts of point and nonpoint control measures on reservoir water quality as well as future phosphorus reduction implementation strategies.

5.3 **Conclusion**

The DEC is committed to the TMDL Program. It is recognized that there is an ongoing need to reduce phosphorus loads, particularly in the Croton Watershed. It is also recognized that the implementation of NPS management practices does not follow the same regulatory framework as with point sources. As Croton Planning moves toward implementation, the combination of the recommendations resulting from Croton Watershed Protection Plans and Stormwater Pollution Prevention Plans required by Phase II-Stormwater Regulations is important to achieving significant NPS phosphorus reductions.

The specific implementation components listed in the Preface represent the framework for the development of a final implementation plan. They can be summarized as follows:

- identification of BMPs specific to each reservoir basin to meet TMDLs and achieve downstream standards;
- a list of municipal entities designated by Phase II Stormwater Regulations;
- quantifications of upstream, additional load reductions, above those to meet the TMDL for that waterbody and necessary to achieve downstream standards;
- a description of implementation mechanisms;
- the time frame for implementing the actions;
- funding sources for implementation; and,
- a plan for evaluating/monitoring plan effectiveness.

The specifics of implementation and the development of individual basin plans will rely on key activities previously outlined such as: Croton Planning, Phase II Stormwater Regulations implementation and continued ambient water quality monitoring. Therefore, it is important that these activities remain sufficiently funded and on schedule.

ATTACHMENT A

Appropriateness of Offset Mechanisms

NYC DEP guidance describes several offset mechanisms that can be used to achieve reductions in phosphorus loading. The committee has reviewed each mechanism and gives comments below, particularly for those mechanisms that require substantial improvement before they are able to provide the reliable, long-term protection needed for the program.

Stormwater BMP Retrofits. Stormwater retrofits can be an effective element of an overall watershed strategy to reduce phosphorus loads in stormwater runoff generated by existing urban development. Given the applications received by NYC DEP to date, they are the most popular mechanism chosen for achieving a phosphorus offset. However, the guidance document for the program (NYC DEP, 1997c) needs to be greatly strengthened in several areas to ensure that stormwater retrofits are effective.

1. The guidance appears to permit the use of any urban nonpoint source practice as an eligible stormwater retrofit, such as might be found in the "Urban/Stormwater Runoff Management Practices Catalogue for Nonpoint Source Pollution Prevention and Water Quality Protection" (NYS DEC, 1996). In fact, only four of the 43 urban nonpoint source practices that are summarized in the NYS DEC catalogue appear to meet the quantifiable and/or permanent removal criteria of the pilot program. Sufficient research is presently available only to quantify the expected phosphorus removal capability of ponds, wetlands, sand filters, and swales (Brown and Schueler, 1997). The phosphorus offset pilot program should restrict eligible stormwater retrofit BMPs to these four groups until further independent research indicates that other practices have quantifiable phosphorus removal capability. In practice, most stormwater retrofitting employs stormwater ponds and wetlands that can cost-effectively treat large catchment areas.

2. The table of expected phosphorus removal rates provided in Appendix F of the guidance document for the phosphorus offset pilot program (NYC DEP, 1997c) is outdated and has been superseded by more recent data. Updated stormwater BMP removal rates are provided in MDE (1998).

3. The sizing of stormwater retrofit BMPs is not explicitly addressed in the offset program. The guidance document bases the phosphorus credit solely on the presumed pollutant removal capability of the stormwater retrofit that is ultimately designed. It does not specifically require that the retrofit have an adequate storage or treatment volume to actually accomplish the desired removal. The computational methodology needs to be revised to ensure that the stormwater retrofit has a minimum stormwater treatment volume to accomplish the desired degree of pollutant removal.

4. Program applications have assumed that BMP removal rates are constant for BMPs placed in series. (That is, if a BMP has a 40 percent removal rate, effluent pollutant concentrations will be decreased by 40 through each BMP

used.) However, removal efficiences of individual BMPs generally decline when placed in series, based on the handful of performance research studies that have examined the issue (Gain, 1996; McCann and Olson, 1994; Oberts, 1997; Urbonas, 1994). Removal efficiencies vary in accordance with the changing composition of stormwater as it passes through multiple BMPs. For example, the first BMP may accomplish 50 percent removal of sediment and sediment-associated particles. But because larger particles are more effectively removed, subsequent BMPs will be treating stormwater enriched with finer particles, and removal efficiency will drop below 50 percent. At some point, the incremental removal is negligible, and the pollutant concentration from the final BMP reaches an irreducible concentration, which represents the maximum treatment limit for gravity-driven practices (Schueler, 1996). Upper bounds on the amount of pollutant removal from BMPs in series vary depending on the specific pollutant, but none approach 100 percent.

5. Current stormwater treatment technology cannot reduce pollution loads to below predevelopment levels. In most cases, the asserted pollutant removal shown in stormwater offset applications is a result of computational methods that have no real basis in engineering or science (e.g., using BMPs in series, use of curve numbers rather than runoff coefficients, and over-sizing). Also, the committee is unaware of any field study that has actually documented that stormwater BMPs (or groups of BMPs) were actually able to reduce phosphorus loads to predevelopment levels for forest or meadow conditions. In a modeling study, Caraco et al. (1998) found that predevelopment nutrient loadings could not be achieved through any combination of better site design and stormwater BMPs.

6. Although the Simple Method (Schueler, 1987) used to compute pre- and postdevelopment pollutant loads is a general model that has been widely used across the country, it is important to utilize regional data for phosphorus event mean concentrations (EMCs) and background loads. The guidance relies heavily on stormwater EMCs developed from the mid-Atlantic Region and also employs the annual background phosphorus load of 0.5 lbs/ac/year that was derived from a mix of rural land from the Chesapeake Bay region. Stormwater monitoring data have been collected to derive more accurate stormwater EMCs for the Catskill/Delaware region. Derivation of a regional background load should also be a priority, since a higher or lower regional background load will have a profound influence on the offset calculations.

7. The current guidance requires that applicants consider several physical feasibility factors, but it does not address several feasibility factors that are unique to stormwater retrofitting. Examples include locational factors (e.g., are retrofits allowed within watershed setbacks? Within jurisdictional wetlands?), public acceptance factors (acceptance by adjacent landowners, potential habitat/restoration benefits, long-term maintenance capability), and watershed significance (minimum size or load reduced per retrofit). Implementation of stormwater retrofits in other regions of the country has generally been done in a watershed

ATTACHMENT B

STORMWATER POLLUTION PREVENTION PLANS

Urban stormwater is the final type of NPS pollution considered in this chapter. Most types of new, large-scale development in the New York City watershed region are required to submit a Stormwater Pollution Prevention Plan (SPPP) for controlling the quantity and quality of stormwater runoff generated by new impervious cover (MOA, Appendix X, Section 18-39). SPPPs specify best management practices that will prevent erosion and sedimentation during construction and any increase in the rate of pollutant loading in stormwater after construction. These plans must include a quantitative analysis demonstrating that runoff quantity and quality from postconstruction conditions will be less than or equal to that of preconstruction conditions. Whether or not an SPPP or some other type of stormwater plan is developed depends on a number of factors, including the proximity of the project to nearby waterbodies. For detailed information on the multiple types of stormwater plans and the activities that require them, see NYC DEP, 1997b.

Although they have existed since 1993 as part of the NYS DEC's General Permit for stormwater discharges, SPPPs have recently received considerable attention because of their inclusion in the MOA for a variety of activities. Prior to the MOA, fewer activities required the drafting of an SPPP, and the regulatory oversight was spread among multiple agencies. It is not surprising, then, that SPPPs have spawned a great deal of confusion among engineers, developers, and local and State agencies about how SPPPs should be interpreted and implemented, since most of these organizations had no prior experience with stormwater quality control and/or stormwater BMP design.

Stormwater Pollution Prevention Plan Contents

An SPPP must include a description of the proposed construction activities. An estimate of pre- and postdevelopment runoff is required, considering both the quantity and quality of stormwater. Pollutants of concern vary, but often include biological oxygen demand, phosphorus, nitrogen, total suspended solids, organic matter, and bacteria. Measures that might be undertaken to reduce runoff rates and pollutant loading from stormwater are then presented. These measures are committed to a Stormwater Management Plan, which describes the specific BMPs that will be used to ensure that the postdevelopment runoff rates will not exceed predevelopment runoff rates for the 2-year, 10-year, and 100-year 24-hour storms. To prevent pollutant loadings, the Stormwater Management Plan must control the "first flush"—the first half inch of runoff from the 1-year, 24-hour storm event. However, there are no numeric standards requiring a certain amount of pollution to be removed by stormwater BMPs. Erosion and Sediment Control Plans are also part of an SPPP. These contain a complete description of the BMPs that will be used to control erosion during each phase of construction. The methods, criteria, and documentation for preparing an SPPP are contained in a series of guidance and permit documents (NYC DEP, 1997b; NYS DEC, 1996).

Performance of Stormwater BMPs

Throughout the SPPP guidance document, it is clear that the goal is to prevent postdevelopment loadings of pollutants from exceeding predevelopment levels (NYC DEP, 1997b). The requirement is stated by the following: "Regulations require that pre- and postconstruction runoff characteristics not be substantially altered." In order for this to be achieved, the SPPPs rely on an underlying premise that current engineering technologies (i.e., stormwater BMPs) are capable of reducing postdevelopment pollutant loadings to predevelopment levels. Unfortunately, there is little basis for confidence that the current generation of urban stormwater BMPs can reduce pollutant loads to levels that approach predevelopment conditions. Table 9-7 provides a summary of reported nutrient removal rates for stormwater BMPs.

Phosphorus Removal

Although their removal rates are variable, most BMP groups have median annual removal rates in the 30 percent to 50 percent range for both soluble and total phosphorus (Table 9-7). Dry extended detention ponds and open channels

TABLE 9-7 Median Removal Rates for Selected Groups of Stormwater Practices

	Median Removal Rate, %						
BMP Groups	n	TSS	Total P	Sol P	Total N	Nitrate	Carbon
Wet Ponds	36	67	48	52	31	24	41
Stormwater Wetlands	35	78	51	39	21	67	28
Sand Filters[a]	11	87	51	-31	44	(-13)	66
Channels	9	0	(-14)	(-15)	0	2	18
Water Quality Swales[b]	9	81	29	34	ND	38	67

Notes: n is a number of performance monitoring studies. The actual number for a given parameter is likely to be slightly less. Sol P is soluble phosphorus, measured as orthophosphate, soluble reactive phosphorus, or biologically available phosphorus. Carbon is a measure of organic carbon (BOD, COD, or TOC). ND = not determined.

[a]Excluding vertical sand filters and vegetated filter strips, but including organic filters.

[b]Includes biofilters, wet swales and dry swales.

Source: Brown and Schueler (1997). Reprinted, with permission, from Center for Watershed Protection, 1997. ©1997 by Center for Watershed Protection.

showed low or no ability to remove either total or dissolved phosphorus. Interestingly, several BMP groups—wetlands, water quality swales, and sand filters—exhibit very wide variation in phosphorus removal, suggesting internal nutrient cycling can be an important factor in determining BMP effectiveness. Some BMPs, such as sand filters, actually increase soluble phosphorus concentrations via desorption, dissolution, or extraction of phosphorus into the aqueous phase.

These removal rates are average annual load reductions, and the removal rates do not account for diminished removal related to poor design or construction, age, or lack of maintenance. It is also important to remember that trapping of phosphorus within a stormwater BMP is only a temporary form of removal; ultimate removal is dependent on the cleanout, removal, and safe disposal of trapped sediments through periodic maintenance. For stormwater wetlands, continued phosphorus removal may require periodic replacement of wetland media as adsorption sites diminish over time (Oberts, 1997).

The moderate phosphorus removal of stormwater BMPs needs to be balanced against the sharp rise in phosphorus loads produced by new development. The effect of stormwater BMPs on phosphorus load as a function of impervious cover is shown in Figure 9-3. At a low density of development (5 percent to 25 percent site impervious cover), the reduction in phosphorus load by stormwater BMPs keeps pace with the increased load produced by impervious cover. After that point, however, stormwater BMPs can no longer achieve predevelopment phosphorus loads.

Bacterial Removal

To date, studies evaluating the performance of stormwater BMPs in removing microbial pathogens have focused on bacteria. Urban stormwater BMPs must be extremely efficient if they are to produce stormwater effluents that meet the 200-CFU/100 mL standard for fecal coliforms at a site. Assuming a national mean storm inflow fecal coliform concentration of 15,000/100 mL (see Table 5-6), a 99 percent removal rate is needed to meet the standard. The limited research conducted to date indicates that current BMPs cannot meet this standard on a reliable basis. Only 24 BMP performance-monitoring studies have measured the input and output of fecal coliform bacteria from stormwater BMPs during storm events. These data, collected for fecal coliform, fecal streptococcus, and *E. coli*, are summarized in Table 9-8.

For stormwater ponds, the mean fecal coliform removal efficiency was about 65 percent (range was from –5 percent to 99 percent). The mean removal efficiency calculated for sand filters was lower (about 50 percent), but these practices had a wider range in reported removal (–68 percent to 97 percent). It should be noted that most sand filter performance data have been collected in warm seasons, and most sites were in Texas—conditions unlike those in the Catskill/Delaware watershed. Grass swales and biofilters were found to have no ability to

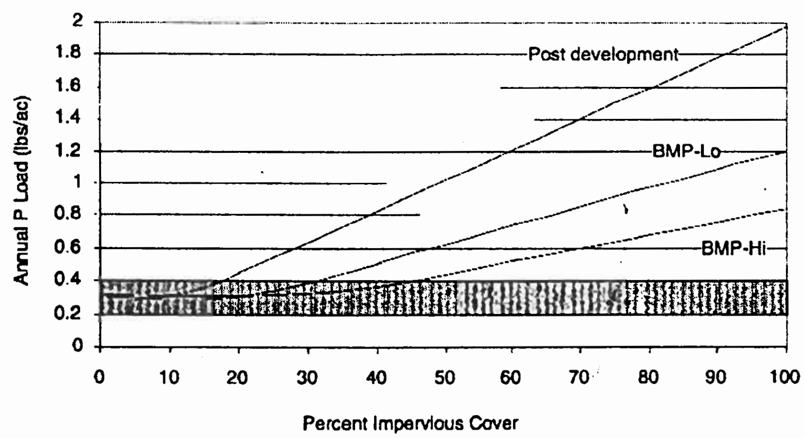

FIGURE 9-3 Relationships between impervious cover, phosphorus loads, and stormwater BMP performance in a typical watershed. The grey band indicates typical "background" phosphorus loads from undeveloped watersheds. The BMP-Hi line illustrates the effect of reducing phosphorus loads using BMPs with an average long-term removal rate of 60 percent. The BMP-Lo indicates a 40 percent removal rate. It should be noted that actual curves in individual watersheds may be different. For example, the contribution of new septic systems that accompany development to overall phosphorus loading is not represented by these curves. Source: Schueler (1996). Reprinted, with permission, from Center for Watershed Protection, 1996. © 1996 by Center for Watershed Protection.

TABLE 9-8 Comparison of Mean Bacterial Removal Rates Achieved by Different Stormwater BMP Groups

	Bacterial Removal Rate, %		
Bacterial Indicator	Ponds	Sand Filters	Swales
Fecal Coliform	65% (n =9)	51% (n=9)	-58% (n=5)
Fecal Streptococci	73% (n =4)	58% (n=7)	ND
E. coli	51% (n=2)	ND	ND

ND=not determined

Source: Schueler (1999). Reprinted, with permission, from Center for Watershed Protection, 1999. © 1999 by Center for Watershed Protection.

Appendix D

Phase 1 Cultural Resource Survey

PHASE I CULTURAL RESOURCES SURVEY
SITE ASSESSMENT AND SITE IDENTIFICATION PHASES
EMERALD RIDGE DEVELOPMENT
TOWN OF PUTNAM VALLEY, PUTNAM COUNTY, NEW YORK

OPRHP FILE NO. 04PR06174

Prepared for
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Report CA520AB-2-9-05
September 2005

REPORT SUMMARY - EMERALD RIDGE SUBDIVISION

SHPO Project Review Number (if available): **04 PR 06174**

Involved State and Federal Agencies: **OPRHP consultation requested by Town**

Phase Of Survey: **Phase I**

Location Information:
Location: **E of Marsh Hill Road, N of Peekskill Hollow Road**
Minor Civil Division: **Town of Putnam Valley**
County: **Putnam**

Survey Area:
Length: **2650 feet (808 meters)**
Width: **1300 feet (396 meters)**
Depth (where appropriate): **n/a**
Number of Acres: **85.4 (34.5 hectares)**

USGS 7.5-Minute Quadrangle Map: **Mohegan Lake**

Archaeological Survey Overview:
Number & Interval of Shovel Tests: **369 tests @ 50 feet (15 meters)**
Number & Size of Units: **n/a**
Width of Plowed Strips: **n/a**
Surface Survey Transect Interval: **n/a**

Results of Archaeological Survey
Number & name of prehistoric sites identified: **0**
Number & name of historic sites identified: **0**
Number & name of sites recommended for Phase II/Avoidance: **n/a**

Results of Architectural Survey
Number of potentially eligible buildings/structures/cemeteries within project area: **0**
Number of potentially eligible buildings/structures/cemeteries adjacent to project area: **0**
Number of previously determined NR listed or eligible buildings/structures/cemeteries/districts: **0**
Number of identified eligible buildings/structures/cemeteries/districts: **0**
Report Author(s): **Stephen J. Oberon**

Date of Report: **8 December 2005**

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INTRODUCTORY SUMMARY

A Phase IA Site Assessment Study was carried out for a parcel consisting of approximately 85.4 acres (34.5 hectares) in the southwest portion of the Town of Putnam Valley in southwestern Putnam County, New York, north of Peekskill Hollow Road. The study area contains one standing structure located outside the project impact zone, is characterized by gently through moderately and steeply sloping terrain and is populated mostly by young forest and scrub vegetation.

The Phase IA component of a Phase I Cultural Resources Survey was carried out in May 2005 to evaluate the potential of the study area for containing buried Native and/or European American era cultural remains and to document identified cultural resources in its vicinity.

Based on known settlement patterns associated with each of these eras, the occurrence of known cultural resources in the immediate vicinity of the study area, and the results of a reconnaissance of the property to identify subareas of greater and lesser archaeological sensitivity, the flatter portions of lands to be affected by construction in this upland context may be considered to have at least an average potential for containing buried Native American cultural remains. The study area was seen to have low potential for containing buried European American era cultural resources.

As part of the Phase IA study, standing structures adjacent to and within view of the study area were evaluated with regard to meeting minimum age requirements for inclusion on the State and National Register of Historic Places. No such structures meeting these requirements were noted within the project view shed.

Based on these findings, a Phase IB site identification survey is recommended for any flatter, well drained portions of the study area for which construction impact is proposed in order to determine whether buried cultural remains are in fact present and subject to impact.

Implementing the recommendations of the Phase IA site assessment study, a Phase IB site identification survey was carried out later in September 2005 to determine whether buried cultural remains are in fact subject to project impact. No material relating to the Native American occupation of the area was recovered and no concentrations of European American era cultural material were encountered. Based on these findings, proposed development may be seen to have no effect on cultural resources and no further archaeological investigation is recommended.

PHASE IA SITE ASSESSMENT STUDY

PROJECT BACKGROUND

Construction of a 25-lot residential development is proposed for a property that encompasses some 85.4 acres (34.5 hectares) of land north of the terminus of Marsh Hill Road and north of Peekskill Hollow Road in the southwestern portion of the Town of Putnam Valley in the southwestern corner of Putnam County in southeastern New York. Lake Peekskill and the community that shares its name lie some 0.4 miles (0.6 kilometers) to the west and southwest, respectively, and the City of Peekskill limits are located some 3.8 miles (6.1 kilometers) to the south-southwest. Oscawana Creek, flowing approximately 800 feet (244 meters) to the west of the parcel drains the extensive wetlands that lie to the north and the channel of Peekskill Hollow Creek passes roughly the same distance to the south of the southeastern limits of the study area, where it is joined by the Mohegan Lake Outlet.

The parcel is characterized by flat to gently, moderately and steeply sloping in topography and is populated principally by young growth forest, with mature trees present singly and along\ former hedgerows. Four wetlands totaling just under 6.0 acres (2.4 hectares) are documented for the property, which combines Lot 84-1-5 and portions of Lot 84-1-10.1, 10.2 and 10.3. One standing structure, a residence, currently stands in the southwestern corner of the property, outside the limits of proposed development.

The site of proposed development is located near the interface of the Hudson Highlands and the Manhattan Hills portions of the New England Upland region of New York State, an area characterized by complexly folded and faulted metamorphic and igneous rocks containing iron deposits. The bedrock material beneath the study area is described as Poikilitic hornblende norite dating from the Upper Ordovician, with schist and gneiss associated with the Manhattan Formation to the north and Hornblende norite to the south (Thompson 1966: Figs. 8 & 33; New York State Museum 1995; USDA n.d.).

A variety of soils have been mapped for the study area. Soils of the Chatfield-Charlton complex are the most common on the property, along with Charlton Loam, Chatfield-Hollis Rock Outcrop Complex, and Leicester Loam are present in the steepest subareas and Palms and Carlisle Soils characterize the northeasternmost poorly drained subarea (USDA n.d.). Prior to the changes to forest extent and population that followed the arrival of European settlers, the study area lay within the oak zone, characterized by warmer temperatures than the region as a whole, due to the shelter provided by the Catskill Mountains, the proximity of the Atlantic Ocean and the generally low altitude. This forest was populated by red cedar, red maple, fire cherry, and hickory.

As noted above, the affected area consists of former agricultural field and/or pasture, with the degree of slope varying from gentle to very steep. The property is bordered by scattered recent residential structures along Marsh Hill Road, with scattered recent and older residences as well as a school complex located along the adjacent portion of Peekskill Hollow Road.

A Phase IA site assessment study was performed in May 2005 by Stephen Oberon, Principal Investigator, assisted by Kim Croshier, using resources of the Newburgh Free Library, the New York State Historic Preservation Office, the New York State Museum and the New York State Archives in Albany.

A reconnaissance of the study area was carried out by the Principal Investigator, during which the relative archaeological potential of the various subareas was assessed, any serious prior upper soil disturbance and other factors likely to reduce such potential were noted, and any structures that meet minimum age criteria for inclusion on the State and National Register of Historic Places within view of the proposed development were photodocumented.

CULTURAL BACKGROUND AND SENSITIVITY ASSESSMENT

As mentioned, the study area consists of some 85.4 acres (34.5 hectares) of flat to gently, moderately and steeply sloping mostly wooded former pasture and farmland north of Peekskill Hollow Road,

One structure, a house dating from the second half of the twentieth century, is situated in the southwestern corner of the study area. It will not be affected by proposed development. No other structures stand within the study area. Reconnaissance noted the presence of dry-laid field stone farm walls, not considered significant cultural resources, and encountered no other structural remains. Proposed development will involve construction of 25 residences, wells, septic treatment sites, and driveways, connected by a loop access road to Marsh Hill Road, along with two water detention basins.

Historic Structures

No structures currently listed on, nominated to, or determined eligible for inclusion on the State or National Register of Historic Places are located within a one-mile (1.6-kilometer) radius of the study area or within its view shed. No buildings that meet minimum age requirements for listing were noted to have a view of the proposed development.

Native American Era

No sites of Native American occupation have been listed in the New York State Museum archaeological site files for the portion of the Town of Putnam Valley within one mile (1.6 kilometers) radius of the study area. The State Historic Preservation site files also list no sites of indigenous activity within this proximity.

It should be noted that this area has never had the benefit of a systematic survey by professional archaeologists. As mentioned in a previous section of this report, most development that has occurred in this part of the Town of Putnam Valley has involved individual or small numbers of residential buildings with very few larger-scale housing, commercial, or mining projects. For this reason, operative historic preservation laws have triggered only a few archaeological investigations in this area (Boesch 1992; Wiegand 1995, 2000; Oberon 2001). Native American cultural material was encountered along Peekskill Hollow Creek some 1.1 miles (1.8 kilometers) to the southwest of the study area and was determined to represent a small camp occupied by few people exploiting the nearby stream and related faunal resources during at least the Late Woodland Period (AD 1000-1600) (Oberon 2001: 9). In view of the comparatively small amount of archaeological investigation that has been carried out in this area and the fact that one of the three surveys performed did in fact encounter Native American cultural material along Peekskill Hollow Creek, it is likely that the numbers, as well as the temporal and cultural range, of indigenous occupation sites present in this drainage system are underrepresented in the current site files.

Documented Native American occupations from portions of Putnam and adjacent Westchester County to the north and to the east of the study area indicate the region was occupied by at least the Late Archaic period, which began some 4000 years ago. As-yet-undocumented archaeological remains present in this area could therefore be expected to pertain to any and all regional cultures that occurred during this time span.

The potential must therefore be recognized for flatter portions of upland settings such as the study area that are located near wetlands to have seen what would most likely have been short-term seasonal occupations by small groups exploiting the plant and animal resources offered by the wetland environment. A higher potential for indigenous habitation and the presence of larger scale sites occupied for longer periods of time would exist nearer to the streams located to the west, south and east of the study area, particularly Peekskill Hollow Brook. Such occupations would most likely have been one component in the seasonal patterns of movement that characterized indigenous populations in general through at least the Archaic and Transitional periods, although small seasonal occupation sites were also present during later times.

As noted, Native American archaeological remains likely to be present in the study area would probably consist of small, seasonally occupied camps that would have supported small numbers of people for short periods of time, probably on a recurring basis. Cultural remains associated with such sites typically are sparse, shallow and spatially restricted, although they may include hearths, storage pits and/or traces of structures. Larger sites, usually located at lower elevations, may also include extensive refuse deposits and fortifications. Exposed veins of lithic resources suitable for the manufacture of stone tools, and rock formations such as caves and overhangs that could provide shelter, are also likely to have attracted the indigenous population of the area, as are certain natural phenomena, such as springs and unique rock formations, that would have held religious significance. Reconnaissance and a review of the geological record of the area noted no exposed or easily accessible deposits of lithic material known to have been used in the manufacture of stone tools; however the presence of rock outcrops creates a potential for native quarries and current or former overhangs or caves that might have served as shelters. No natural features known or likely to have been endowed with religious significance were noted.

A potential may therefore be seen to exist in flatter, better-drained portions of the study area for the presence of Native American cultural remains pertaining to seasonally occupied camps dating anywhere from the Late Archaic through the arrival of Europeans in the seventeenth century.

European American Era

European American era settlement of what is now the Town of Putnam Valley dates to the early decades of the eighteenth century, when this area was included in the Manor of Philipsburgh, an entity dating to 1693. What is now the township was occupied very sparsely and mostly by people engaged in agriculture during the eighteenth century, with the tranquility of everyday life interrupted by periodic hostilities with what remained of the native population, the French and Indian War and the American Revolution.

As was the case in most of this region, early settlement outside nucleated rural industrial and commercial centers in southwestern Putnam County was dispersed and focused along early roadways, near which farm houses and their associated outbuildings were erected. The portion of the township in which the study area is located appears to have been typical of the pattern described above, only more sparsely developed. Most of the area along Peekskill Hollow Road was characterized by scattered farm houses located near roadways, but the upland area to the north is depicted as largely unoccupied by roads or houses during the second half of the nineteenth century, when detailed local maps were first published.

European American settlement of the area remained relatively sparse throughout the nineteenth and early twentieth centuries. Most early settlers relocated from Connecticut, and earned their livelihood through small-scale farming and pasturing small numbers of sheep and cows. Since most of the early residents were engaged primarily in farming, small rural service centers, such as Adams Corners to the east and Crofts Corners (later Oscawana Corners) to the north developed at crossroads and places suitable for the operation of water-powered industries. These locations saw the development of commercial enterprises such as stores, small scale industries such as saw and grist mills, and services such as hotels, taverns, medical and legal offices and smithies to serve the nearby rural population as well as the travelers through the area.

This area lay outside the Hudson River and Harlem River transportation corridors that developed and spurred the growth of industry and commerce during the post-Civil War era of the nineteenth century. As a result, settlement lagged behind areas to the south and west. The late nineteenth and early twentieth century saw an increased movement of urban residents to acquire recreational properties in scenic rural areas such as Putnam Valley. As the trend of leaving the city during the summer months increased, encouraged by the growth of the highway network and the number of automobiles, the Lake Peekskill area saw the development of recreational facilities such as summer camps and cabin colonies. Upland locations such as the study area remained unoccupied until the development of Marsh Hill Road and the construction of a small number of residences during the post-World War II era (O'Connor 1854; Beers 1867).

One European American era archaeological site is listed for the vicinity of the study area in the historical and archaeological site files maintained by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) in Albany. What is described as "historic midden evidence" was documented as Site A079-05-0019) by Lewis Brennan in 1982 on the southeast shore of Lake Peekskill, approximately 0.5 miles (0.8 kilometers) west of the western limits of the study area.

Based on known European American era settlement patterns, a reconnaissance of the property and a search of historical texts and maps, the potential for construction impact to buried structural remains and/or cultural features pertaining to this period of occupation may be considered low.

RECOMMENDATIONS

A Phase IB site identification survey is recommended for flatter, better-drained portions of the study area for which development impact is planned, as such locations in this physiographic setting must be considered to have an above-average potential for the presence of buried Native American cultural remains. The rock outcrops within the affected area should also be systematically observed for evidence of possible use as rock shelters or native quarry activity. The potential for buried European American era cultural remains to be present within the study area is considered low.

The Phase IB survey should employ sampling methods adequate for detecting traces of the small, seasonally occupied camps likely to occur in this upland physiographic setting, as well as any larger occupation sites and/or activity areas that might be present.

PHASE IB SITE IDENTIFICATION SURVEY

RESEARCH DESIGN

The Phase IA site assessment performed for this study area identified a potential for buried Native American cultural remains to be present within the flatter, better drained portions of the areas where the access road and 25 residential units will be constructed, along with associated driveways, utilities, and water management facilities. This assessment was based on the fact that the physiographic character of these areas, near wetland environments, is similar to the settings in which indigenous occupation has been documented in other parts of Putnam and nearby Westchester County, despite the fact that fewer sites of occupation have been noted in upland areas. Native American occupation is known to have occurred along Peekskill Hollow Brook, located at a lower elevation to the south of the project parcel.

Flatter, better-drained locations near a water source, even in upland settings, have been found to have been preferred by indigenous populations in the Northeast for occupations usually consisting of small seasonally-occupied camps focused on procuring resources from the nearby wetlands and streams or special purpose sites such as quarries in locations where lithic resources useful in the manufacture of stone tools were accessible. Villages tended to be located at lower elevations near flowing water. In times of turmoil, defensive considerations were added to these criteria. Steeply sloping and poorly drained areas or wetlands would generally be seen as of low potential for the occurrence of Native American cultural resources.

Exceptions to this assessment would include steeply sloping locations where lithic resources such as chert would have been accessible to indigenous populations and/or where rock overhangs and caves that could have served as shelters are present. Although poorly-drained areas would seldom be expected to contain habitation sites, the more elevated, better-drained peripheries of such places are likely to have been selected for camps from which the plant and animal resources of the wetter areas would be exploited. Such camps would have served as temporary habitation sites and locations where food was prepared, tools completed and repaired, and animal resources processed (i.e., skinned, butchered, smoked, dried) after being procured nearby.

Smaller sites, which predominate prior to the later Woodland Period and continue to occur during this time, are known to have been occupied by indigenous populations in conjunction with what was usually a seasonal exploitation of plant and animal resources. Generally, these camps would be inhabited for short periods of time, although such episodes of occupation are known to have continued on a regular basis over many centuries.

The inventory of reported archaeological sites for this area indicates locations of Native American occupation in the Peekskill Hollow Brook drainage and the townships of Putnam Valley and Cortlandt in neighboring Westchester County dates from at least the Late Archaic period, which began some 4000 years ago, and is likely to have continued through the arrival of Europeans in the seventeenth century. From this information, it is reasonable to extrapolate that the temporal and cultural affiliation of Native American era archaeological remains that might be expected to occur within and in the vicinity of the affected area could represent any and all of the Late Archaic, Transitional and Woodland manifestations of Native American culture in this region.

As mentioned above, occupation of sites through at least the Middle Woodland Period (c.100 BC-AD 1000)was considered likely to have occurred on a seasonal basis and to have usually been associated with the exploitation of nearby plant and animal resources. The material remains of sites reflecting such behavior are most likely to be sparse, shallow and spatially restricted, although deeper cultural features and remains of structures may be present. Larger sites, usually pertaining to Woodland period occupations, may include deep refuse deposits, remains of more substantial structures and defensive constructions, such as stockades.

Because reconnaissance had revealed no outcrops of lithic material likely to have been utilized in the manufacture of stone tools within the area of proposed development, the potential for the presence of bedrock quarry sites was considered low. The absence of caves and rock overhangs within the affected area eliminates a potential for shelters associated with such features to be subject to project impact. The occurrence of glacial outwash deposits near the ground surface raises the possibility of the localized exploitation of accessible cobbles and boulders of chert, quartz, quartzite and other lithic resources suitable for the manufacture of stone tools and the presence of small stone processing stations and workshops.

No structures that meet age criteria for inclusion on the State and National Register of Historic Places stand within potential view of the proposed development. Because this part of what is now Putnam County has seen European American era occupation since at least the mid-eighteenth century, a general potential exists for the presence along early roads of buried structural remains and associated cultural features pertaining to buildings associated with the earliest period of settlement that were longer standing when the first detailed maps of the area were published in the mid-nineteenth century. Like smaller Native American sites, the archaeological remains of early buildings that were abandoned prior to the publication of area maps showing individual structures, as well as eighteenth century military activity, and cultural features associated with such sites, would be likely to be spatially restricted and characterized by sparse cultural material quite shallow in vertical extent and occurring near the ground surface in areas not characterized by stream or erosion deposition. Therefore, methods selected for archaeological field investigation would need to be sensitive enough to detect the presence of these smaller Native and European American era sites characterized by relatively sparse cultural material, as well as larger sites.

Marsh Hill Road does not appear on historical maps and appears to date from the World War II era of the twentieth century. This potential for early remains in the vicinity of the project area may be seen not to extend into the uplands north of Peekskill Hollow Road.

METHODOLOGY

The affected area is characterized topographically by gently to moderately to steeply sloping terrain. The presence of older and more recently constructed field stone walls reflects the use of the property as farmland and pasture through the early decades of the twentieth century and its transformation during the post-World War II era as part of what is today a dispersed residential community.

A subsurface sampling plan was developed that called for the portions of the study area for which house, utility and driveway construction are proposed to be archaeologically sampled by means of hand-dug shovel tests placed at roughly 50-foot (15-meter) intervals, with adjustments in spacing made as required to follow or avoid topographic features, steep slopes and any zones of obvious prior serious upper soil disturbance that might be encountered. The sampling interval would be reduced in the vicinity of any visible or discovered structural remains to more effectively detect relative concentrations of cultural material. Test holes approximately 24 inches (60 centimeters) in diameter would be dug using small hand tools and their contents screened through 1/4-inch (6.25-millimeter) hardware cloth to facilitate the recovery of smaller cultural items.

The location of any Native American cultural items noted in archaeological sampling would be marked in the field for further investigation, as would any relative concentrations of pre-World War II European American era material encountered.

Any test holes that produced Native American cultural material would be more intensively sampled by means of four to eight additional shovel tests placed at 6.5- to 15-foot (2- to 4.5-meter) interval at cardinal points around each find spot to determine whether a site likely to represent focused cultural activity or a stray find was indicated. Relative concentrations of European American era items would be marked for subsequent more intensive investigation.

Such methods are considered adequate for detecting traces of smaller Native American camps, special purpose sites and early European American era settlement or military sites, as well as any larger occupations that might be present. Evidence of more casual human activity and the remains of very small buildings, such as privies or guard huts, are less likely to be detected by these methods. Since the vicinity of small buildings is usually characterized by some scatter of cultural material, it was hoped the presence of cultural items that would be noted using the means outlined above would lead to the identification of these sites during the more intensive investigation that follows initial identification.

Assessment of soils present within the affected area, containing gravels and other glacial deposits on or just beneath the ground surface, indicated a low potential for the presence of deeply buried culture-bearing soils.

To systematically sample the subareas of greatest potential for buried cultural resources, as well as to facilitate record keeping, the shovel tests would be laid out in parallel transects forming a grid pattern.where possible. Given the uneven topography and the presence of wetland and steeply sloping subareas, modifications to this ideal would have to be made in the field.

FIELD INVESTIGATION

Phase IB field investigation of the affected area was carried out in September of 2005, under excellent field conditions, warm temperatures, and no precipitation. Ground visibility was generally poor due to the density of vegetative ground cover and decayed leaves in the sampling areas, particularly in the vicinity of wetlands.

Soils were found to be well-drained in most places sampled and quite dry from lack of rainfall. No problems were encountered that might have affected the results of sampling. The Phase IB field investigation was performed by the Principal Investigator, assisted by Archibald Miller, John Lott, Michael Hampton, and Sean Lott.

Culturally sterile soil consisted of orange, tan orange, yellow tan, and orange tan silt and sandy silt, with traces of some clay near wetland environments, with often dense coarse, medium and fine gravel and cobbles. This was overlain by light to medium brown silt, sandy silt or clayey silt, with sometimes dense coarse, medium and fine gravel, often with cobbles, under a thin stratum of dark brown root and leaf mat. Culturally sterile soils were found to be present at depths ranging between 3.2 and 6.8 inches (8 and 17 centimeters) beneath the ground surface. No evidence of a developed plow zone was encountered and dense glacial till was noted even in flatter portions of the sampling area.

Archaeological sampling units were laid out in a grid or cluster pattern across the flatter, better drained portions of proposed development area at 50-foot (15-meter) paced intervals. Considerable modifications in this alignment were necessitated in order to avoid obstacles such as large trees and stone field walls, and to follow contours above or below a steep slope and adjacent to poorly drained subareas in the vicinity of wetlands. At times, a single transect of shovel tests was laid out where topographic features such as steep slopes made the execution of a grid pattern unfeasible. Sampling was geared as much as possible, though not strictly, to proposed house, septic, driveway, road, and other locations that are subject to development impact.

Test holes were dug using small hand tools, measured approximately 24 inches (60 centimeters) in diameter, and were dug following natural soil levels. Sampling continued until culturally sterile soils were reached or progress was halted by the presence of solid rock. Where possible, such holes were relocated to avoid these obstacles. Test hole contents were screened through 1/4-inch (6.25-millimeter) hardware cloth to facilitate the recovery of smaller cultural items. The locations of the shovel tests were recorded on the project map once field sampling had been completed.

Archaeological sampling encountered no items associated with the Native American occupation of the area, although unmodified chert cobbles were noted in the soils displaced by rodents and mechanical excavation of subsurface permeability tests carried out by Cronin Engineering, PC of Peekskill, New York. European American surface deposition of later twentieth century items was noted in the southwestern portion of the property in the vicinity of Marsh Hill Road and the existing residential structure. Several items dating from this time period were recovered from sampling of this area. No structural remains or relative concentrations of European American era items were encountered.

CONCLUSIONS AND RECOMMENDATIONS

Systematic archaeological sampling of the portions of the property to be affected by proposed residential construction by means of screened shovel tests encountered no evidence of Native American occupation and only sparse and scattered European American era items dating from the post-World War II era.

Based on these findings, proposed development may be seen to have no effect on cultural resources and no additional archaeological investigation is recommended.

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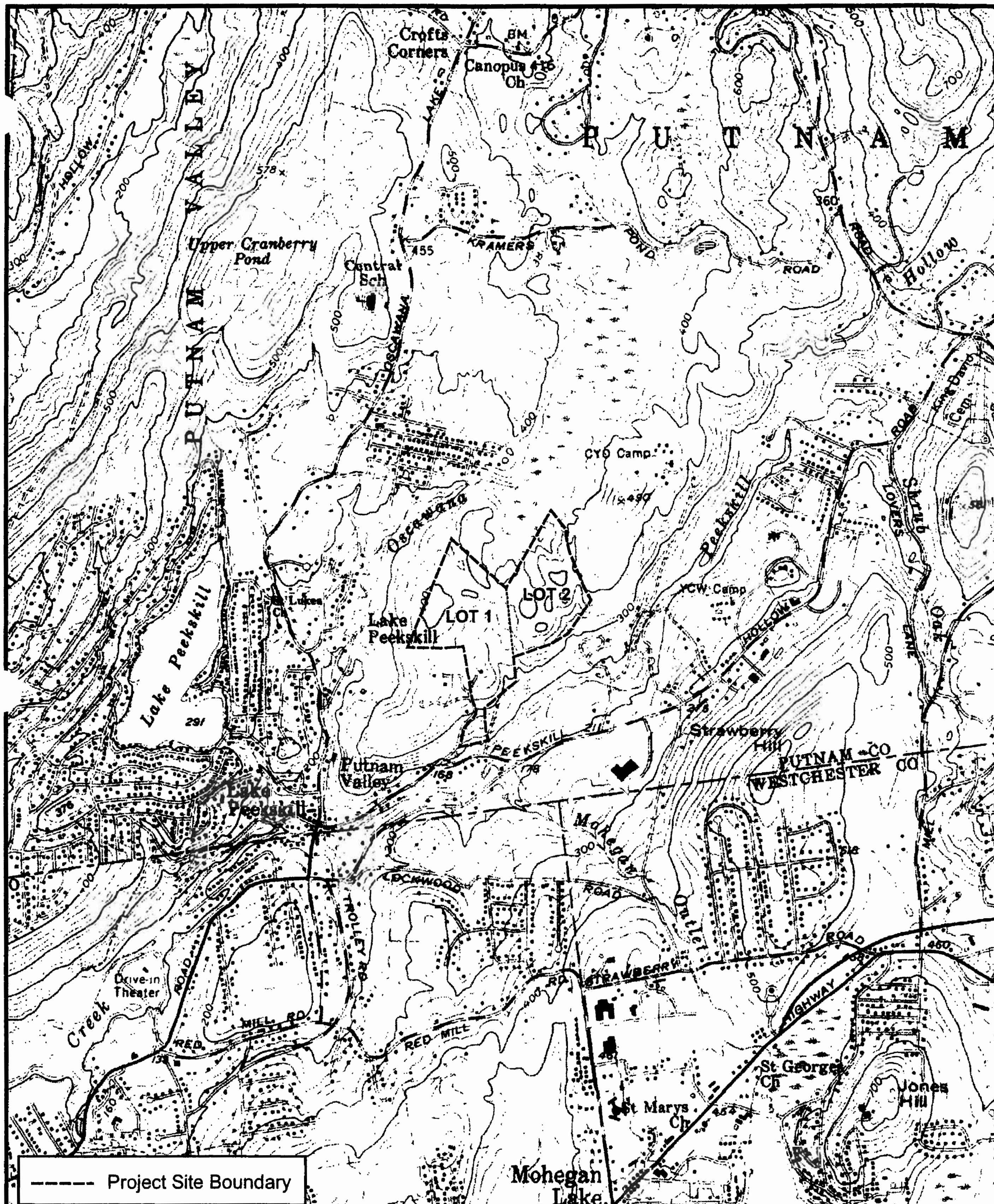
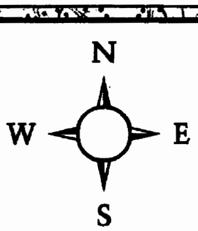
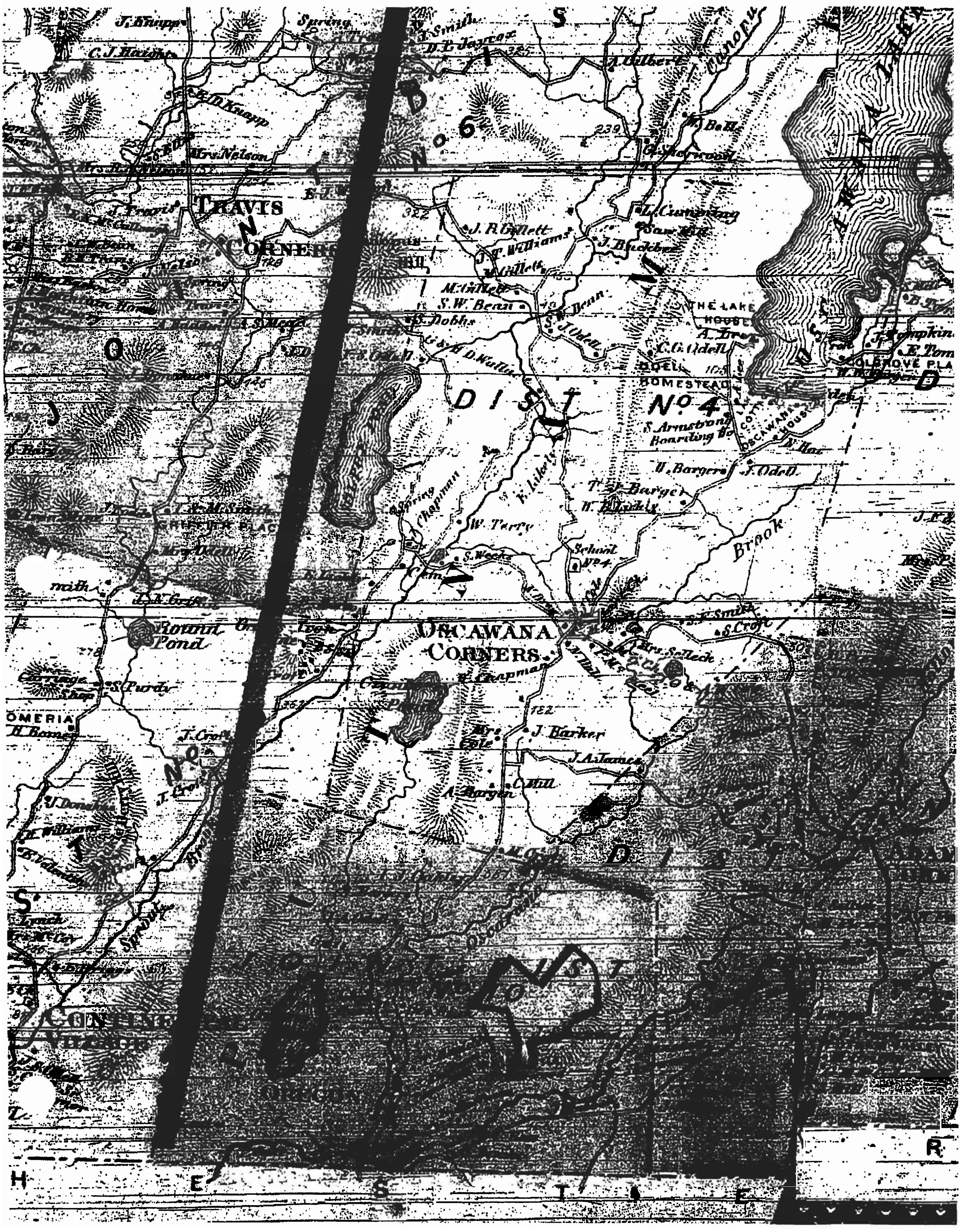
FIGURES

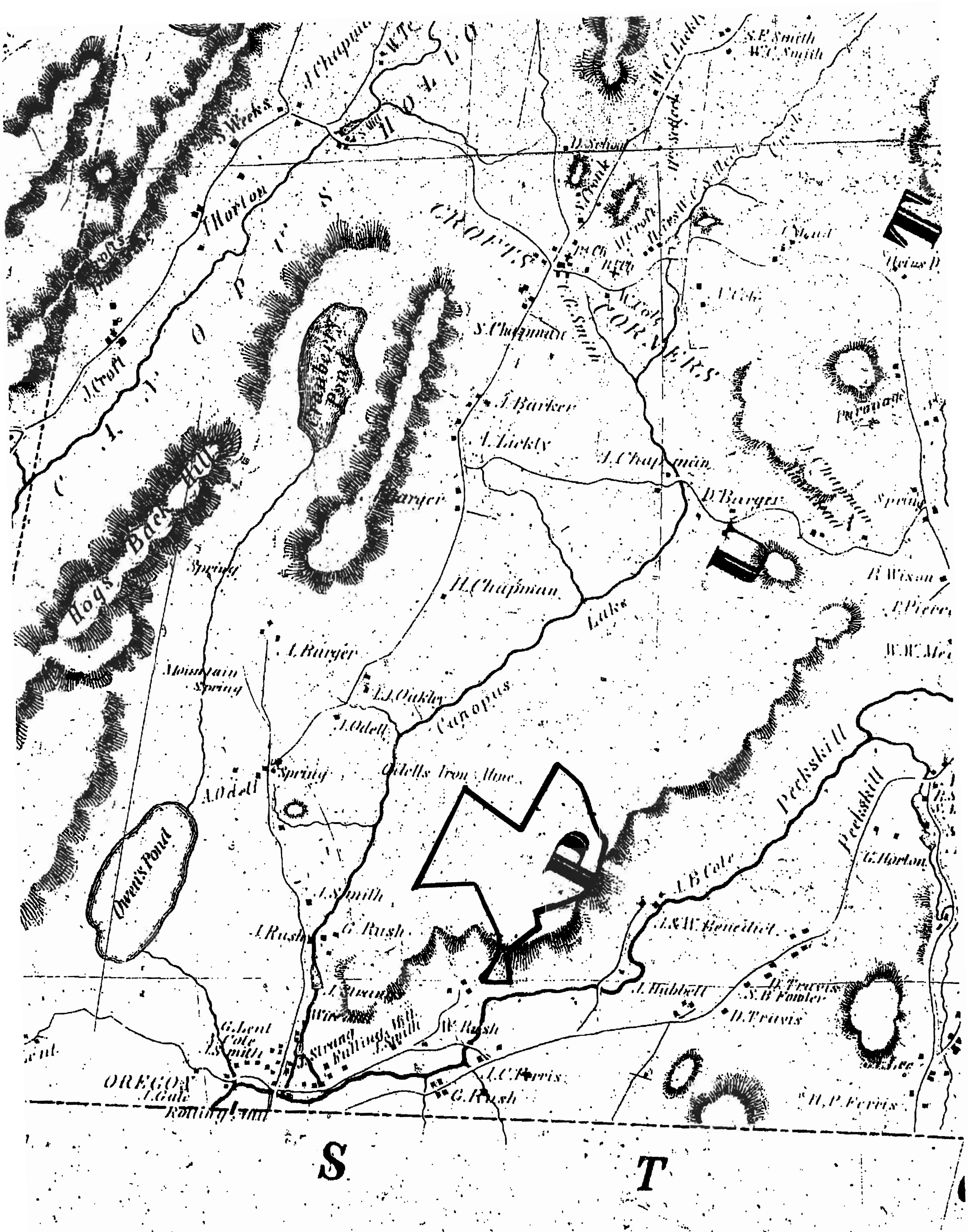




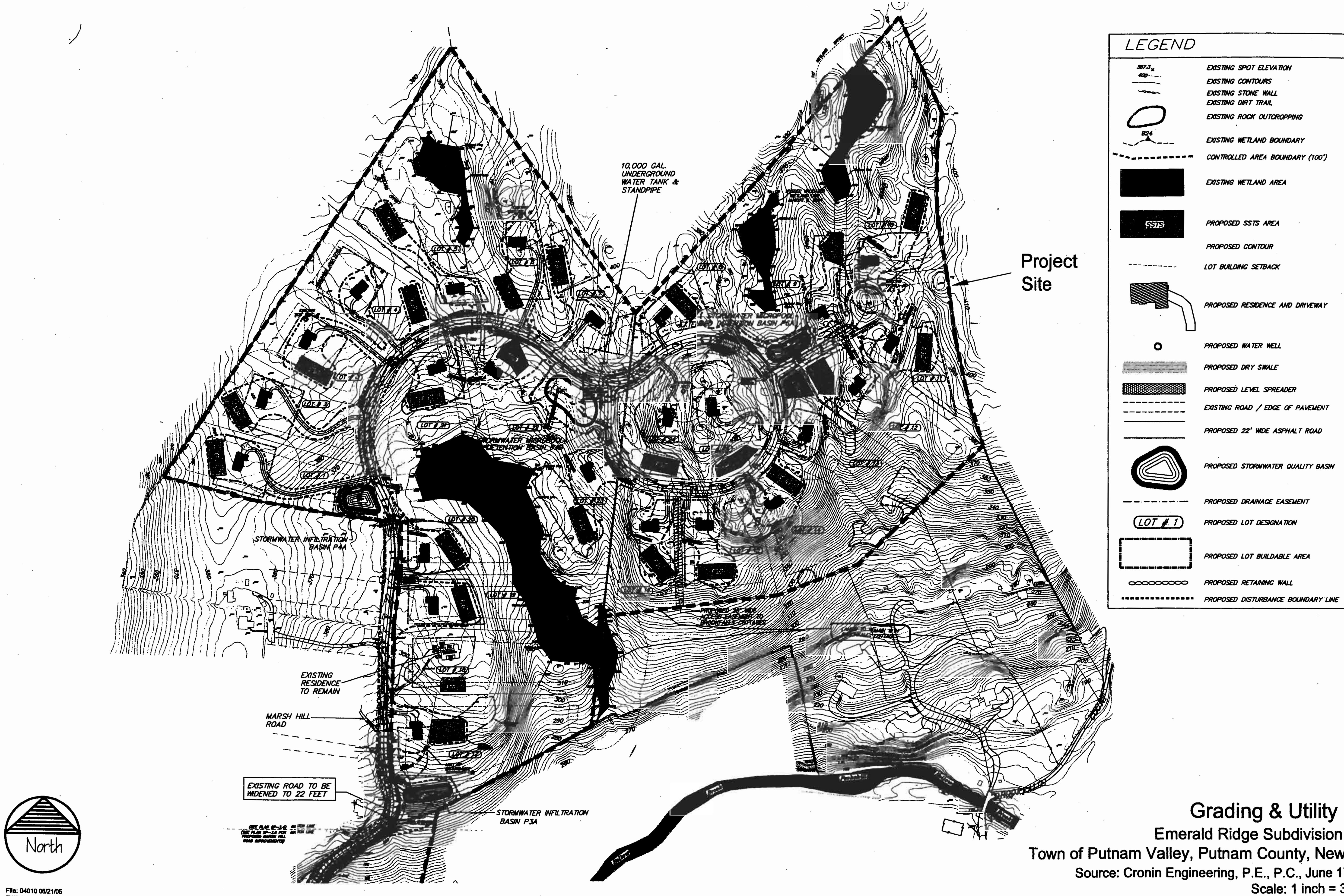
Site Location Map
Emerald Ridge
Town of Putnam Valley, Putnam County, New York
Base Map: USGS Topographic Map, Mohegan Lake Quad (1981)
Scale: 1 inch = 2,000 feet

STUDY AREA AND VICINITY - 1867
(from Beers 1867)





STUDY AREA AND VICINITY - 1854
(from O'Connor 1854)



Grading & Utility Plan

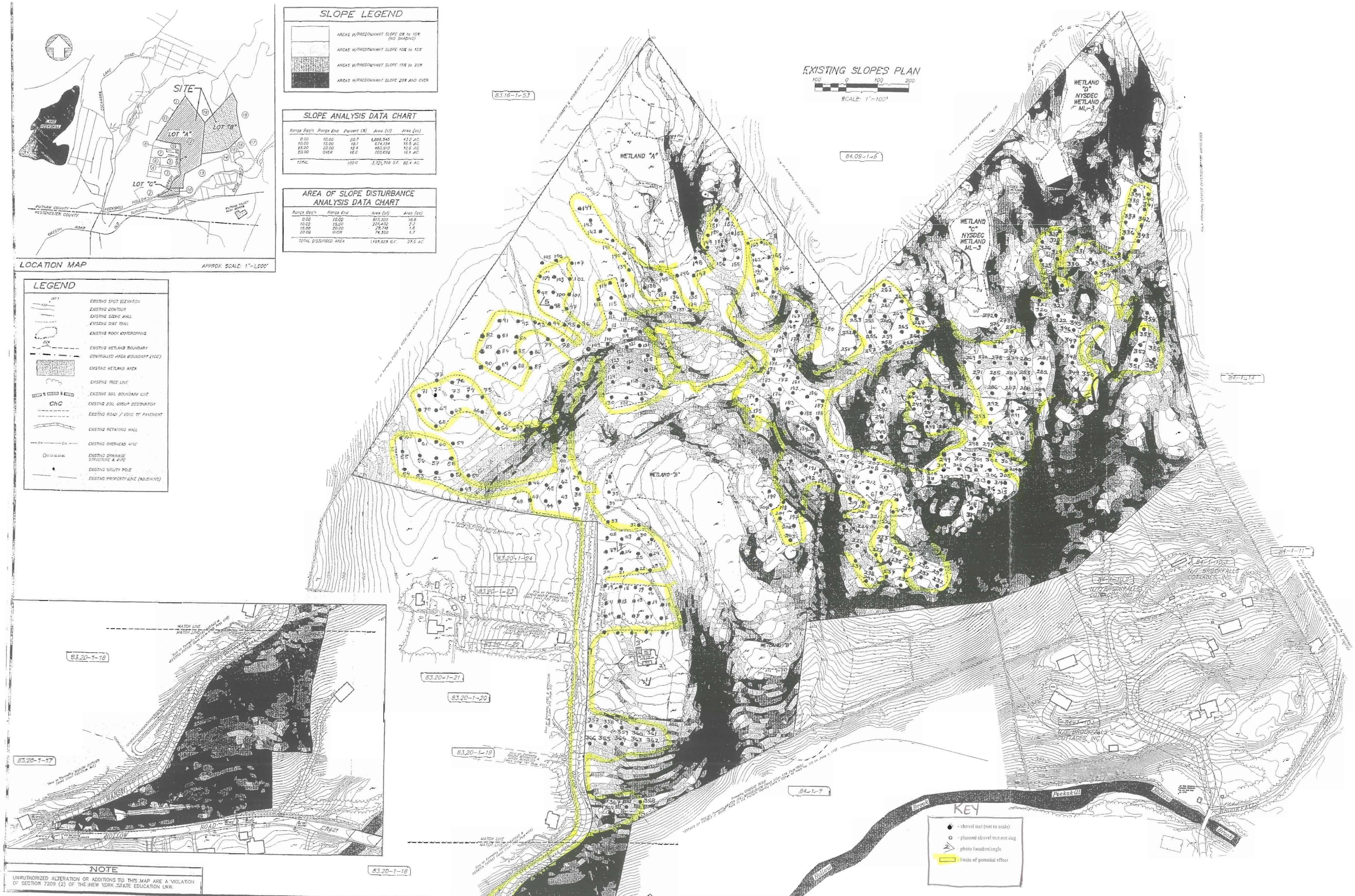
Emerald Ridge Subdivision DEIS

Town of Putnam Valley, Putnam County, New York

Source: Cronin Engineering, P.E., P.C., June 17, 2005

Scale: 1 inch = 300 feet

Tim Miller Associates, Inc., 10 North Street, Cold Spring, New York 10516 (845) 265-4400 Fax (845) 265-4418



SLOPE ANALYSIS DATA CHART

Range Begin	Range End	Percent (%)	Area (sf)	Area (ac)
0.00	10.00	50.7	1,886,545	43.2 AC
10.00	15.00	18.1	674,154	15.5 AC
15.00	20.00	12.4	460,910	10.6 AC
20.00	OVER	18.8	700,099	16.1 AC
TOTAL		100.0	3,721,708 S.F.	85.4 AC

AREA OF SLOPE DISTURBANCE ANALYSIS DATA CHART

Range Beg'n	Range End	Area (sf)	Area (ac)
0.00	10.00	817,300	18.8
10.00	15.00	226,432	5.2
15.00	20.00	79,741	1.8
20.00	OVER	74,350	1.7
TOTAL DISTURBED AREA		1,197,823 S.F.	27.5 AC

NOTE

UNAUTHORIZED ALTERATION OR ADDITIONS TO THIS MAP ARE A VIOLATION OF SECTION 7209 (2) OF THE NEW YORK STATE EDUCATION LAW.

CIVIL ENGINEER

CRONIN ENGINEERING P.E. P.C.

PROFESSIONAL ENGINEERS AND PLANNING CONSULTANTS

LAND SURVEYOR

DONNELLY LAND SURVEYING, P.C.

1929 COMMERCE STREET
YORKTOWN HEIGHTS, NY 10598
PHONE: (914) 962-2215
FAX: (914) 962-2209

OWNER/APPLICANT

VS CONSTRUCTION CORP.
37 CROTON DAM ROAD
OSSINING, NEW YORK 10562

TIMOTHY L. CRONIN III, P.E.
LICENSE #062080

SLOPES DISTURBANCE MAP

PROPOSED DEVELOPMENT SHOWING AREAS OF POTENTIAL EFFECT AND PHASE IB SUBSURFACE SAMPLING

LOCATION: MARSH HILL ROAD, TOWN OF PUTNAM VALLEY

FIG 1-3

PHOTODOCUMENTATION

PHOTO 1 - Standing residential structure in study area (view to NNW)

PHOTO 2 - Residential structure in study area (view to WNW)

PHOTO 3 - Residential structure in study area (view to SE)

PHOTO 4 - Sampling area adjacent to Wetland B (view to NNE)

PHOTO 5 - Typical flatter upland sampling area (view to NE)

PHOTO 6 - Typical view in flatter south-central portion of project area (view to NNW)

SUBSURFACE SAMPLING RECORD

CA 520B - EMERALD RIDGE SUBDIVISION

PHASE IB SUBSURFACE SAMPLING RECORD

TP	STRATUM	DEPTH(cm)	SOIL PROFILE	CULTURAL
1	1	0-12	med brn silt, cmf gravel, cobbles	none
	2	12-21+	tan ora silt, some sand, cmf gravel, cobbles	none
2	1	0-14	(same as above)	none
	2	14-25+	(same as above)	none
3	1	0-14	(same as above)	none
	2	14-22+	ora tan silt, trace sand, cmf gravel, cobbles	none
4	1	0-12	(same as above)	none
	2	12-24+	tan ora silt, some sand, cmf gravel, cobbles	none
5	1	0-13	(same as above)	wire nail (NR)
	2	13-25+	(same as above)	none
6	1	0-15	(same, drk brn root/leaf mat)	none
	2	15-23+	(same as above)	none
7	1	0-12	(same as above)	none
	2	22-30+	ora tan silt, cmf gravel, cobbles	none
8	1	0-12	(same as above)	none
	2	12-25+	(same as above)	none
9	1	0-15	(same, drk brn root/leaf mat)	none
	2	15-23+	(same as above)	none
10	1	0-16	(same as above)	none
	2	16-30+	(same as above)	none
11	1	0-15	(same as above)	none
	2	15-24+	(same as above)	none
12	1	0-14	(same as above)	none
	2	14-28+	(same as above)	none

13	1	0-12	(same as above)	none
	2	12-22+	(same as above)	none
14	1	0-12	(same as above)	none
	2	12-24+	ora silt, cmf gravel, cobbles	none
15	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
16	1	0-11	(same as above)	none
	2	11-24+	(same as above)	none
17	1	0-15	(same as above)	none
	2	15-25+	(same as above)	none
18	1	0-14	(same as above)	none
	2	14-22+	ora tan silt, cmf gravel, cobbles	none
19	1	0-13	(same as above)	none
	2	13-26+	(same as above)	none
20	1	0-14	(same as above)	none
	2	14-23+	(same as above)	none
21	1	0-15	(same as above)	none
	2	15-22+	(same as above)	none
22	1	0-15	(same as above)	none
	2	15-20+	(same as above)	none
23	1	0-16	(same as above)	none
	2	16-23+	(same as above)	none
24	1	0-11	(same, denser gravel)	none
	2	11-22+	(same as above)	none
25	1	0-15	(same, less dense gravel)	none
	2	15-22+	(same as above)	none
26	1	0-15	(same as above)	none
	2	15-24+	(same as above)	none
27	1	0-11	(same as above)	none
	2	11-28+	(same as above)	none
28	1	0-15	(same as above)	none
	2	15-21+	(same as above)	none

29	1	0-16	(same as above)	none
	2	16-23+	tan silt, cmf gravel	none
30	1	0-16	med brn silt, trace clay, cmf gravel, drk brn root/leaf mat	none
	2	16-27+	(same, trace clay)	none
31	1	0-17	(same as above)	none
	2	17-22+	(same, moist)	none
32	1	0-16	(same as above)	none
	2	16-26+	(same as above)	none
33	1	0-14	(same, no clay)	none
	2	14-23+	(same, no clay)	none
34	1	0-15	(same as above)	none
	2	15-21+	(same as above)	none
35	1	0-15	(same as above)	none
	2	15-24+	(same as above)	none
36	1	0-16	(same as above)	none
	2	16-28+	(same as above)	none
37	1	0-14	med brn silt, cmf gravel, cobbles, drk brn root/leaf mat	none
	2	14-22+	ora tan silt, cmf gravel	none
38	1	0-15	(same as above)	none
	2	15-25+	(same as above)	none
39	1	0-13	(same as above)	none
	2	13-20+	(same as above)	none
40	1	0-9	(same, denser gravel)	none
	2	9-21+	(same, denser gravel)	none
41	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
42	1	0-12	(same as above)	none
	2	12-20+	(same as above)	none
43	1	0-14	(same, less dense gravel)	none
	2	14-24+	(same, less dense gravel)	none
44	1	0-15	(same as above)	none
	2	15-22+	(same as above)	none

45	1	0-14	(same as above)	none
	2	14-24+	(same as above)	none
46	1	0-13	(same, with cobbles)	none
	2	13-24+	(same as above)	none
47	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none
48	1	0-12	(same as above)	none
	2	12-21+	(same as above)	none
49	1	0-9	med brn silt, dense cmf gravel, cobbles drk brn root/leaf mat	none
	2	9-19+	tan silt, trace sand, dense cmf gravel	none
50	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
51	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
52	1	0-12	(same, less dense gravel)	none
	2	12-25+	(same, less dense gravel)	none
53	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
54	1	0-12	(same as above)	none
	2	12-23+	(same as above)	none
55	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
56	1	0-13	(same as above)	none
	2	13-20+	(same as above)	none
57	1	0-14	(same as above)	none
	2	14-23+	(same as above)	none
58	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none
59	1	0-13	(same as above)	none
	2	13-20+	(same as above)	none

60	1	0-13	(same as above)	none
	2	13-21+	(same as above)	none
61	1	0-12	(same as above)	none
	2	12-22+	(same as above)	none
62	1	0-9	(same, dense gravel)	none
	2	9-20+	(same, dense gravel)	none
63	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
64	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
65	1	0-12	(same less dense)	none
	2	12-21+	(same as above)	none
66	1	0-11	(same as above)	none
	2	11-23+	(same as above)	none
67	1	0-12	(same as above)	none
	2	12-24+	(same as above)	none
68	1	0-12	(same as above)	none
	2	12-22+	(same as above)	none
69	1	0-14	(same as above)	none
	2	14-20+	(same as above)	none
70	1	0-13	(same as above)	none
	2	13-20+	(same as above)	none
71	1	0-13	(same as above)	none
	2	13-21+	(same as above)	none
72	1	0-13	(same as above)	none
	2	13-24+	(same as above)	none
73	1	0-14	(same as above)	none
	2	14-22+	(same as above)	none
74	1	0-14	(same as above)	none
	2	14-27+	(same as above)	none
75	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none

76	1	0-14	(same as above)	none
	2	14-20+	(same as above)	none
77	1	0-12	(same, with cobbles)	none
	2	12-23+	(same as above)	none
78	1	0-12	med brn silt, some sand, cmf gravel, cobbles, drk brn root/leaf mat	none
	2	12-22+	ora tan silt, trace sand, cmf gravel	none
79	1	0-14	(same as above)	none
	2	14-25+	(same as above)	none
80	1	0-14	(same as above)	none
	2	14-26+	(same as above)	none
81	1	0-13	(same as above)	none
	2	13-20+	(same as above)	none
82	1	0-14	(same as above)	none
	2	14-24+	(same as above)	none
83	1	0-14	(same as above)	none
	2	14-24+	(same as above)	none
84	1	0-13	(same as above)	none
	2	13-24+	(same as above)	none
85	1	0-14	(same as above)	none
	2	14-22+	(same as above)	none
86	1	0-14	(same as above)	none
	2	14-23+	(same as above)	none
87	1	0-12	(same, with cobbles)	none
	2	12-23+	(same as above)	none
88	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none
89	1	0-12	(same, no cobbles)	none
	2	12-22+	(same as above)	none
90	1	0-13	(same as above)	none
	2	13-25+	(same as above)	none
91	1	0-14	(same as above)	none
	2	14-22+	(same as above)	none

92	1	0-13	(same as above)	none
	2	13-21+	(same as above)	none
93	1	0-13	(same as above)	none
	2	13-24+	(same as above)	none
94	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none
95	1	0-11	(same, denser gravel)	none
	2	11-23+	(same as above)	none
96	1	0-12	(same as above)	none
	2	12-23+	(same as above)	none
97	1	0-11	(same as above)	none
	2	11-24+	(same as above)	none
98	1	0-14	(same, less dense gravel)	none
	2	14-22+	(same as above)	none
99	1	0-14	(same as above)	none
	2	14-24+	(same as above)	none
100	1	0-13	(same as above)	none
	2	13-25+	(same as above)	none
101	1	0-11	(same as above)	none
	2	11-23+	(same as above)	none
102	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
103	1	0-14	(same as above)	none
	2	14-22+	(same as above)	none
104	1	0-13	(same as above)	none
	2	13-24+	(same as above)	none
105	1	0-14	(same as above)	none
	2	14-21+	(same as above)	none
106	1	0-14	(same as above)	none
	2	14-20+	(same as above)	none
107	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none

108	1	0-11	(same, with cobbles)	none
	2	11-23+	tan silt, trace ora, trace sand, cmf gravel	none
109	1	0-9	(same, denser gravel)	none
	2	9-19+	(same as above)	none
110	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
111	1	0-11	(same as above)	none
	2	11-22+	(same as above)	none
112	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
113	1	0-12	(same as above)	none
	2	12-22+	(same as above)	none
114	1	0-12	(same as above)	none
	2	12-20+	(same as above)	none
115	1	0-13	(same, less dense gravel, no cobbles)	none
	2	13-23+	ora tan silt, cmf gravel	none
116	1	0-12	(same as above)	none
	2	12-23+	(same as above)	none
117	1	0-10	(same, denser gravel)	none
	2	10-21+	(same as above)	none
118	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
119	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
120	1	0-9	(same, with cobbles)	none
	2	9-19+	(same as above)	none
121	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
122	1	0-10	(same as above)	none
	2	10-20+	(same, with cobbles)	none
123	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none

124	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
125	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
126	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
127	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
128	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
129	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
130	1	0-11	(same as above)	none
	2	11-22+	(same as above)	none
131	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
132	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
133	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
134	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
135	1	0-13	(same, less dense gravel)	none
	2	13-22+	(same as above)	none
136	1	0-12	(same, no cobbles)	none
	2	12-23+	(same as above)	none
137	1	0-13	(same as above)	none
	2	13-24+	(same as above)	none
138	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none
139	1	0-12	(same as above)	none
	2	13-23+	(same as above)	none

140	1	0-14	(same as above)	none
	2	14-22+	(same as above)	none
141	1	0-14	(same as above)	none
	2	14-24+	(same as above)	none
142	1	0-13	(same as above)	none
	2	13-22+	(same as above)	none
143	1	0-13	(same as above)	none
	2	13-24+	(same as above)	none
144	1	0-13	(same as above)	none
	2	13-25+	(same as above)	none
145	1	0-9	(same, denser gravel, cobbles)	none
	2	9-19+	(same, cobbles)	none
146	1	0-11	(same, less dense gravel)	none
	2	11-23+	(same as above)	none
147	1	0-13	(same, no cobbles)	none
	2	13-22+	(same, no cobbles)	none
148	1	0-13	(same as above)	none
	2	13-21+	(same as above)	none
149	1	0-11	(same, with cobbles)	none
	2	11-22+	(same as above)	none
150	1	0-11	(same as above)	none
	2	11-23+	(same, with cobbles)	none
151	1	0-9	(same, denser gravel)	none
	2	9-18+	(same, denser gravel)	none
152	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
153	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
154	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
155	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none

156	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
157	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
158	1	0-8	(same, dense graved)	none
	2	8-16+	(same as above)	none
159	1	0-10	(same, less dense gravel)	none
	2	10-20+	(same, less dense gravel)	none
160	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
161	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
162	1	0-12	(same as above)	none
	2	12-22+	(same as above)	none
163	1	0-12	(same as above)	none
	2	12-21+	(same as above)	none
164	1	0-12	(same as above)	none
	2	12-24+	(same as above)	none
165	1	0-11	(same as above)	none
	2	11-23+	(same as above)	none
166	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
167	1	0-12	med brn silt, trace sand, cmf gravel, cobbles drk brn root/leaf mat	none
	2	12-24+	ora tan silt, trace sand, cmf gravel, cobbles	none
168	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
169	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
170	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
171	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none

172	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
173	1	0-8	(same, denser gravel and cobbles)	none
	2	8-16+	(same, denser gravel)	none
174	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
175	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
176	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
177	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
178	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
179	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
180		(steep slope - not dug)		
181	1	0-9	med brn silt, trace sand, dense cmf gravel, cobbles, drk brn root/leaf mat	none
	2	9-19+	ora tan silt, trace sand, dense cmf gravel	none
182	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
183	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
184	1	0-8	(same, very dense gravel)	none
	2	8-18+	(same as above)	none
185	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
186	1	0-12	(same, less dense gravel)	none
	2	12-22+	(same as above)	none
187	1	0-12	(same as above)	none
	2	12-20+	(same as above)	none

188	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
189	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
190		(steel slope - not dug)		
191	1	0-9	med brn silt, trace sand, dense cmf gravel, cobbles, drk brn root/leaf mat	none
	2	9-17+	tan ora silt, trace sand, dense cmf gravel	none
192	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
193	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
194	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
195	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
196	1	0-8	(same as above)	none
	2	8-16	(same as above)	none
197	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
198	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
199	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
200	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
201	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
202	1	0-11	(same as above)	none
	2	11-23+	(same as above)	none
203	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none

204	1	0-9	med brn silt, trace sand, dense cmf gravel, cobbles, drk brn root/leaf mat	none
	2	9-18+	tan ora silt, trace sand, dense cmf gravel	none
205	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
206	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
207	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
208	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
209	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
210	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
211	1	0-9	(same as above)	none
	2	9-20+	(same, with cobbles)	none
212	1	0-10	(same as above)	none
	2	10-21+	(same, no cobbles)	none
213	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
214	1	0-11	(same as above)	none
	2	11-18+	(same as above)	none
215	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
216	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
217	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
218	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none

219	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
220	1	0-9	(same as above)	none
	2	9-18+	(same, cobbles)	none
221	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
222	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
223	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
224	1	0-9	(same as above)	none
	2	9-17+	(same, dense gravel and cobbles)	none
225	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
226	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
227	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
228	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
229	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
230	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
231	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
232	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
233	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
234	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none

235	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
236	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
237	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
238	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
239	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
240a	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
240b	1	0-10	tan silt, trace sand, dense cmf gravel, cobbles	none
	2	10-20+	(same as above)	none
241	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
242	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
243	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
244	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
245	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
246	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
247	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
248	1	0-8	(same as above)	none
	2	8-16+	(same as above)	none
249	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none

250	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
251	1	0-10	(same as above)	none
	2	10-20+	(same, trace ora)	none
252	1	0-8	(same as above)	none
	2	8-16+	(same, no ora)	none
253	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
254	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
255	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
256	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
257	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
258	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
259	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
260	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
261	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
262	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
263	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
264	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
265	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none

266	1	0-10	(same as above)	none
	2	10-19+	(same as above)	none
267	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
268	1	0-8	(same as above)	none
	2	8-16+	(same as above)	none
269	1	0-8	med brn silt, some sand, dense cmf gravel, cobbles, drk brn root/leaf mat	none
	2	8-18+	tan ora silt, some sand, dense cmf gravel	none
270	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
271	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
272	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
273	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
274	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
275	1	0-8	(same as above)	none
	2	8-20+	(same as above)	none
276	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
277	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
278	1	0-8	(same as above)	none
	2	8-16+	(same as above)	none
279	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
280	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
281	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none

282	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
283	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
284	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
285	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
286	1	0-9	(same as above)	none
	2	9-17+	(same as above)	none
287	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
288	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
289	1	0-9	(same as above)	none
	2	9-21+	(same as above)	none
290	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
291	1	0-11	(same, more soil)	none
	2	11-19+	(same as above)	none
292	1	0-11	(same as above)	none
	2	11-22+	(same as above)	none
293	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
294	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
295	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
296	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
297	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none

298	1	0-9	(same as above)	none
	2	9-21+	(same as above)	none
299	1	0-9	(same as above)	none
	2	9-18+	(same as above)	none
300	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
301	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
302	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
303	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
304	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
305	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
306	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
307	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
308	1	0-10	(same as above)	none
	2	10-22+	(same as above)	none
309	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
310	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
311	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
312	1	0-9	(same as above)	none
	2	9-18+	(same, very dense rock)	none
313	1	0-11	(same as above)	none
	2	11-20+	(same, less dense)	none

314	1	0-11	(same as above)	none
	2	11-19+	(same as above)	none
315	1	0-9	(same as above)	none
	2	9-21+	(same as above)	none
316	1	0-8	(same, very dense rock)	none
	2	8-18+	(same as above)	none
317	1	0-8	med brn silt, trace sand, dense cmf gravel, cobbles, boulders, drk brn root/leaf mat	none
	2	8-17+	tan silt, trace sand, dense cmf gravel, cobbles	none
318	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
319	1	0-10	(same as above)	none
	2	10-18+	(same as above)	none
320	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
321	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
322	1	0-11	(same as above)	none
	2	11-22+	(same as above)	none
323	1	0-9	(same as above)	none
	2	9-17+	(same as above)	none
324	1	0-8	(same as above)	none
	2	8-17+	(same as above)	none
325	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
326	1	0-8	(same as above)	none
	2	8-16+	(same, very rocky)	none
327	1	0-9	(same as above)	none
	2	9-17+	(same as above)	none
328	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
329	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none

330	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
331	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
332	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
333	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
334	1	0-8	(same as above)	none
	2	8-20+	(same as above)	none
335	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
336	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
337	1	0-11	(same, less rocky)	none
	2	11-20+	(same as above)	none
338	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
339	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
340	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
341	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
342	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
343	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
344	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
345	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none

346	1	0-10	(same as above)	none
	2	10-20+	(same as above)	none
347	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none
348	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
349	1	0-8	(same as above)	none
	2	8-19+	(same as above)	none
350	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
351	1	0-11	(same as above)	none
	2	11-21+	(same, less dense gravel, no cobbles)	none
352	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
353	1	0-11	(same as above)	none
	2	11-18+	(same as above)	none
354	1	0-9	(same as above)	none
	2	9-19+	(same as above)	none
355	1	0-9	(same as above)	none
	2	9-20+	(same as above)	none
356	1	0-8	(same as above)	none
	2	8-17+	(same, denser gravel, cobbles)	none
357	1	0-14	med brn silt, some sand, cmf gravel, drk brn root/leaf mat	none
	2	14-25+	ora silt, trace tan, trace sand, cmf gravel	none
358	1	0-13	(same as above)	none
	2	13-25+	(same as above)	none
359	1	0-14	(same as above)	none
	2	14-22+	(same as above)	none
360	1	0-11	(same, with cobbles)	none
	2	11-22+	(same as above)	none
361	1	0-11	(same as above)	none
	2	11-21+	(same as above)	none

362	1	0-12	(same as above)	none
	2	12-22+	(same as above)	none
363	1	0-10	(same as above)	none
	2	10-21+	(same as above)	none
364	1	0-10	(same as above)	none
	2	10-22+	(same as above)	none
365	1	0-11	(same as above)	none
	2	11-20+	(same as above)	none
366	1	0-10	(same as above)	none
	2	10-22+	(same as above)	none
367	1	0-9	(same, dense gravel, cobbles)	none
	2	9-20+	(same, dense gravel, cobbles)	none
368	1	0-8	(same as above)	none
	2	8-18+	(same as above)	none
369	1	0-10	(same as above)	none
	2	10-22+	(same as above)	none

KEY
brn - brown
ora - orange
drk - dark
NR - not retained

INVESTIGATOR QUALIFICATIONS

QUALIFICATIONS OF PRINCIPAL INVESTIGATOR

Over the past 24 years, Stephen J. Oberon has directed over 500 cultural resources surveys in New York, Vermont, New Jersey, Massachusetts and Pennsylvania, ranging from Phase I site assessment studies. architectural inventories and site identification surveys through Phase III data recovery/impact mitigation programs and National Register listings. These have involved both Native and European American era sites relating to all time periods represented in this geographic area. In addition, he has conducted historical and ethnohistorical research and/or directed archaeological excavations in New Mexico, Peru, Ontario, Jamaica and Switzerland.

He holds a Bachelor's degree in history (Colgate University), a Master's degree in archaeology (Trent University), a Master's degree in anthropology (Cornell University) and has been admitted to doctoral candidacy at Cornell in anthropology with concentrations in archaeology and architecture.

He is an approved archaeological consultant both for Native and European American era sites by the State Historic Preservation Office (SHPO) in New York, Vermont, Pennsylvania, Massachusetts, New Jersey and New Hampshire as well as by the US Army Corps of Engineers (ACOE), the US Environmental Protection Agency (EPA), the New York State Department of Environmental Conservation (DEC), the New York State Department of Transportation (DOT), and the New Jersey Department of Environmental Protection (DEP). He has also successfully completed an OSHA-approved 40-hour hazardous waste site worker training course and required yearly updates.

Professional memberships include the New York Archaeological Council, the Council for Northeast Historical Archaeology, the Society for Historical Archaeology, the Society for American Archaeology, the Society for Industrial Archaeology, the Native American Institute, the Vermont Archaeological Society, and the Society of Architectural Historians.

Appendix E

Visual Impact Viewshed Analysis

04010

TIM MILLER ASSOCIATES, INC.

10 North Street, Cold Spring, New York 10516 Phone (845) 265-4400 Fax (845) 265-4418

March 17, 2005

Jan K. Johannessen, The Chazen Companies
C/o Town of Putnam Valley Planning Department
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Emerald Ridge Subdivision Viewshed Analysis

Dear Mr. Johannessen,

Attached please find eight copies of the Viewshed Map (see following Viewshed Within 2 Mile Radius Diagram) and supporting line of sight profiles for the Emerald Ridge Subdivision DEIS. Pursuant to the adopted scope, this is being transmitted to the Planning Board for its review to define view points from which the development may be potentially visible. We will confirm whether or not the development is in fact visible by flying a balloon at a height the equivalent of the highest roofline on the project site, and field surveying whether the balloon is visible from the view points selected by the Planning Board. The Viewshed Map identifies resources including public parks, bike trails, public thoroughfares, National and State Register of Historic Places sites, libraries, schools, municipal buildings and public recreational facilities within a two-mile radius of the high point of our site, located at a 407-foot elevation.

Our preliminary analysis indicates that views of the project, based on topography only, may be visible from a limited number of locations on public thoroughfares within two miles of the project site, and possibly from the Town park to the north. We look forward to discussing this matter at the April 4th Planning Board meeting for purposes of selecting view points.

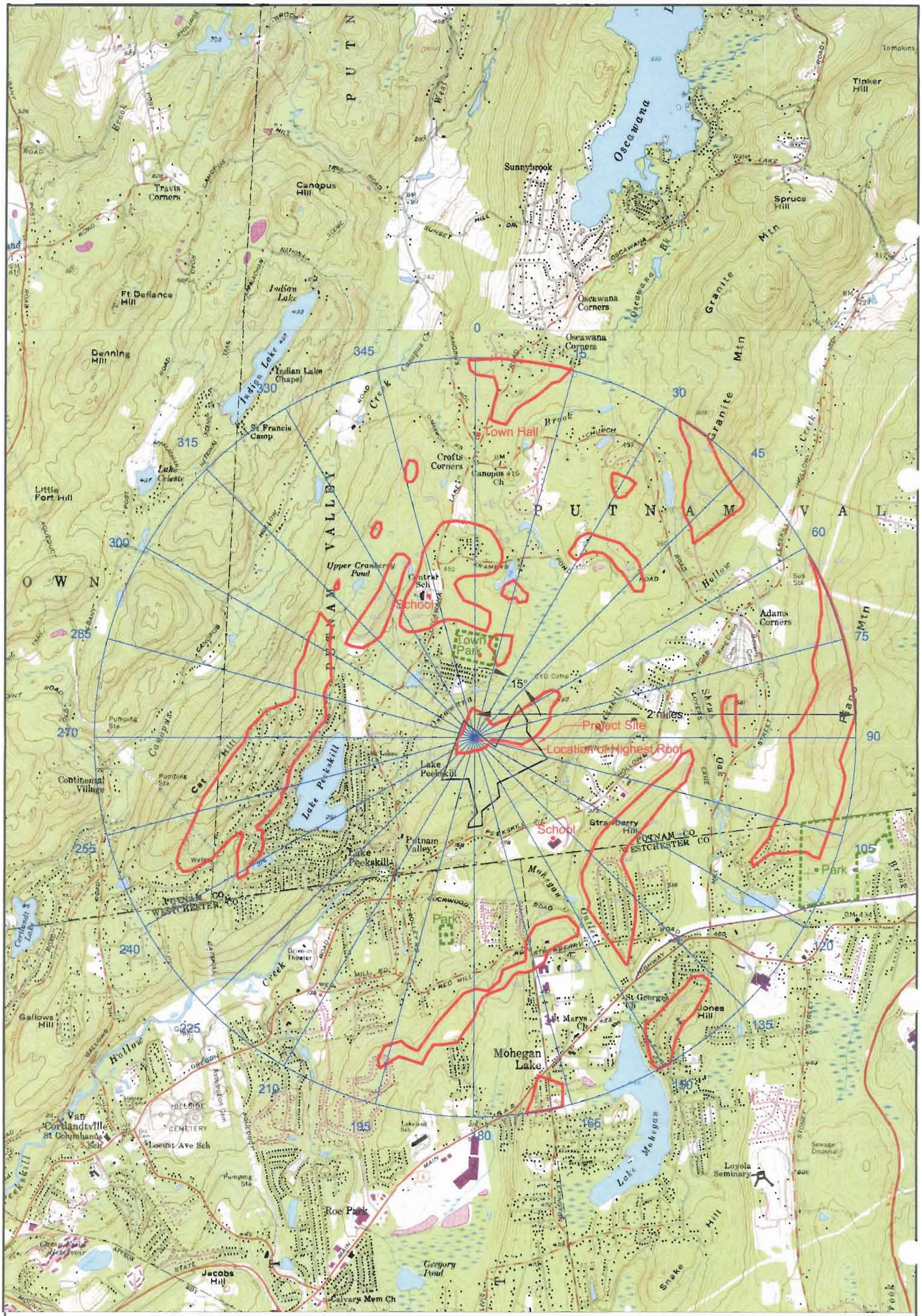
Sincerely,

Josh Moreinis, AICP, PP
TIM MILLER ASSOCIATES, INC.

encl.

C: Val Santucci, VS Construction Corp.

TMA Wordpro/Marsh Hill/Correspondence/Viewshed Diagram 3-17 Cover Letter.lwp



Viewshed within 2 Mile Radius

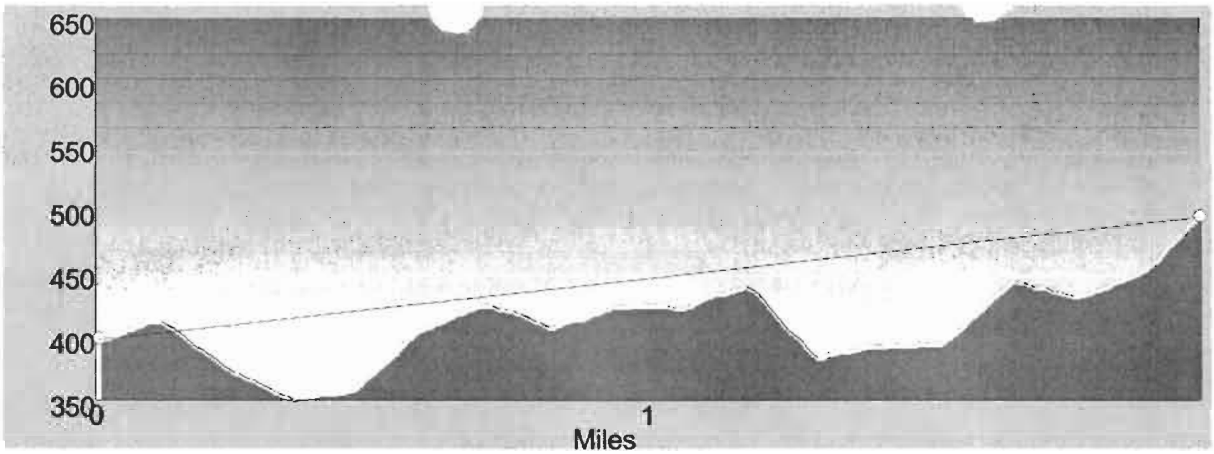
Emerald Ridge

Town of Putnam Valley, Putnam County, New York

Base Map: USGS Mohegan Quad

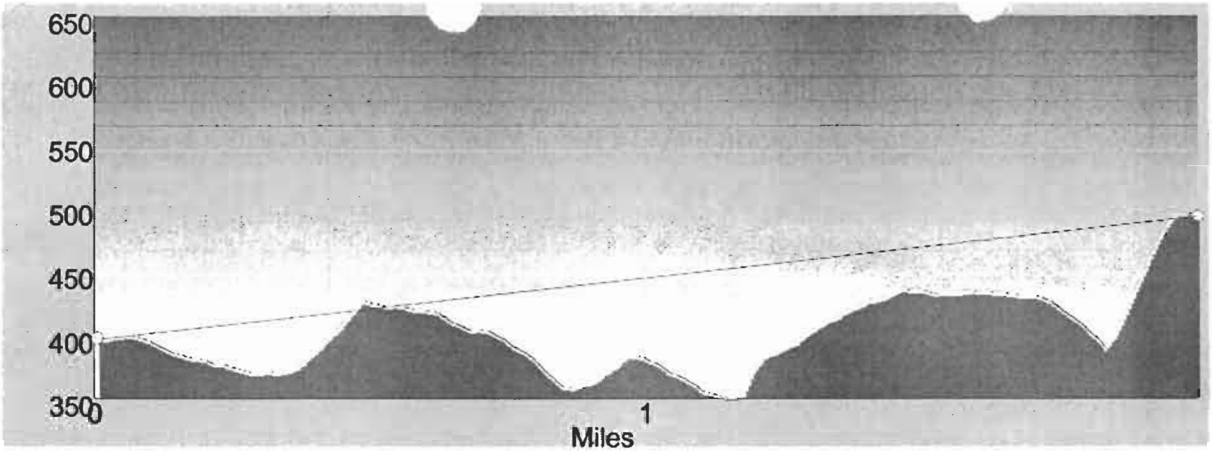
Scale: 1 inch = 2500 feet

Tim Miller Associates, Inc., 10 North Street, Cold Spring, New York 10516 (845) 265-4400 Fax (845) 265-4418



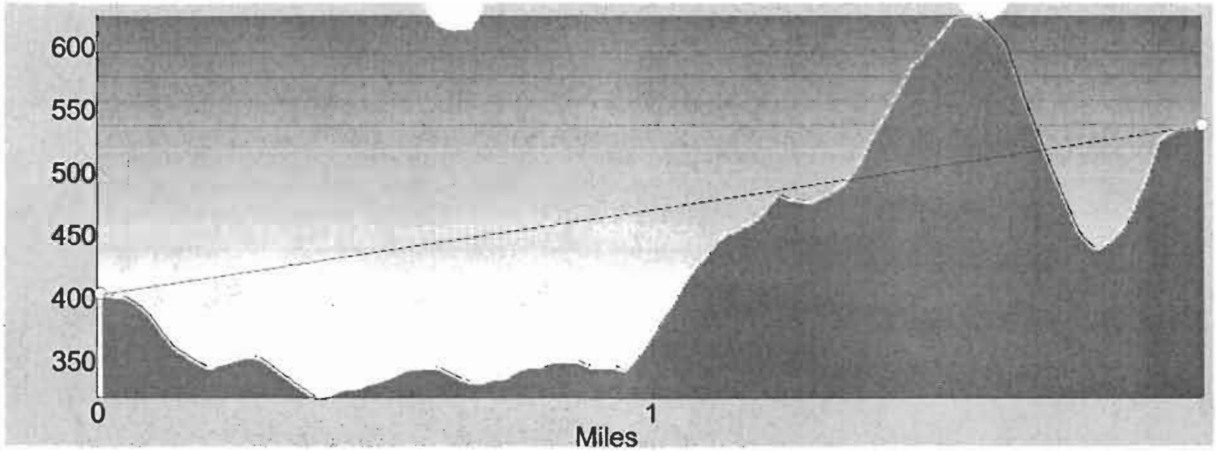
Cross Section 0

Total distance:	1 miles, 5279 feet	Climbing:	244 feet	Latitude:	000° 00' 00.0" N
		Descending:	-148 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 11 feet	Elevation change:	95 feet	Elevation:	
		Min/Max:	356/499	Grade:	



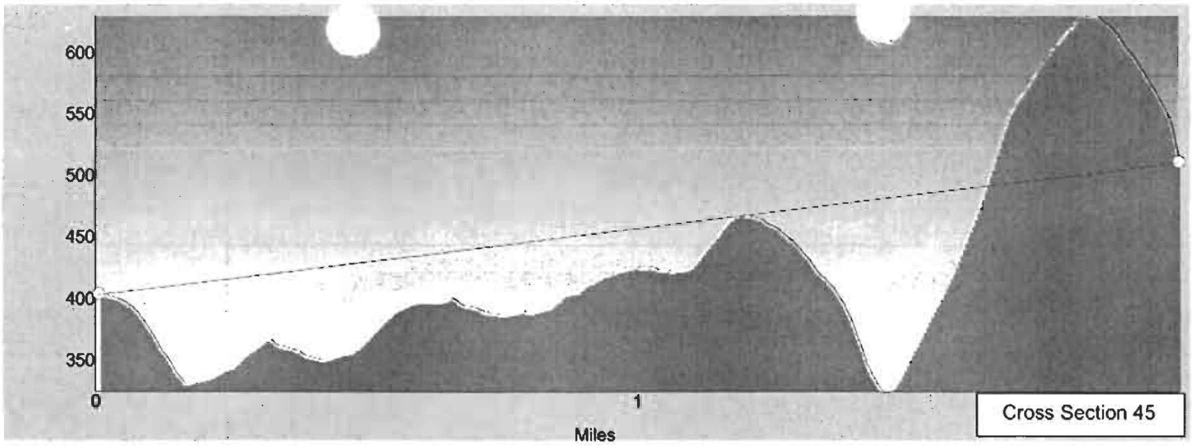
Cross Section 15

Total distance:	1 miles, 5279 feet	Climbing:	277 feet	Latitude:	000° 00' 00.0" N
		Descending:	-181 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 19 feet	Elevation change:	96 feet	Elevation:	
		Min/Max:	357/502	Grade:	

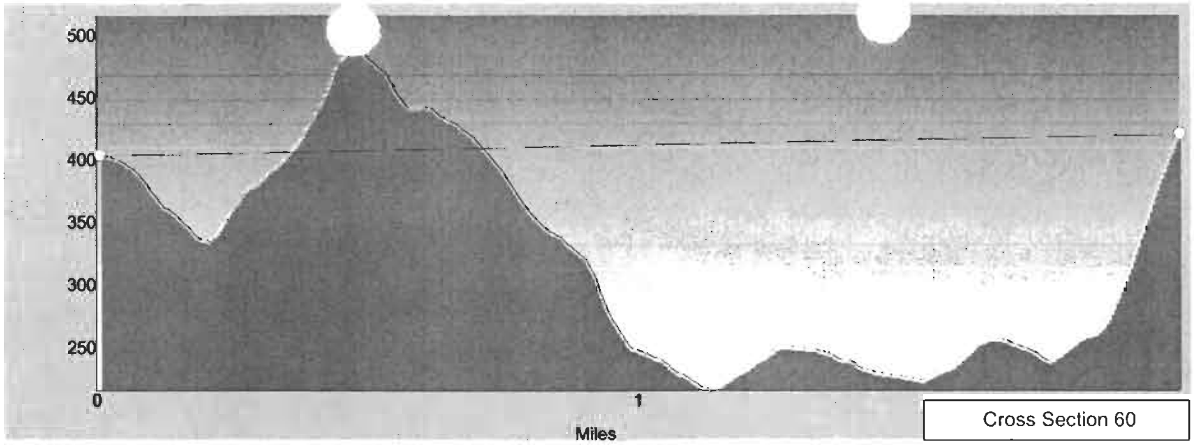


Cross Section 30

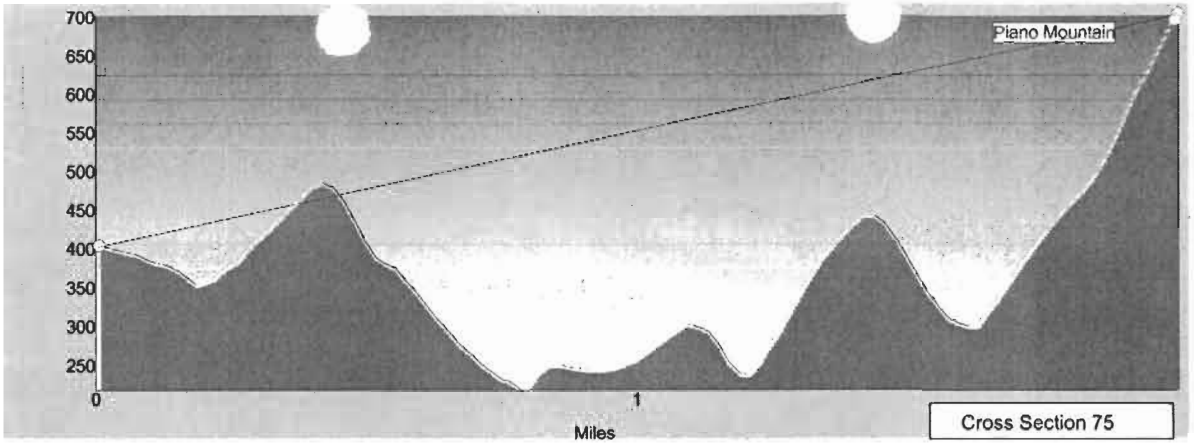
Total distance:	1 miles, 5241 feet	Climbing:	435 feet	Latitude:	000° 00' 00.0" N
		Descending:	-300 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 7 feet	Elevation change:	134 feet	Elevation:	
		Min/Max:	321/626	Grade:	



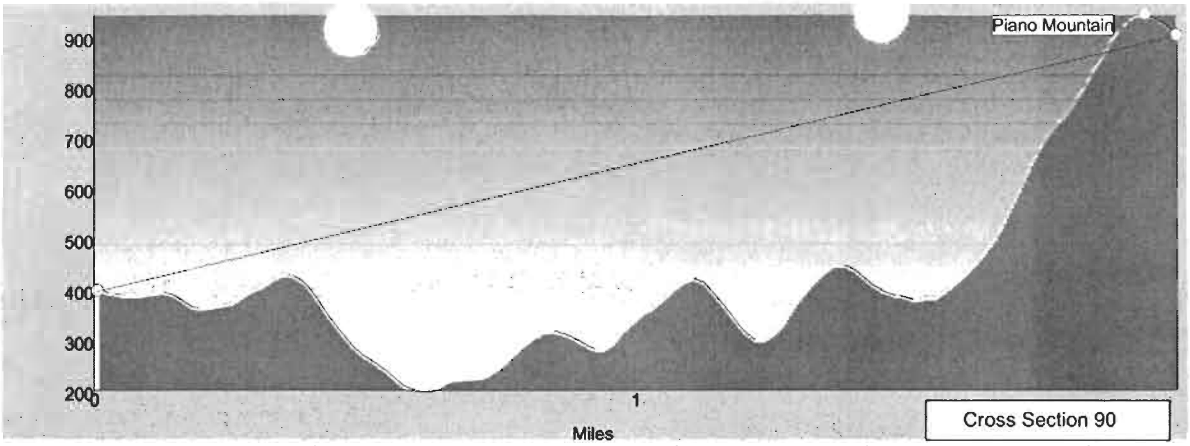
Total distance:	1 miles, 5279 feet	Climbing:	475 feet	Latitude:	000° 00' 00.0" N
		Descending:	-367 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 58 feet	Elevation change:	107 feet	Elevation:	
		Min/Max:	325/630	Grade:	



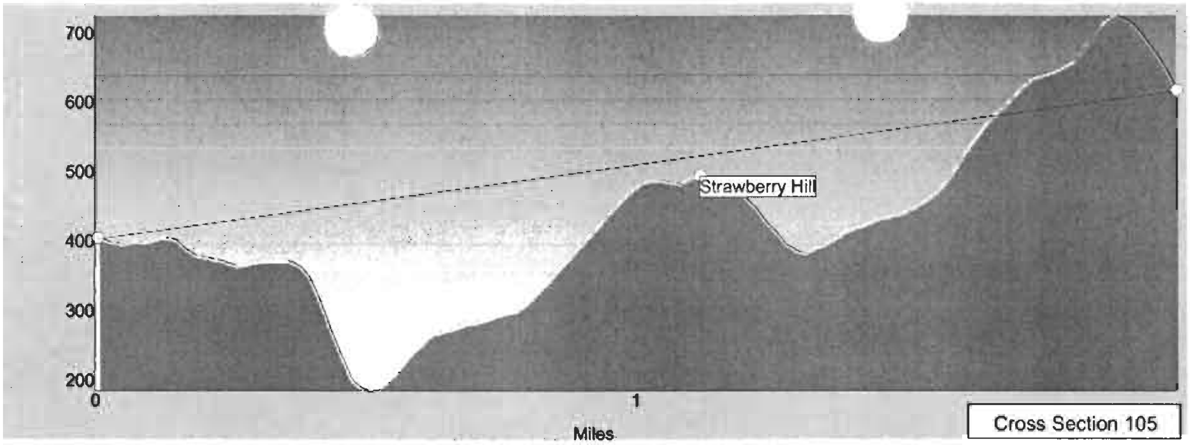
Total distance:	1 miles, 5279 feet	Climbing:	400 feet	Latitude:	000° 00' 00.0" N
		Descending:	-383 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 46 feet	Elevation change:	17 feet	Elevation:	
		Min/Max:	216/486	Grade:	



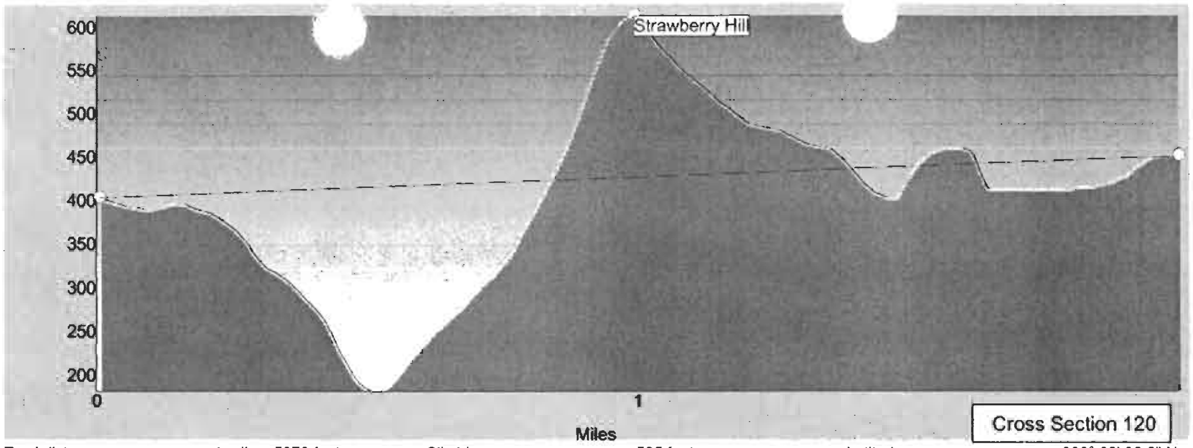
Total distance:	1 miles, 5279 feet	Climbing:	830 feet	Latitude:	000° 00' 00.0" N
		Descending:	-529 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 116 feet	Elevation change:	300 feet	Elevation:	
		Min/Max:	219/703	Grade:	



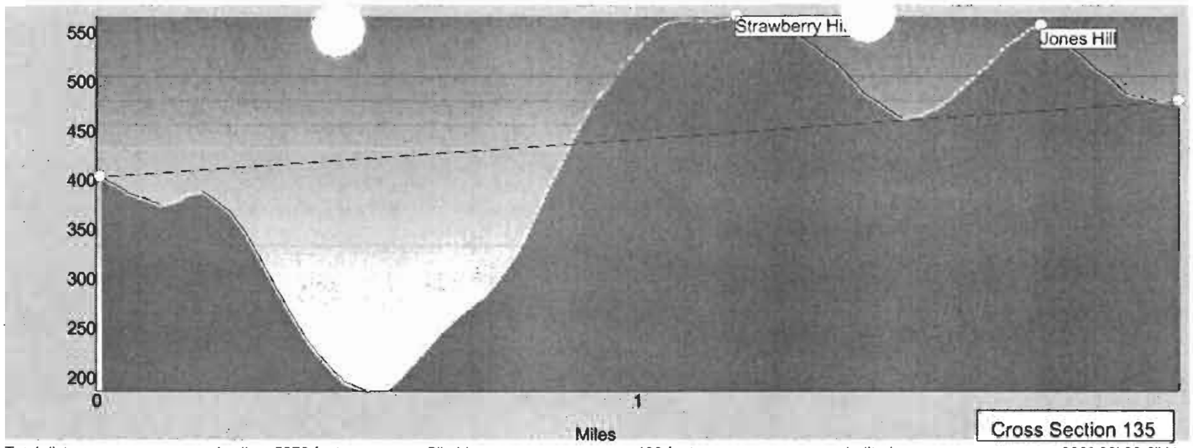
Total distance:	1 miles, 5279 feet	Climbing:	1038 feet	Latitude:	000° 00' 00.0" N
		Descending:	-533 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 172 feet	Elevation change:	505 feet	Elevation:	
		Min/Max:	209/950	Grade:	



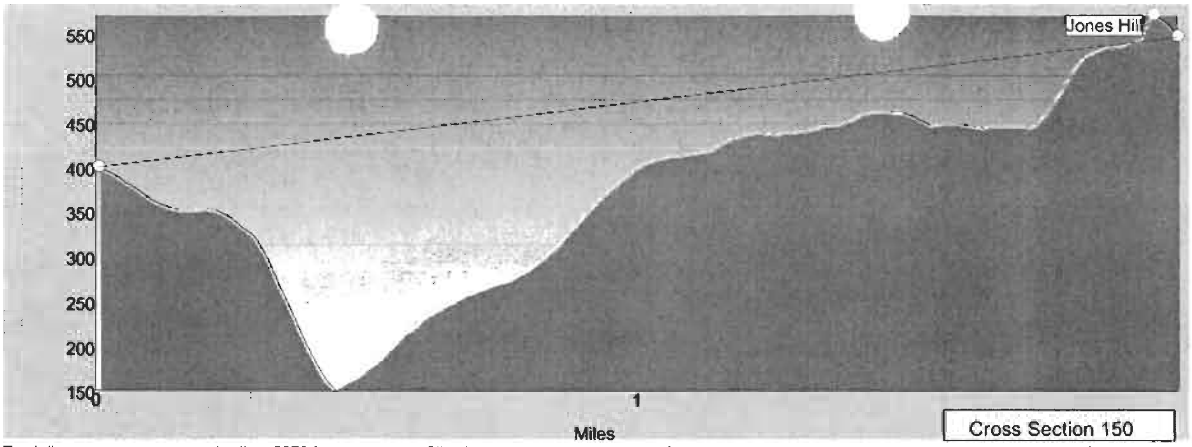
Total distance:	1 miles, 5279 feet	Climbing:	672 feet	Latitude:	000° 00' 00.0" N
		Descending:	-459 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 94 feet	Elevation change:	212 feet	Elevation:	
		Min/Max:	186/726	Grade:	



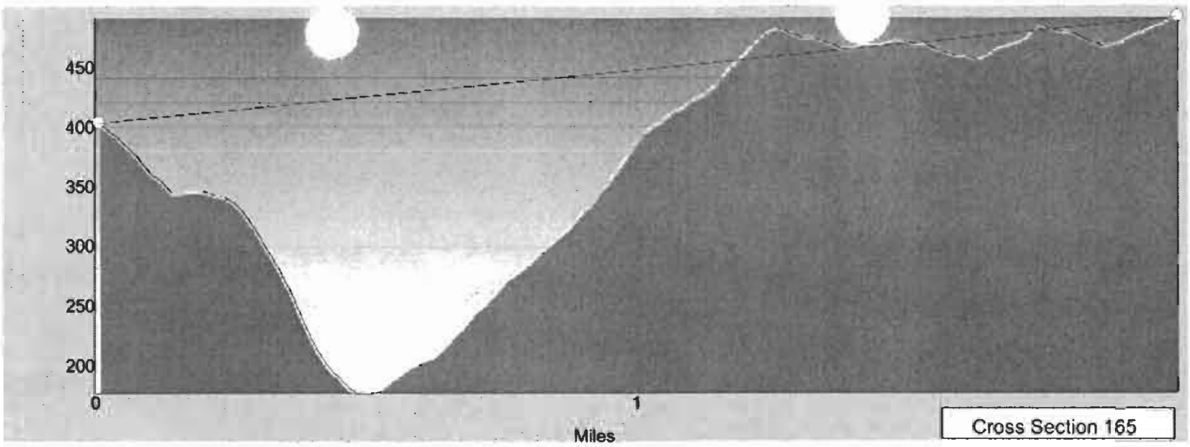
Total distance:	1 miles, 5279 feet	Climbing:	535 feet	Latitude:	000° 00' 00.0" N
		Descending:	-487 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 82 feet	Elevation change:	48 feet	Elevation:	
		Min/Max:	182/613	Grade:	



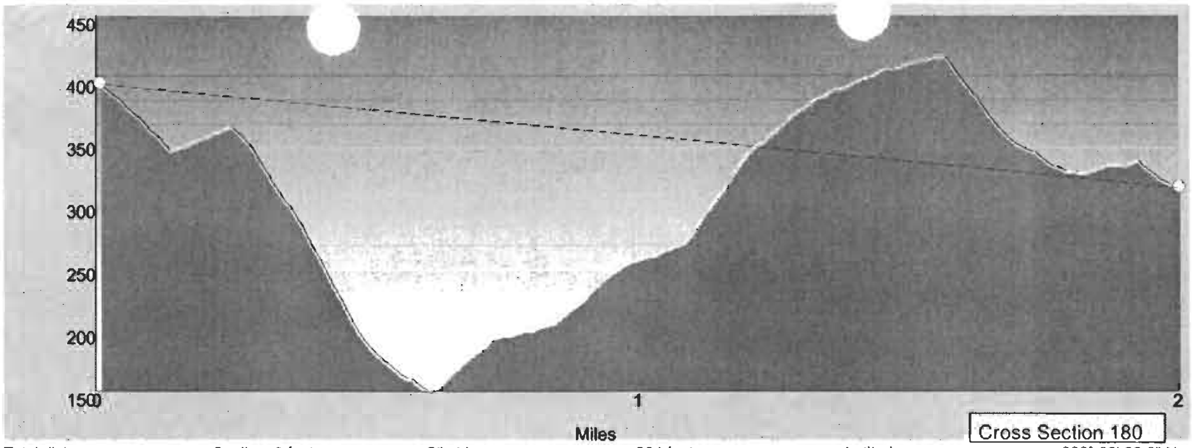
Total distance:	1 miles, 5279 feet	Climbing:	488 feet	Latitude:	000° 00' 00.0" N
		Descending:	-411 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 54 feet	Elevation change:	77 feet	Elevation:	
		Min/Max:	187/567	Grade:	



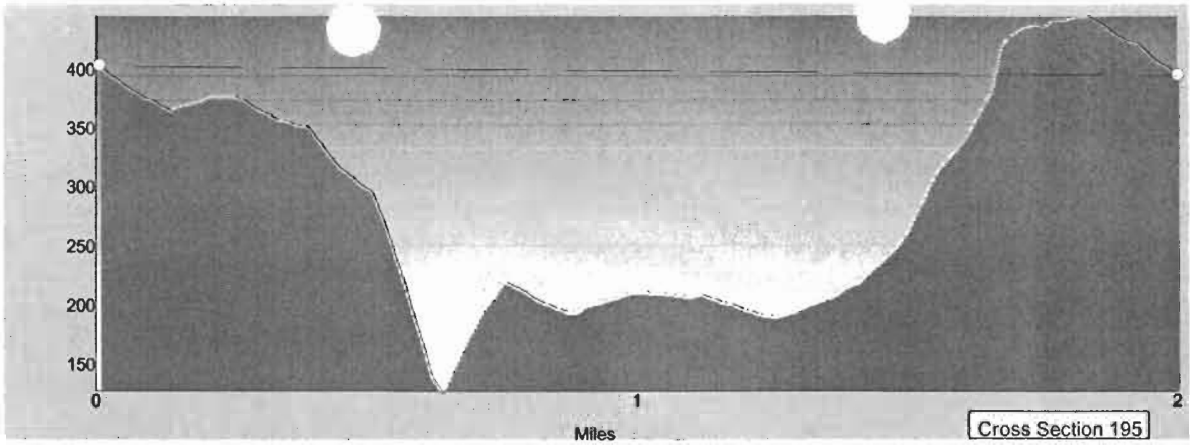
Total distance:	1 miles, 5279 feet	Climbing:	445 feet	Latitude:	000° 00' 00.0" N
		Descending:	-298 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 46 feet	Elevation change:	146 feet	Elevation:	
		Min/Max:	154/574	Grade:	



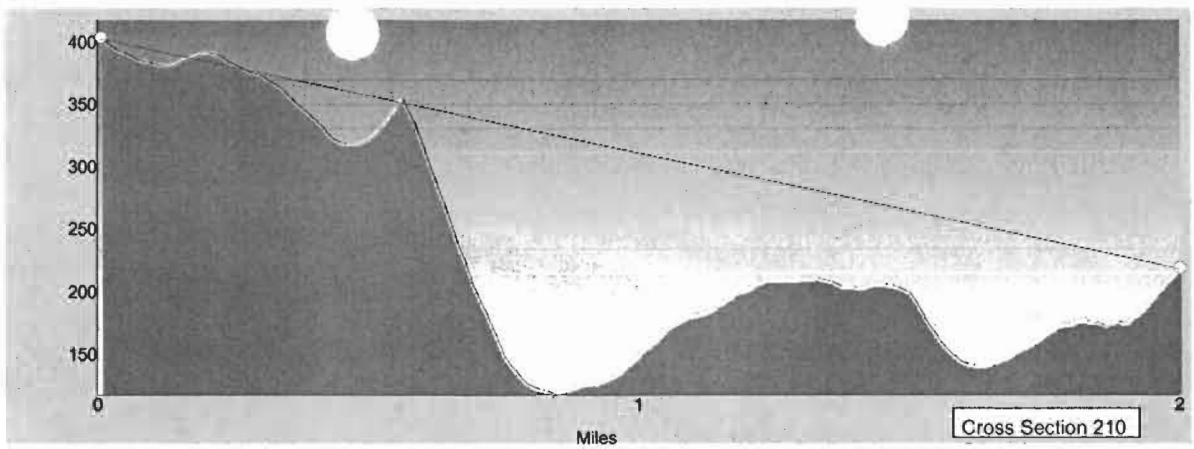
Total distance:	1 miles, 5279 feet	Climbing:	368 feet	Latitude:	000° 00' 00.0" N
		Descending:	-279 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 29 feet	Elevation change:	88 feet	Elevation:	
		Min/Max:	177/492	Grade:	



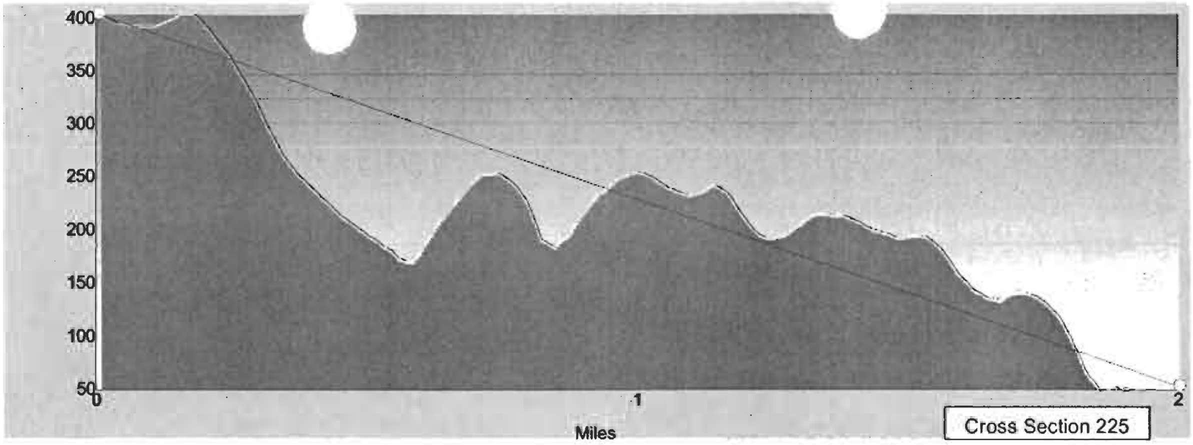
Total distance:	2 miles, 0 feet	Climbing:	294 feet	Latitude:	000° 00' 00.0" N
		Descending:	-377 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 29 feet	Elevation change:	-82 feet	Elevation:	
		Min/Max:	158/424	Grade:	



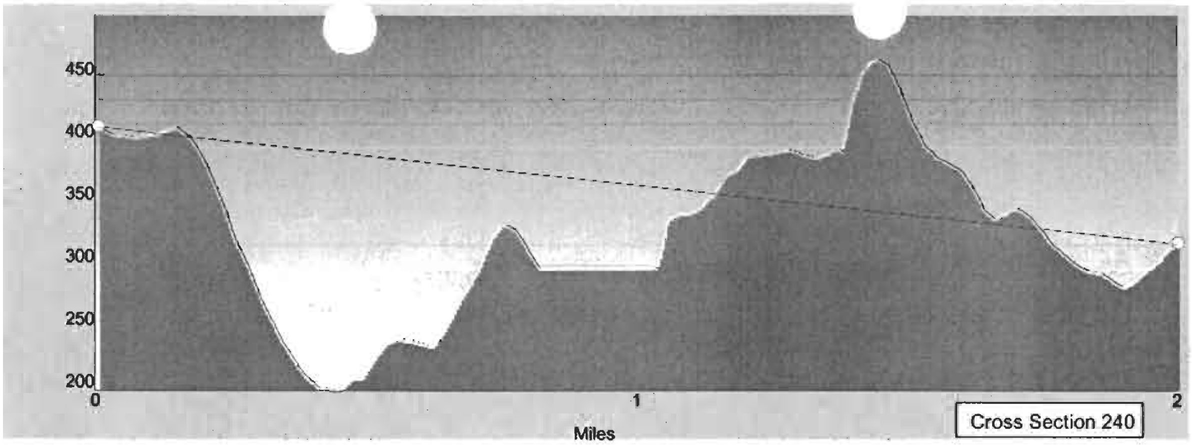
Total distance:	2 miles, 0 feet	Climbing:	379 feet	Latitude:	000° 00' 00.0" N
		Descending:	-387 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 55 feet	Elevation change:	-7 feet	Elevation:	
		Min/Max:	128/446	Grade:	



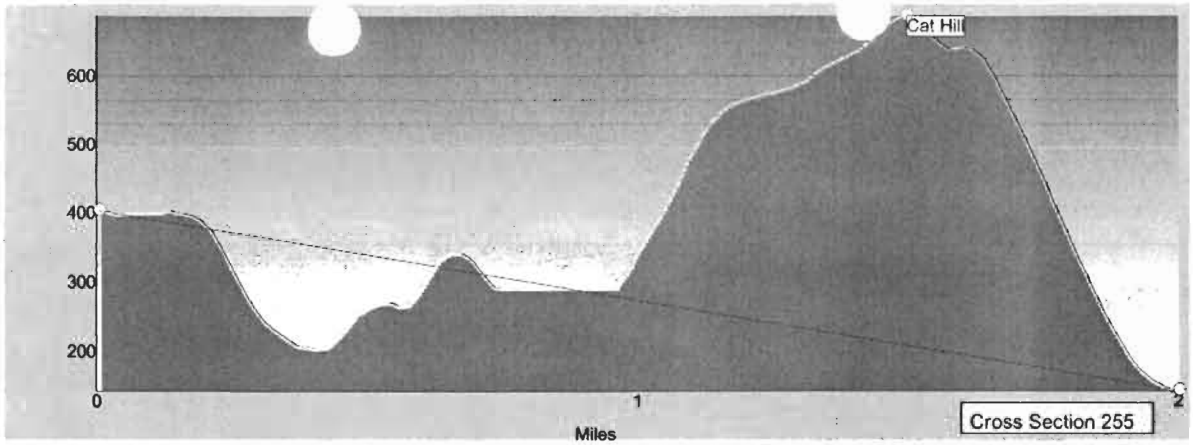
Total distance:	2 miles, 0 feet	Climbing:	225 feet	Latitude:	000° 00' 00.0" N
		Descending:	-410 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 35 feet	Elevation change:	-185 feet	Elevation:	
		Min/Max:	118/403	Grade:	



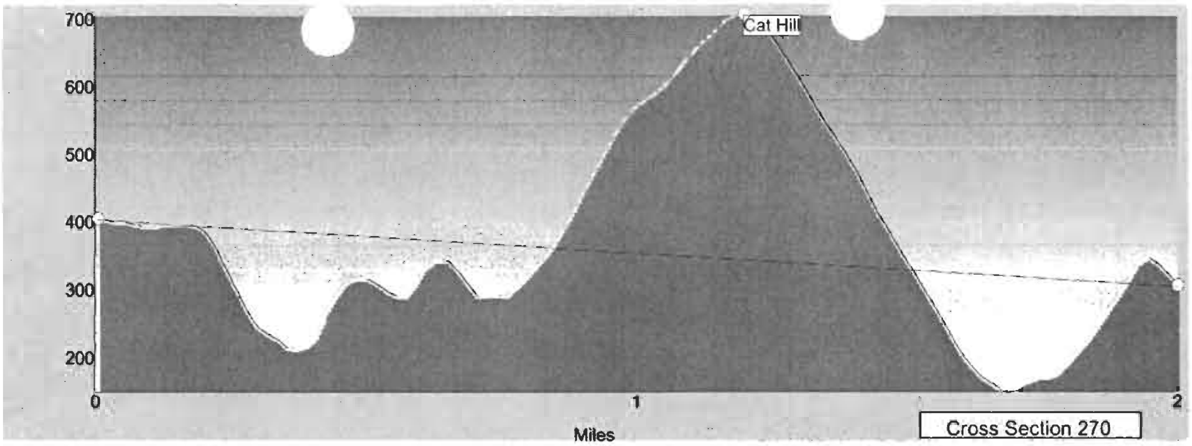
Total distance:	2 miles, 0 feet	Climbing:	213 feet	Latitude:	000° 00' 00.0" N
		Descending:	-564 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 45 feet	Elevation change:	-350 feet	Elevation:	
		Min/Max:	49/403	Grade:	



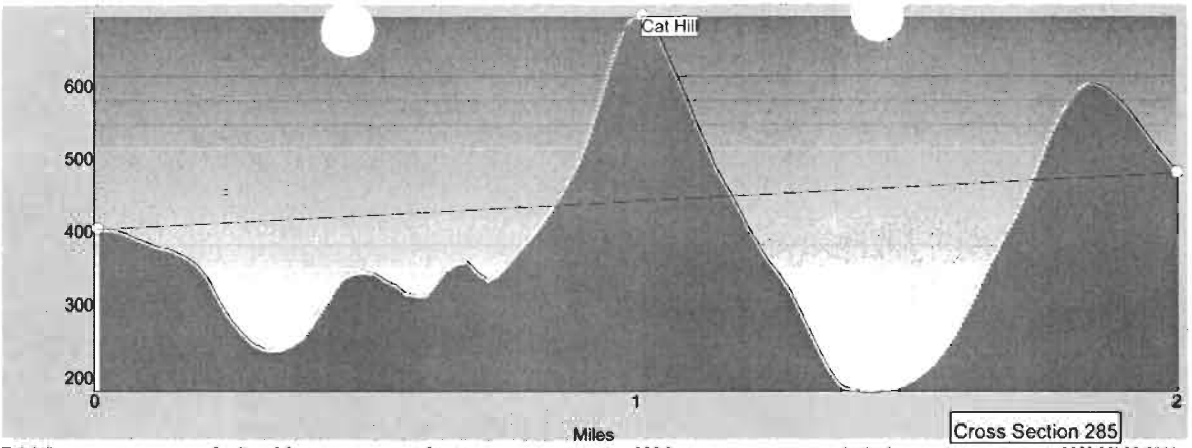
Total distance:	2 miles, 0 feet	Climbing:	363 feet	Latitude:	000° 00' 00.0" N
		Descending:	-456 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 59 feet	Elevation change:	-93 feet	Elevation:	
		Min/Max:	193/457	Grade:	



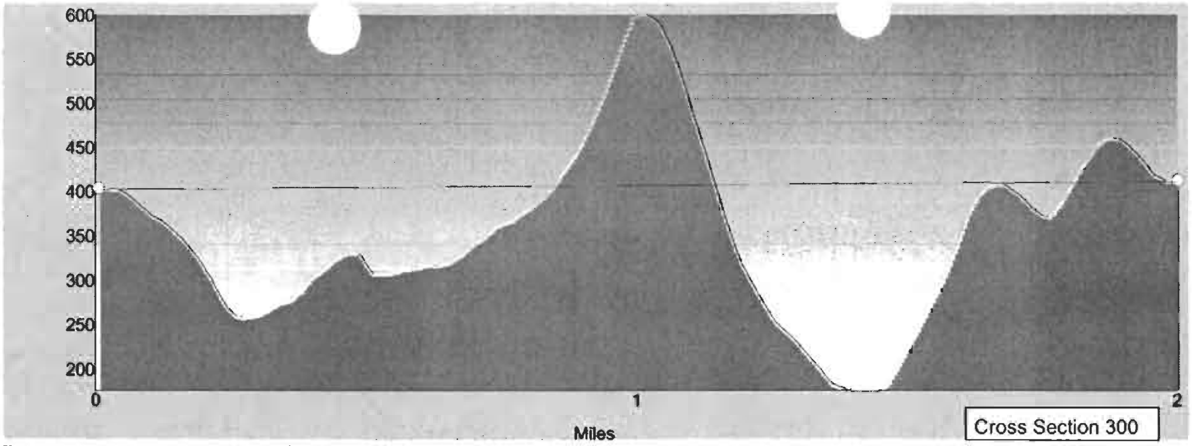
Total distance:	2 miles, 0 feet	Climbing:	547 feet	Latitude:	000° 00' 00.0" N
		Descending:	-809 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 147 feet	Elevation change:	-261 feet	Elevation:	
		Min/Max:	142/687	Grade:	



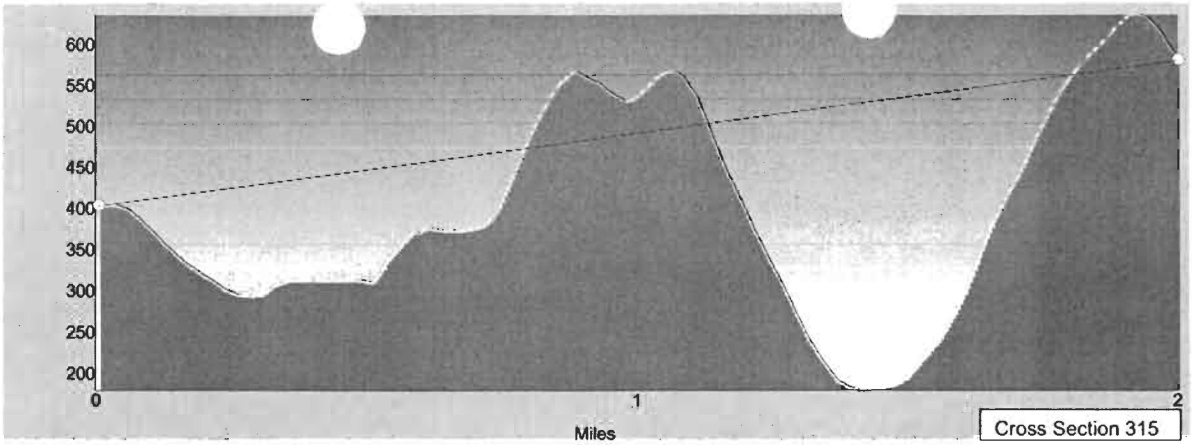
Total distance:	2 miles, 0 feet	Climbing:	770 feet	Latitude:	000° 00' 00.0" N
		Descending:	-868 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 173 feet	Elevation change:	-97 feet	Elevation:	
		Min/Max:	151/705	Grade:	



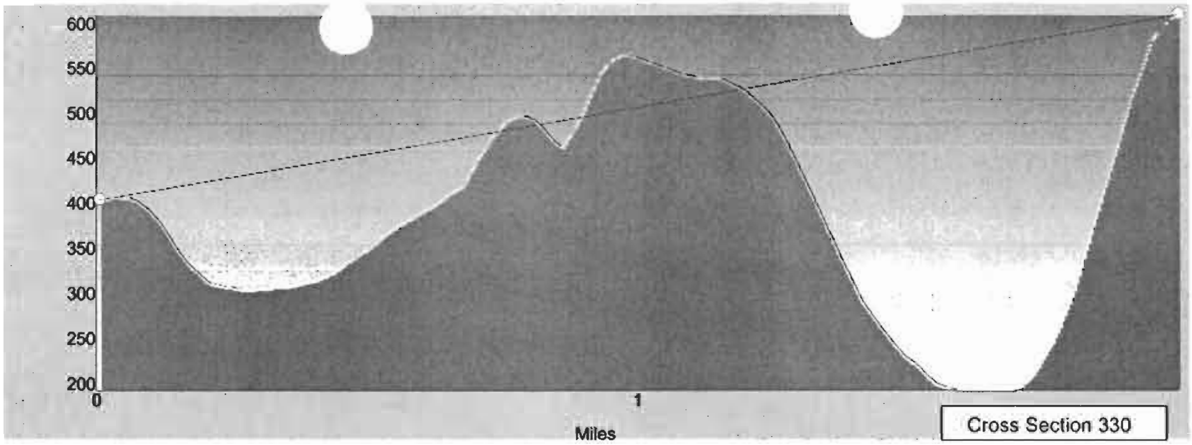
Total distance:	2 miles, 0 feet	Climbing:	936 feet	Latitude:	000° 00' 00.0" N
		Descending:	-858 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 211 feet	Elevation change:	77 feet	Elevation:	
		Min/Max:	182/696	Grade:	



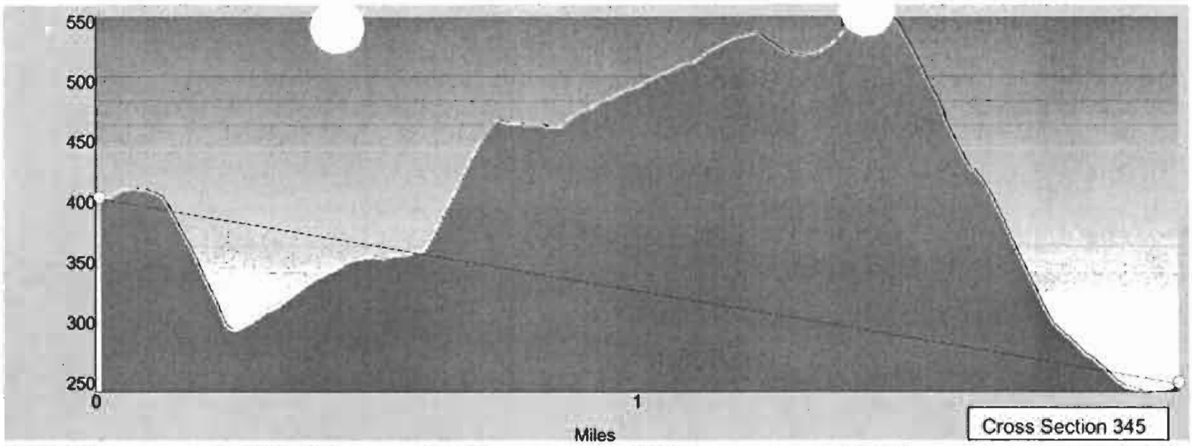
Total distance:	2 miles, 0 feet	Climbing:	686 feet	Latitude:	000° 00' 00.0" N
		Descending:	-677 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 137 feet	Elevation change:	9 feet	Elevation:	
		Min/Max:	177/601	Grade:	



Total distance:	2 miles, 0 feet	Climbing:	772 feet	Latitude:	000° 00' 00.0" N
		Descending:	-594 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 135 feet	Elevation change:	177 feet	Elevation:	
		Min/Max:	180/636	Grade:	



Total distance:	1 miles, 5279 feet	Climbing:	712 feet	Latitude:	000° 00' 00.0" N
		Descending:	-506 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 121 feet	Elevation change:	206 feet	Elevation:	
		Min/Max:	193/609	Grade:	



Total distance:	1 miles, 5279 feet	Climbing:	303 feet	Latitude:	000° 00' 00.0" N
		Descending:	-455 feet	Longitude:	000° 00' 00.0" E
Ground distance:	2 miles, 46 feet	Elevation change:	-152 feet	Elevation:	
		Min/Max:	243/555	Grade:	

TIM
MILLER
ASSOCIATES, INC.
10 North Street, Cold Spring, New York 10516 *Phone (845) 265-4400* *Fax (845) 265-4418*

April 11, 2005

Jan K. Johannessen, The Chazen Companies
C/o Town of Putnam Valley Planning Department
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, New York 10579

Re: Emerald Ridge Subdivision Revised Viewshed Analysis

Dear Mr. Johannessen,

Attached please find eight copies of the revised Viewshed Map (see following Potential Viewshed Within 2 Mile Radius diagram) for the Emerald Ridge Subdivision DEIS. Per the Planning Board's request, we have revised the diagram to show locations of potential views of the entire site rather than potential views of the highest proposed roofline location.

As discussed at the Planning Board's April 4th meeting, this analysis is based on topography alone. Therefore, the presence of vegetation or buildings may further limit the extent to which the project site may actually be visible from these areas. We have supplemented the analysis with field visits and have added indication of several specific Field Surveyed Potential View Locations (noted with asterikses).

I trust that this revised diagram will provide the Planning Board with the information necessary to select potential view points on April 18th that we will analyze using a balloon flight from the proposed highest roofline, per requirement of the adopted scope. The revised list of locations where the project site *may* be visible, and from where we recommend that field investigations be conducted, is as follows:

1.Town Park north of the project site
2.Oscawana Lake Road 900-1300 feet north of Town Hall
3.Oscawana Lake Road 2000 feet north and 800 feet south of a school
4.Kramers Pond Road 0-1500 feet east of Oscawana Road
5.Kramer Road 1000-1500 feet southwest of intersection of Kramer Road and Church Road
6. Subdivision Roads in the residential neighborhood east of Cat Hill
7. Strawberry Road 0-500 feet east of Red Mill Road and 0-500 east of Mohegan Outlet (Towns of Cortlandt and Yorktown)
8.Lexington Avenue 250-1100 feet south of intersection of Route 6 and Lexington Avenue (Towns of Cortlandt and Yorktown)
9.Subdivision Roads near Jones Hill (Town of Yorktown)

10. Peekskill Hollow Road in vicinity of project site
11. School complex on Peekskill Hollow Brook Road (from vicinity of athletic fields)
12. Old Turnpike Road south of project site
13. Lockwood Road (Town of Cortlandt)
14. Intersection of Brook Street and Austin Street (Floredan Estates)
15. Potential Trail locations on Piano Mountain

We look forward to meeting with the Planning Board on April 18th to resolve the selection of locations for analysis.

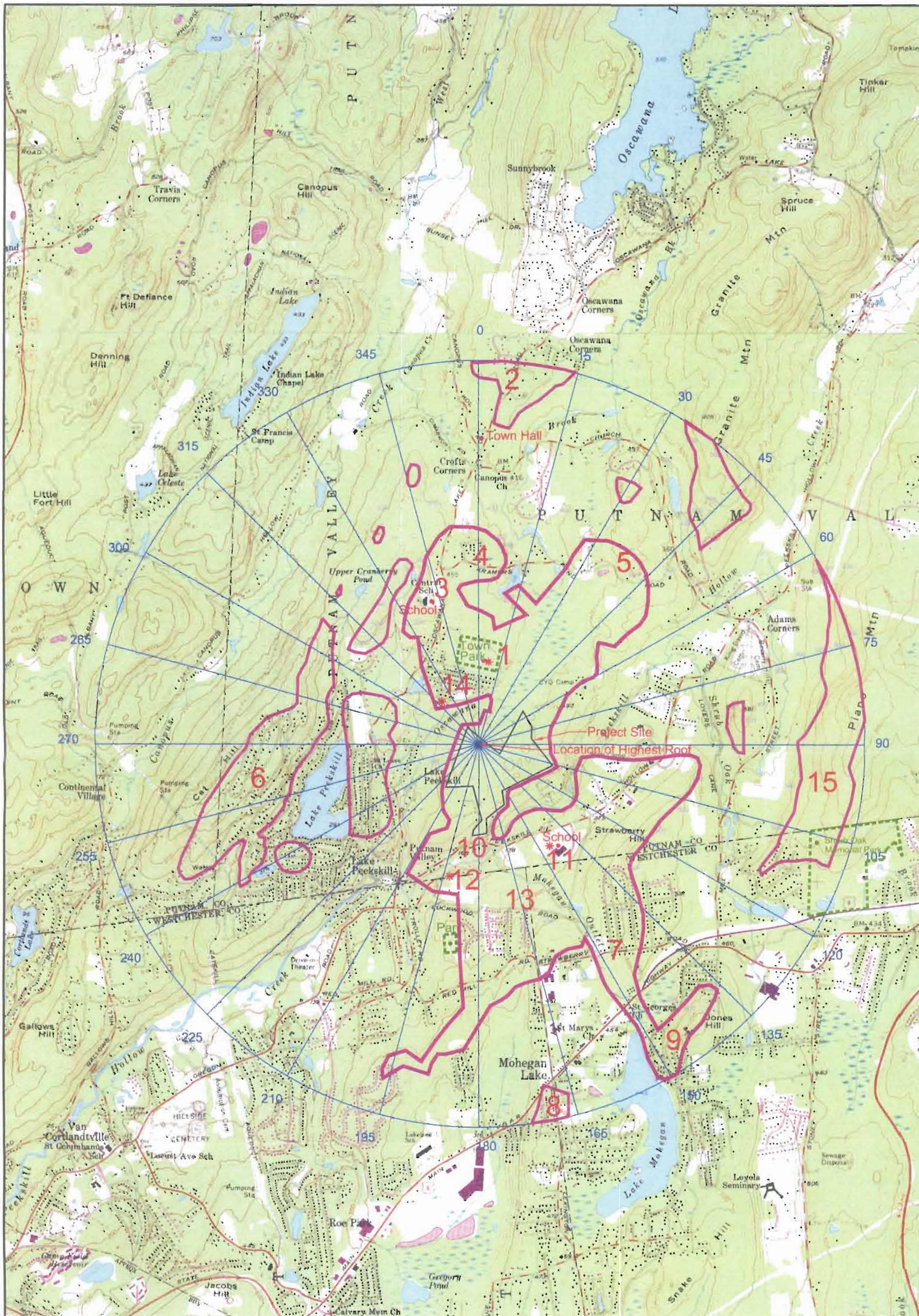
Sincerely,

Josh Moreinis, AICP, PP
TIM MILLER ASSOCIATES, INC.

encl.

C: Val Santucci, VS Construction Corp.

TMA Wordpro/Marsh Hill/Correspondence/Viewshed Diagram 4-11 Cover Letter.lwp



Legend
Viewshed
Park
Keys to Cross Sections
* Field Surveyed Potential View Locations

Potential Viewshed within 2 Mile Radius

Emerald Ridge

Town of Putnam Valley, Putnam County, New York

Base Map: USGS Mohegan Quad

Scale: 1 inch = 2500 feet

Tim Miller Associates, Inc., 10 North Street, Cold Spring, New York 10516 (845) 265-4400 Fax (845) 265-4418

\\Fileserver\TMA Wordpro\Marsh Hill - Emerald Ridge (04010)\visual\2 Mile Viewshed 04-08-2005.dwg

Existing Views from Potential Critical Receptor Locations

1) Town Park north of the project site

2) Oscawana Lake Road 900-1300 feet north of Town Hall

3) Oscawana Lake Road 2000 feet north and 800 feet south of a school

4) Kramers Pond Road 0-1500 feet east of Oscawana Road

[CONTINUED →]

Existing Views from Potential Critical Receptor Locations

5) Kramer Road 1000-1500 feet southwest of intersection of Kramer Road and Church Road

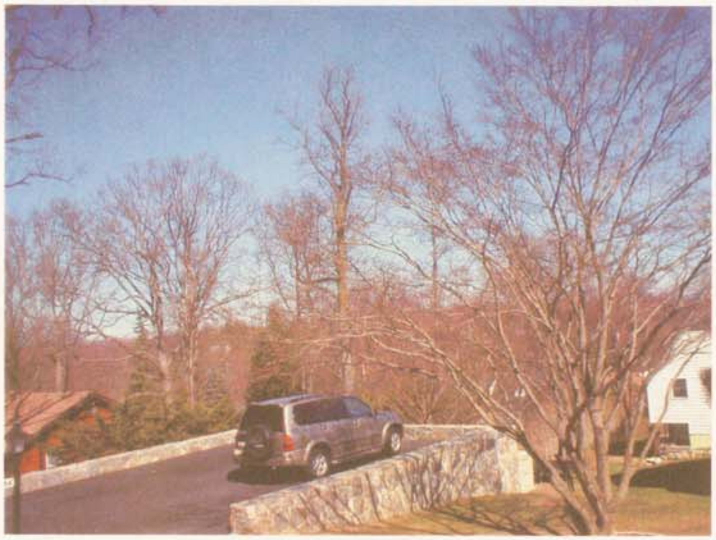
6) Subdivision Roads in the residential neighborhood east of Cat Hill

7) Strawberry Road 0-500 feet east of Red Mill Road and 0-500 east of Mohegan Outlet (Towns of Cortlandt and Yorktown)

8) Lexington Avenue 250-1100 feet south of intersection of Route 6 and Lexington Avenue (Towns of Cortlandt and Yorktown)

[CONTINUED →]

Existing Views from Potential Critical Receptor Locations



9) Subdivision Roads near Jones Hill (Town of Yorktown)

10) Peekskill Hollow Road in vicinity of project site

11) School complex on Peekskill Hollow Brook Road
(from vicinity of athletic fields)

12) Old Turnpike Road south of project site

[CONTINUED →]

Existing Views from Potential Critical Receptor Locations

13) Lockwood Road (Town of Cortlandt)

14) Intersection of Brook Street and Austin Street (Floredan Estates)

15) Potential Trail locations on Piano Mountain

Appendix F

Traffic Level of Service Calculations

CAPACITY CALCULATIONS
APPENDIX F

EXISTING

NO-BUILD

BUILD

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	AAC	Intersection	Peekskill Hollow & Oscawana Lk
Agency or Co.	TMA	Area Type	All other areas
Date Performed	5/5/2005	Jurisdiction	Town of Putnam Valley
Time Period	AM Peak Hour	Analysis Year	Existing Condition
		Project ID	Emerald Ridge - Marsh Hill

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	0	36	37	123	17	68	15	136	67	130	259	4
% Heavy vehicles, %HV	0	0	0	7	7	7	4	4	4	4	4	4
Peak-hour factor, PHF	0.76	0.76	0.76	0.81	0.81	0.81	0.81	0.81	0.81	0.92	0.92	0.92
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		17	0		17	0		0
Lane width		12.3			13.8			11.9			12.6	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p		3.2			3.2			3.2			3.2	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 20.0	G =	G =	G =	G = 32.0	G =	G =	G =
	Y =	Y =	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 60.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		96			236			249			427	
Lane group capacity, c		596			447			903			810	
v/c ratio, X		0.16			0.53			0.28			0.53	
Total green ratio, g/C		0.33			0.33			0.53			0.53	
Uniform delay, d_1		14.1			16.2			7.7			9.1	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		0.6			4.4			0.8			2.4	
Initial queue delay, d_3												
Control delay		14.7			20.6			8.4			11.5	
Lane group LOS		B			C			A			B	
Approach delay	14.7			20.6			8.4			11.5		
Approach LOS	B			C			A			B		
Intersection delay	13.2			X_C = 0.53			Intersection LOS			B		

 Version 4.1e

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*AAC*
Agency/Co.	*TMA*
Date Performed	*5/5/2005*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Peekskill Hollow & Marsh Hill*
Jurisdiction	*Town of Putnam Valley*
Analysis Year	

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road*	North/South Street: *Marsh Hill Road*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*351*	*0*	*0*	*196*	*0*
Peak-hour factor, PHF	*0.74*	*0.74*	*1.00*	*1.00*	*0.88*	*0.88*
Hourly Flow Rate (veh/h)	*0*	*474*	*0*	*0*	*222*	*0*
Proportion of heavy vehicles, P_{HV}	*5*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*1*	*0*	*0*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.25*	*1.00*	*0.25*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*4*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*0*	*0*	*0*
Percent grade (%)	*0*			*-4*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*0*						*4*	
Capacity, c_m (vph)	*1329*						*411*	
v/c ratio	*0.00*						*0.01*	
Queue length (95%)	*0.00*						*0.03*	
Control Delay (s/veh)	*7.7*						*13.8*	
LOS	*A*						*B*	
Approach delay (s/veh)	--	--				*13.8*		
Approach LOS	--	--				*B*		

HCS2000™ Version 4.1d

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*AAC*
Agency/Co.	*TMA*
Date Performed	*5/5/2005*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Peekskill Hollow Pembrook Ct*
Jurisdiction	*Town of Putnam Valley*
Analysis Year	*Existing Condition*

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road*	North/South Street: *Peekskill Hollow Turnpike/Pem*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*341*	*3*	*14*	*201*	*0*
Peak-hour factor, PHF	*1.00*	*0.70*	*0.70*	*0.79*	*0.79*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*487*	*4*	*17*	*254*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*9*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*11*	*0*	*36*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.78*	*1.00*	*0.78*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*14*	*0*	*46*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*2*	*0*	*2*	*0*	*0*	*0*
Percent grade (%)	*0*			*0*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*17*		*60*				
Capacity, c_m (vph)		*1037*		*507*				
v/c ratio		*0.02*		*0.12*				
Queue length (95%)		*0.05*		*0.40*				
Control Delay (s/veh)		*8.5*		*13.1*				
LOS		*A*		*B*				
Approach delay (s/veh)	--	--	*13.1*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow Foothill St*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*Existing Condition*
Analysis Time Period	*AM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* | North/South Street: *Foothill Street*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*317*	*185*	*52*	*160*	*0*
Peak-hour factor, PHF	*1.00*	*0.78*	*0.78*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*406*	*237*	*59*	*181*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*8*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*39*	*0*	*17*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*1.00*	*0.88*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*44*	*0*	*19*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*7*	*0*	*7*	*0*	*0*	*0*
Percent grade (%)		*-5*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*59*		*63*				
Capacity, c_m (vph)		*914*		*361*				
v/c ratio		*0.06*		*0.17*				
Queue length (95%)		*0.21*		*0.62*				
Control Delay (s/veh)		*9.2*		*17.1*				
LOS		*A*		*C*				
Approach delay (s/veh)	--	--		*17.1*				
Approach LOS	--	--		*C*				

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow & Oscawana Lk*
Agency or Co.	*TMA*	Area Type	*All other areas*
Date Performed	*5/5/2005*	Jurisdiction	*Town of Putnam Valley*
Time Period	*PM Peak Hour*	Analysis Year	
		Project ID	*Emerald Ridge - Marsh Hill*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	3	24	43	123	52	130	58	322	109	88	197	2
% Heavy vehicles, %HV	1	1	1	2	2	2	0	0	0	1	1	1
Peak-hour factor, PHF	0.83	0.83	0.83	0.79	0.79	0.79	0.84	0.84	0.84	0.82	0.82	0.82
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		30	0		29	0		0
Lane width		12.3			13.8			11.9			12.6	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p		3.2			3.2			3.2			3.2	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 20.0	G =	G =	G =	G = 32.0	G =	G =	G =
	Y =	Y =	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		85			349			547			349	
Lane group capacity, c		572			512			907			784	
v/c ratio, X		0.15			0.68			0.60			0.45	
Total green ratio, g/C		0.33			0.33			0.53			0.53	
Uniform delay, d_1		14.0			17.3			9.6			8.6	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		0.5			7.2			3.0			1.8	
Initial queue delay, d_3												
Control delay		14.6			24.4			12.6			10.4	
Lane group LOS		B			C			B			B	
Approach delay	14.6			24.4			12.6			10.4		
Approach LOS	B			C			B			B		
Intersection delay	15.2			X_C = 0.63			Intersection LOS			B		

 Version 4.1e

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow & Marsh Hill*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*Existing Condition*
Analysis Time Period	*PM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road*	North/South Street: *Marsh Hill Road*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*3*	*205*	*0*	*0*	*281*	*1*
Peak-hour factor, PHF	*0.79*	*0.79*	*1.00*	*1.00*	*0.82*	*0.82*
Hourly Flow Rate (veh/h)	*3*	*259*	*0*	*0*	*342*	*1*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*2*	*0*	*0*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.50*	*1.00*	*0.50*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*4*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*0*	*0*	*0*
Percent grade (%)	*0*			*-4*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*3*						*4*	
Capacity, c_m (vph)	*1216*						*462*	
v/c ratio	*0.00*						*0.01*	
Queue length (95%)	*0.01*						*0.03*	
Control Delay (s/veh)	*8.0*						*12.9*	
LOS	*A*						*B*	
Approach delay (s/veh)	--	--				*12.9*		
Approach LOS	--	--				*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	AAC	Intersection	Peekskill Hollow Pembrook Ct
Agency/Co.	TMA	Jurisdiction	Town of Putnam Valley
Date Performed	5/5/2005	Analysis Year	Existing Condition
Analysis Time Period	PM Peak Hour		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* North/South Street: *Pembrook Court*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	197	8	28	271	0
Peak-hour factor, PHF	1.00	0.82	0.82	0.85	0.85	1.00
Hourly Flow Rate (veh/h)	0	240	9	32	318	0
Proportion of heavy vehicles, P_{HV}	0	--	--	2	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	11	0	17	0	0	0
Peak-hour factor, PHF	0.55	1.00	0.55	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	19	0	30	0	0	0
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	0
Percent grade (%)	0			0		
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
Volume, v (vph)		32		49				
Capacity, c_m (vph)		1317		607				
v/c ratio		0.02		0.08				
Queue length (95%)		0.07		0.26				
Control Delay (s/veh)		7.8		11.5				
LOS		A		B				
Approach delay (s/veh)	--	--	11.5					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow Foothill St*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*Existing*
Analysis Time Period	*PM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*	
East/West Street: *Peekskill Hollow Road*	North/South Street: *Foothill Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*167*	*47*	*15*	*150*	*0*
Peak-hour factor, PHF	*1.00*	*0.85*	*0.85*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*196*	*55*	*17*	*170*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*2*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*118*	*0*	*25*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*1.00*	*0.81*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*145*	*0*	*30*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*1*	*0*	*1*	*0*	*0*	*0*
Percent grade (%)	*-5*			*0*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*17*		*175*				
Capacity, c_m (vph)		*1314*		*609*				
v/c ratio		*0.01*		*0.29*				
Queue length (95%)		*0.04*		*1.18*				
Control Delay (s/veh)		*7.8*		*13.3*				
LOS		*A*		*B*				
Approach delay (s/veh)	--	--	*13.3*					
Approach LOS	--	--	*B*					

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow & Oscawana Lk*
Agency or Co.	*TMA*	Area Type	*All other areas*
Date Performed	*5/5/2005*	Jurisdiction	*Town of Putnam Valley*
Time Period	*AM Peak Hour*	Analysis Year	
		Project ID	*Emerald Ridge - Marsh Hill*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	0	39	40	140	18	76	16	148	81	144	284	4
% Heavy vehicles, %HV	0	0	0	7	7	7	4	4	4	4	4	4
Peak-hour factor, PHF	0.76	0.76	0.76	0.81	0.81	0.81	0.81	0.81	0.81	0.92	0.92	0.92
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		17	0		17	0		0
Lane width		12.3			13.8			11.9			12.6	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p		3.2			3.2			3.2			3.2	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 20.0	G =	G =	G =	G = 32.0	G =	G =	G =
	Y =	Y =	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		104			268			282			470	
Lane group capacity, c		596			429			899			795	
v/c ratio, X		0.17			0.62			0.31			0.59	
Total green ratio, g/C		0.33			0.33			0.53			0.53	
Uniform delay, d_1		14.2			16.8			7.8			9.5	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		0.6			6.7			0.9			3.2	
Initial queue delay, d_3												
Control delay		14.8			23.6			8.8			12.8	
Lane group LOS		B			C			A			B	
Approach delay	14.8			23.6			8.8			12.8		
Approach LOS	B			C			A			B		
Intersection delay	14.5			X_C = 0.60			Intersection LOS			B		

 Version 4.1e

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow & Marsh Hill*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*No-Build*
Analysis Time Period	*AM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* | North/South Street: *Marsh Hill Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*391*	*0*	*0*	*221*	*0*
Peak-hour factor, PHF	*0.74*	*0.74*	*1.00*	*1.00*	*0.88*	*0.88*
Hourly Flow Rate (veh/h)	*0*	*528*	*0*	*0*	*251*	*0*
Proportion of heavy vehicles, P_{HV}	*5*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*1*	*0*	*0*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.25*	*1.00*	*0.25*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*4*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*0*	*0*	*0*
Percent grade (%)	*0*			*-4*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*0*						*4*	
Capacity, c_m (vph)	*1297*						*368*	
v/c ratio	*0.00*						*0.01*	
Queue length (95%)	*0.00*						*0.03*	
Control Delay (s/veh)	*7.8*						*14.9*	
LOS	*A*						*B*	
Approach delay (s/veh)	--	--				*14.9*		
Approach LOS	--	--				*B*		

HCS2000™ Version 4.1d

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*AAC*
Agency/Co.	*TMA*
Date Performed	*5/5/2005*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Peekskill Hollow Pembrook Ct*
Jurisdiction	*Town of Putnam Valley*
Analysis Year	*No-Build Condition*

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* | North/South Street: *Pembrook Court*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*380*	*3*	*15*	*227*	*0*
Peak-hour factor, PHF	*1.00*	*0.70*	*0.70*	*0.79*	*0.79*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*542*	*4*	*18*	*287*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*9*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*12*	*0*	*39*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.78*	*1.00*	*0.78*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*15*	*0*	*50*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*2*	*0*	*2*	*0*	*0*	*0*
Percent grade (%)	*0*			*0*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*18*		*65*				
Capacity, c_m (vph)		*989*		*464*				
v/c ratio		*0.02*		*0.14*				
Queue length (95%)		*0.06*		*0.48*				
Control Delay (s/veh)		*8.7*		*14.0*				
LOS		*A*		*B*				
Approach delay (s/veh)	--	--		*14.0*				
Approach LOS	--	--		*B*				

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow Foothill St*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*No-Build Condition*
Analysis Time Period	*AM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road*	North/South Street: *Foothill Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*353*	*201*	*56*	*181*	*0*
Peak-hour factor, PHF	*1.00*	*0.78*	*0.78*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*452*	*257*	*63*	*205*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*8*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*43*	*0*	*18*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*1.00*	*0.88*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*48*	*0*	*20*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*7*	*0*	*7*	*0*	*0*	*0*
Percent grade (%)	*-5*			*0*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*63*		*68*				
Capacity, c_m (vph)		*863*		*319*				
v/c ratio		*0.07*		*0.21*				
Queue length (95%)		*0.24*		*0.79*				
Control Delay (s/veh)		*9.5*		*19.3*				
LOS		*A*		*C*				
Approach delay (s/veh)	--	--	*19.3*					
Approach LOS	--	--	*C*					

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	AAC	Intersection	Peekskill Hollow & Oscawana Lk
Agency or Co.	TMA	Area Type	All other areas
Date Performed	5/5/2005	Jurisdiction	Town of Putnam Valley
Time Period	PM Peak Hour	Analysis Year	
		Project ID	Emerald Ridge - Marsh Hill

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	3	26	47	157	56	144	63	352	141	96	216	2
% Heavy vehicles, %HV	1	1	1	2	2	2	0	0	0	1	1	1
Peak-hour factor, PHF	0.83	0.83	0.83	0.79	0.79	0.79	0.84	0.84	0.84	0.82	0.82	0.82
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		30	0		29	0		0
Lane width		12.3			13.8			11.9			12.6	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p		3.2			3.2			3.2			3.2	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 20.0	G =	G =	G =	G = 32.0	G =	G =	G =
	Y =	Y =	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = 0.25					Cycle Length, C = 60.0			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		92			414			627			382	
Lane group capacity, c		571			505			899			746	
v/c ratio, X		0.16			0.82			0.70			0.51	
Total green ratio, g/C		0.33			0.33			0.53			0.53	
Uniform delay, d_1		14.1			18.3			10.4			9.0	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		0.6			13.9			4.5			2.5	
Initial queue delay, d_3												
Control delay		14.7			32.2			14.9			11.5	
Lane group LOS		B			C			B			B	
Approach delay	14.7			32.2			14.9			11.5		
Approach LOS	B			C			B			B		
Intersection delay	18.7			X_C = 0.74			Intersection LOS			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	AAC	Intersection	Peekskill Hollow & Marsh Hill
Agency/Co.	TMA	Jurisdiction	Town of Putnam Valley
Date Performed	5/5/2005	Analysis Year	No-Build
Analysis Time Period	PM Peak Hour		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* North/South Street: *Marsh Hill Road*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	3	246	0	0	331	1
Peak-hour factor, PHF	0.79	0.79	1.00	1.00	0.82	0.82
Hourly Flow Rate (veh/h)	3	311	0	0	403	1
Proportion of heavy vehicles, P_{HV}	2	--	--	0	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	2	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	0.50	1.00	0.50
Hourly Flow Rate (veh/h)	0	0	0	4	0	0
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	0
Percent grade (%)		0			-4	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
Volume, v (vph)	3						4	
Capacity, c_m (vph)	1155						397	
v/c ratio	0.00						0.01	
Queue length (95%)	0.01						0.03	
Control Delay (s/veh)	8.1						14.2	
LOS	A						B	
Approach delay (s/veh)	--	--				14.2		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*AAC*
Agency/Co.	*TMA*
Date Performed	*5/5/2005*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Peekskill Hollow Pembrook Ct*
Jurisdiction	*Town of Putnam Valley*
Analysis Year	*No-Build*

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* North/South Street: *Pembrook Court*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*233*	*9*	*30*	*320*	*0*
Peak-hour factor, PHF	*1.00*	*0.82*	*0.82*	*0.85*	*0.85*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*284*	*10*	*35*	*376*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*2*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*12*	*0*	*18*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.55*	*1.00*	*0.55*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*21*	*0*	*32*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*0*	*0*	*0*
Percent grade (%)	*0*			*0*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*35*		*53*				
Capacity, c_m (vph)		*1268*		*542*				
v/c ratio		*0.03*		*0.10*				
Queue length (95%)		*0.09*		*0.32*				
Control Delay (s/veh)		*7.9*		*12.4*				
LOS		*A*		*B*				
Approach delay (s/veh)	--	--		*12.4*				
Approach LOS	--	--		*B*				

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	AAC	Intersection	Peekskill Hollow Foothill St
Agency/Co.	TMA	Jurisdiction	Town of Putnam Valley
Date Performed	5/5/2005	Analysis Year	No-Build Condition
Analysis Time Period	PM Peak Hour		

Project Description Emerald Ridge - Marsh Hill

East/West Street: Peekskill Hollow Road	North/South Street: Foothill Street
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	205	51	16	188	0
Peak-hour factor, PHF	1.00	0.85	0.85	0.88	0.88	1.00
Hourly Flow Rate (veh/h)	0	241	59	18	213	0
Proportion of heavy vehicles, P_{HV}	0	--	--	2	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	129	0	27	0	0	0
Peak-hour factor, PHF	0.81	1.00	0.81	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	159	0	33	0	0	0
Proportion of heavy vehicles, P_{HV}	1	0	1	0	0	0
Percent grade (%)	-5			0		
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
Volume, v (vph)		18		192				
Capacity, c_m (vph)		1261		544				
v/c ratio		0.01		0.35				
Queue length (95%)		0.04		1.58				
Control Delay (s/veh)		7.9		15.2				
LOS		A		C				
Approach delay (s/veh)	--	--	15.2					
Approach LOS	--	--	C					

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*AAC*	Intersection	*Peekskill Hollow & Oscawana Lk*
Agency or Co.	*TMA*	Area Type	*All other areas*
Date Performed	*5/5/2005*	Jurisdiction	*Town of Putnam Valley*
Time Period	*AM Peak Hour*	Analysis Year	
		Project ID	*Emerald Ridge - Marsh Hill*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*1*	*0*
Lane group		*LTR*			*LTR*			*LTR*			*LTR*	
Volume, V (vph)	*0*	*39*	*40*	*146*	*18*	*78*	*16*	*148*	*83*	*145*	*284*	*4*
% Heavy vehicles, %HV	*0*	*0*	*0*	*7*	*7*	*7*	*4*	*4*	*4*	*4*	*4*	*4*
Peak-hour factor, PHF	*0.76*	*0.76*	*0.76*	*0.81*	*0.81*	*0.81*	*0.81*	*0.81*	*0.81*	*0.92*	*0.92*	*0.92*
Pretimed (P) or actuated (A)	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*
Start-up lost time, l_1		*2.0*			*2.0*			*2.0*			*2.0*	
Extension of effective green, e		*2.0*			*2.0*			*2.0*			*2.0*	
Arrival type, AT		*3*			*3*			*3*			*3*	
Unit extension, UE		*3.0*			*3.0*			*3.0*			*3.0*	
Filtering/metering, I		*1.000*			*1.000*			*1.000*			*1.000*	
Initial unmet demand, Q_b		*0.0*			*0.0*			*0.0*			*0.0*	
Ped / Bike / RTOR volumes	*0*		*0*	*0*		*17*	*0*		*17*	*0*		*0*
Lane width		*12.3*			*13.8*			*11.9*			*12.6*	
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B		*0*			*0*			*0*			*0*	
Min. time for pedestrians, G_p		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = *20.0*	G =	G =	G =	G = *32.0*	G =	G =	G =
	Y =	Y =	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *60.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		*104*			*277*			*284*			*471*	
Lane group capacity, c		*596*			*428*			*898*			*794*	
v/c ratio, X		*0.17*			*0.65*			*0.32*			*0.59*	
Total green ratio, g/C		*0.33*			*0.33*			*0.53*			*0.53*	
Uniform delay, d_1		*14.2*			*17.0*			*7.9*			*9.6*	
Progression factor, PF		*1.000*			*1.000*			*1.000*			*1.000*	
Delay calibration, k		*0.50*			*0.50*			*0.50*			*0.50*	
Incremental delay, d_2		*0.6*			*7.4*			*0.9*			*3.2*	
Initial queue delay, d_3												
Control delay		*14.8*			*24.4*			*8.8*			*12.8*	
Lane group LOS		*B*			*C*			*A*			*B*	
Approach delay	*14.8*			*24.4*			*8.8*			*12.8*		
Approach LOS	*B*			*C*			*A*			*B*		
Intersection delay	*14.8*			X_c = *0.61*			Intersection LOS			*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*AAC*
Agency/Co.	*TMA*
Date Performed	*5/5/2005*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Peekskill Hollow & Marsh Hill*
Jurisdiction	*Town of Putnam Valley*
Analysis Year	*Build Condition*

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* | North/South Street: *Marsh Hill Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*3*	*391*	*0*	*0*	*221*	*4*
Peak-hour factor, PHF	*0.74*	*0.74*	*1.00*	*1.00*	*0.88*	*0.88*
Hourly Flow Rate (veh/h)	*4*	*528*	*0*	*0*	*251*	*4*
Proportion of heavy vehicles, P_{HV}	*5*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*13*	*0*	*8*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.25*	*1.00*	*0.25*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*52*	*0*	*32*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*0*	*0*	*0*
Percent grade (%)	*0*			*-4*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*4*						*84*	
Capacity, c_m (vph)	*1293*						*456*	
v/c ratio	*0.00*						*0.18*	
Queue length (95%)	*0.01*						*0.67*	
Control Delay (s/veh)	*7.8*						*14.7*	
LOS	*A*						*B*	
Approach delay (s/veh)	--	--				*14.7*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*AAC*
Agency/Co.	*TMA*
Date Performed	*5/5/2005*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Peekskill Hollow Pembrook Ct*
Jurisdiction	*Town of Putnam Valley*
Analysis Year	*Build*

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* | North/South Street: *Pembrook Court*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	392	3	15	231	0
Peak-hour factor, PHF	1.00	0.70	0.70	0.79	0.79	1.00
Hourly Flow Rate (veh/h)	0	560	4	18	292	0
Proportion of heavy vehicles, P_{HV}	0	--	--	9	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12	0	39	0	0	0
Peak-hour factor, PHF	0.78	1.00	0.78	1.00	1.00	1.00
Hourly Flow Rate (veh/h)	15	0	50	0	0	0
Proportion of heavy vehicles, P_{HV}	2	0	2	0	0	0
Percent grade (%)	0			0		
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
Volume, v (vph)		18		65				
Capacity, c_m (vph)		974		452				
v/c ratio		0.02		0.14				
Queue length (95%)		0.06		0.50				
Control Delay (s/veh)		8.8		14.3				
LOS		A		B				
Approach delay (s/veh)	--	--	14.3					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow Foothill St*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*Build Condition*
Analysis Time Period	*AM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road* | North/South Street: *Foothill Street*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*360*	*206*	*56*	*183*	*0*
Peak-hour factor, PHF	*1.00*	*0.78*	*0.78*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*461*	*264*	*63*	*207*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	*--*	*--*	*8*	*--*	*--*
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*45*	*0*	*18*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*1.00*	*0.88*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*51*	*0*	*20*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*7*	*0*	*7*	*0*	*0*	*0*
Percent grade (%)	*-5*			*0*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*63*		*71*				
Capacity, c_m (vph)		*851*		*311*				
v/c ratio		*0.07*		*0.23*				
Queue length (95%)		*0.24*		*0.86*				
Control Delay (s/veh)		*9.6*		*20.0*				
LOS		*A*		*C*				
Approach delay (s/veh)	--	--	*20.0*					
Approach LOS	--	--	*C*					

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	AAC	Intersection	Peekskill Hollow & Oscawana Lk
Agency or Co.	TMA	Area Type	All other areas
Date Performed	5/5/2005	Jurisdiction	Town of Putnam Valley
Time Period	PM Peak Hour	Analysis Year	
		Project ID	Emerald Ridge - Marsh Hill

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	3	27	47	160	56	145	63	352	147	98	216	2
% Heavy vehicles, %HV	1	1	1	2	2	2	0	0	0	1	1	1
Peak-hour factor, PHF	0.83	0.83	0.83	0.79	0.79	0.79	0.84	0.84	0.84	0.82	0.82	0.82
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		30	0		29	0		0
Lane width		12.3			13.8			11.9			12.6	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p		3.2			3.2			3.2			3.2	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 20.0	G =	G =	G =	G = 32.0	G =	G =	G =
	Y =	Y =	Y =	Y =	Y =	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		94			420			634			385	
Lane group capacity, c		572			505			898			737	
v/c ratio, X		0.16			0.83			0.71			0.52	
Total green ratio, g/C		0.33			0.33			0.53			0.53	
Uniform delay, d_1		14.1			18.4			10.5			9.1	
Progression factor, PF		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		0.6			14.7			4.7			2.6	
Initial queue delay, d_3												
Control delay		14.7			33.2			15.1			11.7	
Lane group LOS		B			C			B			B	
Approach delay	14.7			33.2			15.1			11.7		
Approach LOS	B			C			B			B		
Intersection delay	19.2			X_C = 0.75			Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow & Marsh Hill*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*Build*
Analysis Time Period	*PM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road*	North/South Street: *Marsh Hill Road*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*11*	*246*	*0*	*0*	*331*	*12*
Peak-hour factor, PHF	*0.79*	*0.79*	*1.00*	*1.00*	*0.82*	*0.82*
Hourly Flow Rate (veh/h)	*13*	*311*	*0*	*0*	*403*	*14*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*9*	*0*	*4*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.50*	*1.00*	*0.50*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*18*	*0*	*8*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*0*	*0*	*0*
Percent grade (%)		*0*			*-4*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*13*						*26*	
Capacity, c_m (vph)	*1142*						*435*	
v/c ratio	*0.01*						*0.06*	
Queue length (95%)	*0.03*						*0.19*	
Control Delay (s/veh)	*8.2*						*13.8*	
LOS	*A*						*B*	
Approach delay (s/veh)	--	--				*13.8*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow Pembrook Ct*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	*Build Condition*
Analysis Time Period	*PM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*

East/West Street: *Peekskill Hollow Road*	North/South Street: *Pks Turnpike Pembrook Court*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*240*	*9*	*30*	*331*	*0*
Peak-hour factor, PHF	*1.00*	*0.82*	*0.82*	*0.85*	*0.85*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*292*	*10*	*35*	*389*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*2*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*12*	*0*	*18*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.55*	*1.00*	*0.55*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*21*	*0*	*32*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*0*	*0*	*0*
Percent grade (%)	*0*			*0*		
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service								
Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*35*		*53*				
Capacity, c_m (vph)		*1259*		*531*				
v/c ratio		*0.03*		*0.10*				
Queue length (95%)		*0.09*		*0.33*				
Control Delay (s/veh)		*7.9*		*12.5*				
LOS		*A*		*B*				
Approach delay (s/veh)	--	--	*12.5*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*AAC*	Intersection	*Peekskill Hollow Foothill St*
Agency/Co.	*TMA*	Jurisdiction	*Town of Putnam Valley*
Date Performed	*5/5/2005*	Analysis Year	
Analysis Time Period	*PM Peak Hour*		

Project Description *Emerald Ridge - Marsh Hill*	
East/West Street: *Peekskill Hollow Road*	North/South Street: *Foothill Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*209*	*54*	*16*	*194*	*0*
Peak-hour factor, PHF	*1.00*	*0.85*	*0.85*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*245*	*63*	*18*	*220*	*0*
Proportion of heavy vehicles, P_{HV}	*0*	--	--	*2*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*134*	*0*	*27*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*1.00*	*0.81*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*165*	*0*	*33*	*0*	*0*	*0*
Proportion of heavy vehicles, P_{HV}	*1*	*0*	*1*	*0*	*0*	*0*
Percent grade (%)		*-5*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
Volume, v (vph)		*18*		*198*				
Capacity, c_m (vph)		*1253*		*534*				
v/c ratio		*0.01*		*0.37*				
Queue length (95%)		*0.04*		*1.70*				
Control Delay (s/veh)		*7.9*		*15.7*				
LOS		*A*		*C*				
Approach delay (s/veh)	--	--		*15.7*				
Approach LOS	--	--		*C*				

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Appendix G

No Build Projects
Trip Generation

	Table G-1 No Build Projects in the Town of Putnam Valley	
	Project, Size, and Type	**Location**
1	HYH Subdivision - 33 Single Family Residential Units	Pudding Street
2	Marinelli Subdivision - 15 Single Family Residential Units	Oscawana Lake Road
3	Makan - 44 Multifamily Residential Units	Barger Street
4	Fieldstone Residential - 8 Single Family Residential Units Commercial - 50,000 square feet commercial	Bryant Pond Road
5	Timberline - 9 Single Family Residential Units	Oscawana Heights Road
6	Bear Mountain Towing - 1,000 square feet garage	Oscawana Lake Road
7	Indian Hill - 77 Single Family Residential Units	Indian Hill Road

Source: Chazen Engineering for the Town of Putnam Valley, 2005.

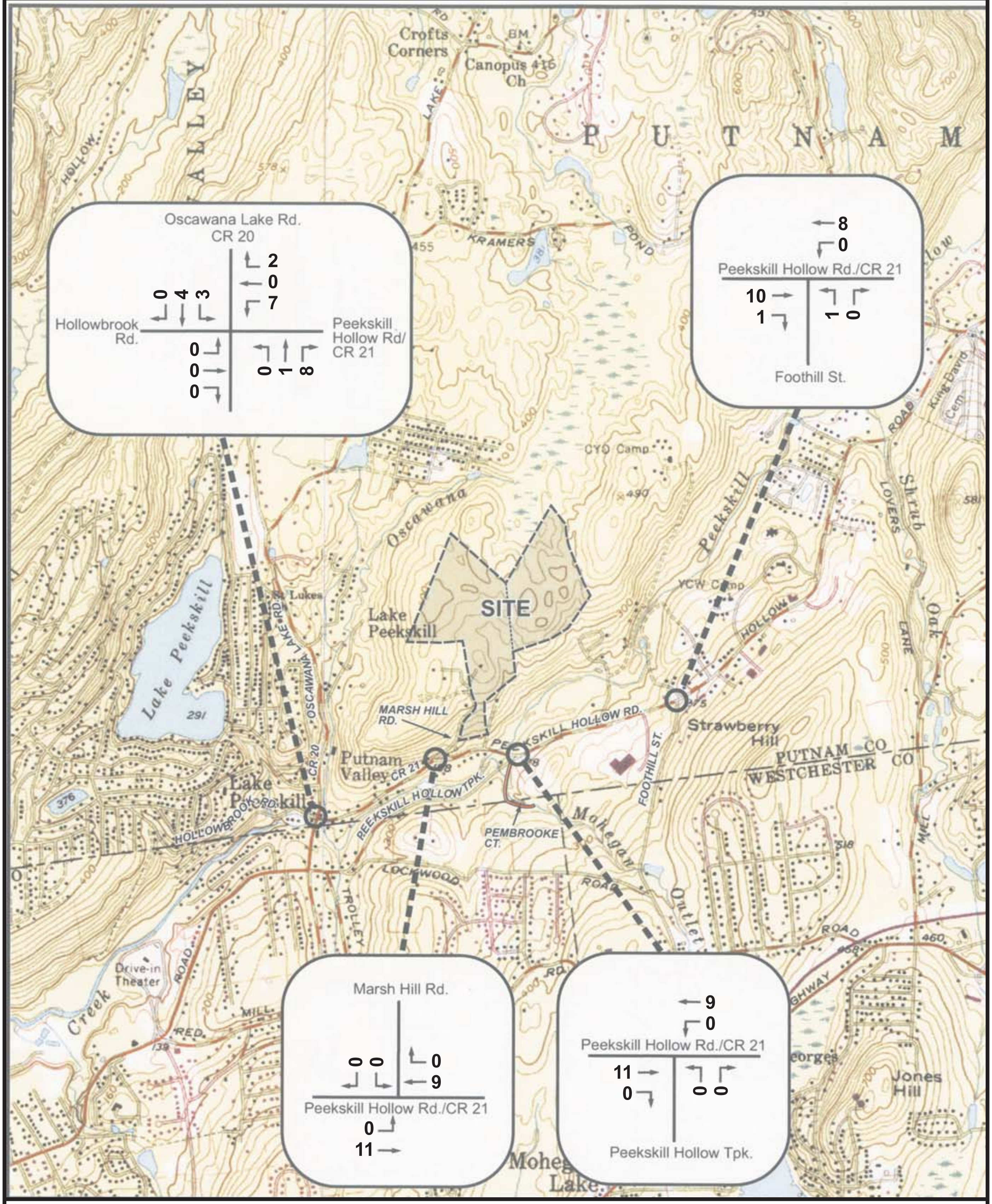
	Table G-2 No Build Project Trip Rates for Pending and Approved Projects				
		Trip Rate			
		A.M. Peak Hour		**P.M. Peak Hour**	
	Land Uses {ITE Code}	**IN (Trips/ Unit)[1]**	**OUT (Trips/ Unit)[1]**	**IN (Trips/ Units)[1]**	**OUT (Trips/ Units)[1]**
1	HYH Subdivision - 33 Single Family Residential Units {210}	0.247	0.740	0.755	0.443
2	Marinelli Subdivision - 15 Single Family Residential Units {210}	0.332	0.998	0.817	0.480
3	Makan - 44 Multifamily Residential Units {230}	0.104	0.506	0.467	0.230
4	Fieldstone Residential - 8 Single Family Residential Units {210} Commercial - 50,000 square feet commercial {820}	 0.470 1.260	 1.409 0.805	 0.869 3.804	 0.511 4.121
5	Timberline - 9 Single Family Residential Units {210}	0.437	1.311	0.859	0.505
6	Bear Mountain Towing - 1,000 square feet garage {942}	1.911	1.029	1.690	1.690
7	Indian Hill Subdivision - 15 Single Family Residential Units {210}	0.206	0.617	0.639	0.407

[1] Trips per dwelling unit for residential development, and Trips per 1,000 square feet for commercial development.
Trip Generation, Institute of Transportation Engineers, 7th edition, Washington, DC, 2003.

Table G-3
No Build Projects Trips for Pending and Approved Projects

	Land Uses	Trips A.M. Peak Hour In	Out	Total	Trips P.M. Peak Hour In	Out	Total
1	HYH Subdivision - 33 Single Family Residential Units	8	24	32	25	15	40
2	Marinelli Subdivision - 15 Single Family Residential Units	5	15	20	12	7	19
3	Makan - 44 Multifamily Residential Units	5	22	27	21	10	31
4	Fieldstone						
	Residential - 8 Single Family Residential Units	4	11	15	7	4	11
	Commercial - 50,000 square feet commercial	63	40	103	190	206	396
5	Timberline - 9 Single Family Residential Units	4	12	16	8	5	13
6	Bear Mountain Towing - 1,000 square feet garage	2	1	3	2	2	4
7	Indian Hill - 77 Single Family Residential Units	4	12	16	8	5	13

Trip Generation, Institute of Transportation Engineers, 7th edition, Washington, DC, 2003.



N

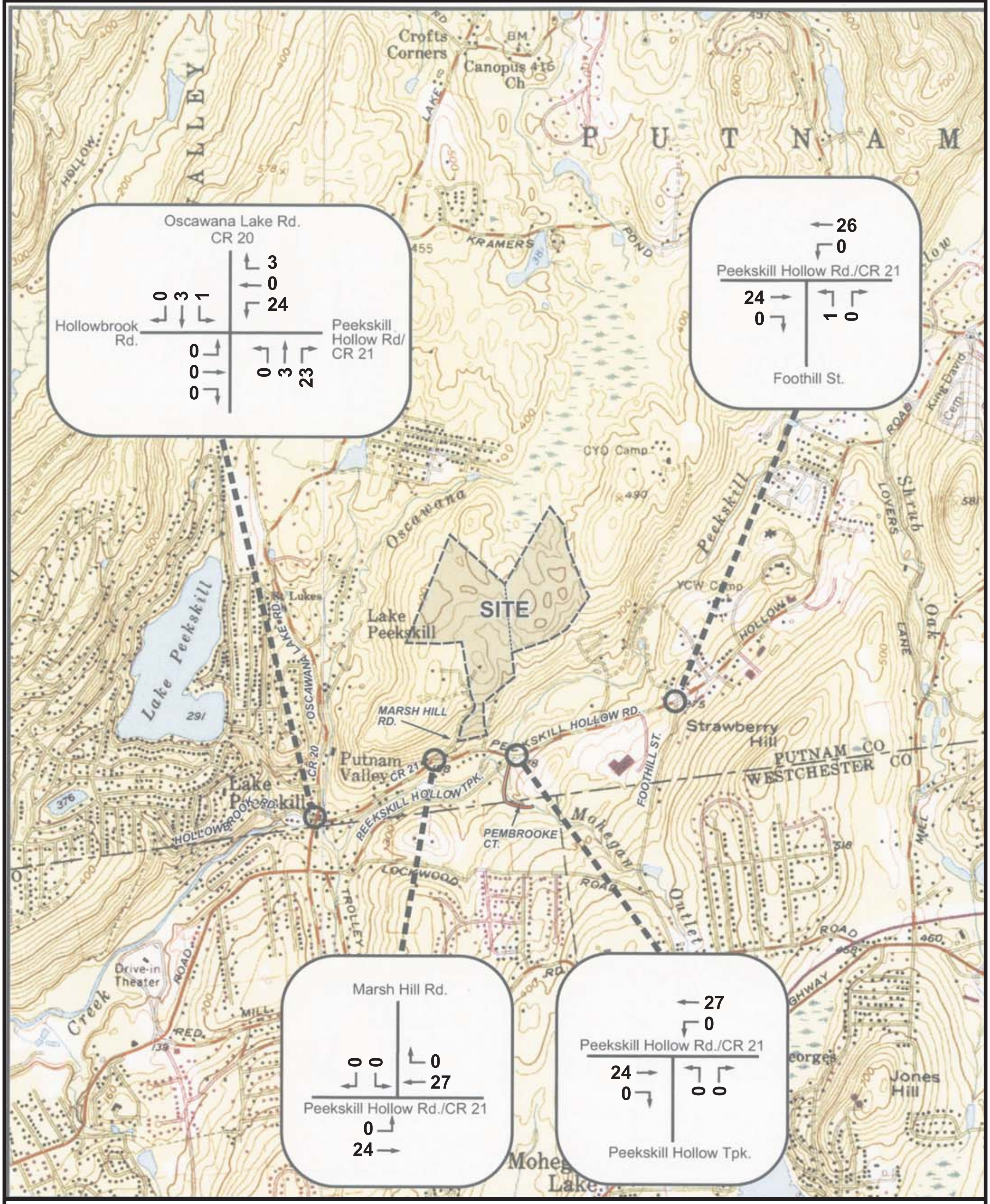
W E

S

Figure G-1: Cumulative No Build AM Traffic
Emerald Ridge
Town of Putnam Valley, Putnam County, New York
Base Map: USGS 7.5-minute Topographic Map, Mohegan Lake Quad (1981)
Approx. Scale: 1 inch = 2,000 feet

File 04011 12/06/05
JS:\04011

Tim Miller Associates, Inc.,10 North Street, Cold Spring, New York 10516 (845) 265-4400 Fax (845) 265-4418



N
W E
S

Figure G-2: Cumulative No Build PM Traffic

Emerald Ridge

Town of Putnam Valley, Putnam County, New York

Base Map: USGS 7.5-minute Topographic Map, Mohegan Lake Quad (1981)

Approx. Scale: 1 inch = 2,000 feet

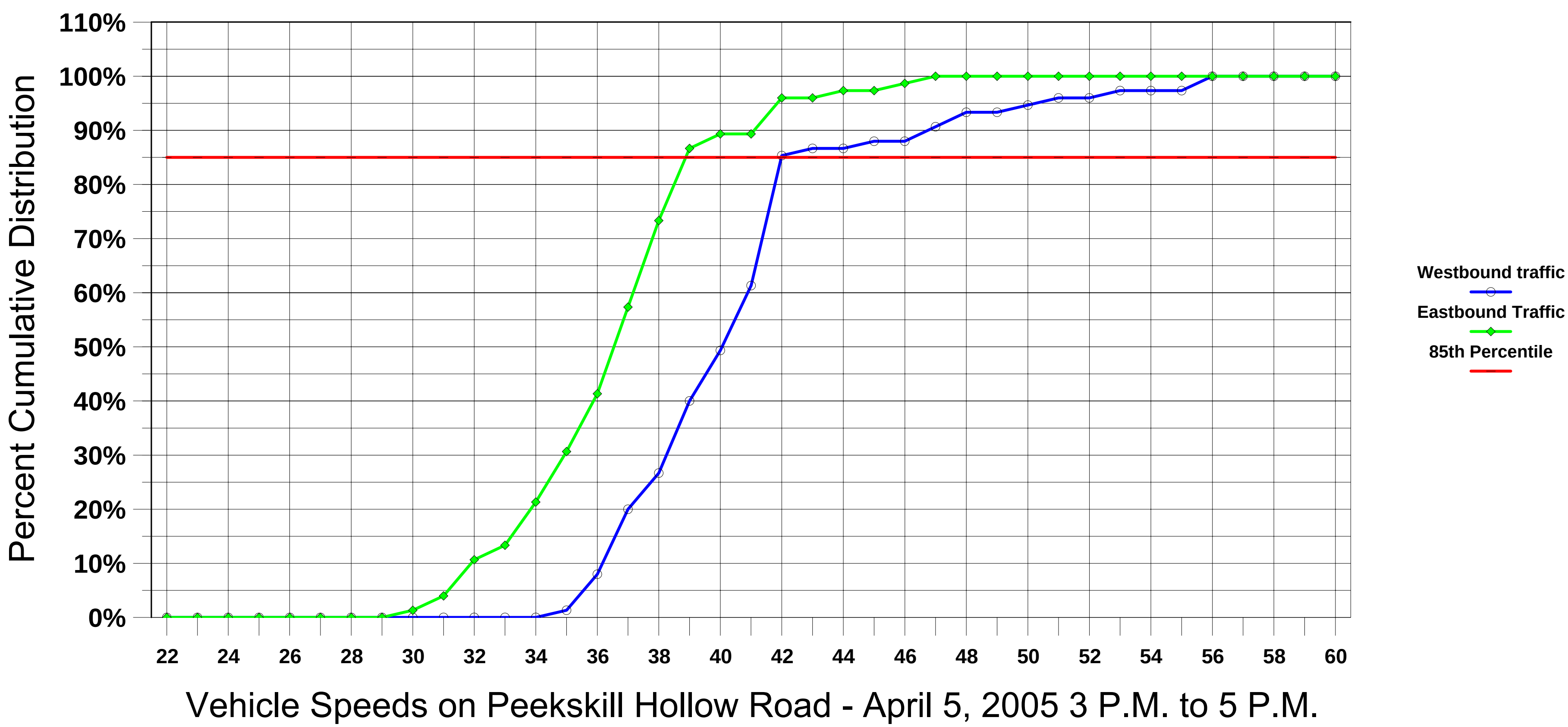
File 04011 12/06/05
JS:\04011

Tim Miller Associates, Inc.,10 North Street, Cold Spring, New York 10516 (845) 265-4400 Fax (845) 265-4418

Appendix H

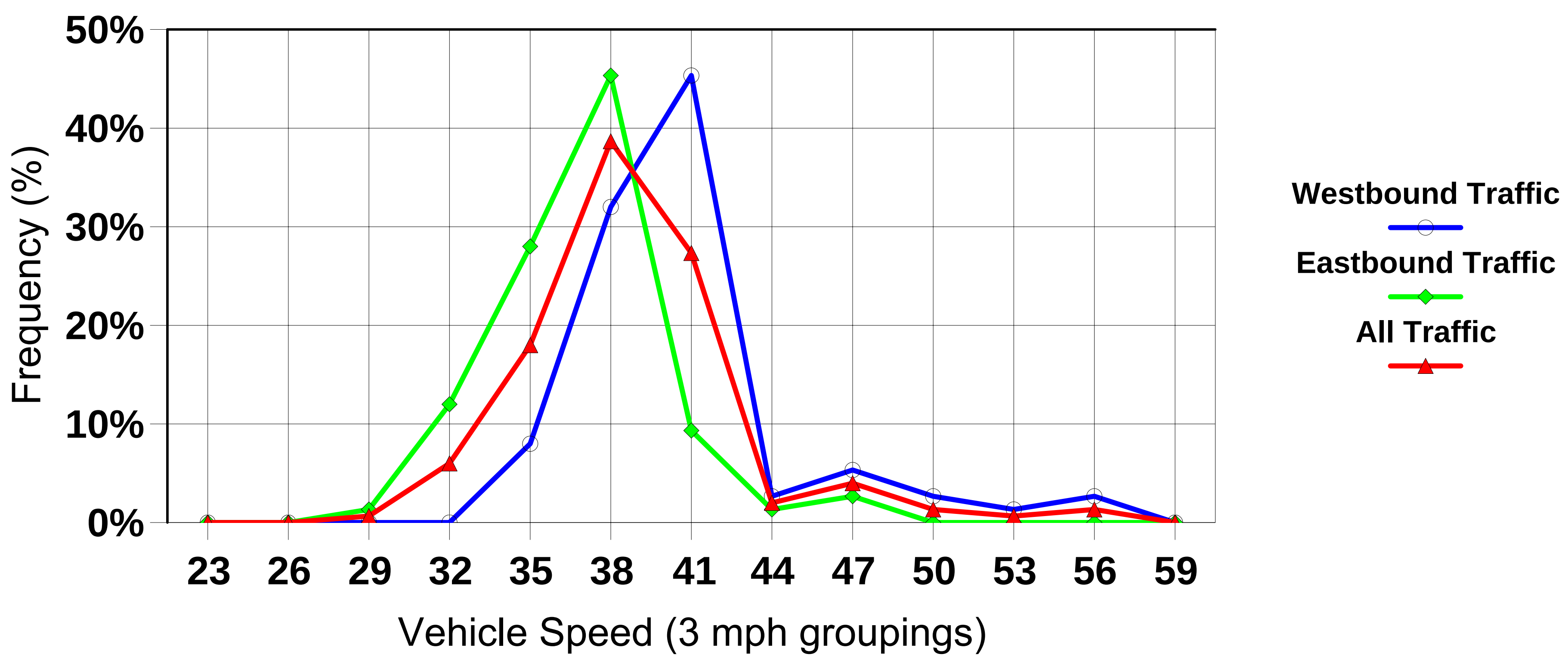
Vehicle Speed Graphs

Figure 1



110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Cumulative Distribution
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
Vehicle Speeds on Peekskill Hollow Road - April 5, 2005 3 P.M. to 5 P.M.
Westbound traffic
Eastbound Traffic
85th Percentile

Figure 2
Speed Distribution Peekskill Hollow Road



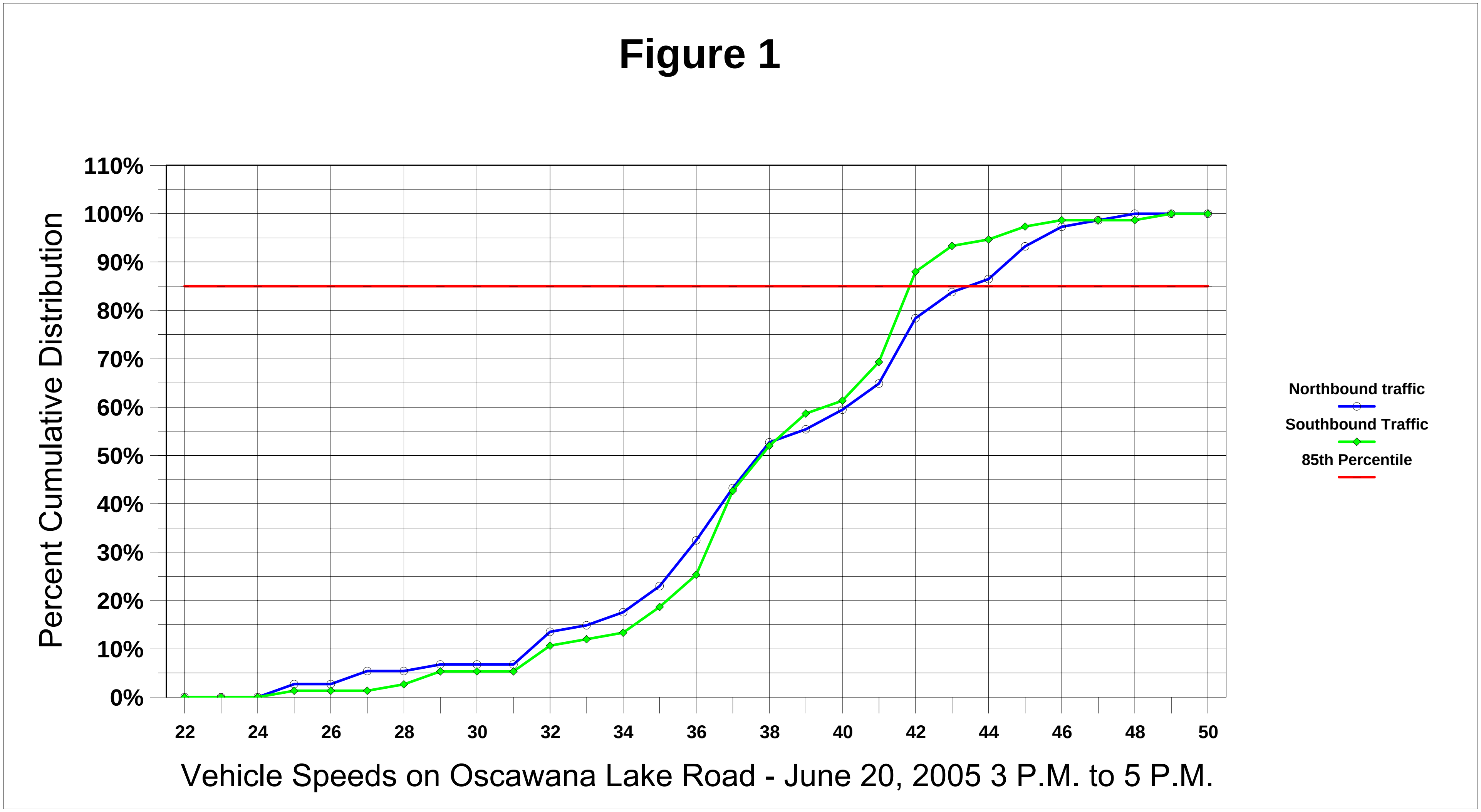


Figure 1
Percent Cumulative Distribution
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
Vehicle Speeds on Oscawana Lake Road - June 20, 2005 3 P.M. to 5 P.M.
Northbound traffic
Southbound Traffic
85th Percentile

Figure 2
Speed Distribution Oscawana Lake Road

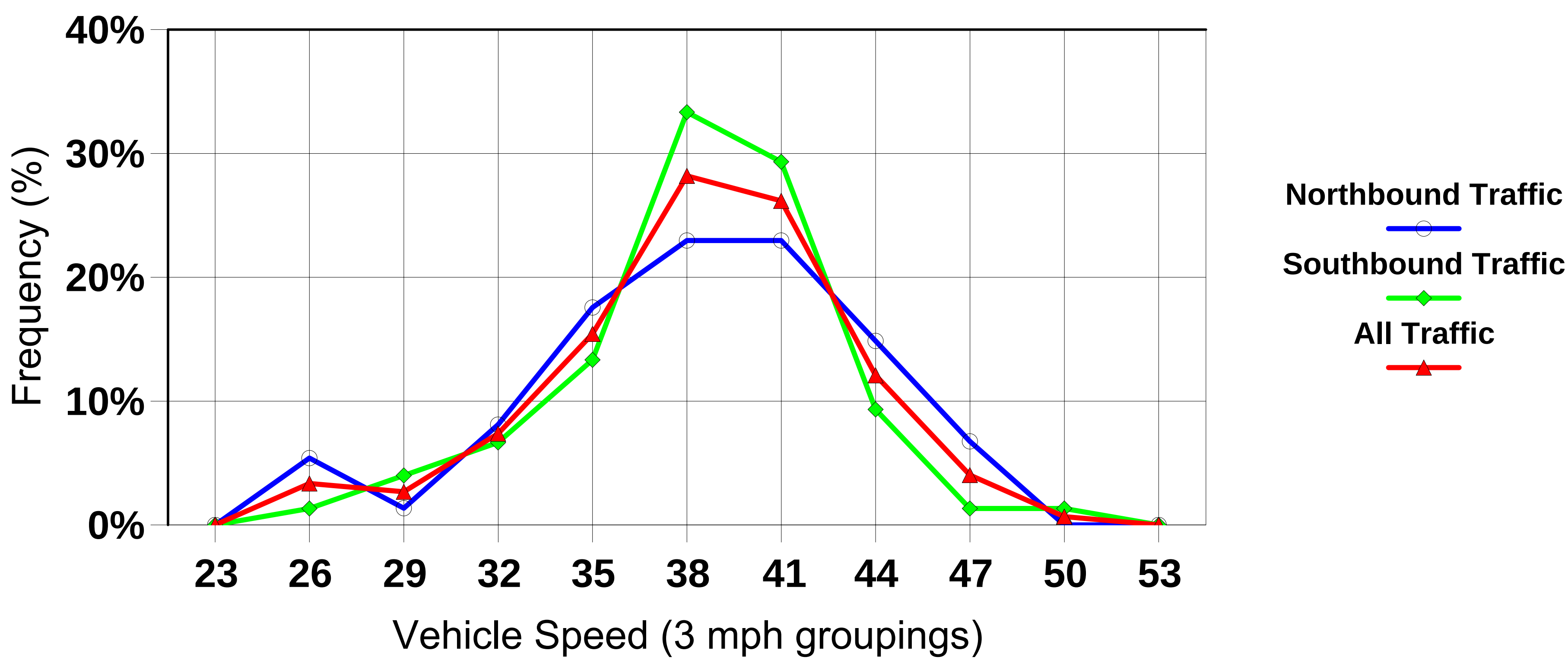
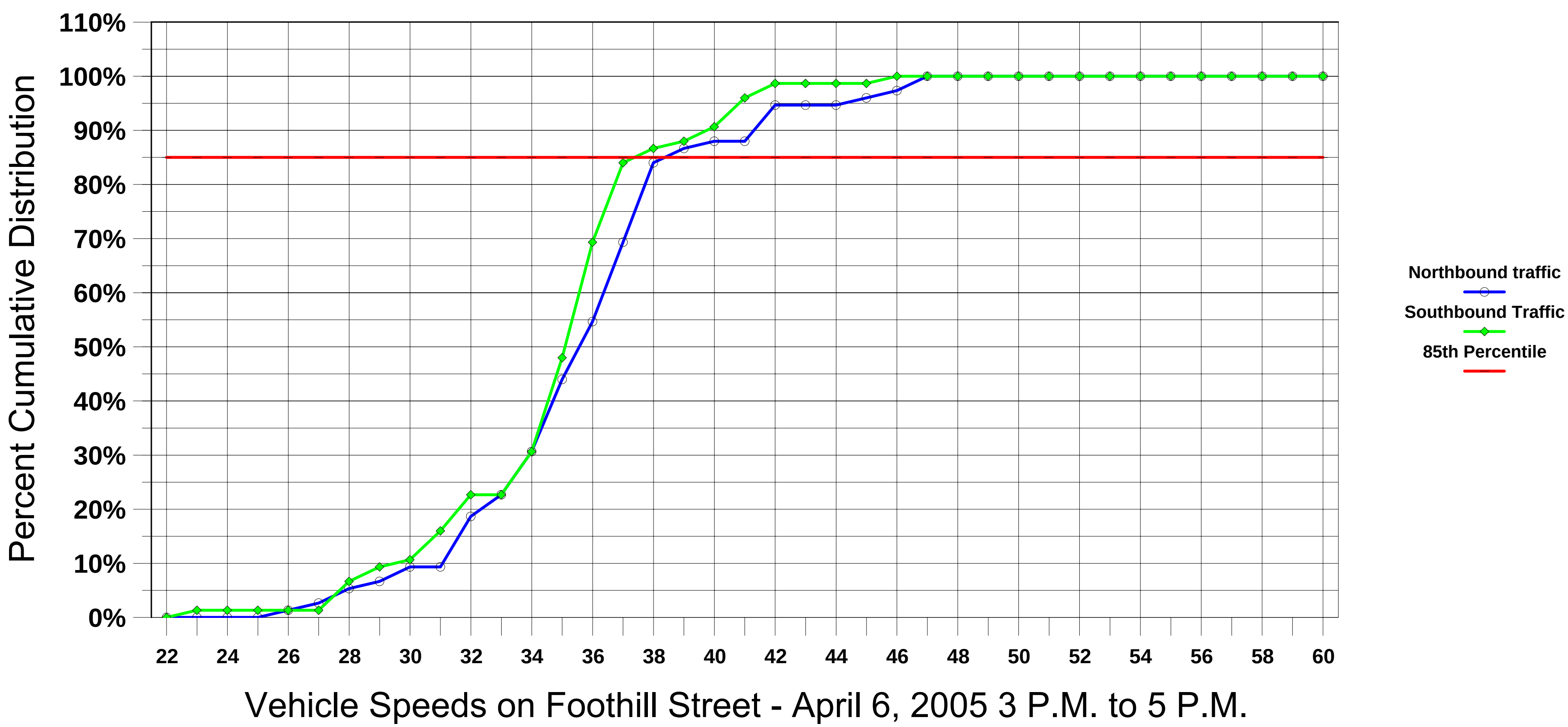


Figure 1


110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Cumulative Distribution
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
Vehicle Speeds on Foothill Street - April 6, 2005 3 P.M. to 5 P.M.
Northbound traffic
Southbound Traffic
85th Percentile

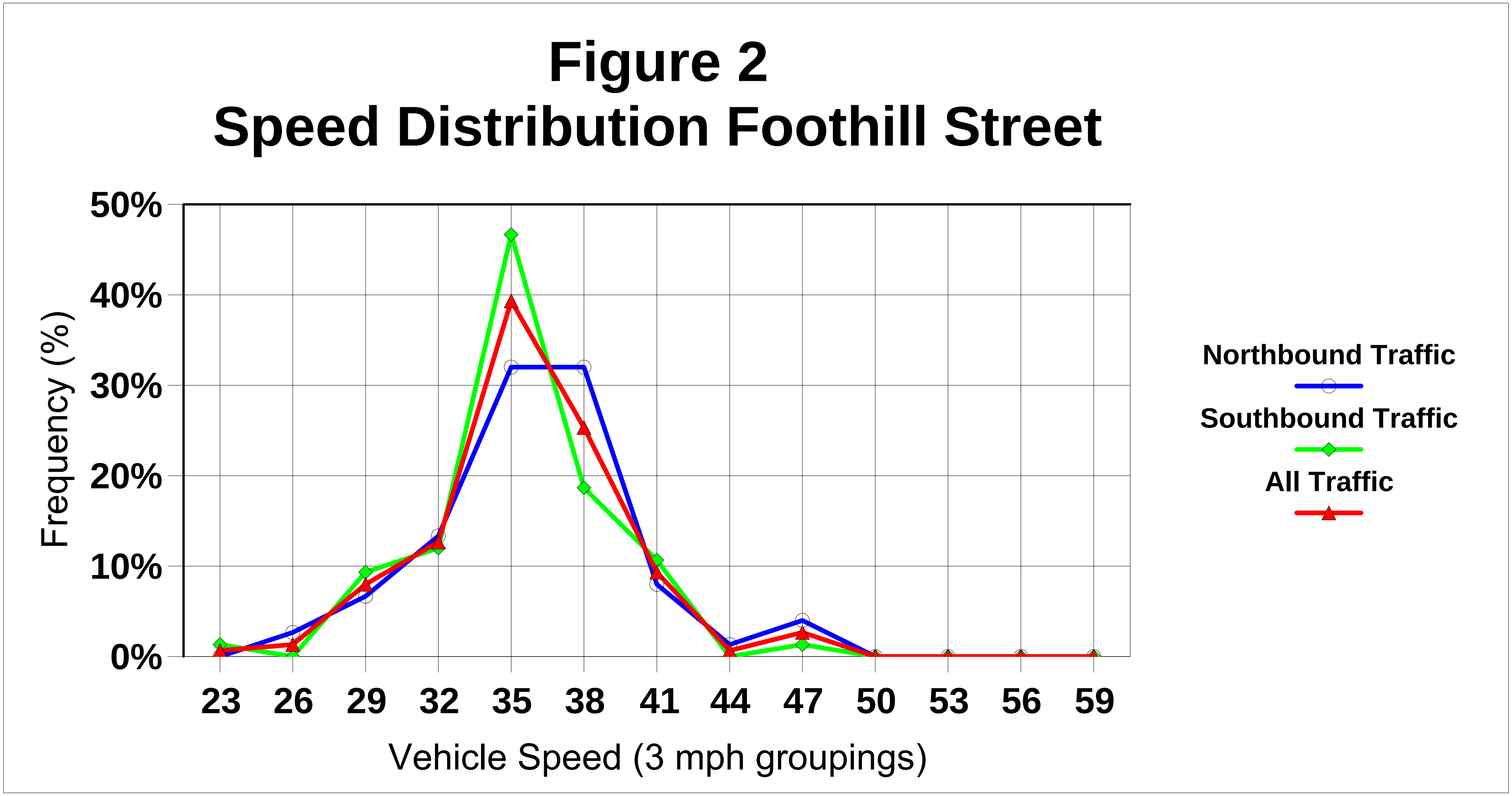


Figure 2
Speed Distribution Foothill Street
50%
40%
30%
20%
10%
0%
Frequency (%)
23
26
29
32
35
38
41
44
47
50
53
56
59
Vehicle Speed (3 mph groupings)
Northbound Traffic
Southbound Traffic
All Traffic

Appendix I

Well Test Report

THREE WELL PUMPING TEST REPORT
EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

Prepared For:

Emerald Ridge Subdivision

July 2005

(Revised December 2005)

Prepared By

LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Ground-Water and Environmental Engineering Services
126 Monroe Turnpike
Trumbull, CT 6611

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(at end of report)

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THREE WELL PUMPING TEST REPORT
EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

SUMMARY

Three prototype water wells on representative lots of the Emerald Ridge Subdivision property in Putnam Valley were subjected to a simultaneous 12-hour pumping test, with each well producing 5 gpm (gallons per minute) or more, demonstrating adequate water-supply yield capacity. In fact, the total water production during this half-day test exceeded the estimated average daily water demand of the entire 25-lot subdivision. Observations at one idle onsite well and three offsite domestic supply wells indicated no drawdown impacts. The water quality met all applicable standards

INTRODUCTION

Leggette, Brashears & Graham, Inc. (LBG) was retained by VS Construction Corp. in March 2005 to conduct a 12-hour pumping test of three prototype domestic water supply wells on the proposed Emerald Ridge Subdivision property. Four wells had been drilled on the property by well contractor Norman Anderson at sites identified by Cronin Engineering, P.E., P.C., and reviewed by and approved by Town hydrogeologic consultant HydroEnvironmental Solutions, Inc. (HES), and by the Putnam County Department of Health. A pumping test plan was submitted to the Putnam County Health Department and HES, and was approved by them. LBG was then asked to join the project team to complete the water-supply feasibility report and began work on the project on March 22, 2005.

PROPOSED DEVELOPMENT

Emerald Ridge is proposed as a 25-lot residential subdivision on a parcel of about 87.824 acres. All of the lots would be accessed from a new subdivision road extending northerly from the present end of Marsh Hill Road and ending in a loop roadway in the north-central part of the property. In this R-2 zone, requiring a minimum lot size of 2.00 acres, the proposed lot sizes range from 2.06 to 5.47 acres. One lot, Lot 18, contains an existing residence which would remain. The 24 proposed new residences would be served by new individual onsite domestic supply wells and new individual septic systems. Five storm-water quality/detention basins are proposed to manage runoff and encourage infiltration of water into the ground.

HYDROGEOLOGIC SETTING

The Emerald Ridge property lies to the east of Lake Peekskill and northerly of Peekskill Hollow Road. The site is an upland of glacial till soils over crystalline metamorphic bedrock consisting mainly of amphibolite and gneiss (Fisher et al., 1970), some of which crops out at the surface in upland parts of the site. Four wetland areas have been flagged and surveyed on the property, including one New York State Department of Environmental Conservation wetland, ML-3, designated also as Wetland “D” on the site plans.

GROUND-WATER BUDGET

Potable Water Usage and Consumption

The 24 new residences are planned as 4-bedroom houses. According to Bulletin RS-21, the Putnam County Department of Health will assume 6 persons per house and a design water flows of 450 gpd (gallons per day) per residence. The existing residence is a 5-bedroom house, which has a design flow of 525 gpd. Accordingly, the total water demand of the new homes would be 10,800 gpd, and the total water demand of all 25 homes would be 11,325 gpd, or the equivalent of 4.13 million gallons annually. In all likelihood, the average daily water demand of the development will be less, as it is unlikely that all of the houses will have resident populations of 6 persons.

Of these water demand quantities, about 85 percent of the water use, on an annual basis, would be returned to the ground as waste water discharged to septic system leaching systems. Thus, only about 1,700 gpd would be consumptive water use, or about 620,000 gallons annually. The consumptive water use would increase to 30 to 35 percent of the daily water use in the hot summer months, and would decrease to near zero in the winter months.

Irrigation Water Usage

The above discussion relates to the proposed homes without in-ground sprinkler systems, and is regarded as a good representation of the average seasonal water use. An increase in irrigation water use by hand-held watering or hose sprinklers in the growing season also implies a lower daily water use in the cold weather months, still arriving at the conservative Putnam County water use requirements on a year-round basis. VS Construction intends to construct the new homes and does not offer in-ground sprinkler systems.

To comply with the comments of the Town hydrogeologic consultant, HydroEnvironmental Solutions, Inc., LBG has estimated that perhaps 20 percent of the home buyers, or five new owners, will retrofit their properties with in-ground sprinkler systems. If that were the case, the irrigation water use for these properties would be estimated as follows.

It is a relatively accepted rule of thumb in this region that golf course fairway turf grass requires about one inch of water per week from natural or irrigation sources, which converts to 4.3 to 4.4 inches monthly during the 30-day and 31-day months of the growing season. Climatological data for West Point indicate that the average monthly rainfall in the growing/irrigation season is as follows:

April	4.32	August	4.39
May	4.86	September	4.51
June	4.24	October	4.14
July	4.39		

These data would tend to imply that lawn irrigation is really not needed but, of course, rainfall does not occur every day, a week or more can go by with no rainfall, and average precipitation means that some months are wetter than normal and some are more dry. It is also a truism that homeowners with in-ground irrigation systems, even those with rain-detector cutoffs which are fairly standard with new irrigation systems, tend to over water as compared to golf course superintendents. Whereas in golf course irrigation the water use is generally considered to be nearly 100 percent consumptive water use, residential irrigation tends to have some return flow back to the subsurface. Finally, most residential in-ground irrigation systems are activated in late April, after the frost season, and deactivated and drained in early October, before the start of the frost season.

The building lots at Emerald Ridge are large and are most amenable to landscaping plantings around the homes and a envelope of lawn, surrounded by natural woodlands to provide privacy for the homeowners. For estimation purposes, it is assumed that five lots with in-ground irrigation will each irrigate one acre of landscaped area, and that the average water use will be 2.0 to 2.5 inches per month in the peak growing season months of May through September. On this basis, the increment of annual water demand would be about 270,000 to 340,000 per lot, or about 1.36 to 1.70 million gallons for five lots.

Bedrock Aquifer Ground-Water Recharge

The site comprises about 87.8 acres of land which will contribute ground-water recharge to the bedrock aquifer beneath the site. There are numerous estimates of average recharge rates to till-covered metamorphic bedrock. The most pertinent in our view are those by Snavely (1980) for the Fishkill-Beacon area and by Wolcott and Snow (1995) for adjacent areas of northern Westchester County. Snavely estimated the average annual recharge rate as 8 inches of precipitation. Wolcott and Snow did a computerized analysis on a sub-watershed by sub-watershed basis, and found an average annual recharge rate for all of northern Westchester of 8.45 inches. For the nearest sub-watershed to the site, the Peekskill Hollow Brook sub-watershed (26B), the computed average recharge rate was 8.53 inches.

If the average annual recharge rate is 8 inches, the recharge to the 87.8 acres of the site would be somewhat more than 19 million gallons annually, or an average of about 52,000 gpd. This is substantially greater than the estimated potable water demand of 4.13 gallons annually, or 11,325 gpd. The estimated water demand including the posited five in-ground irrigation systems is still a small fraction of the natural recharge to the bedrock aquifer.

Average annual recharge means that some years have greater than average precipitation and ground-water recharge, and some years are dryer than normal. In a one-year-in-30 drought year, a fairly extreme drought, the precipitation rate and the corresponding annual rate of recharge would be only about 2/3 of those in average years.

During such extreme drought conditions, the annual recharge to the bedrock aquifer beneath the site would decrease to about 12.7 million gallons, or an average of about 35,000 gpd, still substantially greater than the water demand of 11,325 gpd. With the return of renovated waste water to the subsurface, the ground-water recharge budget would remain very positive after development. The water balance would still be quite favorable if the posited in-ground irrigation systems were in use, but it is noted that irrigation is commonly restricted in such drought emergency conditions.

PROTOTYPE WATER WELLS

Prototype domestic supply wells were drilled in January 2005 at locations approved by the Putnam County Department of Health and by Town hydrogeologic consultant, HydroEnvironmental Solutions, Inc. The wells are located on and will serve residences on Lots 3, 6, 11 and 24. The wells are 6-inch diameter wells, cased through the overburden, each to a depth of 38.5 feet, and completed as open boreholes in the granitic gneiss bedrock to depths of 580 to 600 feet. Upon completion, the estimated yield of the well on Lot 11 was 5 gpm and the other three wells were estimated to produce 6 gpm.

Copies of the Well Completion Reports by drilling contractor Norman Anderson are provided in Appendix I.

PUMPING TEST PROCEDURES AND RESULTS

The approved pumping test plan called for test well TW-1 on Lot 3, TW-2 on Lot 6 and TW-4 on Lot 11 to be pumped simultaneously for 12 hours. Offsite monitoring of private wells in the surrounding area was proposed, subject to the permission of the well owners. In addition, the test well TW-3 on Lot 24 was added to determine onsite drawdown impacts, if any.

Wells TW-1, TW-2 and TW-4 were equipped with electric submersible pumps and generators by well contractor Anderson. LBG equipped each of the four onsite wells with pressure transducer/date logger devices known as MiniTrolls® to record water level changes in the wells.

The owners of the following neighboring wells were contacted and gave written permission to monitor the water levels in their wells;

Mandelbaum, 95 Peekskill Hollow Road
Marazino, 29 Marsh Hill Road
Venezia, 17 Brook Falls Road.

The pumping test was conducted on Tuesday, April 12, 2005. Details on the field operations are summarized below.

TW-1

The total depth of this well is 580 feet, and the pump was set at 560 feet. The pre-test static water level was 50.23 feet btoc (below the top of the well casing), and the pre-test water-level trend was essentially flat.

The pump in well TW-1 was turned on at 0559 hours. At 1634 hours the generator ran out of gas. The generator was restarted at 1654 hours, and the test was extended to compensate for the down time and was completed at 1840 hours. The well was pumped at a constant rate of 5.8 gpm for 12 hours and 21 minutes. The maximum depth to water measured was 154.63 feet btoc.

Following the test, the water level recovered to within 3 feet of the pre-test water level by 1040 hours on April 15, representing about 97 percent recovery. The hydrograph for TW-1 is shown by figure 2.

TW-2

The total depth of this well is 600 feet, and the pump was set at 580 feet. The pre-test static water level was 27.35 feet below the top of the well casing, and the pre-test water-level trend was essentially flat.

The pump in well TW-2 was turned on at 0622 hours. This well was pumped at a constant rate of 6 gpm for 12 hours and 8 minutes, until the pump was shut down at 1830 hours. The maximum depth to water measured was 91.20 feet btoc.

Following the test, the water level recovered to within 0.6 feet of the pre-test water level, by 1049 hours on April 15, representing about 99 percent recovery. The hydrograph for TW-2 is shown by figure 3.

TW-4

The total depth of this well is 600 feet, and the pump was set at 580 feet. The pre-test static water level was 19.34 feet below the top of the well casing, and the pre-test water-level trend was essentially flat, with a slight downward trend.

The pumping test of TW-4 was started at 0645 hours. A circuit in the control box shorted out at 0758 hours, turning off the pump. The box was repaired and the test resumed at 0848 hours, the test was extended to compensate for the down time, and was completed at 2000 hours. The well was pumped at a constant rate of 5 gpm for 12 hours and 25 minutes. The maximum depth to water measured was 209.37 feet btoc.

Following the test, the water level recovered to within 2.5 feet of the pre-test water level by 1108 hours on April 15, representing about 99 percent recovery. The hydrograph for TW-4 is shown by figure 4.

Onsite Monitoring Well

TW-3

The total depth of this prototype water well is 600 feet, and it was used as an observation well during the 3-well pumping test. The reported yield for TW-3 at the end of about 6 hours of air-lift pumping at the completion of drilling was 6 gpm.

The water level in well TW-3 declined slowly and steadily from 30.02 feet btoc on April 8 to 34.61 feet btoc on April 15, i.e., before, during and after the test, with no change in the rate of decline during the pumping phase of the test, as seen on the hydrograph for TW-3, figure 5, which only covers the period from April 11 – 15. This is a natural water level decline, similar to that seen in TW-4 before the test began. There is no suggestion of drawdown influence caused by the pumping of wells TW-1, TW-2 and TW-4. Furthermore, the data from idle TW-3 suggest that part of the reason that the three pumping wells did not recover to 100 percent of their pre-test water levels was a slight seasonal decline in the upland areas, representing a dryer period following early April rains and the start of the growing season.

Offsite Monitoring Wells

Mandelbaum Residence, 95 Peekskill Hollow Road

The water level in this well rose steadily before, after and during the pumping test, from 10.33 feet btoc to 7.00 feet btoc, as seen on the hydrograph, figure 6. This trend appears to be a natural water-level trend in this lowland area, and does not show any influence by the pumping of wells TW-1, TW-2 and TW-3.

Marazino Residence, 29 Marsh Hill Road

The water level in this well fluctuated from 38 to 60 feet btoc during the test, as observed from manual measurements because a MiniTroll could not be installed in this well. As seen on the hydrograph, figure 7, the water level fluctuated both before and during the test, with no observable relationship to the essentially constant pumping of the three tested wells. These fluctuations were apparently caused by domestic water use causing cycles of the well's own pump, rather than the pumping of the onsite wells. This is shown by the return to pre-test levels on this well during the pumping test, as seen on the hydrograph.

Venezia Residence, 17 Brook Falls Road

The water level in this well remained essentially constant throughout the test, as seen on the hydrograph, figure 8. There was no impact on the water level in this well, caused by the pumping test.

Summary raw data tables from the MiniTroll data files can be provided by request; they comprise about ¼-inch of paper.

WATER QUALITY

Water samples were taken from TW-1, TW-2 and TW-4 near the end of the pumping test and were delivered under chain-of-custody documentation to York Analytical Laboratories, Inc. in Shelton, Connecticut, a New York State Certified Laboratory. The analyses were unfortunately requested for the list of parameters required by the Putnam County Department of Health (Bulletin CS-31) for commercial and multi-family projects, and met all these water quality standards. The laboratory reports for these analyses are provide in Appendix II-A.

The wells were resampled on May 11, 2005, and analyzed for the parameters required by Bulletin RS-21, covering Realty Subdivisions. The water quality reported by the laboratory met all applicable standards except that arsenic was detected at 0.0135 mg/l (milligrams per liter) in the water from Well TW-1, versus a drinking water limit of 0.010 mg/l. The laboratory was asked to check their calculations and quality control records, and reported back that the analysis was correct. These laboratory reports are provided in Appendix II-B.

Well TW-1 was pumped again on June 24, 2005, at 10+ gpm to evacuate the well of 1.5 borehole volumes, and then re-sampled three times at one-half hour intervals. The laboratory found no arsenic to a detection limit of 0.004 mg/l. This laboratory report is provided in Appendix II-C.

The water quality met all of the mandatory standards.

CONCLUSIONS

The feasibility of providing water wells completed in the fractured bedrock aquifer beneath the site to serve 24 new 4-bedroom houses and continued use of the existing residence on proposed Lot 18 has been demonstrated and has been shown to have no adverse impact to offsite domestic supply wells. This conclusion is supported by:

- A positive ground-water recharge budget, even during a 1-year-in-30 drought year.
- A positive ground-water recharge budget, even assuming that 20 percent of the lots install post-development in-ground irrigation systems, even during a 1-year-in-30 drought year.
- A simultaneous, 12-hour, 3-well pumping test at a combined pumping rate of 16.8 gpm, during which test the wells produced more than 12,000 gallons, more than the average daily demand of the 25 homes according to the conservative Putnam County Department of Health requirements.
- Observation of no drawdown impact during the pumping test at one idle onsite water well and at three offsite domestic supply wells.
- Laboratory water analyses of water from each of the three wells, plus the idle well, TW-3, that fully complies with the Putnam County Department of Health drinking water standards.

RECOMMENDATIONS

In response to concerns expressed by the Town's hydrogeologic consultant, it is recommended that the three neighboring wells monitored during the pumping test be monitored for water level changes beginning at the start of construction and continuing until two years after the final certificate of occupancy is issued provided that these well owners grant permission for such monitoring. Monitoring would consist of using MiniTroll pressure transducer-data logger units set to read every 4 hours and checked approximately monthly, as well as basic water quality tests at the beginning and end of the program. The water quality parameters to be tested are total coliform bacteria (and E coli if coliform are present), pH, turbidity, color, odor, hardness, iron and manganese. Required potability tests of each onsite well would be done before applying for a certificate of occupancy. The monitoring data would be reported to the Town and to participating well owners in January of each year.

LEGGETTE, BRASHEARS & GRAHAM, INC.

R. G. Slayback, CPG
Principal

ng
July 1, 2005
Revised December 13, 2005
cc: V. Santucci
K. Staudohar
W. Canavan
H:\emerald ridge\2005\Test Narrative.doc

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Fisher, Donald W., Ingvar W. Isachsen and Lawrence V. Rickard, 1970, "Geologic Map of New York, Lower Hudson Sheet", New York State Museum and Science Service, Map and Chart Series No. 15.

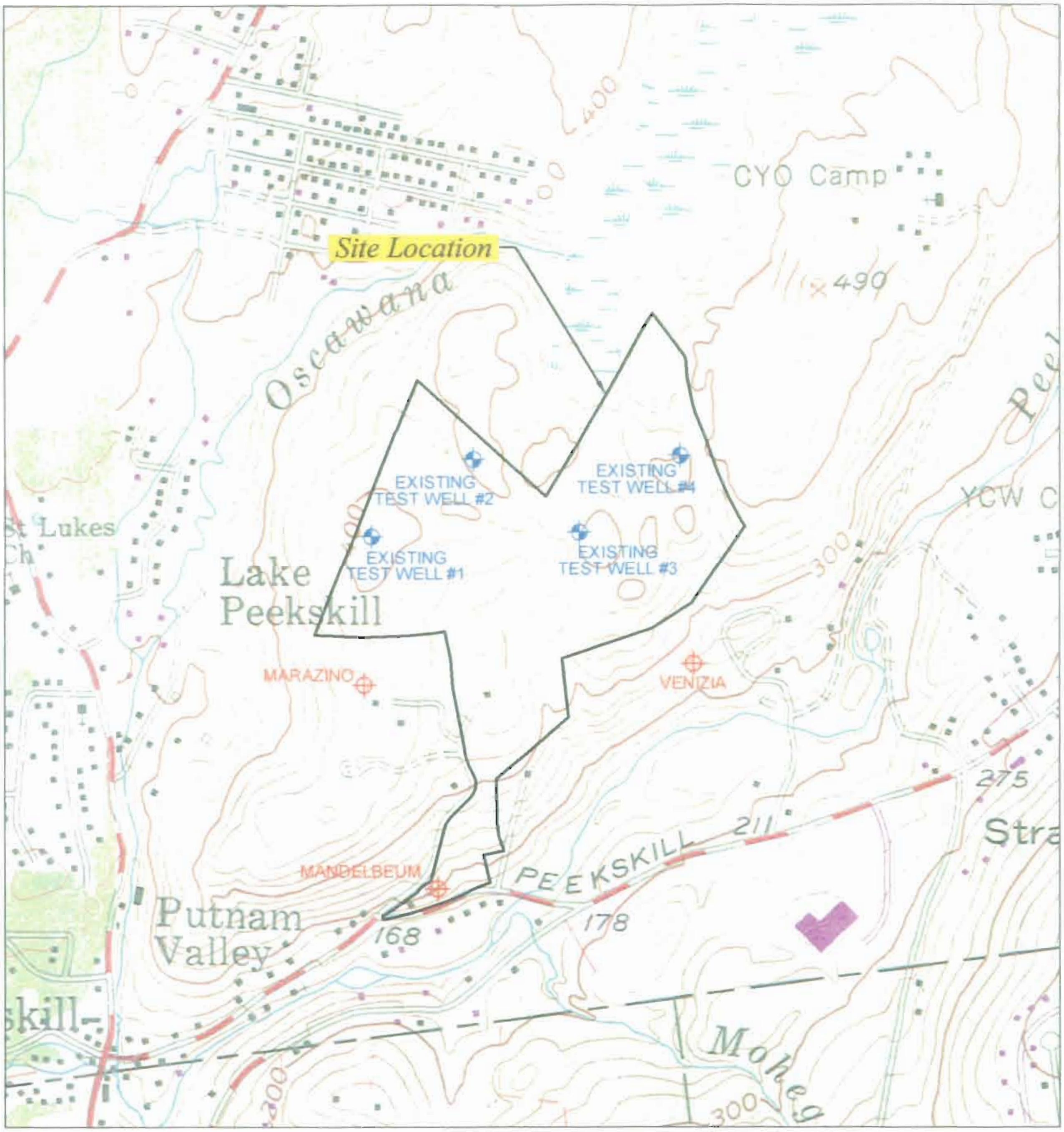
Putnam County Department of Health, 1998, "Program Review & Policies, Sewage Treatment & Water Supply Facilities for Commercial & Multi-Family Residential Projects, Bulletin CS-31.

Putnam County Department of Health, 1998, "Procedures and Policies for Realty Subdivision Program", Bulletin RS-21.

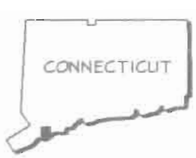
Snavely, Deborah S., 1980, "Ground-Water Appraisal of the Fishkill-Beacon Area, Dutchess County, New York", U. S. Geological Survey, Water Resources Investigation, Open-File Report 80-437.

Wolcott, Stephen W. and Robert F. Snow, 1995, "Computation of Bedrock-Aquifer Recharge in Northern Westchester County, New York, and Chemical Quality of Water from Selected Wells", U. S. Geological Survey, Water-Resources Investigations Report 92-4157.

FIGURES



SOURCE: USGS TOPOGRAPHIC QUADRANGLES MOHEGAN LAKE, NEW YORK (PHOTOREVISED 1981) AND PEEKSKILL, NEW YORK (PHOTOREVISED 1981).



QUADRANGLE LOCATION

SCALE IN FEET

VS CONSTRUCTION CORPORATION
EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

SITE AND WELL LOCATION MAP

DATE	REVISED	PREPARED BY:
		LEGGETTE, BRASHEARS & GRAHAM, INC. Professional Ground-Water and Environmental Engineering Services 126 Monroe Turnpike Trumbull, CT 06611 (203) 452-3100

DRAWN: FCS | CHECKED: RS | DATE: 5/17/05 | FIGURE: 1

EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

Hydrograph of Well TW-1
During Simultaneous 12-Hour Constant-Rate Pumping Test
April 12, 2005

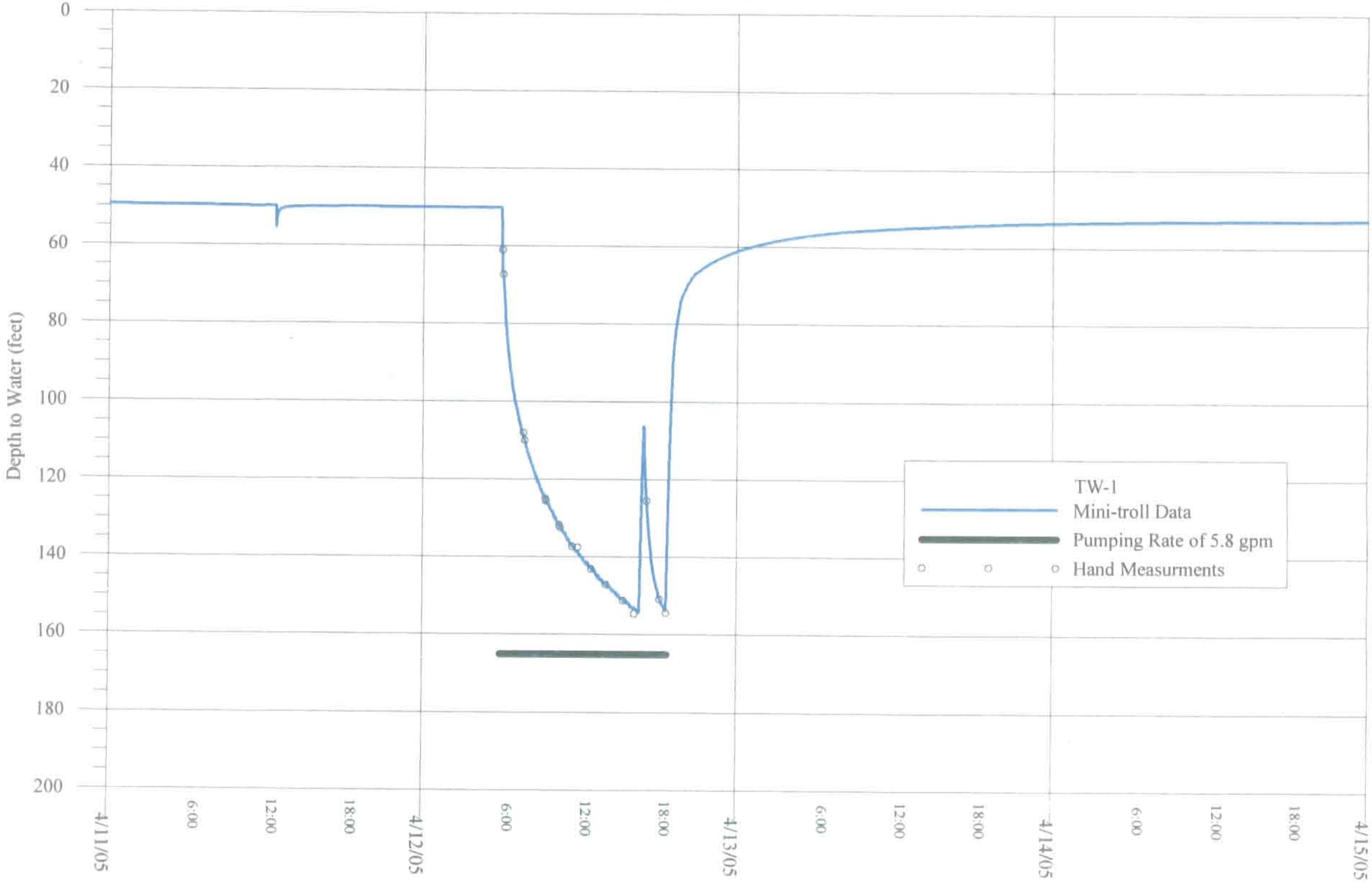


Figure 2

Leggette, Brashears & Graham, Inc.

EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

Hydrograph of Well TW-2
During Simultaneous 12-Hour Constant-Rate Pumping Test
April 12, 2005

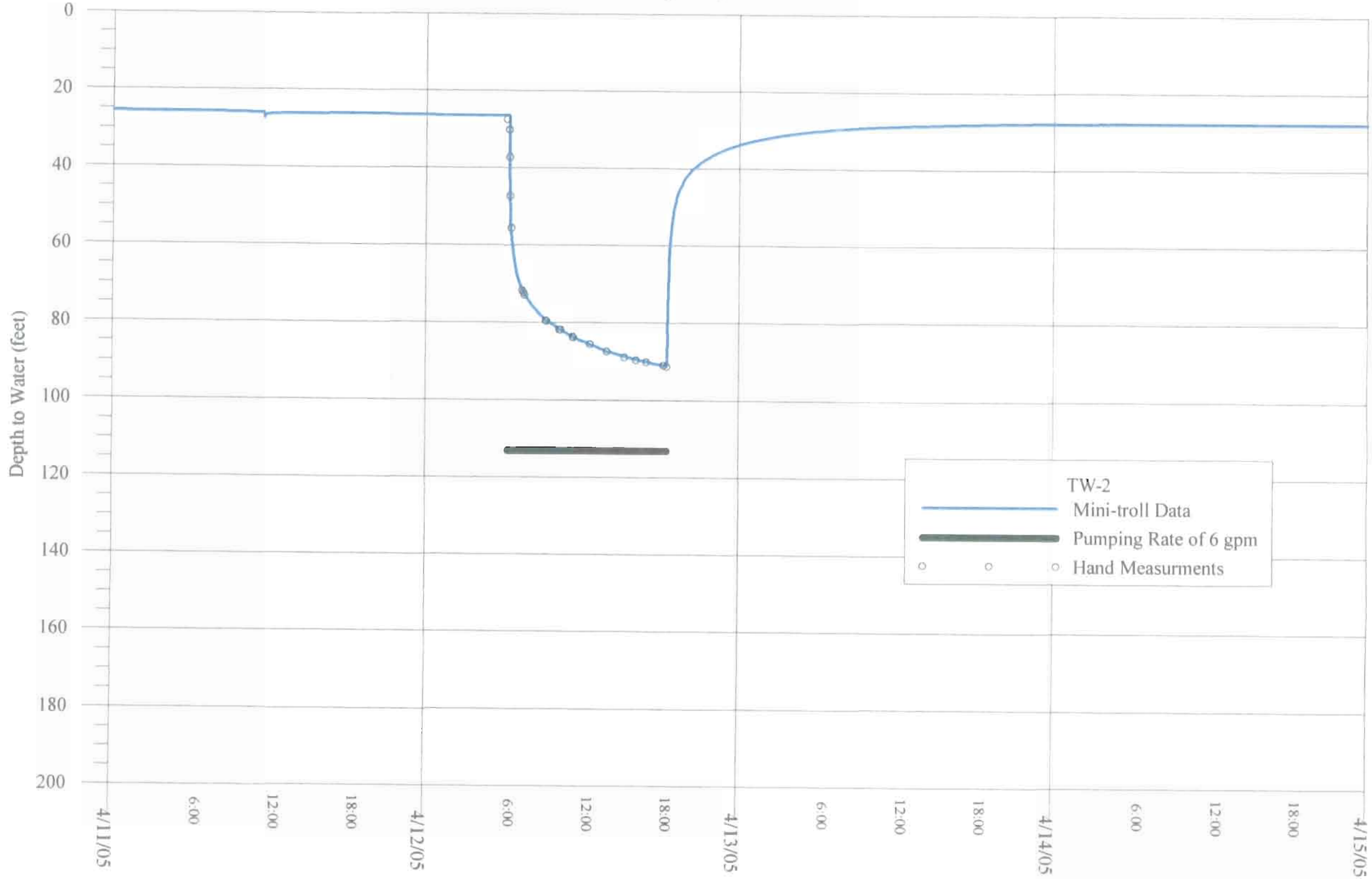


Figure 3

Leggette, Brashears & Graham, Inc.

EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

Hydrograph of Well TW-4
During Simultaneous 12-Hour Constant-Rate Pumping Test
April 12, 2005

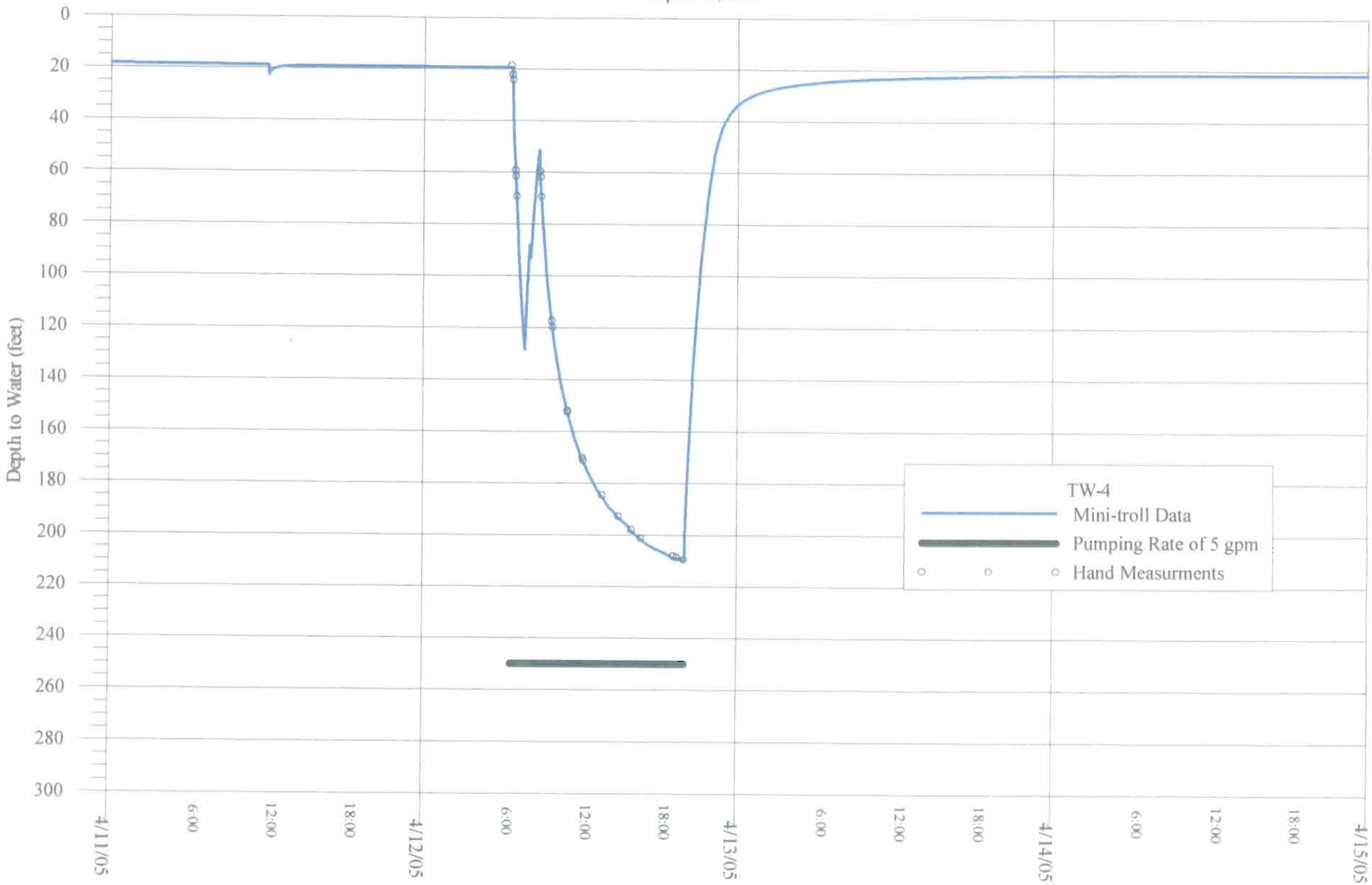


Figure 4

Leggette, Brashears & Graham, Inc.

EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

Hydrograph of Well TW-3
During Simultaneous 12-Hour Constant-Rate Pumping Test
April 12, 2005

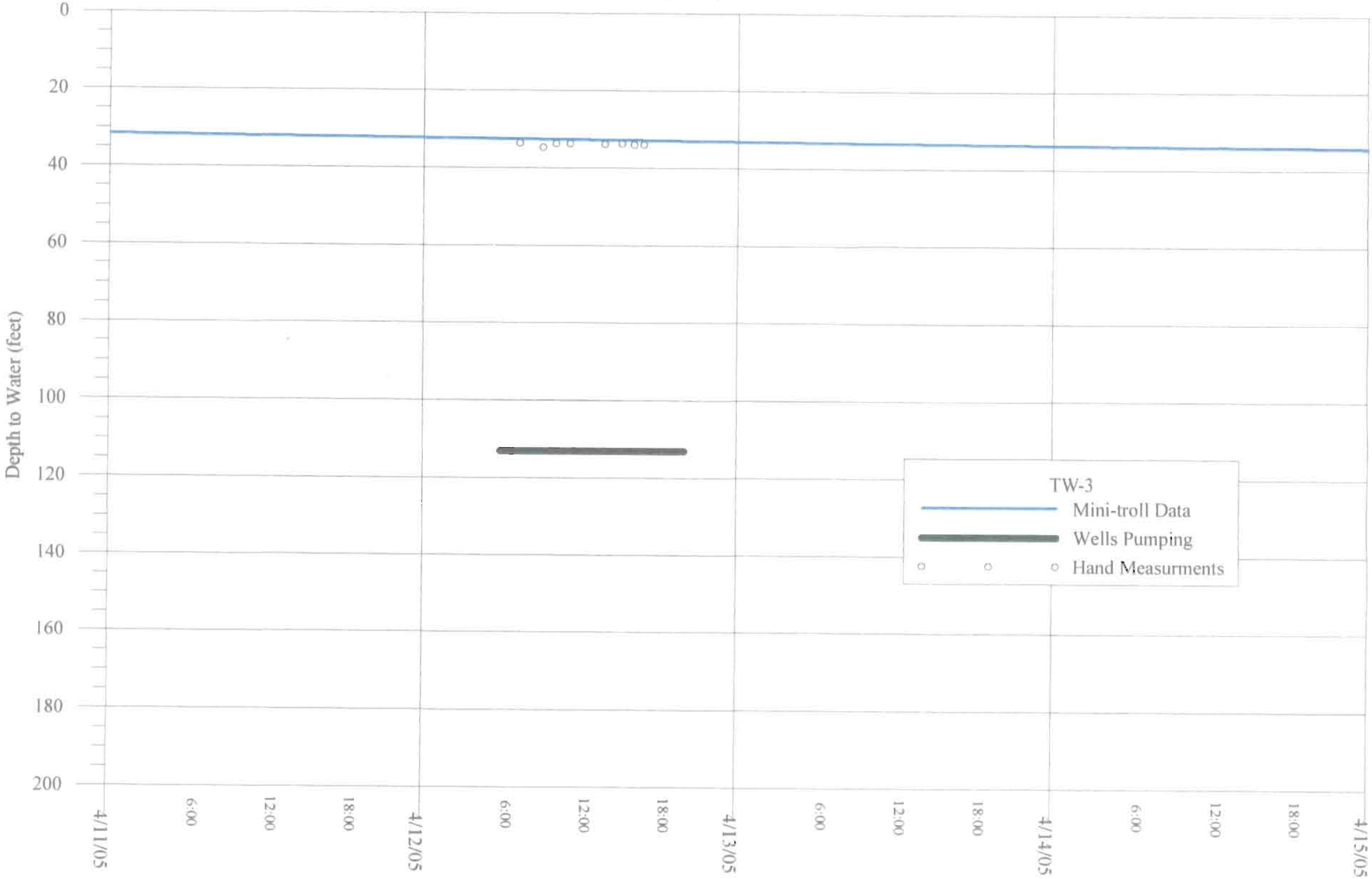


Figure 5

Leggette, Brashears & Graham, Inc.

EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK

Hydrograph of Well at Mandelbaum Residence
95 Peekskill Hollow Road
During Simultaneous 12-Hour Constant-Rate Pumping Test
April 12, 2005

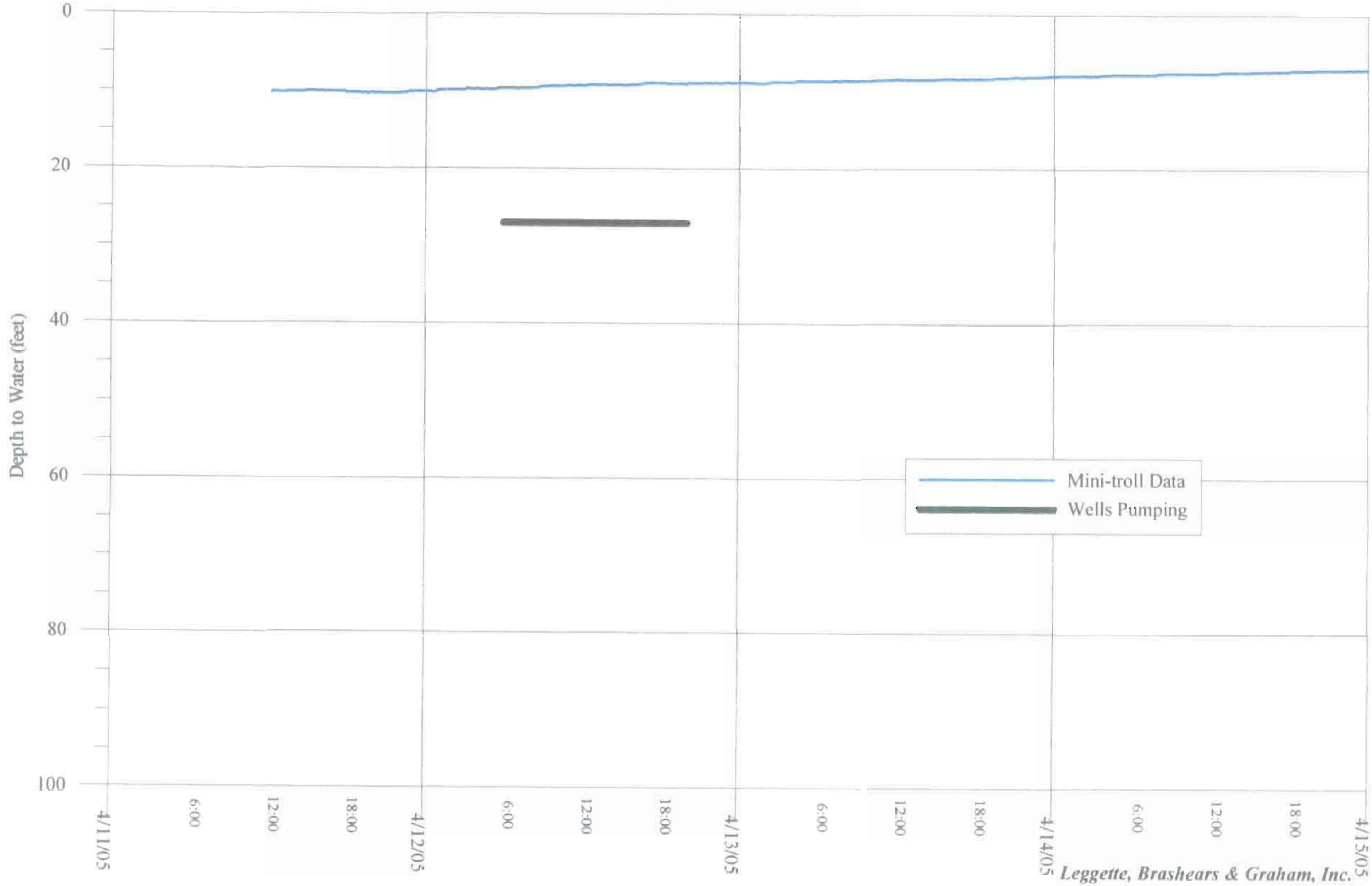
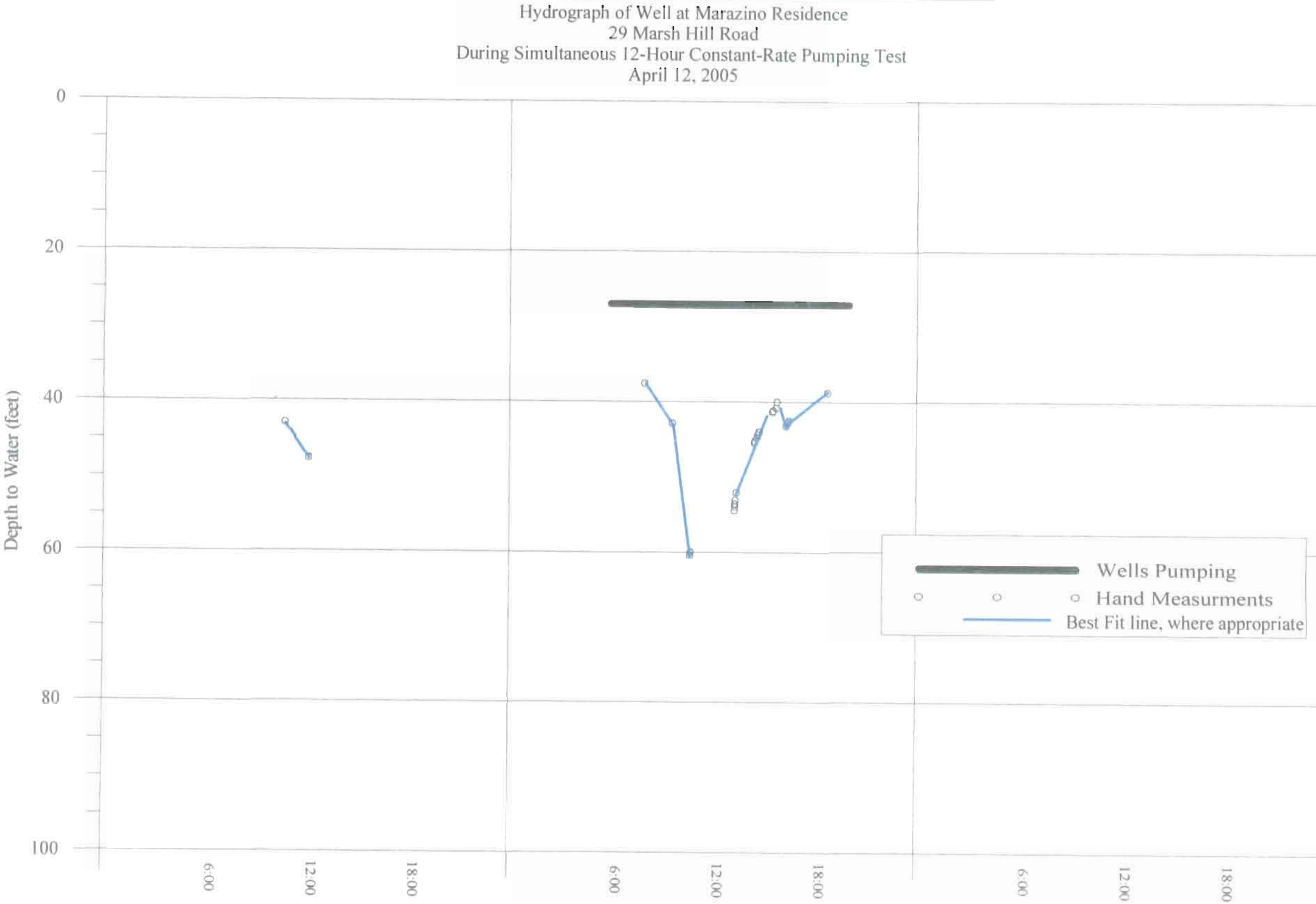


Figure 6

Leggette, Brashears & Graham, Inc.

Figure 7

EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK



Leggette, Brashears & Graham, Inc.

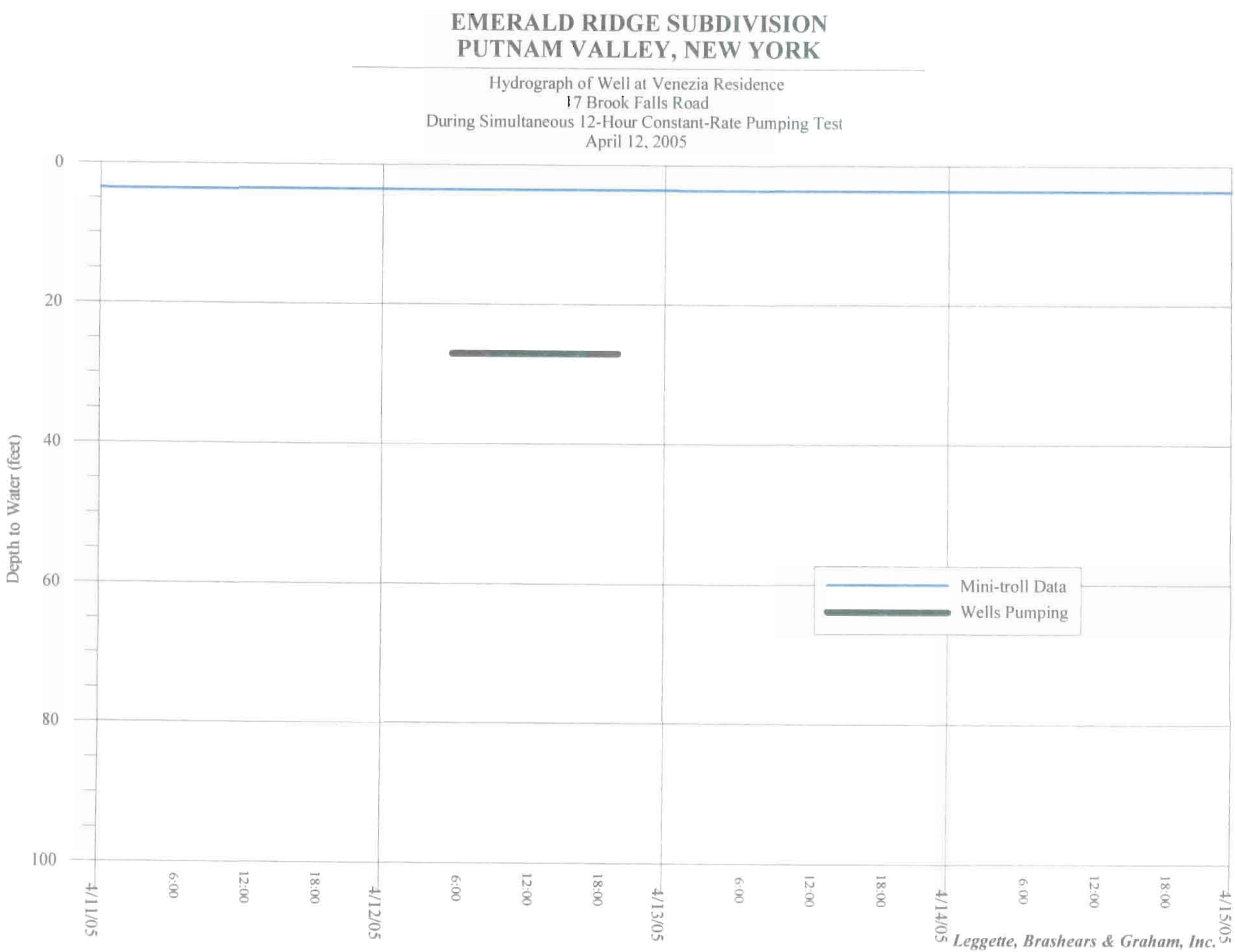

EMERALD RIDGE SUBDIVISION
PUTNAM VALLEY, NEW YORK
Hydrograph of Well at Venezia Residence
17 Brook Falls Road
During Simultaneous 12-Hour Constant-Rate Pumping Test
April 12, 2005
Depth to Water (feet)
0
20
40
60
80
100
Mini-troll Data
Wells Pumping
4/11/05
6:00
12:00
18:00
4/12/05
6:00
12:00
18:00
4/13/05
6:00
12:00
18:00
4/14/05
6:00
12:00
18:00
4/15/05
Leggette, Brashears & Graham, Inc.

Figure 8

APPENDIX I

WELL COMPLETION REPORTS

TW-1

1
SUBDIVISION
LOT 3

PUTNAM COUNTY DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH SERVICES

WELL COMPLETION REPORT

Well Location	Street Address: Marsh Hill Rd	Town/Village: Putnam Valley	Tax Grid # Map 84 Block 1 Lot(s) 5
Well Owner:	Name: VS Construction	Address: 37 Croton Dam Rd Ossining NY 10562	
Use of Well: 1-primary 2-secondary	X Residential ___ Business ___ Industrial	___ Public Supply ___ Farm ___ Institutional	___ Air cond/heat pump ___ Test/monitoring ___ Standby ___ Irrigation ___ Other(specify)
Drilling Equipment	X Rotary ___ Cable percussion ___ Compressed air percussion ___ Other (specify)		
Well Type	___ Screened ___ Open end casing ___ Open hole in bedrock ___ Other		
Casing Details	Total length 40 ft. Length below grade 38 ft. Diameter 6 in. Weight per foot ___ lb/ft.	Materials: ✓ Steel ___ Plastic ___ Other; Joints: ___ Welded ✓ Threaded ___ Other; Seal: ___ Cement grout ___ Bentonite ___ Other; Drive shoe: ___ Yes ___ No	Liner: ___ Yes ___ No

Screen Details		Diameter (in)	Slot Size	Length(ft)	Depth to Screen (ft)	Developed?
	First					___ Yes ___ No
	Second					Hours ___

Well Yield Test	___ Bailed ___ Pumped ✓ Compressed Air	Hours 6 hr	Yield 6 gpm
Depth Data	Measure from land surface-static (specify ft)	During yield test(ft)	Depth of completed well in feet 580'

Well Log If more detailed information descriptions or sieve analyses are available, please attach.	Depth From Surface ft.	ft.	Water Bearing	Well Diameter(in)	Formation Description
	Land Surface	28'		6'	overburden
	28'	580.00		6'	granite

If yield was tested at different depths during drilling, list:	Feet	Gallons Per Minute	Pump/Storage Tank Information
			Pump Type sub Capacity ___
			Depth 570 Model 5515-2G
			Voltage 230 HP 1.5
			Tank Type ___ Volume ___

Date Well Completed	Putnam County Certification No.	Date of Report	Well Driller (signature)
1/05		4/18/05	Norman Anderson

NOTE: Exact location of well with distances to at least two permanent landmarks to be provided on a separate sheet/plan.

Well Driller's Name Norman Anderson Address: 152 Barger St Putnam Valley

Signature: Norman Anderson Date: 4/18/05

White copy: HD File; Yellow copy - Building Inspector; Pink copy - Owner; Orange copy - Well driller

Form WC-97

TW-2

#2
SUBDIVISION
LOT 6

PUTNAM COUNTY DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH SERVICES
WELL COMPLETION REPORT

Well Location	Street Address: Marsh Hill Rd	Town/Village: Putnam Valley	Tax Grid # Map 84 Block 1 Lot(s) 5
Well Owner:	Name: V.S Construction	Address: 37 Croton Dam Rd Ossining NY 10562	
Use of Well: 1-primary 2-secondary	✓ Residential ___ Business ___ Industrial	___ Public Supply ___ Farm ___ Institutional	___ Air cond/heat pump ___ Test/monitoring ___ Standby ___ Irrigation ___ Other(specify)
Drilling Equipment	✓ Rotary ___ Cable percussion ___ Compressed air percussion ___ Other (specify)		
Well Type	___ Screened ___ Open end casing ___ Open hole in bedrock ___ Other		
Casing Details	Total length 40 ft. Length below grade 28.5 ft. Diameter 6 in. Weight per foot ___ lb/ft.	Materials: ✓ Steel ___ Plastic ___ Other Joints: ___ Welded ✓ Threaded ___ Other Seal: ___ Cement grout ___ Bentonite ___ Other Drive shoe: ___ Yes ___ No	Liner: ___ Yes ___ No

Screen Details

	Diameter (in)	Slot Size	Length(ft)	Depth to Screen (ft)	Developed?
First					___ Yes ___ No
Second					Hours ___

Well Yield Test	___ Bailed ___ Pumped ✓ Compressed Air	Hours 6	Yield 6 gpm
Depth Data	Measure from land surface-static (specify ft)	During yield test(ft)	Depth of completed well in feet 600'

Well Log If more detailed information descriptions or sieve analyses are available, please attach.

Depth From Surface ft.	ft.	Water Bearing	Well Diameter(in)	Formation Description
Land Surface	28.5		6"	overburden
28.5	600		6"	granite

If yield was tested at different depths during drilling, list: Feet	Gallons Per Minute

Pump/Storage Tank Information

Pump Type Sub	Capacity ___
Depth 570	Model 5515-26
Voltage 230	HP 1.5
Tank Type ___	Volume ___

Date Well Completed	Putnam County Certification No.	Date of Report	Well Driller (signature)
1/05		4/18/05	Norman Anderson

NOTE: Exact location of well with distances to at least two permanent landmarks to be provided on a separate sheet/plan.

Well Driller's Name: Norman Anderson
Address: 152 Baker St Putnam Valley
Signature: Norman Anderson
Date: 4/18/05

White copy: HD File; Yellow copy - Building Inspector; Pink copy - Owner; Orange copy - Well driller

Form WC-97

#3

TW-3

SUBDIVISION
LOT 24

PUTNAM COUNTY DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH SERVICES
WELL COMPLETION REPORT

Well Location	Street Address: Marsh Hill Road	Town/Village: Putnam Valley	Tax Grid # Map 84 Block 1 Lot(s) 02
Well Owner:	Name: VS Construction	Address: 37 Croton Dam Rd Ossining, NY 10562	
Use of Well: 1-primary 2-secondary	X Residential ___ Business ___ Industrial	___ Public Supply ___ Farm ___ Institutional	___ Air cond/heat pump ___ Test/monitoring ___ Standby ___ Irrigation ___ Other(specify)
Drilling Equipment	X Rotary ___ Cable percussion ___ Compressed air percussion ___ Other (specify)		
Well Type	___ Screened ___ Open end casing ___ Open hole in bedrock ___ Other		
Casing Details	Total length 40 ft. Length below grade 38.5 ft. Diameter 6 in. Weight per foot ___ lb/ft.	Materials: ✓ Steel ___ Plastic ___ Other; Joints: ___ Welded ✓ Threaded ___ Other; Seal: ___ Cement grout ___ Bentonite ___ Other; Drive shoe: ___ Yes ___ No; Liner: ___ Yes ___ No	

Screen Details

	Diameter (in)	Slot Size	Length(ft)	Depth to Screen (ft)	Developed?
First					___ Yes ___ No
Second					Hours ___

Well Yield Test: ___ Bailed ___ Pumped ✓ Compressed Air 6+ Hours 6+ Yield 6 gpm

Depth Data: Measure from land surface-static (specify ft) | During yield test(ft) | Depth of completed well in feet 600'

Well Log If more detailed information descriptions or sieve analyses are available, please attach.

Depth From Surface ft.	ft.	Water Bearing	Well Diameter(in)	Formation Description
Land Surface	38.5		6"	overburden
38.5	600'		6"	granite

If yield was tested at different depths during drilling, list:	Feet	Gallons Per Minute	Pump/Storage Tank Information
			Pump Type Subm. Capacity ___
			Depth 570 Model 5515-96
			Voltage 230 HP 1.5
			Tank Type ___ Volume ___

Date Well Completed	Putnam County Certification No.	Date of Report	Well Driller (signature)
1/05		4/18/05	Norman Anderson

NOTE: Exact location of well with distances to at least two permanent landmarks to be provided on a separate sheet/plan.

Well Driller's Name Norman Anderson Address: 152 Barger St Putnam Valley

Signature: Norman Anderson Date: 4/18/05

White copy: HD File; Yellow copy - Building Inspector; Pink copy - Owner; Orange copy - Well driller

Form WC-97

TW-4

PUTNAM COUNTY DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH SERVICES
WELL COMPLETION REPORT

SUBDIVISION
LOT 11

Well Location	Street Address: Marsh Hill Rd	Town/Village: Putnam Valley	Tax Grid # Map 84 Block 1 Lot(s) 10.3
Well Owner:	Name: VS. Construction	Address: 37 Croton Dam Rd Ossining, NY 10562	
Use of Well: 1-primary 2-secondary	✓ Residential ___ Business ___ Industrial	___ Public Supply ___ Farm ___ Institutional	___ Air cond/heat pump ___ Test/monitoring ___ Standby ___ Irrigation ___ Other(specify)
Drilling Equipment	✓ Rotary ___ Cable percussion ___ Compressed air percussion ___ Other (specify)		
Well Type	___ Screened ___ Open end casing ___ Open hole in bedrock ___ Other		
Casing Details	Total length 40 ft. Length below grade 38.5 ft. Diameter 6 in. Weight per foot ___ lb/ft.	Materials: ✓ Steel ___ Plastic ___ Other; Joints: ___ Welded ✓ Threaded ___ Other; Seal: ___ Cement grout ___ Bentonite ___ Other; Drive shoe: ___ Yes ___ No; Liner: ___ Yes ___ No	

Screen Details		Diameter (in)	Slot Size	Length(ft)	Depth to Screen (ft)	Developed? ___ Yes ___ No Hours ___
	First					
	Second					

Well Yield Test	___ Bailed ___ Pumped ✓ Compressed Air	Hours 6	Yield 5 gpm
Depth Data	Measure from land surface-static (specify ft)	During yield test(ft)	Depth of completed well in feet 600'

Well Log — If more detailed information descriptions or sieve analyses are available, please attach.

Depth From Surface ft.	ft.	Water Bearing	Well Diameter(in)	Formation Description
Land Surface	38.5		6	Overburden
38.5	600.		6	granite

If yield was tested at different depths during drilling, list:

Feet	Gallons Per Minute

Pump/Storage Tank Information

Pump Type sub	Capacity ___
Depth 570	Model 5815-26
Voltage 230	HP 1.5
Tank Type ___	Volume ___

Date Well Completed	Putnam County Certification No.	Date of Report	Well Driller (signature)
1/05		4/18/05	Norman Anderson

NOTE: Exact location of well with distances to at least two permanent landmarks to be provided on a separate sheet/plan.

Well Driller's Name Norman Anderson Address: 152 Barger St Putnam V.

Signature: Norman Anderson Date: 4/18/05

White copy: HD File; Yellow copy - Building Inspector; Pink copy - Owner; Orange copy - Well driller

Form WC-97

APPENDIX II-A

WATER QUALITY

YORK
ANALYTICAL LABORATORIES, INC.

Technical Report

prepared for

Leggette Brashears & Graham
126 Monroe Turnpike
Trumbull, CT 06611
Attention: Russ Slayback

Report Date: 4/19/2005
Re: Client Project ID: Emerald Ridge
York Project No.: 05040345

CT License No. PH-0723 New York License No. 10854

120 RESEARCH DRIVE STRATFORD, CT 06615 (203) 325-1371 FAX (203) 357-0166

Report Date: 4/19/2005
Client Project ID: Emerald Ridge
York Project No.: 05040345

Leggette Brashears & Graham
126 Monroe Turnpike
Trumbull, CT 06611
Attention: Russ Slayback

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on 04/13/05. The project was identifed as your project "Emerald Ridge ".

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables .

All samples were received in proper condition meeting the NELAC acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All the analyses met the method and laboratory standard operating procedure requirements except as indicated under the Notes section of this report, or as indicated by any data flags, the meaning of which is explained in the attachment to this report, if applicable.

The results of the analyses, which are all reported on an as-received basis unless otherwise noted, are summarized in the following table(s).

Analysis Results

Client Sample ID			TW1		TW2	
York Sample ID			05040345-01		05040345-02	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
Alkalinity-Total	SM403	mg/L	82.0	2.0	90.0	2.0
Iron	SW846-6010	mg/L	0.025	0.005	0.054	0.005
Hardness, total	SM314B	mg/L CaCO3	58.6	1.0	87.8	1.0
Manganese	SW846-6010	mg/L	0.026	0.005	0.011	0.005
Sodium	SW846-6010	mg/L	5.17	0.10	3.00	0.10
Nitrite	EPA300/SW9056	mg/L	Not detected	0.05	Not detected	0.05
Nitrate	EPA 300/SW9056	mg/L	Not detected	0.05	Not detected	0.05
Lead	SW846-6010	mg/L	Not detected	0.005	Not detected	0.005
pH	EPA 150.1	units	7.11	---	7.49	---
Total Coliform	EPA9221A	col./100ml.	0	0	0	0
Turbidity	EPA 180.1	NTU	0.82	0	0.43	0

YORK

Client Sample ID			TW4	
York Sample ID			05040345-03	
Matrix	.		WATER	
Parameter	Method	Units	Results	MDL
Alkalinity-Total	SM403	mg/L	86.0	2.0
Iron	SW846-6010	mg/L	0.112	0.005
Hardness, total	SM314B	mg/L CaCO3	77.2	1.0
Manganese	SW846-6010	mg/L	0.033	0.005
Sodium	SW846-6010	mg/L	4.19	0.10
Nitrite	EPA300/SW9056	mg/L	Not detected	0.05
Nitrate	EPA 300/SW9056	mg/L	Not detected	0.05
Lead	SW846-6010	mg/L	Not detected	0.005
pH	EPA 150.1	units	7.15	---
Total Coliform	EPA9221A	col./100ml.	0	0
Turbidity	EPA 180.1	NTU	1.20	0

Units Key: For Waters/Liquids: mg/L = ppm ; ug/L = ppb For Soils/Solids: mg/kg = ppm ; ug/kg = ppb

Notes for York Project No. 05040345

1. The MDL (Minimum Detectable Limit) reported is adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation.
6. All analyses conducted met method or Laboratory SOP requirements.
7. It is noted that no analyses reported herein were subcontracted to another laboratory.

Approved By: Robert Q. Bradley
Managing Director

Date: 4/19/2005

YORK

YORK
ANALYTICAL LABORATORIES, INC.
120 RESEARCH DRIVE STRATFORD, CT 06615
(203) 325-1371 FAX (203) 357-0166

Field Chain-of-Custody Record

Page ___ of ___

05040345

Company Name	Report To:	Invoice To:	Project ID/No.	Samples Collected By (Signature) / Name (Printed)
LBC	Russ Slavbeck	Same	Emerald Ridge	Mark Wright

Sample No.	Location/ID	Date Sampled	Sample Matrix: Water	Soil	Air	OTHER	ANALYSES REQUESTED	Container Description(s)
TW1	Emerald Ridge	4/12	X				Coliform Bacteria, Lead, Nitrates, Nitrites, Iron, Manganese, Iron + Manganese, Sodium, PH, Hardness, Alkalinity, Turbidity	3
TW2	"	"	X				Same	3
TW4	"	"	X				Same	3

Chain-of-Custody Record

Bottles Relinquished from Lab by	Date/Time	Sample Relinquished by	Date/Time 4/15 815	Sample Received by	Date/Time
Bottles Received in Field by	Date/Time	Sample Relinquished by	Date/Time	Sample Received in LAB by	Date/Time 4/13/05 8:20AM

Comments/Special Instructions

Turn-Around Time
___Standard ___RUSH(define)___

APPENDIX II-B

WATER QUALITY

YORK
ANALYTICAL LABORATORIES, INC.

Technical Report

prepared for

Leggette Brashears & Graham
126 Monroe Turnpike
Trumbull, CT 06611
Attention: Russ Slayback

Report Date: 5/24/2005
Re: Client Project ID: Emerald
York Project No.: 05050368

CT License No. PH-0723   New York License No. 10854

120 RESEARCH DRIVE   STRATFORD, CT 06615   (203) 325-1371   FAX (203) 357-0166

Report Date: 5/24/2005
Client Project ID: Emerald
York Project No.: 05050368

Leggette Brashears & Graham
126 Monroe Turnpike
Trumbull, CT 06611
Attention: Russ Slayback

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on 05/12/05. The project was identifed as your project "Emerald ".

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables .

All samples were received in proper condition meeting the NELAC acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All the analyses met the method and laboratory standard operating procedure requirements except as indicated under the Notes section of this report, or as indicated by any data flags, the meaning of which is explained in the attachment to this report, if applicable.

The results of the analyses, which are all reported on an as-received basis unless otherwise noted, are summarized in the following table(s).

Analysis Results

Client Sample ID			MW-1		MW-2	
York Sample ID			05050368-01		05050368-02	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
Volatiles,524.2 list +MTBE	EPA 524.2	ug/L	---	---	---	---
1,1,1,2-Tetrachloroethane			Not detected	0.2	Not detected	0.2
1,1,1-Trichloroethane			Not detected	0.2	Not detected	0.2
1,1,2,2-Tetrachloroethane			Not detected	0.2	Not detected	0.2
1,1,2-Trichloroethane			Not detected	0.2	Not detected	0.2
1,1-Dichloroethane			Not detected	0.2	Not detected	0.2
1,1-Dichloroethylene			Not detected	0.2	Not detected	0.2
1,1-Dichloropropylene			Not detected	0.2	Not detected	0.2
1,2,3-Trichlorobenzene			Not detected	0.2	Not detected	0.2
1,2,3-Trichloropropane			Not detected	0.4	Not detected	0.4
1,2,3-Trimethylbenzene			Not detected	0.4	Not detected	0.4
1,2,4-Trichlorobenzene			Not detected	0.2	Not detected	0.2
1,2,4-Trimethylbenzene			Not detected	0.2	Not detected	0.2
1,2-Dibromo-3-chloropropane			Not detected	0.4	Not detected	0.4
1,2-Dibromoethane			Not detected	0.2	Not detected	0.2
1,2-Dichlorobenzene			Not detected	0.2	Not detected	0.2
1,2-Dichloroethane			Not detected	0.2	Not detected	0.2

YORK

Client Sample ID			MW-1		MW-2	
York Sample ID			05050368-01		05050368-02	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
1,2-Dichloroethylene (Total)			Not detected	0.2	Not detected	0.2
1,2-Dichloropropane			Not detected	0.2	Not detected	0.2
1,3,5-Trimethylbenzene			Not detected	0.2	Not detected	0.2
1,3-Dichlorobenzene			Not detected	0.2	Not detected	0.2
1,3-Dichloropropane			Not detected	0.2	Not detected	0.2
1,3-Dichloropropylene			Not detected	0.2	Not detected	0.2
1,4-Dichlorobenzene			Not detected	0.2	Not detected	0.2
2,2-Dichloropropane			Not detected	0.4	Not detected	0.4
2-Chlorotoluene			Not detected	0.2	Not detected	0.2
4-Chlorotoluene			Not detected	0.2	Not detected	0.2
Benzene			Not detected	0.1	Not detected	0.1
Bromobenzene			Not detected	0.1	Not detected	0.1
Bromochloromethane			Not detected	0.1	Not detected	0.1
Bromodichloromethane			Not detected	0.1	Not detected	0.1
Bromoform			Not detected	0.2	Not detected	0.2
Bromomethane			Not detected	0.2	Not detected	0.2
Carbon tetrachloride			Not detected	0.2	Not detected	0.2
Chlorobenzene			Not detected	0.2	Not detected	0.2
Chloroethane			Not detected	0.2	Not detected	0.2
Chloroform			3.0	0.2	2.2	0.2
Chloromethane			Not detected	0.2	Not detected	0.2
Dibromochloromethane			Not detected	0.2	Not detected	0.2
Dibromomethane			Not detected	0.2	Not detected	0.2
Dichlorodifluoromethane			Not detected	0.2	Not detected	0.2
Ethylbenzene			Not detected	0.2	Not detected	0.2
Hexachlorobutadiene			Not detected	0.2	Not detected	0.2
Isopropylbenzene			Not detected	0.2	Not detected	0.2
Methyl tert-butyl ether (MTBE)			Not detected	0.2	Not detected	0.2
Methylene chloride			Not detected	0.2	Not detected	0.2
Naphthanlene			Not detected	0.2	Not detected	0.2
n-Butylbenzene			Not detected	0.2	Not detected	0.2
n-Propylbenzene			Not detected	0.2	Not detected	0.2
o-Xylene			Not detected	0.2	Not detected	0.2
p- & m-Xylenes			Not detected	0.2	Not detected	0.2
p-Isopropyltoluene			Not detected	0.2	Not detected	0.2
sec-Butylbenzene			Not detected	0.2	Not detected	0.2
Styrene			Not detected	0.2	Not detected	0.2
tert-Butylbenzene			Not detected	0.2	Not detected	0.2
Tetrachloroethylene			Not detected	0.2	Not detected	0.2
Toluene			0.8	0.2	Not detected	0.2
Trichloroethylene			Not detected	0.2	Not detected	0.2
Trichlorofluoromethane			Not detected	0.2	Not detected	0.2
Vinyl chloride			Not detected	0.2	Not detected	0.2
Silver	EPA 200.7	mg/L	Not detected	0.001	Not detected	0.001
Arsenic	EPA 200.7	mg/L	0.0135	0.005	Not detected	0.005
Asbestos	EPA	---	Not detected	2.00	Not detected	2.00
Barium	EPA 200.7	mg/L	0.036	0.010	0.055	0.010
Beryllium	EPA 200.7	mg/L	Not detected	0.0005	Not detected	0.0005
Cadmium	EPA 200.7	mg/L	Not detected	0.002	Not detected	0.002
Chloride	EPA 300	mg/L	3.16	0.5	1.79	0.5
Cyanide, total	EPA 335.2	mg/L	Not detected	0.01	Not detected	0.01

YORK

Client Sample ID			MW-1		MW-2	
York Sample ID			05050368-01		05050368-02	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
Color	EPA 110.1	Pt-Co units	5	1	15	1
Chromium	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Copper	EPA 200.7	mg/L	0.011	0.005	Not detected	0.005
Iron	EPA 200.7	mg/L	0.146	0.005	2.01	0.005
Fluoride	EPA 300	mg/L	0.30	0.1	Not detected	0.1
Mercury	EPA 245.1	mg/L	Not detected	0.0002	Not detected	0.0002
Manganese	EPA 200.7	mg/L	0.040	0.005	0.046	0.005
Sodium	EPA 200.7	mg/L	27.8	0.20	2.61	0.20
Nickel	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Nitrite	EPA300	mg/L	Not detected	0.05	Not detected	0.05
Nitrate	EPA 300	mg/L	Not detected	0.05	Not detected	0.05
Odor	EPA 140.1	O.T.U.	0	0	0	0
Lead	EPA 200.7	mg/L	0.0020	0.0010	0.0025	0.0010
Antimony	EPA 200.7	mg/L	Not detected	0.002	Not detected	0.002
Selenium	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Sulfate	EPA 300	mg/L	7.32	0.2	7.34	0.2
Total Coliform	EPA9221A	col./100ml.	Absent	0	Absent	0
Thallium	EPA 200.7	mg/L	Not detected	0.0010	Not detected	0.0010
Turbidity	EPA 180.1	NTU	0.29	0	14.9	0
Zinc	EPA 200.7	mg/L	0.011	0.005	0.013	0.005

Client Sample ID			MW-3		MW-4	
York Sample ID			05050368-03		05050368-04	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
Volatiles,524.2 list +MTBE	EPA 524.2	ug/L	---	---	---	---
1,1,1,2-Tetrachloroethane			Not detected	0.2	Not detected	0.2
1,1,1-Trichloroethane			Not detected	0.2	Not detected	0.2
1,1,2,2-Tetrachloroethane			Not detected	0.2	Not detected	0.2
1,1,2-Trichloroethane			Not detected	0.2	Not detected	0.2
1,1-Dichloroethane			Not detected	0.2	Not detected	0.2
1,1-Dichloroethylene			Not detected	0.2	Not detected	0.2
1,1-Dichloropropylene			Not detected	0.2	Not detected	0.2
1,2,3-Trichlorobenzene			Not detected	0.2	Not detected	0.2
1,2,3-Trichloropropane			Not detected	0.4	Not detected	0.4
1,2,3-Trimethylbenzene			Not detected	0.4	Not detected	0.4
1,2,4-Trichlorobenzene			Not detected	0.2	Not detected	0.2
1,2,4-Trimethylbenzene			Not detected	0.2	Not detected	0.2
1,2-Dibromo-3-chloropropane			Not detected	0.4	Not detected	0.4
1,2-Dibromoethane			Not detected	0.2	Not detected	0.2
1,2-Dichlorobenzene			Not detected	0.2	Not detected	0.2
1,2-Dichloroethane			Not detected	0.2	Not detected	0.2
1,2-Dichloroethylene (Total)			Not detected	0.2	Not detected	0.2
1,2-Dichloropropane			Not detected	0.2	Not detected	0.2
1,3,5-Trimethylbenzene			Not detected	0.2	Not detected	0.2
1,3-Dichlorobenzene			Not detected	0.2	Not detected	0.2
1,3-Dichloropropane			Not detected	0.2	Not detected	0.2
1,3-Dichloropropylene			Not detected	0.2	Not detected	0.2
1,4-Dichlorobenzene			Not detected	0.2	Not detected	0.2

Client Sample ID			MW-3		MW-4	
York Sample ID			05050368-03		05050368-04	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
2,2-Dichloropropane			Not detected	0.4	Not detected	0.4
2-Chlorotoluene			Not detected	0.2	Not detected	0.2
4-Chlorotoluene			Not detected	0.2	Not detected	0.2
Benzene			Not detected	0.1	Not detected	0.1
Bromobenzene			Not detected	0.1	Not detected	0.1
Bromochloromethane			Not detected	0.1	Not detected	0.1
Bromodichloromethane			Not detected	0.1	Not detected	0.1
Bromoform			Not detected	0.2	Not detected	0.2
Bromomethane			Not detected	0.2	Not detected	0.2
Carbon tetrachloride			Not detected	0.2	Not detected	0.2
Chlorobenzene			Not detected	0.2	Not detected	0.2
Chloroethane			Not detected	0.2	Not detected	0.2
Chloroform			2.4	0.2	1.0	0.2
Chloromethane			Not detected	0.2	Not detected	0.2
Dibromochloromethane			Not detected	0.2	Not detected	0.2
Dibromomethane			Not detected	0.2	Not detected	0.2
Dichlorodifluoromethane			Not detected	0.2	Not detected	0.2
Ethylbenzene			Not detected	0.2	Not detected	0.2
Hexachlorobutadiene			Not detected	0.2	Not detected	0.2
Isopropylbenzene			Not detected	0.2	Not detected	0.2
Methyl tert-butyl ether (MTBE)			Not detected	0.2	Not detected	0.2
Methylene chloride			Not detected	0.2	Not detected	0.2
Naphthanlene			Not detected	0.2	Not detected	0.2
n-Butylbenzene			Not detected	0.2	Not detected	0.2
n-Propylbenzene			Not detected	0.2	Not detected	0.2
o-Xylene			Not detected	0.2	Not detected	0.2
p- & m-Xylenes			Not detected	0.2	Not detected	0.2
p-Isopropyltoluene			Not detected	0.2	Not detected	0.2
sec-Butylbenzene			Not detected	0.2	Not detected	0.2
Styrene			Not detected	0.2	Not detected	0.2
tert-Butylbenzene			Not detected	0.2	Not detected	0.2
Tetrachloroethylene			Not detected	0.2	Not detected	0.2
Toluene			0.7	0.2	Not detected	0.2
Trichloroethylene			Not detected	0.2	Not detected	0.2
Trichlorofluoromethane			Not detected	0.2	Not detected	0.2
Vinyl chloride			Not detected	0.2	Not detected	0.2
Silver	EPA 200.7	mg/L	Not detected	0.001	Not detected	0.001
Arsenic	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Asbestos	EPA	---	Not detected	2.00	Not detected	2.00
Barium	EPA 200.7	mg/L	0.040	0.010	0.095	0.010
Beryllium	EPA 200.7	mg/L	Not detected	0.0005	Not detected	0.0005
Cadmium	EPA 200.7	mg/L	Not detected	0.002	Not detected	0.002
Chloride	EPA 300	mg/L	1.86	0.5	1.84	0.5
Cyanide, total	EPA 335.2	mg/L	Not detected	0.01	Not detected	0.01
Color	EPA 110.1	Pt-Co units	10	1	20	1
Chromium	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Copper	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Iron	EPA 200.7	mg/L	0.365	0.005	1.54	0.005
Fluoride	EPA 300	mg/L	Not detected	0.1	Not detected	0.1
Mercury	EPA 245.1	mg/L	Not detected	0.0002	Not detected	0.0002
Manganese	EPA 200.7	mg/L	0.047	0.005	0.052	0.005

Client Sample ID			MW-3		MW-4	
York Sample ID			05050368-03		05050368-04	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
Sodium	EPA 200.7	mg/L	1.53	0.20	1.56	0.20
Nickel	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Nitrite	EPA300	mg/L	Not detected	0.05	Not detected	0.05
Nitrate	EPA 300	mg/L	Not detected	0.05	Not detected	0.05
Odor	EPA 140.1	O.T.U.	0	0	0	0
Lead	EPA 200.7	mg/L	0.0022	0.0010	0.0013	0.0010
Antimony	EPA 200.7	mg/L	Not detected	0.002	Not detected	0.002
Selenium	EPA 200.7	mg/L	Not detected	0.005	Not detected	0.005
Sulfate	EPA 300	mg/L	5.38	0.2	6.65	0.2
Total Coliform	EPA9221A	col./100ml.	Absent	0	Absent	0
Thallium	EPA 200.7	mg/L	Not detected	0.0010	Not detected	0.0010
Turbidity	EPA 180.1	NTU	4.88	0	8.98	0
Zinc	EPA 200.7	mg/L	0.007	0.005	0.011	0.005

Units Key: For Waters/Liquids: mg/L = ppm ; ug/L = ppb For Soils/Solids: mg/kg = ppm ; ug/kg = ppb

Notes for York Project No. 05050368

1. The MDL (Minimum Detectable Limit) reported is adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation.
6. All analyses conducted met method or Laboratory SOP requirements.
7. It is noted that Arsenic, Lead, and Thallium analyses reported herein were subcontracted to Con-Test Analytical Laboratory; East Longmeadow, MA; Total Coliform to Brooks Laboratories; Norwalk, CT; and, Asbestos to AmeriSci New York; New York, NY.

Approved By: for Robert Q. Bradley
Managing Director

Date: 5/24/2005

YORK
ANALYTICAL LABORATORIES, INC.
120 RESEARCH DRIVE
STRATFORD, CT 06615
203.325.1371 FAX 203.357-0166

050503108

Field Chain-of-Custody Record

Company Name	Report to:	Invoice to:	Project ID/No.	Samples Collected by (signature)
LBG inc	Russ Slayback	Emerald Ridge	Emerald	James Girardi (Name (printed))

Sample No.	Location/ID	Date Sampled	Sample Matrix: Water	Soil	Air	Other	Analyses Requested	Container Desc.
MW-1	Emerald Ridge	5/11/05	X				See Attached list of Part 5-1 Analysis	7 total
MW-2	|	|	|					
MW-3	|	|	|					
MW-4	|	|	|					

Chain-of-Custody Record

Bottles Relinquished from Lab by	Date/Time	Samples Relinquished by	5/12 900 Date/Time	Samples received by	5/14 9:18AM Date/Time
Bottles received in field by	Date/Time	Samples Relinquished by	Date/Time	Samples received in LAB by	Date/Time

Comments/Special Instructions

Turn-Around Time Requested- Specify Date Expected if RUSH Requested: DATE DUE FOR RUSH:

X STANDARD ______ RUSH(Define) ______

Full Part 5-1 Water Testing Requirements

Bacteria Total Coliform
E. Coli

Inorganic Chemicals & Physical Characteristics

Arsenic	Iron	Antimony
Barium	Manganese	Beryllium
Cadmium	Sodium	Nickel
Chromium	Sulfate	Thallium
Mercury	Zinc	Cyanide
Selenium	Color	Turbidity
Silver	Odor	Nitrate
Fluoride	Lead	Nitrite
Chloride	Copper	Asbestos

Principal Organic Contaminants (POC's)

benzene	1,1-dichloroethane	1,1,1,2-tetrachloroethane
bromobenzene	1,2-dichloroethane	1,1,2,2-tetrachloroethane
bromochloromethane	1,1-dischlorothene	tetrachloroethene
bromomethane	cis-1,2-dichloroethene	toluene
n-butylbenzene	trans-1,2-dichloroethene	1,2,3-trichlorobenzene
sec-butylbenzene	1,2-dichloropropane	1,2,4-trichlorobenzene
tert-butylbenzene	1,3-dichloropropane	1,1,1-trichloroethane
carbon tetrachloride	2,2-dichloropropane	1,1,2-trichloroethane
chlorobenzene	1,1-dichloropropene	trichloroethene
chloroethane	cis-1,3-dichloropropene	trichlorofluoromethane
chloromethane	trans-1,3-dichloropropene	1,2,3-trichloropropane
2-chlorotoluene	ethylbenzene	1,2,4-trimethylbenzene
4-chlorotoluene	hexachlorobutadiene	1,3,5-trimethylbenzene
dibromomethane	isopropylbenzene	m-xylene
1,2-dichlorobenzene	p-isopropyltoluene	o-xylene
1,3-dichlorobenzene	methylene chloride	p-xylene
1,4-dichlorobenzene	n-propylbenzene	vinyl chloride
dichlorodifluoromethane	styrene	MTBE

EPA method 502.2 or EPA method 524.1 or EPA method 524.2 or a combination of EPA methods 502.1 and 503.1 with a detection limit of 0.5 ug/l or less.

APPPENDIX II-C

WATER QUALITY

YORK
ANALYTICAL LABORATORIES, INC.

Technical Report

prepared for

Leggette Brashears & Graham
126 Monroe Turnpike
Trumbull, CT 06611
Attention: R. Slayback

Report Date: 6/24/2005
Re: Client Project ID: Emerald Ridge
York Project No.: 05060730

CT License No. PH-0723 New York License No. 10854

120 RESEARCH DRIVE STRATFORD, CT 06615 (203) 325-1371 FAX (203) 357-0166

Report Date: 6/24/2005
Client Project ID: Emerald Ridge
York Project No.: 05060730

Leggette Brashears & Graham
126 Monroe Turnpike
Trumbull, CT 06611
Attention: R. Slayback

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on 06/23/05. The project was identifed as your project "Emerald Ridge ".

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables .

All samples were received in proper condition meeting the NELAC acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All the analyses met the method and laboratory standard operating procedure requirements except as indicated under the Notes section of this report, or as indicated by any data flags, the meaning of which is explained in the attachment to this report, if applicable.

The results of the analyses, which are all reported on an as-received basis unless otherwise noted, are summarized in the following table(s).

Analysis Results

Client Sample ID			Well-1		Well-2	
York Sample ID			05060730-01		05060730-02	
Matrix			WATER		WATER	
Parameter	Method	Units	Results	MDL	Results	MDL
Arsenic	EPA 200.7	mg/L	Not detected	0.004	Not detected	0.004

Client Sample ID			Well-3	
York Sample ID			05060730-03	
Matrix			WATER	
Parameter	Method	Units	Results	MDL
Arsenic	EPA 200.7	mg/L	Not detected	0.004

Units Key: For Waters/Liquids: mg/L = ppm ; ug/L = ppb For Soils/Solids: mg/kg = ppm ; ug/kg = ppb

YORK

Report Date: 6/24/2005
Client Project ID: Emerald Ridge
York Project No.: 05060730

Notes for York Project No. 05060730

1. The MDL (Minimum Detectable Limit) reported is adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation.
6. All analyses conducted met method or Laboratory SOP requirements.
7. It is noted that no analyses reported herein were subcontracted to another laboratory.

Approved By: ____________________
Robert Q. Bradley
Managing Director

Date: 6/24/2005

YORK

YORK
ANALYTICAL LABORATORIES, INC.
120 RESEARCH DRIVE STRATFORD, CT 06615
(203) 325-1371 FAX (203) 357-0166

Field Chain-of-Custody Record

05060730.

Company Name	Report To:	Invoice To:	Project ID/No.	Samples Collected By (Signature) / Name (Printed)
LBG	R. Slaybeck	R. Slaybeck	Emerald Ridge	[signature] / DPaskausky M Wright

Sample No.	Location/ID	Date Sampled	Sample Matrix: Water	Soil	Air	OTHER	ANALYSES REQUESTED	Container Description(s)
Well - 1	Emerald Ridge	6/22/05	X				Arsenic	1
Well - 2	Emerald Ridge	6/22/05	X				Arsenic	1
Well - 3	Emerald Ridge	6/22/05	X				Arsenic	1

Chain-of-Custody Record

Bottles Relinquished from Lab by	Date/Time	[signature] Sample Relinquished by	6/23/05 Date/Time 1000	Sample Received by	Date/Time		
Bottles Received in Field by	Date/Time	Sample Relinquished by	Date/Time	[signature] 6/23/05 10AM. Sample Received in LAB by	Date/Time		

Comments/Special Instructions
Please filter samples ✱ Potable wells ✱

Turn-Around Time
___ Standard X RUSH(def ASAP

Appendix J

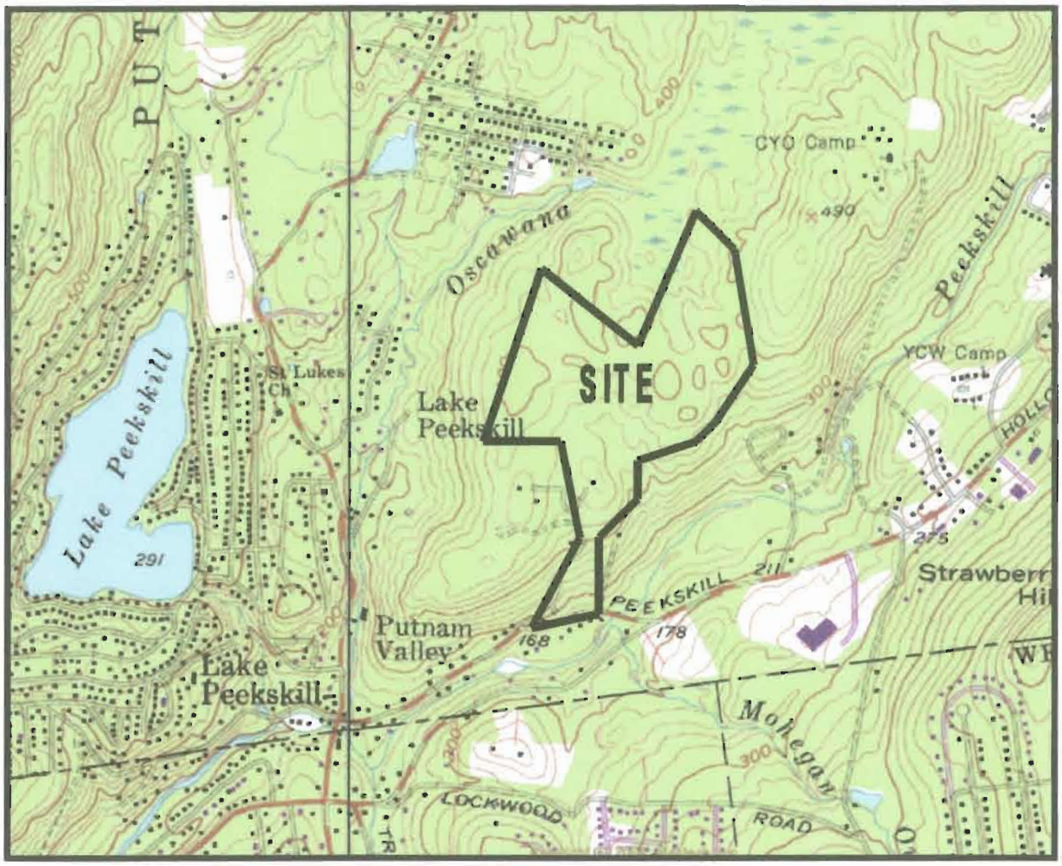
Stormwater Pollution Prevention Plan

EMERALD RIDGE

STORMWATER POLLUTION PREVENTION PLAN

TOWN OF PUTNAM VALLEY, PUTNAM COUNTY, NEW YORK

May 13, 2005
Revised December 9, 2005



Prepared by:	**Cronin Engineering, P.E., P.C.**
Owner/Operator:	**V.S. Construction Corp.**
Approving Authority:	**Town of Putnam Valley Planning Board, NYSDEC**

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Project Description

Reference is made to the Plans prepared by this office, "Subdivision and Site Development for Emerald Ridge", dated June1, 2005, *revised December 9, 2005.* Said plans and this report together complete this stormwater pollution prevention plan (SWPPP).

1.1.1 Proposed Project

The development of Emerald Ridge consists of a 25 lot residential subdivision with the construction of a road extension of Marsh Hill Road, storm drainage facilities and individual well water supplies and subsurface sewage treatment systems. The site is located on the north and east side of Marsh Hill Road where the same terminates at the driveway to the existing residence located on the site. Marsh Hill Road is currently a Town Road that serves five houses. No individual access to Peekskill Hollow Road from the site is provided except for Marsh Hill Road. See **figure 1**.

The Emerald Ridge development will involve construction required to modify the existing Marsh Hill Road (widen to 22 feet, re-align the road vertically and horizontally), extend the road into the site creating a loop road and develop 24 new single family lots with houses, driveways, lawns, sewage treatment systems and wells. There is an existing residence, driveway and lawn area on lot 18 that is to remain. There will be a total site disturbance of approximately 27 acres for the construction of all infrastructure, lots and utilities.

The site tax map designation is: section 84; block 01; lot 5, and portions of lots 10.1, 10.2 and 10.3. The site zoning designation is R-2, single family residential on minimum two acre lots.

The property owner is V.S. Construction Corp., 37 Croton Dam Road, Ossining, NY 10562

1.1.2 Physical Features

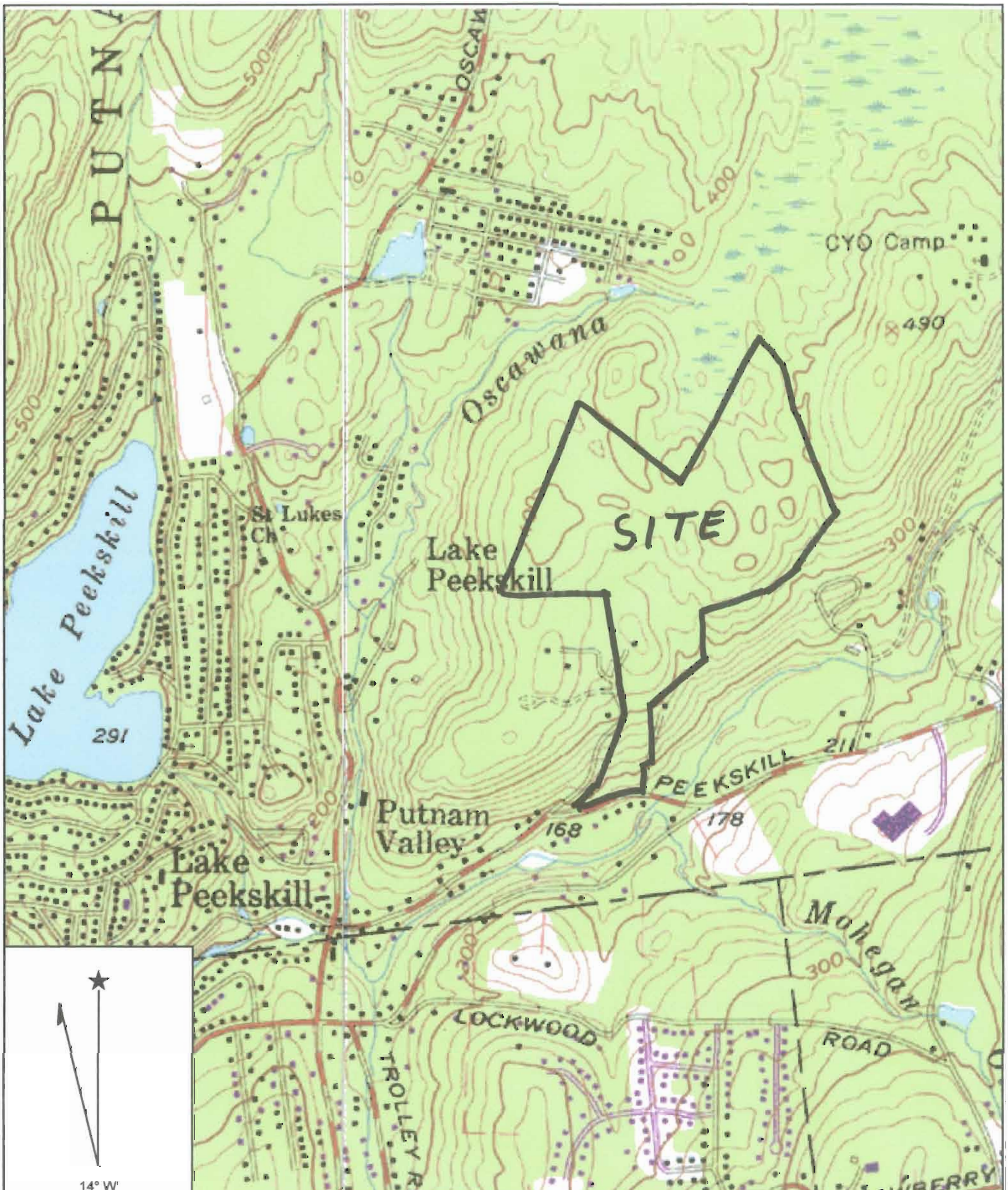
The project site encompasses a total of approximately 85 acres in size consisting of second and third generation forest cover and contains an existing residence together with a grassed lawn and paved driveway.

Topographically, the site is generally an elevated plateau with topographic undulations throughout the site. The land slopes down on the southern and eastern portions to the Peekskill Hollow Brook and also slopes down on the northern and western portions to the Oscawana Brook. Within the site are several wetland areas. There are two wetlands on site that are regulated by the Town of Putnam Valley. The wetland located on the northeast portion of the site is a NYSDEC regulated wetland, ML-3. The town wetlands have been flagged by the Town Wetland Inspector and survey located. The NYSDEC wetland has been validated by a representative of the NYSDEC and has also been survey located.

On site elevations range from a high of approximately 420 feet at a peak in the central portion of the site to a low of approximately 170 where Marsh Hill Road intersects with Peekskill Hollow Road.

1.1.3 Approving Authority

This application is for a realty subdivision in the Town of Putnam Valley. As such, the Town of Putnam Valley Planning Board has taken the lead agency status for the environmental review. Approvals required from the Town of Putnam Valley Planning Board and other approving authorities are as follows:



Name: MOHEGAN LAKE
Date: 11/23/2005
Scale: 1 inch equals 1000 feet

Location: 041° 20' 25.94" N 073° 52' 13.33" W
Caption: Figure 1, location map

- Subdivision Approval
- Development Plan Approval
- Wetlands Permit
- *Major Grading Permit*

Additional approvals are also required by various agencies for this subdivision. The approving agencies, required permits and the permit status are listed below

Putnam County Health Department
- Realty Subdivision
- Individual sewage systems and water supplies

NYS Dept. of Environmental Conservation
- Stormwater SPDES Permit, GP-02-01

Putnam County Department of Highways and Facilities
- Highway Permit for improvements at the Peekskill Hollow Road intersection and drainage along Peekskill Hollow Road.

A copy of the NOI is included in **Appendix B** of this report.

1.2 Stormwater Management Objective

The Emerald Ridge development will result in approximately 27 acres of disturbance for the development of a single family residential subdivision and is therefore subject to the requirements of the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit for stormwater discharges from construction activity, Permit GP-02-01.

The stormwater management objective for Emerald Ridge is to develop a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the New York State Discharge Elimination System (SPDES) General Permit, GP-02-01 for stormwater discharges associated with construction activities. The SWPPP is a plan for controlling runoff and pollutants from a site both during and after construction activities by utilizing and implementing the following practices:

- reduction or elimination of erosion and sediment loading to waterbodies during construction
- control of the impact of stormwater runoff on the water quality of the receiving waters
- control of the increased volume and peak rate of runoff during and after construction
- maintenance of stormwater controls during and after completion of construction

This SWPPP will utilize properly selected, sized and located stormwater management practices to protect water resources from stormwater impacts due to erosion and sedimentation caused by construction. This result will be realized with the implementation of the erosion and sediment control plan and the water quantity and quality control plans in this report.

1.3 NYSDEC SPDES General Permit GP-02-01 Applicability and Requirements

Disturbance >1 acre	yes (27 acres)
Disturbance > 5 acres	yes (27 acres)
Construction other than single family residential	no
Project located in TMDL watershed or 303(d) listed water	no

SWPPP components required pursuant to NYSDEC:

Erosion & sediment control plan	required and provided
Water quality control plan	required and provided
Water quantity control plan*	required and provided*

*Stormwater quantity controls are not required for several of the sub drainage basins as they have a direct discharge to a fourth order stream, the Peekskill Hollow Brook

This report includes an Erosion and Sediment Control program a Water Quality Control plan and a Water Quantity Control plan.

2.0 SOILS

2.1 On Site Soils

On site soils were determined utilizing the USDA SCS Soil Survey of Putnam and Westchester Counties, New York, issued September 1994. The soils found on site consist of Charlton loam (ChB, ChC), Charlton-Chatfield complex (CrC), Chatfield-Charlton complex (CsD), Chatfield-Hollis rock outcrop complex (CtC), Leicester loam (LeB) and Palms and Carlisle soils (Pc). For the soil boundaries, see **figure 2**.

2.2 Soils descriptions

The following soil descriptions are as presented in the aforementioned soil survey.

ChB, ChC, Charlton loam: consists of very deep, well-drained soils typically located on hillsides. Slopes range from 2% to 8% for ChB and from 8% to 15% for ChC.

Charlton soils within this category have the following properties:

Water table	usually greater than 6 feet
Permeability	moderate or moderately rapid
Surface runoff	medium
Erosion hazard	moderate
Depth to bedrock	greater than 5 feet

CrC, Charlton-Chatfield complex: consists of very deep and moderately deep, well-drained soils typically located on hilltops and hillsides. Slopes range from 2% to 15%.

Charlton-Chatfield soils within this category have the following properties:

Water table	usually greater than 6 feet
Permeability	moderate or moderately rapid
Surface runoff	medium
Erosion hazard	moderate
Depth to bedrock	greater than 5 feet, 20 to 40 inches for the Chatfield soils

CsD, Chatfield-Charlton complex: consists of very deep and moderately deep, well-drained soils typically located on hilltops and hillsides. Slopes range from 15% to 35%.

Chatfield-Charlton soils within this category have the following properties:

Water table	usually greater than 6 feet
Permeability	moderate or moderately rapid
Surface runoff	rapid
Erosion hazard	severe
Depth to bedrock	greater than 5 feet, 20 to 40 inches for the Chatfield soils

CtC, Chatfield-Hollis rock outcrop complex: consists of moderately deep, well-drained and somewhat excessively drained Chatfield soil and shallow, well drained and somewhat excessively drained Hollis soil, typically located on hilltops and narrow ridges. Slopes range from 3% to 15%.

Chatfield-Hollis soils within this category have the following properties:

Water table	usually greater than 6 feet
Permeability	moderate or moderately rapid
Surface runoff	medium
Erosion hazard	moderate
Depth to bedrock	20 to 40 inches for the Chatfield soils, 10-20 inches for the Hollis soils

LeB, Leicester loam: consists of very deep, gently sloping and somewhat poorly to poorly drained soils typically located on the lower parts of hillsides and along small drainage-ways in bedrock-controlled areas. Slopes range from 2% to 8%.

Leicester soils within this category have the following properties:

Water table	within a depth of 1.5 feet from November through May
Permeability	moderate to moderately rapid
Surface runoff	medium
Erosion hazard	moderate
Depth to bedrock	greater than 5 feet

Pc, Palms and Carlisle soils: consists of very deep, nearly level and very poorly drained soils typically located in depressions or in areas bordering lakes or streams. Slopes range from 0% to 1%.

Palms and Carlisle soils within this category have the following properties:

Water table	1 foot above to 1 foot below the surface from November through May
Permeability	moderate to moderately rapid in the organic layers
Surface runoff	ponded
Erosion hazard	susceptible to wind erosion
Depth to bedrock	greater than 5 feet

For the Emerald Ridge project, the limits of disturbance encompass approximately 27 acres which include the Carlton Loam (ChB) and Charlton-Chatfield complex (CrC) soils. The remaining soils on site are generally outside of the limits of disturbance.

2.3 Hydrologic Soils Group (HSG)

ChB, ChC, Charlton loam:	HSG = B
CsD, Chatfiled-Charlton complex:	HSG = B
CrC, Charlton-Chatfield complex	HSG = B
CtC, Chatfield-Hollis rock outcrop complex	HSG = D
LeB, Leicester loam:	HSG = C
Pc, Palms and Carlisle soils:	HSG = D

3.0 STORMWATER MANAGEMENT PLAN - QUANTITY

3.1 Description

Pursuant to the NYSDEC General Permit GP-02-01, stormwater quantity controls for Stream Channel Protection Volumes (Cpv – 1 year storm), Overbank Flood Control (Qp – 10 year storm) and Extreme Flood Control (Qf – 100 year storm) are not required if the site drains directly to a fourth order stream. In this case, the Peekskill Hollow Brook is a fourth order stream along the southern side of the development site. Therefore peak flow attenuation for the design storms studied in this analysis (1 yr, 2 yr, 10 yr, *25 yr* and 100 yr) are not required for those drainage basins that drain to the Peekskill Hollow Brook. A stormwater quality program for these drainage areas has been developed but quantity controls are not proposed.

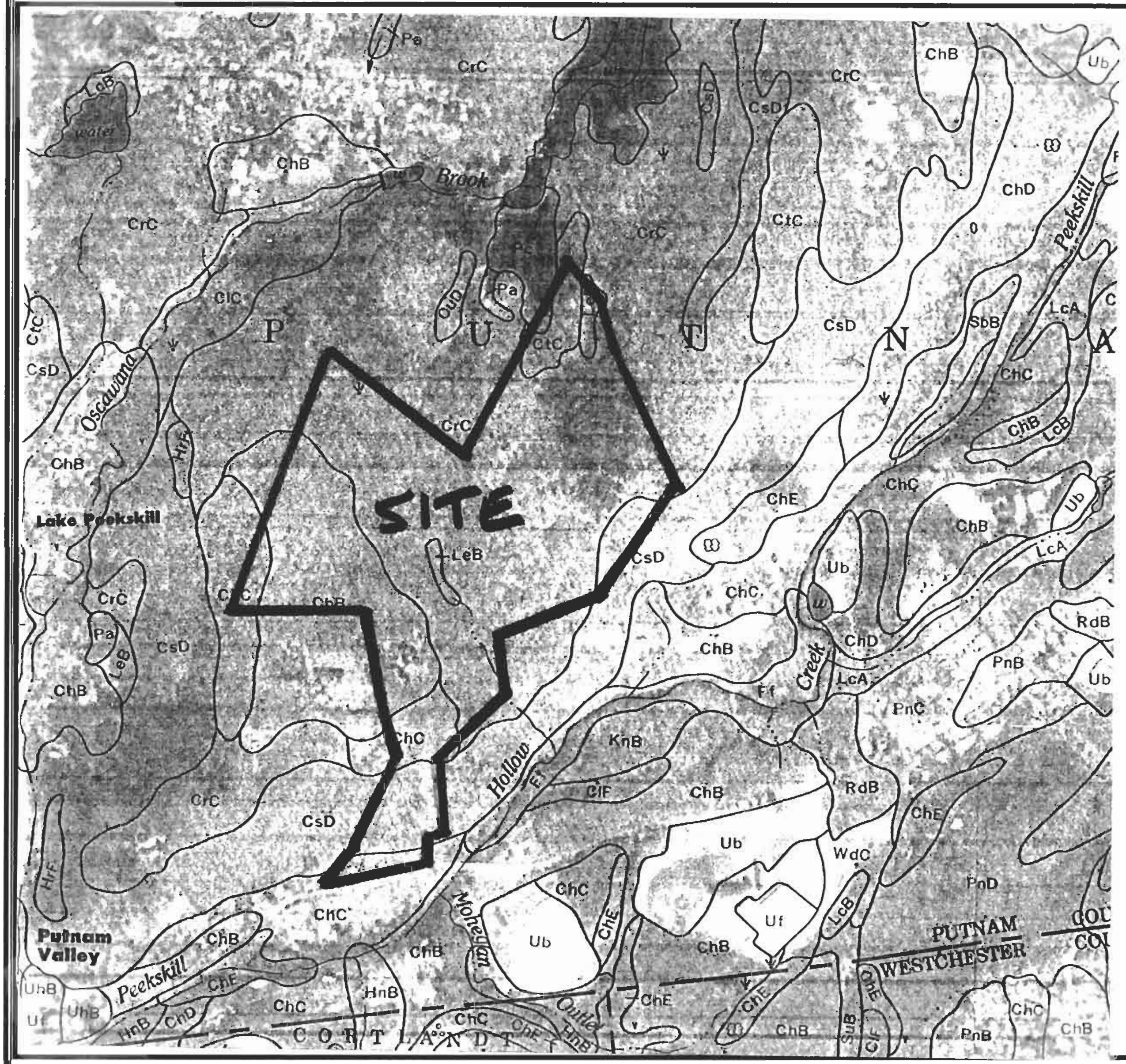


Figure 2, Soils

ChB,ChC	Charlton Loam
CrC	Charlton-Chatfield complex
CsD	Chatfield-Charlton
CtC	Chatfield-Hollis rock outcrop complex
Leb	Leicester Loam
Pc	Palms and Carlisle soils

Source: USDA SCS "Soil Survey of Putnam and Westchester Counties, New York", 1994

There are two drainage basins within the development that drain to the north which will be provided with stormwater quantity controls. The stormwater management plan for quantity is proposed to limit the peak rates of stormwater runoff from the site to or below the pre-development peak rates of runoff. This analysis shows that upon completion of the site drainage improvements as recommended in the analysis, there will not be an increase in the rate of discharge of stormwater flows from this site for the 1, 2, 10, 25 and 100 year design storms for those two drainage basins. The drainage improvements will provide for stream channel protection (Cpv), overbank flood control (Qp) and extreme flood control (Qf), respectively.

The site is located in the Peekskill Hollow Brook Drainage Basin, which is also the supply watershed for the City of Peekskill public drinking water. The Peekskill Hollow Brook has eventual discharge to the Hudson River. Generally, the southern 75% of the site drains to the Peekskill Hollow Brook and the northern 25% of the site drains to the NYSDEC wetland and Oscawana Brook, each of which have eventual discharge to the Peekskill Hollow Brook.

Hydrologically, the project site is broken into seven pre-development drainage basins, each discharging to a designated design point. The design points are the points of discharge for modeling the stormwater characteristics for each of the drainage basins

3.2 Methodology

The procedure employed to analyze and quantify the stormwater characteristics of the site is the USDA Soil Conservation Service Technical Release TR-20. The TR-20 method of stormwater modeling is an accepted standard by both the US Soil Conservation Service and the US Army Corps of Engineers.

This study was performed using the computer-modeling program HydroCad version 7.0 that is based on TR-20. The HydroCad Stormwater Modeling System is a computer program formulated by Applied Microcomputer Systems and was utilized in determining the stormwater hydrographs. This program requires that each of the hydrologically distinct areas, or sub-basins, be analyzed with the appropriate data input to the program. These distinct areas are referred to as "subcatchments" in HydroCad. Flow from the subcatchments are then routed to either a stream or drainage course, which are referred to as "reaches" in HydroCad, for conveyance to existing ponds or wetlands. In the description of the travel paths of the subcatchments, the use of culverts is allowed. This will result in the direct discharge of the subcatchments directly into the ponds or wetlands. The detention ponds, first flush basins, first flush basin control structures and wetlands are all modeled as "ponds" in the HydroCad program.

The TR-20 procedure requires the input of data that is based on the subcatchments and their discharge points. Select discharge points are considered as design points in this report. These include values for time of concentration, Tc, and runoff curve numbers, CN, which are defined as follows:

> The runoff curve number (CN) indicates the runoff potential of a particular soil cover in an unfrozen state. The CN is determined by evaluating the hydrologic soil group, land use and treatment condition (cover). The higher the curve number (such as 98 for pavement), the greater the runoff potential, while a low CN (such as 55 for some wooded areas), indicates a large infiltration capacity or minimal runoff potential. The CN value is not a percentage of the amount of runoff from a specific storm event.
>
> The time of concentration (Tc) is a key element in the calculation of peak rate of runoff and can be defined as the time required for runoff to travel from the most hydrologically distant point of the watershed to the point of discharge. The time of concentration is determined by summing the travel time (Tt) for each consecutive flow segment along the hydrologic path for the drainage basin which requires the identification of the type of flow occurring in each segment.

The procedure requires that we first determine the site specific factors. This information along with the size of the drainage basin and other physical characteristics of the basin were input into the computer program for the generation of stormwater flows.

The soil types comprising the study area are an important component in the hydrologic analysis. Based on the USDA Soil Conservation Service Soil Survey, issued in September 1994, and prepared for Putnam and Westchester Counties the soils in Emerald Ridge drainage basin are primarily B and C type or average soils. There is a small pocket of D type soils at the northern wetland areas.

Once the specific components of the project have been described, hydrographs for each drainage area are generated. Based on the site layout and flow paths, the stormwater flows resulting from each of the design storms considered in both the pre and post-development condition are calculated. The appropriate values were summed to determine the extent to which detention was required. Based on the computations, improvements are recommended that upon completion, will result in the peak rate of runoff from the Emerald Ridge Subdivision being less than that which currently exists in the required sub drainage basins.

Stormwater hydrographs and subsequent routings for both the pre and post-development conditions have been generated for all of the sub basins showing the peak flows based on the time of concentration and runoff curve numbers. The storms analyzed in this study were the 1, 2, 10, *25* and 100 year recurrence storms. Summaries are presented for all of the design storms, and a complete set of data output is presented for the 1 year storm.

3.3 Rainfall Data

For this site an SCS Type III rainfall distribution is utilized. The 24 hour rainfall amounts are as follows:

1 year storm	2.8"
2 year storm	3.5"
10 year storm	5.0"
25 year storm	*6.0"*
100 year storm	7.5"

3.4 Pre-development Hydrologic Analysis

For information, including drainage basin delineation and design point locations, for the pre-development condition see the enclosed map entitled "Stormwater Management Study, Subdivision and Site Development Plan for Emerald Ridge", sheet DS-8.1, dated June 1, 2005, *revised December 9, 2005.*

The total drainage basin delineated for this project is approximately 145.8 acres in size and includes off-site lands on all sides of the project site.

3.4.1 Basin b1 to Design Point 1

The contributing area for this basin is approximately 8.2 acres in size with a wooded cover and mostly type "B" soils and a portion of the existing paved Marsh Hill Road. The basin has a runoff curve number (Cn) of 56. This basin drains to the lower section of existing Marsh Hill Road and via an existing catch basin and culvert, crosses under Peekskill Hollow Road and discharges onto the front lawn of an existing residence. Design point 1 for drainage basin 1 is the existing culvert under Peekskill Hollow Road.

3.4.2 Basin b2 to Design Point 2

The contributing area for this basin is approximately 10.5 acres in size with a wooded cover and mostly type "B" soils and a portion of the existing paved Marsh Hill Road and an existing residence, lawn area and paved driveway. The basin has a Cn of 58. This basin drains to Peekskill Hollow Road and stays along the north side of the pavement, draining to a catch basin and then to an 18" cmp that crosses under Peekskill Hollow Road onto another property containing an existing residence. Design point 2 for drainage basin b2 is the existing 18" cmp under Peekskill Hollow Road.

3.4.3 Basin b3 to Design Point 3

The contributing area for this basin is approximately 19.7 acres in size with a wooded cover with type "B" soils, a portion of the existing paved Marsh Hill Road and three existing houses, paved driveways and portions of lawn areas. The basin has a Cn of 58. This basin drains via overland flow directly to the Peekskill Hollow Brook. Design point 3 for drainage basin b3 is at the Peekskill Hollow Brook.

3.4.4 Basin b4 to Design Point 4

The contributing area for this basin is approximately 44.9 acres in size with a wooded cover with type "B" and "C" soils. The basin has a Cn of 56. This basin is the central portion of the site and contains a Town regulated wetland and drains via overland flow directly to the Peekskill Hollow Brook. Design point 4 for drainage basin b4 is at the Peekskill Hollow Brook.

3.4.5 Basin b5 to Design Point 5

The contributing area for this basin is approximately 41.9 acres in size with a wooded cover with mostly type "B" soils, several existing residences and other out buildings, paved driveways, lawn areas and an existing paved road. The basin has a Cn of 57. This basin drains via overland flow directly to the Peekskill Hollow Brook. Design point 5 for drainage basin b5 is at the Peekskill Hollow Brook.

3.4.6 Basin b6 to Design Point 6

The contributing area for this basin is approximately 9.4 acres in size with a wooded cover with type "B" and "D" soils. This basin contains a southern extension of NYSDEC wetland ML-3 and has a Cn of 56. This basin drains via overland flow to the wetland at the edge of the site. Design point 6 for drainage basin b6 is where the stormwater leaves the site at the wetland.

3.4.7 Basin b7 to Design Point 7

The contributing area for this basin is approximately 11.1 acres in size with a wooded cover with type "B" and "D" soils. This basin also contains a southern extension of NYSDEC wetland ML-3. The Cn for this basin is 57. This basin drains via overland flow to the wetland at the edge of the site. Design point 7 for drainage basin b7 is where the stormwater leaves the site at the wetland.

3.4.8 Peak Flows

Peak flows are based on a Type III, 24-hour rainfall distribution that yields a design rainfall of 2.8", 3.5", 5.0", *6.0"* and 7.5" for the 1, 2, 10, *25* and 100 year recurrence storms, respectively. The drainage basin summaries including the Cn calculations, times of concentration and other data are shown for the 1 year storm event in **Appendix C.**

Table 1 Pre-development Peak Discharges (cfs)

basin	1 year storm	2 year storm	10 year storm	*25 year storm*	100 year storm
b1 to DP1*	0.4	1.4	5.5	*9.2*	15.6
b2 to DP2*	0.6	1.7	6.0	*9.6*	15.6
b3 to DP3*	1.3	4.0	13.8	*22.1*	36.2
b4 to DP4*	1.3	4.4	16.4	*27.3*	46.1
b5 to DP5*	1.7	5.6	20.2	*33.0*	54.9
b6 to DP6	0.3	1.1	4.1	*6.8*	11.5
b7 to DP7	0.5	1.6	5.8	*9.4*	15.6

* Basins b1 through b5 in the post-development scenario will discharge directly to the Peekskill Hollow Brook and therefore peak flow attenuation for these drainage basins is not proposed. Stormwater from these drainage basins will be provided with the required stormwater quality controls as described later in this report.

For drainage basins b6 and b7, it is the above peak discharge rates that are the basis to insure the post-development peak discharge rates are less than those presented above. All numbers shown have been rounded to the nearest tenth.

3.5 Post-development Hydrologic Analysis

For information on the pre-development drainage basins see the enclosed map entitled "Stormwater Management Study, Subdivision and Site Development Plan for Emerald Ridge", sheet DS-8.2, dated June 1, 2005, *revised December 9, 2005.*

In the post development condition, the drainage basin shapes, drainage patterns, runoff curve numbers and areas change due to the construction of the roadway, houses, driveways, lawn areas and other site improvements.

3.5.1 Basin b1 to Design Point 1

In the post-development condition, stormwater runoff to this design point has been eliminated and rerouted to design point dp3. This will eliminate the uncontrolled pre-development stormwater point discharge onto the private property on the south side of Peekskill Hollow Road.

3.5.2 Basin b2 to Design Point 2

In the post-development condition, stormwater runoff to this design point has also been eliminated and rerouted to design point dp3. This will eliminate the uncontrolled pre-development stormwater point discharge onto another private property on the south side of Peekskill Hollow Road.

3.5.3 Basins b2, b3a, b3b and b3 to Design Point 3

These drainage basins are generally the pre-development drainage basins b1, b2 and b3 and contain an area of 38.54 acres with four existing residences and driveways, a widened Marsh Hill Road and two new residences, lawn areas and driveways. However, all three basins will now discharge at design point three at the Peekskill Hollow Brook and eliminate design points 1 and 2. The runoff curve numbers (Cn) are 58, 57 and 64 for drainage basins b2, b3 and b3a, respectively.

As stated previously, peak flow attenuation for these drainage basins is not required nor provided. Water quality controls are proposed and consist of infiltration basins for the water quality treatment, see section 4 of this report.

Water quality treatment will not be provided for a section of Marsh Hill Road, from its intersection with Peekskill Hollow Road to Marsh Hill Road station 4+50 (9,000 square feet). This section of Marsh Hill road is existing and paved. The project proposes to widen this section of pavement from ±16' to 22' wide. Due to the terrain in this area, water quality features are not practical, therefore the runoff from this section of road will be conveyed to the proposed drainage system along Peekskill Hollow Road.

In its current condition, Marsh Hill Road is paved to station 14+00 at ±16' wide (approximately 22,400 square feet of pavement) with no water quality features. The result of the proposed improvements will be a substantial increase in the water quality treatment of Marsh Hill Road as compared to the current condition.

3.5.4 Basins b4a, b4b, b4c and b4d to Design Point 4

These four drainage basins are generally the pre-development drainage basin b4 and contain an area of approximately 45.65 acres with the majority of the new road (new and existing Marsh Hill Road), houses, driveways and lawn areas.

As stated previously, peak flow attenuation for these drainage basins is not required nor provided. Water quality controls are proposed and consist of infiltration basins, a micro-pool extended detention basin and individual lot practices for the water quality treatment, see section 4 of this report.

3.5.5 Basin b5 to Design Point 5

This drainage basin in the post-development condition remains essentially the same in area and configuration but includes five new houses, driveways and lawn areas.

As stated previously, peak flow attenuation for this drainage basin is not required nor provided. Water quality controls are proposed for the individual lots in the form of dry swales, level spreaders and other controls. See section 4 of this report.

3.5.6 Basins b6a and b6b to Design Point 6

These drainage basins discharge to the north at the southern stem of the NYSDEC wetland and are essentially pre-development basin b6. These basins include portions of the new Marsh Hill Road, new cul-de-sac and three new houses, driveways and lawn areas. Stormwater quantity control is required and proposed for these basins and includes a micro-pool extended detention basin.

3.5.7 Basin b7 to Design Point 7

This drainage basin in the post-development condition remains essentially the same in area and configuration as in the pre-development condition and includes one new house, driveway and lawn area. The drainage basin area is reduced slightly while the Cn remains the same

3.5.8 Post Development Peak Flows

Peak flows are based on a Type III, 24 hour rainfall distribution that yields a design rainfall of 2.8", 3.5", 5.0", *6.0"* and 7.5" for the 1, 2, 10, *25* and 100 year recurrence storms, respectively. The drainage basin summaries including the Cn calculations, times of concentration and other data are shown for the 1 year storm event in **Appendix D.**

Table 2 Post development Peak Discharges (cfs)

drainage basin	1 year storm	2 year storm	10 year storm	*25 year storm*	100 year storm
b2, b3a, b3b, b3 to DP3*	1.2	4.5	20.9	*35.5*	61.3
b4a, b4b, b4c, b4d to DP4*	1.8	5.3	19.4	*32.5*	55.4
b5 to DP5*	1.6	5.5	19.7	*32.1*	53.5
b6a, b6b to DP6	0.3	1.0	4.0	*6.8*	11.3
b7 to DP7	0.5	1.6	5.6	*9.2*	15.2

* These design points do not require peak flow attenuation

Design points 1 and 2 were eliminated and stormwater runoff diverted to design point 3. The above numbers were rounded to the nearest tenth.

3.5.9 Summary table of pre and post development peak flows

Table 3 below compares the pre development peak flow rates to the post development peak flow rates at design points dp6 and dp7. Drainage basin b6a discharges to design point dp6 and requires the use of the micro-pool extended detention basin. Drainage basin b7 shows a slight decrease in peak flow rates and therefore no attenuation is required. As can be seen, for each of the design points, it can be expected that the post development rates are equal to or less than the pre development rates and that mitigation is accomplished.

Table 3 Pre and Post Development Peak Discharge Comparison

Design point	Design storm	Pre development discharge *(cfs)	Post development discharge *(cfs)	Net change (cfs) % reduction ( )
dp6	**1**	0.3	0.3	-0.0(00%)
	2	1.1	1.0	-0.1(09%)
	10	4.1	4.0	-0.1(02%)
	25	*6.8*	*6.8*	*-0.0(00%)*
	100	11.5	11.3	-0.2(02%)
dp7	**1**	0.5	0.5	-0.0(00%)
	2	1.6	1.6	-0.0(00%)
	10	5.8	5.6	-0.2(03%)
	25	*9.4*	*9.2*	*-0.2(02%)*
	100	15.6	15.2	-0.4(02%)

* The flow values shown in this table have been rounded to the nearest tenth from the values generated by the computer model and are appropriate for this type of analysis. See **Appendix C** for the pre-development stormwater summaries, calculations and hydrographs and **Appendix D** for the post-development stormwater summaries, calculations and hydrographs.

Based on the above table, the Emerald Ridge subdivision as proposed with its stormwater management system will not result in an increase in the peak rate of discharge at design points dp6 and dp7 for all of the analyzed storms in the post-development condition as compared to the pre development condition.

With respect to the NYSDEC General Stormwater SPDES Permit requirement, the above described post development peak flow attenuation satisfies the requirements for Stream Channel Protection Volume (Cpv), Overbank Flood Control (Qp), and Extreme Flood Control (Qf).

3.5.10 Pipe Capacities

All proposed pipe capacities will be checked prior to final approval for the project. In general, all piping will be 15", 18", 24" or 30" diameter HDPE piping. The methodology to be employed in determining the pipe capacities are based on the Rational Method of determining the instantaneous peak rate of flow for those areas tributary to the pipe runs. In utilizing the Rational Method, a design storm of 10 years will be modeled based on the Intensity-Duration frequency Curves for Central Westchester County, NY. The rainfall intensity is based on the time of concentration for each tributary area.

The areas tributary to the pipe runs will be delineated, sized in acres and runoff coefficients, or C-values, will be tabulated for each pipe run. Times of concentration are assigned to each drainage basin using a minimum value of five minutes.

Pipe capacities will also be checked for the 100 year design storm to verify the ability of the stormwater conveyance system to direct flows to the appropriate detention facility in the larger storms.

4.0 STORMWATER MANAGEMENT PLAN - QUALITY

4.1 Introduction

The stormwater water quality program presented herein is designed to meet the NYSDEC required sizing criteria and pollutant removal goals. As part of the water quality program and sizing criteria, a water quality volume, WQv, shall be provided to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover **created** at a site. The following equation is utilized to determine the water quality volume in acre-feet of storage for the Emerald Ridge development:

$$\mathbf{WQv} = \frac{(P)\,(Rv)\,(A)}{12}$$

WQv	=	water quality volume	(acre-feet)
P	=	90% rainfall event Number	(figure 4.1 DEC Stormwater Manual)
Rv*	=	0.05 + 0.009 (I)	(I = percent of impervious cover)
A	=	site area	(acres)

* A minimum Rv value of 0.2 shall be used for all regulated sites.

For this site, the P value of the 90% rainfall for New York State in figure 4.1 of the NYSDEC Stormwater Management Design Manual is **1.2**.

4.2 Water Quality Treatment – Drainage Basins

4.2.1 post-development basin b2

WQv	=	water quality volume (acre-feet)	
P	=	1.2	
Rv*	=	0.1 use 0.2	(I = 6%)
A	=	8.09 acres	

WQv	=	(1.2) (0.2) (8.09) / 12	= 0.162 acre-feet
WQv	=	0.162 acre-feet or 7056 or **7,100** cubic feet	

For post-development basin b2, an infiltration basin is proposed to collect and treat the required stormwater quality volume. The following table shows the available storage at elevation for the infiltration basin, pond p2. The required water quality volume for this drainage basin is 0.162 acre-feet.

Pond p2 storage-elevation table

elevation (msl)	area (sq ft)	ave area (sq ft)	depth (ft)	volume (ft3)	cum volume (ft3)	cum vol (ac-ft)
212	1,300	0	0	0	0	0
214	3,600	2,450	2	4,900	4,900	0.112
216	6,100	4,850	2	9,700	14,600	0.335
217	7,500	6,800	1	6,800	21,400	0.491

Stormwater runoff from this drainage basin will be directed to the infiltration basin. Once the pond is filled to elevation 216, the "splitter" catch basin in Marsh Hill Road will allow the additional runoff to be conveyed down slope with eventual flow to the Peekskill Hollow Brook. The volume provided in the infiltration basin is greater than the water quality volume required.

Post development basin b2 will have discharge to design point 3 at the Peekskill Hollow Brook.

4.2.2 post-development basin b3

Post-development basin b3 has direct discharge to the Peekskill Hollow Brook and includes the existing pavement for Peekskill Hollow Road, existing houses, driveways and lawn areas and the first 450 feet of Marsh Hill Road.

Stormwater quality for this drainage basin is not proposed, as there are no changes from the existing ground covers except for the widening of the existing Marsh Hill Road. In the pre-development scenario, the stormwater runoff for the approximately 1,400 feet (at 16 feet wide) of existing Marsh Hill Road was untreated and uncontrolled runoff. This is approximately 22,400 square feet of untreated impervious area.

In the post-development condition, the new Marsh Hill Road will be 22 feet wide and the first 450 feet is approximately 9,900 square feet of untreated stormwater runoff. Therefore, there is a reduction by more than half of the currently untreated stormwater runoff from the road.

4.2.3 post-development basin b3a

WQv = water quality volume (acre-feet)
P = 1.2
Rv* = 0.185 use 0.2 (I = 15%)
A = 8.34 acres

WQv = (1.2) (0.2) (8.34) / 12 = 0.167 acre-feet
WQv = 0.167 acre-feet or 7274 or **7,300** cubic feet

For post-development basin b3a, an infiltration basin is proposed to collect and treat the required stormwater quality volume. The following table shows the available storage at elevation for the infiltration basin, pond p3a. The required volume for this drainage basin is 0.167 acre-feet.

Pond p3a storage-elevation table

elevation (msl)	area (sq ft)	ave area (sq ft)	depth (ft)	volume (ft3)	cum volume (ft3)	cum vol (ac-ft)
302	150	0	0	0	0	0
304	1,200	675	2	1,350	1,350	0.031
306	2,800	2,000	2	4,000	5,350	0.123
308	4,600	3,700	2	7,400	12,750	0.292
309	5,500	5,050	1	5,050	17,800	0.408
310	6,600	6,050	1	6,050	23,850	0.547

Stormwater runoff from this drainage basin will be directed to the infiltration basin. Once the pond is filled to elevation 308, the "splitter" catch basin in Marsh Hill Road will allow the additional runoff to be conveyed down slope with eventual flow to the Peekskill Hollow Brook. The volume provided in the infiltration basin is greater than the water quality volume required.

Post development basin b3a will have discharge to design point 3 at the Peekskill Hollow Brook.

4.2.4 post-development basin b4a

WQv = water quality volume (acre-feet)
P = 1.2
Rv* = 0.176 use 0.2 (I = 14%)
A = 8.60 acres

WQv = (1.2) (0.2) (8.60) / 12 = 0.172 acre-feet
WQv = 0.172 acre-feet or 7492 or **7,500** cubic feet

For post-development basin b4a, an infiltration basin is proposed to collect and treat the required stormwater quality volume. The following table shows the available storage at elevation for the infiltration basin, pond p4a. The required volume for this drainage basin is 0.172 acre-feet.

Pond p4a storage-elevation table

elevation (msl)	area (sq ft)	ave area (sq ft)	depth (ft)	volume (ft3)	cum volume (ft3)	cum vol (ac-ft)
352	3,000	0	0	0	0	0
353	3,800	3,400	1	3,400	3,400	0.078
354	4,600	4,200	1	4,200	7,600	0.174
355	5,500	5,050	1	5,050	12,650	0.290

Stormwater runoff from this drainage basin will be directed to the infiltration basin. Once the pond is filled to elevation 355, the "splitter" catch basin in Marsh Hill Road will allow the additional runoff to be conveyed down slope with eventual flow to the Peekskill Hollow Brook. The volume provided in the infiltration basin is greater than the water quality volume required.

Post development basin b4a will have discharge to design point 4 at the Peekskill Hollow Brook.

4.2.5 post-development basin b4b

WQv = water quality volume (acre-feet)
P = 1.2
Rv* = 0.2 (I = 17%)
A = 8.31 acres

WQv = (1.2) (0.2) (8.31) / 12 = 0.166 acre-feet
WQv = 0.166 acre-feet or 7230 or **7,300** cubic feet

For post-development basin b4b, a micro-pool extended detention basin is proposed to collect and treat the required stormwater quality volume as well as attenuate peak flow rates. The following table shows the available storage at elevation for the micro-pool extended detention basin, pond p4b. The required water quality volume for this drainage basin is 0.166 acre-feet.

Pond p4b storage-elevation table

elevation (msl)	area (sq ft)	ave area (sq ft)	depth (ft)	volume (ft3)	cum volume (ft3)	cum vol (ac-ft)
366	1,300	0	0	0	0	0
368	4,700	3,000	2	6,000	6,000	0.138
370	6,800	5,750	2	11,500	17,500	0.402
372	9,100	7,950	2	15,900	33,400	0.767
374	11,700	10,400	2	20,800	54,200	1.244
375	13,000	12,350	1	12,350	66,550	1.528

All stormwater runoff from this drainage basin will be directed through the micro-pool extended detention basin. This pond will provide for both water quality treatment and water quantity control. While quantity controls are not required for this drainage basin, the micro-pool extended detention basin is provided to add additional support for the stormwater management of the site and further protect the town regulated wetland.

Post development basin b4b will have discharge to design point 4 at the Peekskill Hollow Brook.

4.2.6 post-development basin b6a

WQv = water quality volume (acre-feet)
P = 1.2
Rv* = 0.32 (I = 30%)
A = 3.35 acres

WQv = (1.2) (0.32) (3.35) / 12 = 0.107 acre-feet
WQv = 0.107 acre-feet or 4,660 or **4,700** cubic feet

For post-development basin b6a, a micro-pool extended detention basin is proposed to collect and treat the required stormwater quality volume as well as provide the necessary peak flow attenuation for this drainage basin. The following table shows the available storage at elevation for the micro-pool extended detention basin, pond p6a. The required water quality volume for this drainage basin is 0.107 acre-feet.

Pond p6a storage-elevation table

elevation (msl)	area (sq ft)	ave area (sq ft)	depth (ft)	volume (ft3)	cum volume (ft3)	cum vol (ac-ft)
382	800	0	0	0	0	0
384	2,100	1,450	2	2,900	2,900	0.066
386	3,600	2,850	2	5,700	8,600	0.197
387	4,300	3,950	1	3,950	12,550	0.288
388	5,200	4,750	1	4,750	17,300	0.397

Post development basin b6a will have discharge to design point 6 to the wetland at the north property line.

4.2.7 water quality treatment locations

Lot 1 discharge in water quality area b4a to infiltration basin, pond p4a.
Lot 2 discharge in water quality area b4a to infiltration basin, pond p4a.
Lot 3 discharge in water quality area b4a to infiltration basin, pond p4a.

Lot 4	discharge in water quality area b4a to infiltration basin, pond p4a.
Lot 5	discharge in water quality area b4a to infiltration basin, pond p4a.
Lot 6	discharge in water quality area b4b to infiltration basin, pond p4b.
Lot 7	discharge in water quality area b4b to infiltration basin, pond p4b.
Lot 8	discharge in water quality area b4b to infiltration basin, pond p4b.
Lot 9	discharge in water quality area b6a to micro-pool extended detention basin, pond p6a.
Lot 10	discharge in water quality area b7, house/driveway drainage to dry swales.*
Lot 11	discharge in water quality area b5, house/driveway drainage to dry swales.*
Lot 12	discharge in water quality area b5, house/driveway drainage to dry swales.*
Lot 13	discharge in water quality area b5, house/driveway drainage to dry swales.*
Lot 14	discharge in water quality area b5, house/driveway drainage to dry swales.*
Lot 15	discharge in water quality area b5, house/driveway drainage to dry swales.*
Lot 16	discharge in water quality area b4c, house/driveway drainage to dry swales.*
Lot 17	discharge in water quality area b3a to infiltration basin, pond p3a.
Lot 18	discharge in water quality area b3a to infiltration basin, pond p3a.
Lot 19	discharge in water quality area b3a to infiltration basin, pond p3a.
Lot 20	discharge in water quality area b4c, house/driveway drainage to dry swales.*
Lot 21	discharge in water quality area b4c, house/driveway drainage to dry swales.*
Lot 22	discharge in water quality area b4c, house/driveway drainage to dry swales.*
Lot 23	discharge in water quality area b4c, house/driveway drainage to dry swales.*
Lot 24	discharge in water quality area b4b to infiltration basin, pond p4b.
Lot 25	discharge in water quality area b6a to micro-pool extended detention basin, pond p6a.

Road station 0+00 to 4+50	no water quality (see sections 3.5.3 and 4.2.2).
Road station 4+50 to 11+50	to infiltration basin, pond p2.
Road station 11+50 to 21+75	to infiltration basin, pond p3a.
Road station 21+75 to 29+25	to infiltration basin, pond p4a.
Road station 29+25 to 38+25	to micro-pool extended detention basin, pond p4b.
Road station 38+25 to 44+50	to micro-pool extended detention basin, pond p6a.
Road station 44+50 to 51+50	to micro-pool extended detention basin, pond p4b
Cul-de-sac road	to micro-pool extended detention basin, pond p6a.

* While dry swales are shown, there will be the option of using seepage pits or subsurface infiltration chambers (see section 4.4).

4.2.8 water quality basins

The water quality basins, both the infiltration basins and the micro-pool extended detention basins, are shown on the construction plan set and are reasonably detailed. Each type of basin has certain required elements such as forebays, micro-pools and access ways among other items pursuant to the NYSDEC Stormwater Management Design Manual.

The basins as designed will not require grading past what is shown on the plans. The required elements for each basin will be provided during final design and all elements will be located within the proposed drainage easements shown.

4.3 Individual Lot Water Quality Requirements

A representative parcel as shown on the subdivision plans would have a house with a roof area of approximately 2,500 square feet and a driveway of approximately 2,500 square feet for those lots not tributary to the water quality treatment facilities. Where stormwater collection is required for the driveways, curbing and/or driveway pitches to yard drains or other conveyances are proposed. This will prevent the escape of stormwater from the driveway surfaces and allow the full capture of the rainfall landing on them, therefore these calculations will be based on 100% impervious surfaces containing only the required areas for treatment.

Water quality volumes for individual houses are as follows:

WQv	=	water quality volume (acre-feet)
P	=	1.2
Rv*	=	0.95 (I = 100%)
A	=	0.057 acres (2,200 square feet of roof area)
WQv	=	(1.2) (0.95) (0.057) / 12 = 0.00541 acre-feet
WQv	=	0.00541 acre-feet = 235 cubic feet **>>>design for 250 cubic feet**

Water quality volumes for individual driveways are as follows:

WQv	=	water quality volume (acre-feet)
P	=	1.2
Rv*	=	0.95 (I = 100%)
A	=	0.057 acres (2,200 square feet of driveway area)
WQv	=	(1.2) (0.95) (0.057) / 12 = 0.00541 acre-feet
WQv	=	0.00541 acre-feet = 235 cubic feet **>>>design for 250 cubic feet**

The proposed method of water quality treatment is by providing dry swales, underground infiltration units or seepage pits. Seepage pits can only be used for treatment of roof drainage.

Individual parcels that require individual water quality treatment are shown on the Stormwater Pollution Prevention Plan, Sheets ER-6.2, ER-6.3 and ER-6.4 of the project plan set. Parcels that require curbing for driveways, roof leaders or yard drains from driveways connected either to the stormwater collection system or to individual drywells also have this information shown and noted on the Stormwater Pollution Prevention Plan of the project plan set.

4.4 Individual Lot Water Quality Sizing

The following are typical designs of the water quality practices for the individual parcels not tributary to the proposed stormwater collection system. Each of these parcels are to have dry swales as shown on the project plan set to provide for the necessary water quality volume and subsequently by default, will meet the water quality objectives of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, GP-02-01.

Dry Swale = 4' base x 10' top width x 18" deep = 10.5 cu. ft. / lineal foot
= 60' long dry swale = 630 cubic feet

Optional methods include seepage pits for roof drainage only and subsurface infiltrators for either the roof drainage or driveway drainage or both.

Seepage Pit = 8' diameter x 6' h = 50 sq. ft x 6' h = 300 cu. ft. / pit

Infiltrator chambers = 10.4 cu. ft. / lineal foot (as mfd. by Cultec, Recharger 330 or eq.)
the chambers are to be surrounded with a layer of crushed stone

Therefore, each lot that is not tributary to the water quality treatment facilities in the project will require to have a minimum 30 foot long dry swale for the roof drainage and a minimum 30 foot long dry swale for the driveway drainage. In total, a minimum of 60 feet of dry swale per lot will be required for the capture and water quality treatment of the driveway and roof drainage.

Similarly, each roof drainage system would require one seepage pit or 30 feet of infiltrator chambers or 60 feet of infiltrators to collect runoff from both the roof and driveway.

The individual lot requirements using dry swales are outlined below:

WQA-lot 10
roof and driveway area = 4,100 sq. ft (2,200 roof + 1,900 driveway)
WQv required = 390 cubic feet for roof & driveway drainage
Dry swale **60 feet** x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.6 times greater

WQA-lot 11
roof and driveway area = 3,950 sq. ft (2,200 roof + 1,750 driveway)
WQv required = 375 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.7 times greater

WQA-lot 12
roof and driveway area = 4,700 sq. ft (2,200 roof + 2,500 driveway)
WQv required = 446 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.4 times greater

WQA-lot 13
roof and driveway area = 4,100 sq. ft (2,200 roof + 1,900 driveway)
WQv required = 390 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.6 times greater

WQA-lot 14
roof and driveway area = 4,400 sq. ft (2,200 roof + 2,200 driveway)
WQv required = 418 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.5 times greater

WQA-lot 15
roof and driveway area = 4,250 sq. ft (2,200 roof + 2,050 driveway)
WQv required = 404 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.5 times greater

WQA-lot 16
roof and driveway area = 4,300 sq. ft (2,200 roof + 2,100 driveway)
WQv required = 408 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.5 times greater

WQA-lot 20
roof and driveway area = 4,050 sq. ft (2,200 roof + 1,850 driveway)
WQv required = 385 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.6 times greater

WQA-lot 21
roof and driveway area = 4,425 sq. ft (2,200 roof + 2,225 driveway)
WQv required = 411 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.5 times greater

WQA-lot 22
roof and driveway area = 4,300 sq. ft (2,200 roof + 2,100 driveway)
WQv required = 420 cubic feet for roof & driveway drainage
Dry swale **60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
Volume provided 1.5 times greater

WQA-lot 23	roof and driveway area	= 4,100 sq. ft (2,200 roof + 1,900 driveway)
	WQv required	= 390 cubic feet for roof & driveway drainage
	Dry swale	**60** feet x = 10.5 cu. ft./lf. = **630 cubic feet provided**
	Volume provided 1.6 times greater	

All of the above lots are required to have both the roof drainage and driveway drainage conveyed to the proposed dry swales. The dry swales may be substituted with subsurface infiltration units or seepage pits, however the seepage pits shall only be used for the roof drainage.

4.5 Additional Water Quality Features

While the above water quality practices meet or exceed the objectives of the stated water quality goals and NYSDEC requirements, the development of this site provides for additional permanent water quality features to further protect down stream areas. These are discussed as follows:

a) The project site is located in the Town of Putnam Valley Watershed Protection Overlay District and therefore pursuant to Town Code, the use of herbicides or pesticides is prohibited. This will minimize the potential pollutant loading of all receiving water bodies.
b) The proposed limits of disturbance are the least extensive, as is practicable. The limits of disturbance will be flagged prior to construction and said line shall be followed during the course of construction.
c) The pre-development design points dp1 and dp2 are eliminated in the post-development scenario. These design points currently are point discharges onto private properties located on the south side of Peekskill Hollow Road. The stormwater from Peekskill Hollow Road and most of the length of the existing Marsh Hill Road contribute to these discharges.
d) There will be several conservation easements on site totaling almost 20 acres of land that will forever remain undisturbed, ensuring water quality through these areas.
e) Providing water quality treatment for an existing paved town road that currently has none. Additionally, providing stormwater conveyance structures (catch basins and pipes) for an existing town road that currently has none.

5.0 EROSION AND SEDIMENT CONTROL PLAN

5.1 Introduction and Narrative

This erosion and sedimentation control plan has been prepared for the Emerald Ridge site, with mitigating measures specified for the construction of the infrastructure, lots, and related site work and other site improvements. This control plan includes a description of each erosion, sedimentation, and site control practice planned; a construction schedule identifying the sequence of site development activities; and a maintenance schedule stipulating the maintenance requirements of the mitigating measures during, immediately after, and beyond construction.

The control plan has been prepared in accordance with the latest editions of:

- "New York State Standards for Erosion and Sediment Control"
- "Westchester County Best Management Practices Manual for Erosion and Sediment Control"
- "NYSDEC Stormwater Management Design Manual"
- "NYSDEC Instruction Manual for the Stormwater Construction Permit

In general, prior to the commencement of clearing *for a particular phase of construction*, the developer will have the site clearly marked and staked by the surveyor, including the establishing of all necessary control and datum points. The owner/developer will identify all trees scheduled for protection, located within or adjacent to the construction area; install tree protection measures as necessary; erect construction fencing to control the site and to protect the boundaries of all conservation easements and no disturbance buffers; install silt fences and straw bale barriers; and will provide stabilized construction entrances and staging areas.

During the construction process, silt fences, straw bale barriers, temporary diversion dikes, temporary swales, rip rap and vegetative channels, and sediment traps and basins will be provided as required or as determined by the engineer, to prevent soil erosion and sedimentation of the surrounding areas. Temporary drop inlet protection measures will be implemented to protect catch basins, yard drains, or other inlet components of the storm drainage system. Mitigating measures will be inspected on a regular basis, including prior to and after every runoff-producing rainfall. Needed repairs will be made immediately to maintain measures as designed. Sediment will be removed from sediment traps, basins, or from behind all barriers when the storage capacity is approximately 50 percent filled. Gravel, filter fabric, silt fences and straw bales will be replaced as required.

Stormwater runoff will be managed both during the construction process and following completion of construction to prevent flooding, erosion, and sedimentation of existing watercourses, wetlands, or the storm drainage system. The erosion and sedimentation control measures will be implemented to reduce the velocity of stormwater runoff, increase infiltration, and direct stormwater runoff into permanent or temporary sediment basins, first flush basins, or other control devices. Direct discharge of runoff from disturbed site areas or lawn areas into wetlands, watercourses, or water bodies without water quality enhancement features adequate to prevent sedimentation, siltation, or pollution of downstream areas with fertilizers, herbicides, and pesticides will not be permitted.

Clearing or grubbing of the ground and forest cover within the proposed limits of disturbance will be done on a selective basis with great care. Ground cover will not be removed sooner than necessary to avoid exposing soils to erosion.

Clearing outside of the limits of disturbance, which is delineated on the subdivision plans and which will be flagged on the parcel by the surveyor, is generally prohibited except for special conditions subject to approval of the Town. Maintenance practices of areas within the limits of the proposed conservation easements, if any, will be limited to those permitted by the Town.

Because of the slope conditions on some portions of the site, grading and drainage measures will be critical to successful erosion control. In general, grading of slopes will not exceed 1:2 vertical to horizontal. Slopes with grades of 1:2 vertical to horizontal or greater will require special consideration and the implementation of specific site stabilizing measures as deemed necessary by the engineer. Topsoil will be stripped, stockpiled, and reused on-site. Areas disturbed by vehicular or equipment traffic will be stabilized temporarily with gravel. This gravel will be removed as required upon completion of the work and may be reused on-site as is practical. Site areas disturbed by grading or excavation will be re-vegetated as soon as practical. Until ground cover and plantings have become established, disturbed areas will be stabilized with straw, mulch, and soil fabric. Snow fences, netting, and silt fences will also be used to control air currents and airborne dust due to wind.

Temporary cuts may be sloped 1:1 maximum in silty sand soils and 1 vertical to 1.5 horizontal maximum in sandy gravelly soils. Excavations for the foundations and utilities may be cut at a steeper cut, provided that precautions are taken to prevent instability and unsafe working conditions and that all requirements of OSHA are maintained.

All stockpiles of topsoil or excavated materials, as well as materials delivered as fill to the site, will be scheduled to avoid excessive quantities stored on-site for an extended period of time.

Stockpiles will be located in dry and stable areas away from swales, drainage channels, watercourses, wetlands, or steep slopes. Stockpiles will be surrounded by silt fences and straw bale barriers, as required. Maximum slope of stockpiled loose material will be 1 vertical to 2 horizontal and will be keyed into a stable subbase to prevent slides. Stockpiled loose material will be mulched or covered to prevent erosion by wind or water.

Site areas disturbed by the construction process will be stabilized by replanting as soon as practical.

Construction sites will be replanted with material specifically selected to quickly establish soil stability and prevent erosion and sedimentation. Primary to this effort will be reestablishment of ground cover, including critical area seeding. Mulching and Geo-Mat netting fabric will be used in conjunction with critical area seeding and site planting to establish plant cover, conserve moisture, and reduce erosion and sedimentation.

5.2 Temporary Erosion, Sedimentation and Site Control Practices

Reference is made to the subdivision and site development plans for details and locations of the proposed temporary erosion and sediment control devices to be implemented prior to and during construction. This report is an integral part of the site development plans previously referenced.

All devices and structures shall be constructed and maintained in accordance with the design guidelines as set forth in the "New York Guidelines for Urban Erosion and Sediment Control". Additional measures may be required as deemed necessary by the design engineer and/or Town Environmental Inspector, if field conditions warrant.

5.2.1 Security Fencing:
Temporary chain link fences with lockable gates or other similar fencing will be installed at locations as is required or desired to control access to the site or other areas of the site and to restrict unauthorized personnel from entering the construction areas or the conservation areas.

5.2.2 Stabilized Construction Entrance:
A temporary gravel construction entrance will be installed at the proposed subdivision entrance to the site. During wet weather it may be necessary to wash vehicle tires at this location. The entrance will be graded so that runoff water will be directed to an inlet protection structure or erosion control barrier and not out into the streets or onto neighboring properties.

5.2.3 Traffic Control:
The on-site developer will provide necessary traffic control to maintain and promote the safe passage of vehicles and delivery trucks to and from the site as well as within the site. All work done in the Town of Putnam Valley right of way (Marsh Hill Road) shall be in accordance with the approved plans. All work done in the Putnam County right of way (Peekskill Hollow Road) shall be performed in accordance with the highway work permit from the County.

5.2.4 Silt Fence - Protection of Off-Site and Conservation Areas:
Temporary silt fences will be constructed as shown on the plans, generally along the down hill slope edge of all construction and up slope of each side of the drainage course at the subdivision entrance.

5.2.5 Silt Fence - Construction:
Temporary silt fences will be constructed around material stockpiles, around the base of large fill areas, and along channel berms adjacent to deep cut areas as necessary to prevent sediment from entering channels. Prior to construction commencing on individual building lots, temporary silt fences will be placed down slope of all construction.

5.2.6 Straw Bale Sediment Barrier:
Temporary straw bale dike barriers will be installed to intercept sediment laden runoff from small drainage areas of disturbed soil and to prevent erosion from sheet stormwater flow as depicted on the plans and as deemed necessary by the site engineer.

5.2.7 Temporary Diversion:
Temporary diversion dikes will be constructed as is required or deemed necessary by the engineer above cut slopes and near the middle of long re-graded sloped areas to prevent surface runoff from eroding these banks. Temporary diversion dikes will be constructed along the top edge of cut or fill slopes at the end of each day during filling operations to protect the fill slope. Temporary diversions will outlet to temporary inlet protection devices or to swales channeling runoff towards sediment traps.

5.2.8 Temporary Swale:
Temporary swales will be created along the uphill edge within areas of cut or fill operations and at the perimeter of construction areas to prevent runoff from entering disturbed areas by intercepting and diverting it to stabilized outlets, dissipation pads or other sediment barriers. Temporary swales will be created along the downhill edge of construction areas to direct sediment laden water to sediment trapping devices or provided and located as deemed necessary by the site engineer.

5.2.9 Temporary Drop Inlet Protection:
Temporary drop inlet protection measures will be installed at the catch basins using straw bale details to prevent sediment laden runoff from silting pipes and to reduce the burden on the sediment traps.

5.2.10 Sediment Trap:
Sediment traps will be used in conjunction with temporary diversion methods and swales to intercept and control sediment laden runoff as required to prevent siltation of watercourses, wetland areas and off-site areas.

5.2.11 Soil Stockpiling:
Topsoil will be stripped from areas scheduled for construction and stockpiled for reuse on site. Stockpiles will be located in dry and stable areas away from swales and drainage channels and will be surrounded with silt fences and with straw bales as required. Maximum slope of stockpiled material is 1 vertical to 2 horizontal. Stockpiles will be mulched or covered to prevent erosion by wind or water. Stockpiles will be keyed into a stable subbase to prevent slides.

5.2.12 Dust Control:
Construction work will be scheduled to avoid premature or unnecessary disturbance of site areas. Mulch or gravel will be placed on disturbed areas as required to reduce dust levels. Water sprinkling will be used as is necessary during the placement of fill material to reduce dust levels. Snow fences, netting, and silt fences will be used as necessary to control air currents and airborne dust due to wind when and where it is deemed necessary.

5.2.13 Limits of Disturbance:
The site development plan and erosion and sediment control plan includes a Limit of Disturbance clearly defined. These Limits of Disturbance define those areas on the site which may be disturbed during construction. The boundaries of the Limits of Disturbance will be staked on the parcel and shall not be extended without the prior approval of the Town.

5.2.14 Property Line Protection:
Property boundaries will be surveyed and staked prior to any site disturbance and erosion and sediment control measures will be implemented prior to the initiation of construction. Due to the permissible areas of disturbance on the lot being restricted by the limits of disturbance, there will be a natural buffer between construction areas and neighboring properties to obviate concerns with disturbance to trees and other vegetation on the neighboring properties. These buffers, as well as the other mitigating measures described above, will prevent disturbance to or adverse impacts on neighboring properties. If in the event damage is caused to a neighboring property, the damages shall be replaced in kind at the expense of the owner/developer.

5.2.15 Vegetation Preservation and Protection:
Trees to be protected shall be identified, clearly marked and protected as detailed on the site plan. Snow fencing will be installed at the canopy drip line prior to initiating clearing or grubbing of the site and this fencing will be maintained until all heavy equipment work has been completed. The fencing is intended to prevent stockpiled fill material or building materials from being placed within the canopy drip line of the protected trees as well as prohibit heavy equipment from compacting the soil and damaging the root system. Where construction is required within the canopy drip line or where drip line protection measures will block access or significantly impede construction activities, the fencing will be placed so as to restrict unnecessary disturbance to the tree. In cases where the fencing is

placed closer than 5 feet to the tree trunk, trunk armoring will be used to protect the tree from damage to the bark. Snow fences will also be used to restrict access to site areas which are not scheduled for construction activity and to prevent the unnecessary removal of existing vegetation.

5.2.16 Temporary Check Dams:

Stone check dams will be constructed as required during construction to reduce erosion and degradation of the channels prior to stabilization.

5.3 Permanent Erosion, Sedimentation and Site Control Practices

Reference is made to the site development plan for details and locations of the proposed permanent erosion and sediment control devices to be implemented prior to and during construction. This report is an integral part of the site development plans previously referenced.

All devices and structures shall be constructed and maintained in accordance with the design guidelines as set forth in the "New York Guidelines for Urban Erosion and Sediment Control". Additional measures may be required as deemed necessary by the design engineer and/or Town Engineer, if field conditions warrant.

5.3.1 Vegetated Channels:

Vegetated drainage channels will be provided to control the surface flow of drainage from disturbed areas down-slope of the construction areas and divert the stormwater to the stormwater quality basin. The channels will be planted with suitable material to provide for the safe disposal of the surface water without damage from erosion.

5.3.2 Rip Rap Lined Channel:

Rip rap lined channels will be installed as directed by the site engineer in drainage ways and rip rap sediment traps will be installed at the primary points of discharge from major disturbed areas to dissipate the velocity of runoff preventing scour and to intercept sediment laden runoff from areas disturbed by construction.

5.3.3 Surface Stabilization:

Since areas of existing vegetation will be removed or disturbed on the property by the proposed construction, a substantial replanting of all disturbed areas is required. The site will be replanted with material specifically selected to quickly establish soil stability and prevent erosion and sedimentation. Primary to this effort is reestablishment of groundcover, including critical area seeding, since this is the most effective method to reduce sources of siltation and dust. Mulching and Geo-Mat netting fabric will be used, as required, in conjunction with critical area seeding and with site planting to help establish plant cover, conserve moisture, and reduce erosion and sedimentation.

5.3.4 Level Spreader:

Level spreaders will be provided to create a non-erosive outlet for concentrated runoff and disperse flows uniformly over the slope as sheet flow. The level spreaders will be provided to capture runoff that is diverted away from the proposed development areas via vegetated swales.

The vegetated swales will convey runoff from undisturbed portions of the site to a level spreader and convert the concentrated flow into sheet flow for dispersal into the wooded areas.

5.3.5 Rock Outlet Protection:

Rock outlet protection will be placed at all point discharge locations to reduce the velocity and energy of the discharge flow to minimize erosion. The rock outlets will be sized in accordance with the New York Guidelines for Urban Erosion and Sediment Control.

5.3.6 Erosion Control Matting:

Erosion control matting will be placed on steep slopes as deemed necessary by the site engineer or Town Environmental Inspector. The matting will stabilize the slopes and protect them from erosion and subsequently causing sedimentation down slope.

5.4 Pre-Construction Schedule

1. Satisfy all applicable conditions of Subdivision Plat Approval by the Planning Board and identify what other applicable permits for site development are required.
2. File pertinent documents with the Putnam County Department of Health, Con Edison, the Town of Putnam Valley, and any other involved agency, for necessary reviews and approvals.
3. Obtain the services of a Site Engineer, licensed in the State of New York and as approved by the Town of Putnam Valley.
4. Post all necessary Performance Bonds for the proposed site work.
5. Submit all required insurance riders to the appropriate authorities.
6. Stake the property lines, flag the work limits, identify trees to be protected, if any, and establish elevation reference points (bench marks) on site.
7. Meet with representatives from the appropriate Town Departments to establish acceptable time restrictions for the scheduled delivery of materials and equipment to the site. This is intended to mitigate unnecessary conflicts between construction related traffic and rush hour related traffic.
8. Obtain any required Excavation Permits, Blasting Permits and Street Opening Permits, etc. from the Town of Putnam Valley.
9. Confirm that all required fees to the Town of Putnam Valley and any other involved agency have been paid, that all outstanding fees for the Town's consultants have been paid in full.
10. Contact the Underground Line Location Service (Code 53) at 800-962-7962.
11. Secure the site with required fencing and gates, as necessary.
12. Confirm utility mark out with the Site Engineer and Contractor.

With the completion of the Pre-Construction Schedule, the construction can commence as follows:

5.5 Construction Schedule

The construction schedule is presented on the project plan sheet entitled "Construction Sequence, Subdivision and Site Development Plan for Emerald Ridge", sheet ER-6.7, dated December 9, 2005. The schedule includes a construction sequence in accordance with the requirements of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, GP-02-01, which will ensure that there will be no more than five acres of disturbed soil at any one time.

Generally the construction of the Emerald Ridge subdivision will occur over six phases of construction. All phases are described on the above referenced plan, including acres of disturbance, cut and fill volumes and a description. The phases are generally as follows:

Phase 1 *Marsh Hill Road construction / reconstruction to station 29+25 with all associated water quality basins.*

Phase 2 *Marsh Hill Road construction from station 29+25 to end of loop with remainder of site water quality basins and model homes on lots 17 and 19.*

Phase 3 *House construction on lots 1, 2, 3, 4 and 20.*

Phase 4 *House construction on lots 5, 6, 16, 21, 22 and 23.*

Phase 5 *House construction on lots 7, 13, 14, 15, 24 and 25*

Phase 6 *Cul-de-sac construction and house construction on lots 8, 9, 10, 11 and 12.*

5.6 Construction Operation and Maintenance

It is important during *all phases of* construction that all the erosion and sediment control devices remain stable and effective to protect down slope areas and off site areas from sedimentation and erosion. Therefore, all erosion control measures shall be inspected on a regular basis. During construction, the owner/developer will inspect and maintain the erosion control devices in accordance with the construction schedule and the following:

1. All erosion, sediment, and site stability control measures will be checked for protection, stability, and operation prior to and following every runoff-producing rainfall but in no case less than once every week. Any needed repairs will be made immediately to maintain practices as designed. The Site Engineer will also make inspections of protection measures and all corrective measures will be implemented without delay.
2. The street areas adjacent to the site entrances will be broom swept and washed down at the end of each day on which fill material has been delivered to the site and at other times as is necessary or directed by the Site Engineer. During wet weather, vehicle tires will be checked and washed down, if necessary, at the construction entrance before the trucks leave the site to prevent mud and dirt from being tracked onto the streets.
3. Sediment basins will be checked for protection, stability, and operation following every runoff-producing rainfall but in no case less than once every week and will be cleaned out when the level of sediment reaches 50% capacity of the basin. Gravel will be cleaned or replaced when the sediment pool no longer drains properly.
4. Sediment traps, catch basins and drop inlet protection devices will be checked for protection, stability, and operation prior to and following every runoff-producing rainfall but in no case less than once every week and sediment will be removed when storage capacity has been approximately 50% filled. Gravel will be cleaned or replaced when the sediment pool no longer drains properly. Filter fabric will be replaced as necessary.
5. Silt fences and straw bale barriers will be checked for stability and operation following every runoff-producing rainfall but in no case less than once every week and sediment will be removed from behind devices when it becomes about three inches deep. Silt fence will be repaired and straw bales will be replaced as necessary and as directed by the Site Engineer to maintain a barrier.
6. Drainage channels will be inspected following every runoff producing rainfall but in no case less than once every month to insure that the side slopes remain stable and to check for points of scour and breaches. Channels will be repaired and lined with riprap as necessary.
7. A minimum of 50 additional straw bales will be stored at the site from prior to initiating any cut or fill operation until final site stabilization has been completed. Stacked straw bales will be protected with a tarp cover. These straw bales are available for use as temporary measures to reduce stormwater runoff velocities and, in emergency situations, to prevent failures in the operation of drainage channels, temporary diversions, and silt fences. The stockpile of straw bales will be replenished following each event.
8. Markers and fencing utilized for traffic control, if any, will be inspected periodically to insure they are placed and functioning properly. All efforts will be taken to keep traffic off of all structural erosion control measures at all times. Where traffic must cross a structural measure, a suitable crossing will be constructed in accordance with the instructions and specifications of the Site Engineer.
9. Any tree protection fences and silt fences defining construction boundaries will be inspected weekly to insure that they are properly placed and will be repaired as necessary.
10. Mulch and gravel used to reduce dust in disturbed areas and parking areas will be inspected weekly and will be cleaned off with water, replenished or replaced as necessary.
11. Construction debris will be stored in designated refuse areas either in fenced enclosures or in dumpsters and will be removed from the site to a proper facility on a regular schedule. Full dumpsters will be removed from the site within 3 days. The site will be policed weekly and more often, if necessary, to collect debris which has not been properly placed in a designated refuse area. Food garbage will not be mixed with construction debris and will be removed from the site daily. Recycling containers will be provided in a designated area for recyclable cans and bottles.
12. All maintenance work on construction equipment will be done in a safe area away from drainage and drainage control structures. Maintenance items such as cans, boxes, and cartridges will be stored in a suitable temporary structure. Following use, all such items will be disposed of in a safe and proper manner and at a suitable facility.
13. All seeded areas will be fertilized, re-seeded as necessary, and mulched to maintain a vigorous, dense vegetative cover. Temporary seeding will be inspected every 30 days and damaged areas will be re-seeded and re-mulched as necessary.

14. The developer and/or owner of the project will have the site inspected each spring and each fall for three years following final stabilization. Plant material will be replaced as required and deficiencies in site stability corrected immediately.
15. A maintenance schedule for the proper watering, fertilizing, pruning, mowing, and weeding of planted materials as well as the use of herbicides and pesticides will be implemented and the ongoing responsibility for this maintenance schedule will be the developer and/or owner.
16. The sump sediment trap in each catch basin will be inspected following every runoff-producing rainfall but in no case less than once every week during the construction process. Following the completion of construction, catch basins shall be inspected and cleaned semi-annually.
17. Ongoing site maintenance requirements of the completed project will be identified and the responsible parties so advised.

5.7 Critical Area Seeding

Once the roadway is complete *for a given phase*, all disturbed areas (shoulders, staging areas, and miscellaneous disturbed areas) will require critical seeding to re-establish a vegetative cover. This will consist of the removal of debris, the final grading of these areas, seeding and mulching. This final grade will be left at the prescribed grades in an even and properly compacted condition so as to prevent the formation of depressions where water will stand.

During this entire process, the perimeter erosion control barrier shall be maintained in good working order and checked daily for breach or failure, and repaired or replaced as necessary. This perimeter barrier will prevent any sediment from leaving the site proper and onto the perimeter road or off site areas or entering the wetland system.

After final grading of the site has been brought to the proper grade, and immediately prior to the placement of top soil, this sub-grade shall be loosened by scarifying to a depth of at least 2" to permit bonding of the topsoil to the sub-grade.

Within 30 days of the completion of the final grading, topsoil shall be placed over the area. The topsoil used shall be free of stones >2", trash, debris, and have less than 10% gravel by volume. The soil shall have > 6% by weight fine textured stable organic material, muck soil will not be considered topsoil.

The topsoil shall not be placed in a frozen or muddy condition. Topsoil shall be uniformly distributed over the target areas and evenly spread to a depth of 4". After the topsoil installation is complete, ground limestone (calcium carbonate) shall be spread uniformly and thoroughly over the topsoil at a rate of approximately 100 lbs. per 1000 square feet or to achieve a soil pH of 6.0. Upon completion of the lime, the site soil shall be fertilized with 600 lbs. of 5-10-10 or equivalent per acre.

Immediately after the soil has been prepared, permanent seeding shall be applied. The seed mix shall contain the following ratios:

Kentucky Blue Grass	65%
Perennial Rye Grass	20%
Fine Fescue	15%

This seed mixture shall be applied at a rate of 175-200 lbs. per acre within a day of the completion of the soil placement. Upon placement of the seed mixtures, the entire seeded area shall be mulched. The mulch shall consist of Hay or Straw and shall be applied at a rate of 2 tons per acre or 100-200 bales per acre.

The erosion controls in place for these operations shall remain until a stable vegetative (grass) cover is established. The removal of the erosion control barriers shall be at the direction of the Site Engineer only. The above described critical area seeding as well as the establishment of any trees and shrubs shall be in conformance with the standards presented in "New York Guidelines for Urban Erosion and Sediment Control", 1997 or current and the Westchester County Best Management Practices Manual on Erosion and Sediment Control, 1991 or current.

This stormwater pollution prevention plan is for the proposed improvements as shown of the site plan only. Additional site work outside of the scope of this document is not necessarily protected by the proposed erosion and sediment control devices shown herein.

6.0 SUPPORT DATA

6.1 Support Data

The following items were used as support data for the preparation of this analysis:

Survey and topographic information shown on the plans is based on a map prepared by Donnelly Land Surveying, P.C.

Soils information is based on the soil survey of Putnam and Westchester Counties, NY prepared by the USDA and SCS, dated September 1994.

Mohegan Lake USGS quadrangle, dated as revised 1981.

NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, GP-02-01.

NYSDEC Stormwater Management Design Manual, August 2003.

NYSDEC Instruction Manual for the Stormwater Construction Permit, February 2003.

NYSDEC Reducing the Impacts of Stormwater Runoff from New Development, April 1993.

New York Guidelines for Urban Erosion and Sediment Control, April 1997.

Westchester County Best Management Practices Manual on Stormwater Management, prepared by the Westchester County Department of Planning dated Spring 1984.

Hydrocad Stormwater Modeling System computer program, version 7.0, was used to manage raw data, design structures and calculate all necessary stormwater flows and routing. Hydrocad is based on the SCS TR-20 method of computing stormwater runoff.

Numerous site inspections made by this office to the site proper and areas to which the site is tributary.

7.0 SWPPP Conditions

It is the responsibility of the Owner/Operator to be familiar with this report and the herein referenced Stormwater Pollution Prevention Plan and Subdivision Construction Plans. All conditions of the Stormwater General Permit, GP-02-01 shall be complied with prior to and during construction and until all disturbed areas are stabilized.

Cronin Engineering, P.E., P.C.

Keith Staudohar, CPESC

Timothy L. Cronin III, Professional Engineer

APPENDIX A

Emerald Ridge

Owner/Operator and Contractor Certifications

Emerald Ridge Subdivision SWPPP

Owner / Operator Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those directly responsible for gathering the information. The information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the penal Law.

______________________ signature	______________________ company
______________________ name	______________________ address
______________________ title	______________________ contact number
______________________ date	

Emerald Ridge Subdivision SWPPP

Contractor Certification

The SWPPP must clearly identify for each measure specified in the SWPPP, the contractor(s) and subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the SWPPP must sign a copy of this certification statement. All certifications must be included in this SWPPP. Additionally, new contractors and subcontractors need to similarly certify.

All contractors and subcontractors identified in the SWPPP shall sign a copy of the following certification statement before undertaking any construction activity at the site identified in the SWPPP.

The certification must include the name and title of the person providing the signature. The name, address and telephone numbers of the contracting firm, the address (or other identifying description) of the site and the date the certification is made.

I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge stormwater. I also understand that the owner/operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards.

General Contractor

______________________ signature	______________________ company
______________________ name	______________________ address
______________________ title	______________________ contact number
______________________ date	

Subcontractor

______________________ signature	______________________ company
______________________ name	______________________ address
______________________ title	______________________ contact number
______________________ date	

Emerald Ridge Subdivision SWPPP

Contractor Certification

Subcontractor

signature	company
name	address
title	contact number
date	

Subcontractor

signature	company
name	address
title	contact number
date	

Subcontractor

signature	company
name	address
title	contact number
date	

APPENDIX B

Notice of Intent

The notice of intent will be submitted to the NYSDEC a minimum of five days prior to the start of construction

8717

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-02-01

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.
To properly complete this form, please refer to the Instruction Manual which can be accessed at www.dec.state.ny.us/website/dow/toolbox/instr_man.pdf

-IMPORTANT-

THIS FORM FOR MACHINE PRINT ONLY/USE OTHER FORM FOR HANDPRINT
DO NOT USE HANDWRITING ON THIS FORM

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

VS Construction Corporation

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Santucci

Owner/Operator Contact Person First Name

Val

Owner/Operator Mailing Address

37 CROTON DAM ROAD

City

Ossining

State Zip

NY 1 0 5 6 2 -

Phone (Owner/Operator) Fax (Owner/Operator)

9 1 4 - 7 3 9 - 7 3 6 2   9 1 4 - 7 3 9 - 7 1 5 6

Email (Owner/Operator)

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Location Information

Project Site Information

Project/Site Name

Emerald Ridge Subdivision

Street Address (NOT P.O. BOX)

MARSH HILL ROAD AND PEEKSKILL HOLLOW ROAD

City/Town/Village (THAT ISSUES BUILDING PERMIT)

Town of Putnam Valley

State: **N Y**

Zip: 1 0 5 7 9 -

County

Putnam

DEC Region (if known)

3

Name of Nearest Cross Street

Peekskill Hollow Road

Distance to Nearest Cross Street (Feet)

0

Direction to Nearest Cross Street

○ **North** ● **South** ○ **East** ○ **West**

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.state.ny.us/website/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site go to the dropdown menu on the left and choose "Get Coordinates". Click on the center of your site and a small window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)	Y Coordinates (Northing)
594919	4 4577372

2. What is the nature of this construction project?

● **New Construction**

○ **Redevelopment with increase in imperviousness**

○ **Redevelopment with no increase in imperviousness**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use	**Post-Development Future Land Use**
○ FOREST	○ SINGLE FAMILY HOME
○ PASTURE/OPEN LAND	● SINGLE FAMILY SUBDIVISION
○ CULTIVATED LAND	○ TOWN HOME RESIDENTIAL
● SINGLE FAMILY HOME	○ MULTIFAMILY RESIDENTIAL
○ SINGLE FAMILY SUBDIVISION	○ INSTITUTIONAL\SCHOOL
○ TOWN HOME RESIDENTIAL	○ INDUSTRIAL
○ MULTIFAMILY RESIDENTIAL	○ COMMERCIAL
○ INSTITUTIONAL\SCHOOL	○ ROAD\HIGHWAY
○ INDUSTRIAL	○ RECREATIONAL\SPORTS FIELD
○ COMMERCIAL	○ BIKE PATH\TRAIL
○ ROAD\HIGHWAY	○ SUBSURFACE UTILITY
○ RECREATIONAL\SPORTS FIELD	○ PARKING LOT
○ BIKE PATH\TRAIL	
○ SUBSURFACE UTILITY	
○ PARKING LOT	
OTHER	OTHER
mostly forested	

4. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law ? ○ Yes ● No

5. Is this a remediation project conducted in accordance with a NYSDEC approved work plan? ○ Yes ● No

6. Is this property owned by a state authority, state agency or local government? ○ Yes ● No

7. In accordance with the larger common plan of development or sale; enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area. Round to the nearest tenth of an acre.

Total Project Site Acreage	Acreage to be Disturbed	Impervious Area within Disturbed
85.	27.	5.1

8. Will there be more than 5 acres disturbed at any given time? ○ Yes ● No

9. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
0 %	89 %	10 %	1 %

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10. Is this a phased project? **(if yes, The SWPPP must address all planned phases)**

○ **Yes*** ● **No**

11. Enter the planned start and end dates of the disturbance activities

Start Date		**End Date**
07 / 01 / 06	-	07 / 01 / 08

Receiving System(s)

12. Provide the name of the surface waterbody(ies) into which construction site runoff will discharge.

the Peekskill Hollow Brook

For Questions 13 and 14 refer to the Instruction Manual for a subset of 303(d) segments and TMDL watersheds subject to Condition A of the permit. These waterbodies and watersheds have been identified for regulation within the stormwater program due to a pollutant of concern. The Instruction Manual can be accessed at www.dec.state.ny.us/website/dow/toolbox/instr man.pdf

13. Has the surface waterbody(ies) in question 12 been identified as a 303(d) segment?

○ **Yes*** ● **No**

14. Is this project located in a TMDL Watershed?

○ **Yes*** ● **No**

***NOTE: If you answered Yes to either question 13 or 14, Pursuant to Part I.D.3.(b) of the permit, you must have your SWPPP prepared and certified by a licensed/certified professional and the SWPPP is subject to a 60-business day review.**

15. Does the site runoff enter a separate storm sewer system- including roadside drains, swales, ditches, culverts, etc? **(if no, skip question 16)**

● **Yes** ○ **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

Town of Putnam Valley

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?

○ **Yes** ● **No** ○ **Unknown**

18. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book) ?

● **Yes** ○ **No***

19. Does this construction activity require the development of a SWPPP that includes Water Quality and Quantity Control components (Post-Construction Stormwater Management Practices) **If no, Skip question 20**

● **Yes** ○ **No**

20. Have the Water Quality and Quantity Control components of the SWPPP been developed in comformance with the current NYS Stormwater Management Design Manual ?

● **Yes** ○ **No***

NOTE: If you answered no to question 18 or 20, Pursuant to Part I.D.3.(b) of the permit, you must have your SWPPP prepared and certified by a licensed/certified professional and the SWPPP is subject to a 60-business day review. Please provide further details in the details/comment section on the last page of this form.

21. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

● **Professional Engineer (P.E.)**

○ **Soil and Water Conservation District (SWCD)**

○ **Registered Landscape Architect (R.L.A)**

○ **Certified Professional in Erosion and Sediment Control (CPESC)**

○ **Owner/Operator**

Other

SWPPP Preparer Information
(if different from Owner/Operator info)

SWPPP Preparer

Cronin Engineering PE PC

Contact Name (Last, Space, First)

Staudohar Keith

Mailing Address

2 JOHN WALSH BLVD

City

Peekskill

State

NY

Zip

1 0 5 6 6 -

Phone

9 1 4 - 7 3 6 - 3 6 6 4

Fax

9 1 4 - 7 3 6 - 3 6 9 3

Email

cepepc@advinc.com

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Erosion and Sediment Control Practices

22. Has a construction sequence schedule for the planned management practices been prepared?

● Yes ○ No

23. Select **all** of the erosion and sediment control practices that will be employed on the project site.

Temporary Structural

- ○ Check Dams
- ● Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ● Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ● Sediment Basin
- ● Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ● Storm Drain Inlet Protection
- ● Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ● Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Other

controlled limit of disturbance

conservation easements

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ● Mulching
- ● Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ● Straw/Hay Bale Dike
- ○ Streambank Protection
- ● Temporary Swale
- ● Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ● Diversion
- ○ Grade Stabilization Structure
- ● Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ● Rock Outlet Protection
- ○ Streambank Protection

Important: Completion of Questions 24-30 is not required if the project:

Disturbs less than 5 acres and is planned for single-family residential homes (including subdivisions) or construction on agricultural property and does not have a discharge to a 303(d) water or is not located within a TMDL watershed.

Additionally, sites where there will be no future impervious area within the disturbed area and that do not have a change (pre to post development) in hydrology do not need to complete questions 24-30.

24. Indicate **all** the permanent Stormwater Management Practice(s) that will be installed on this site

Post Construction Stormwater Management Practices

Ponds

- ● Micropool Extended Detention (P-1)
- ○ Wet Pond (P-2)
- ○ Wet Extended Detention (P-3)
- ○ Multiple Pond System (P-4)
- ○ Pocket Pond (P-5)

Filtering

- ○ Surface Sand Filter (F-1)
- ○ Underground Sand Filter (F-2)
- ○ Perimeter Sand Filter (F-3)
- ○ Organic Filter (F-4)
- ○ Bioretention (F-5)

Wetlands

- ○ Shallow Wetland (W-1)
- ○ Extended Detention Wetland (W-2)
- ○ Pond/Wetland System (W-3)
- ○ Pocket Wetland (W-4)

Infiltration

- ○ Infiltration Trench (I-1)
- ● Infiltration Basin (I-2)
- ● Dry Well (I-3)

Open Channels

- ● Dry Swale (O-1)
- ○ Wet Swale (O-2)

○ Other

Describe other stormwater management practices not listed above or explain any deviations from the technicial standards. If the SWPPP does not conform to the technicial standards, the SWPPP must be prepared and certified by a licensed/certified professional and is subject to a 60-business day review.

Has a long term Operation and Maintenance plan for the post construction management practices been developed? ● Yes ○ No

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Town of Putnam Valley

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25. Provide the total water quality volume required and the total provided for the site.

Total Water Quality Volume (WQv)

WQv Required		WQv Provided	
0 . 8 7 4	**acre-feet**	1 . 8 4	**acre-feet**

26. Provide the following Unified Stormwater Sizing Criteria for the site.

Total Channel Protection Storage Volume (CPv) - Extended detention of post-developed 1 year, 24 hour storm event

CPv Required		CPv Provided	
.	**acre-feet**	.	**acre-feet**

The need to provide for channel protection has been waived because
● **Site discharges directly to fourth order stream or larger**

Total Overbank Flood Control Criteria (Qp) - Peak discharge rate for the 10 year storm

Pre-Development		Post-development	
.	**CFS**	.	**CFS**

Total Extreme Flood Control Criteria (Qf) - Peak discharge rate for the 100 year storm

Pre-Development		Post-development	
.	**CFS**	.	**CFS**

The need to provide for flood control has been waived because
● **Site discharges directly to fourth order stream or larger**
○ **Downstream analysis reveals that flood control is not required**

IMPORTANT: For questions 27 and 28 impervious area should be calculated considering the project site and all offsite areas that drain to the post-construction stormwater management practice(s) (Total Drainage Area = Project Site + Offsite areas)

27. Pre-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the existing impervious areas before construction begins. **2 2 %**

28. Post-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the future impervious areas that will be created/remain on the site after completion of construction. **6 6 %**

29. Indicate the total number of permanent stormwater management practices to be installed **16**

30. Provide the total number of stormwater discharge points from the site (include discharges to either surface waters or to seperate storm sewer systems) **5**

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Other Permits

31. Select any other DEC permits that are required for this project or ● **None**

DEC Permits

○ **Air Pollution Control**	○ **Stream Protection/Article 15**
○ **Coastal Erosion**	○ **Water Quality Certificate**
○ **Hazardous Waste**	○ **Dam Safety**
○ **Long Island Wells**	○ **Water Supply**
○ **Mined Land Reclamation**	○ **Freshwater Wetlands**
○ **Other SPDES**	○ **Tidal Wetlands**
○ **Solid Waste**	○ **Wild, Scenic and Recreational Rivers**

Other

If this NOI is being submitted for the purpose of continuing coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.

N Y R

Details/Comments

A SUB DRAINAGE BASIN DISCHARGES TO THE NORTH AND REQUIRES PEAK FLOW ATTENUATION. A MICRO-POOL EXTENDED DETENTION BASIN IS PROVIDED TO MEET THE CPV, QP AND QF REQUIREMENTS.

Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I also certify under penalty of law that this document and the corresponding documents were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction. and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

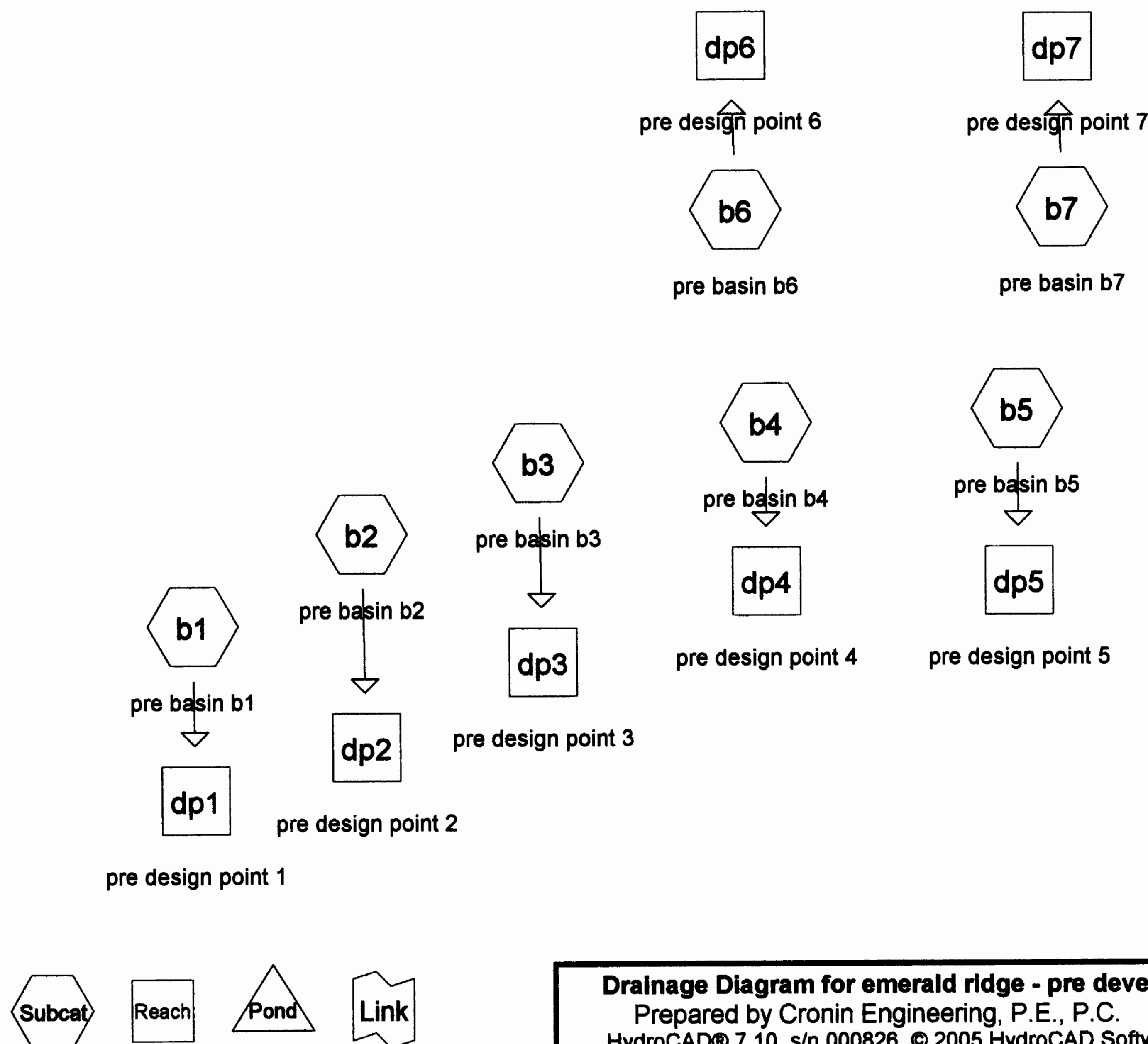
Owner/Operator Signature

Date

12/09/05

APPENDIX C

Pre Development Stormwater Quantity Calculations



Drainage Diagram for emerald ridge - pre development 112205
Prepared by Cronin Engineering, P.E., P.C. 11/22/2005
HydroCAD® 7.10 s/n 000826 © 2005 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment b1: pre basin b1 Runoff Area=8.200 ac Runoff Depth>0.13"
Flow Length=840' Tc=20.0 min CN=56 Runoff=0.36 cfs 0.092 af

Subcatchment b2: pre basin b2 Runoff Area=10.500 ac Runoff Depth>0.17"
Flow Length=1,600' Tc=42.3 min CN=58 Runoff=0.56 cfs 0.151 af

Subcatchment b3: pre basin b3 Runoff Area=19.700 ac Runoff Depth>0.17"
Flow Length=1,960' Tc=27.2 min CN=58 Runoff=1.27 cfs 0.287 af

Subcatchment b4: pre basin b4 Runoff Area=44.900 ac Runoff Depth>0.13"
Flow Length=2,265' Tc=68.3 min CN=56 Runoff=1.26 cfs 0.478 af

Subcatchment b5: pre basin b5 Runoff Area=41.940 ac Runoff Depth>0.15"
Flow Length=2,210' Tc=49.5 min CN=57 Runoff=1.67 cfs 0.525 af

Subcatchment b6: pre basin b6 Runoff Area=9.420 ac Runoff Depth>0.13"
Flow Length=1,350' Tc=51.8 min CN=56 Runoff=0.29 cfs 0.102 af

Subcatchment b7: pre basin b7 Runoff Area=11.110 ac Runoff Depth>0.15"
Flow Length=1,390' Tc=43.5 min CN=57 Runoff=0.47 cfs 0.140 af

Reach dp1: pre design point 1 Inflow=0.36 cfs 0.092 af
Outflow=0.36 cfs 0.092 af

Reach dp2: pre design point 2 Inflow=0.56 cfs 0.151 af
Outflow=0.56 cfs 0.151 af

Reach dp3: pre design point 3 Inflow=1.27 cfs 0.287 af
Outflow=1.27 cfs 0.287 af

Reach dp4: pre design point 4 Inflow=1.26 cfs 0.478 af
Outflow=1.26 cfs 0.478 af

Reach dp5: pre design point 5 Inflow=1.67 cfs 0.525 af
Outflow=1.67 cfs 0.525 af

Reach dp6: pre design point 6 Inflow=0.29 cfs 0.102 af
Outflow=0.29 cfs 0.102 af

Reach dp7: pre design point 7 Inflow=0.47 cfs 0.140 af
Outflow=0.47 cfs 0.140 af

Total Runoff Area = 145.770 ac Runoff Volume = 1.776 af Average Runoff Depth = 0.15"

Subcatchment b1: pre basin b1

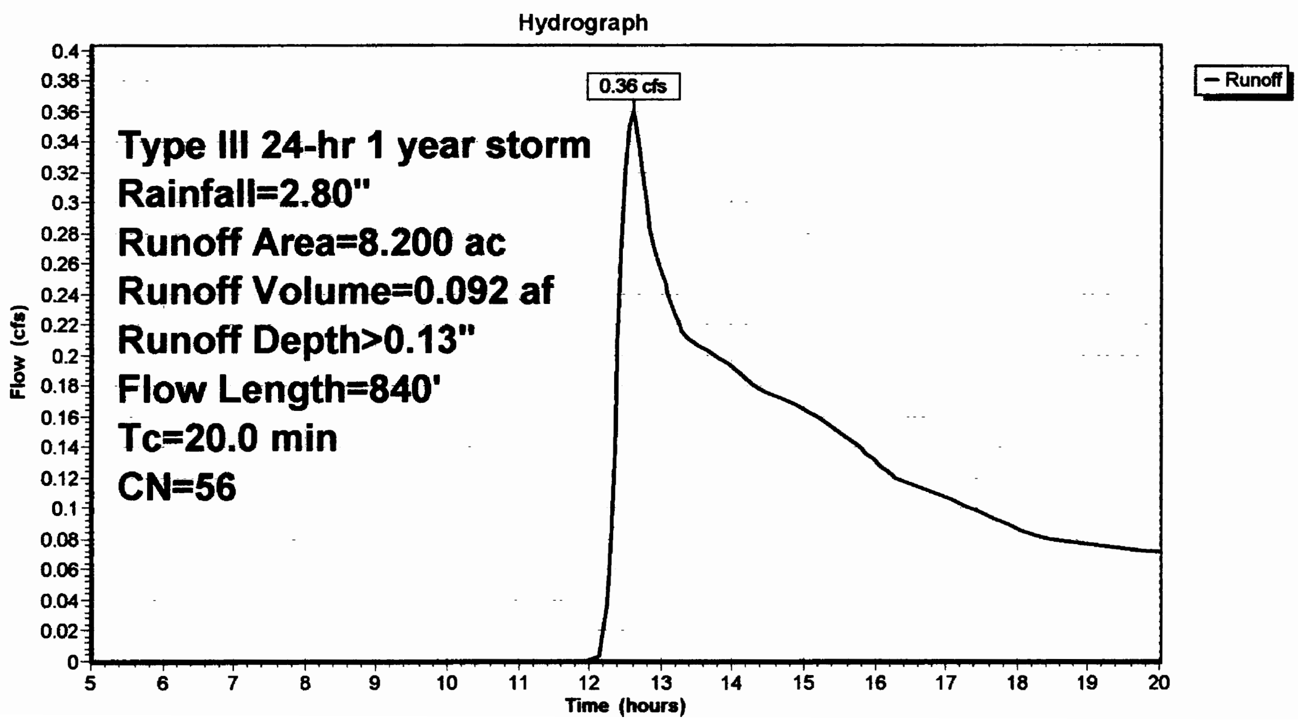
Runoff = 0.36 cfs @ 12.60 hrs, Volume= 0.092 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
7.990	55	Woods, Good, HSG B
0.190	98	imp - exist pvmt-marsh hill road
0.020	98	imp - exist pvmt-peekskill hollow rd
8.200	56	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0800	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
7.9	650	0.3000	1.4		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
0.3	140	0.1200	7.0		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
20.0	840	Total			

Subcatchment b1: pre basin b1



Subcatchment b2: pre basin b2

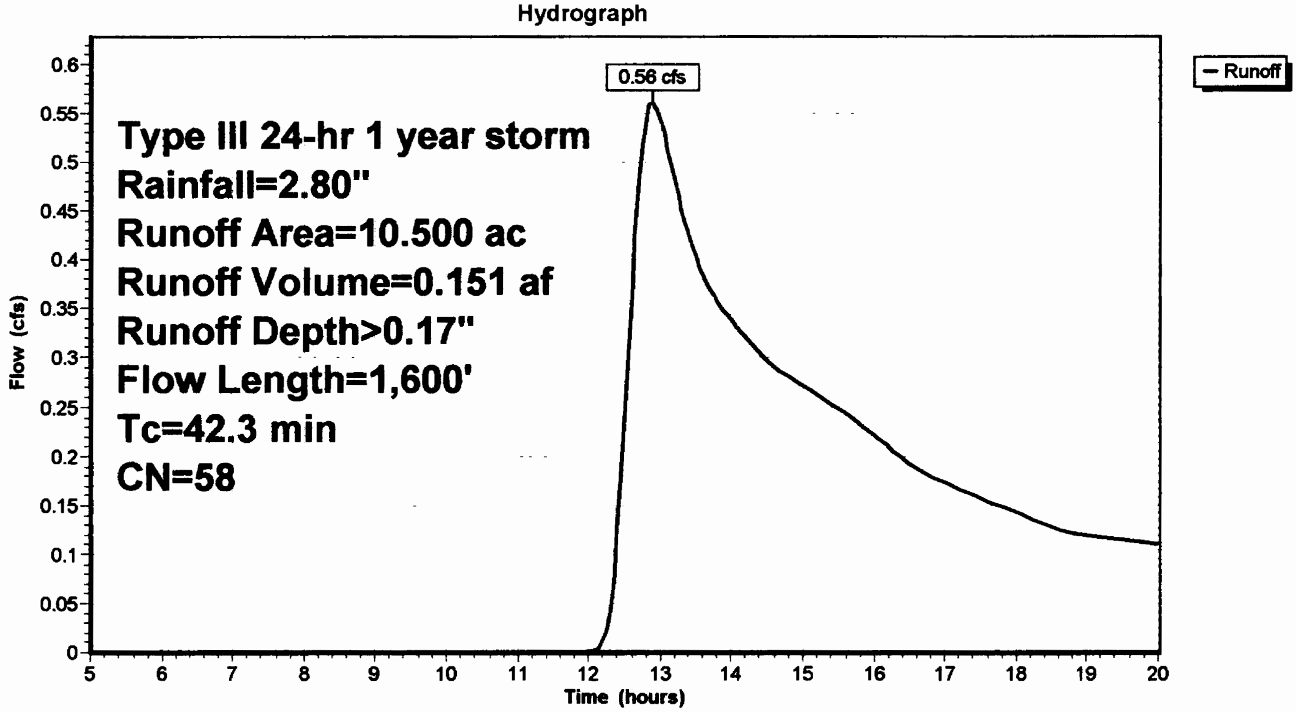
Runoff = 0.56 cfs @ 12.89 hrs, Volume= 0.151 af, Depth> 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
8.480	55	Woods, Good, HSG B
0.230	98	imp - exist pvmt-marsh hill road
0.160	98	imp - exist pvmt-peeksill hollow rd
0.230	98	imp - exist houses and drives
1.400	61	Pasture/grassland/range, Good, HSG B
10.500	58	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.7	110	0.0500	0.1		**Sheet Flow, segment 1**
					Woods: Dense underbrush n= 0.800 P2= 3.50"
9.8	510	0.1200	0.9		**Shallow Concentrated Flow, segment 2**
					Forest w/Heavy Litter Kv= 2.5 fps
0.4	70	0.1500	2.7		**Shallow Concentrated Flow, segment 3**
					Short Grass Pasture Kv= 7.0 fps
1.1	75	0.2000	1.1		**Shallow Concentrated Flow, segment 4**
					Forest w/Heavy Litter Kv= 2.5 fps
1.1	485	0.1300	7.3		**Shallow Concentrated Flow, segment 5**
					Paved Kv= 20.3 fps
2.9	210	0.2400	1.2		**Shallow Concentrated Flow, segment 6**
					Forest w/Heavy Litter Kv= 2.5 fps
0.3	140	0.1100	6.7		**Shallow Concentrated Flow, segment 7**
					Paved Kv= 20.3 fps
42.3	1,600	Total			

Subcatchment b2: pre basin b2



Subcatchment b3: pre basin b3

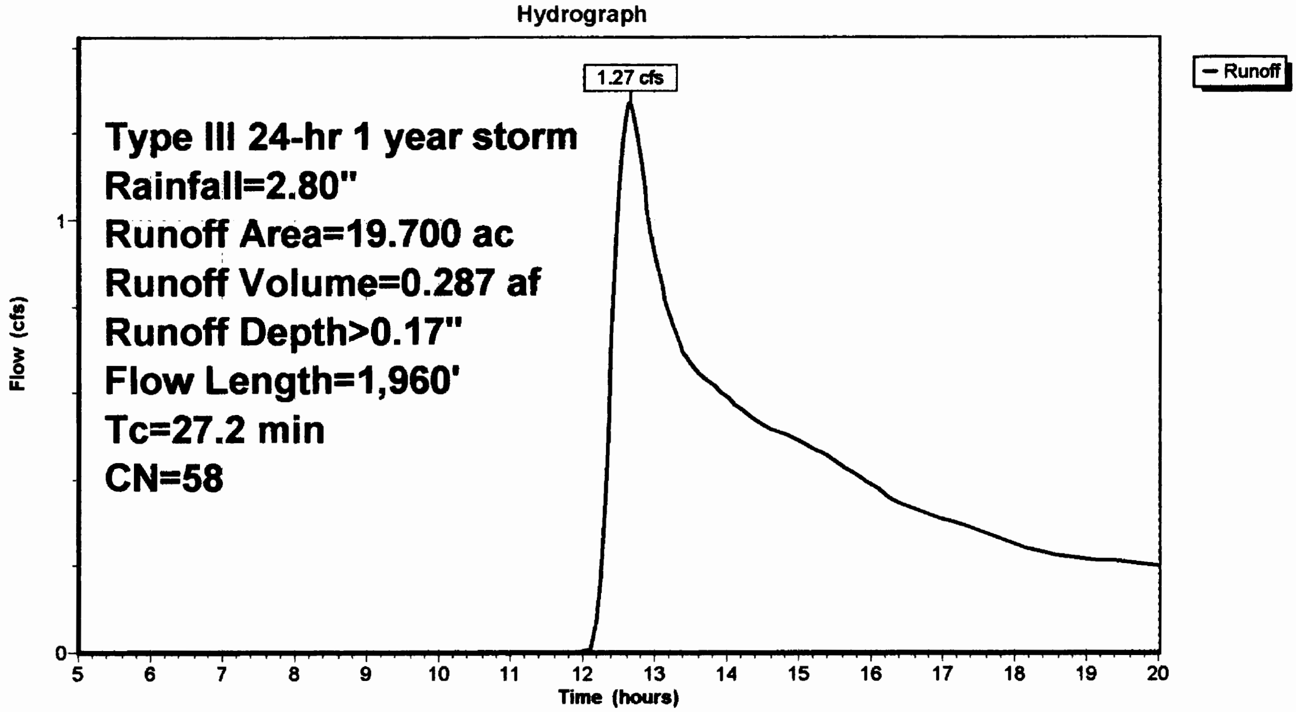
Runoff = 1.27 cfs @ 12.65 hrs, Volume= 0.287 af, Depth> 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
15.570	55	Woods, Good, HSG B
0.170	98	imp - exist pvmt-marsh hill road
0.210	98	imp - exist house/drives on site
0.260	98	imp - exist house/drives off site
1.800	61	on site-Pasture/grassland/range, Good, HSG B
1.400	61	off site-Pasture/grassland/range, Good, HSG B
0.170	98	imp - exist house/drive mandelbaum
0.120	98	imp - exist peekskill hollow road
19.700	58	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	70	0.0300	0.1		**Sheet Flow, segment 1** Grass: Dense n= 0.240 P2= 3.50"
4.5	460	0.0600	1.7		**Shallow Concentrated Flow, segment 2** Short Grass Pasture Kv= 7.0 fps
1.8	630	0.0800	5.7		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
12.2	800	0.1900	1.1		**Shallow Concentrated Flow, segment 4** Forest w/Heavy Litter Kv= 2.5 fps
27.2	1,960	Total			

Subcatchment b3: pre basin b3



Subcatchment b4: pre basin b4

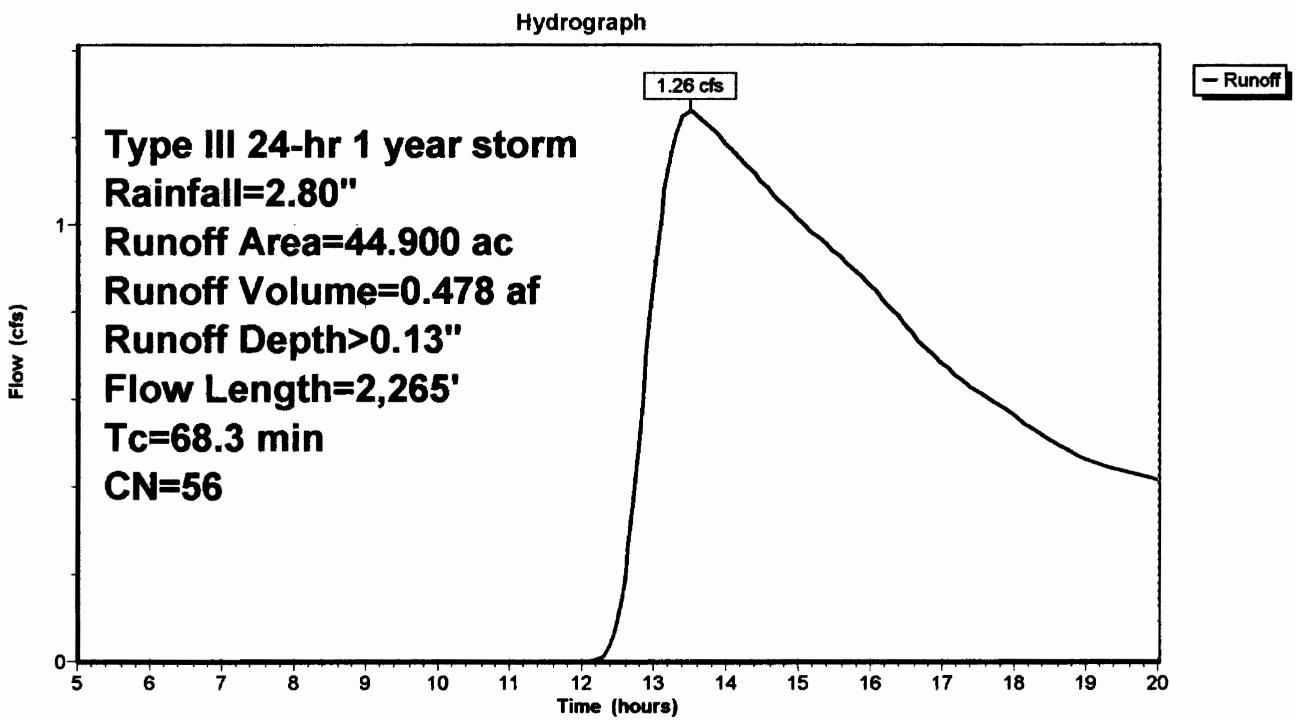
Runoff = 1.26 cfs @ 13.50 hrs, Volume= 0.478 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
41.060	55	Woods, Good, HSG B
3.840	70	Woods, Good, HSG C, wetland
44.900	56	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.4	90	0.0100	0.0		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
14.7	625	0.0800	0.7		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
5.1	1,130	0.0600	3.7		**Shallow Concentrated Flow, segment 3** Grassed Waterway Kv= 15.0 fps
5.1	420	0.3000	1.4		**Shallow Concentrated Flow, segment 4** Forest w/Heavy Litter Kv= 2.5 fps
68.3	2,265	Total			

Subcatchment b4: pre basin b4



Subcatchment b5: pre basin b5

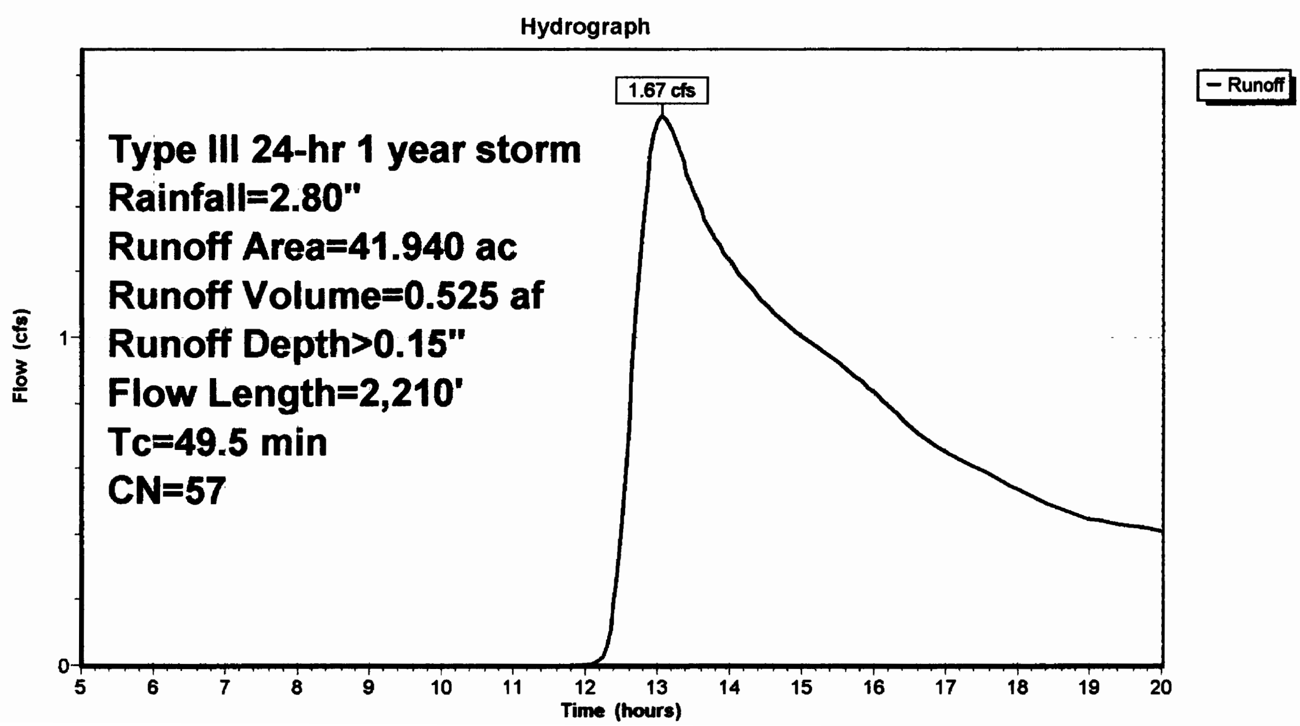
Runoff = 1.67 cfs @ 13.07 hrs, Volume= 0.525 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
38.540	55	Woods, Good, HSG B
1.200	98	imp - drives/houses - venezia
2.200	61	Pasture/grassland/range, Good, HSG B
41.940	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	60	0.0500	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
31.2	1,750	0.1400	0.9		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
0.8	320	0.1200	7.0		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
1.0	80	0.0700	1.3		**Shallow Concentrated Flow, segment 4** Woodland Kv= 5.0 fps
49.5	2,210	Total			

Subcatchment b5: pre basin b5



Subcatchment b6: pre basin b6

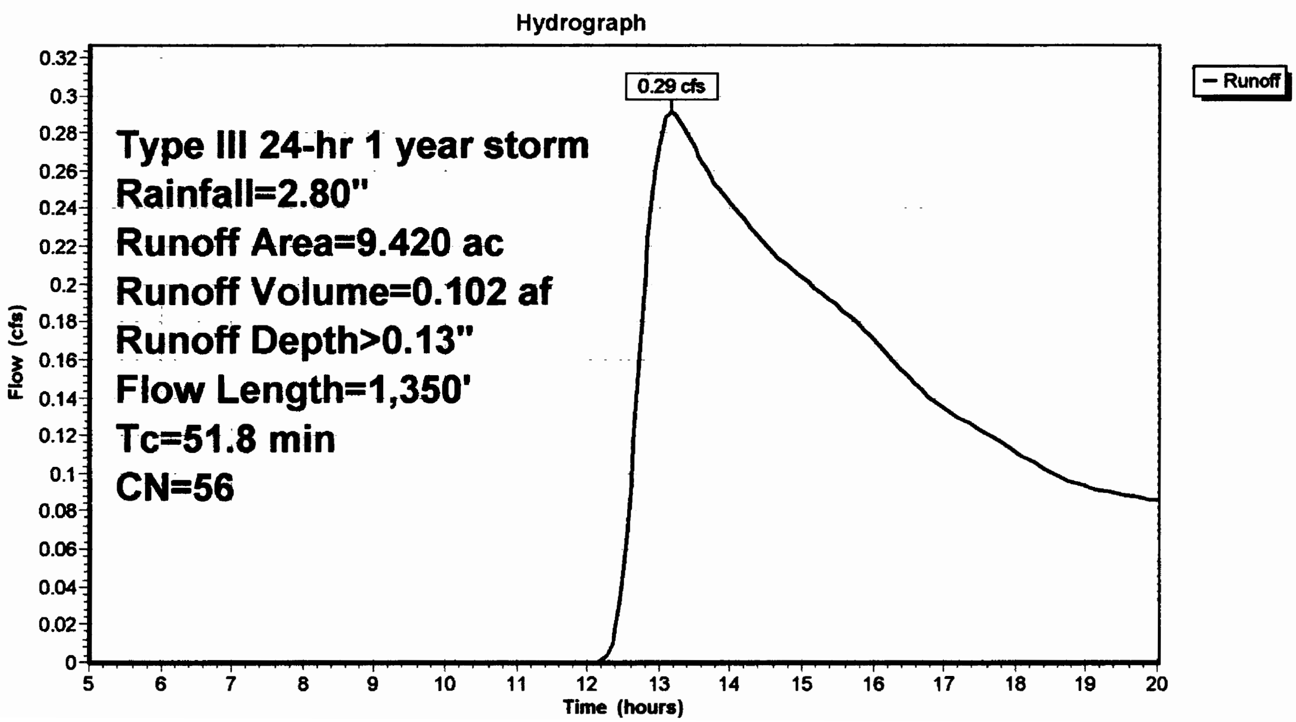
Runoff = 0.29 cfs @ 13.18 hrs, Volume= 0.102 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
8.830	55	Woods, Good, HSG B
0.590	77	Woods, Good, HSG D
9.420	56	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	60	0.0700	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
31.2	810	0.0300	0.4		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
4.3	390	0.0100	1.5		**Shallow Concentrated Flow, segment 3** Grassed Waterway Kv= 15.0 fps
1.9	90	0.1000	0.8		**Shallow Concentrated Flow, segment 4** Forest w/Heavy Litter Kv= 2.5 fps
51.8	1,350	Total			

Subcatchment b6: pre basin b6



Subcatchment b7: pre basin b7

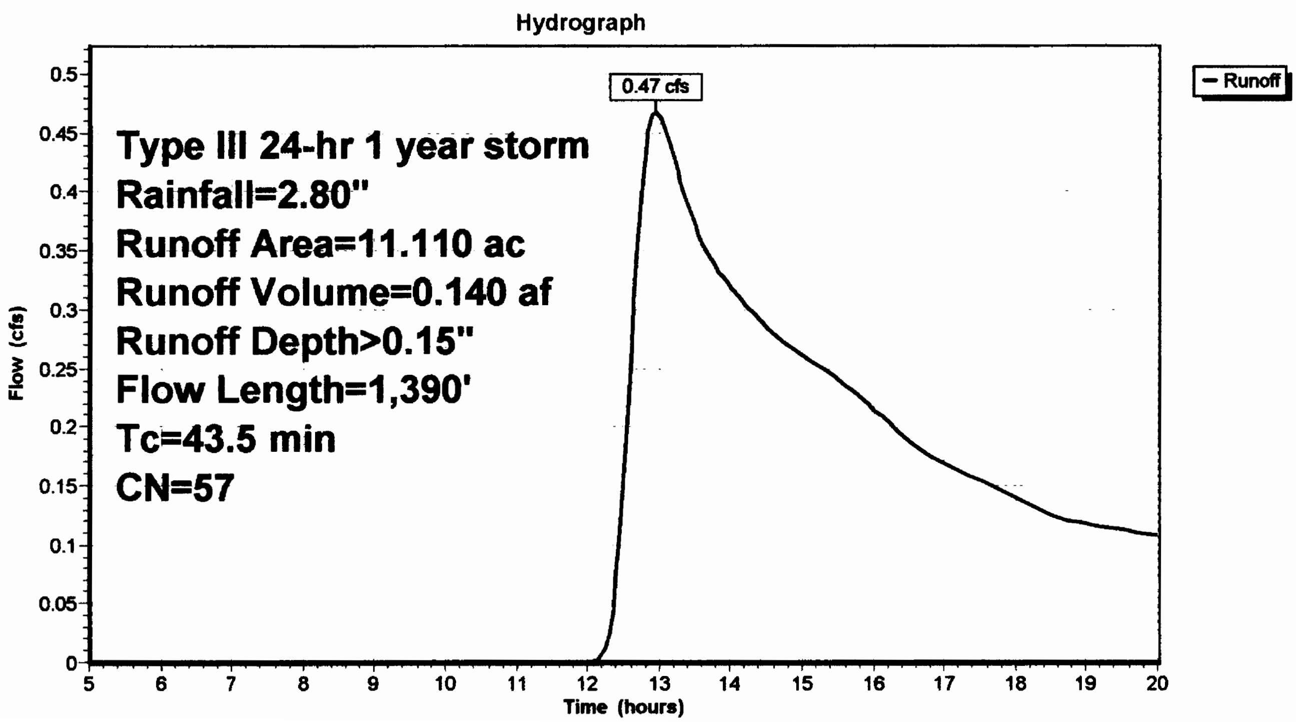
Runoff = 0.47 cfs @ 12.96 hrs, Volume= 0.140 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
10.260	55	Woods, Good, HSG B
0.850	77	Woods, Good, HSG D
11.110	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.4	110	0.0700	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
14.8	800	0.1300	0.9		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
5.3	480	0.0100	1.5		**Shallow Concentrated Flow, segment 3** Grassed Waterway Kv= 15.0 fps
43.5	1,390	Total			

Subcatchment b7: pre basin b7

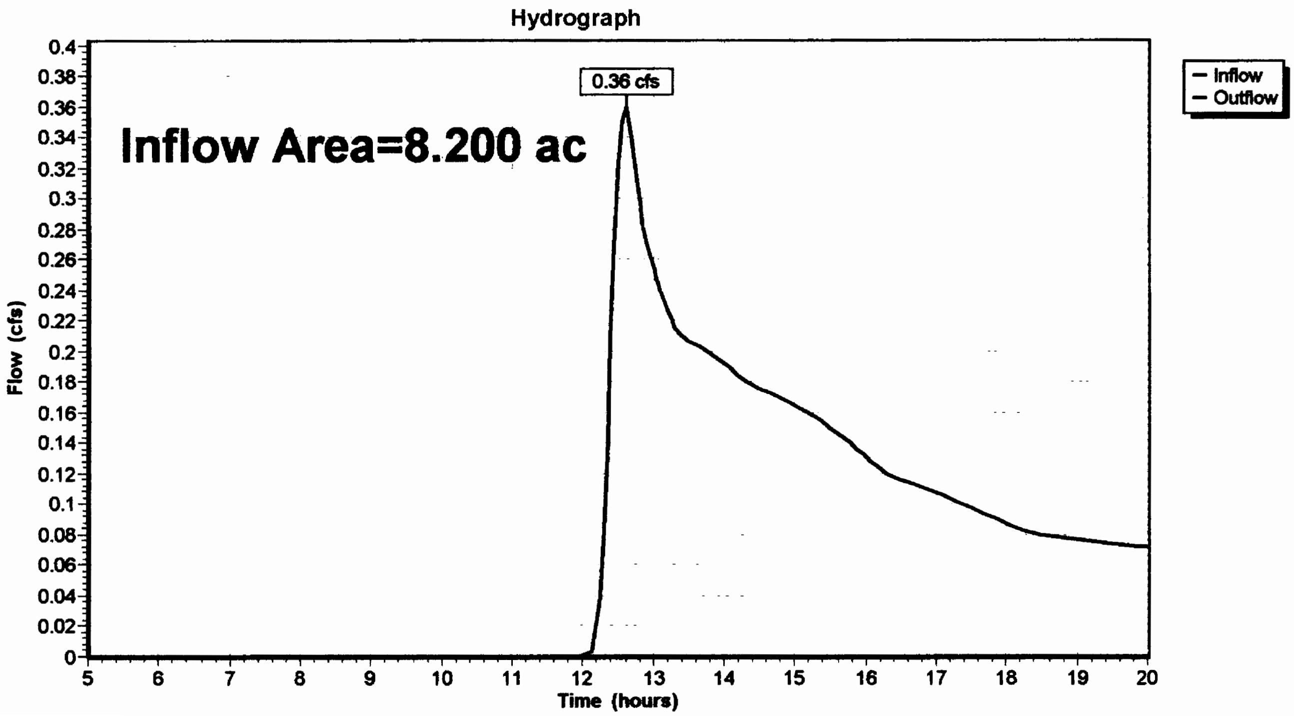


Reach dp1: pre design point 1

Inflow Area =	8.200 ac, Inflow Depth > 0.13"	for 1 year storm event
Inflow =	0.36 cfs @ 12.60 hrs, Volume=	0.092 af
Outflow =	0.36 cfs @ 12.60 hrs, Volume=	0.092 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

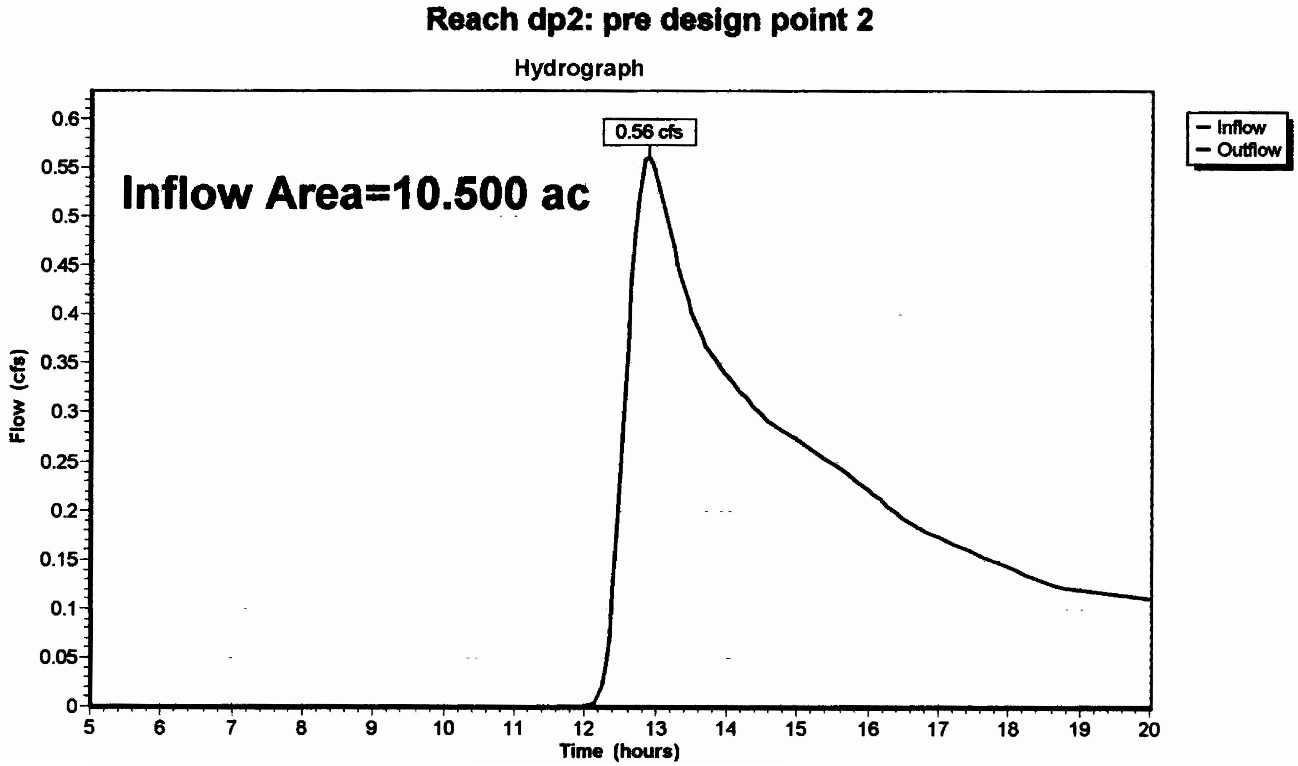
Reach dp1: pre design point 1



Reach dp2: pre design point 2

Inflow Area =	10.500 ac,	Inflow Depth > 0.17"	for 1 year storm event	
Inflow =	0.56 cfs @	12.89 hrs, Volume=	0.151 af	
Outflow =	0.56 cfs @	12.89 hrs, Volume=	0.151 af,	Atten= 0%, Lag= 0.0 min

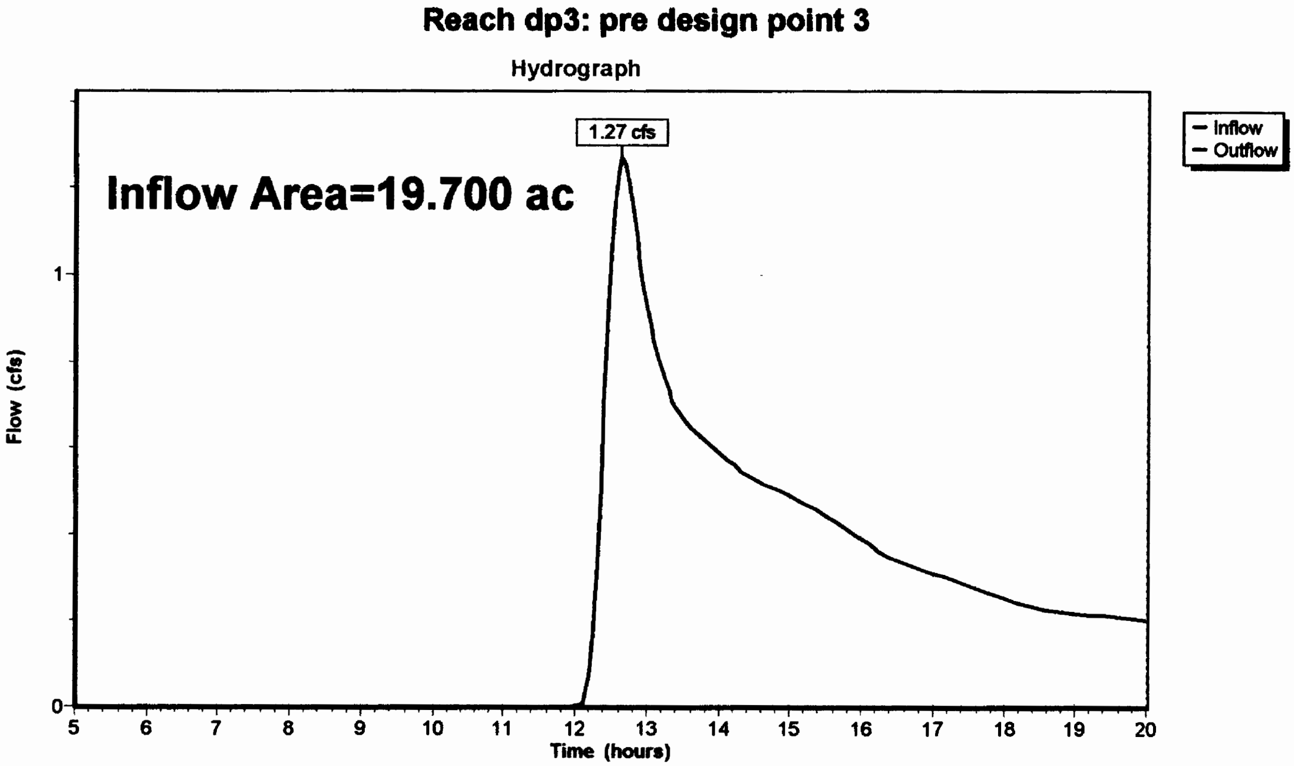
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Reach dp3: pre design point 3

Inflow Area =	19.700 ac, Inflow Depth > 0.17"	for 1 year storm event	
Inflow =	1.27 cfs @ 12.65 hrs, Volume=	0.287 af	
Outflow =	1.27 cfs @ 12.65 hrs, Volume=	0.287 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

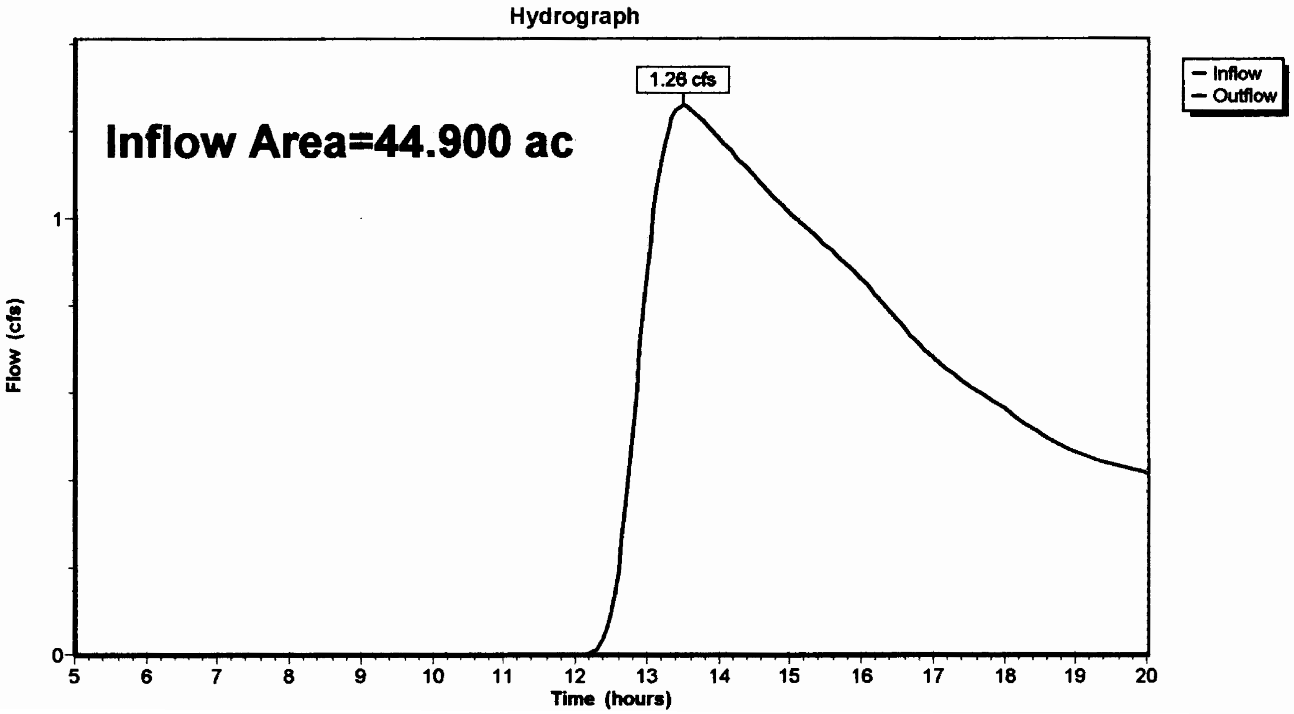


Reach dp4: pre design point 4

Inflow Area =	44.900 ac, Inflow Depth > 0.13"	for 1 year storm event
Inflow =	1.26 cfs @ 13.50 hrs, Volume=	0.478 af
Outflow =	1.26 cfs @ 13.50 hrs, Volume=	0.478 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach dp4: pre design point 4

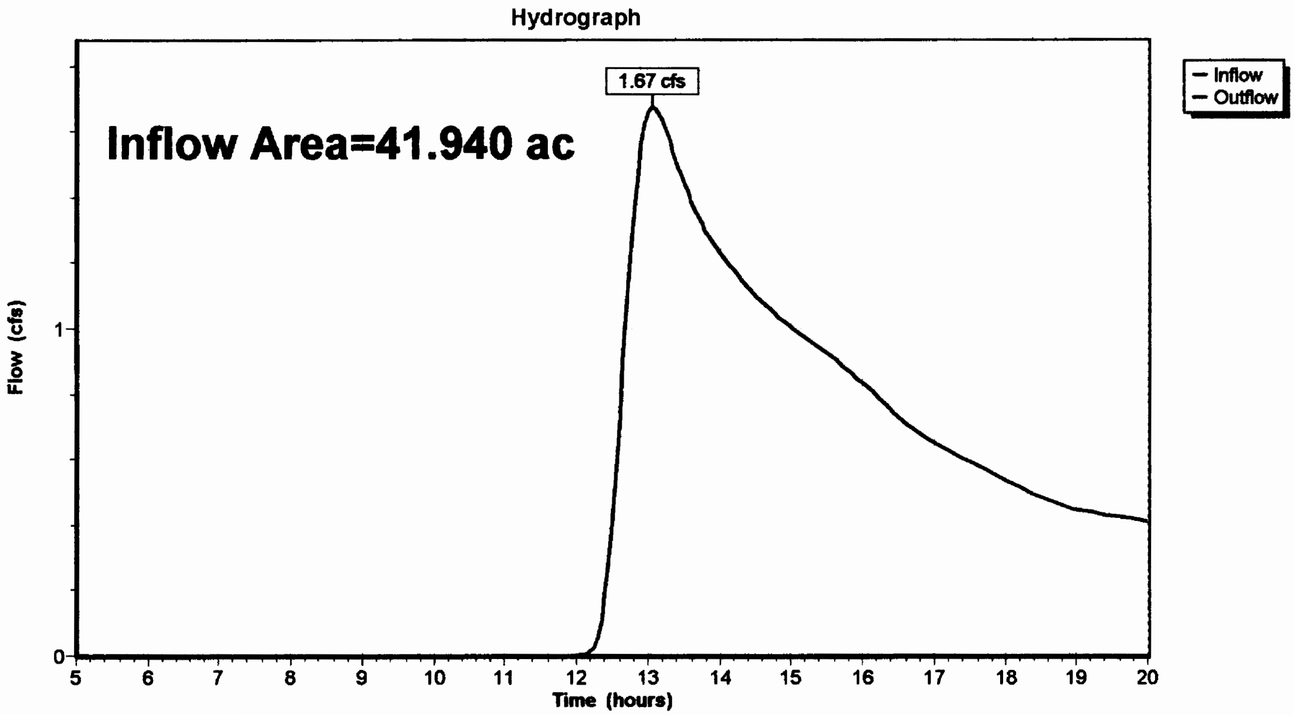


Reach dp5: pre design point 5

Inflow Area =	41.940 ac,	Inflow Depth > 0.15"	for 1 year storm event	
Inflow =	1.67 cfs @	13.07 hrs, Volume=	0.525 af	
Outflow =	1.67 cfs @	13.07 hrs, Volume=	0.525 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach dp5: pre design point 5

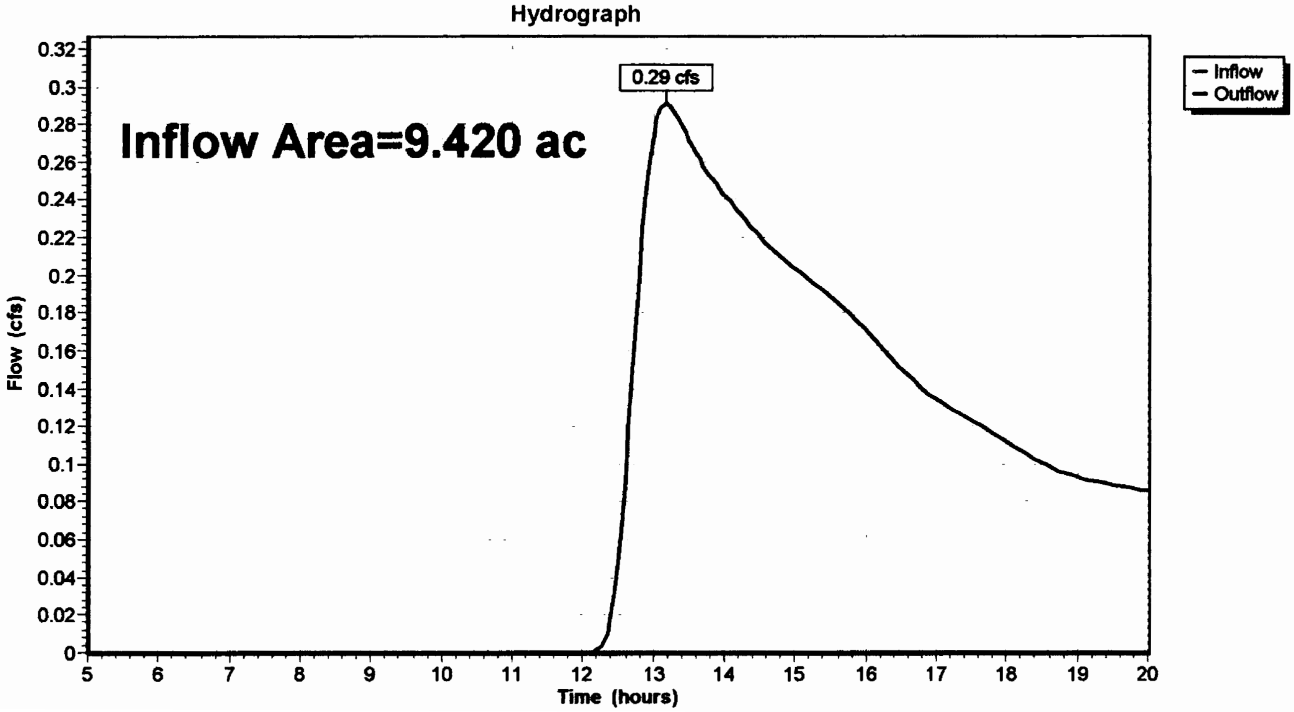


Reach dp6: pre design point 6

Inflow Area =	9.420 ac,	Inflow Depth > 0.13"	for 1 year storm event	
Inflow =	0.29 cfs @	13.18 hrs, Volume=	0.102 af	
Outflow =	0.29 cfs @	13.18 hrs, Volume=	0.102 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach dp6: pre design point 6

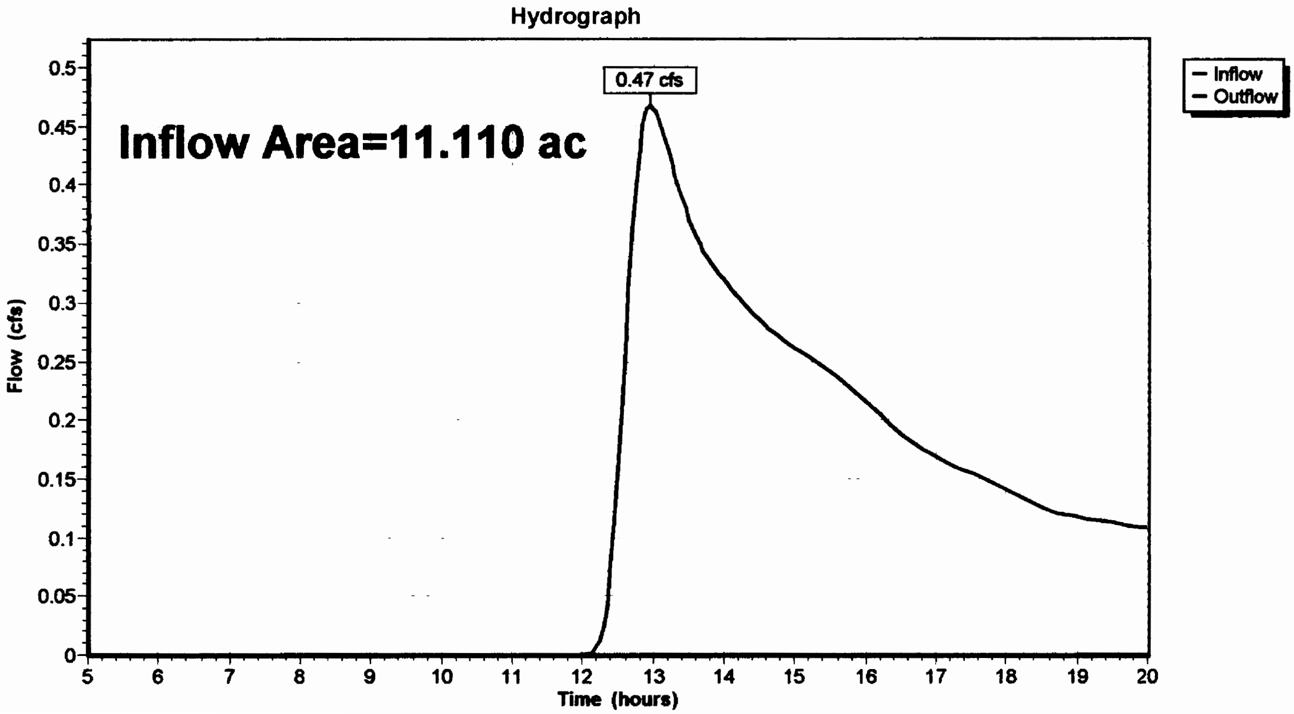


Reach dp7: pre design point 7

Inflow Area =	11.110 ac, Inflow Depth > 0.15"	for 1 year storm event	
Inflow =	0.47 cfs @ 12.96 hrs, Volume=	0.140 af	
Outflow =	0.47 cfs @ 12.96 hrs, Volume=	0.140 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach dp7: pre design point 7

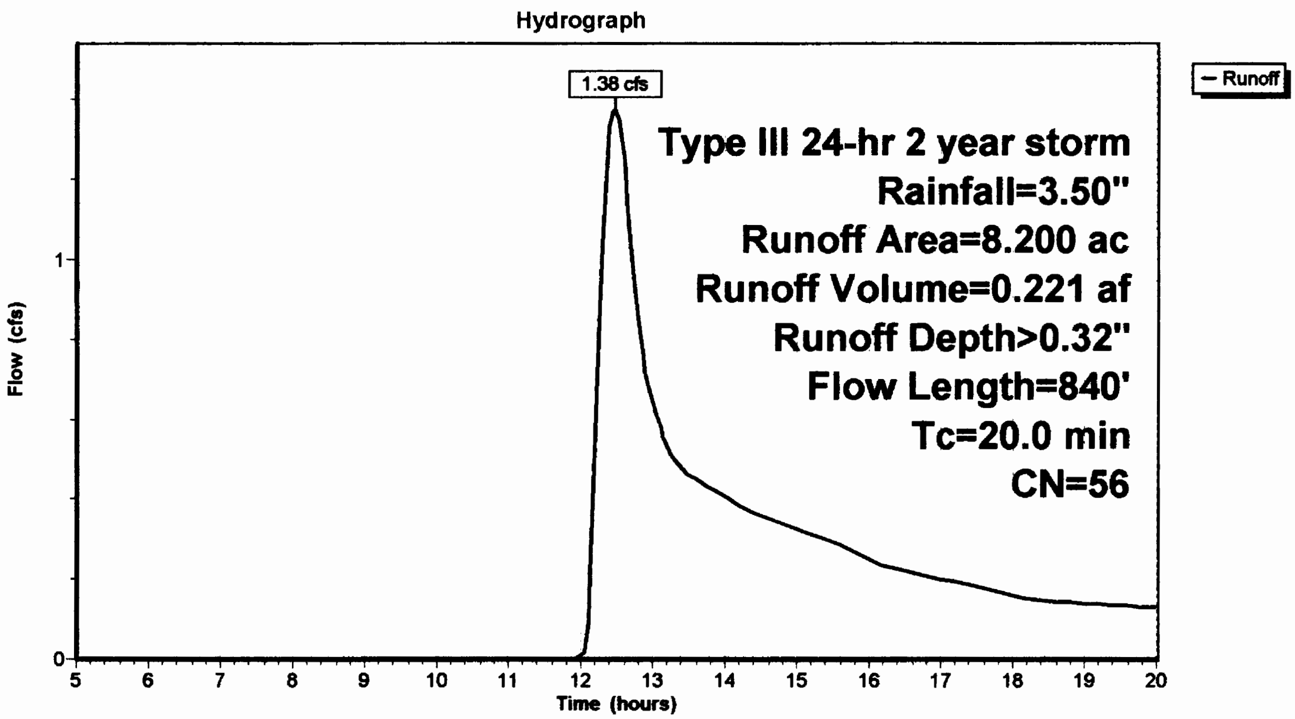


Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

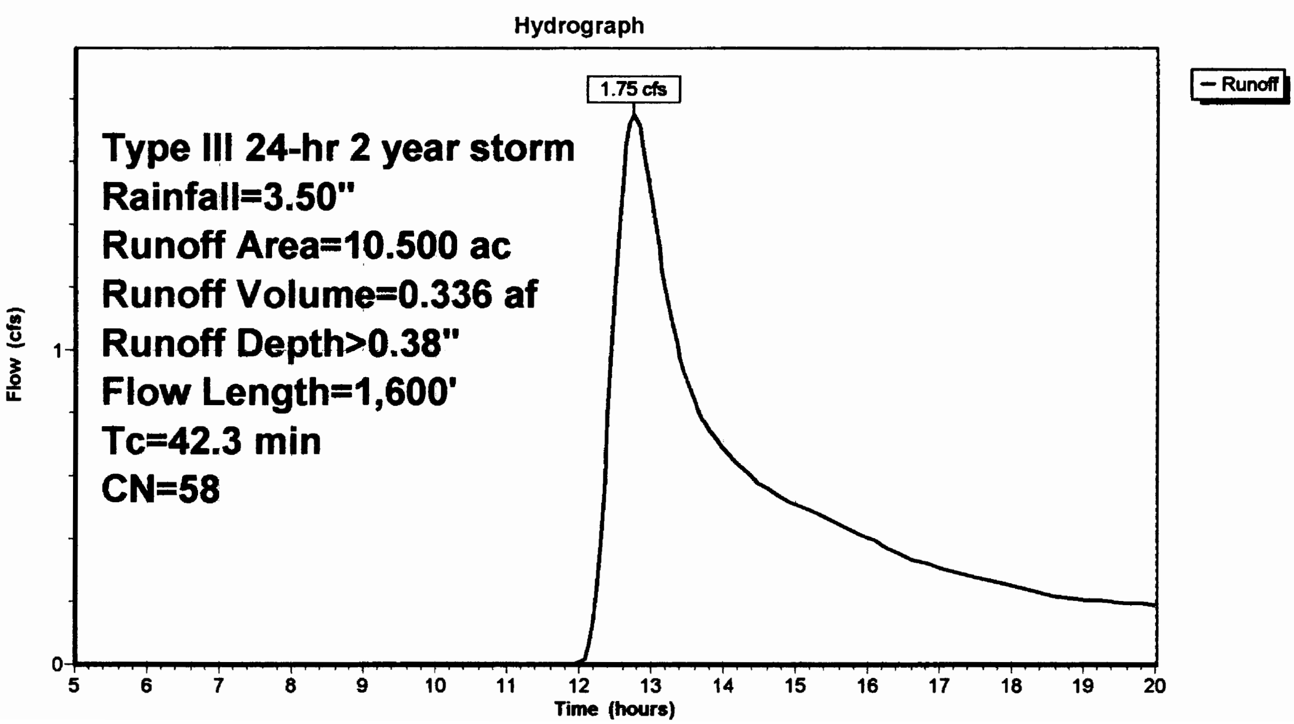
Subcatchment b1: pre basin b1	Runoff Area=8.200 ac Runoff Depth>0.32" Flow Length=840' Tc=20.0 min CN=56 Runoff=1.38 cfs 0.221 af
Subcatchment b2: pre basin b2	Runoff Area=10.500 ac Runoff Depth>0.38" Flow Length=1,600' Tc=42.3 min CN=58 Runoff=1.75 cfs 0.336 af
Subcatchment b3: pre basin b3	Runoff Area=19.700 ac Runoff Depth>0.39" Flow Length=1,960' Tc=27.2 min CN=58 Runoff=4.01 cfs 0.638 af
Subcatchment b4: pre basin b4	Runoff Area=44.900 ac Runoff Depth>0.31" Flow Length=2,265' Tc=68.3 min CN=56 Runoff=4.36 cfs 1.165 af
Subcatchment b5: pre basin b5	Runoff Area=41.940 ac Runoff Depth>0.35" Flow Length=2,210' Tc=49.5 min CN=57 Runoff=5.62 cfs 1.218 af
Subcatchment b6: pre basin b6	Runoff Area=9.420 ac Runoff Depth>0.32" Flow Length=1,350' Tc=51.8 min CN=56 Runoff=1.06 cfs 0.248 af
Subcatchment b7: pre basin b7	Runoff Area=11.110 ac Runoff Depth>0.35" Flow Length=1,390' Tc=43.5 min CN=57 Runoff=1.59 cfs 0.324 af
Reach dp1: pre design point 1	Inflow=1.38 cfs 0.221 af Outflow=1.38 cfs 0.221 af
Reach dp2: pre design point 2	Inflow=1.75 cfs 0.336 af Outflow=1.75 cfs 0.336 af
Reach dp3: pre design point 3	Inflow=4.01 cfs 0.638 af Outflow=4.01 cfs 0.638 af
Reach dp4: pre design point 4	Inflow=4.36 cfs 1.165 af Outflow=4.36 cfs 1.165 af
Reach dp5: pre design point 5	Inflow=5.62 cfs 1.218 af Outflow=5.62 cfs 1.218 af
Reach dp6: pre design point 6	Inflow=1.06 cfs 0.248 af Outflow=1.06 cfs 0.248 af
Reach dp7: pre design point 7	Inflow=1.59 cfs 0.324 af Outflow=1.59 cfs 0.324 af

Total Runoff Area = 145.770 ac Runoff Volume = 4.151 af Average Runoff Depth = 0.34"

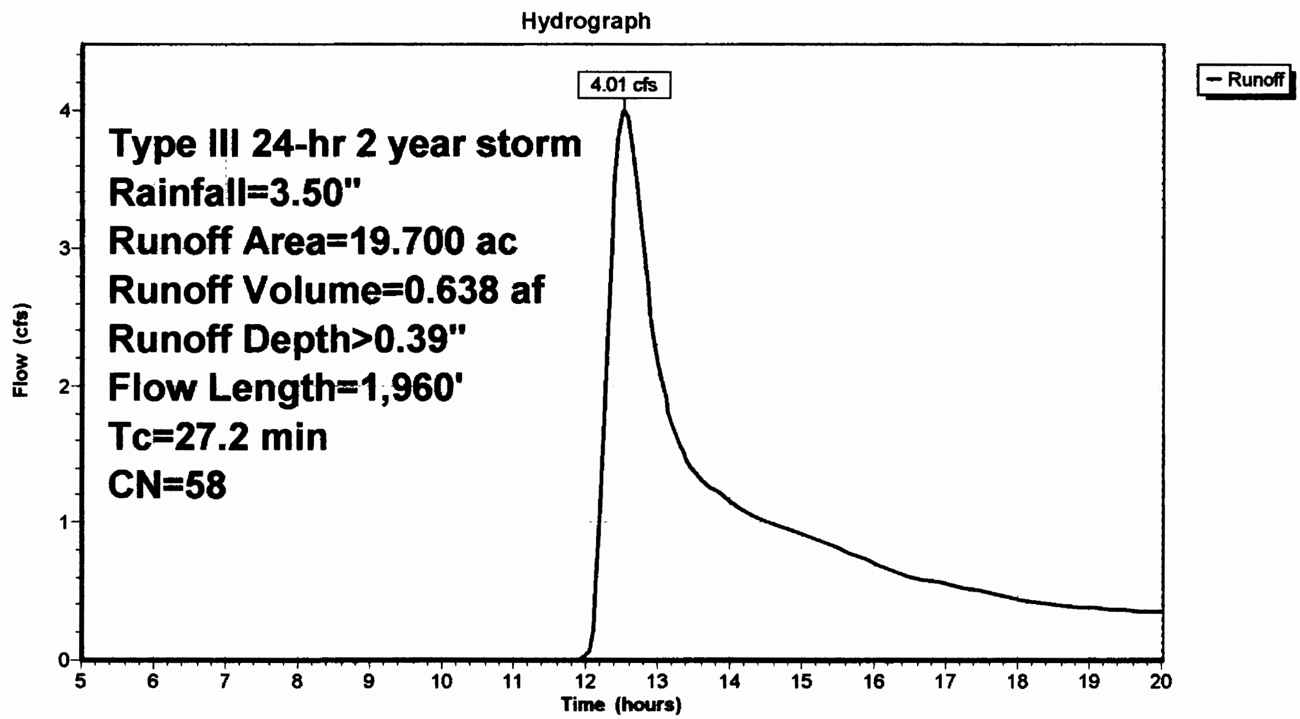
Subcatchment b1: pre basin b1



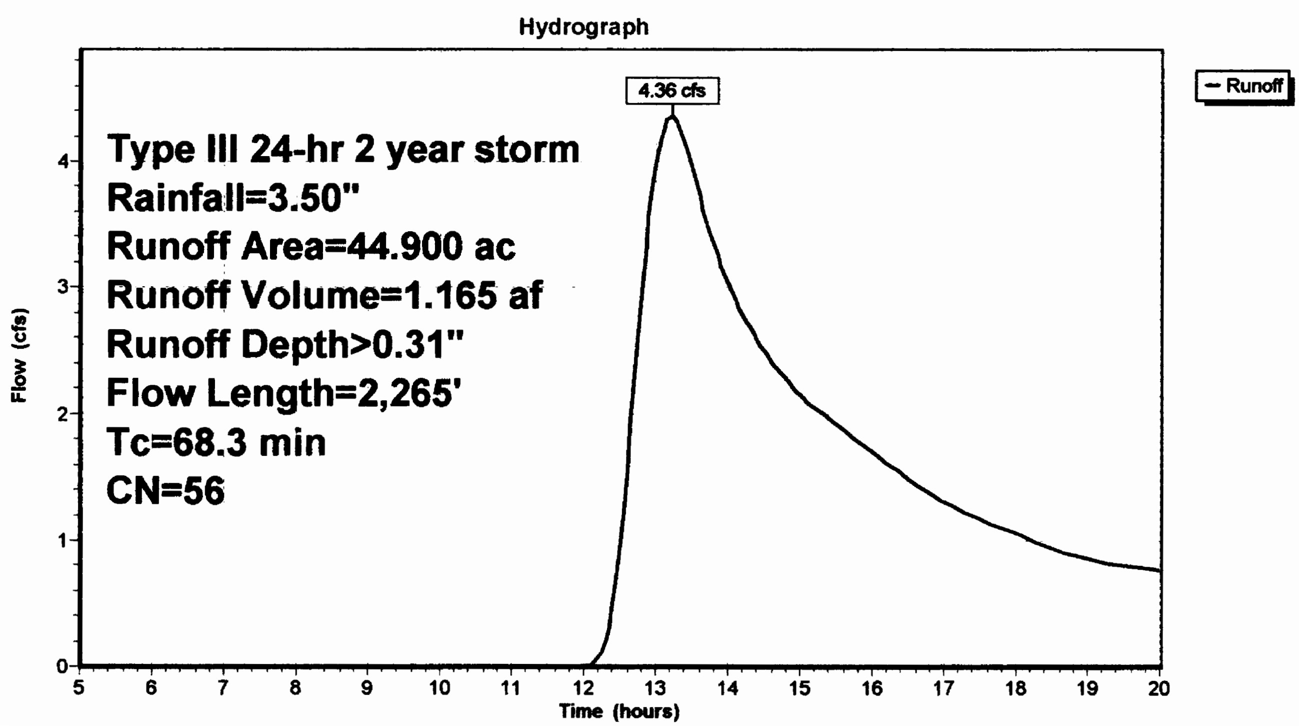
Subcatchment b2: pre basin b2



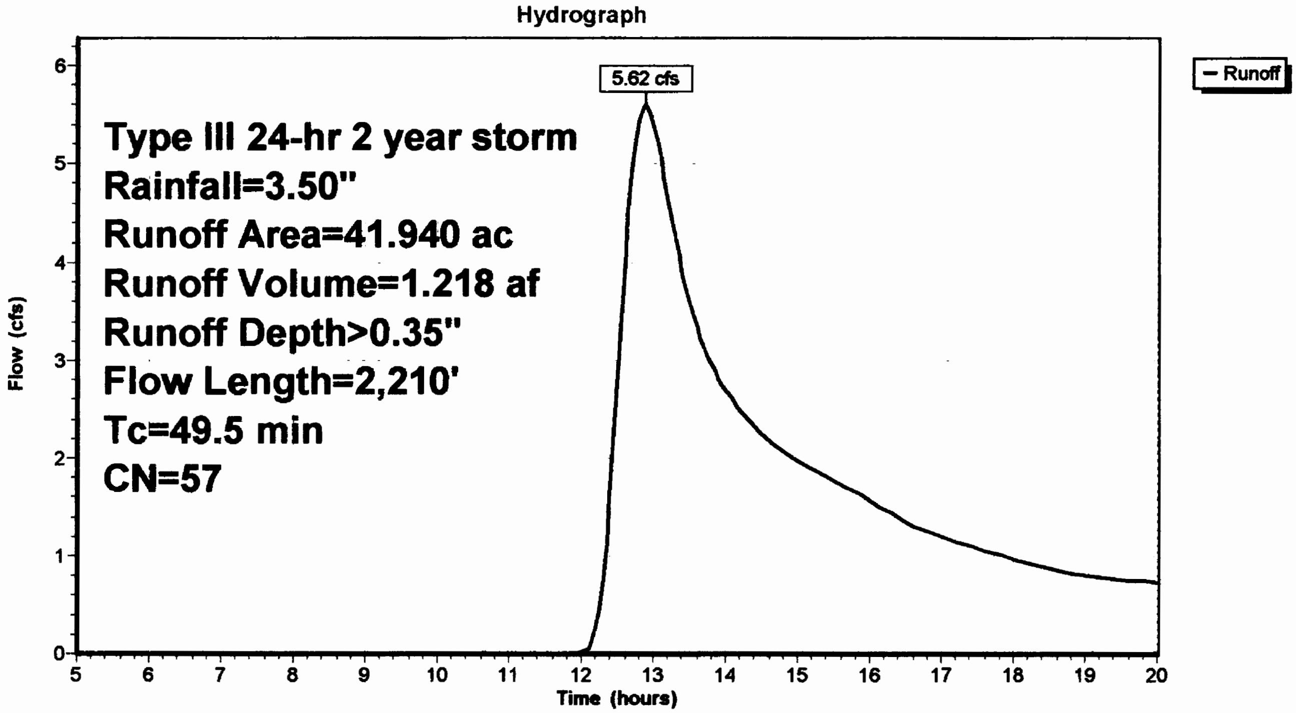
Subcatchment b3: pre basin b3



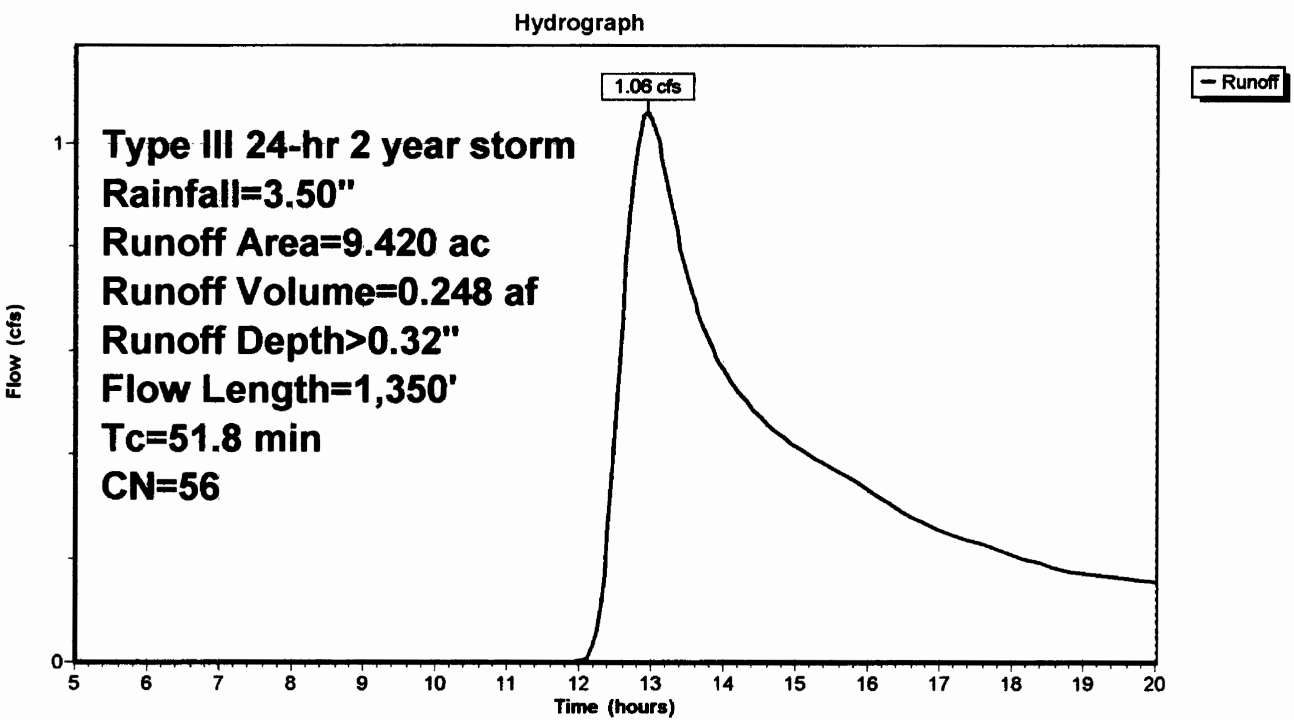
Subcatchment b4: pre basin b4



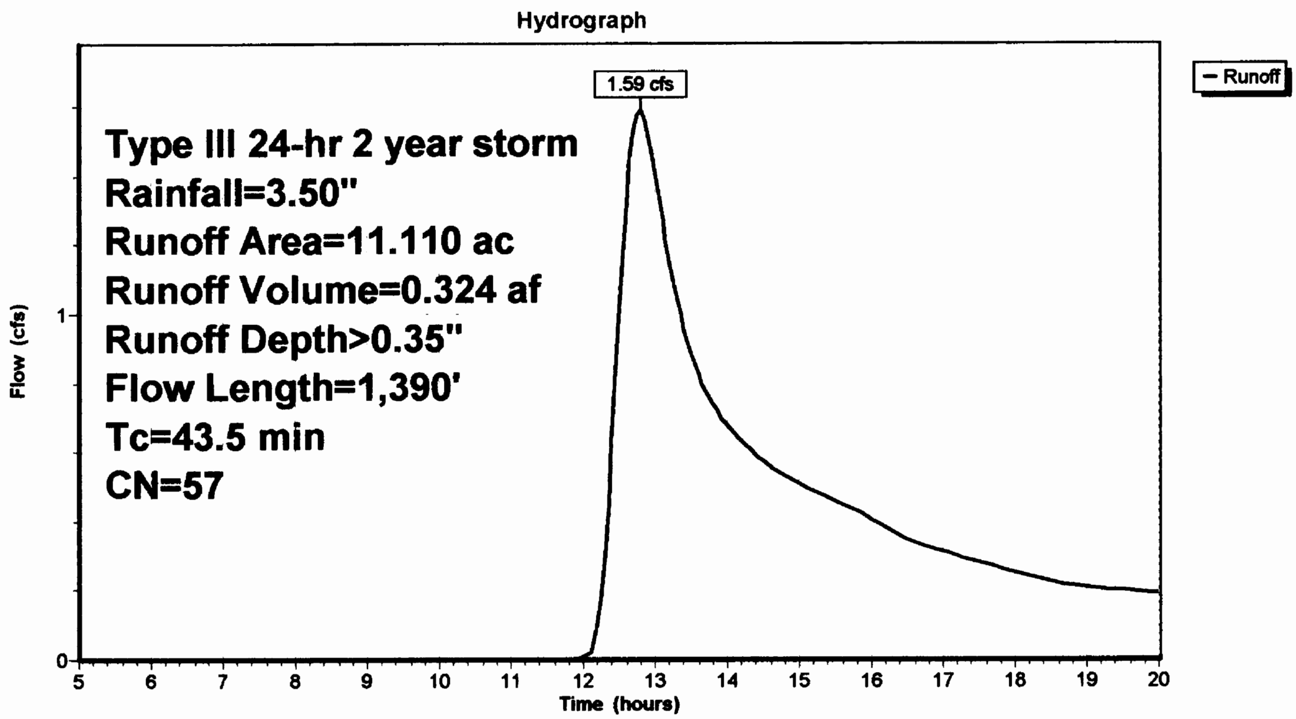
Subcatchment b5: pre basin b5



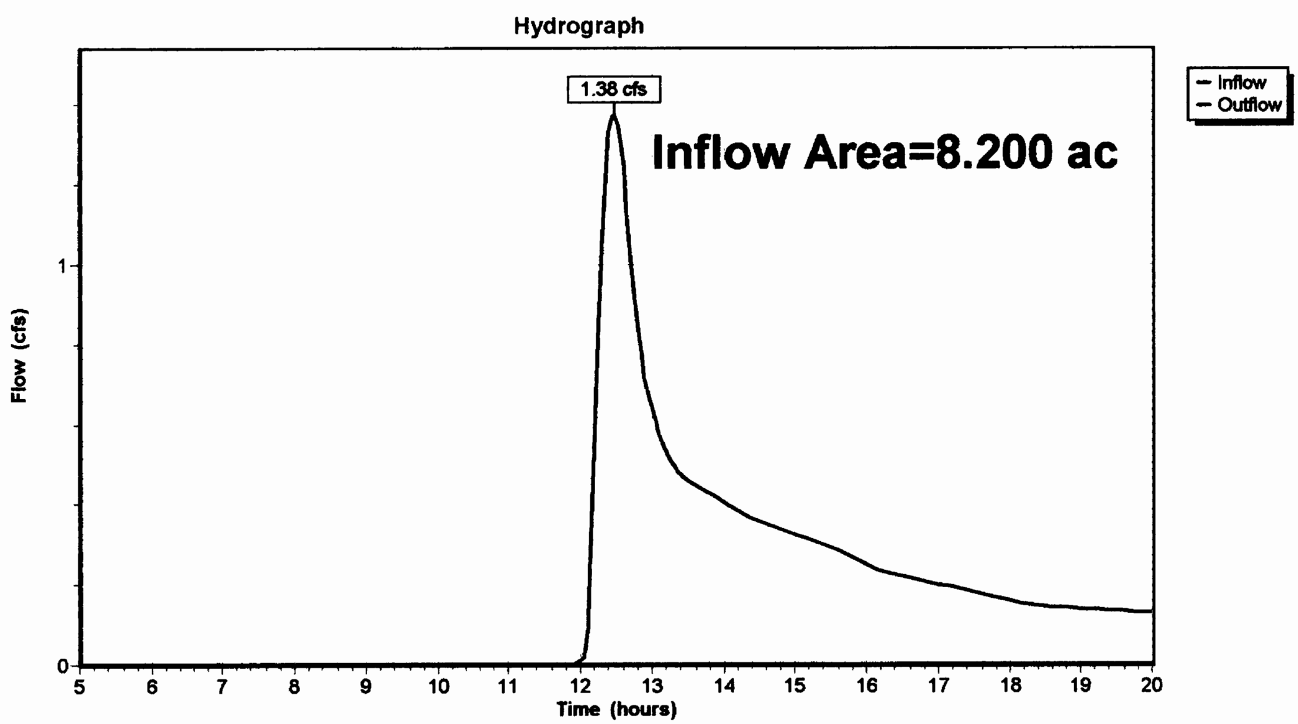
Subcatchment b6: pre basin b6



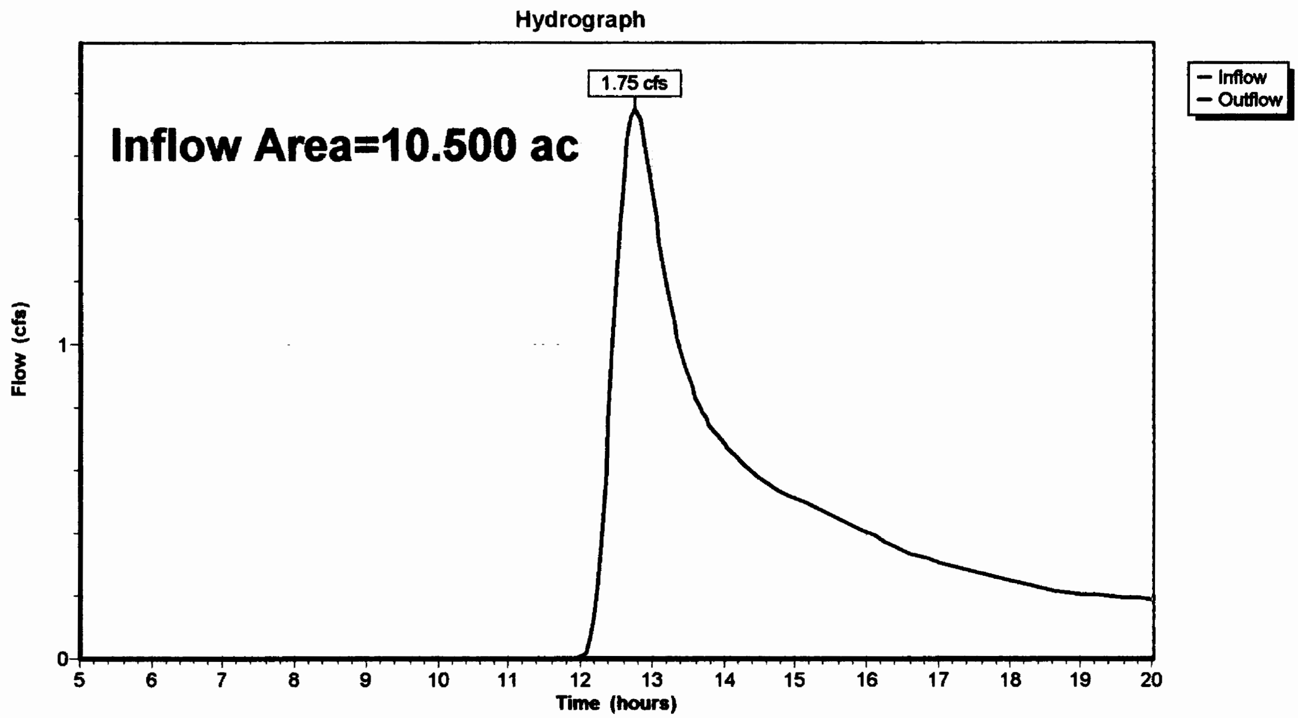
Subcatchment b7: pre basin b7



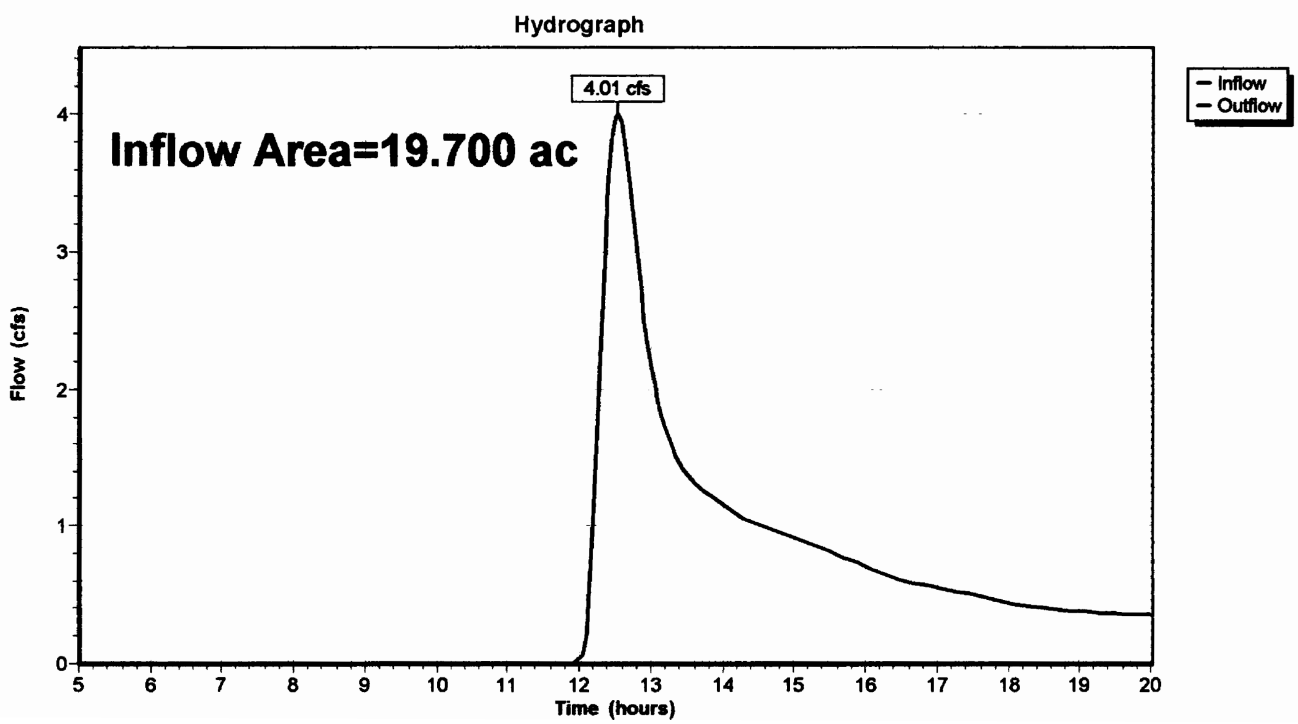
Reach dp1: pre design point 1



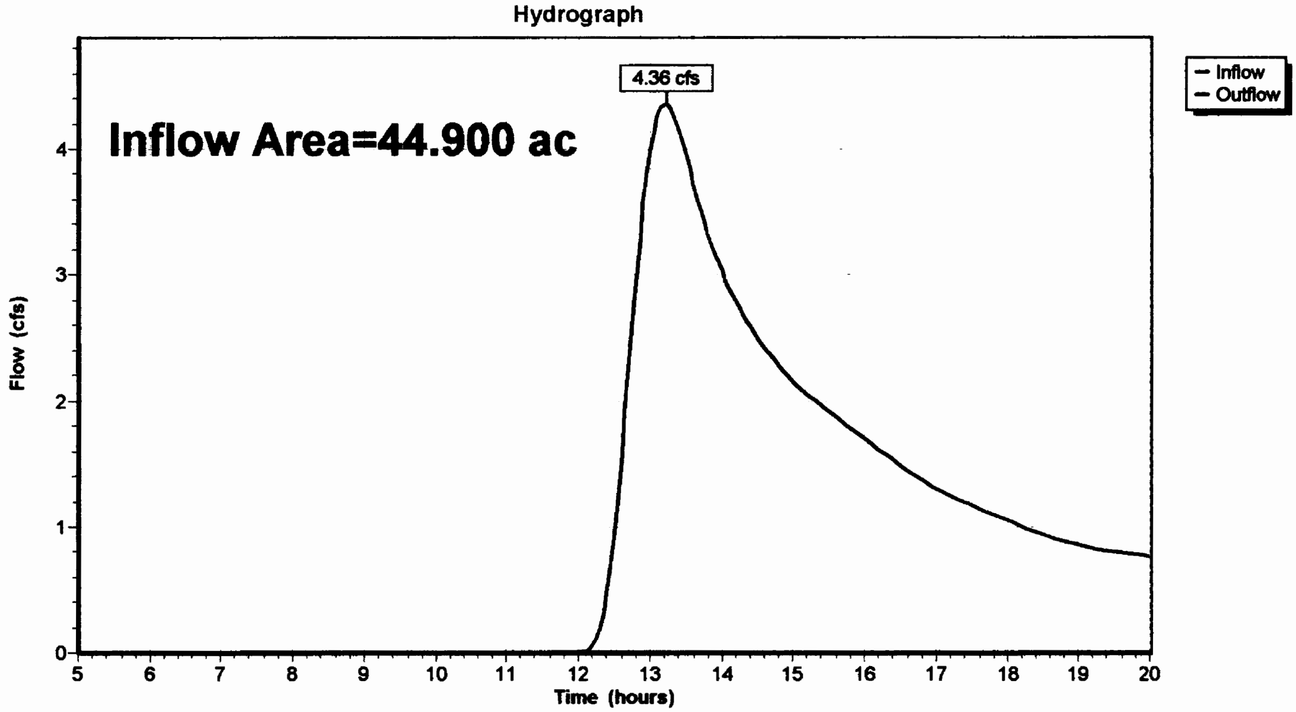
Reach dp2: pre design point 2



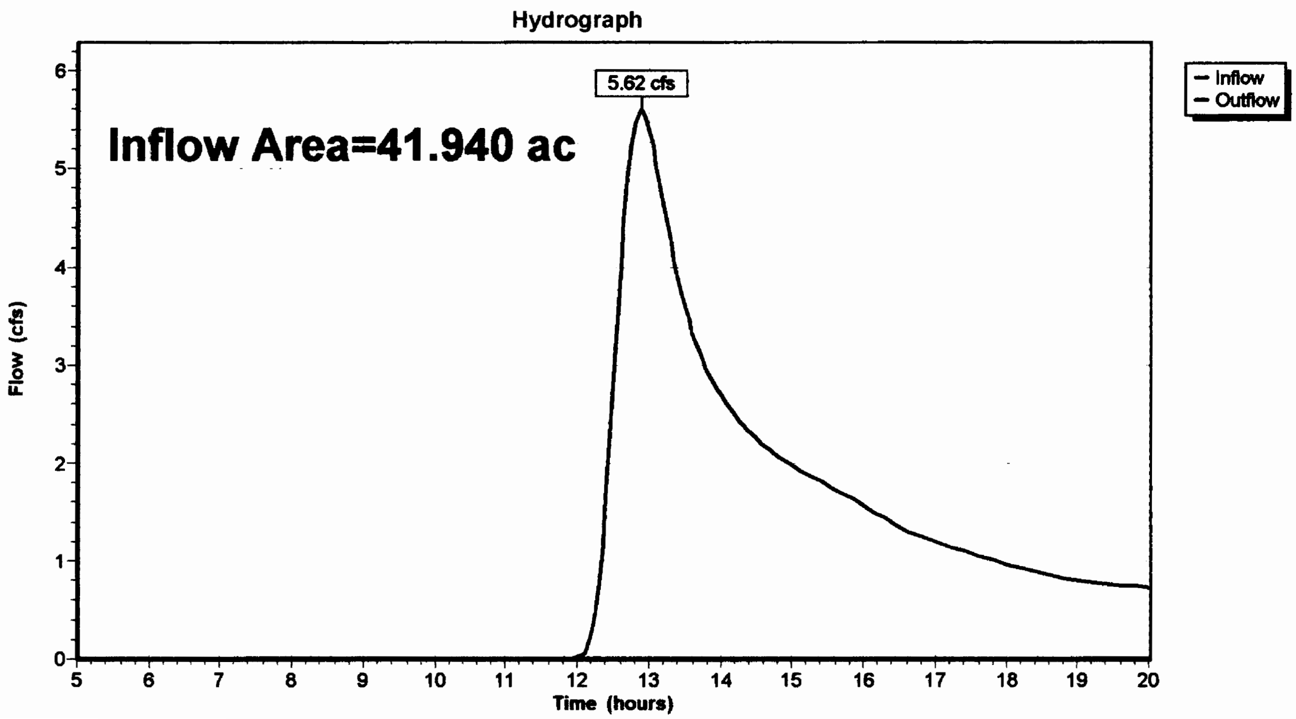
Reach dp3: pre design point 3



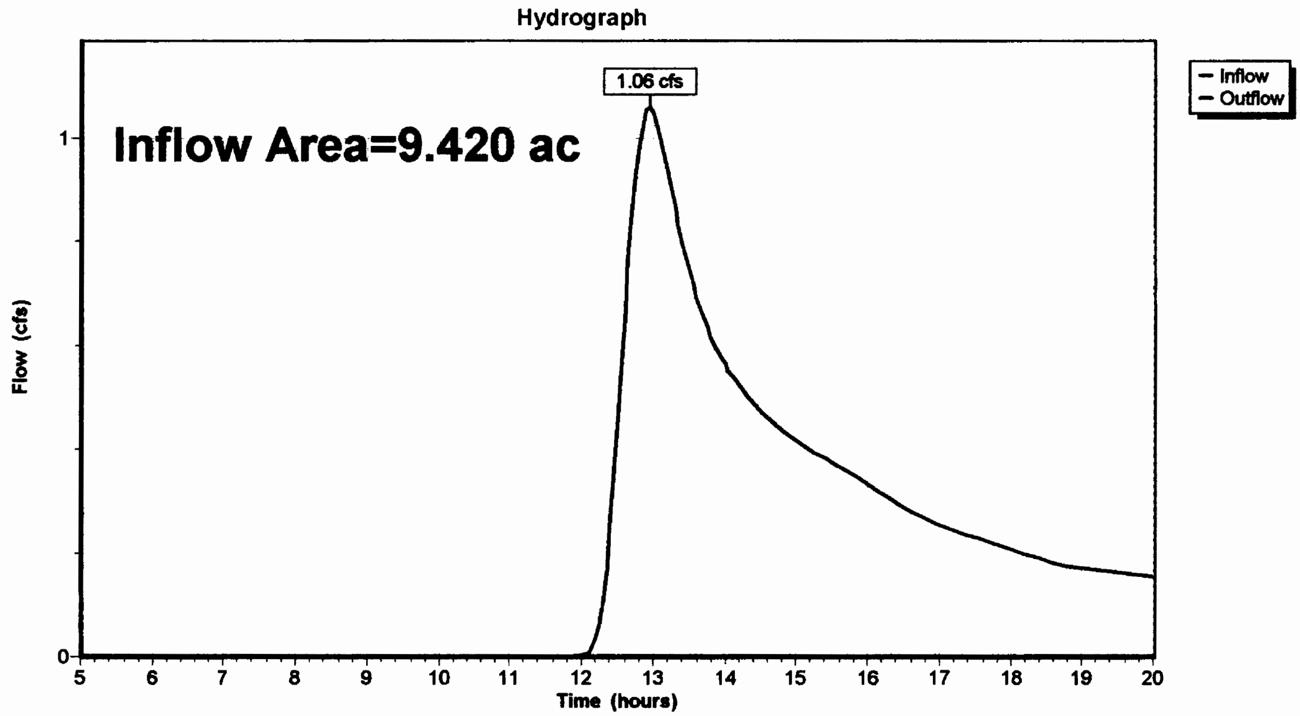
Reach dp4: pre design point 4



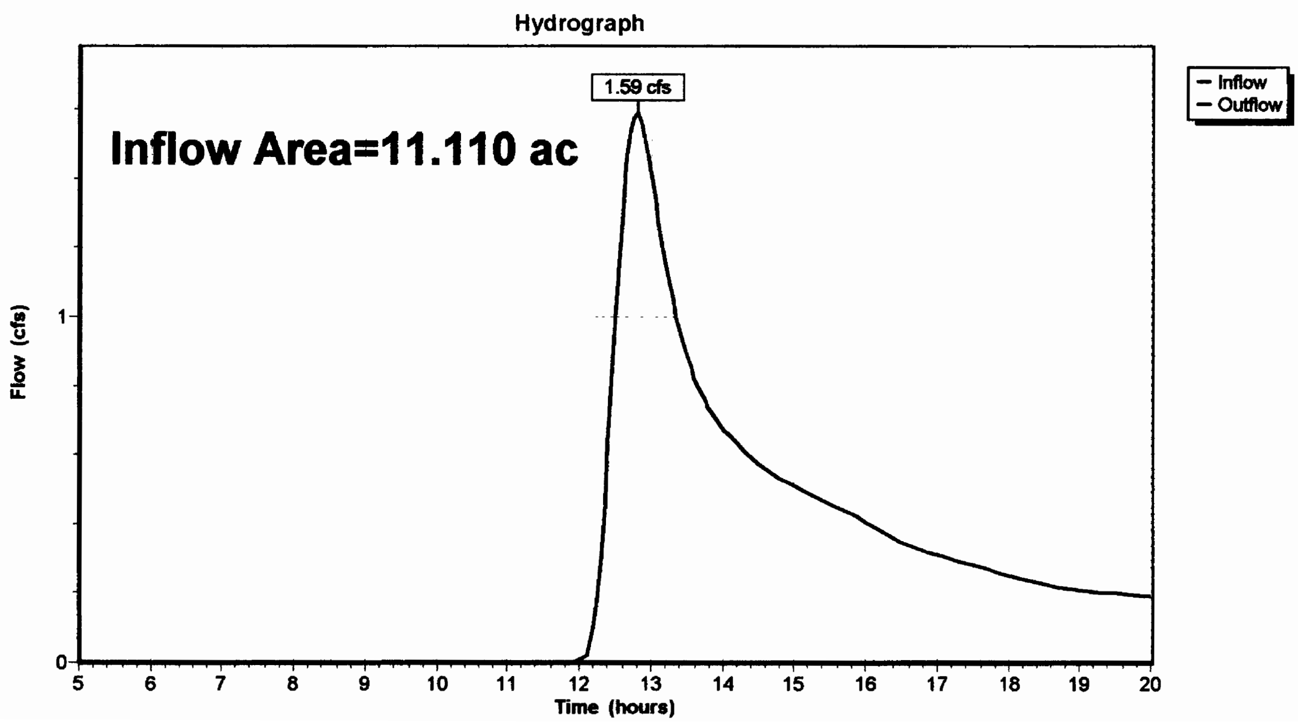
Reach dp5: pre design point 5



Reach dp6: pre design point 6



Reach dp7: pre design point 7

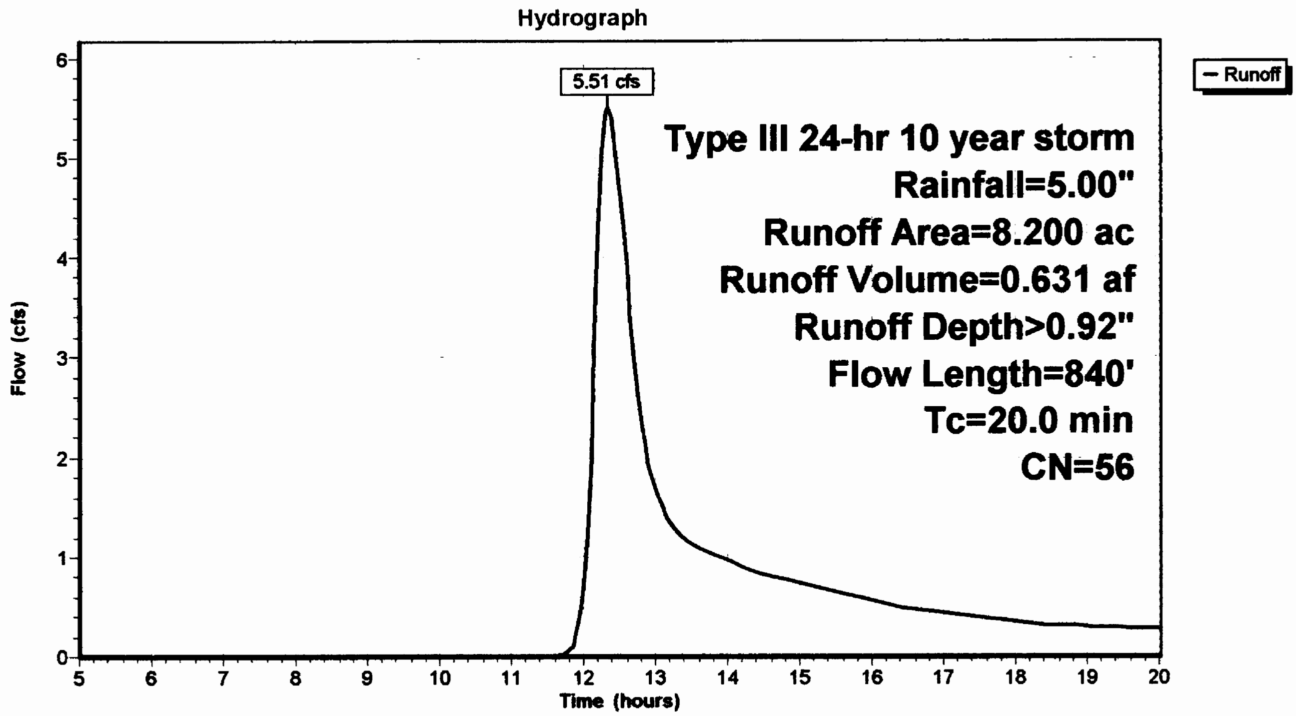


Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

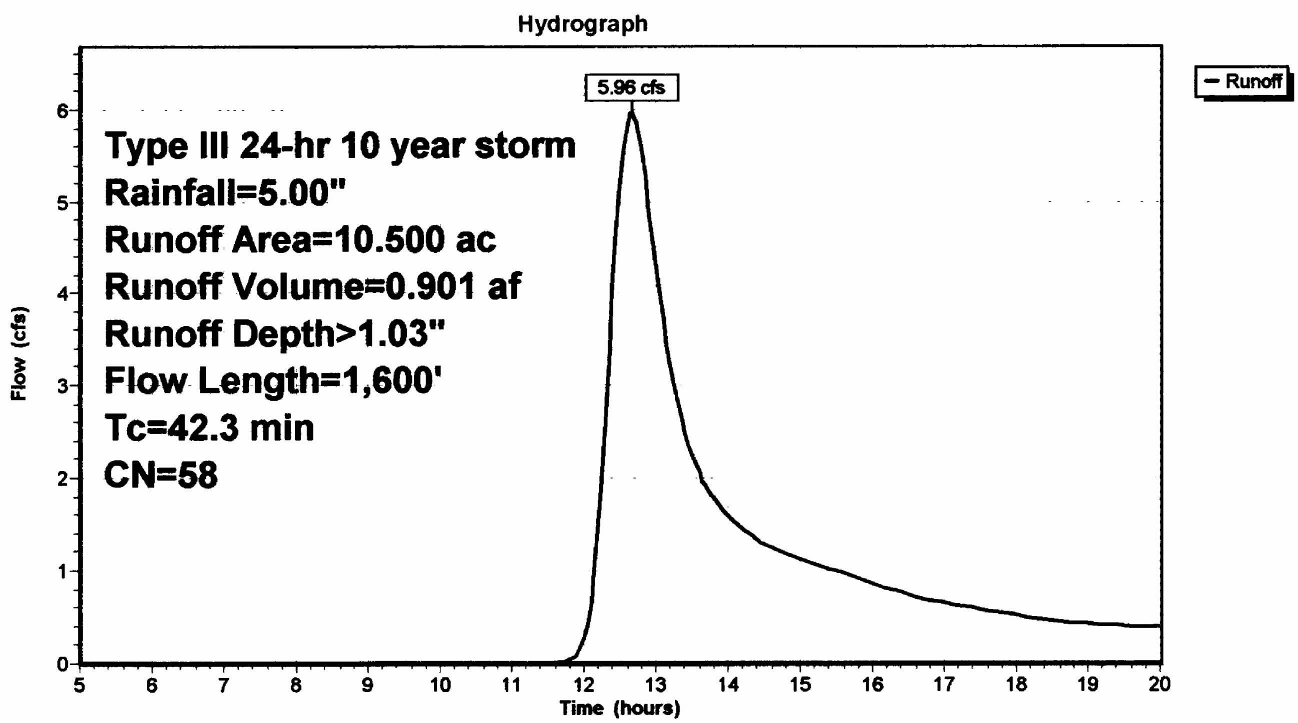
Subcatchment b1: pre basin b1	Runoff Area=8.200 ac Runoff Depth>0.92" Flow Length=840' Tc=20.0 min CN=56 Runoff=5.51 cfs 0.631 af
Subcatchment b2: pre basin b2	Runoff Area=10.500 ac Runoff Depth>1.03" Flow Length=1,600' Tc=42.3 min CN=58 Runoff=5.96 cfs 0.901 af
Subcatchment b3: pre basin b3	Runoff Area=19.700 ac Runoff Depth>1.04" Flow Length=1,960' Tc=27.2 min CN=58 Runoff=13.77 cfs 1.705 af
Subcatchment b4: pre basin b4	Runoff Area=44.900 ac Runoff Depth>0.90" Flow Length=2,265' Tc=68.3 min CN=56 Runoff=16.37 cfs 3.358 af
Subcatchment b5: pre basin b5	Runoff Area=41.940 ac Runoff Depth>0.97" Flow Length=2,210' Tc=49.5 min CN=57 Runoff=20.20 cfs 3.377 af
Subcatchment b6: pre basin b6	Runoff Area=9.420 ac Runoff Depth>0.91" Flow Length=1,350' Tc=51.8 min CN=56 Runoff=4.07 cfs 0.712 af
Subcatchment b7: pre basin b7	Runoff Area=11.110 ac Runoff Depth>0.97" Flow Length=1,390' Tc=43.5 min CN=57 Runoff=5.76 cfs 0.898 af
Reach dp1: pre design point 1	Inflow=5.51 cfs 0.631 af Outflow=5.51 cfs 0.631 af
Reach dp2: pre design point 2	Inflow=5.96 cfs 0.901 af Outflow=5.96 cfs 0.901 af
Reach dp3: pre design point 3	Inflow=13.77 cfs 1.705 af Outflow=13.77 cfs 1.705 af
Reach dp4: pre design point 4	Inflow=16.37 cfs 3.358 af Outflow=16.37 cfs 3.358 af
Reach dp5: pre design point 5	Inflow=20.20 cfs 3.377 af Outflow=20.20 cfs 3.377 af
Reach dp6: pre design point 6	Inflow=4.07 cfs 0.712 af Outflow=4.07 cfs 0.712 af
Reach dp7: pre design point 7	Inflow=5.76 cfs 0.898 af Outflow=5.76 cfs 0.898 af

Total Runoff Area = 145.770 ac Runoff Volume = 11.581 af Average Runoff Depth = 0.95"

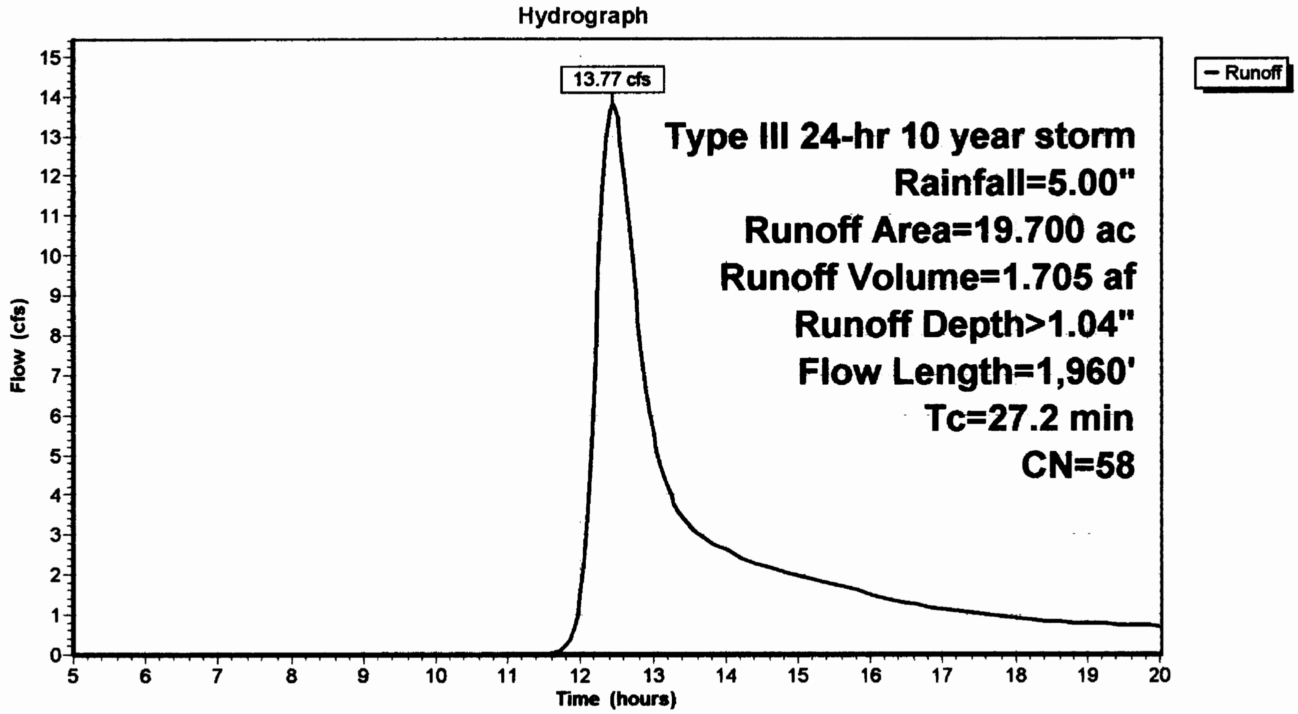
Subcatchment b1: pre basin b1



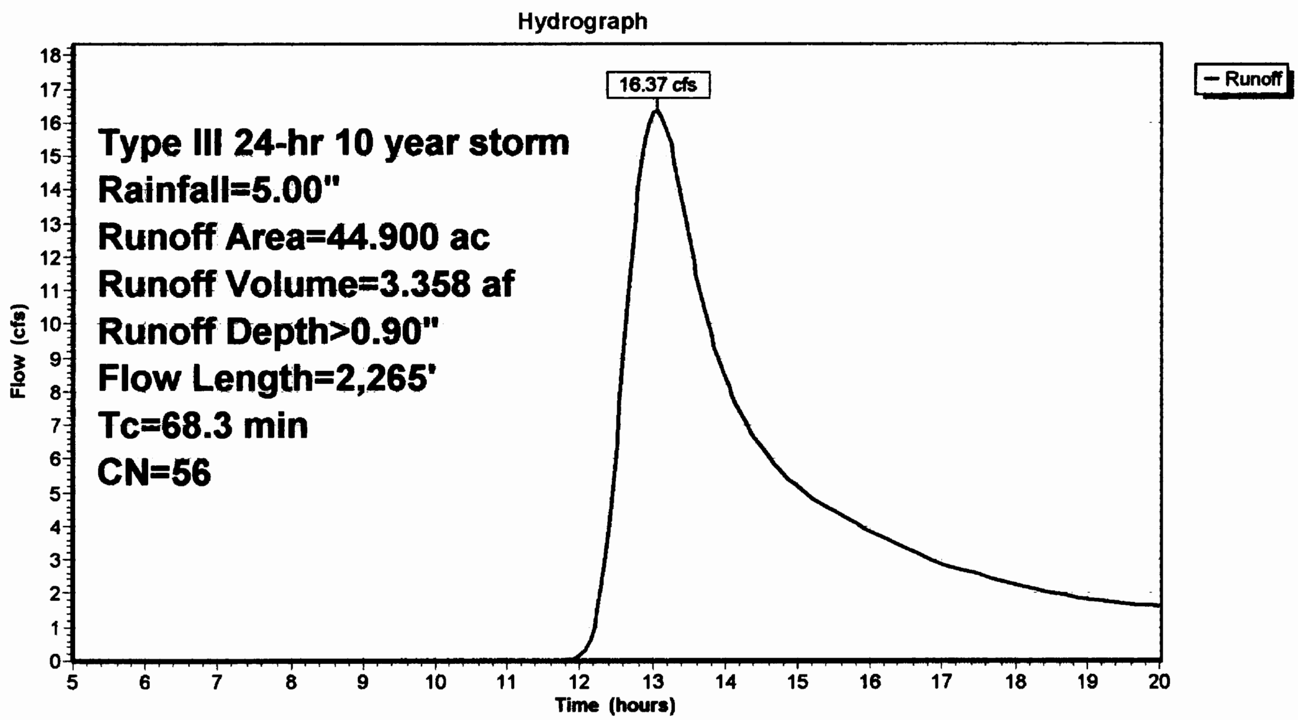
Subcatchment b2: pre basin b2



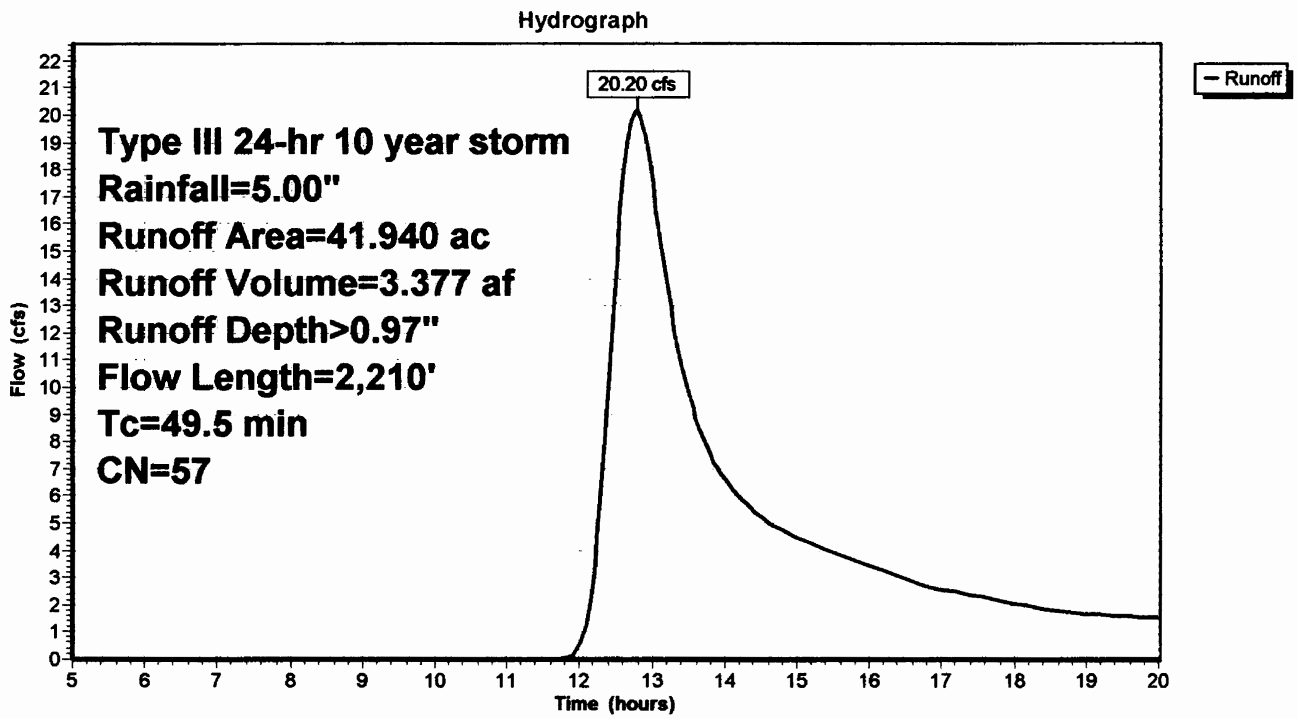
Subcatchment b3: pre basin b3



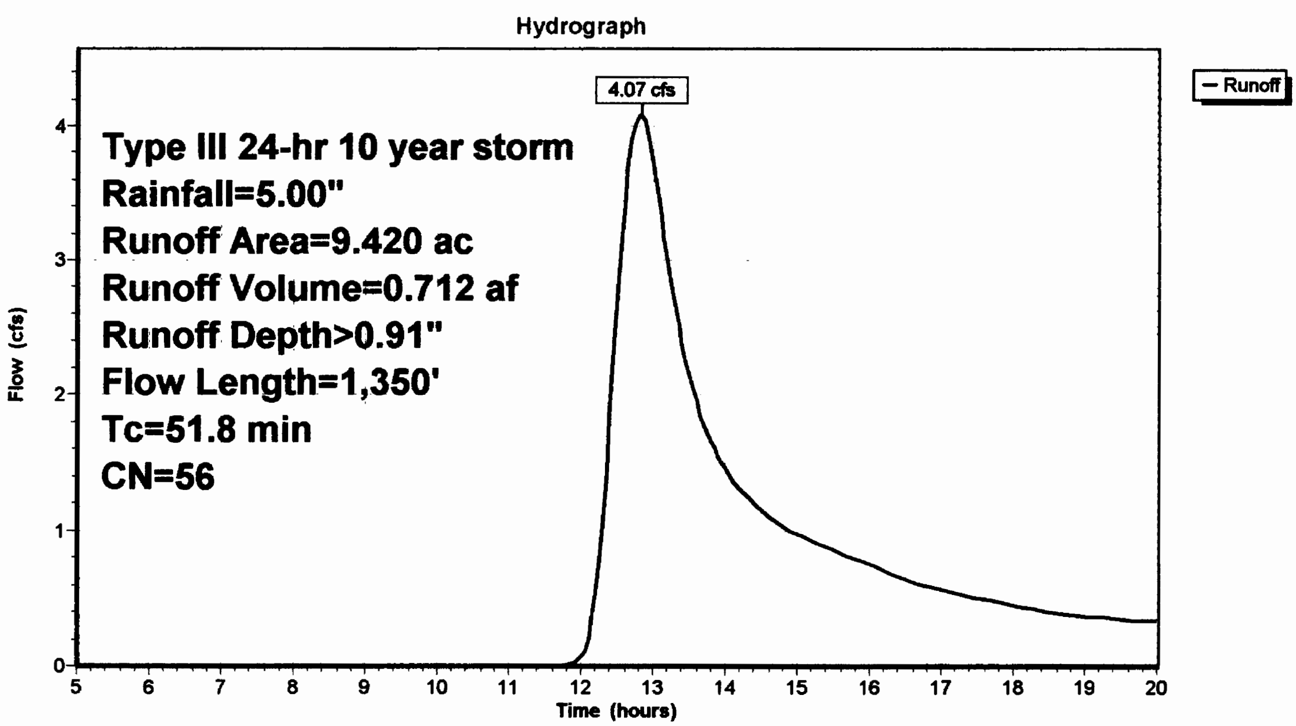
Subcatchment b4: pre basin b4



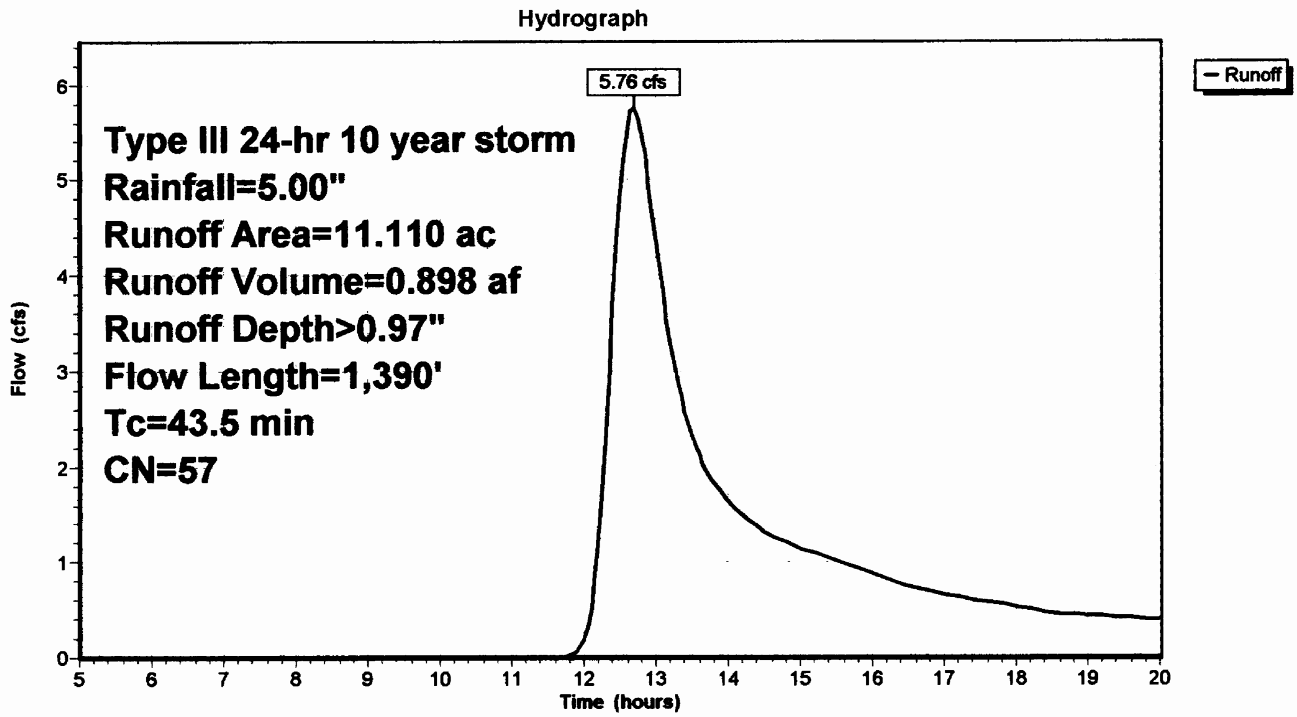
Subcatchment b5: pre basin b5



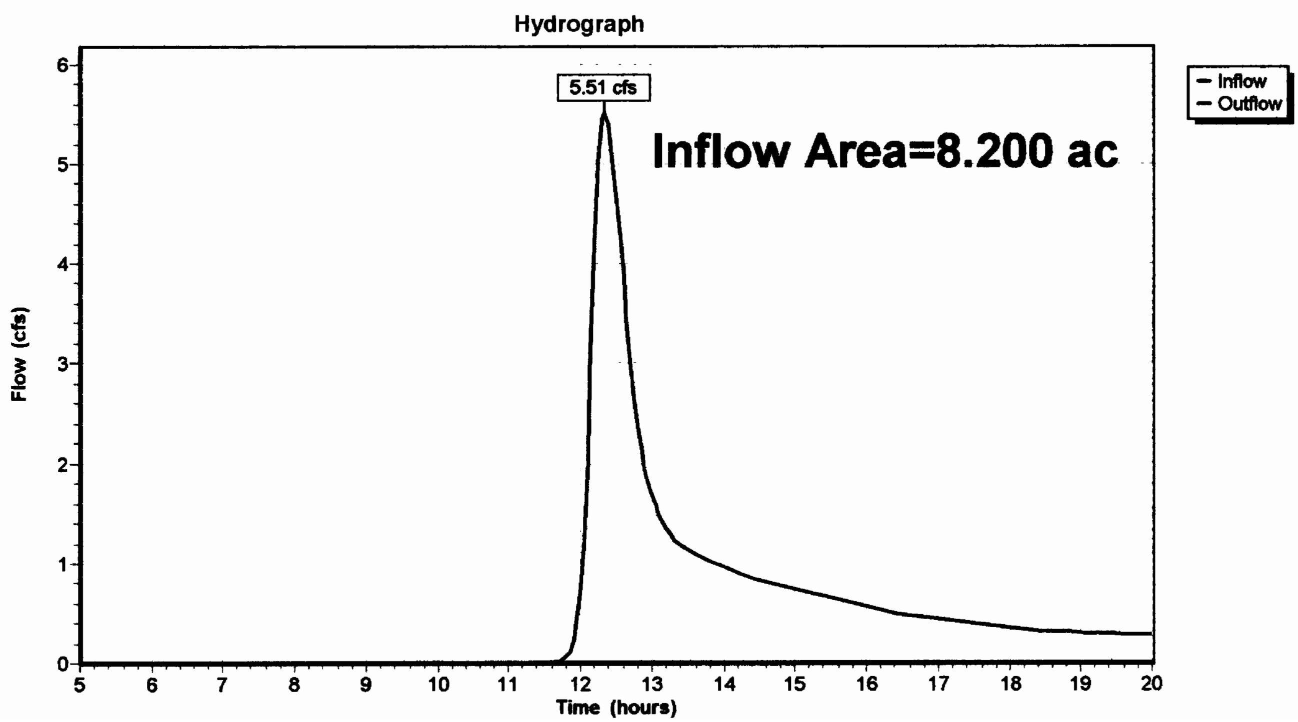
Subcatchment b6: pre basin b6



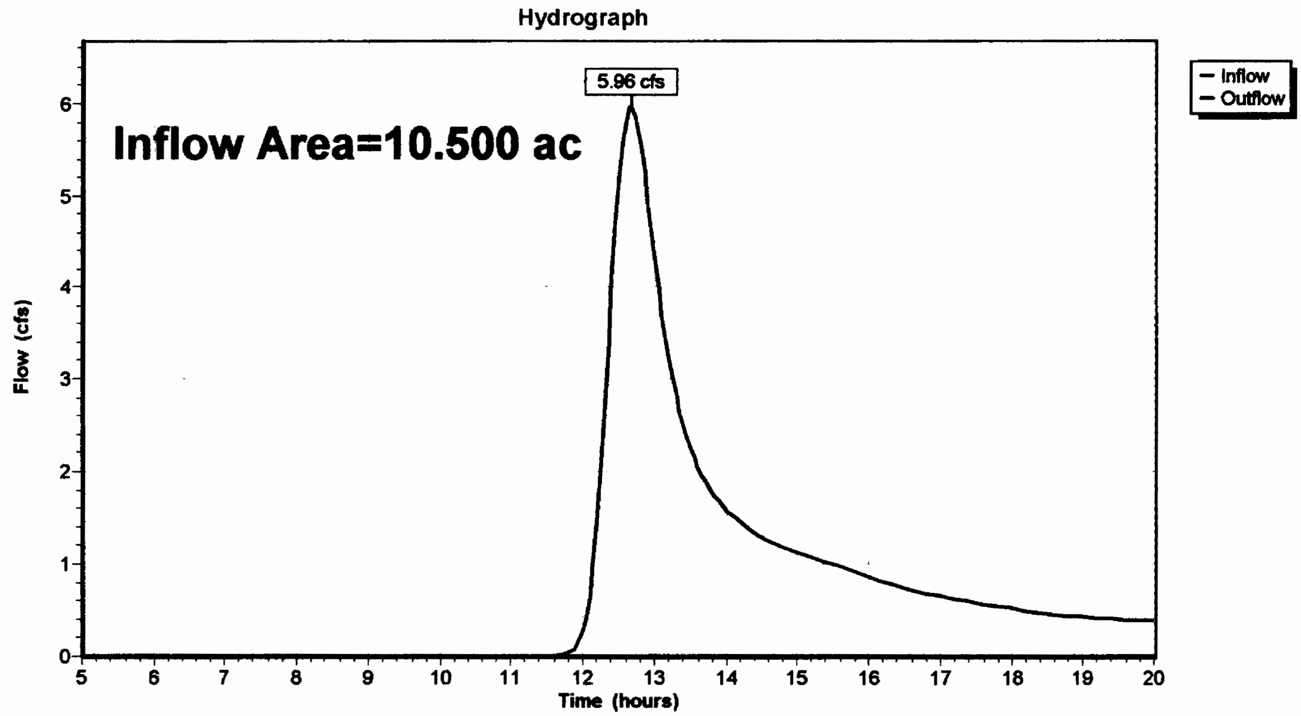
Subcatchment b7: pre basin b7



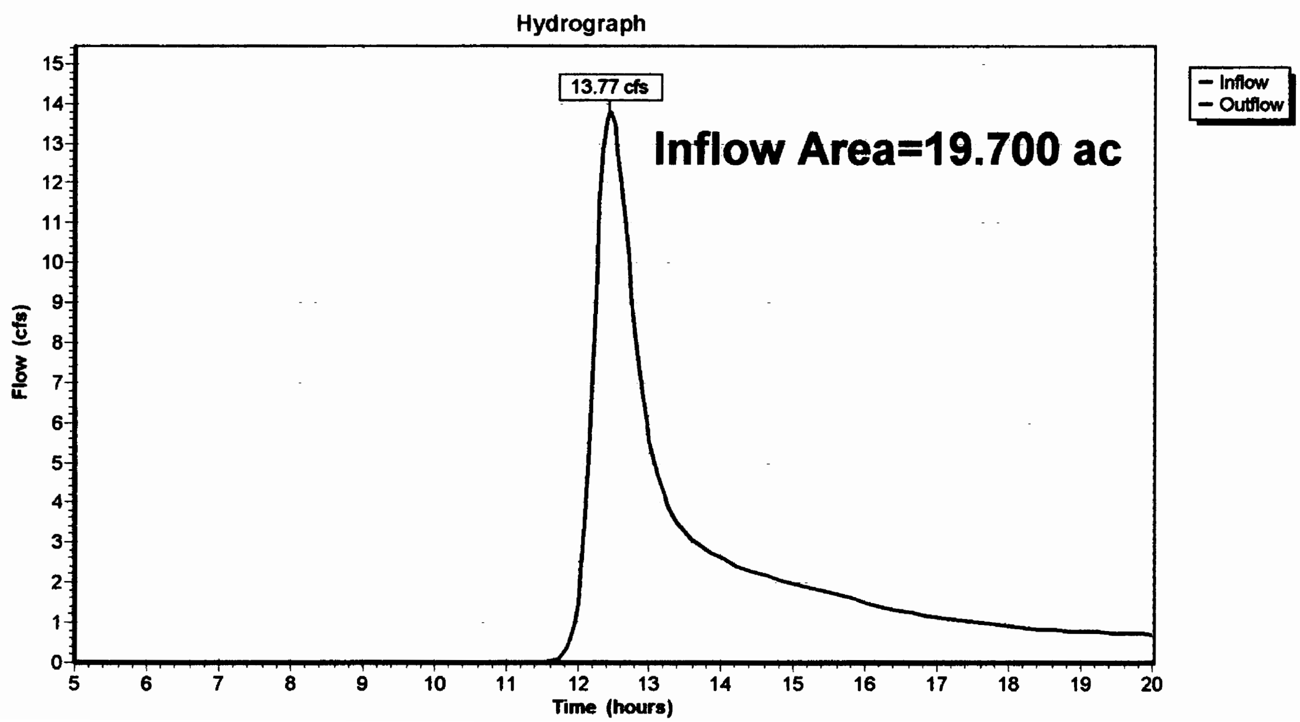
Reach dp1: pre design point 1



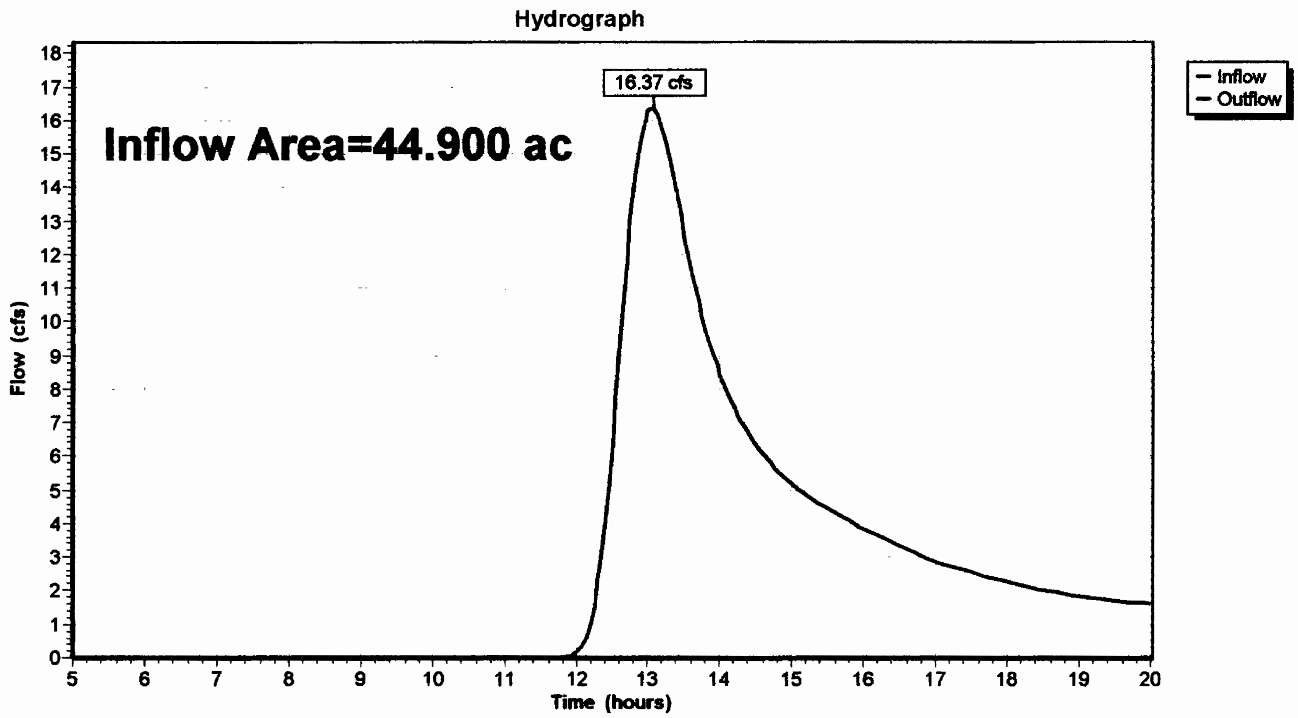
Reach dp2: pre design point 2



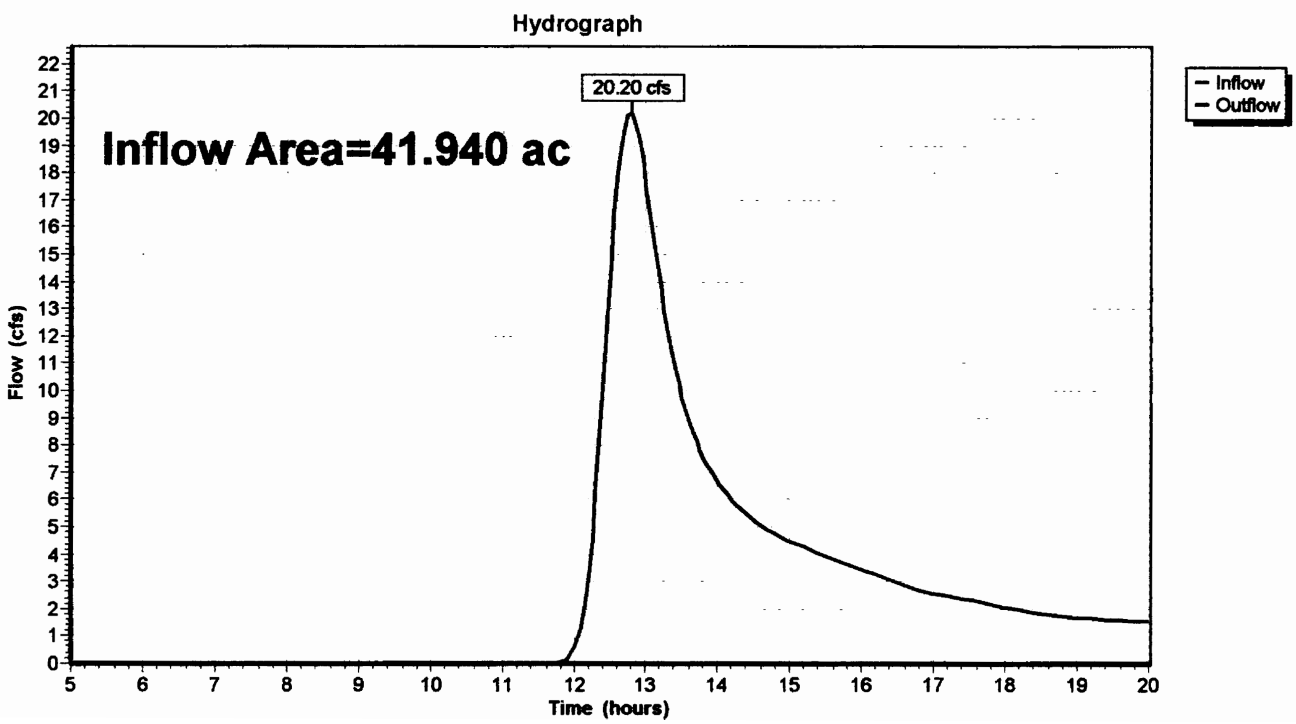
Reach dp3: pre design point 3



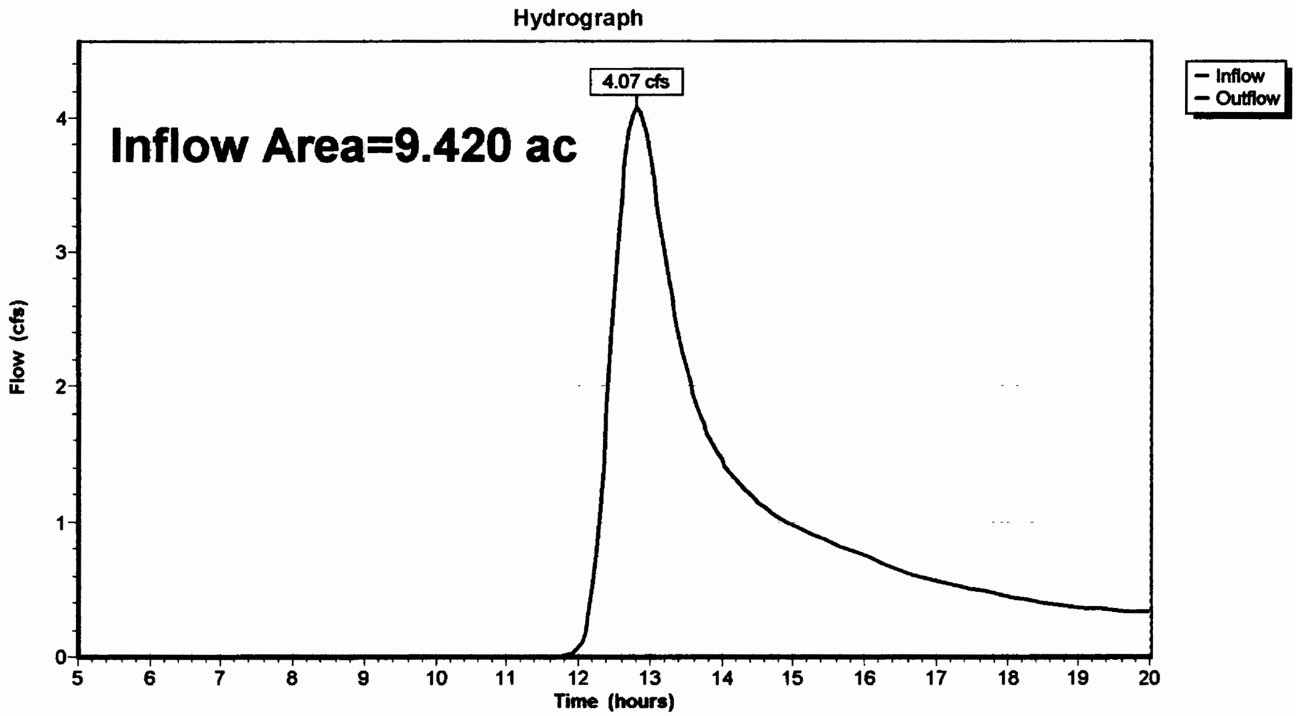
Reach dp4: pre design point 4



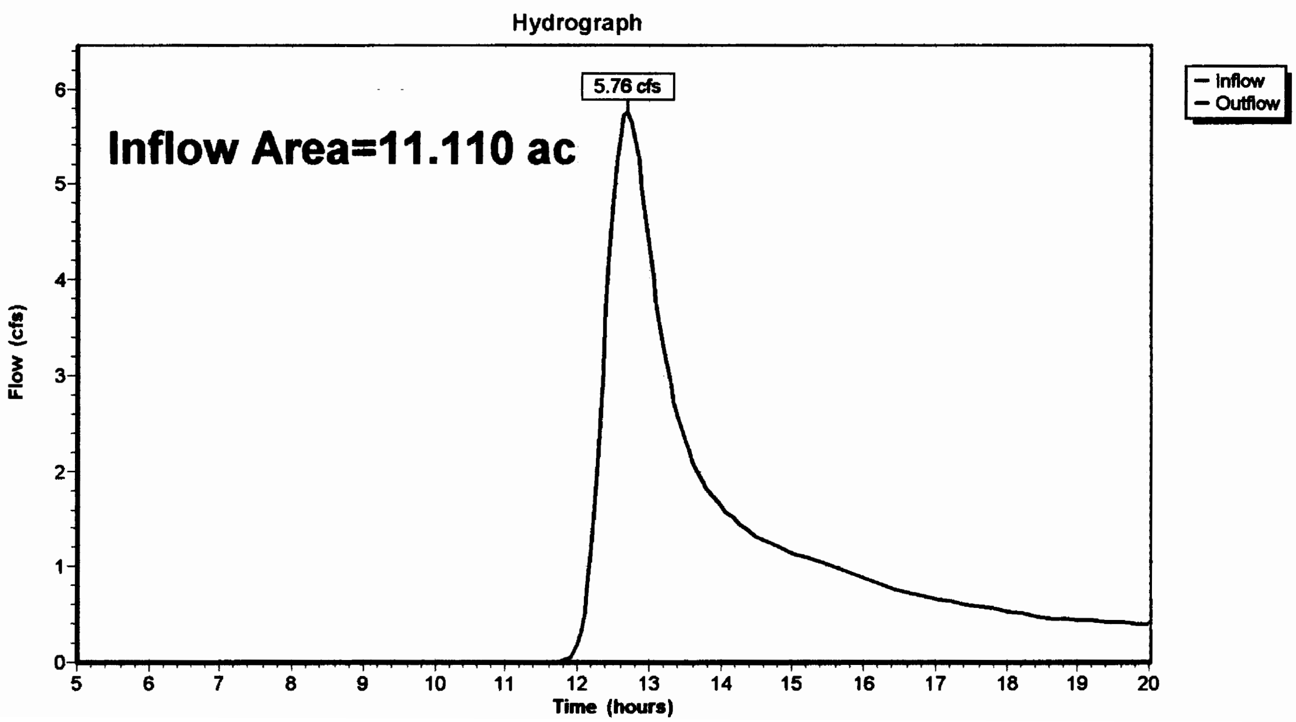
Reach dp5: pre design point 5



Reach dp6: pre design point 6



Reach dp7: pre design point 7

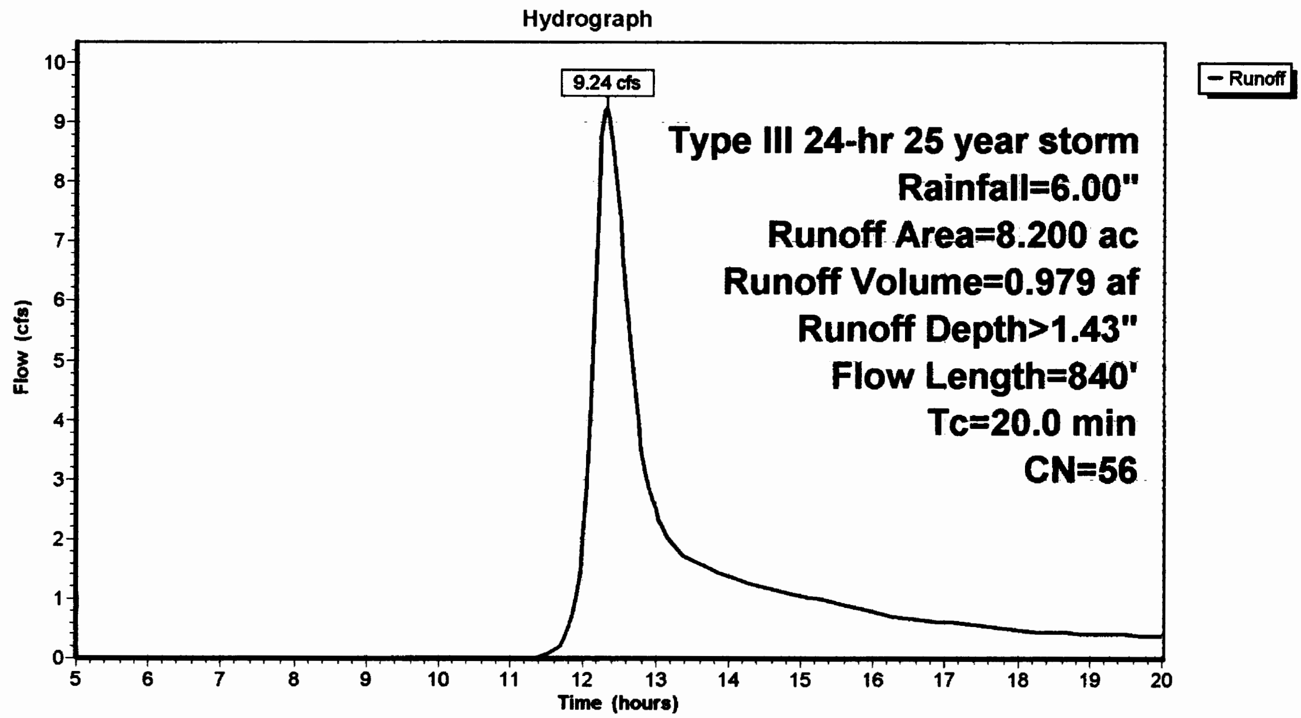


Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

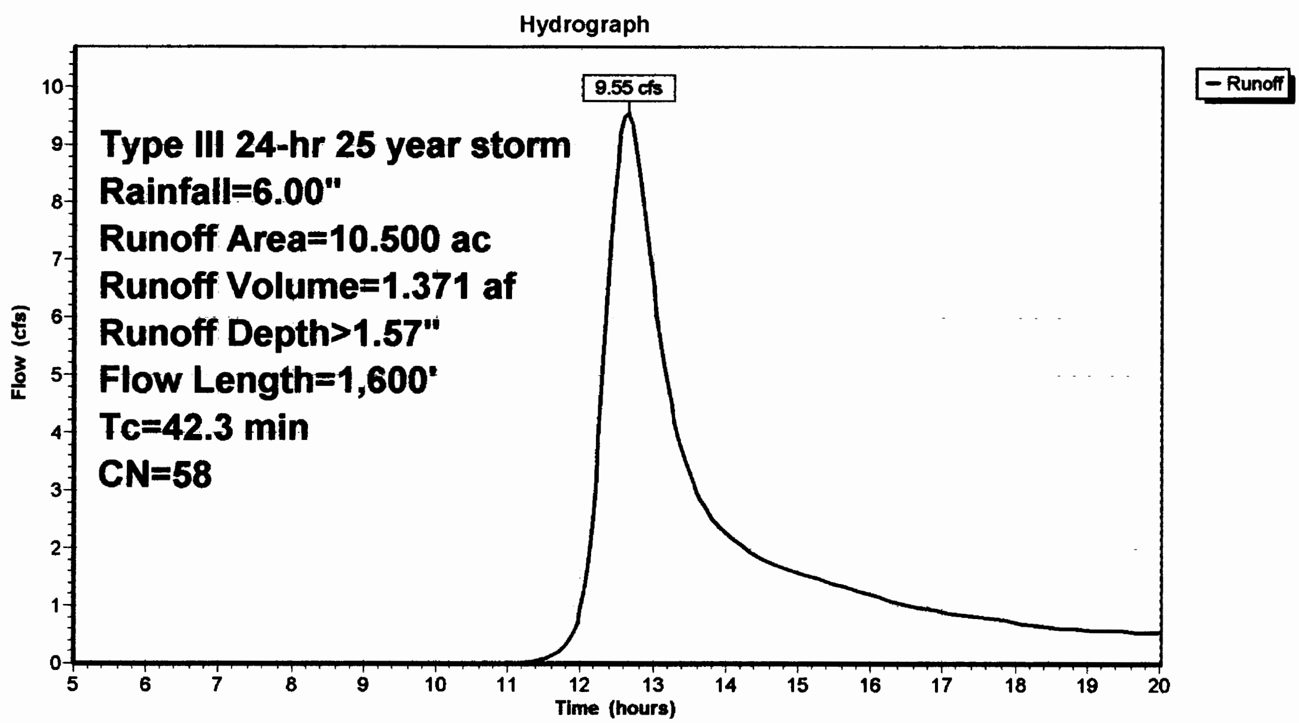
Subcatchment b1: pre basin b1	Runoff Area=8.200 ac Runoff Depth>1.43"
	Flow Length=840' Tc=20.0 min CN=56 Runoff=9.24 cfs 0.979 af
Subcatchment b2: pre basin b2	Runoff Area=10.500 ac Runoff Depth>1.57"
	Flow Length=1,600' Tc=42.3 min CN=58 Runoff=9.55 cfs 1.371 af
Subcatchment b3: pre basin b3	Runoff Area=19.700 ac Runoff Depth>1.58"
	Flow Length=1,960' Tc=27.2 min CN=58 Runoff=22.10 cfs 2.592 af
Subcatchment b4: pre basin b4	Runoff Area=44.900 ac Runoff Depth>1.40"
	Flow Length=2,265' Tc=68.3 min CN=56 Runoff=27.25 cfs 5.227 af
Subcatchment b5: pre basin b5	Runoff Area=41.940 ac Runoff Depth>1.49"
	Flow Length=2,210' Tc=49.5 min CN=57 Runoff=32.95 cfs 5.193 af
Subcatchment b6: pre basin b6	Runoff Area=9.420 ac Runoff Depth>1.41"
	Flow Length=1,350' Tc=51.8 min CN=56 Runoff=6.77 cfs 1.107 af
Subcatchment b7: pre basin b7	Runoff Area=11.110 ac Runoff Depth>1.49"
	Flow Length=1,390' Tc=43.5 min CN=57 Runoff=9.38 cfs 1.380 af
Reach dp1: pre design point 1	Inflow=9.24 cfs 0.979 af
	Outflow=9.24 cfs 0.979 af
Reach dp2: pre design point 2	Inflow=9.55 cfs 1.371 af
	Outflow=9.55 cfs 1.371 af
Reach dp3: pre design point 3	Inflow=22.10 cfs 2.592 af
	Outflow=22.10 cfs 2.592 af
Reach dp4: pre design point 4	Inflow=27.25 cfs 5.227 af
	Outflow=27.25 cfs 5.227 af
Reach dp5: pre design point 5	Inflow=32.95 cfs 5.193 af
	Outflow=32.95 cfs 5.193 af
Reach dp6: pre design point 6	Inflow=6.77 cfs 1.107 af
	Outflow=6.77 cfs 1.107 af
Reach dp7: pre design point 7	Inflow=9.38 cfs 1.380 af
	Outflow=9.38 cfs 1.380 af

Total Runoff Area = 145.770 ac Runoff Volume = 17.850 af Average Runoff Depth = 1.47"

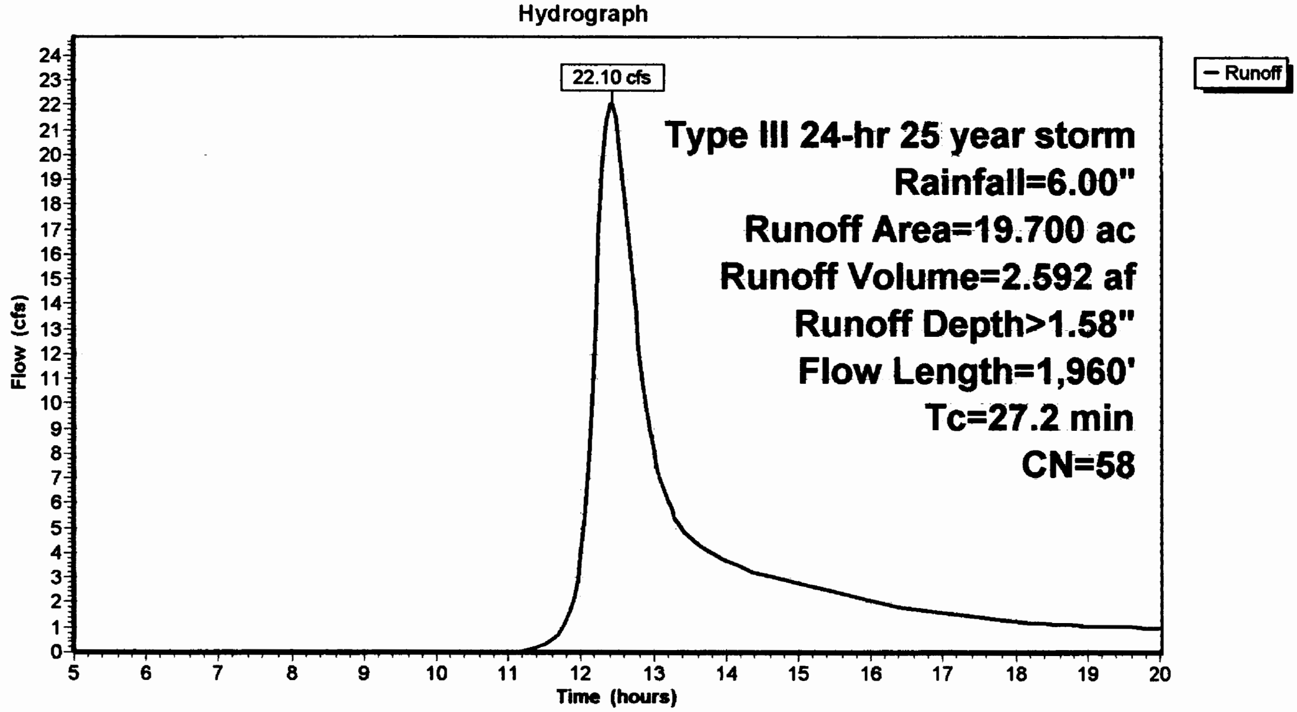
Subcatchment b1: pre basin b1



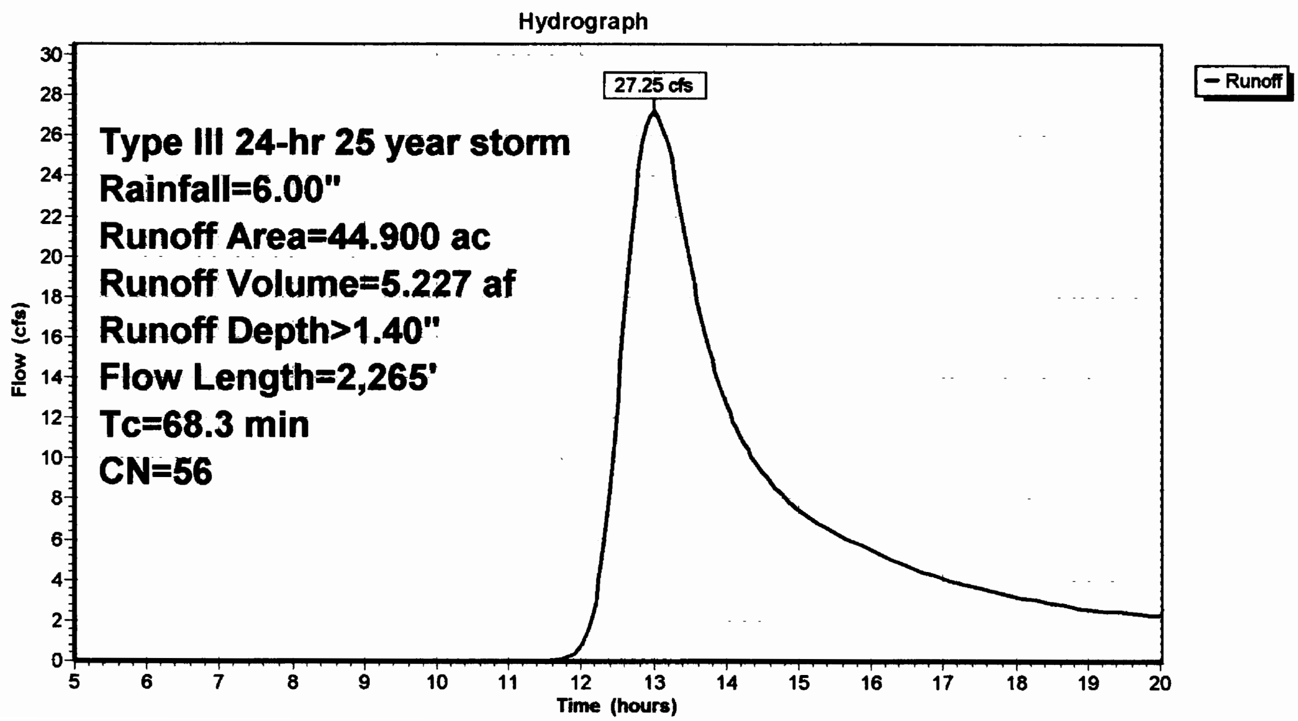
Subcatchment b2: pre basin b2



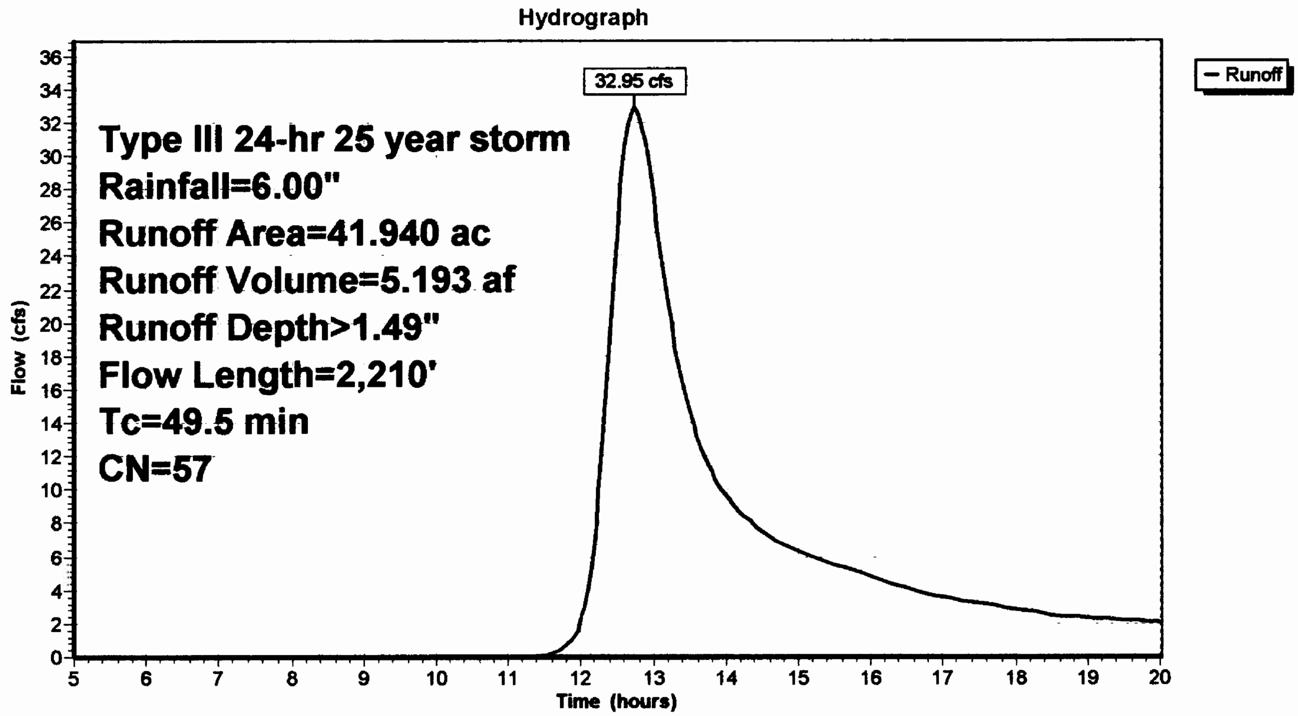
Subcatchment b3: pre basin b3



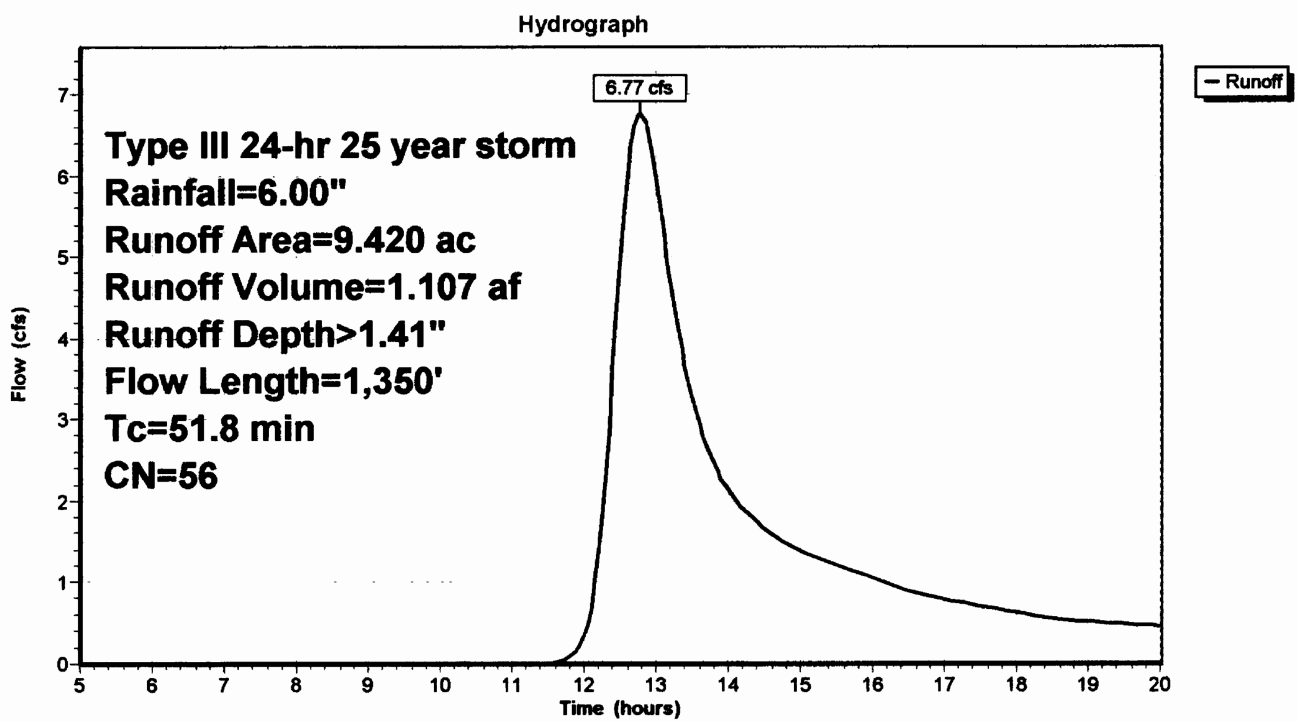
Subcatchment b4: pre basin b4



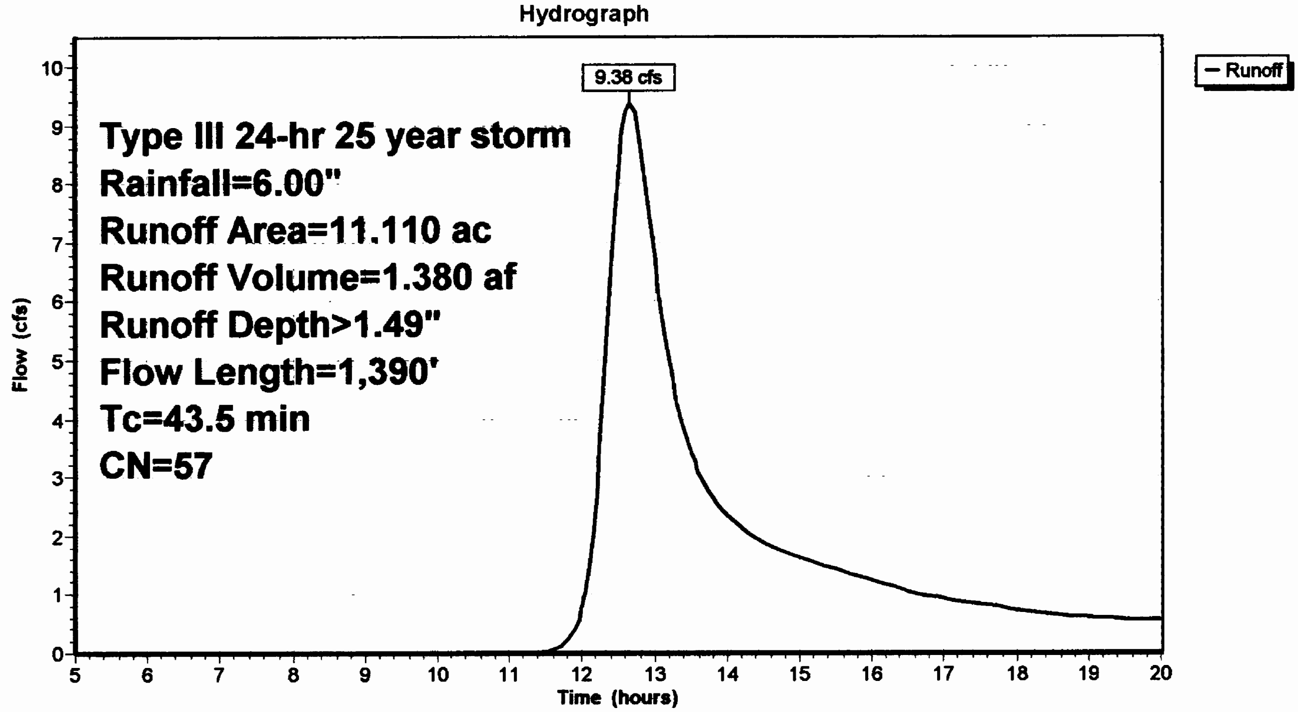
Subcatchment b5: pre basin b5



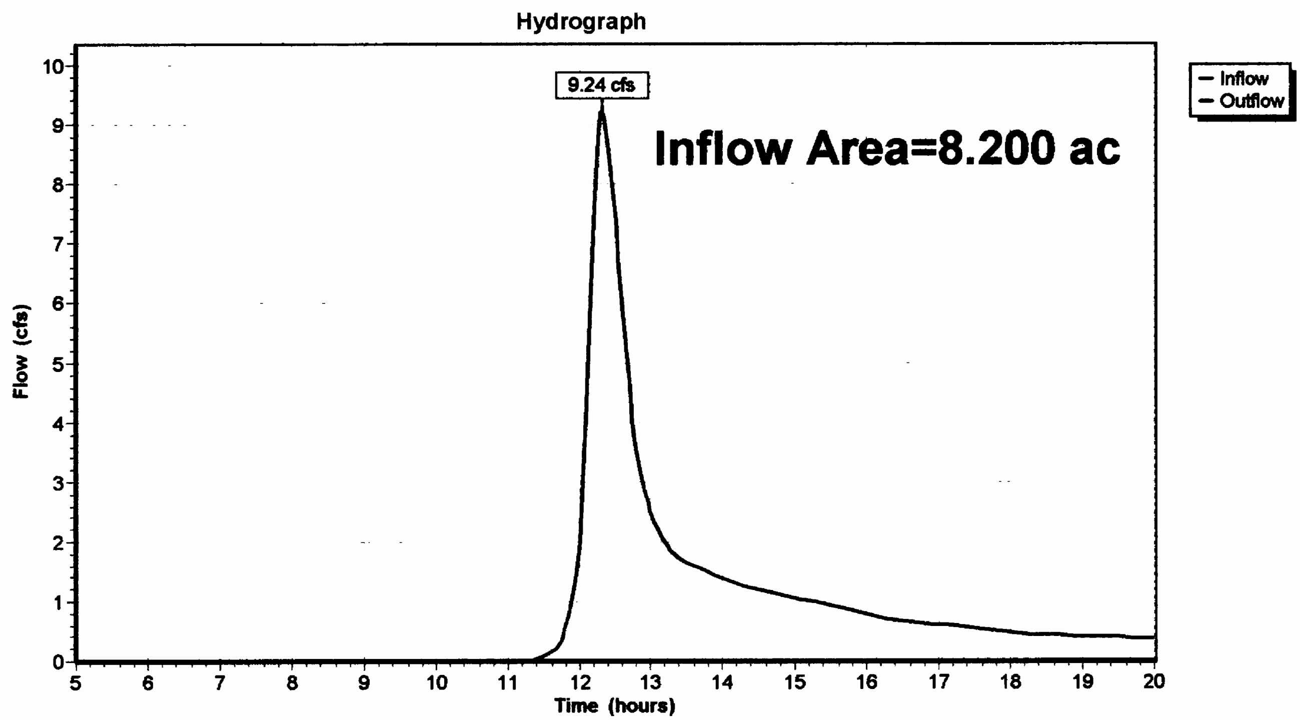
Subcatchment b6: pre basin b6



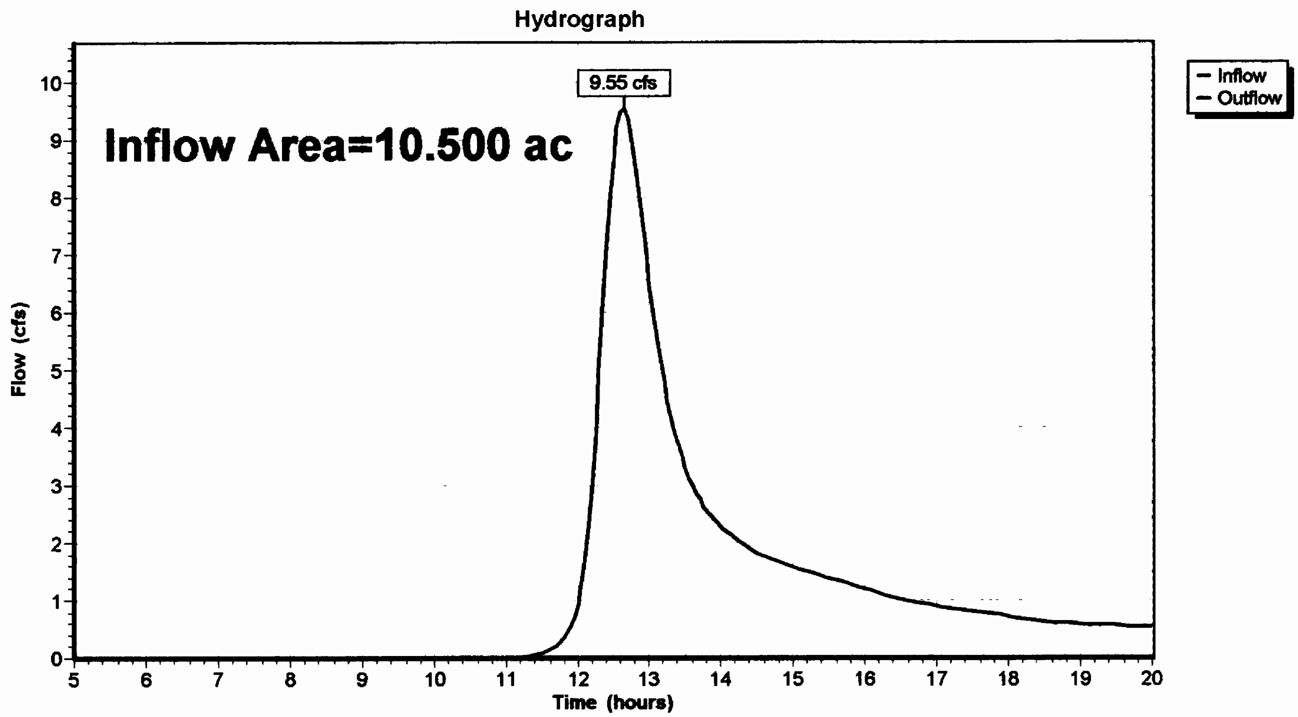
Subcatchment b7: pre basin b7



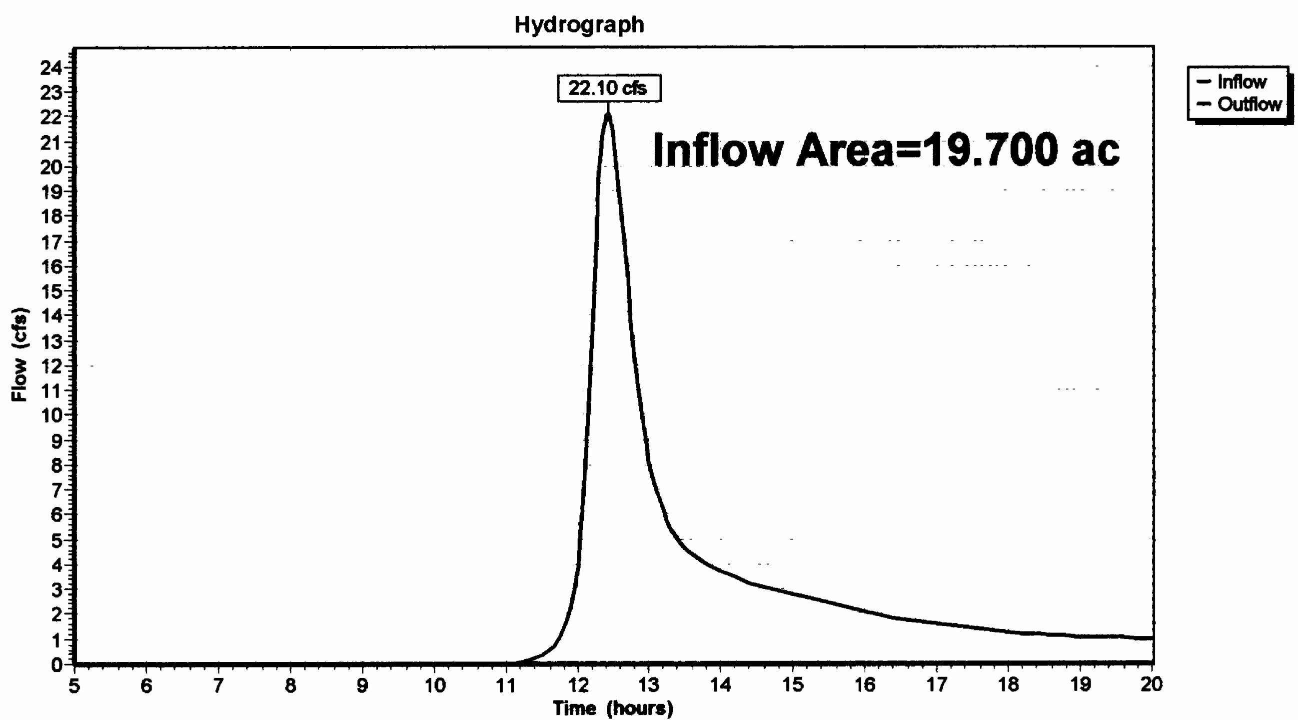
Reach dp1: pre design point 1



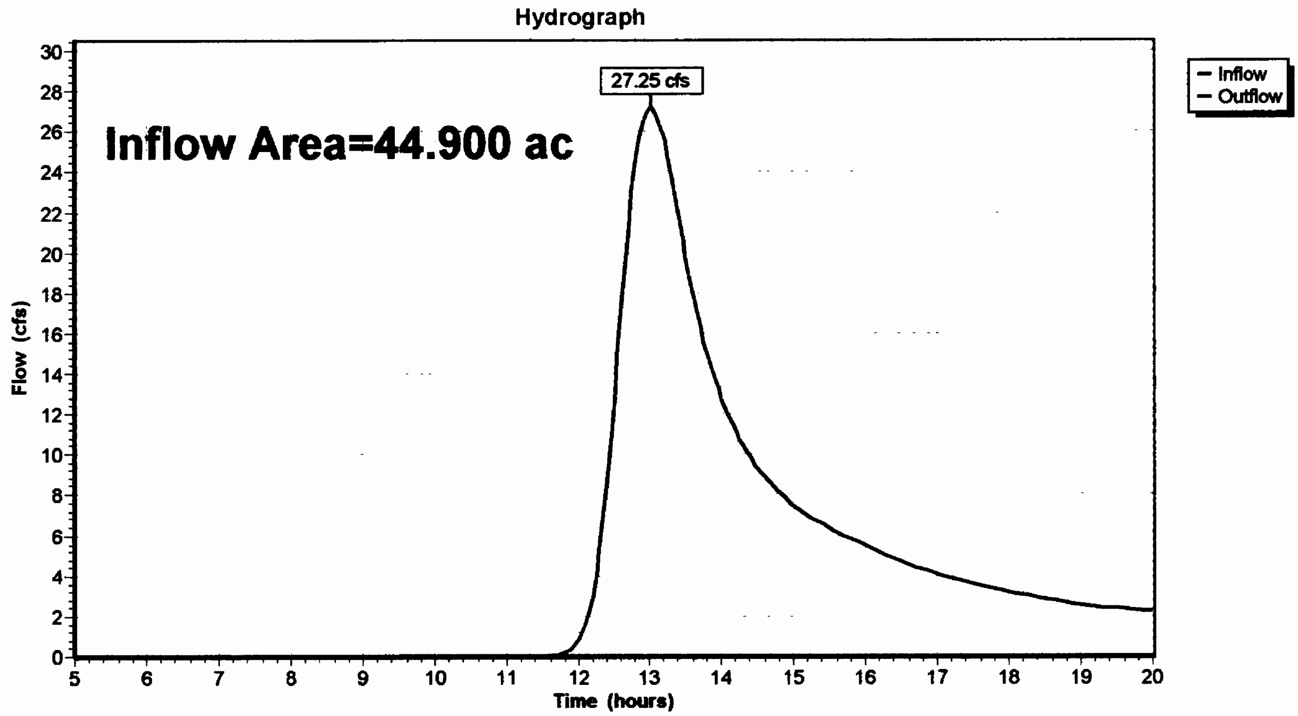
Reach dp2: pre design point 2



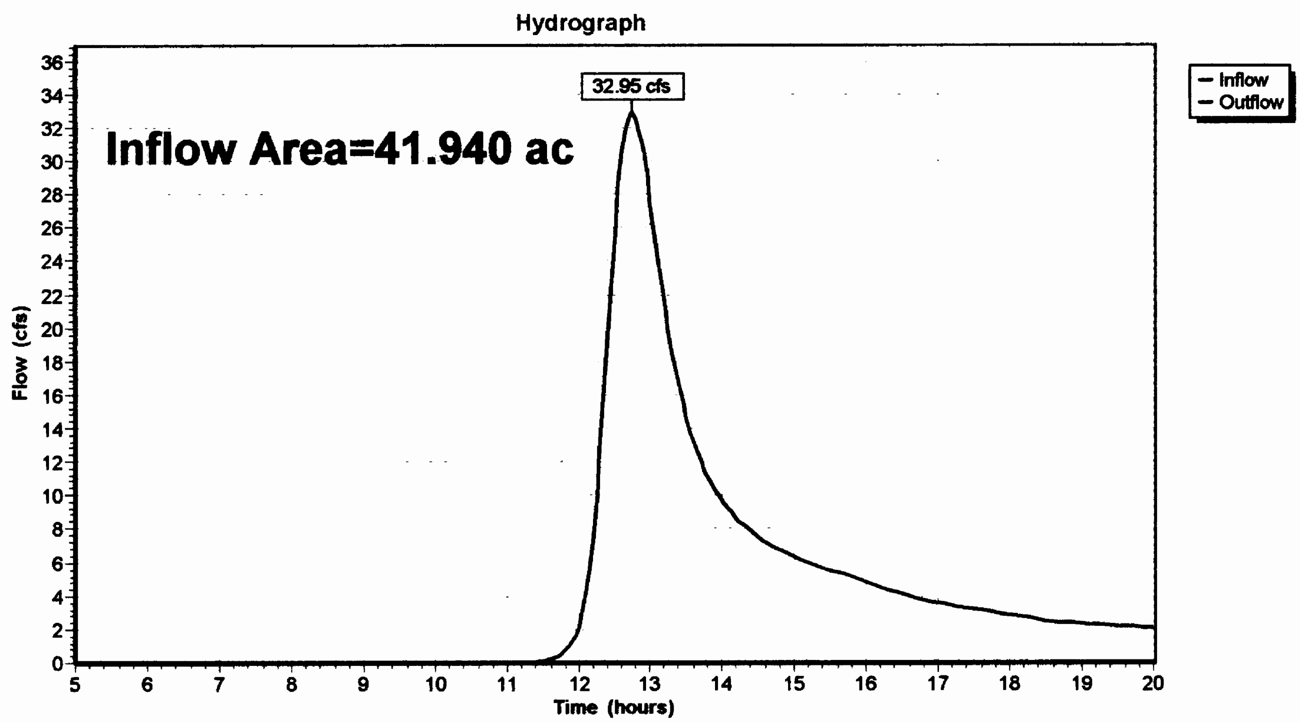
Reach dp3: pre design point 3



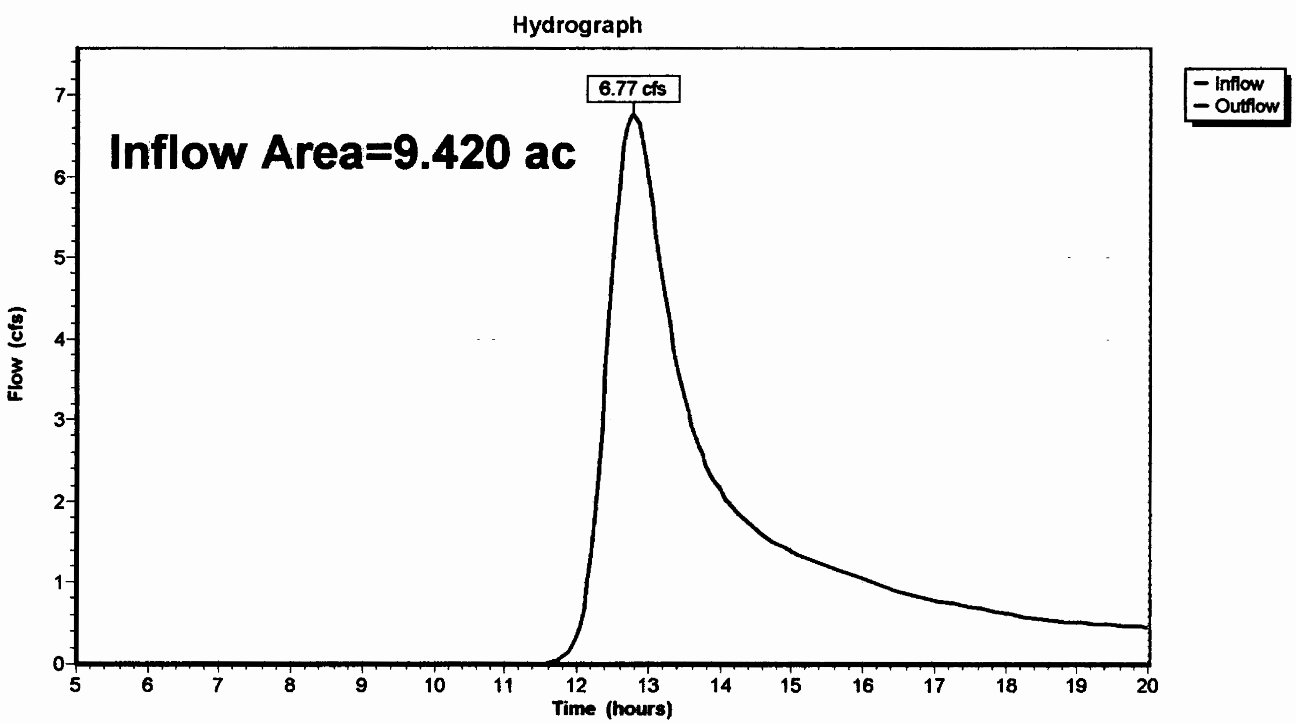
Reach dp4: pre design point 4



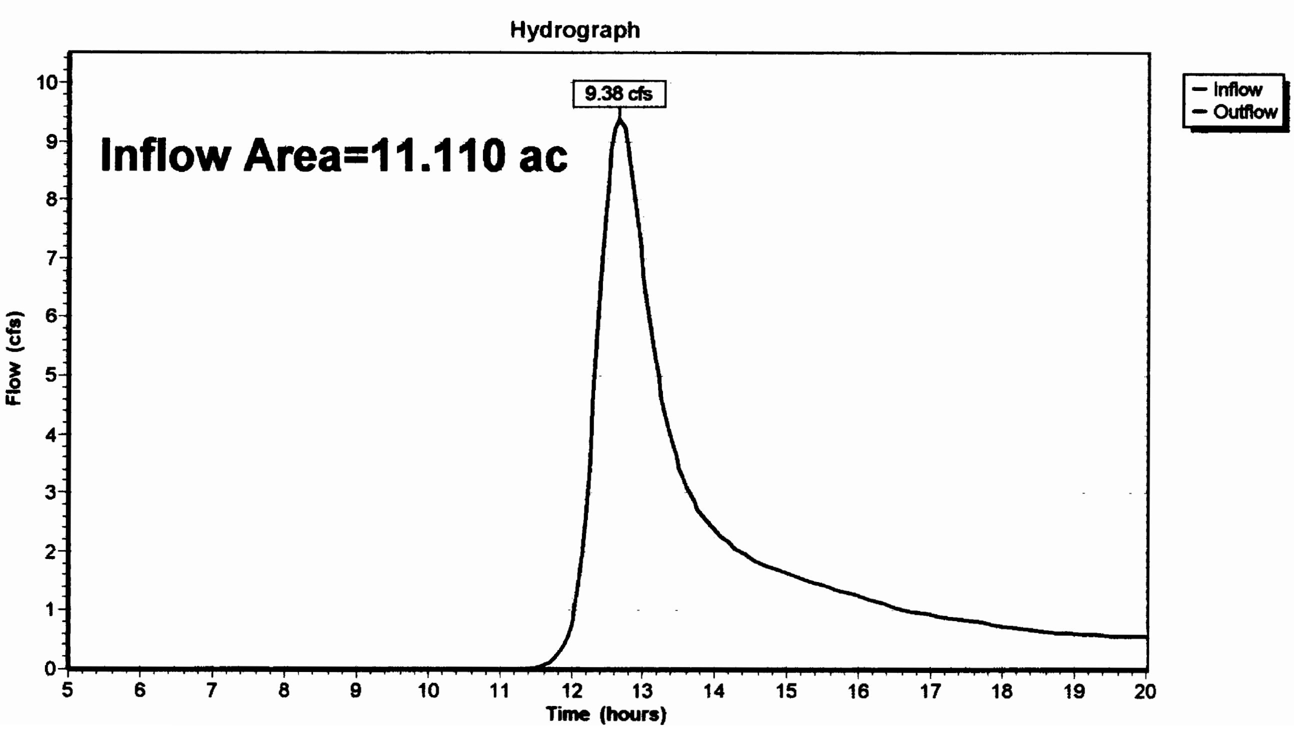
Reach dp5: pre design point 5



Reach dp6: pre design point 6



Reach dp7: pre design point 7



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment b1: pre basin b1 Runoff Area=8.200 ac Runoff Depth>2.32"
Flow Length=840' Tc=20.0 min CN=56 Runoff=15.65 cfs 1.582 af

Subcatchment b2: pre basin b2 Runoff Area=10.500 ac Runoff Depth>2.49"
Flow Length=1,600' Tc=42.3 min CN=58 Runoff=15.63 cfs 2.176 af

Subcatchment b3: pre basin b3 Runoff Area=19.700 ac Runoff Depth>2.50"
Flow Length=1,960' Tc=27.2 min CN=58 Runoff=36.22 cfs 4.110 af

Subcatchment b4: pre basin b4 Runoff Area=44.900 ac Runoff Depth>2.26"
Flow Length=2,265' Tc=68.3 min CN=56 Runoff=46.15 cfs 8.469 af

Subcatchment b5: pre basin b5 Runoff Area=41.940 ac Runoff Depth>2.38"
Flow Length=2,210' Tc=49.5 min CN=57 Runoff=54.90 cfs 8.322 af

Subcatchment b6: pre basin b6 Runoff Area=9.420 ac Runoff Depth>2.28"
Flow Length=1,350' Tc=51.8 min CN=56 Runoff=11.46 cfs 1.791 af

Subcatchment b7: pre basin b7 Runoff Area=11.110 ac Runoff Depth>2.39"
Flow Length=1,390' Tc=43.5 min CN=57 Runoff=15.60 cfs 2.211 af

Reach dp1: pre design point 1 Inflow=15.65 cfs 1.582 af
Outflow=15.65 cfs 1.582 af

Reach dp2: pre design point 2 Inflow=15.63 cfs 2.176 af
Outflow=15.63 cfs 2.176 af

Reach dp3: pre design point 3 Inflow=36.22 cfs 4.110 af
Outflow=36.22 cfs 4.110 af

Reach dp4: pre design point 4 Inflow=46.15 cfs 8.469 af
Outflow=46.15 cfs 8.469 af

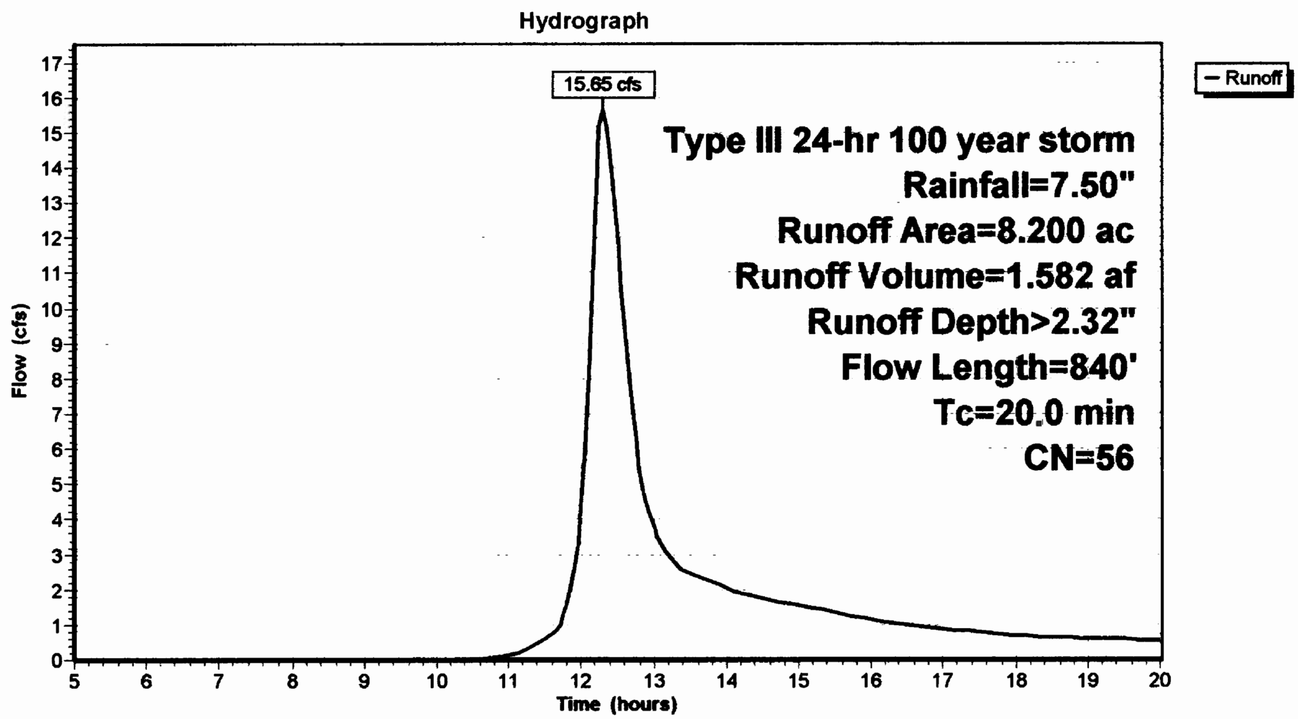
Reach dp5: pre design point 5 Inflow=54.90 cfs 8.322 af
Outflow=54.90 cfs 8.322 af

Reach dp6: pre design point 6 Inflow=11.46 cfs 1.791 af
Outflow=11.46 cfs 1.791 af

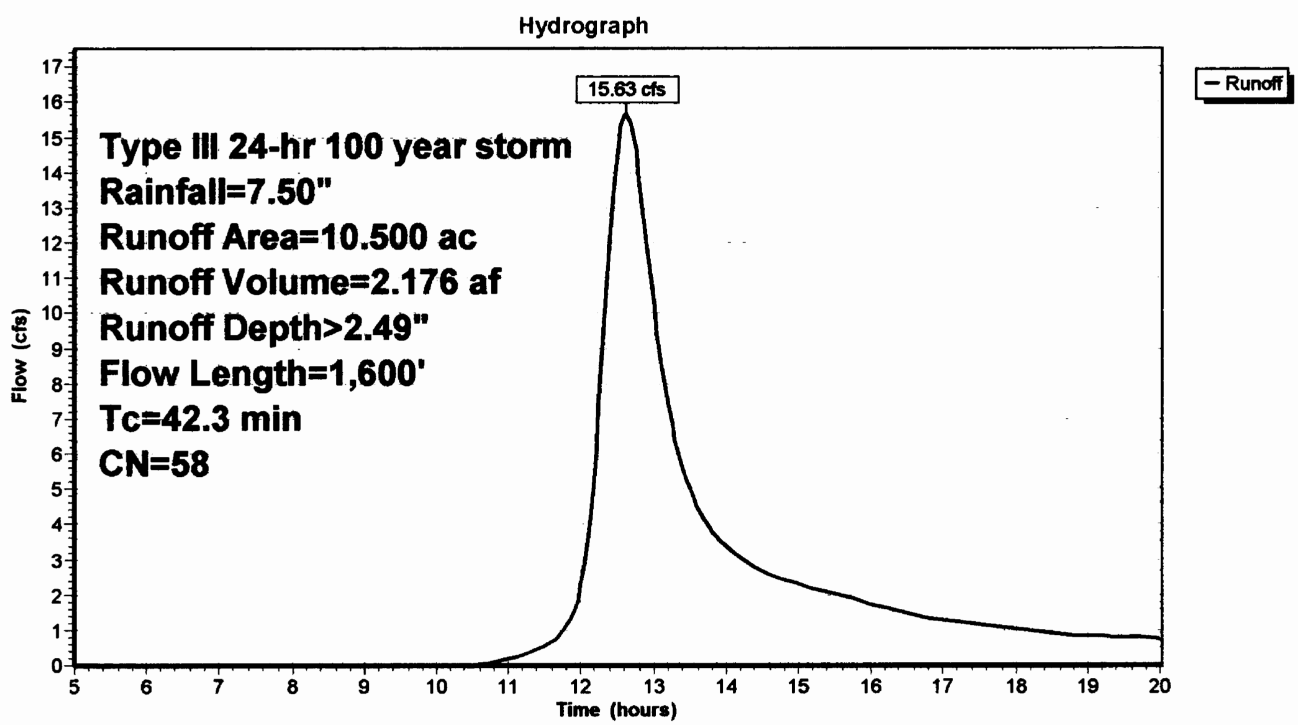
Reach dp7: pre design point 7 Inflow=15.60 cfs 2.211 af
Outflow=15.60 cfs 2.211 af

Total Runoff Area = 145.770 ac Runoff Volume = 28.661 af Average Runoff Depth = 2.36"

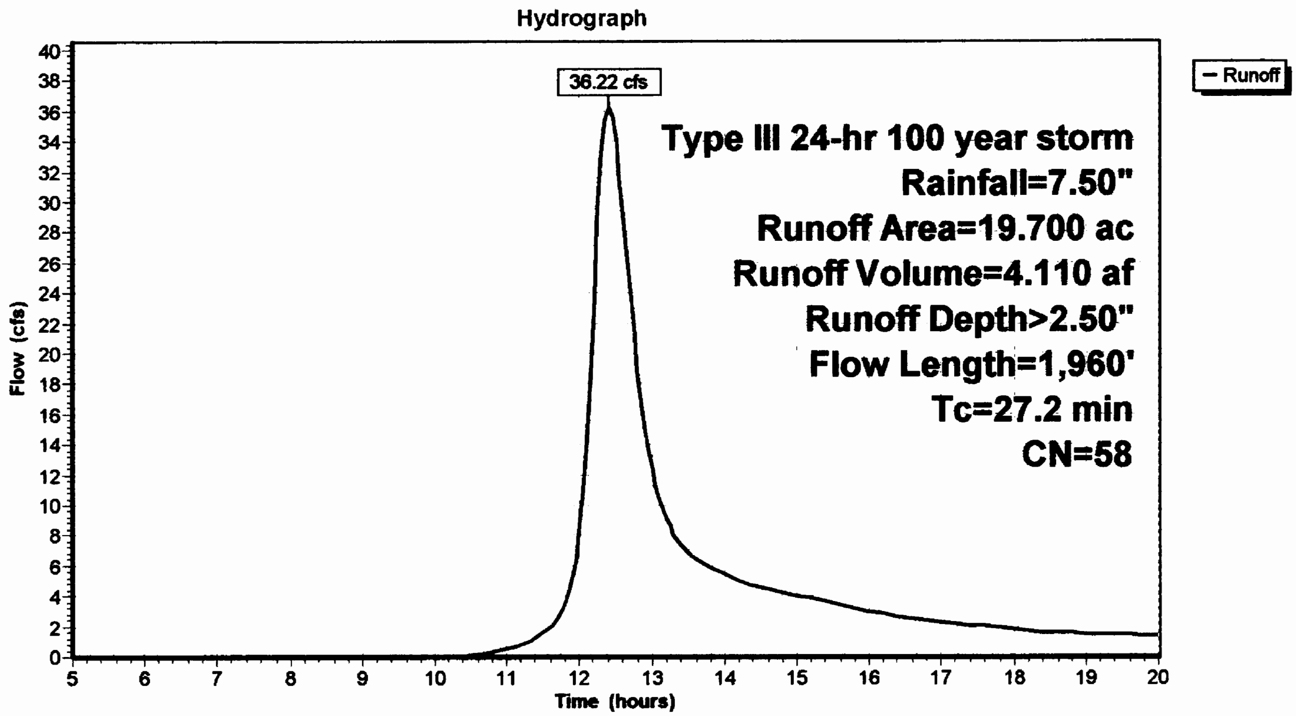
Subcatchment b1: pre basin b1



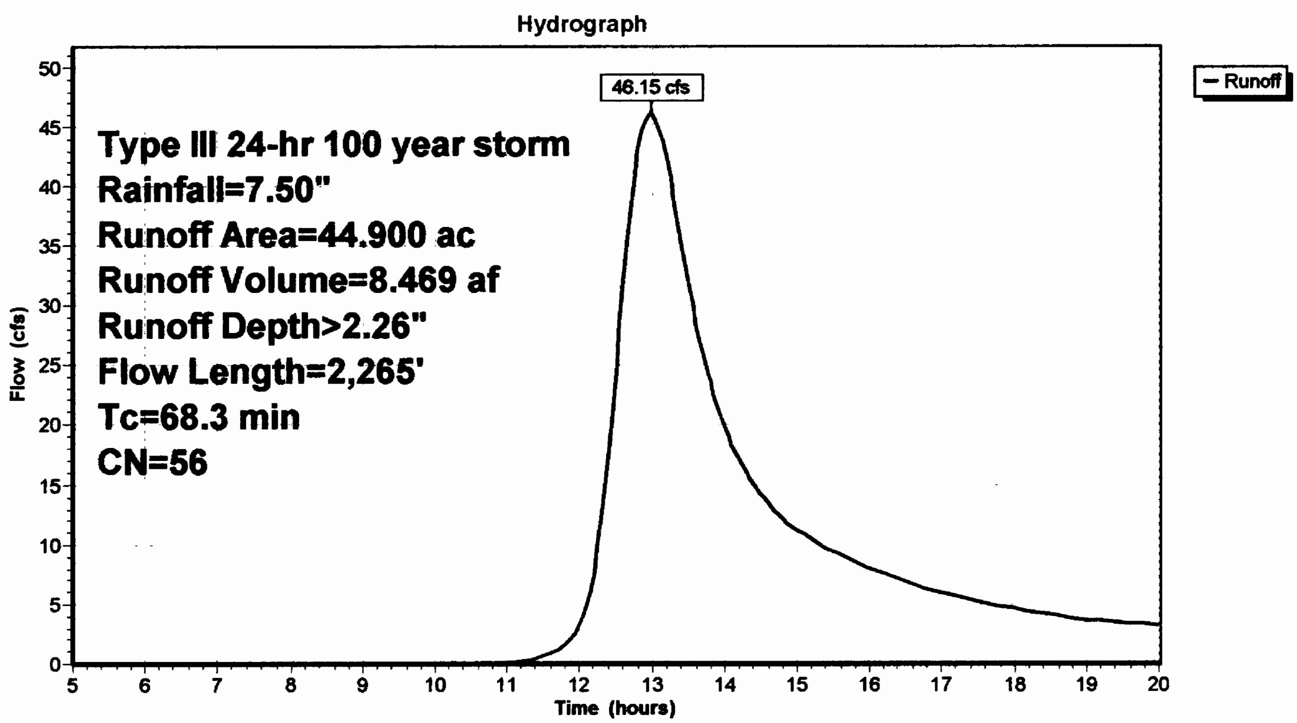
Subcatchment b2: pre basin b2



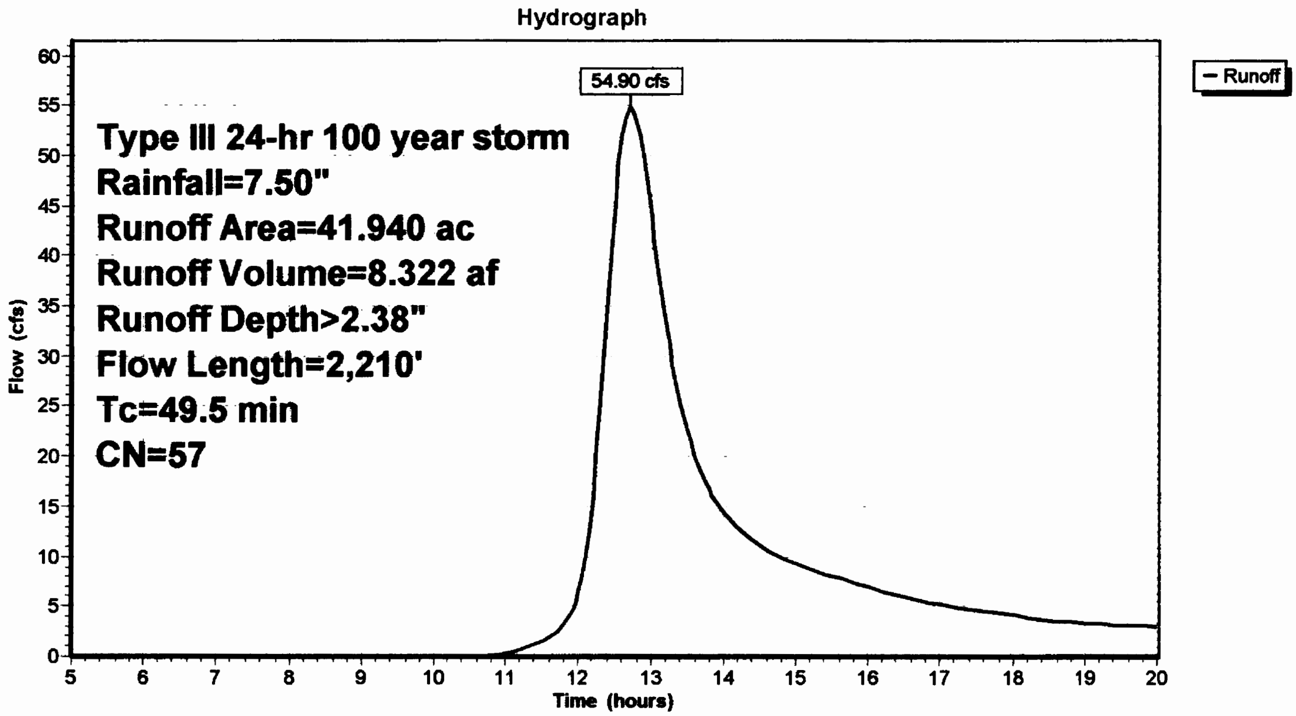
Subcatchment b3: pre basin b3



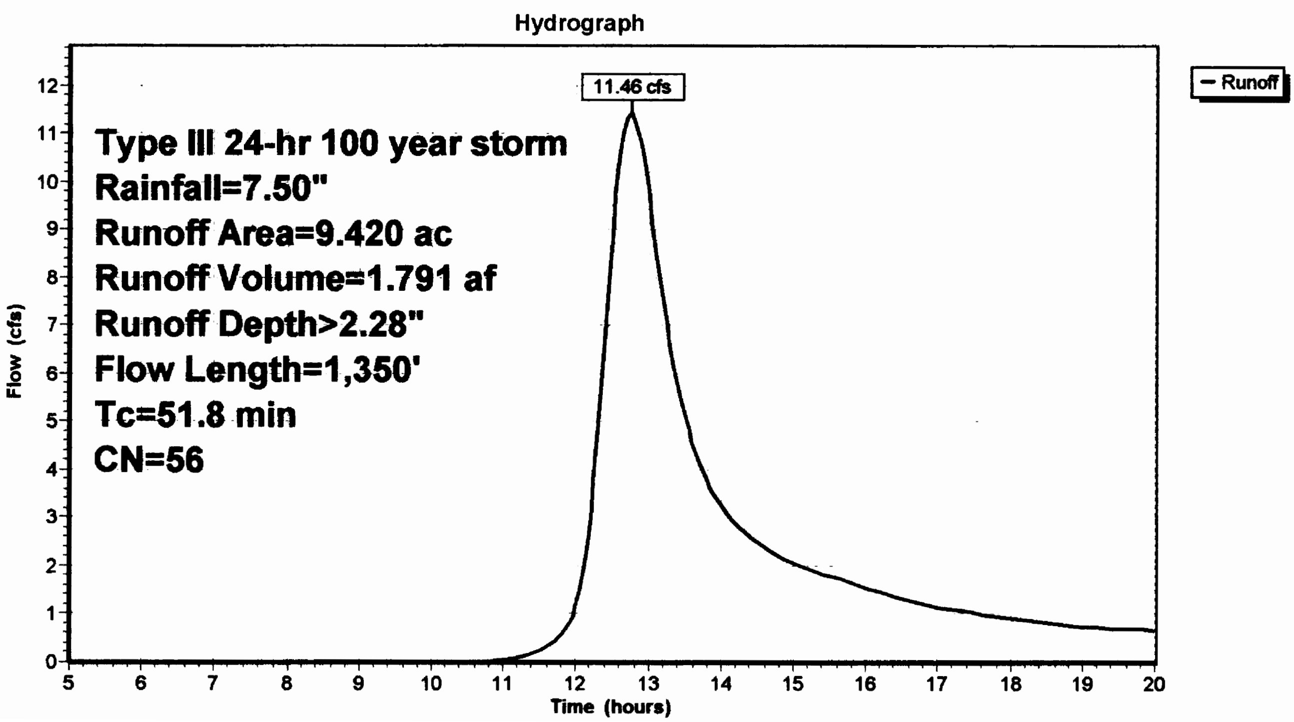
Subcatchment b4: pre basin b4



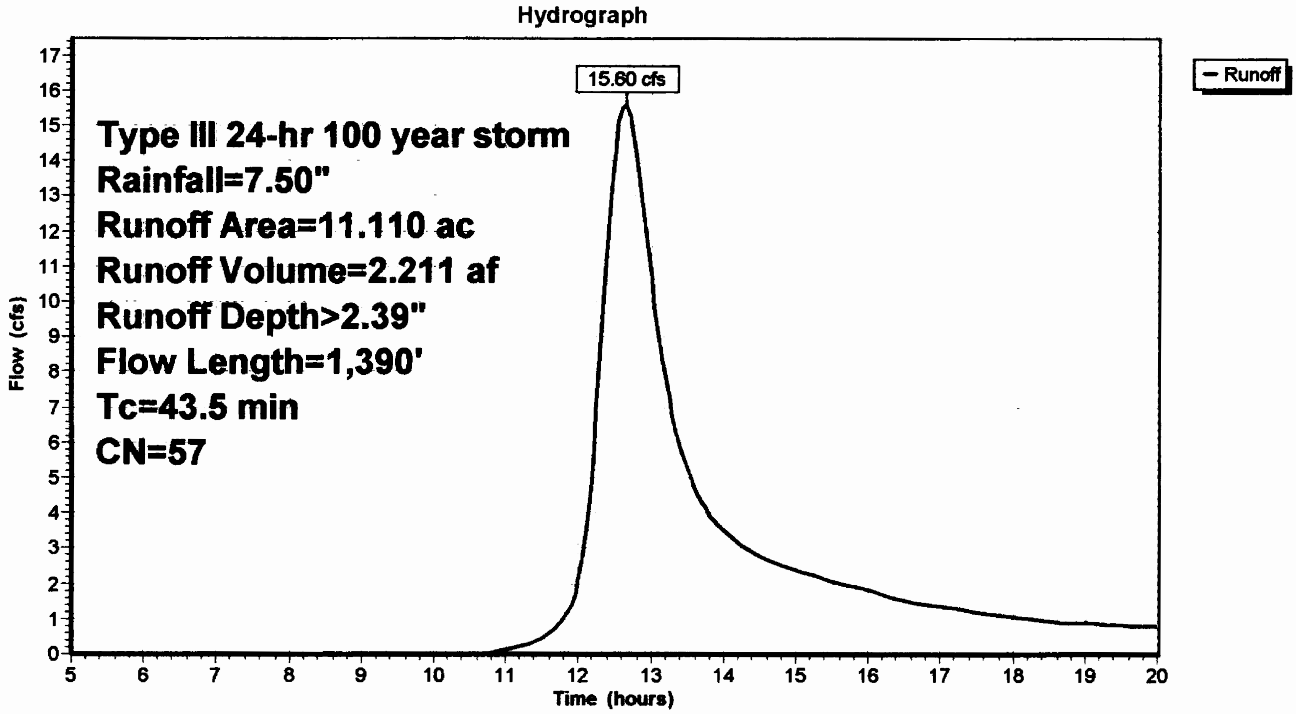
Subcatchment b5: pre basin b5



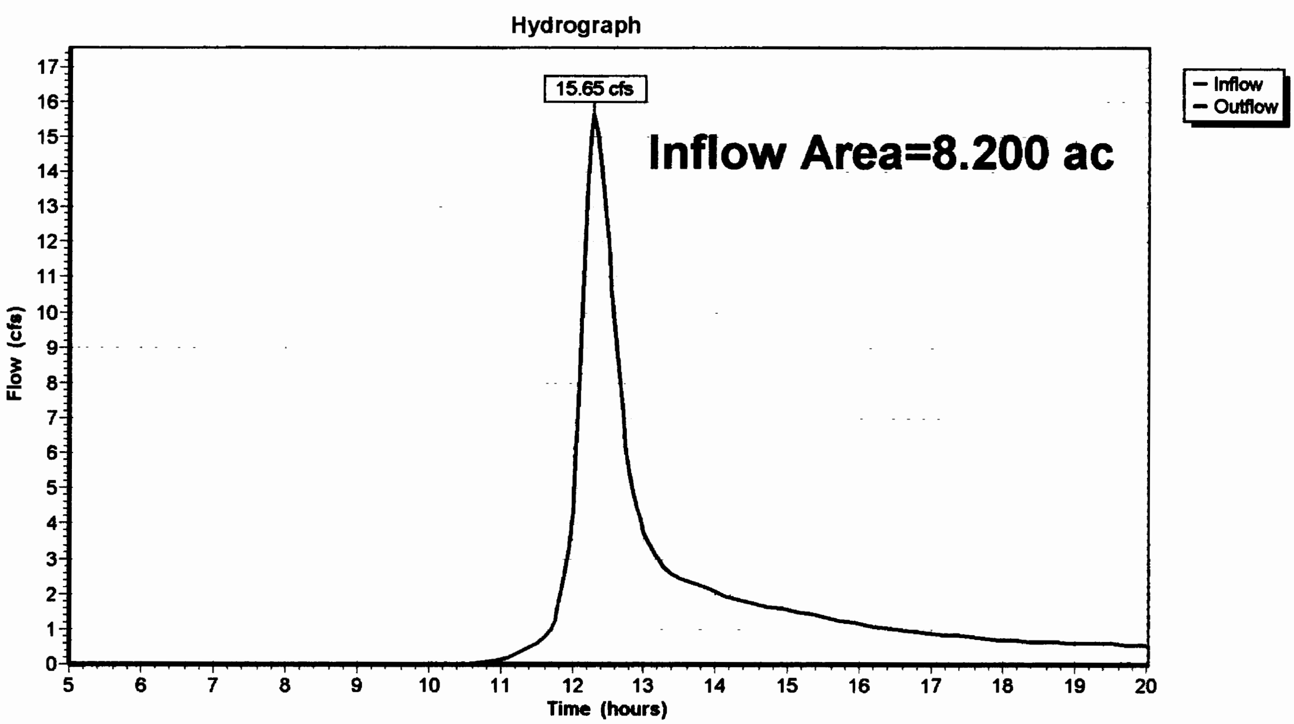
Subcatchment b6: pre basin b6



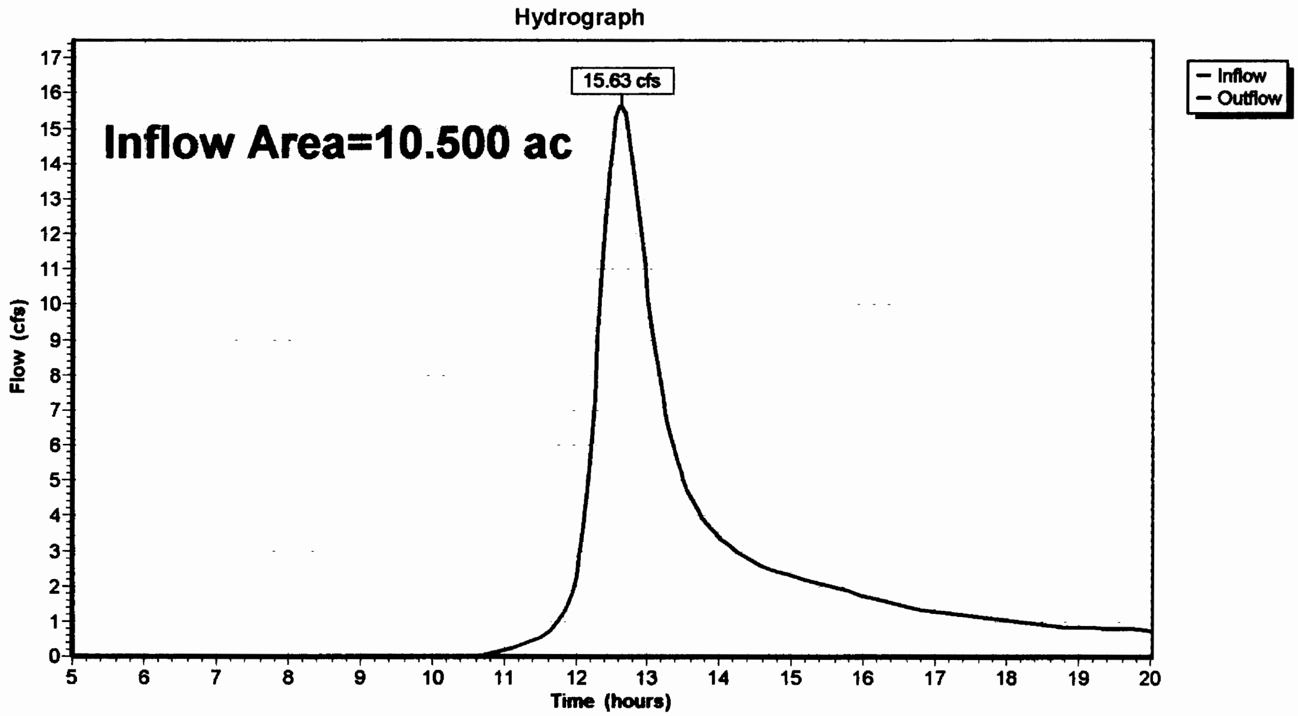
Subcatchment b7: pre basin b7



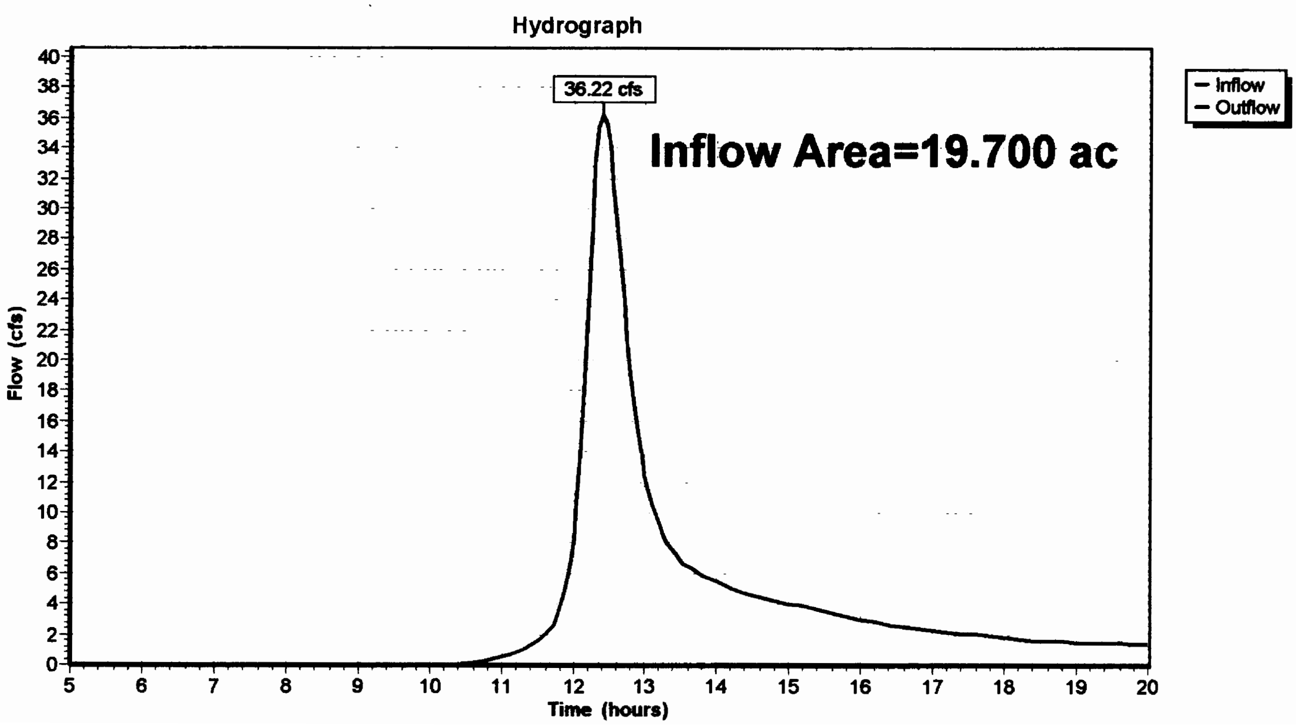
Reach dp1: pre design point 1



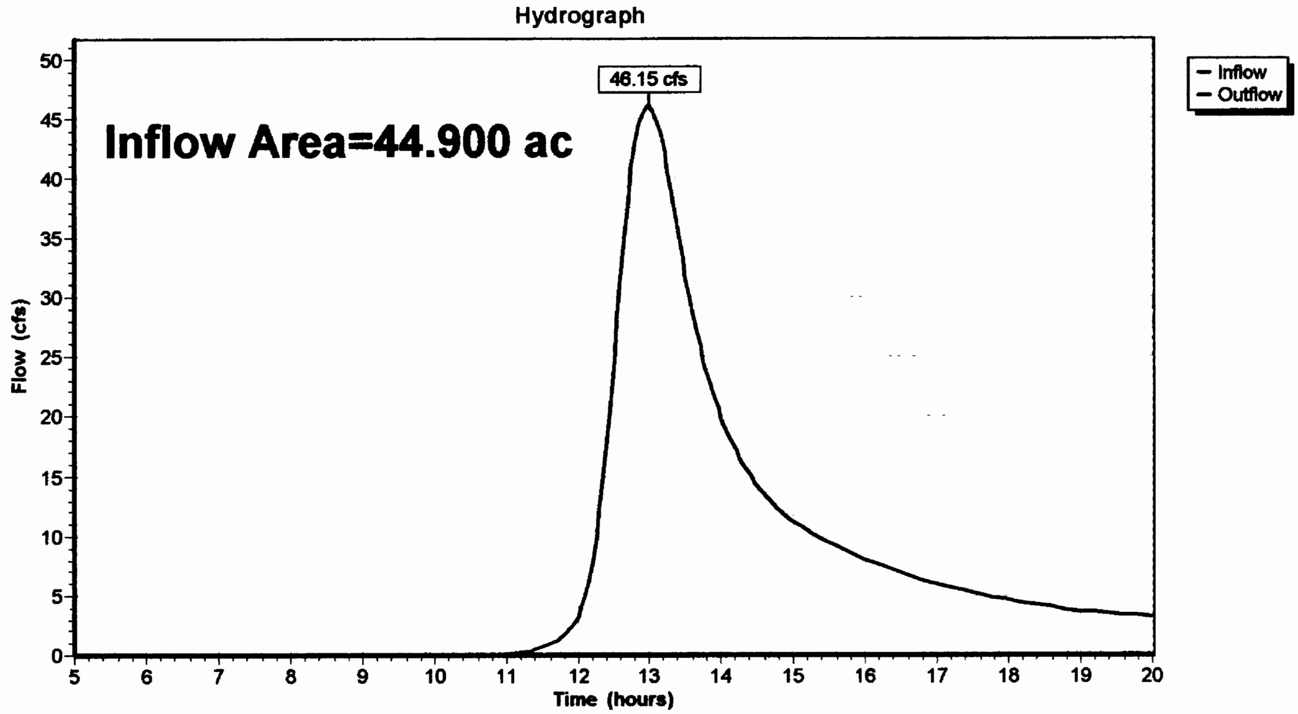
Reach dp2: pre design point 2



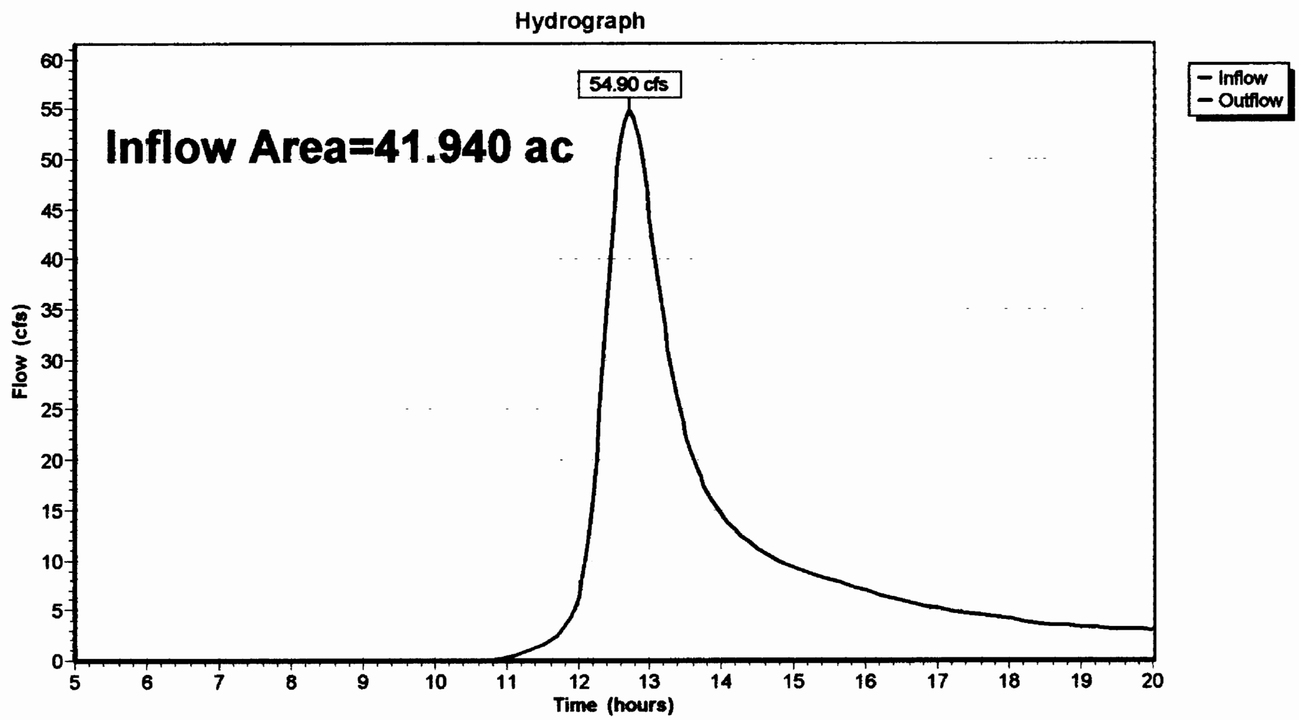
Reach dp3: pre design point 3



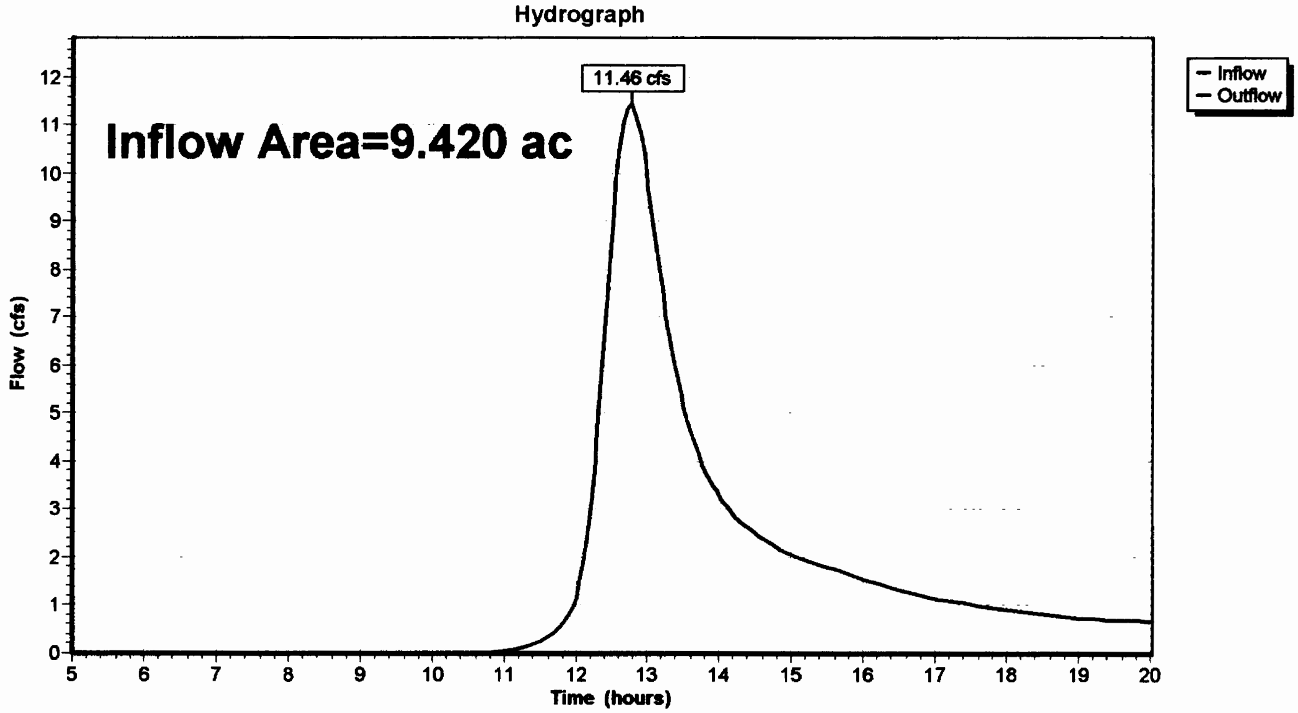
Reach dp4: pre design point 4



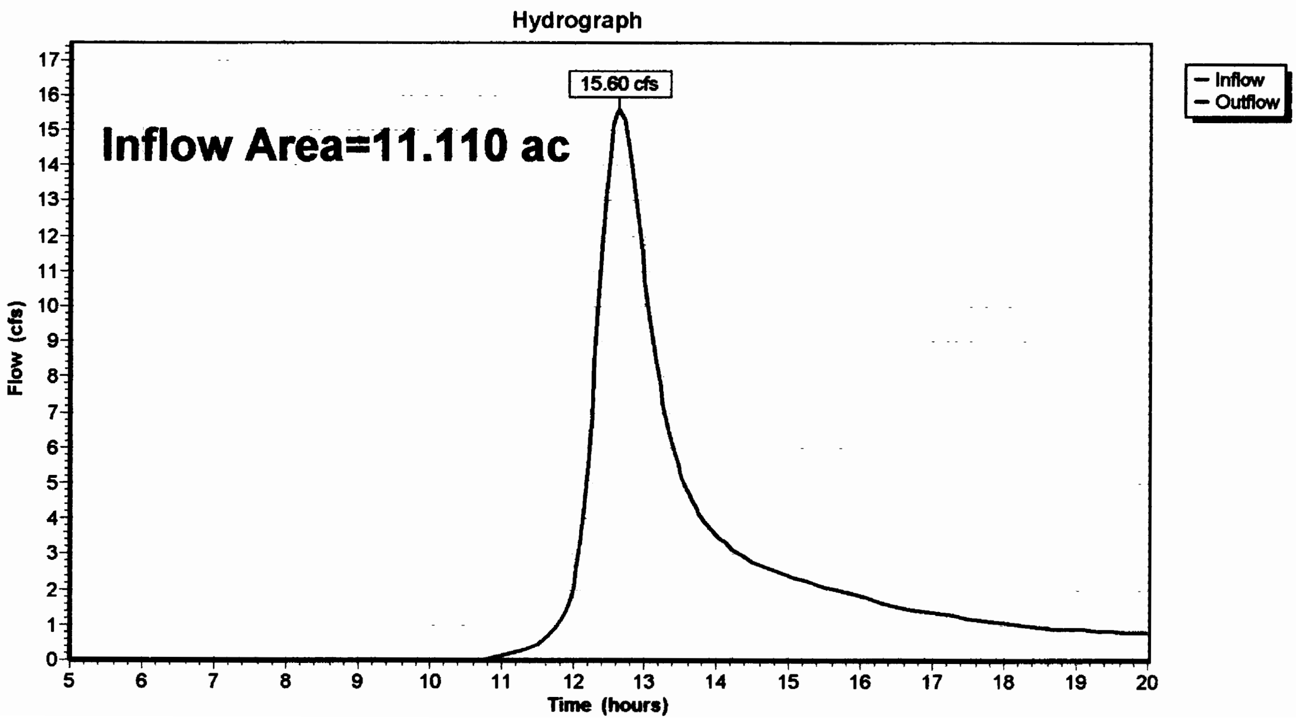
Reach dp5: pre design point 5



Reach dp6: pre design point 6

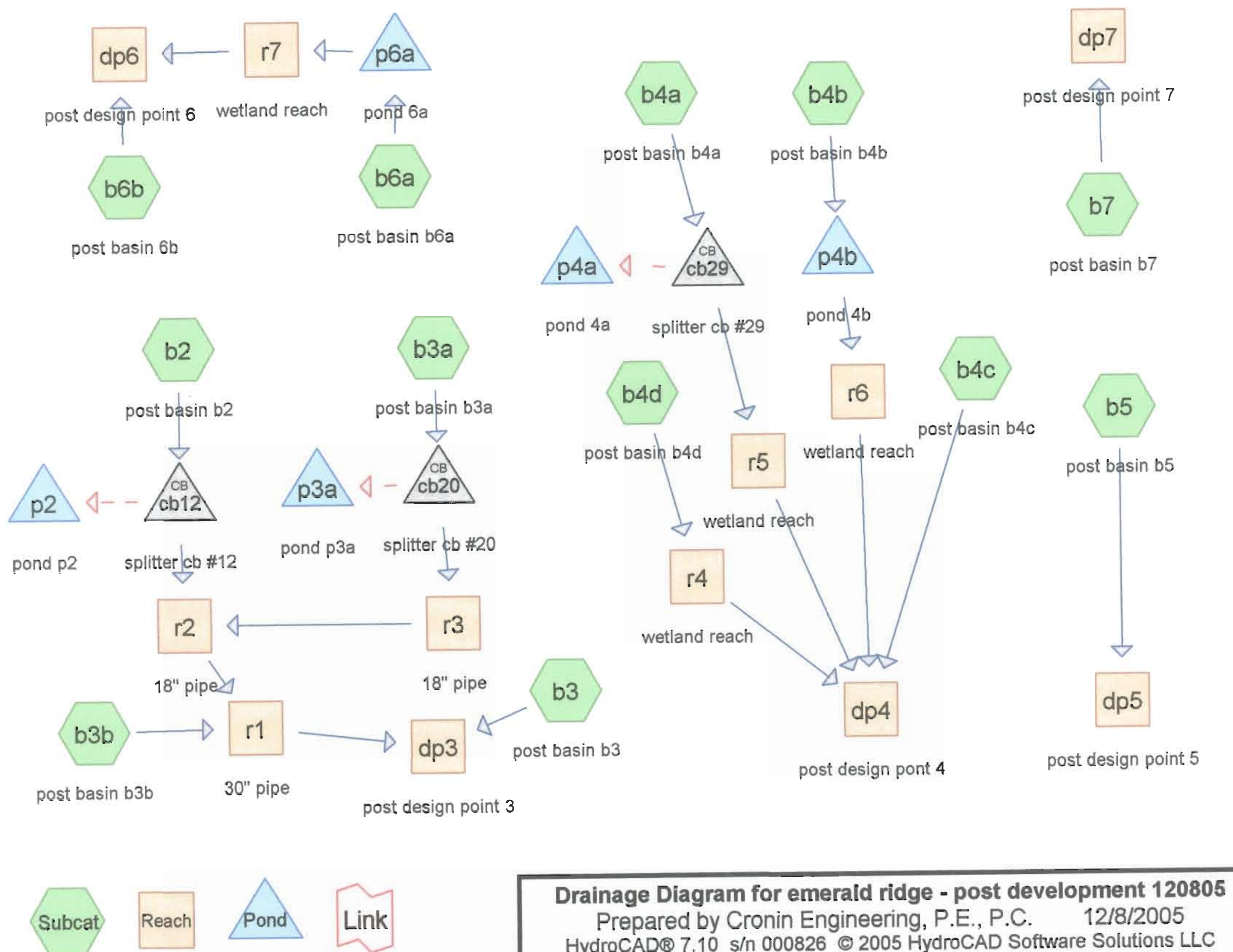


Reach dp7: pre design point 7



APPENDIX D

Post Development Stormwater Quantity Calculations



Drainage Diagram for emerald ridge - post development 120805
Prepared by Cronin Engineering, P.E., P.C. 12/8/2005
HydroCAD® 7.10 s/n 000826 © 2005 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment b2: post basin b2 Runoff Area=8.090 ac Runoff Depth>0.17"
Flow Length=1,580' Tc=39.3 min CN=58 Runoff=0.45 cfs 0.117 af

Subcatchment b3: post basin b3 Runoff Area=13.770 ac Runoff Depth>0.15"
Flow Length=990' Tc=21.9 min CN=57 Runoff=0.76 cfs 0.177 af

Subcatchment b3a: post basin b3a Runoff Area=8.340 ac Runoff Depth>0.33"
Flow Length=1,200' Tc=14.3 min CN=64 Runoff=1.80 cfs 0.232 af

Subcatchment b3b: post basin b3b Runoff Area=8.340 ac Runoff Depth>0.15"
Flow Length=820' Tc=20.0 min CN=57 Runoff=0.48 cfs 0.107 af

Subcatchment b4a: post basin b4a Runoff Area=8.600 ac Runoff Depth>0.30"
Flow Length=880' Tc=27.4 min CN=63 Runoff=1.33 cfs 0.216 af

Subcatchment b4b: post basin b4b Runoff Area=8.310 ac Runoff Depth>0.33"
Flow Length=830' Tc=17.1 min CN=64 Runoff=1.71 cfs 0.231 af

Subcatchment b4c: post basin b4c Runoff Area=26.020 ac Runoff Depth>0.20"
Flow Length=1,830' Tc=37.2 min CN=59 Runoff=1.81 cfs 0.425 af

Subcatchment b4d: post basin b4d Runoff Area=2.740 ac Runoff Depth>0.15"
Flow Length=710' Tc=54.9 min CN=57 Runoff=0.10 cfs 0.034 af

Subcatchment b5: post basin b5 Runoff Area=40.860 ac Runoff Depth>0.15"
Flow Length=2,210' Tc=49.5 min CN=57 Runoff=1.63 cfs 0.512 af

Subcatchment b6a: post basin b6a Runoff Area=3.350 ac Runoff Depth>0.54"
Flow Length=765' Tc=11.4 min CN=70 Runoff=1.63 cfs 0.151 af

Subcatchment b6b: post basin 6b Runoff Area=6.550 ac Runoff Depth>0.15"
Flow Length=1,350' Tc=51.6 min CN=57 Runoff=0.26 cfs 0.082 af

Subcatchment b7: post basin b7 Runoff Area=10.830 ac Runoff Depth>0.15"
Flow Length=1,390' Tc=43.5 min CN=57 Runoff=0.46 cfs 0.136 af

Reach dp3: post design point 3 Inflow=1.22 cfs 0.284 af
Outflow=1.22 cfs 0.284 af

Reach dp4: post design pont 4 Inflow=1.81 cfs 0.457 af
Outflow=1.81 cfs 0.457 af

Reach dp5: post design point 5 Inflow=1.63 cfs 0.512 af
Outflow=1.63 cfs 0.512 af

Reach dp6: post design point 6
Inflow=0.35 cfs 0.178 af
Outflow=0.35 cfs 0.178 af

Reach dp7: post design point 7
Inflow=0.46 cfs 0.136 af
Outflow=0.46 cfs 0.136 af

Reach r1: 30" pipe
Peak Depth=0.17' Max Vel=3.2 fps Inflow=0.48 cfs 0.107 af
D=30.0" n=0.011 L=900.0' S=0.0111 '/' Capacity=51.10 cfs Outflow=0.46 cfs 0.107 af

Reach r2: 18" pipe
Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
D=18.0" n=0.011 L=500.0' S=0.0920 '/' Capacity=37.65 cfs Outflow=0.00 cfs 0.000 af

Reach r3: 18" pipe
Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
D=18.0" n=0.011 L=600.0' S=0.1533 '/' Capacity=48.61 cfs Outflow=0.00 cfs 0.000 af

Reach r4: wetland reach
Peak Depth=0.02' Max Vel=0.2 fps Inflow=0.10 cfs 0.034 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.07 cfs 0.030 af

Reach r5: wetland reach
Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.00 cfs 0.000 af

Reach r6: wetland reach
Peak Depth=0.01' Max Vel=0.2 fps Inflow=0.06 cfs 0.005 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.03 cfs 0.002 af

Reach r7: wetland reach
Peak Depth=0.20' Max Vel=0.1 fps Inflow=0.23 cfs 0.115 af
n=0.400 L=400.0' S=0.0050 '/' Capacity=6.68 cfs Outflow=0.20 cfs 0.096 af

Pond cb12: splitter cb #12
Peak Elev=216.33' Inflow=0.45 cfs 0.117 af
Primary=0.00 cfs 0.000 af Secondary=0.45 cfs 0.117 af Outflow=0.45 cfs 0.117 af

Pond cb20: splitter cb #20
Peak Elev=308.73' Inflow=1.80 cfs 0.232 af
Primary=0.00 cfs 0.000 af Secondary=1.80 cfs 0.232 af Outflow=1.80 cfs 0.232 af

Pond cb29: splitter cb #29
Peak Elev=354.61' Inflow=1.33 cfs 0.216 af
Primary=0.00 cfs 0.000 af Secondary=1.33 cfs 0.216 af Outflow=1.33 cfs 0.216 af

Pond p2: pond p2
Peak Elev=214.04' Storage=5,074 cf Inflow=0.45 cfs 0.117 af
Outflow=0.00 cfs 0.000 af

Pond p3a: pond p3a
Peak Elev=307.28' Storage=10,096 cf Inflow=1.80 cfs 0.232 af
Outflow=0.00 cfs 0.000 af

Pond p4a: pond 4a
Peak Elev=354.36' Storage=9,403 cf Inflow=1.33 cfs 0.216 af
Outflow=0.00 cfs 0.000 af

Pond p4b: pond 4b
Peak Elev=368.66' Storage=9,820 cf Inflow=1.71 cfs 0.231 af
Outflow=0.06 cfs 0.005 af

Pond p6a: pond 6a
Peak Elev=383.85' Storage=2,817 cf Inflow=1.63 cfs 0.151 af
Outflow=0.23 cfs 0.115 af

Total Runoff Area = 145.800 ac Runoff Volume = 2.420 af Average Runoff Depth = 0.20"

Subcatchment b2: post basin b2

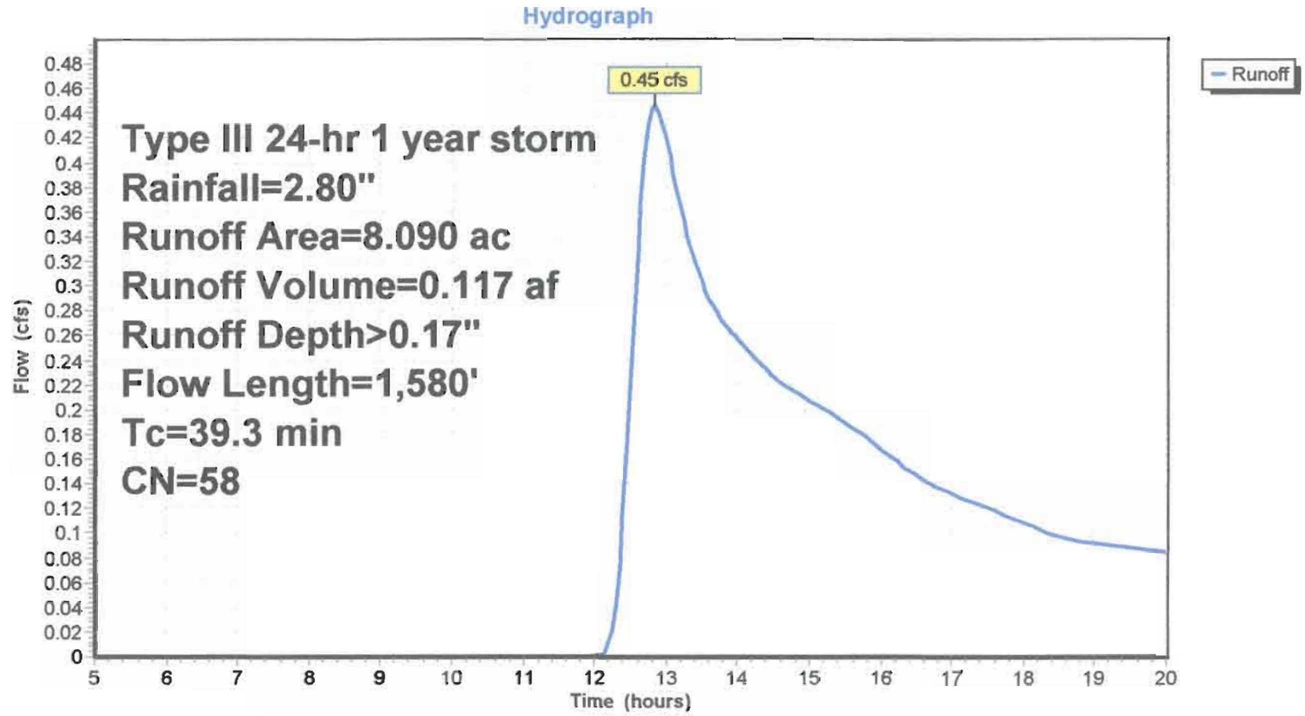
Runoff = 0.45 cfs @ 12.84 hrs, Volume= 0.117 af, Depth> 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
6.500	55	Woods, Good, HSG B
0.400	98	imp - road
0.320	61	grass, B soil, road shoulders
0.070	98	imp - exist houses and drives
0.800	61	grass B soil, existing
8.090	58	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.7	110	0.0500	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
9.8	510	0.1200	0.9		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
0.4	70	0.1500	2.7		**Shallow Concentrated Flow, segment 3** Short Grass Pasture Kv= 7.0 fps
1.1	75	0.2000	1.1		**Shallow Concentrated Flow, segment 4** Forest w/Heavy Litter Kv= 2.5 fps
1.1	485	0.1300	7.3		**Shallow Concentrated Flow, segment 5** Paved Kv= 20.3 fps
0.2	330	0.1400	26.3	46.45	**Circular Channel (pipe), segment 6** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
39.3	1,580	Total			

Subcatchment b2: post basin b2



Subcatchment b3: post basin b3

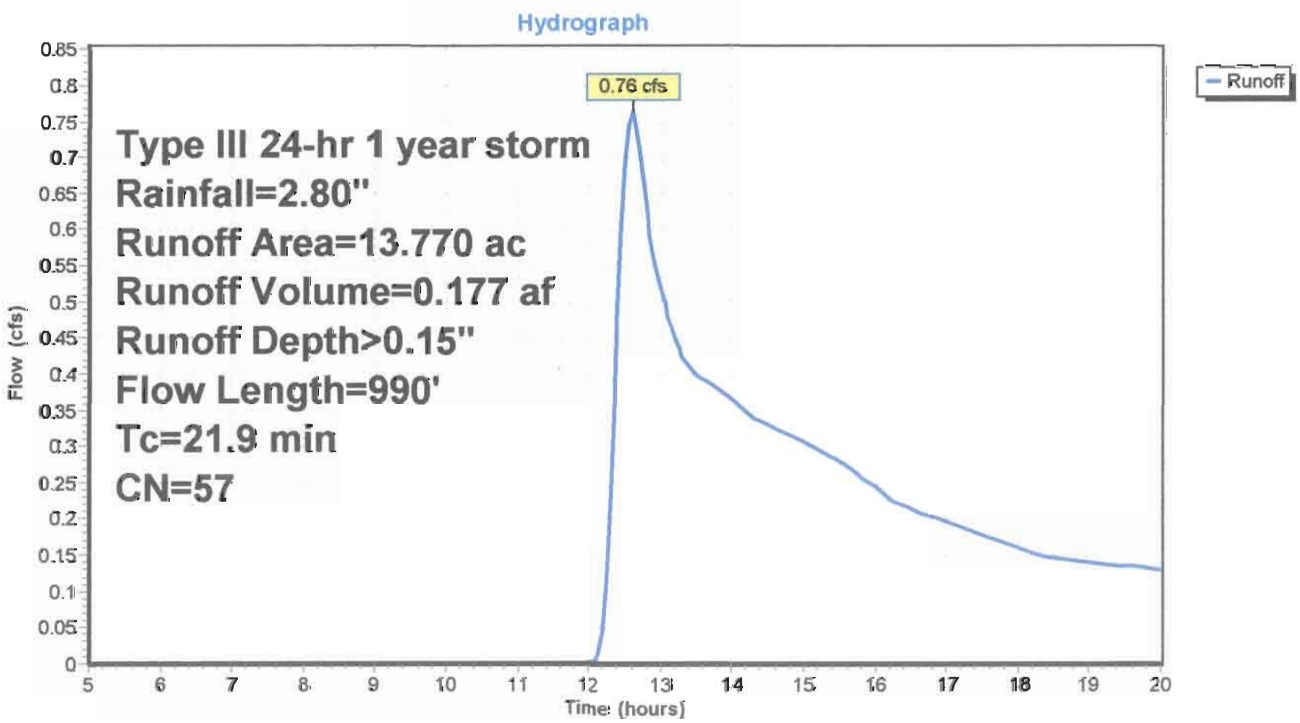
Runoff = 0.76 cfs @ 12.60 hrs, Volume= 0.177 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
12.540	55	Woods, Good, HSG B
0.300	98	imp - peekskill hollow road
0.160	98	imp - house/drive anderson
0.600	61	gras, B soil, lawn, anderson
0.170	98	imp - house/drive mandelbaum
13.770	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	110	0.0500	0.2		**Sheet Flow, segment 1** Grass: Dense n= 0.240 P2= 3.50"
1.3	125	0.0500	1.6		**Shallow Concentrated Flow, segment 2** Short Grass Pasture Kv= 7.0 fps
3.8	230	0.1600	1.0		**Shallow Concentrated Flow, segment 3** Forest w/Heavy Litter Kv= 2.5 fps
6.6	525	0.2800	1.3		**Shallow Concentrated Flow, segment 4** Forest w/Heavy Litter Kv= 2.5 fps
21.9	990	Total			

Subcatchment b3: post basin b3



Subcatchment b3a: post basin b3a

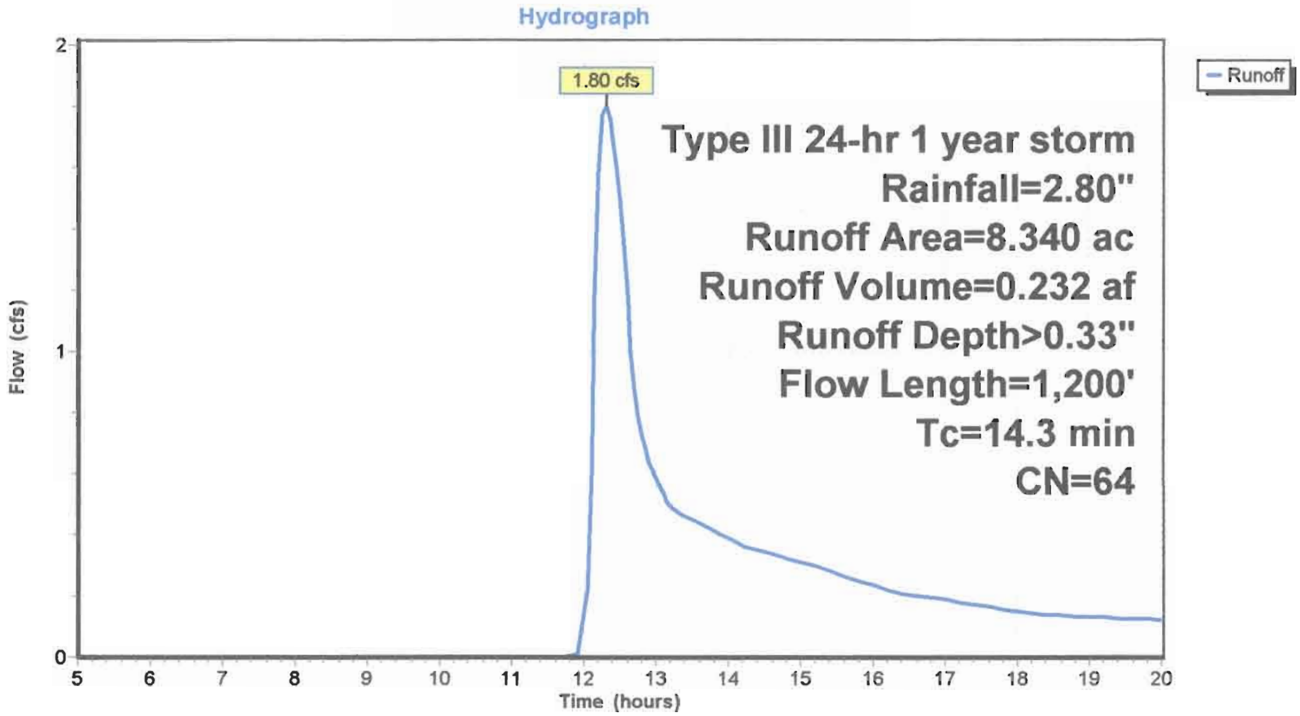
Runoff = 1.80 cfs @ 12.30 hrs, Volume= 0.232 af, Depth> 0.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
2.910	55	Woods, Good, HSG B
1.800	61	grass, B soil, exist off site
1.400	61	grass, B soil, exist on site lot 18
0.500	61	grass, B soil, lawns
0.200	98	imp - houses/drives lots 17,19
0.210	98	imp - exist house/drive lot 18
0.260	98	imp - exist house/drive off site
0.590	98	imp - roadway
0.470	61	grass, B soil, road shoulders
8.340	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	70	0.0300	0.1		**Sheet Flow, segment 1** Grass: Dense n= 0.240 P2= 3.50"
4.8	490	0.0600	1.7		**Shallow Concentrated Flow, segment 2** Short Grass Pasture Kv= 7.0 fps
0.4	90	0.0400	4.1		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
0.4	550	0.1000	22.2	39.26	**Circular Channel (pipe), segment 4** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
14.3	1,200	Total			

Subcatchment b3a: post basin b3a



Subcatchment b3b: post basin b3b

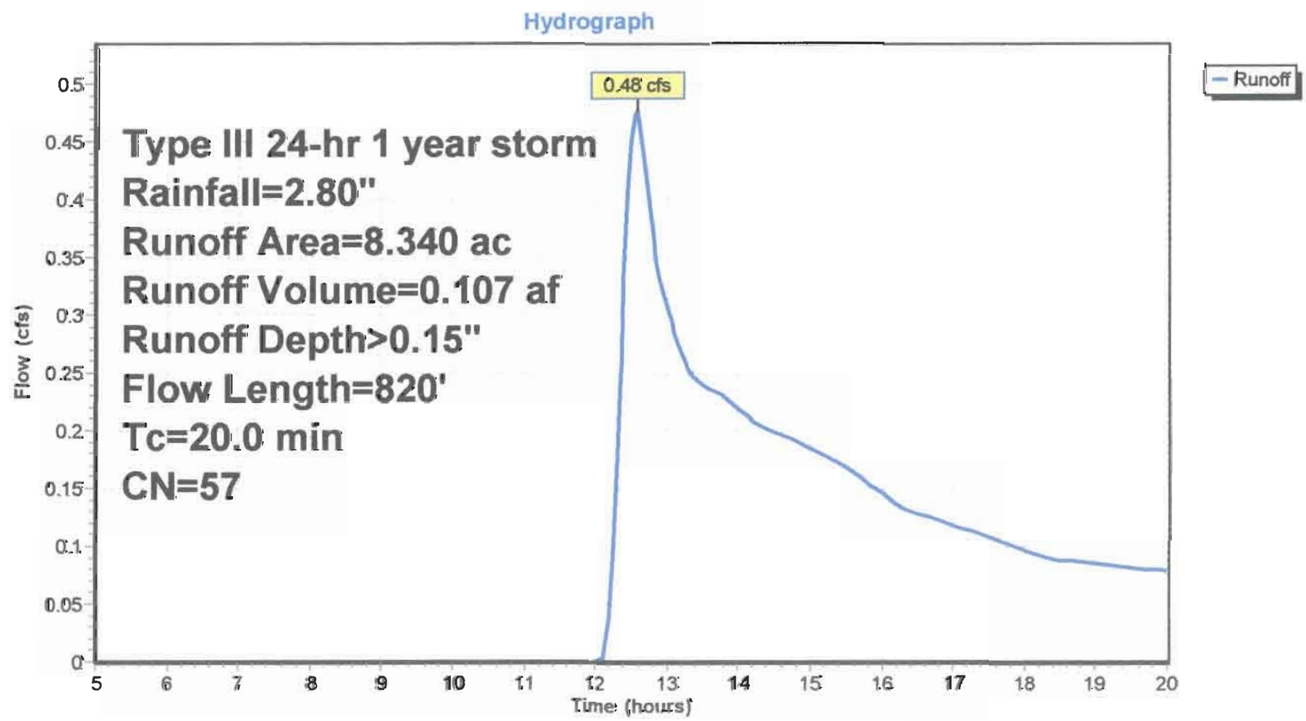
Runoff = 0.48 cfs @ 12.57 hrs, Volume= 0.107 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
7.870	55	Woods, Good, HSG B
0.260	98	imp - new marsh hill road
0.210	98	grass, B soil, road shoulders
8.340	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0800	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
7.9	650	0.3000	1.4		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
0.3	120	0.1200	7.0		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
20.0	820	Total			

Subcatchment b3b: post basin b3b



Subcatchment b4a: post basin b4a

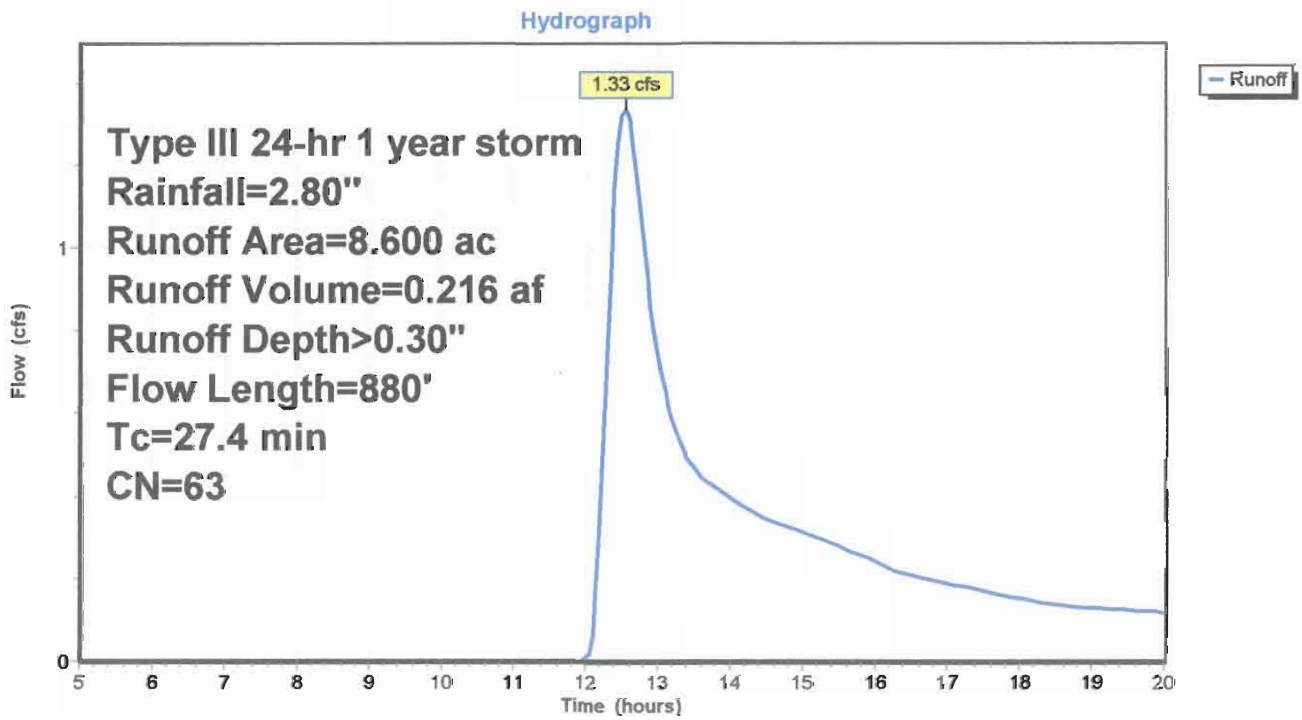
Runoff = 1.33 cfs @ 12.54 hrs, Volume= 0.216 af, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
4.560	55	Woods, Good, HSG B
0.770	98	imp - houses/drives lots 1-5
0.430	98	imp - roadway
2.500	61	grass - B soil, lawns
0.340	61	grass - B soil, road shoulders
8.600	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	80	0.0100	0.1		**Sheet Flow, segment 1** Woods: Light underbrush n= 0.400 P2= 3.50"
3.5	180	0.0300	0.9		**Shallow Concentrated Flow, segment 2** Woodland Kv= 5.0 fps
0.6	110	0.0200	2.9		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
0.6	510	0.0400	14.1	24.83	**Circular Channel (pipe), segment 4** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
27.4	880	Total			

Subcatchment b4a: post basin b4a



Subcatchment b4b: post basin b4b

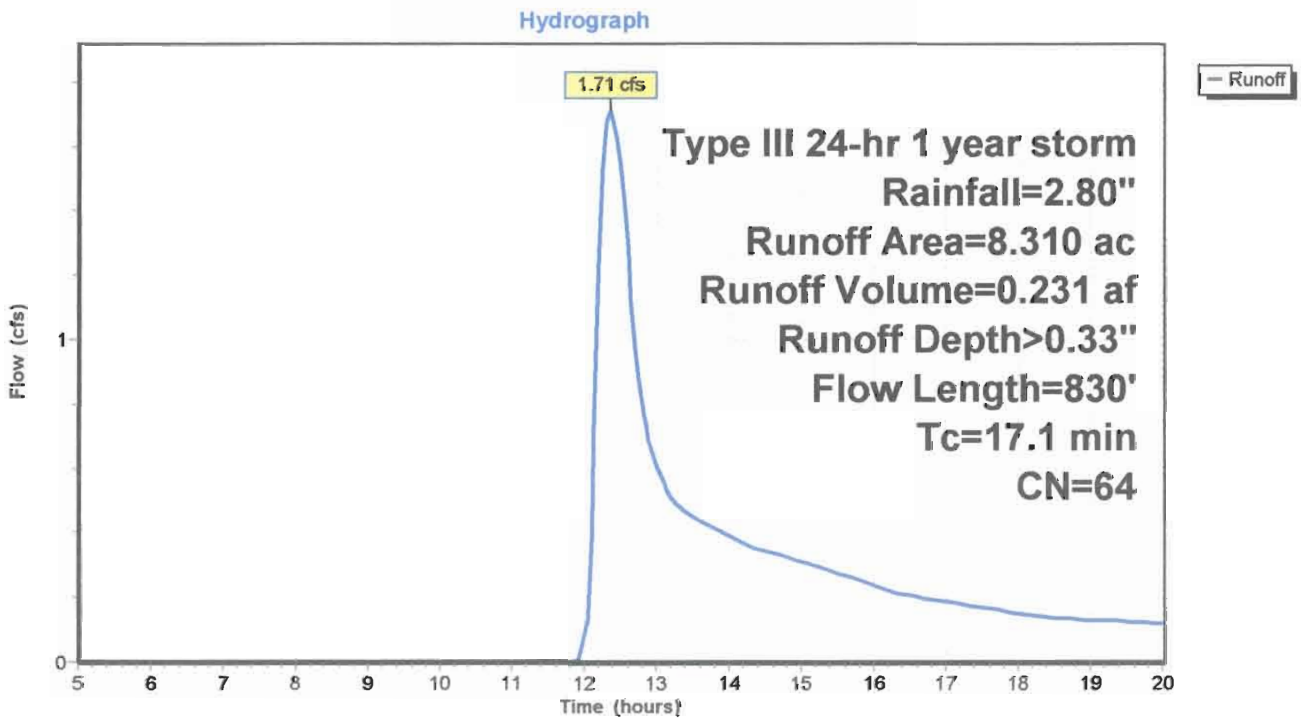
Runoff = 1.71 cfs @ 12.35 hrs, Volume= 0.231 af, Depth> 0.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
4.420	55	Woods, Good, HSG B
0.490	98	imp - houses/drives, lots 6-8,24
0.920	98	imp - road
1.750	61	grass - B soil, lawns
0.730	61	grass - b soil, road shoulders
8.310	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	60	0.1800	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
6.7	450	0.0500	1.1		**Shallow Concentrated Flow, segment 2** Woodland Kv= 5.0 fps
0.2	40	0.0200	2.9		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
0.3	280	0.0400	14.1	24.83	**Circular Channel (pipe), segment 4** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
17.1	830	Total			

Subcatchment b4b: post basin b4b



Subcatchment b4d: post basin b4d

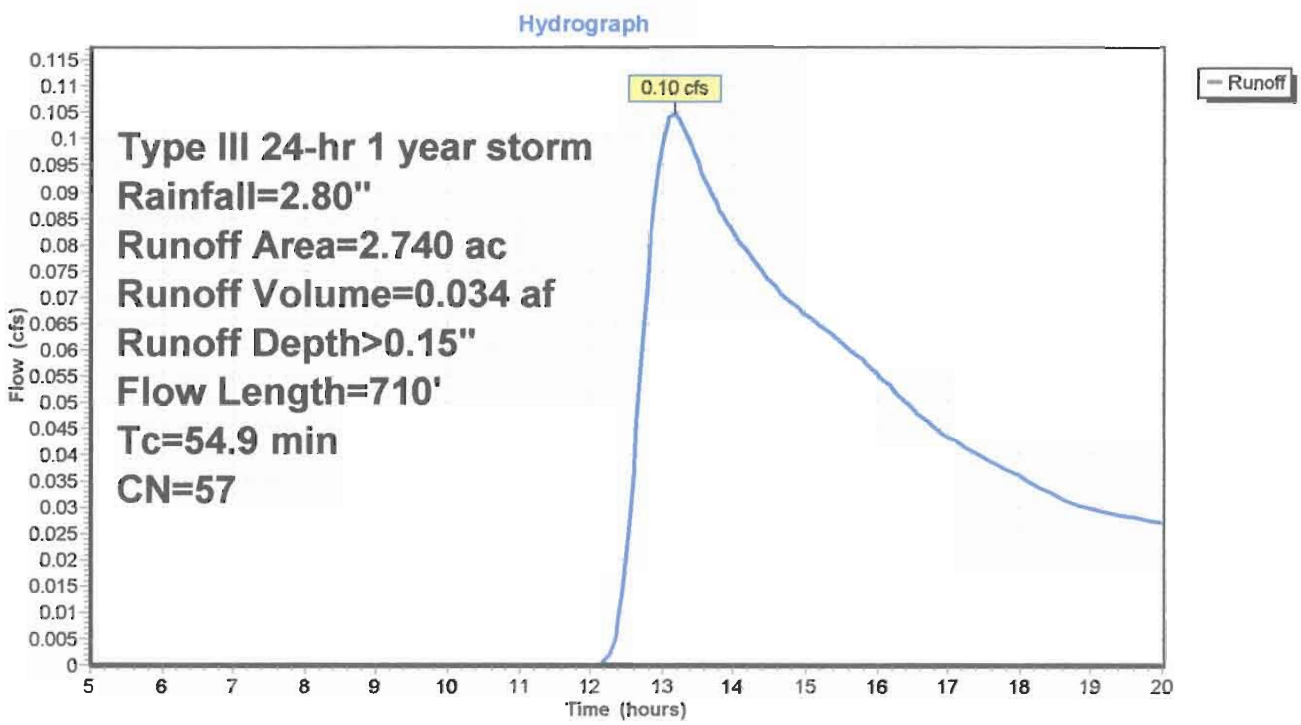
Runoff = 0.10 cfs @ 13.17 hrs, Volume= 0.034 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
1.240	55	Woods, Good, HSG B
1.500	58	Meadow, non-grazed, HSG B
2.740	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.5	130	0.0150	0.0		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
5.1	480	0.0500	1.6		**Shallow Concentrated Flow, segment 2** Short Grass Pasture Kv= 7.0 fps
0.3	100	0.0100	6.2	7.63	**Circular Channel (pipe), segment 3** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
54.9	710	Total			

Subcatchment b4d: post basin b4d



Subcatchment b4c: post basin b4c

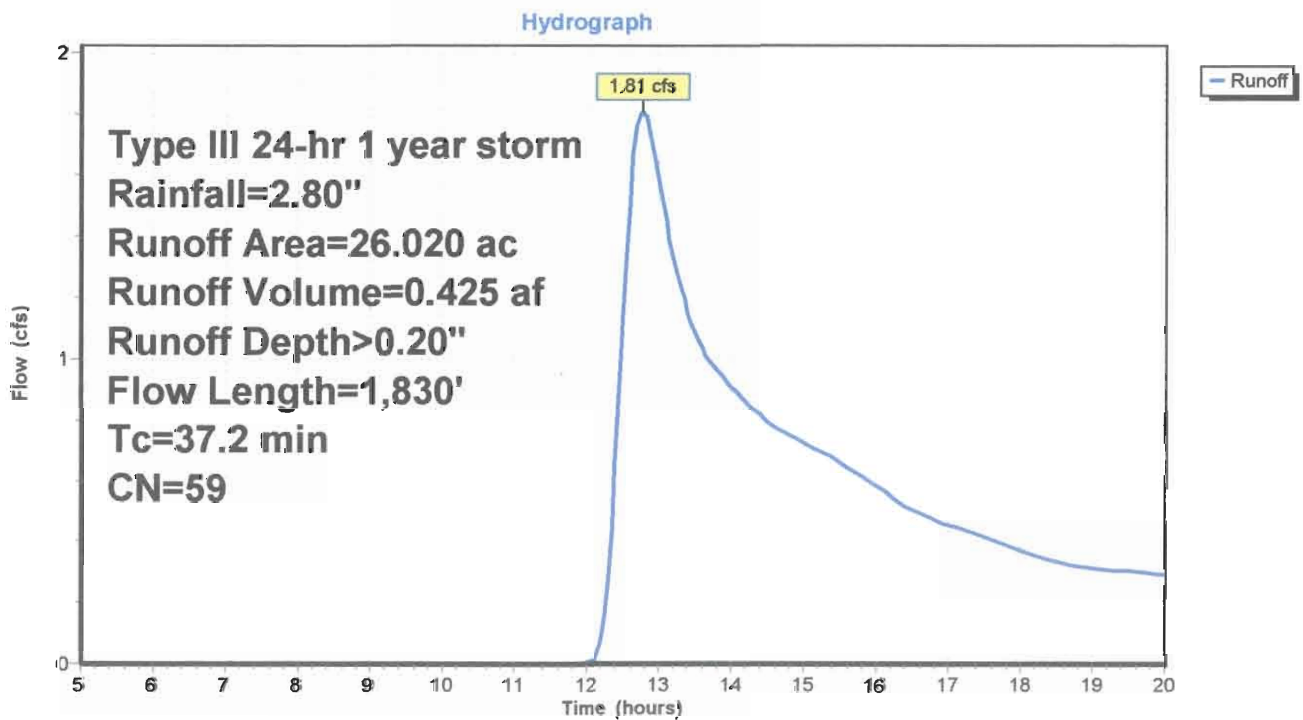
Runoff = 1.81 cfs @ 12.78 hrs, Volume= 0.425 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
18.720	55	Woods, Good, HSG B
3.840	70	Woods, Good, HSG C
0.500	98	imp - houses/drives lots 16-20
2.500	61	grass - B soil, lawns
0.460	61	grass - B soil, road shoulders
26.020	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	80	0.0700	0.1		**Sheet Flow, segment 1** Woods: Light underbrush n= 0.400 P2= 3.50"
8.5	360	0.0800	0.7		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
13.2	970	0.0600	1.2		**Shallow Concentrated Flow, segment 3** Woodland Kv= 5.0 fps
5.1	420	0.3000	1.4		**Shallow Concentrated Flow, segment 4** Forest w/Heavy Litter Kv= 2.5 fps
37.2	1,830	Total			

Subcatchment b4c: post basin b4c



Subcatchment b4d: post basin b4d

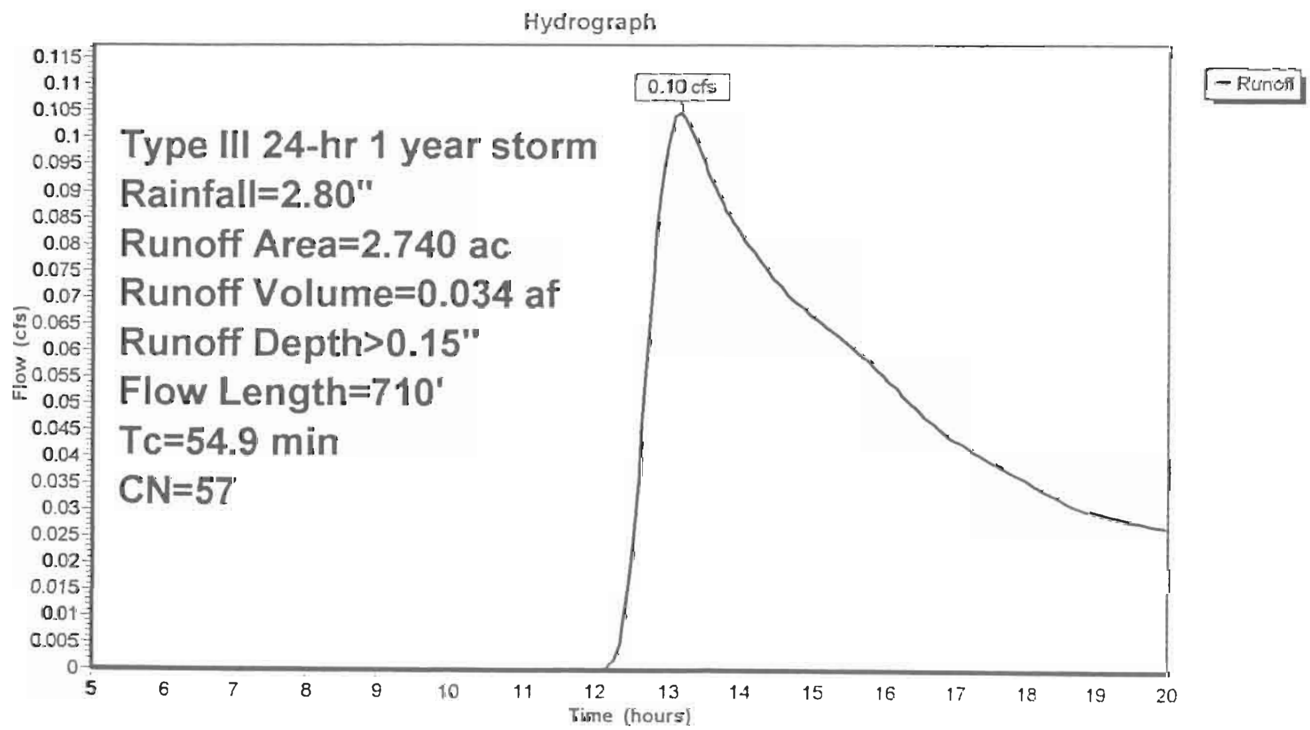
Runoff = 0.10 cfs @ 13.17 hrs, Volume= 0.034 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
1.240	55	Woods, Good, HSG B
1.500	58	Meadow, non-grazed, HSG B
2.740	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.5	130	0.0150	0.0		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
5.1	480	0.0500	1.6		**Shallow Concentrated Flow, segment 2** Short Grass Pasture Kv= 7.0 fps
0.3	100	0.0100	6.2	7.63	**Circular Channel (pipe), segment 3** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
54.9	710	Total			

Subcatchment b4d: post basin b4d



Subcatchment b5: post basin b5

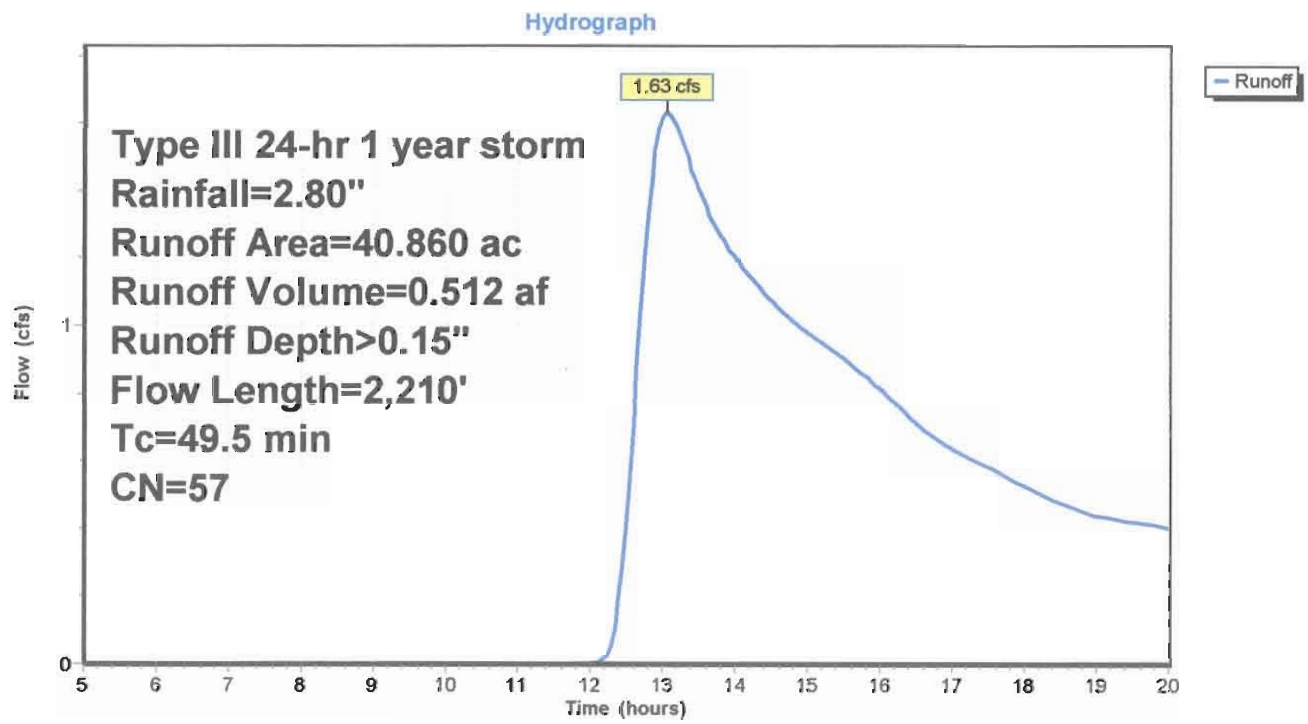
Runoff = 1.63 cfs @ 13.07 hrs, Volume= 0.512 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
34.470	55	Woods, Good, HSG B
1.200	98	imp - drives/houses - venezia
2.200	61	Pasture/grassland/range, Good, HSG B
0.490	98	imp - houses/drives lots 11-15
2.500	61	grass, B soil, lots 11-15
40.860	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	60	0.0500	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
31.2	1,750	0.1400	0.9		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
0.8	320	0.1200	7.0		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
1.0	80	0.0700	1.3		**Shallow Concentrated Flow, segment 4** Woodland Kv= 5.0 fps
49.5	2,210	Total			

Subcatchment b5: post basin b5



Subcatchment b6a: post basin b6a

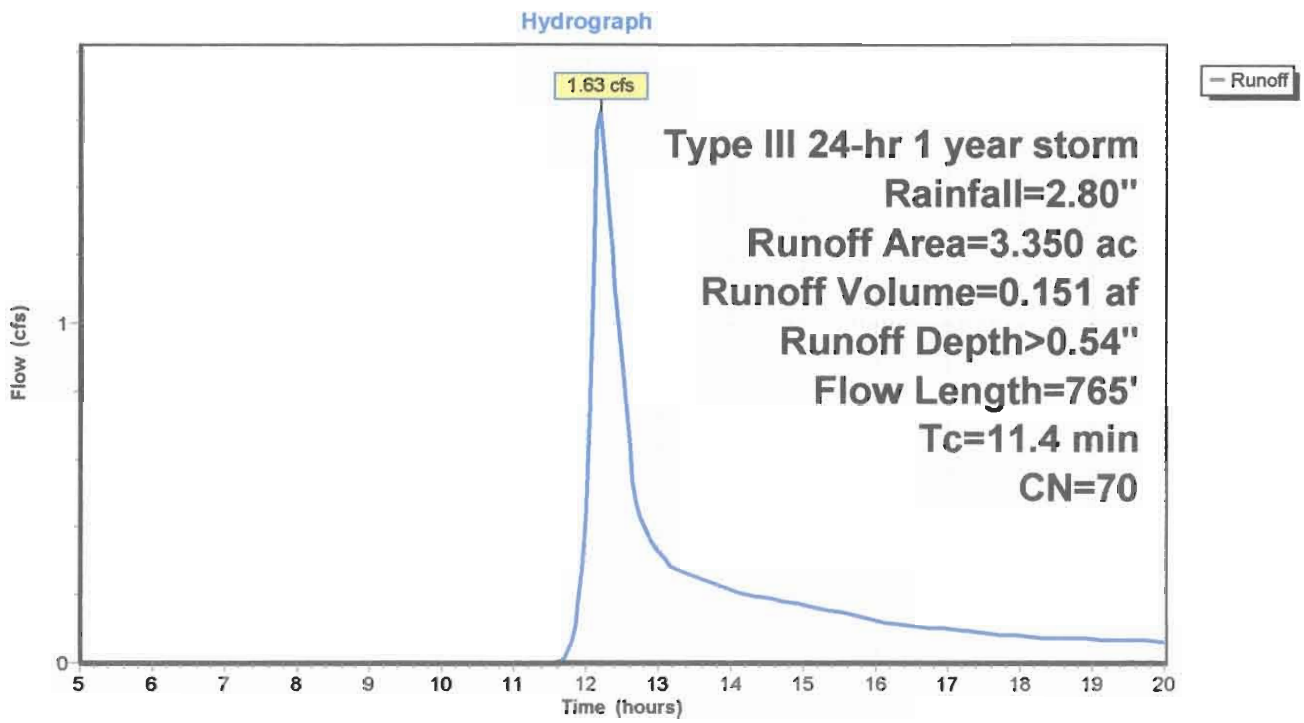
Runoff = 1.63 cfs @ 12.19 hrs, Volume= 0.151 af, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
1.080	55	Woods, Good, HSG B
0.230	98	imp - houses/drives lots 9,25
0.790	98	imp - roadway
0.750	61	grass, B soil, lawns
0.500	61	grass, B soil, road shoulders
3.350	70	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	40	0.1500	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
2.4	190	0.0700	1.3		**Shallow Concentrated Flow, segment 2** Woodland Kv= 5.0 fps
0.6	105	0.0200	2.9		**Shallow Concentrated Flow, segment 3** Paved Kv= 20.3 fps
0.7	430	0.0200	9.9	17.56	**Circular Channel (pipe), segment 4** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011
11.4	765	Total			

Subcatchment b6a: post basin b6a



Subcatchment b6b: post basin 6b

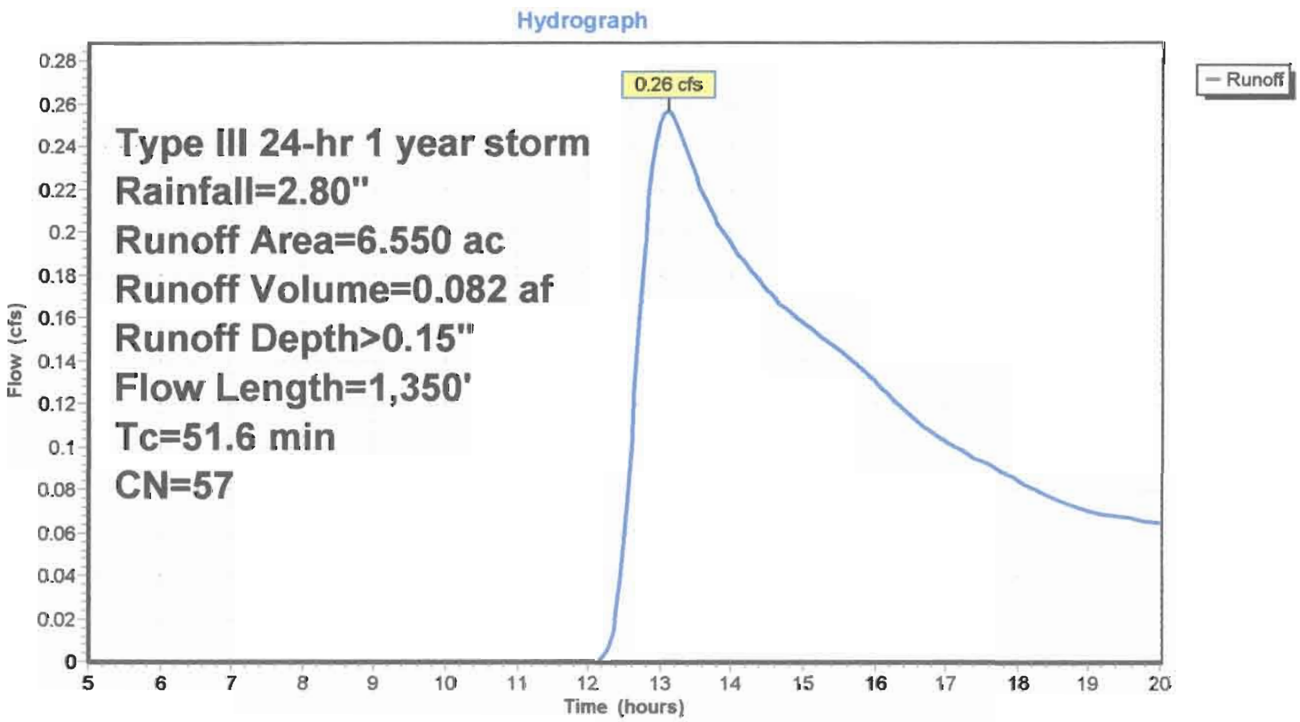
Runoff = 0.26 cfs @ 13.11 hrs, Volume= 0.082 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
5.460	55	Woods, Good, HSG B
0.590	77	Woods, Good, HSG D
0.500	61	grass, B soil, lawns
6.550	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	60	0.0700	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
31.2	810	0.0300	0.4		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
4.1	390	0.1000	1.6		**Shallow Concentrated Flow, segment 3** Woodland Kv= 5.0 fps
1.9	90	0.1000	0.8		**Shallow Concentrated Flow, segment 4** Forest w/Heavy Litter Kv= 2.5 fps
51.6	1,350	Total			

Subcatchment b6b: post basin 6b



Subcatchment b7: post basin b7

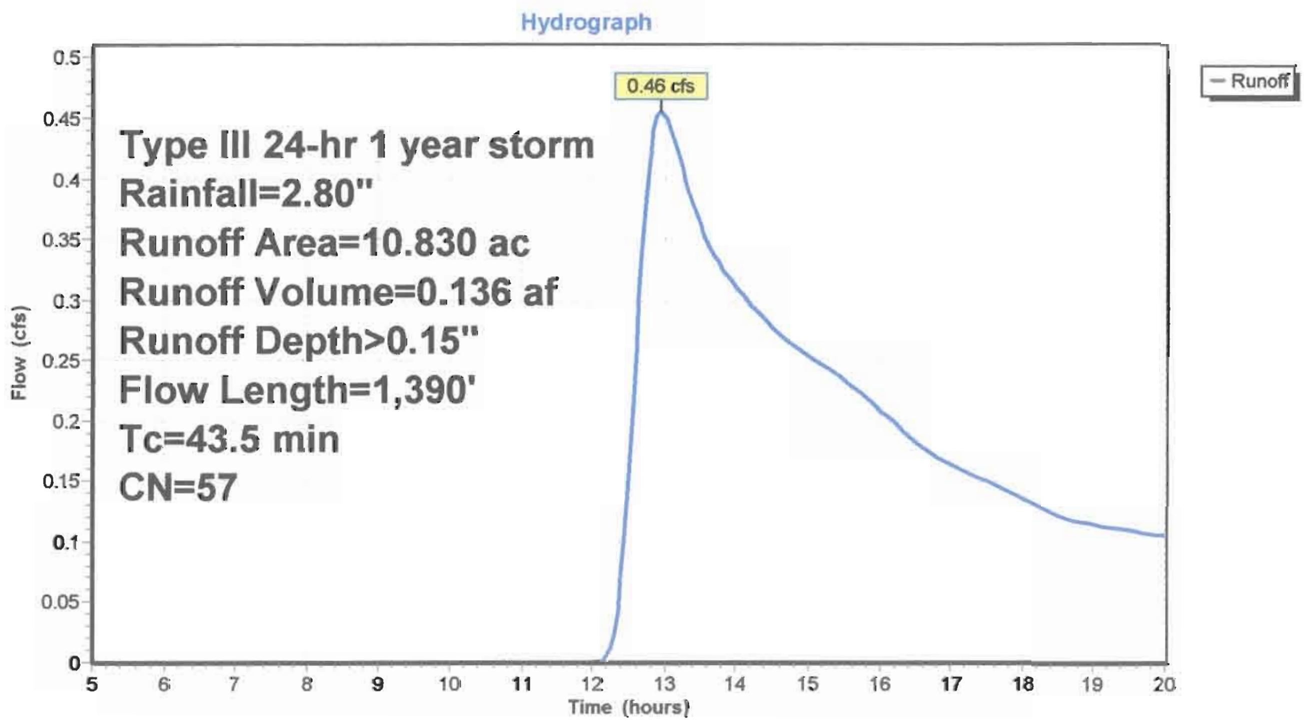
Runoff = 0.46 cfs @ 12.96 hrs, Volume= 0.136 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (ac)	CN	Description
9.380	55	Woods, Good, HSG B
0.850	77	Woods, Good, HSG D
0.100	98	imp -house/drive lot 10
0.500	61	Pasture/grassland/range, Good, HSG B
10.830	57	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.4	110	0.0700	0.1		**Sheet Flow, segment 1** Woods: Dense underbrush n= 0.800 P2= 3.50"
14.8	800	0.1300	0.9		**Shallow Concentrated Flow, segment 2** Forest w/Heavy Litter Kv= 2.5 fps
5.3	480	0.0100	1.5		**Shallow Concentrated Flow, segment 3** Grassed Waterway Kv= 15.0 fps
43.5	1,390	Total			

Subcatchment b7: post basin b7

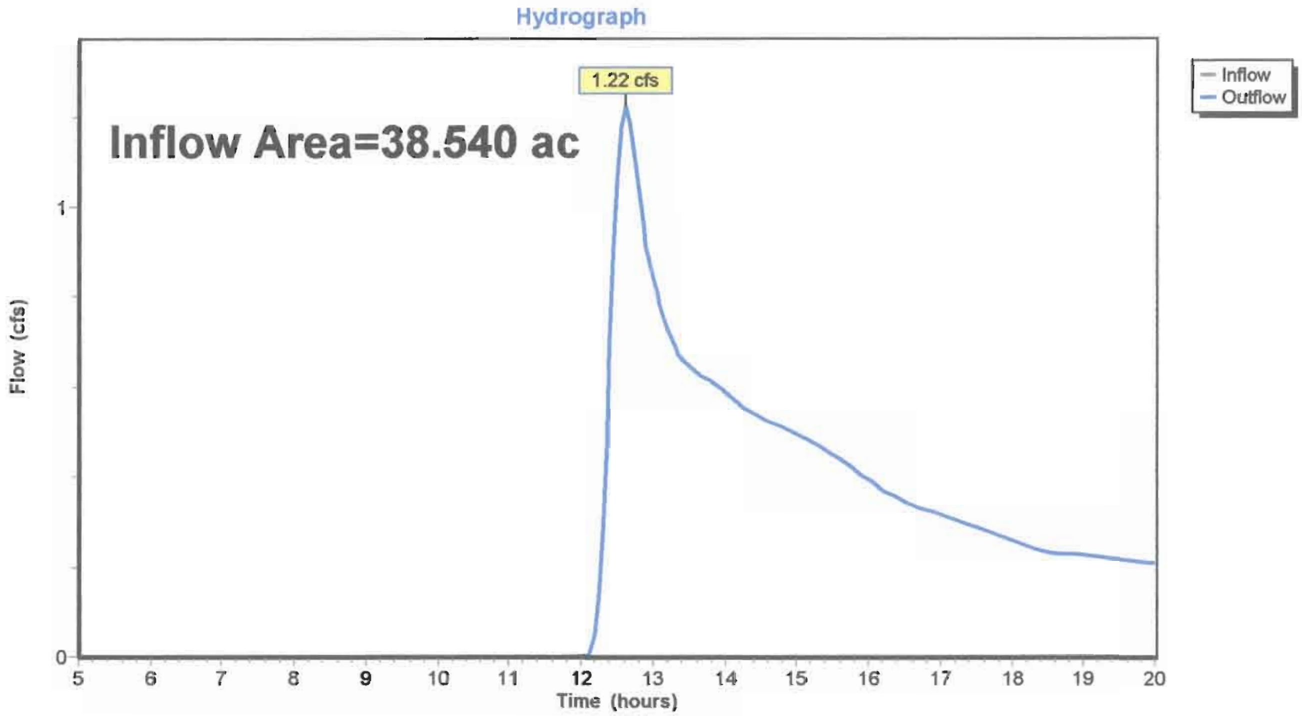


Reach dp3: post design point 3

Inflow Area = 38.540 ac, Inflow Depth > 0.09" for 1 year storm event
Inflow = 1.22 cfs @ 12.62 hrs, Volume= 0.284 af
Outflow = 1.22 cfs @ 12.62 hrs, Volume= 0.284 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach dp3: post design point 3

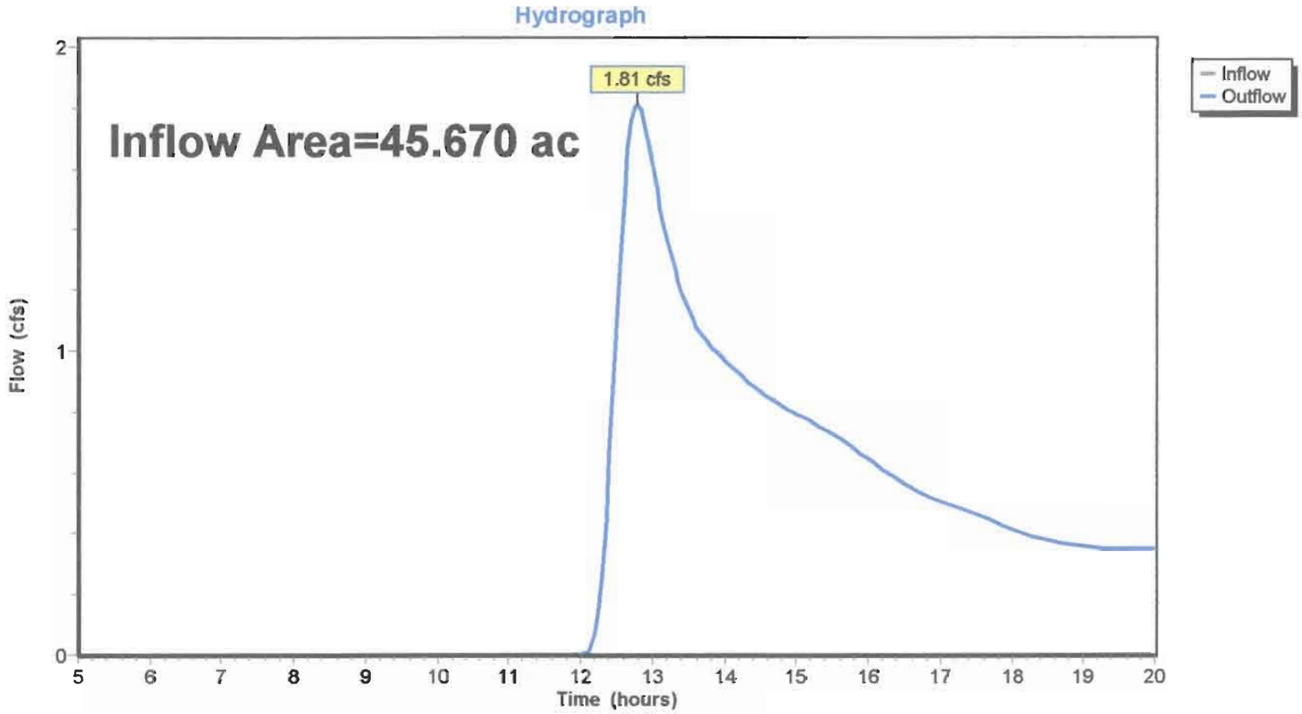


Reach dp4: post design pont 4

Inflow Area =	45.670 ac, Inflow Depth > 0.12"	for 1 year storm event	
Inflow =	1.81 cfs @ 12.78 hrs, Volume=	0.457 af	
Outflow =	1.81 cfs @ 12.78 hrs, Volume=	0.457 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach dp4: post design pont 4

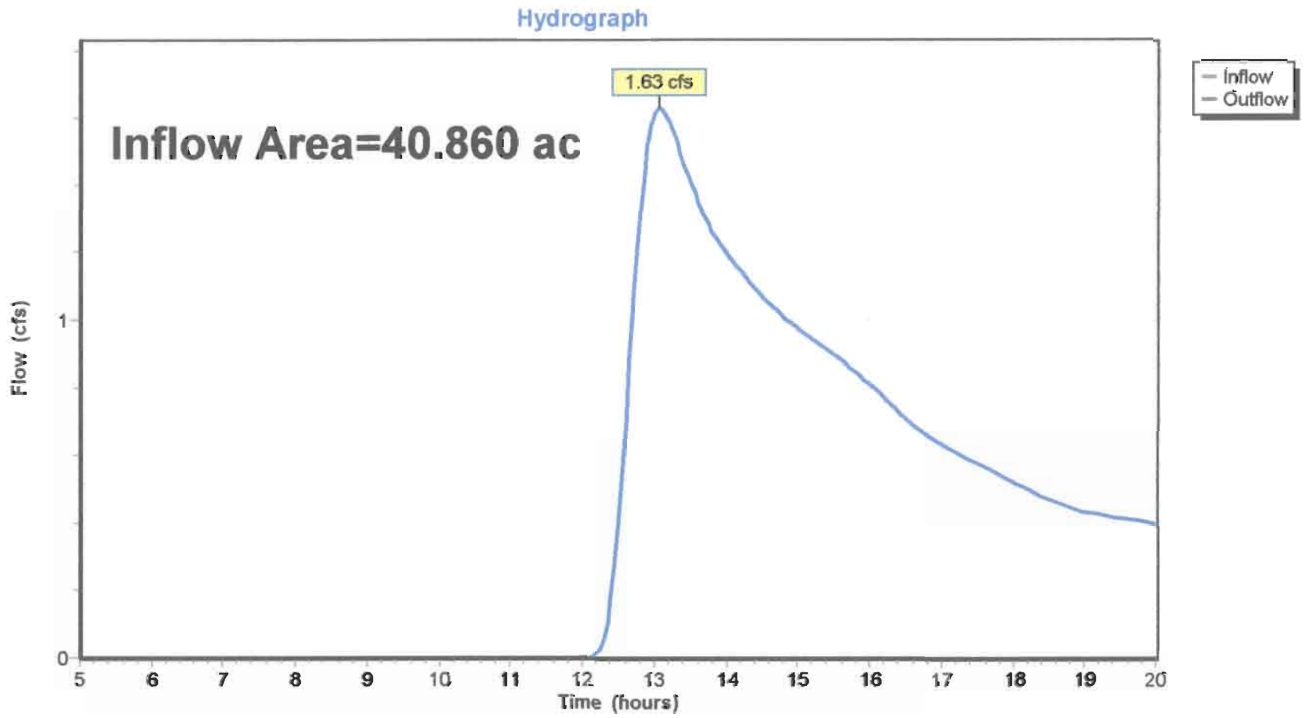


Reach dp5: post design point 5

Inflow Area =	40.860 ac,	Inflow Depth > 0.15"	for 1 year storm event
Inflow =	1.63 cfs @	13.07 hrs, Volume=	0.512 af
Outflow =	1.63 cfs @	13.07 hrs, Volume=	0.512 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach dp5: post design point 5

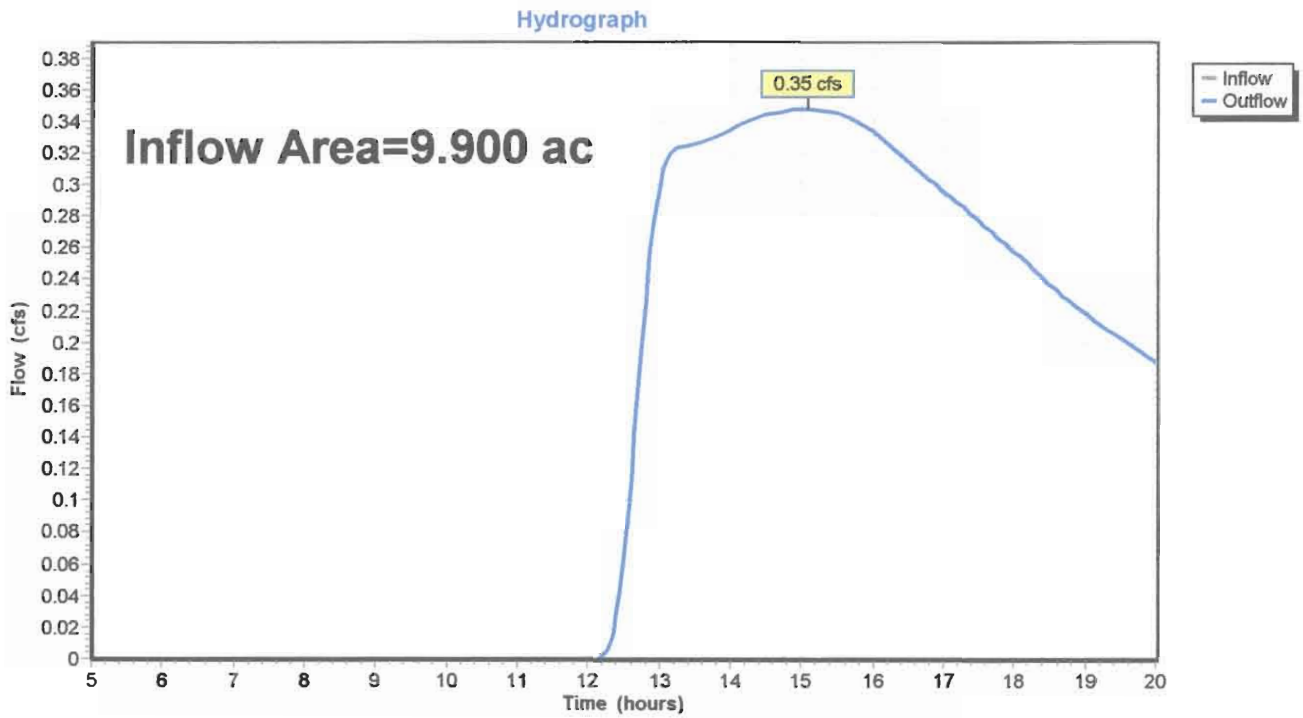


Reach dp6: post design point 6

Inflow Area =	9.900 ac,	Inflow Depth > 0.22"	for 1 year storm event	
Inflow =	0.35 cfs @	15.08 hrs, Volume=	0.178 af	
Outflow =	0.35 cfs @	15.08 hrs, Volume=	0.178 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

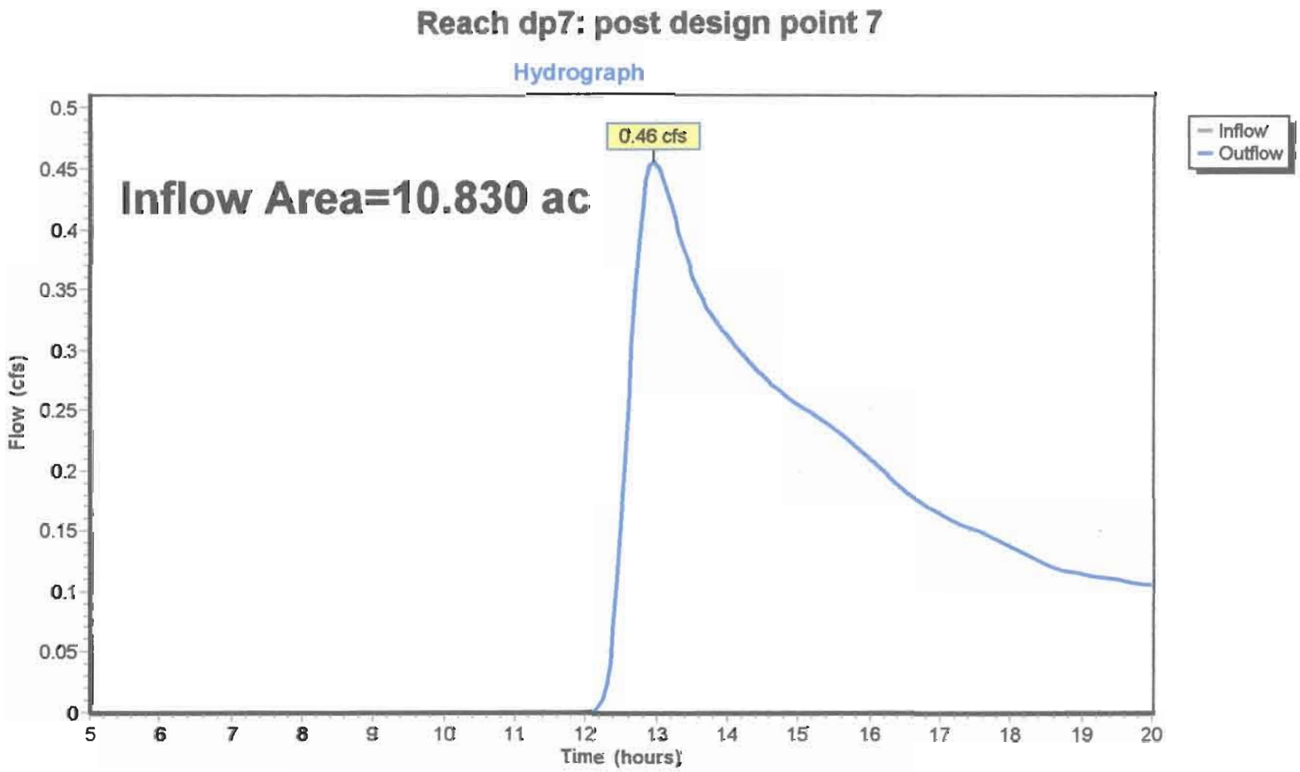
Reach dp6: post design point 6



Reach dp7: post design point 7

Inflow Area =	10.830 ac, Inflow Depth > 0.15"	for 1 year storm event	
Inflow =	0.46 cfs @ 12.96 hrs, Volume=	0.136 af	
Outflow =	0.46 cfs @ 12.96 hrs, Volume=	0.136 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



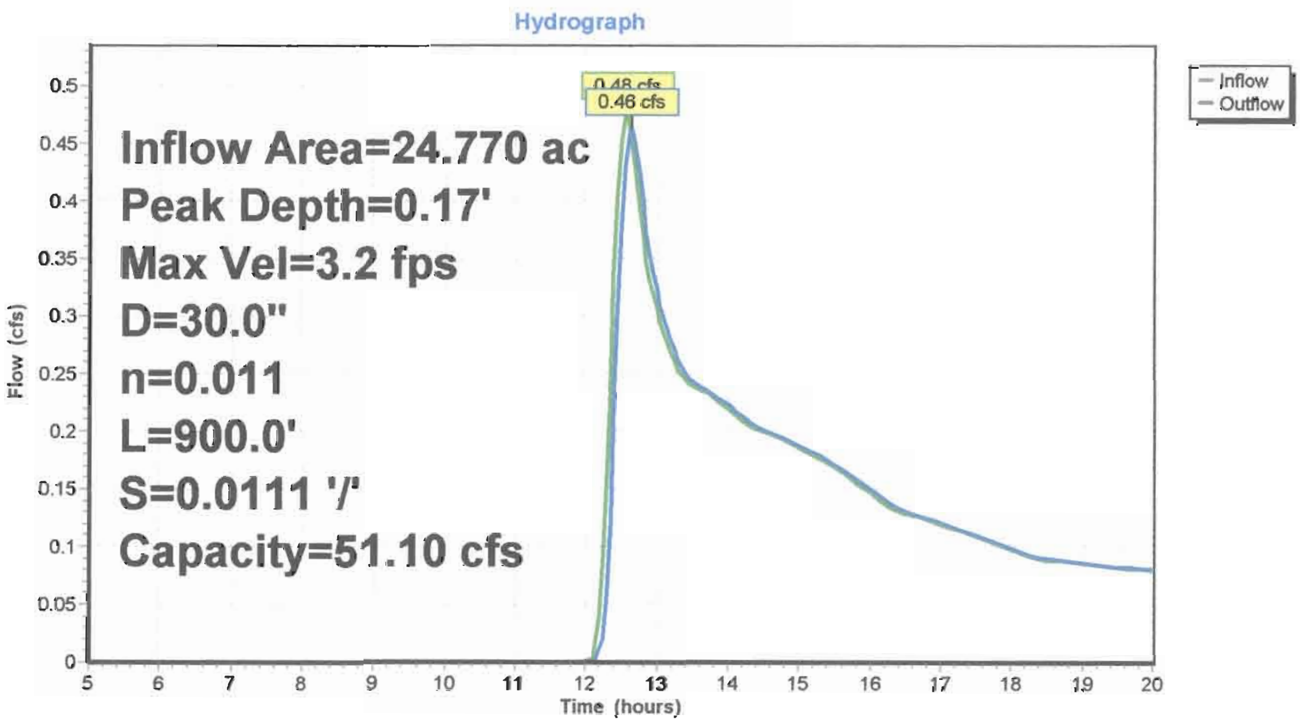
Reach r1: 30" pipe

Inflow Area =	24.770 ac, Inflow Depth > 0.05"	for 1 year storm event	
Inflow =	0.48 cfs @ 12.57 hrs, Volume=	0.107 af	
Outflow =	0.46 cfs @ 12.64 hrs, Volume=	0.107 af, Atten= 3%, Lag= 3.8 min	

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 2.3 fps, Avg. Travel Time= 6.5 min

Peak Depth= 0.17' @ 12.64 hrs
Capacity at bank full= 51.10 cfs
Inlet Invert= 160.00', Outlet Invert= 150.00'
30.0" Diameter Pipe, n= 0.011
Length= 900.0' Slope= 0.0111 '/'

Reach r1: 30" pipe



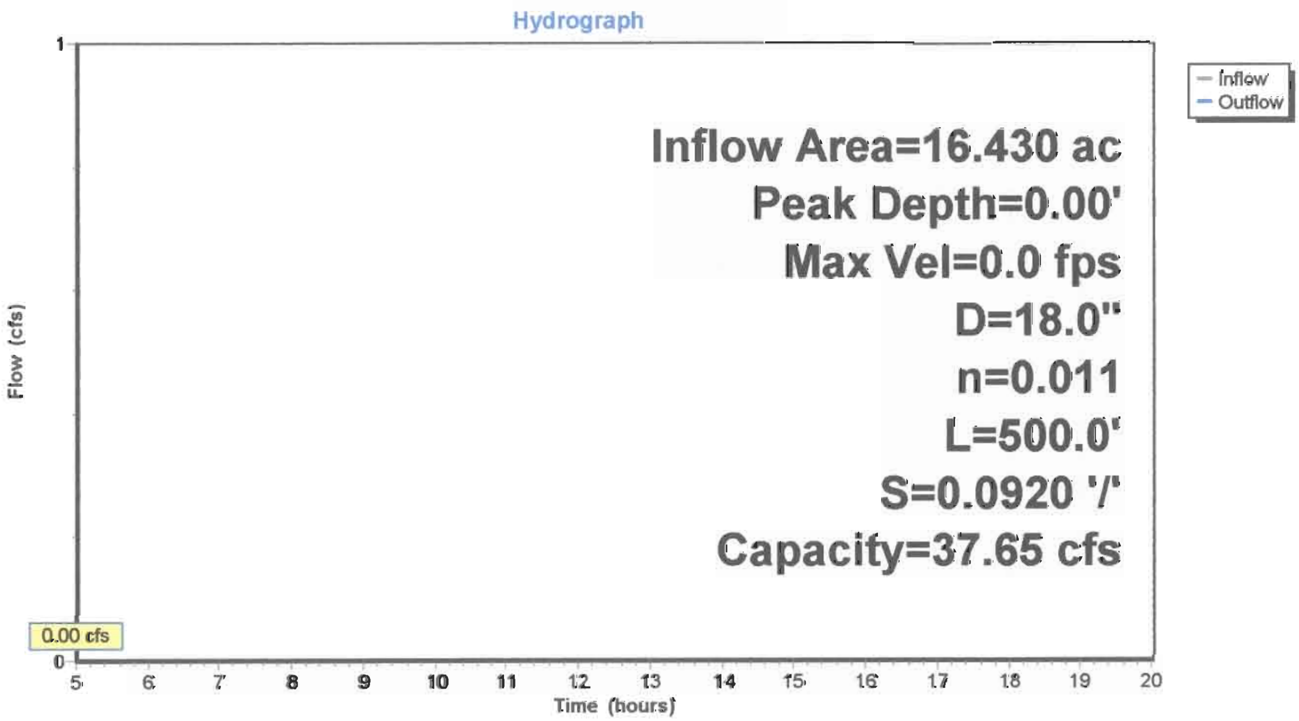
Reach r2: 18" pipe

Inflow Area = 16.430 ac, Inflow Depth = 0.00" for 1 year storm event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 37.65 cfs
Inlet Invert= 206.00', Outlet Invert= 160.00'
18.0" Diameter Pipe, n= 0.011
Length= 500.0' Slope= 0.0920 '/'

Reach r2: 18" pipe



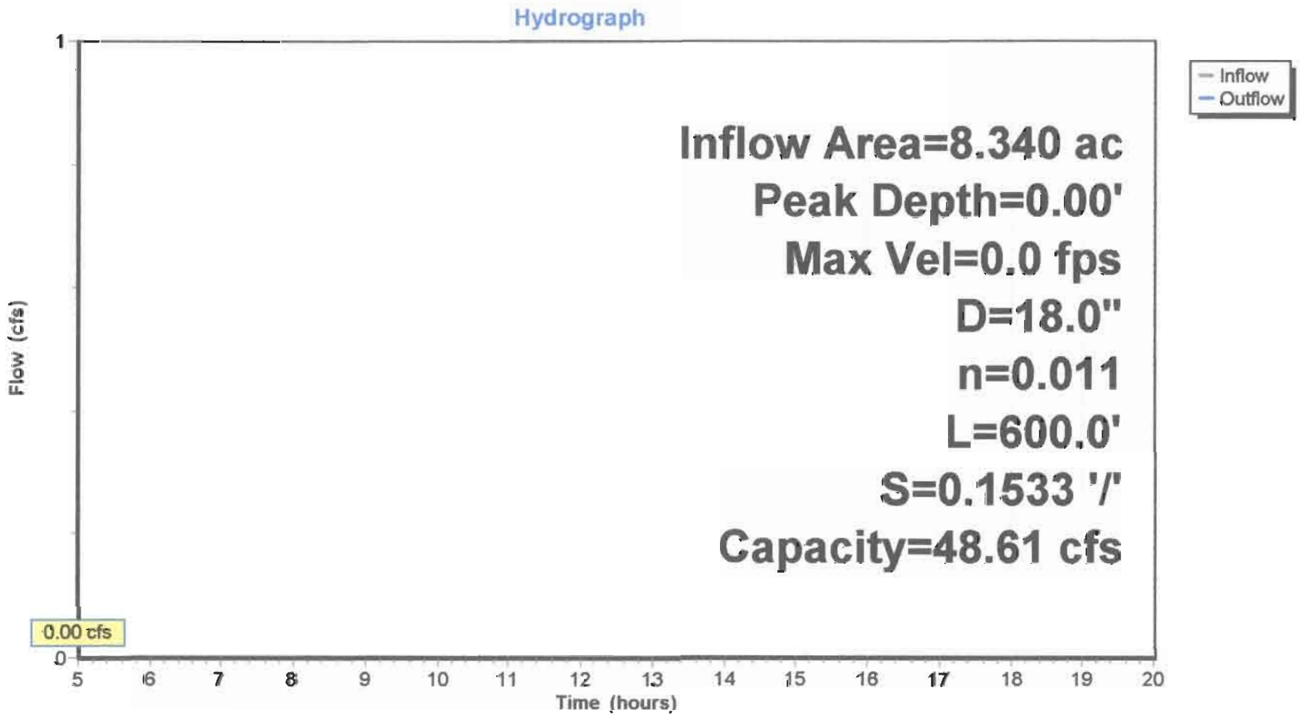
Reach r3: 18" pipe

Inflow Area = 8.340 ac, Inflow Depth = 0.00" for 1 year storm event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 48.61 cfs
Inlet Invert= 298.00', Outlet Invert= 206.00'
18.0" Diameter Pipe, n= 0.011
Length= 600.0' Slope= 0.1533 '/'

Reach r3: 18" pipe



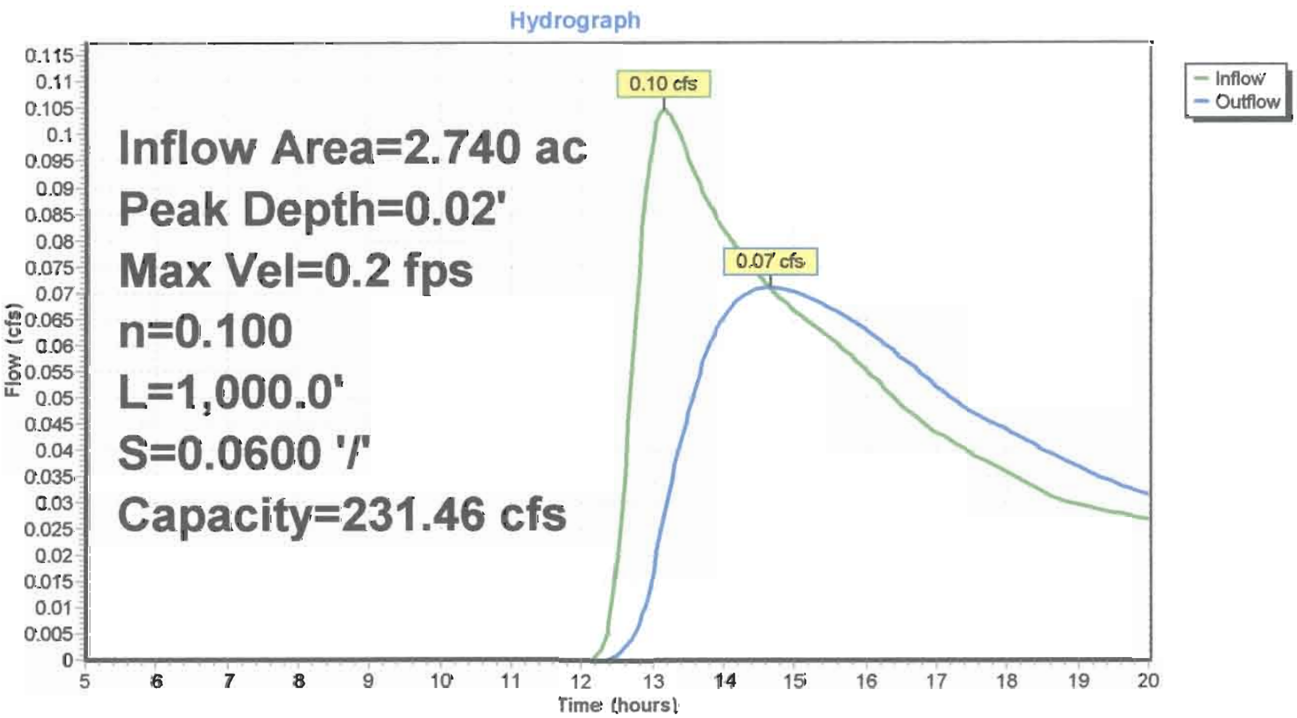
Reach r4: wetland reach

Inflow Area = 2.740 ac, Inflow Depth > 0.15" for 1 year storm event
Inflow = 0.10 cfs @ 13.17 hrs, Volume= 0.034 af
Outflow = 0.07 cfs @ 14.64 hrs, Volume= 0.030 af, Atten= 32%, Lag= 88.5 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.2 fps, Min. Travel Time= 70.8 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 81.9 min

Peak Depth= 0.02' @ 14.64 hrs
Capacity at bank full= 231.46 cfs
125.00' x 1.00' deep Parabolic Channel, n= 0.100
Length= 1,000.0' Slope= 0.0600 '/'

Reach r4: wetland reach



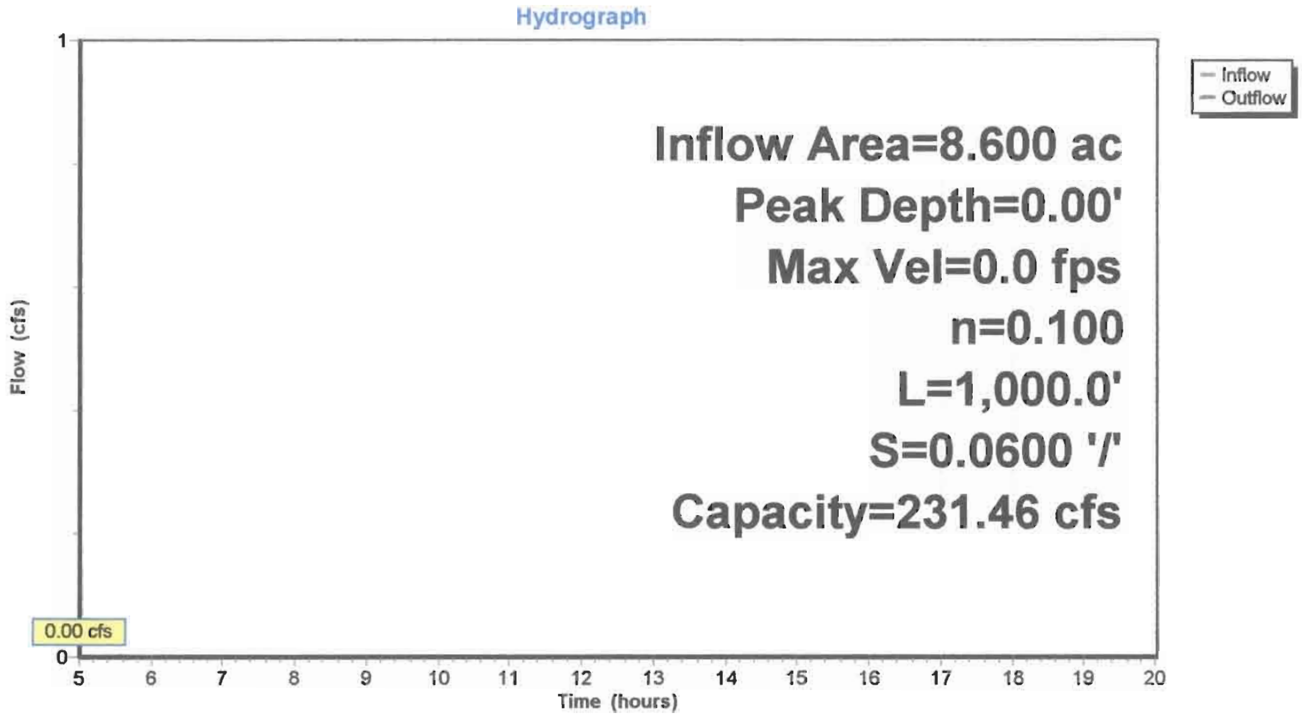
Reach r5: wetland reach

Inflow Area = 8.600 ac, Inflow Depth = 0.00" for 1 year storm event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 231.46 cfs
125.00' x 1.00' deep Parabolic Channel, n= 0.100
Length= 1,000.0' Slope= 0.0600 '/'

Reach r5: wetland reach



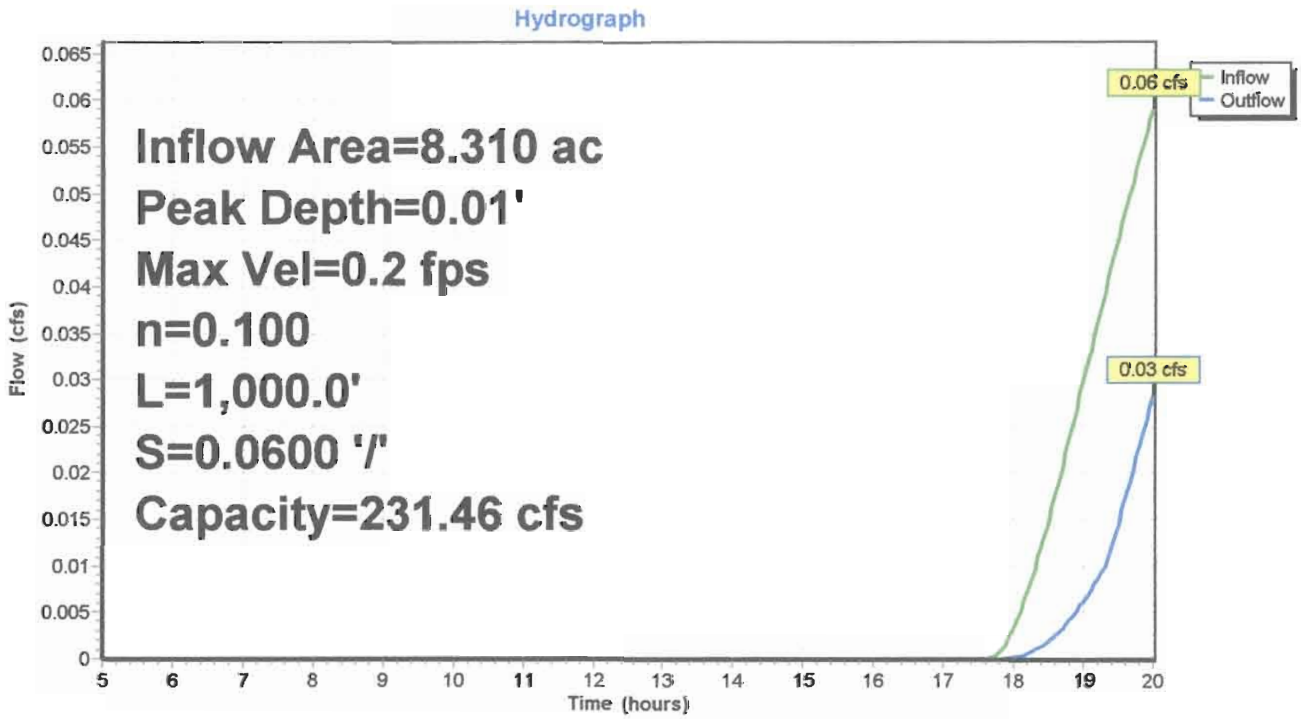
Reach r6: wetland reach

Inflow Area =	8.310 ac, Inflow Depth > 0.01"	for 1 year storm event	
Inflow =	0.06 cfs @ 20.00 hrs, Volume=	0.005 af	
Outflow =	0.03 cfs @ 20.00 hrs, Volume=	0.002 af, Atten= 52%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.2 fps, Min. Travel Time= 91.0 min
Avg. Velocity = 0.1 fps, Avg. Travel Time= 120.0 min

Peak Depth= 0.01' @ 20.00 hrs
Capacity at bank full= 231.46 cfs
125.00' x 1.00' deep Parabolic Channel, n= 0.100
Length= 1,000.0' Slope= 0.0600 '/'

Reach r6: wetland reach



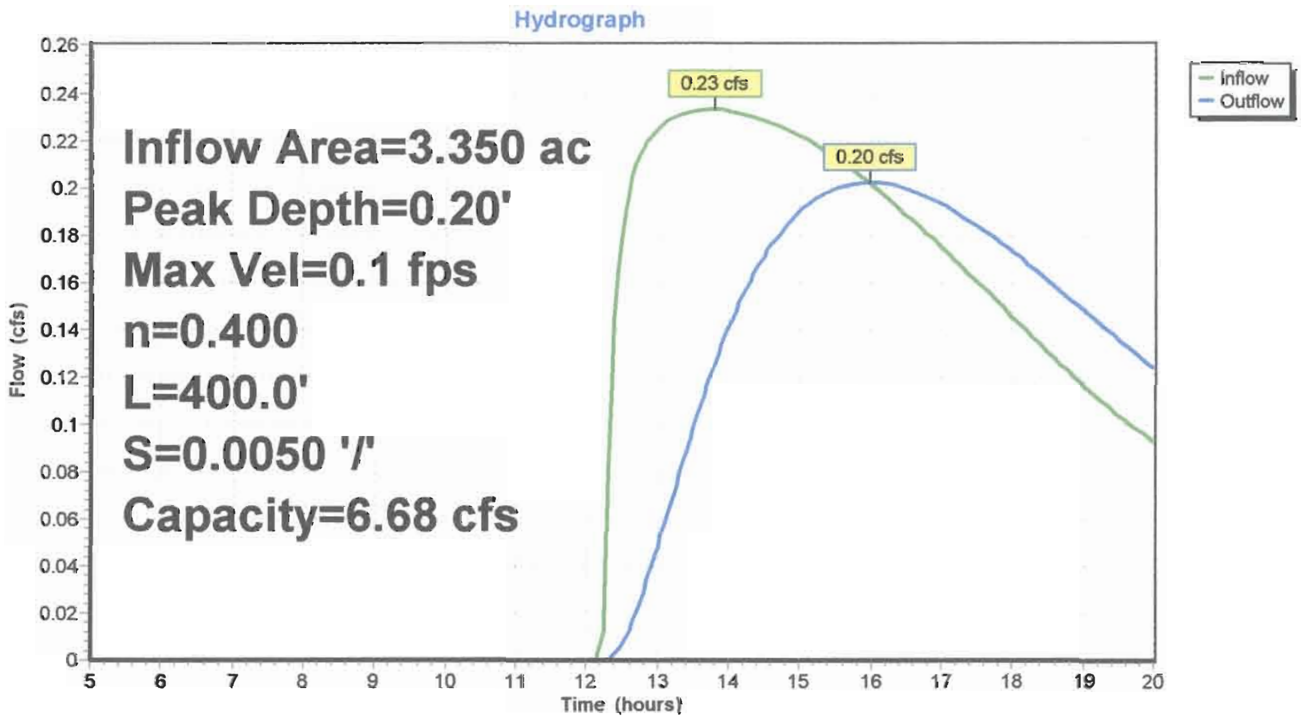
Reach r7: wetland reach

Inflow Area = 3.350 ac, Inflow Depth > 0.41" for 1 year storm event
Inflow = 0.23 cfs @ 13.79 hrs, Volume= 0.115 af
Outflow = 0.20 cfs @ 15.97 hrs, Volume= 0.096 af, Atten= 13%, Lag= 131.2 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.1 fps, Min. Travel Time= 97.6 min
Avg. Velocity = 0.1 fps, Avg. Travel Time= 111.1 min

Peak Depth= 0.20' @ 15.97 hrs
Capacity at bank full= 6.68 cfs
50.00' x 1.00' deep Parabolic Channel, n= 0.400
Length= 400.0' Slope= 0.0050 '/'

Reach r7: wetland reach



Pond cb12: splitter cb #12

Inflow Area =	8.090 ac, Inflow Depth > 0.17"	for 1 year storm event	
Inflow =	0.45 cfs @ 12.84 hrs, Volume=	0.117 af	
Outflow =	0.45 cfs @ 12.84 hrs, Volume=	0.117 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af	
Secondary =	0.45 cfs @ 12.84 hrs, Volume=	0.117 af	

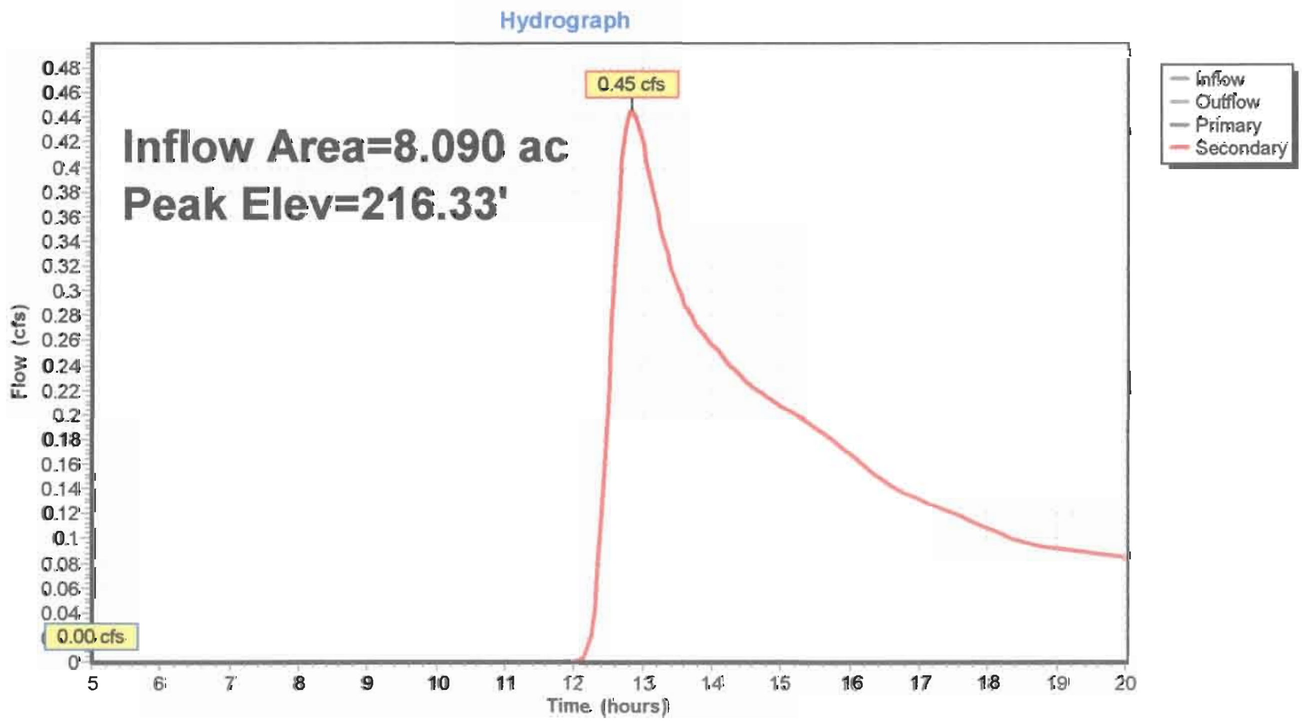
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 216.33' @ 12.84 hrs
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Secondary	216.00'	**12.0" x 95.0' long Culvert to wqb p2** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 212.00' S= 0.0421 '/' Cc= 0.900 n= 0.011
#2	Primary	217.00'	**18.0" x 100.0' long Culvert to next cb** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 206.00' S= 0.1100 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=216.00' TW=206.00' (Dynamic Tailwater)
↑**2=Culvert to next cb** (Controls 0.00 cfs)

Secondary OutFlow Max=0.45 cfs @ 12.84 hrs HW=216.33' TW=212.22' (Dynamic Tailwater)
↑**1=Culvert to wqb p2** (Inlet Controls 0.45 cfs @ 2.0 fps)

Pond cb12: splitter cb #12



Pond cb20: splitter cb #20

Inflow Area =	8.340 ac,	Inflow Depth > 0.33"	for 1 year storm event
Inflow =	1.80 cfs @ 12.30 hrs,	Volume=	0.232 af
Outflow =	1.80 cfs @ 12.30 hrs,	Volume=	0.232 af, Atten= 0%, Lag= 0.0 min
Primary =	0.00 cfs @ 5.00 hrs,	Volume=	0.000 af
Secondary =	1.80 cfs @ 12.30 hrs,	Volume=	0.232 af

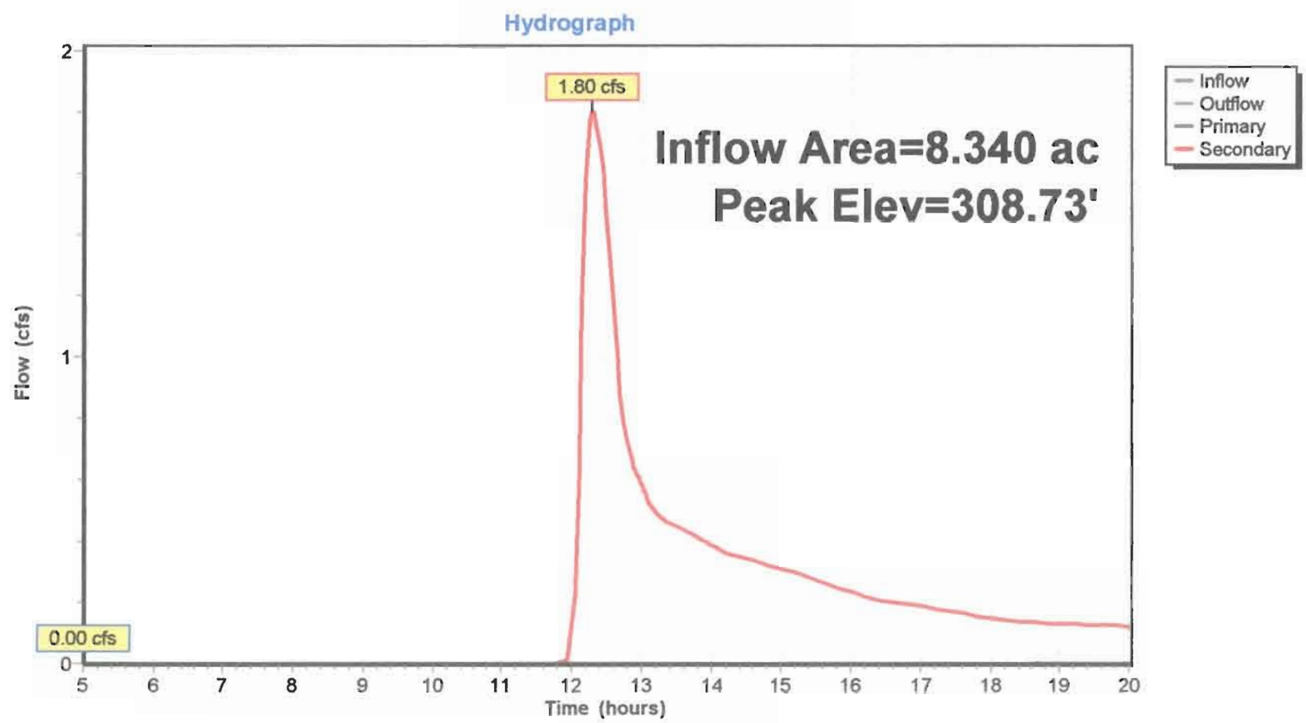
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 308.73' @ 12.30 hrs
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (863.2 - 863.2)

Device	Routing	Invert	Outlet Devices
#1	Secondary	308.00'	**12.0" x 75.0' long Culvert to wqb p3a** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 302.00' S= 0.0800 '/' Cc= 0.900 n= 0.011
#2	Primary	309.00'	**18.0" x 100.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 297.00' S= 0.1200 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=308.00' TW=298.00' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=1.80 cfs @ 12.30 hrs HW=308.73' TW=303.63' (Dynamic Tailwater)
↑—**1=Culvert to wqb p3a** (Inlet Controls 1.80 cfs @ 2.9 fps)

Pond cb20: splitter cb #20



Pond cb29: splitter cb #29

Inflow Area =	8.600 ac, Inflow Depth > 0.30"	for 1 year storm event	
Inflow =	1.33 cfs @ 12.54 hrs, Volume=	0.216 af	
Outflow =	1.33 cfs @ 12.54 hrs, Volume=	0.216 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af	
Secondary =	1.33 cfs @ 12.54 hrs, Volume=	0.216 af	

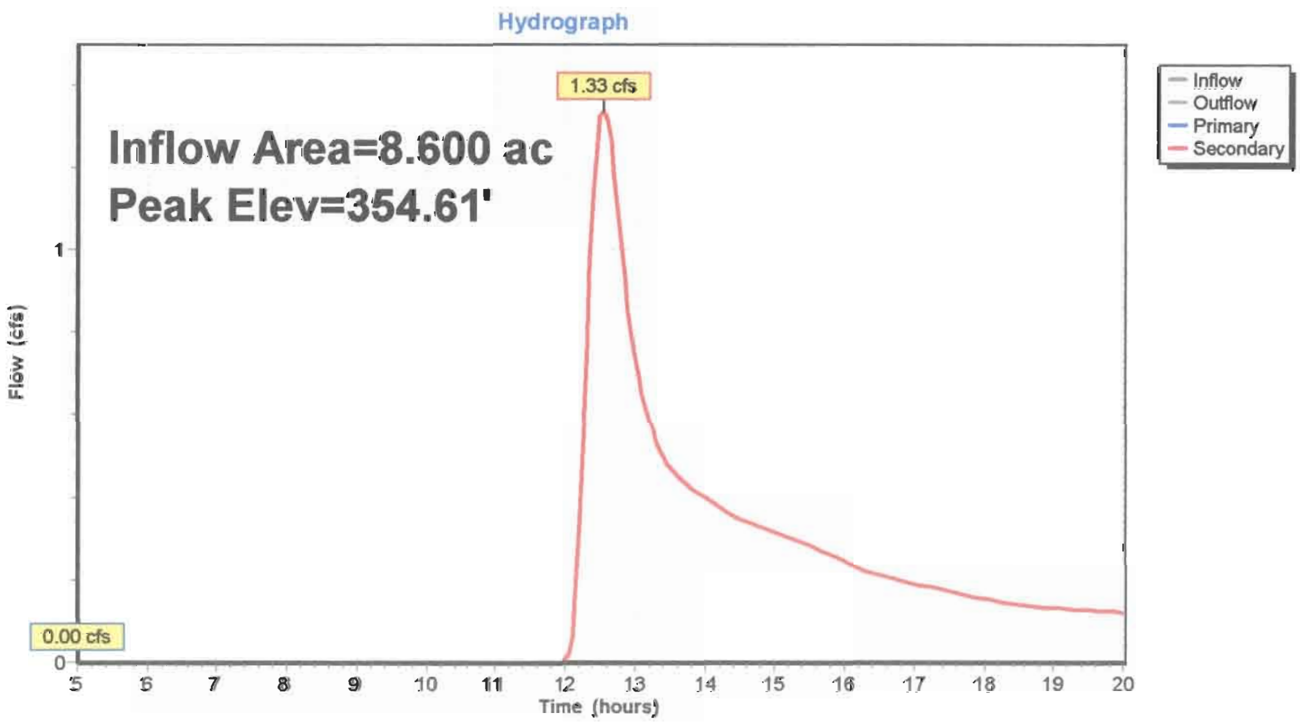
Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 354.61' @ 12.54 hrs
Flood Elev= 360.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Secondary	354.00'	**12.0" x 65.0' long Culvert to wqb p4a** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 353.00' S= 0.0154 '/' Cc= 0.900 n= 0.011
#2	Primary	355.00'	**18.0" x 85.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 353.00' S= 0.0235 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=354.00' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=1.33 cfs @ 12.54 hrs HW=354.61' TW=352.33' (Dynamic Tailwater)
└─**1=Culvert to wqb p4a** (Inlet Controls 1.33 cfs @ 2.7 fps)

Pond cb29: splitter cb #29



Pond p2: pond p2

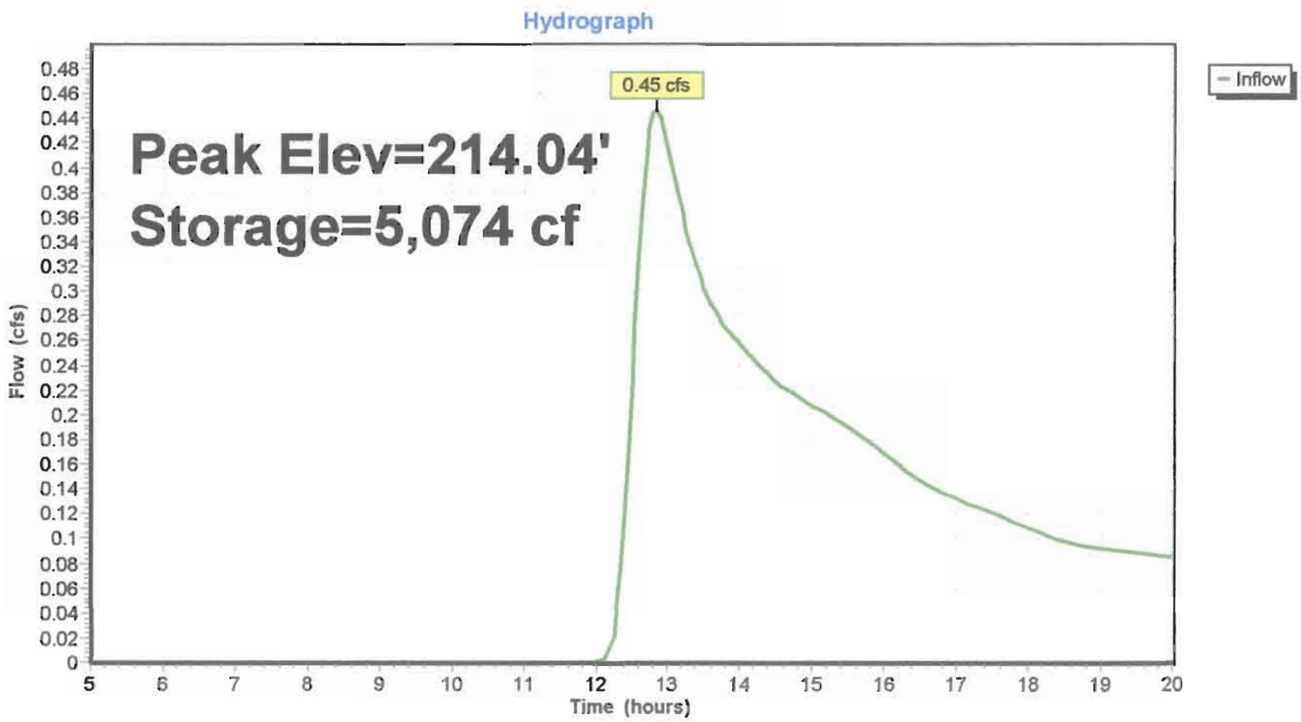
Inflow	=	0.45 cfs @	12.84 hrs,	Volume=	0.117 af
Outflow	=	0.00 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 214.04' @ 20.00 hrs Surf.Area= 3,645 sf Storage= 5,074 cf
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	212.00'	29,550 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.00	1,300	0	0
214.00	3,600	4,900	4,900
216.00	6,100	9,700	14,600
217.00	7,500	6,800	21,400
218.00	8,800	8,150	29,550

Pond p2: pond p2



Pond p3a: pond p3a

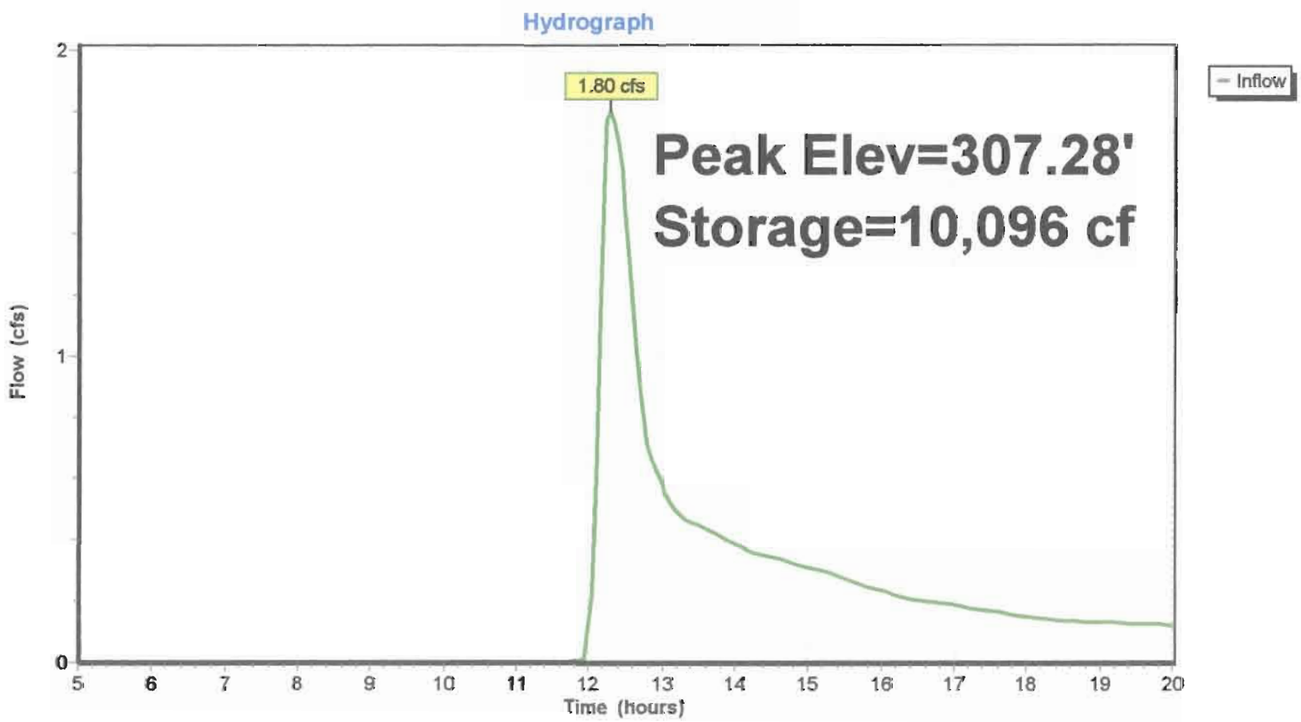
Inflow	=	1.80 cfs @ 12.30 hrs,	Volume=	0.232 af
Outflow	=	0.00 cfs @ 5.00 hrs,	Volume=	0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 307.28' @ 20.00 hrs Surf.Area= 3,954 sf Storage= 10,096 cf
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	302.00'	30,450 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
302.00	150	0	0
304.00	1,200	1,350	1,350
306.00	2,800	4,000	5,350
308.00	4,600	7,400	12,750
309.00	5,500	5,050	17,800
310.00	6,600	6,050	23,850
311.00	6,600	6,600	30,450

Pond p3a: pond p3a



Pond p4a: pond 4a

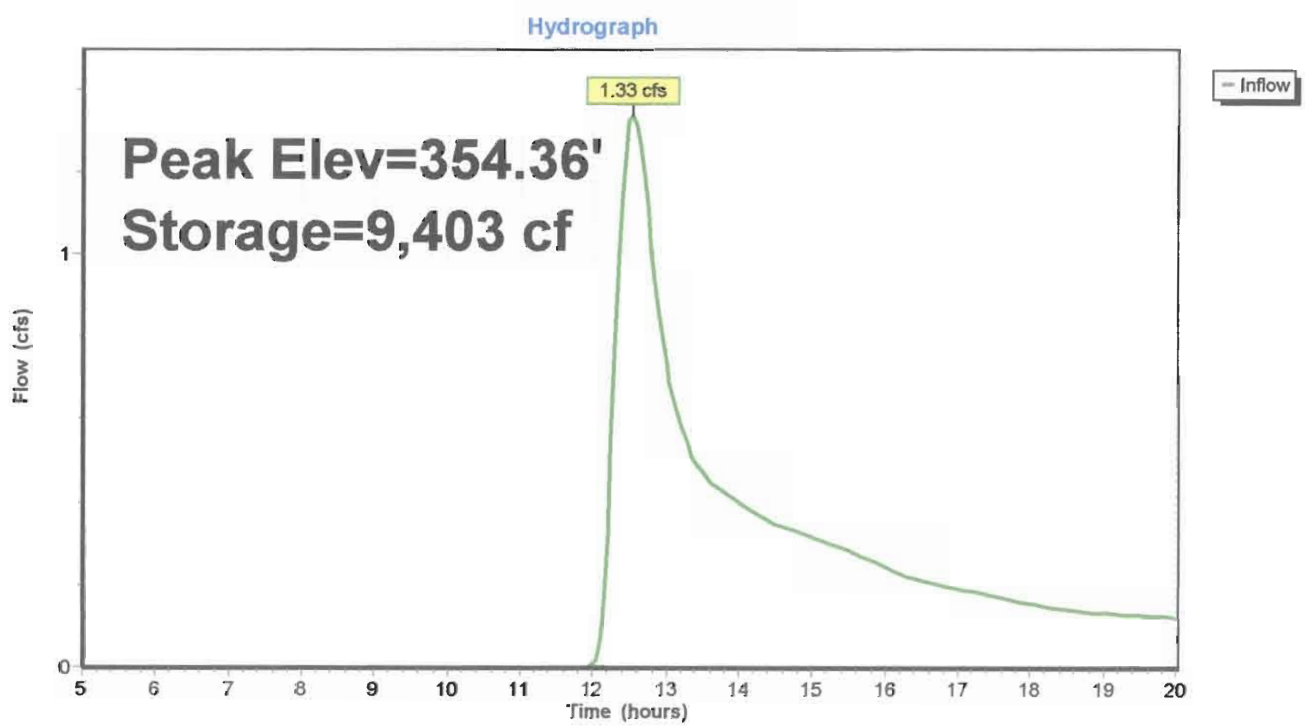
Inflow	=	1.33 cfs @ 12.54 hrs,	Volume=	0.216 af
Outflow	=	0.00 cfs @ 5.00 hrs,	Volume=	0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 354.36' @ 20.00 hrs Surf.Area= 4,921 sf Storage= 9,403 cf
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	352.00'	25,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
352.00	3,000	0	0
354.00	4,600	7,600	7,600
355.00	5,500	5,050	12,650
356.00	6,400	5,950	18,600
357.00	6,400	6,400	25,000

Pond p4a: pond 4a



Pond p4b: pond 4b

Inflow Area = 8.310 ac, Inflow Depth > 0.33" for 1 year storm event
Inflow = 1.71 cfs @ 12.35 hrs, Volume= 0.231 af
Outflow = 0.06 cfs @ 20.00 hrs, Volume= 0.005 af, Atten= 97%, Lag= 458.8 min
Primary = 0.06 cfs @ 20.00 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 368.66' @ 20.00 hrs Surf.Area= 5,398 sf Storage= 9,820 cf
Plug-Flow detention time= 432.0 min calculated for 0.005 af (2% of inflow)
Center-of-Mass det. time= 294.5 min (1,159.7 - 865.2)

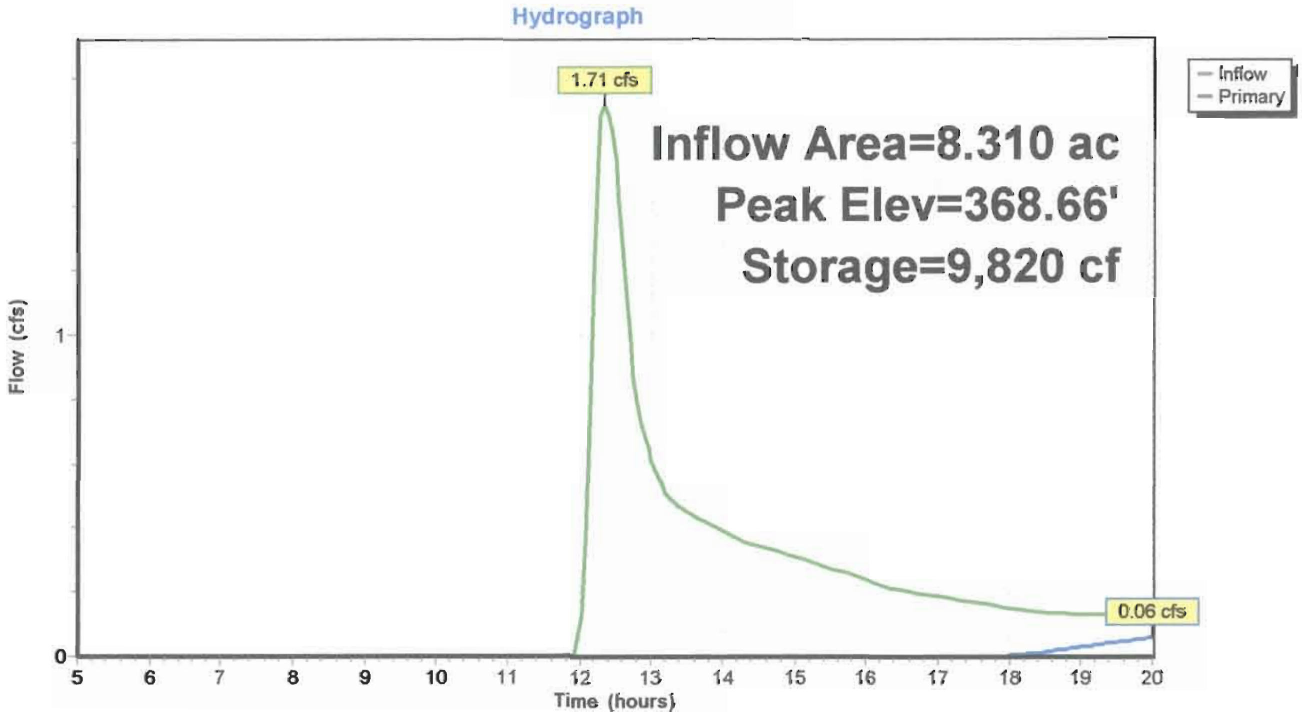
Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	66,550 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
366.00	1,300	0	0
368.00	4,700	6,000	6,000
370.00	6,800	11,500	17,500
372.00	9,100	15,900	33,400
374.00	11,700	20,800	54,200
375.00	13,000	12,350	66,550

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**15.0" x 100.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 0.00' S= 3.6500 '/' Cc= 0.900 n= 0.011
#2	Device 1	368.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	372.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	370.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 20.00 hrs HW=368.66' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.06 cfs of 10.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.4 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond p4b: pond 4b



Pond p6a: pond 6a

Inflow Area =	3.350 ac, Inflow Depth > 0.54"	for 1 year storm event	
Inflow =	1.63 cfs @ 12.19 hrs, Volume=	0.151 af	
Outflow =	0.23 cfs @ 13.79 hrs, Volume=	0.115 af,	Atten= 86%, Lag= 95.9 min
Primary =	0.23 cfs @ 13.79 hrs, Volume=	0.115 af	

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 383.85' @ 13.79 hrs Surf.Area= 2,079 sf Storage= 2,817 cf
Plug-Flow detention time= 162.0 min calculated for 0.115 af (76% of inflow)
Center-of-Mass det. time= 100.2 min (940.5 - 840.3)

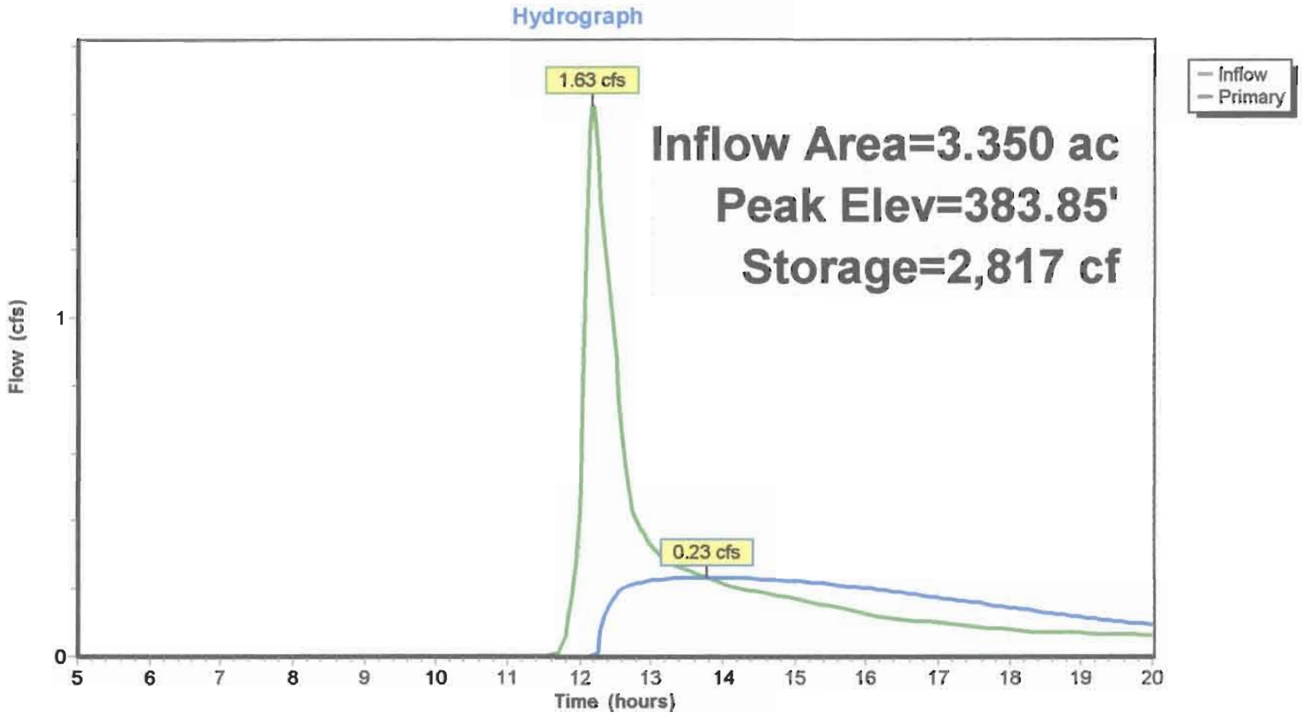
Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	18,078 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
382.00	871	0	0
384.00	2,178	3,049	3,049
386.00	3,485	5,663	8,712
387.00	4,792	4,139	12,851
388.00	5,663	5,228	18,078

Device	Routing	Invert	Outlet Devices
#1	Primary	381.00'	**15.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 380.50' S= 0.0083 '/' Cc= 0.900 n= 0.011
#2	Device 1	382.75'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	385.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	385.50'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	388.00'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.23 cfs @ 13.79 hrs HW=383.85' TW=0.16' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.23 cfs of 8.81 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.23 cfs @ 4.7 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond p6a: pond 6a



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment b2: post basin b2	Runoff Area=8.090 ac Runoff Depth>0.39" Flow Length=1,580' Tc=39.3 min CN=58 Runoff=1.40 cfs 0.260 af
Subcatchment b3: post basin b3	Runoff Area=13.770 ac Runoff Depth>0.36" Flow Length=990' Tc=21.9 min CN=57 Runoff=2.62 cfs 0.408 af
Subcatchment b3a: post basin b3a	Runoff Area=8.340 ac Runoff Depth>0.63" Flow Length=1,200' Tc=14.3 min CN=64 Runoff=4.21 cfs 0.435 af
Subcatchment b3b: post basin b3b	Runoff Area=8.340 ac Runoff Depth>0.36" Flow Length=820' Tc=20.0 min CN=57 Runoff=1.62 cfs 0.248 af
Subcatchment b4a: post basin b4a	Runoff Area=8.600 ac Runoff Depth>0.58" Flow Length=880' Tc=27.4 min CN=63 Runoff=3.11 cfs 0.415 af
Subcatchment b4b: post basin b4b	Runoff Area=8.310 ac Runoff Depth>0.63" Flow Length=830' Tc=17.1 min CN=64 Runoff=3.94 cfs 0.433 af
Subcatchment b4c: post basin b4c	Runoff Area=26.020 ac Runoff Depth>0.42" Flow Length=1,830' Tc=37.2 min CN=59 Runoff=5.28 cfs 0.913 af
Subcatchment b4d: post basin b4d	Runoff Area=2.740 ac Runoff Depth>0.35" Flow Length=710' Tc=54.9 min CN=57 Runoff=0.35 cfs 0.079 af
Subcatchment b5: post basin b5	Runoff Area=40.860 ac Runoff Depth>0.35" Flow Length=2,210' Tc=49.5 min CN=57 Runoff=5.47 cfs 1.187 af
Subcatchment b6a: post basin b6a	Runoff Area=3.350 ac Runoff Depth>0.91" Flow Length=765' Tc=11.4 min CN=70 Runoff=3.01 cfs 0.255 af
Subcatchment b6b: post basin 6b	Runoff Area=6.550 ac Runoff Depth>0.35" Flow Length=1,350' Tc=51.6 min CN=57 Runoff=0.86 cfs 0.190 af
Subcatchment b7: post basin b7	Runoff Area=10.830 ac Runoff Depth>0.35" Flow Length=1,390' Tc=43.5 min CN=57 Runoff=1.55 cfs 0.316 af
Reach dp3: post design point 3	Inflow=4.50 cfs 0.667 af Outflow=4.50 cfs 0.667 af
Reach dp4: post design pont 4	Inflow=5.32 cfs 1.196 af Outflow=5.32 cfs 1.196 af
Reach dp5: post design point 5	Inflow=5.47 cfs 1.187 af Outflow=5.47 cfs 1.187 af

Reach dp6: post design point 6 Inflow=0.95 cfs 0.351 af
Outflow=0.95 cfs 0.351 af

Reach dp7: post design point 7 Inflow=1.55 cfs 0.316 af
Outflow=1.55 cfs 0.316 af

Reach r1: 30" pipe Peak Depth=0.33' Max Vel=5.0 fps Inflow=2.00 cfs 0.261 af
D=30.0" n=0.011 L=900.0' S=0.0111 '/' Capacity=51.10 cfs Outflow=1.96 cfs 0.259 af

Reach r2: 18" pipe Peak Depth=0.14' Max Vel=8.2 fps Inflow=0.71 cfs 0.013 af
D=18.0" n=0.011 L=500.0' S=0.0920 '/' Capacity=37.65 cfs Outflow=0.71 cfs 0.013 af

Reach r3: 18" pipe Peak Depth=0.13' Max Vel=9.9 fps Inflow=0.69 cfs 0.013 af
D=18.0" n=0.011 L=600.0' S=0.1533 '/' Capacity=48.61 cfs Outflow=0.71 cfs 0.013 af

Reach r4: wetland reach Peak Depth=0.04' Max Vel=0.3 fps Inflow=0.35 cfs 0.079 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.22 cfs 0.073 af

Reach r5: wetland reach Peak Depth=0.04' Max Vel=0.4 fps Inflow=0.31 cfs 0.091 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.27 cfs 0.077 af

Reach r6: wetland reach Peak Depth=0.05' Max Vel=0.4 fps Inflow=0.31 cfs 0.151 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.31 cfs 0.133 af

Reach r7: wetland reach Peak Depth=0.24' Max Vel=0.1 fps Inflow=0.33 cfs 0.193 af
n=0.400 L=400.0' S=0.0050 '/' Capacity=6.68 cfs Outflow=0.31 cfs 0.161 af

Pond cb12: splitter cb #12 Peak Elev=216.63' Inflow=1.40 cfs 0.260 af
Primary=0.00 cfs 0.000 af Secondary=1.40 cfs 0.260 af Outflow=1.40 cfs 0.260 af

Pond cb20: splitter cb #20 Peak Elev=309.37' Inflow=4.21 cfs 0.435 af
Primary=0.69 cfs 0.013 af Secondary=3.52 cfs 0.422 af Outflow=4.21 cfs 0.435 af

Pond cb29: splitter cb #29 Peak Elev=355.24' Inflow=3.11 cfs 0.415 af
Primary=0.31 cfs 0.091 af Secondary=3.01 cfs 0.324 af Outflow=3.11 cfs 0.415 af

Pond p2: pond p2 Peak Elev=215.32' Storage=11,297 cf Inflow=1.40 cfs 0.260 af
Outflow=0.00 cfs 0.000 af

Pond p3a: pond p3a Peak Elev=309.09' Storage=18,369 cf Inflow=3.52 cfs 0.422 af
Outflow=0.00 cfs 0.000 af

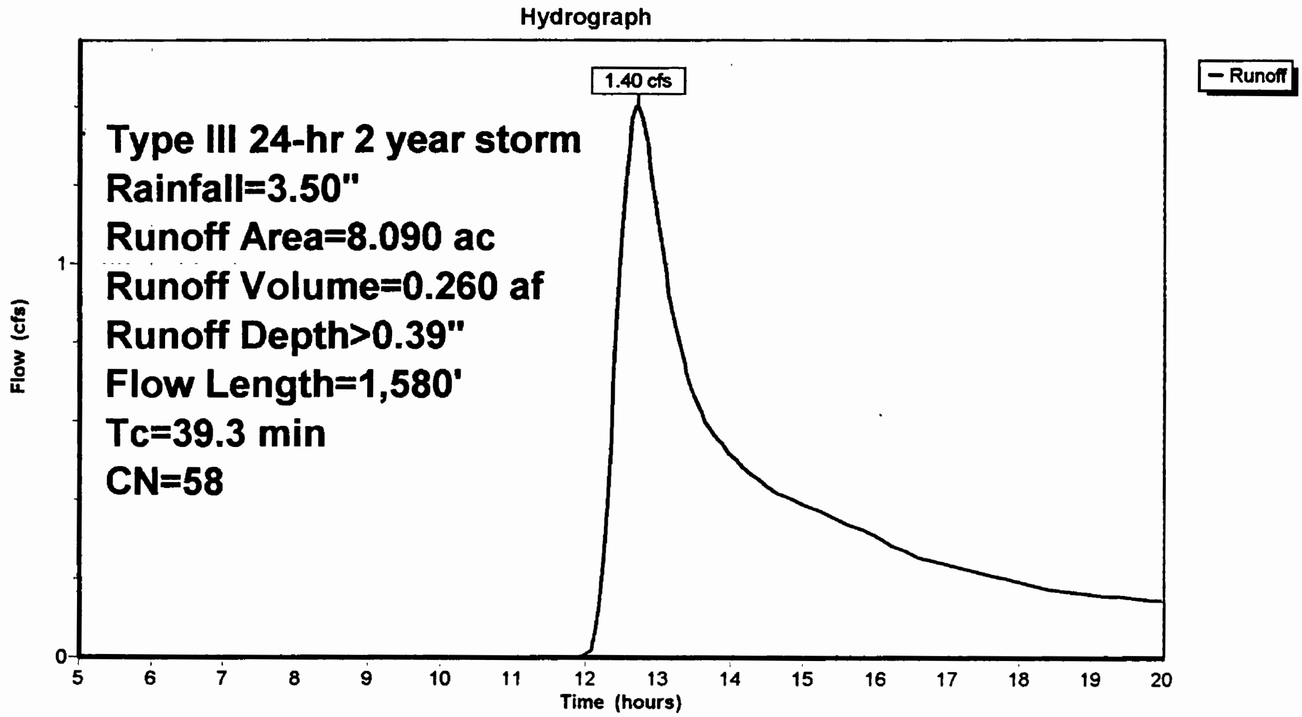
Pond p4a: pond 4a Peak Elev=355.24' Storage=14,101 cf Inflow=3.01 cfs 0.324 af
Outflow=0.00 cfs 0.000 af

Pond p4b: pond 4b Peak Elev=369.21' Storage=12,967 cf Inflow=3.94 cfs 0.433 af
Outflow=0.31 cfs 0.151 af

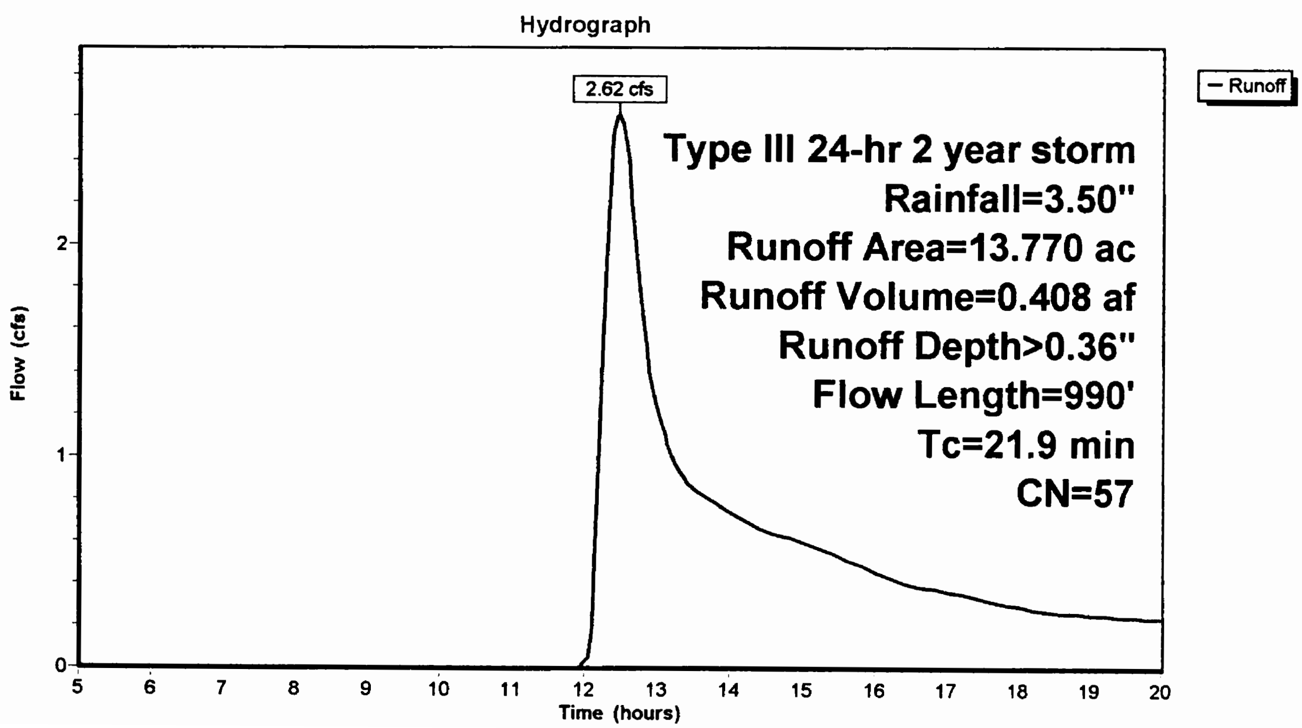
Pond p6a: pond 6a Peak Elev=384.82' Storage=5,358 cf Inflow=3.01 cfs 0.255 af
Outflow=0.33 cfs 0.193 af

Total Runoff Area = 145.800 ac Runoff Volume = 5.138 af Average Runoff Depth = 0.42"

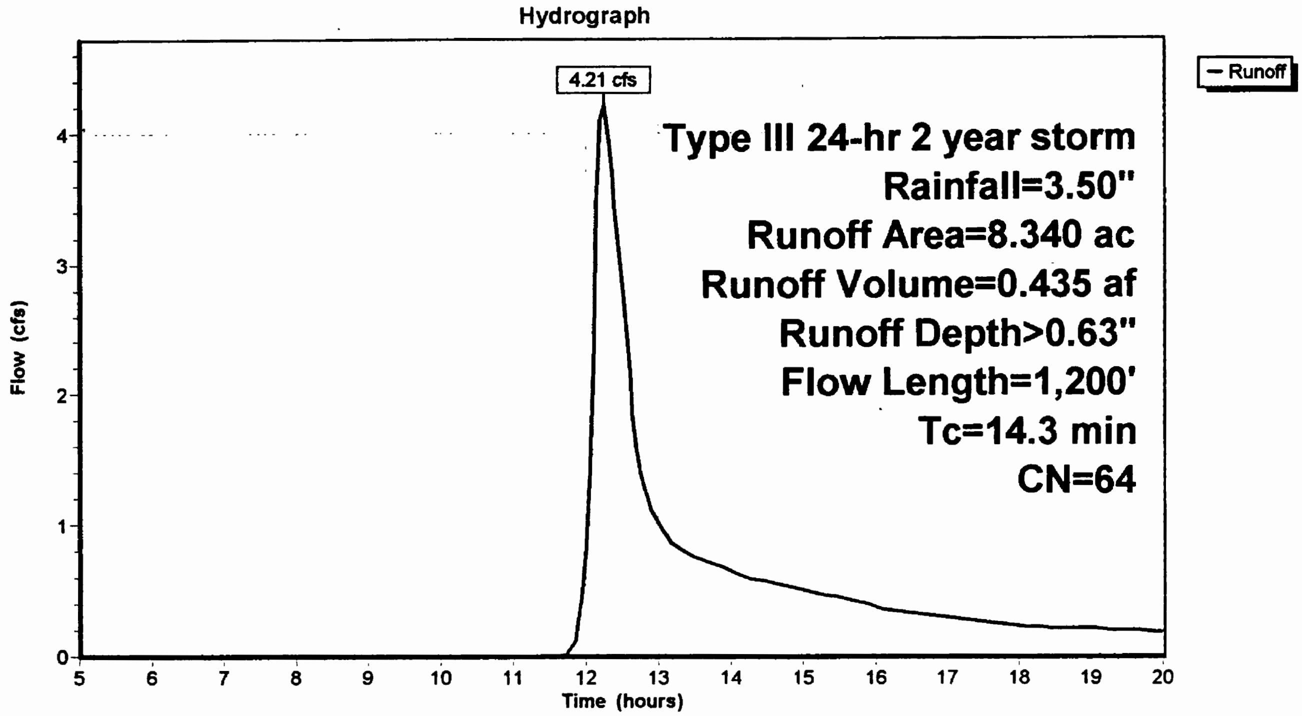
Subcatchment b2: post basin b2



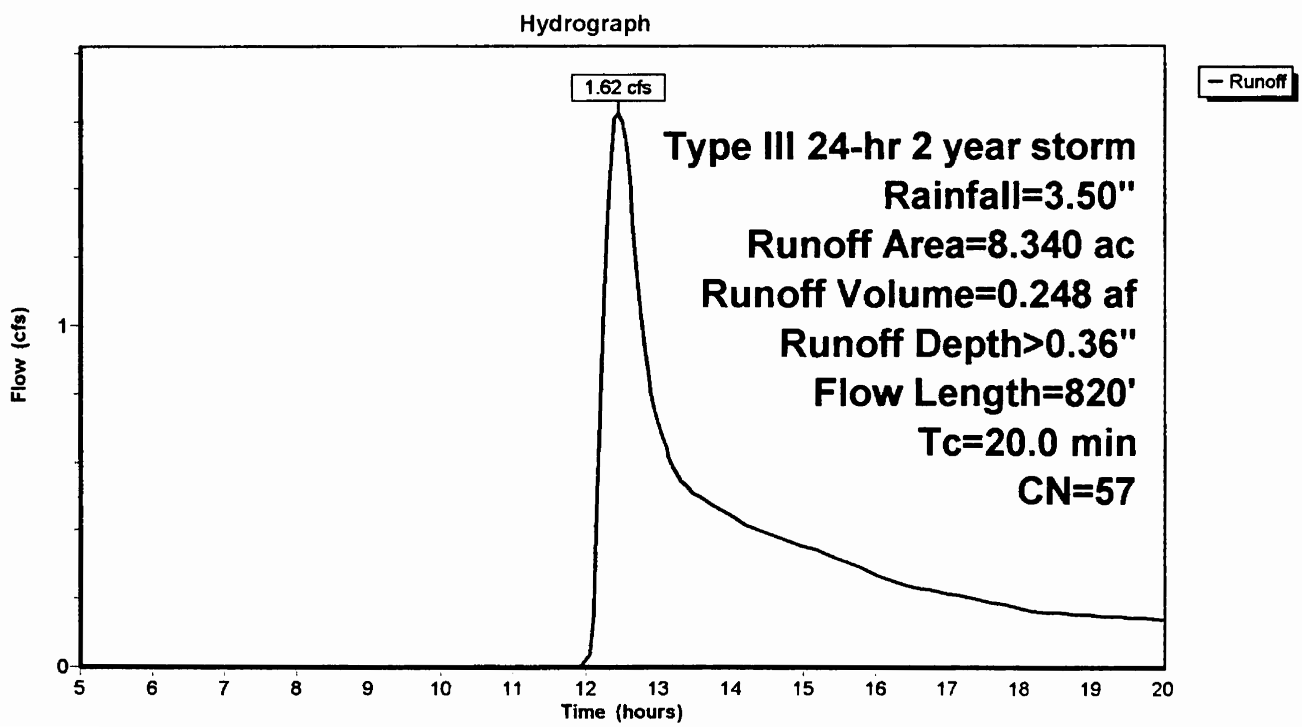
Subcatchment b3: post basin b3



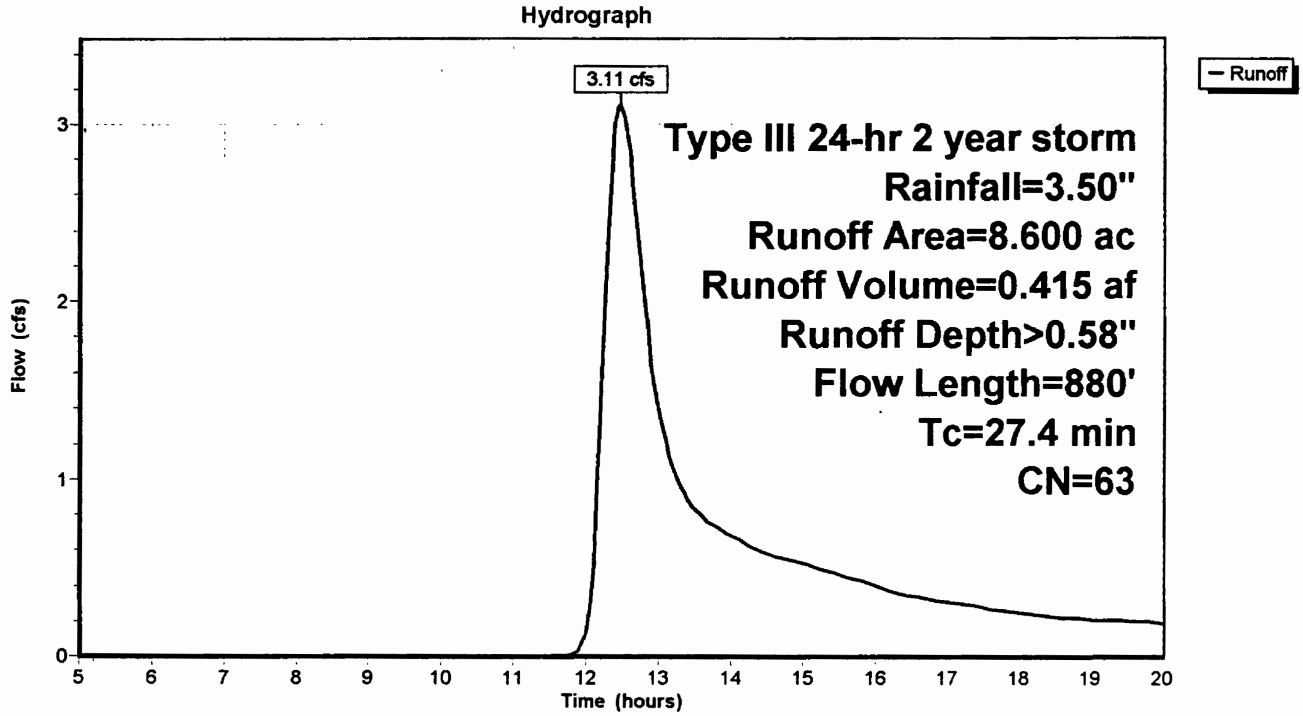
Subcatchment b3a: post basin b3a



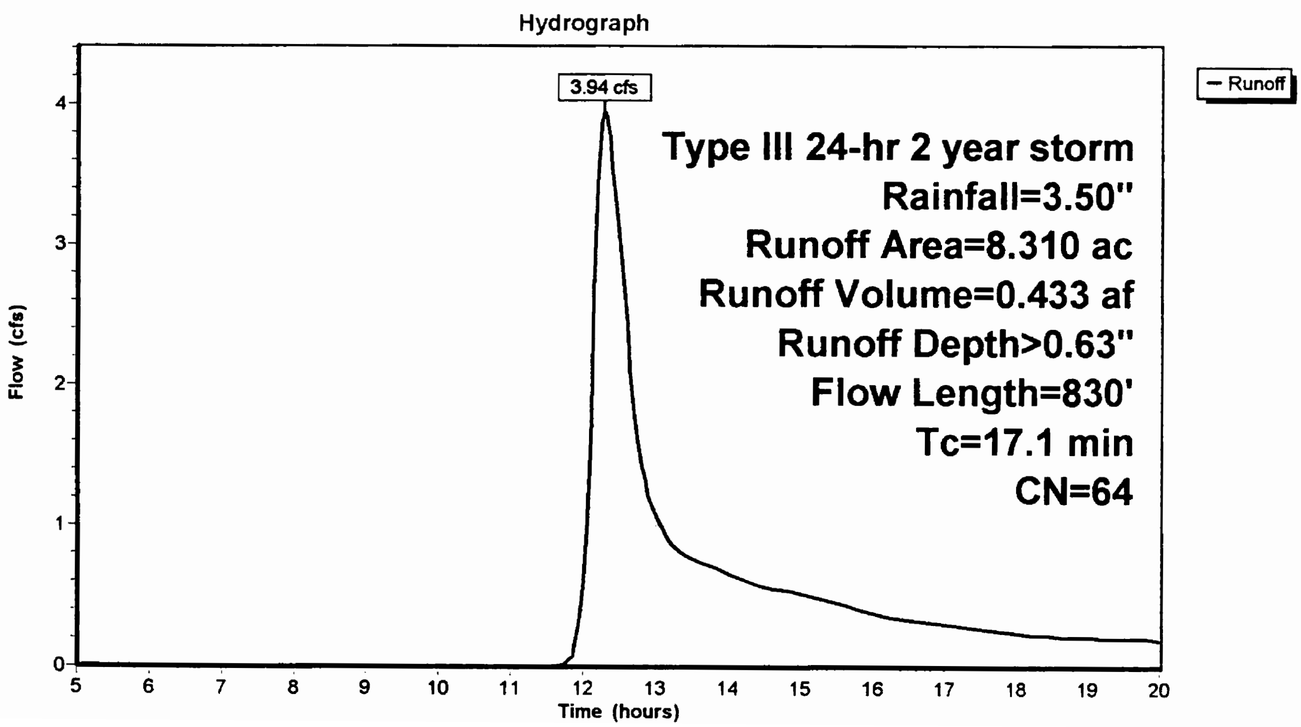
Subcatchment b3b: post basin b3b



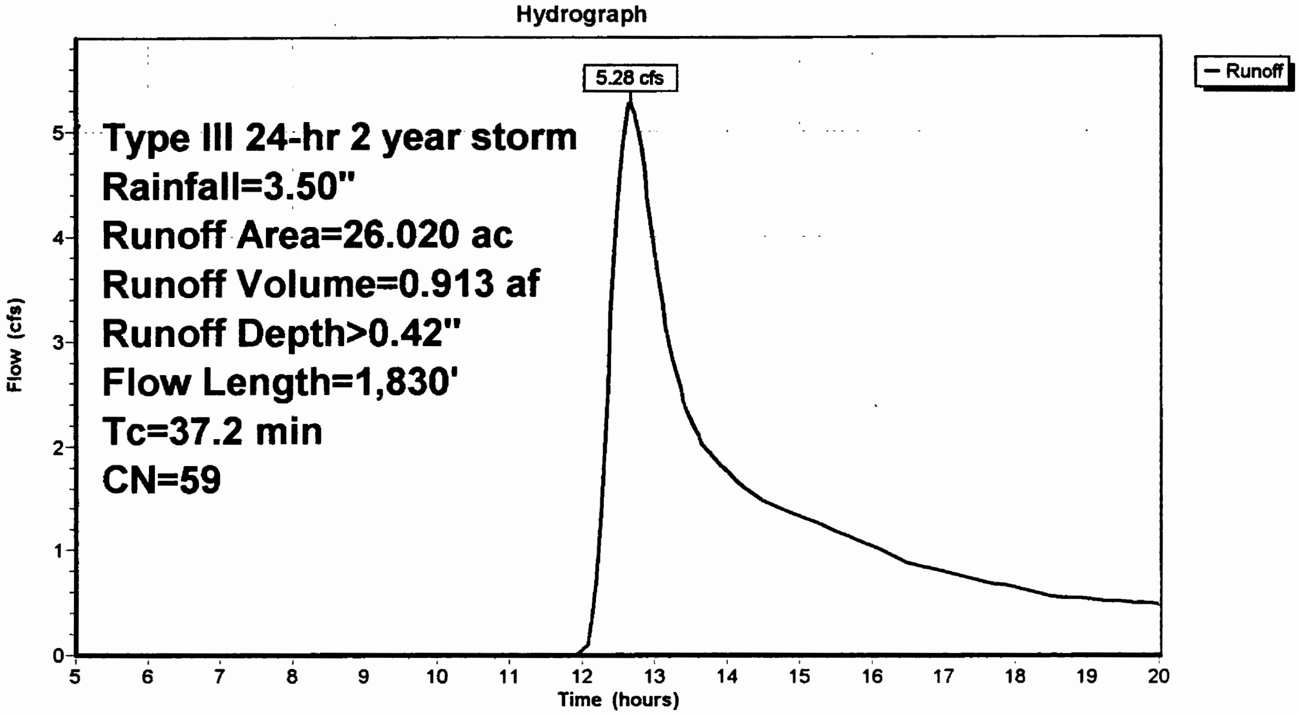
Subcatchment b4a: post basin b4a



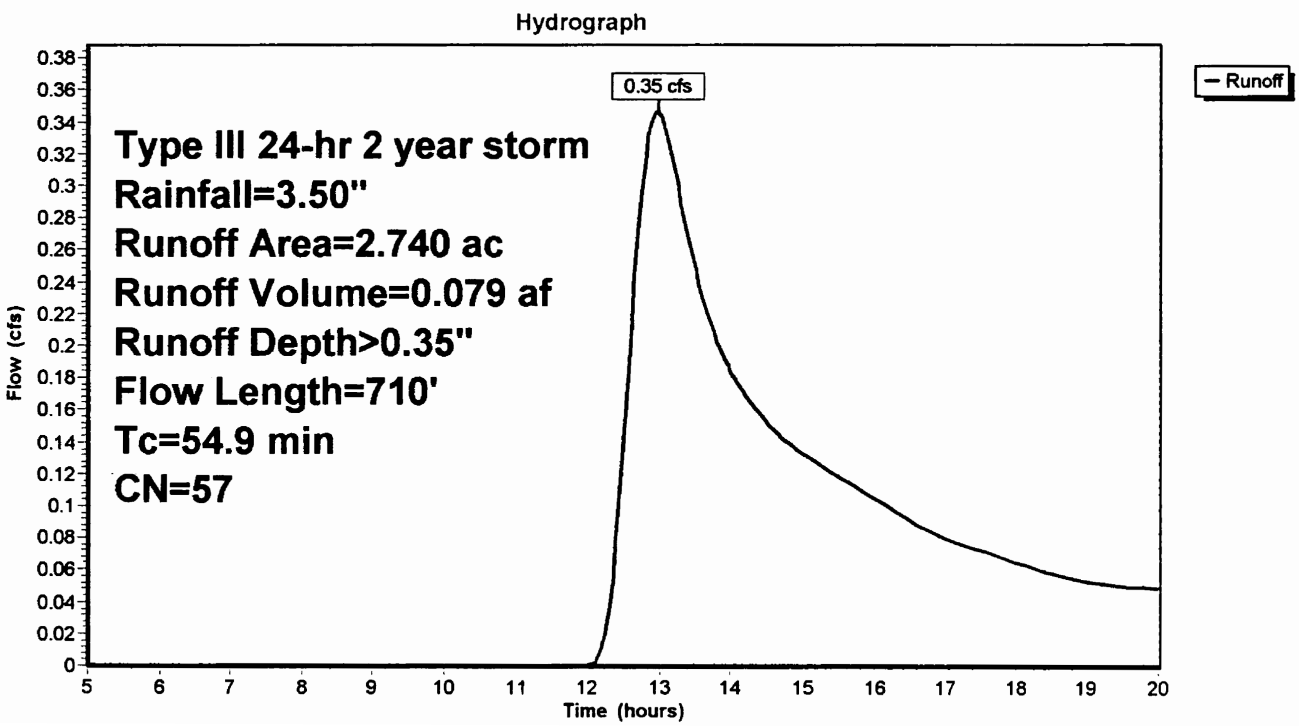
Subcatchment b4b: post basin b4b



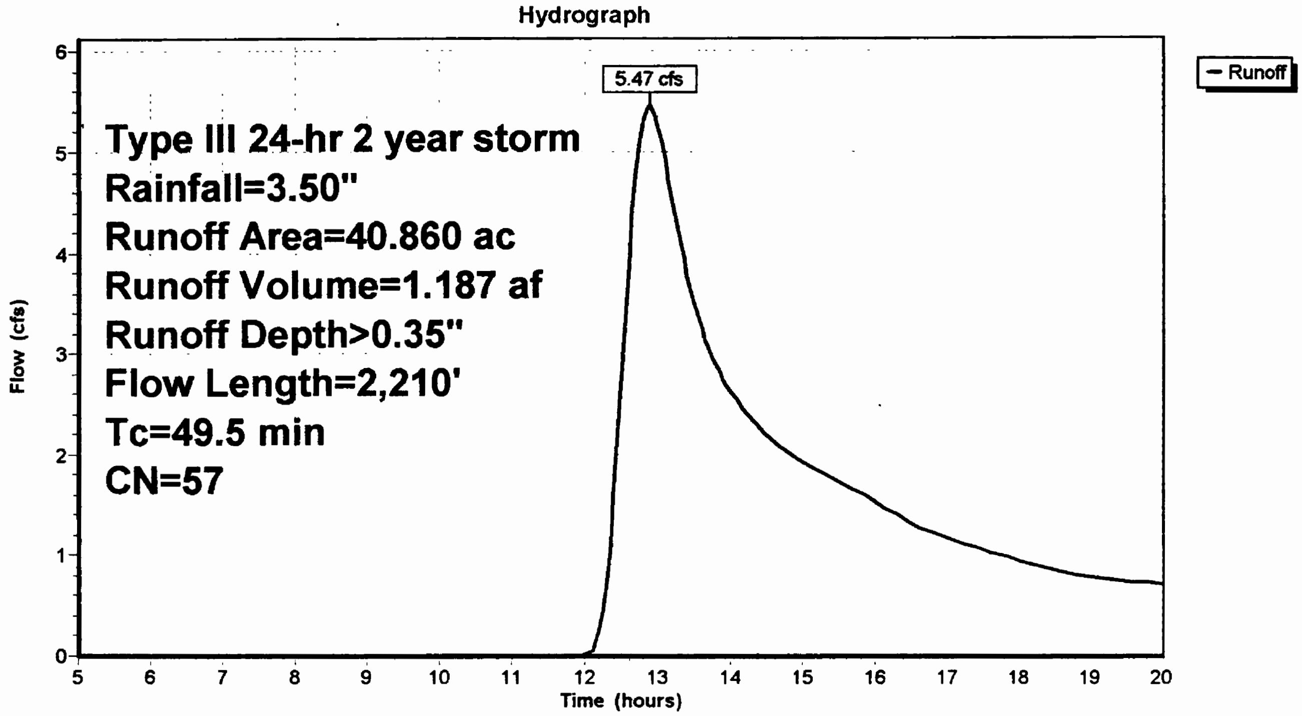
Subcatchment b4c: post basin b4c



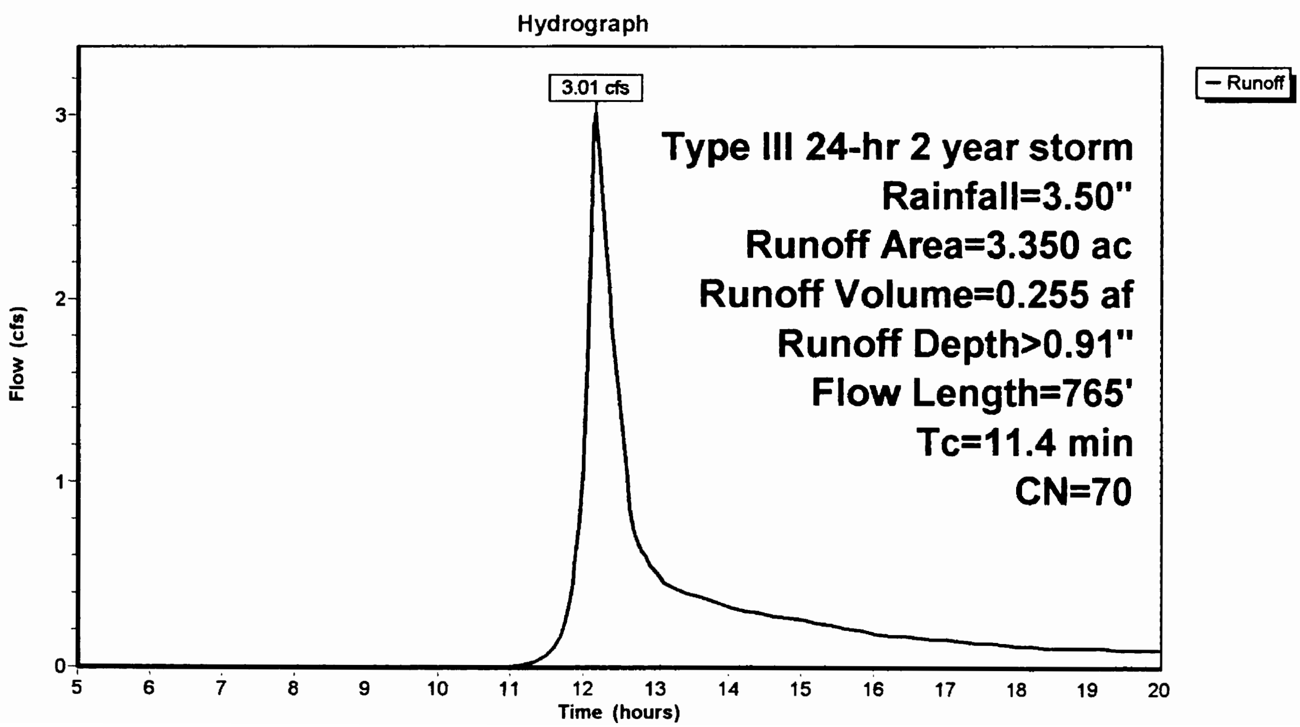
Subcatchment b4d: post basin b4d



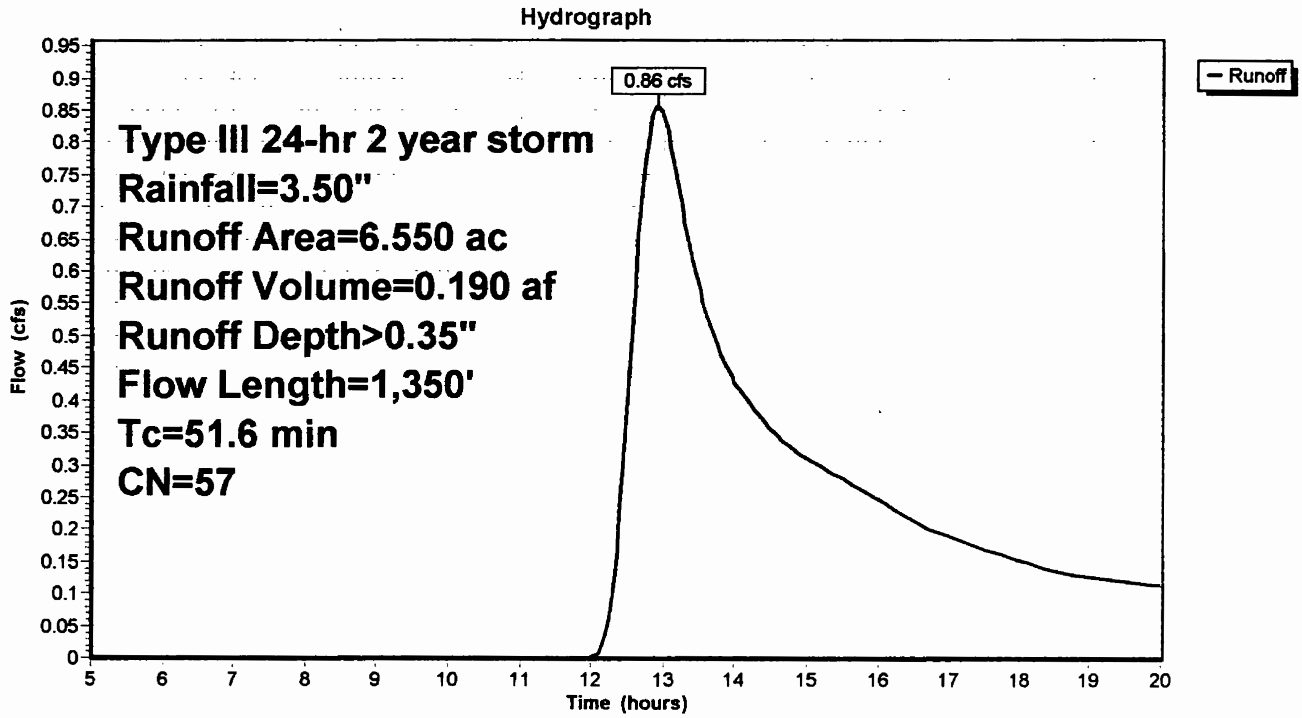
Subcatchment b5: post basin b5



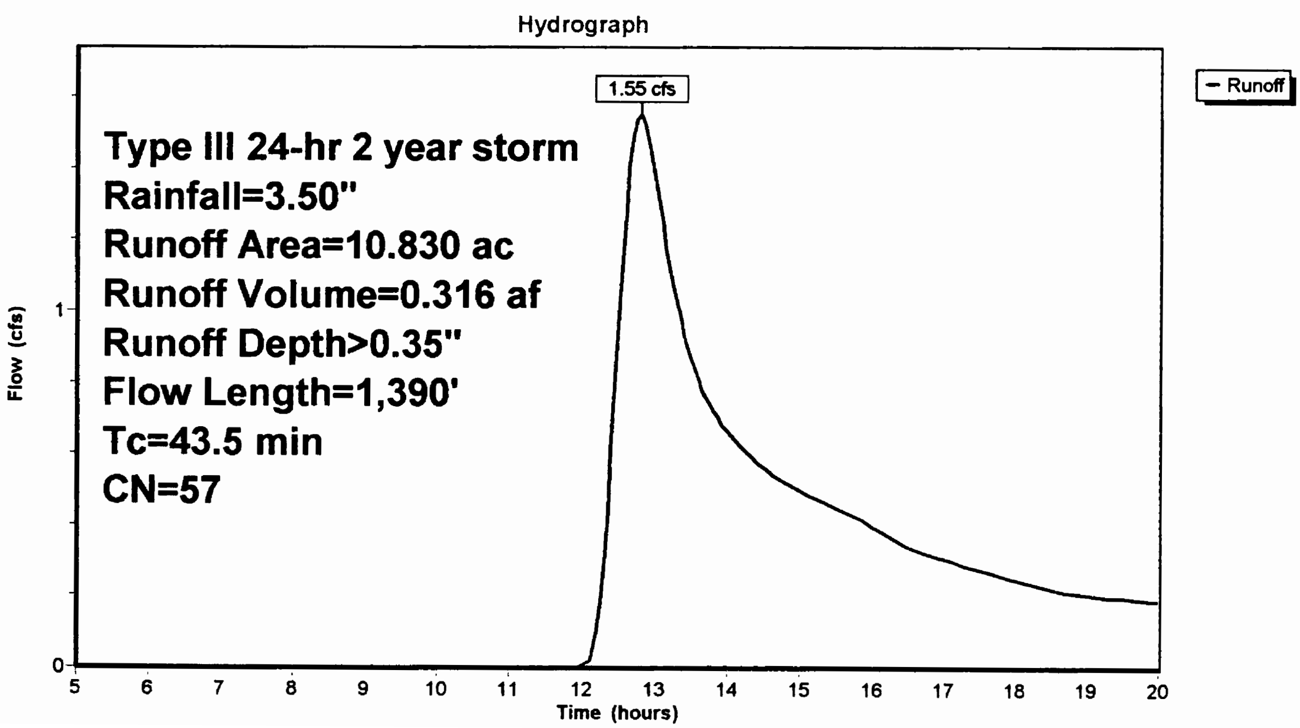
Subcatchment b6a: post basin b6a



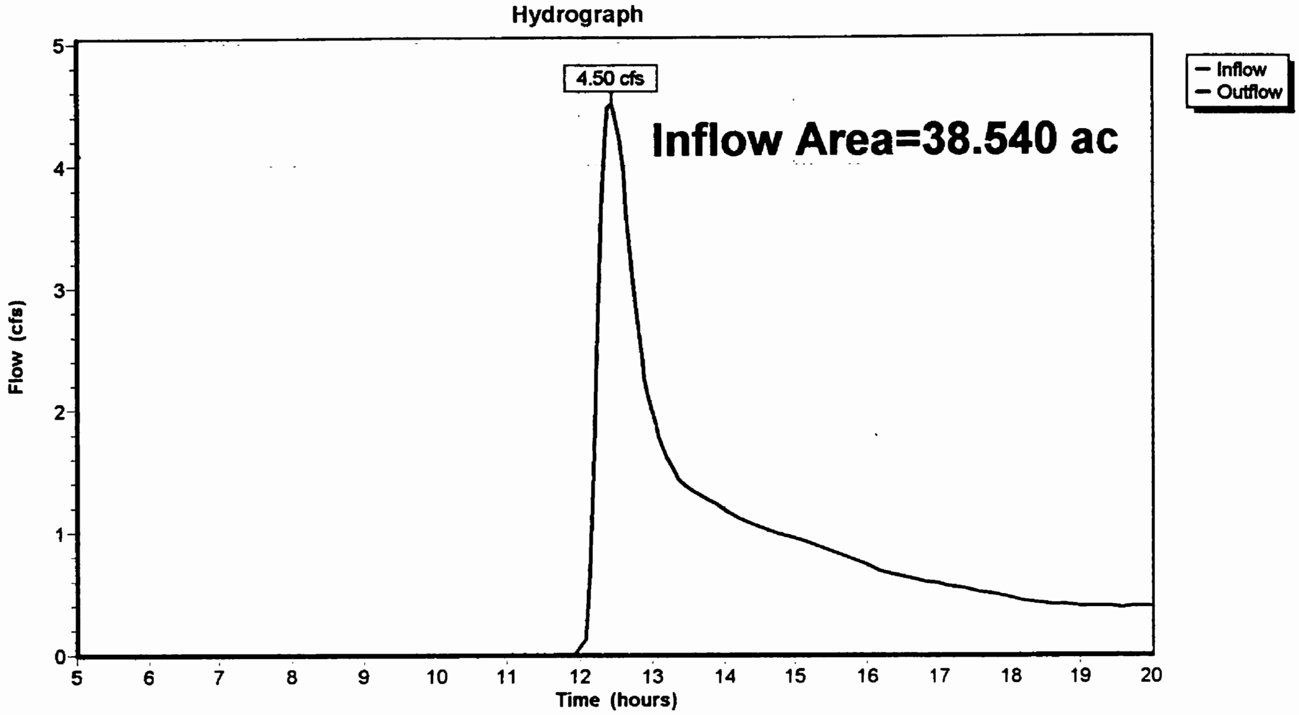
Subcatchment b6b: post basin 6b



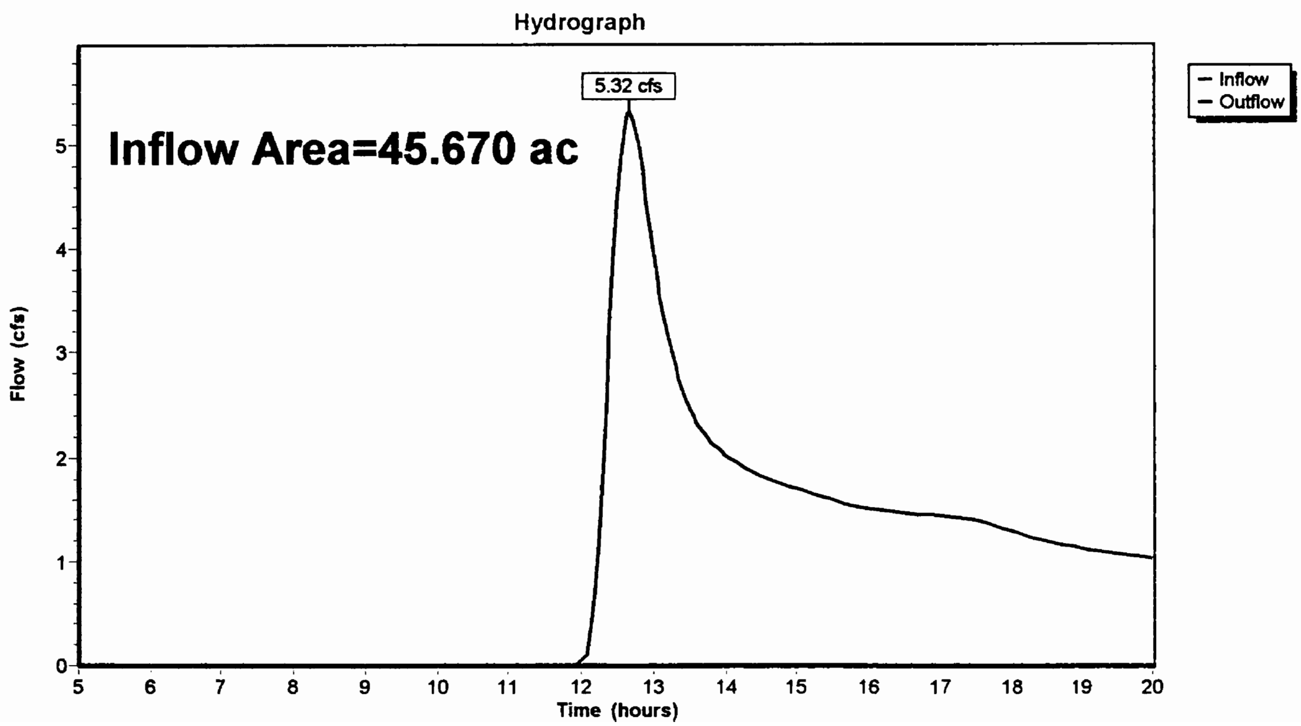
Subcatchment b7: post basin b7



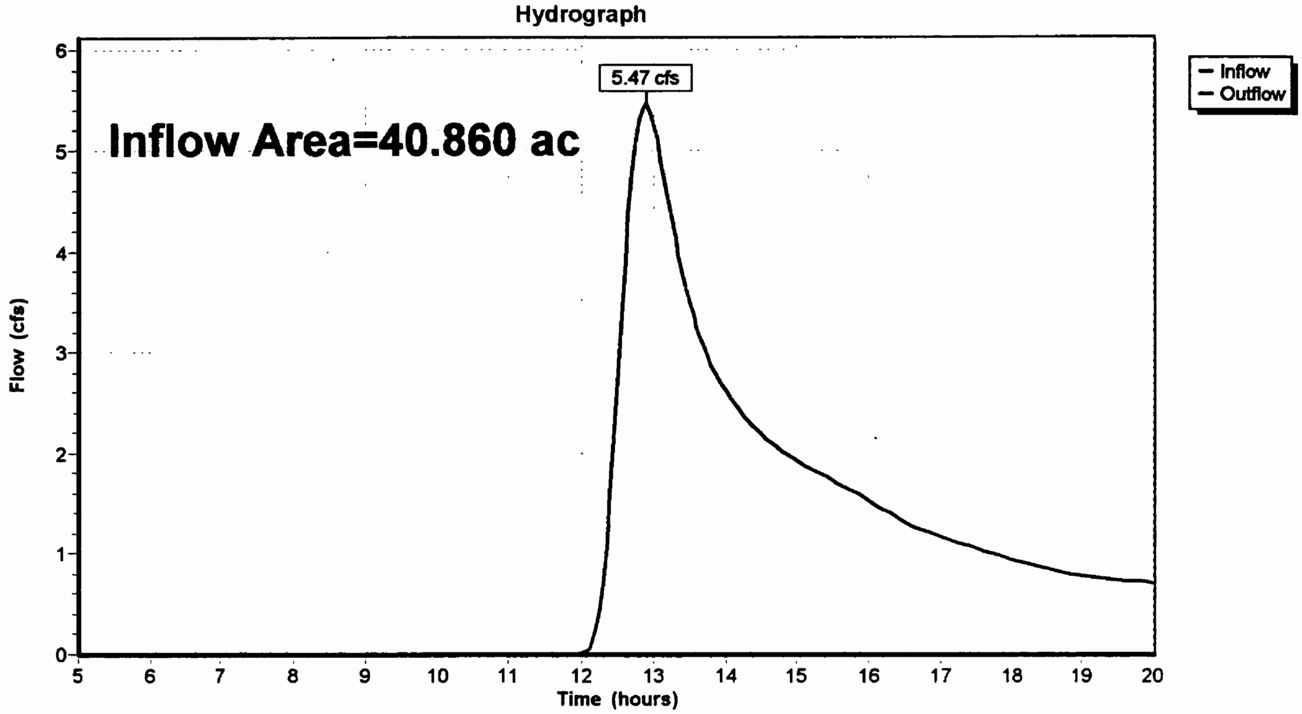
Reach dp3: post design point 3



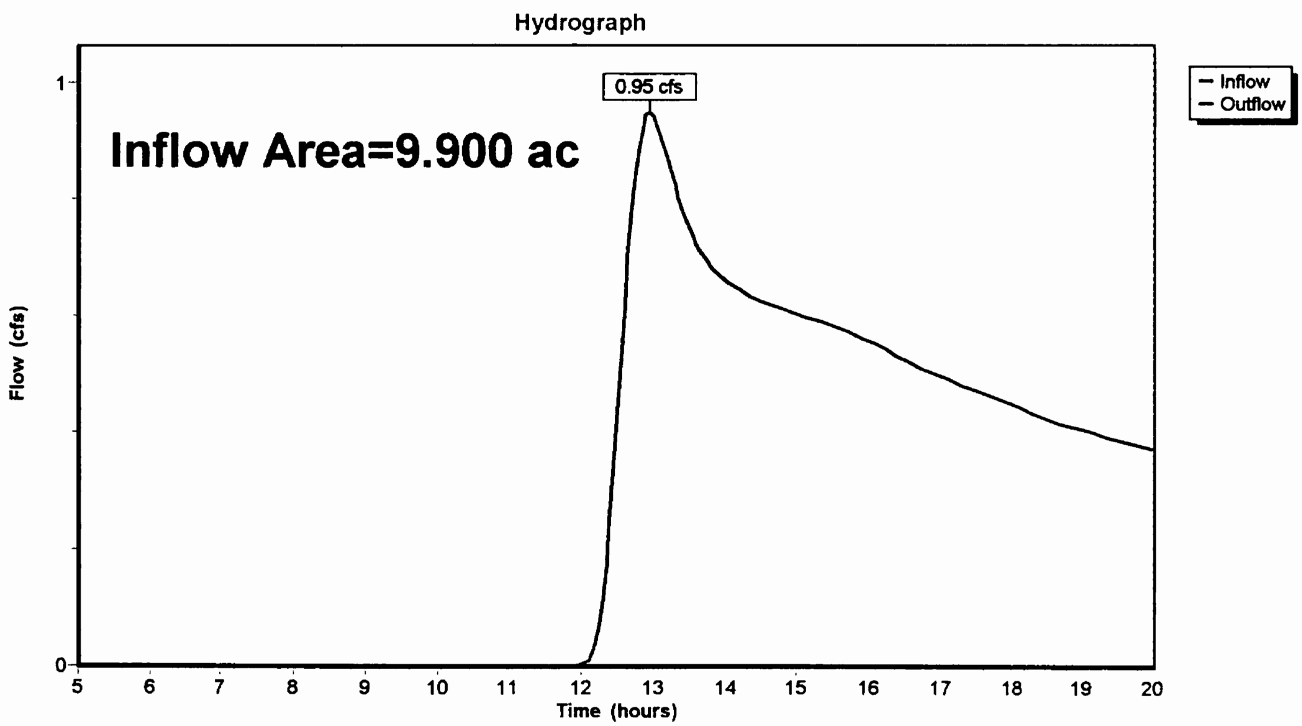
Reach dp4: post design pont 4



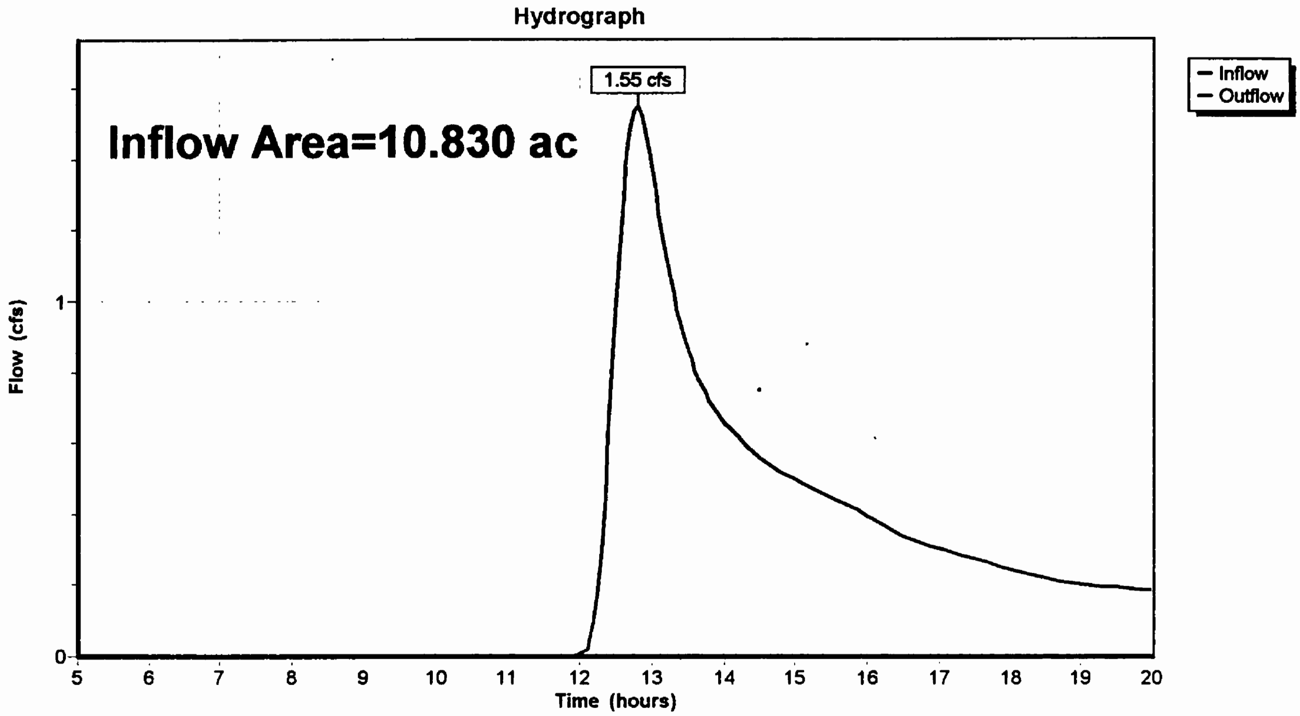
Reach dp5: post design point 5



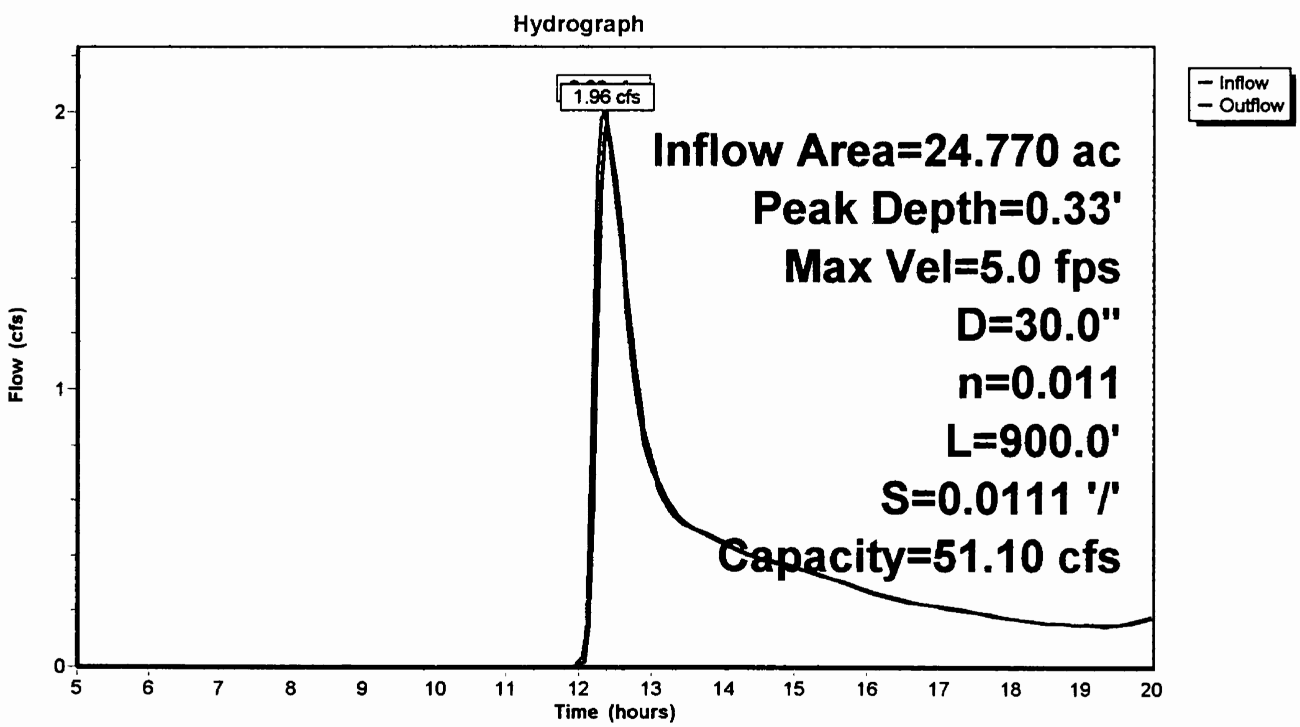
Reach dp6: post design point 6



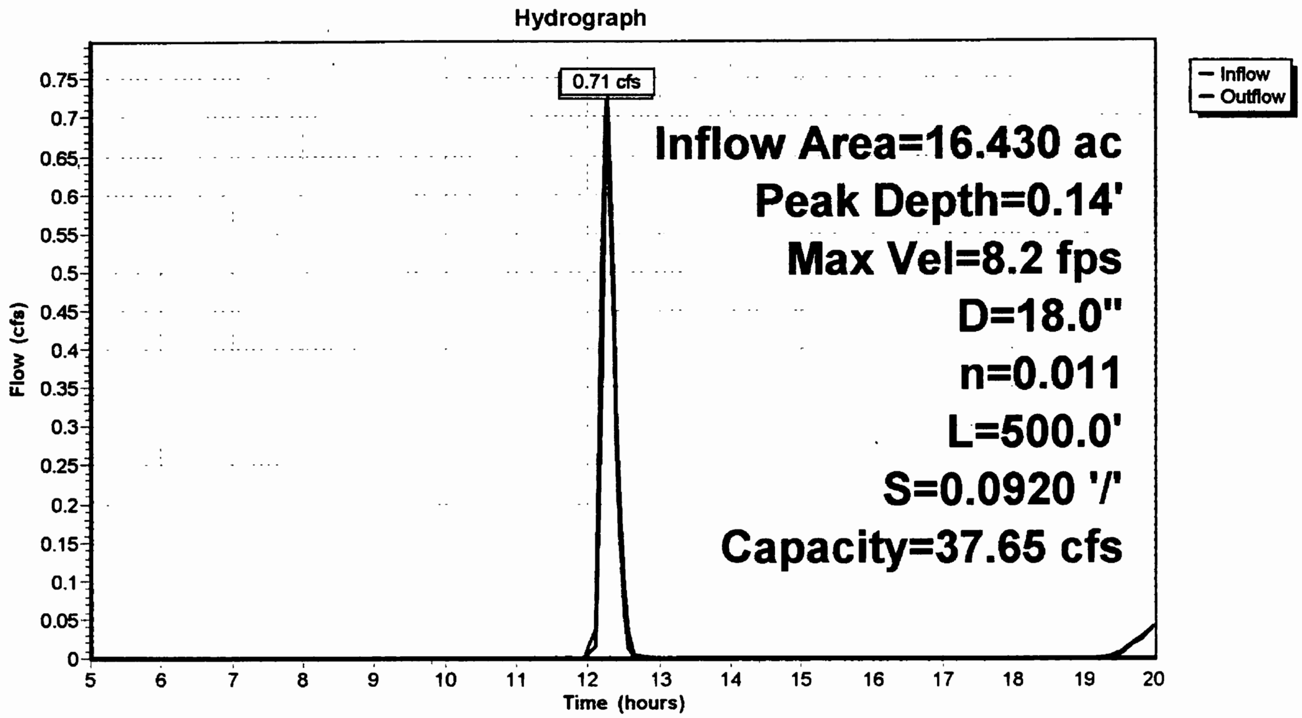
Reach dp7: post design point 7



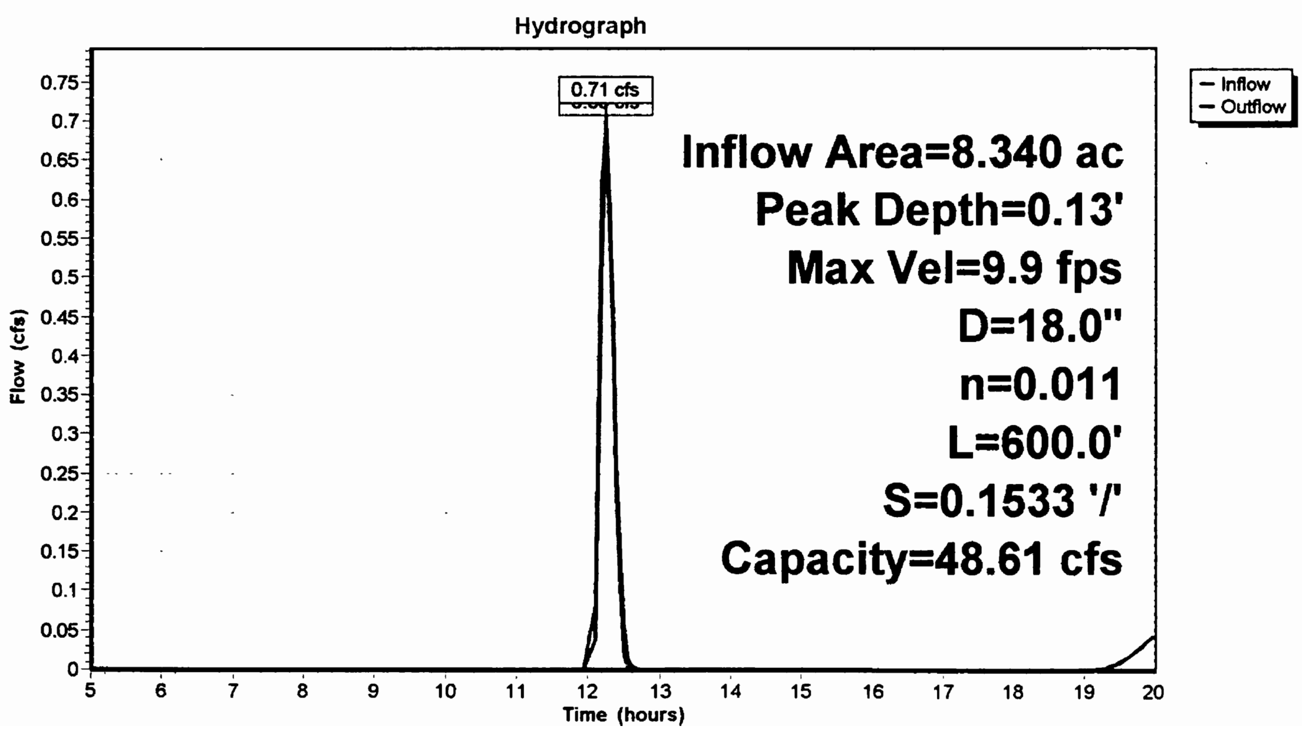
Reach r1: 30" pipe



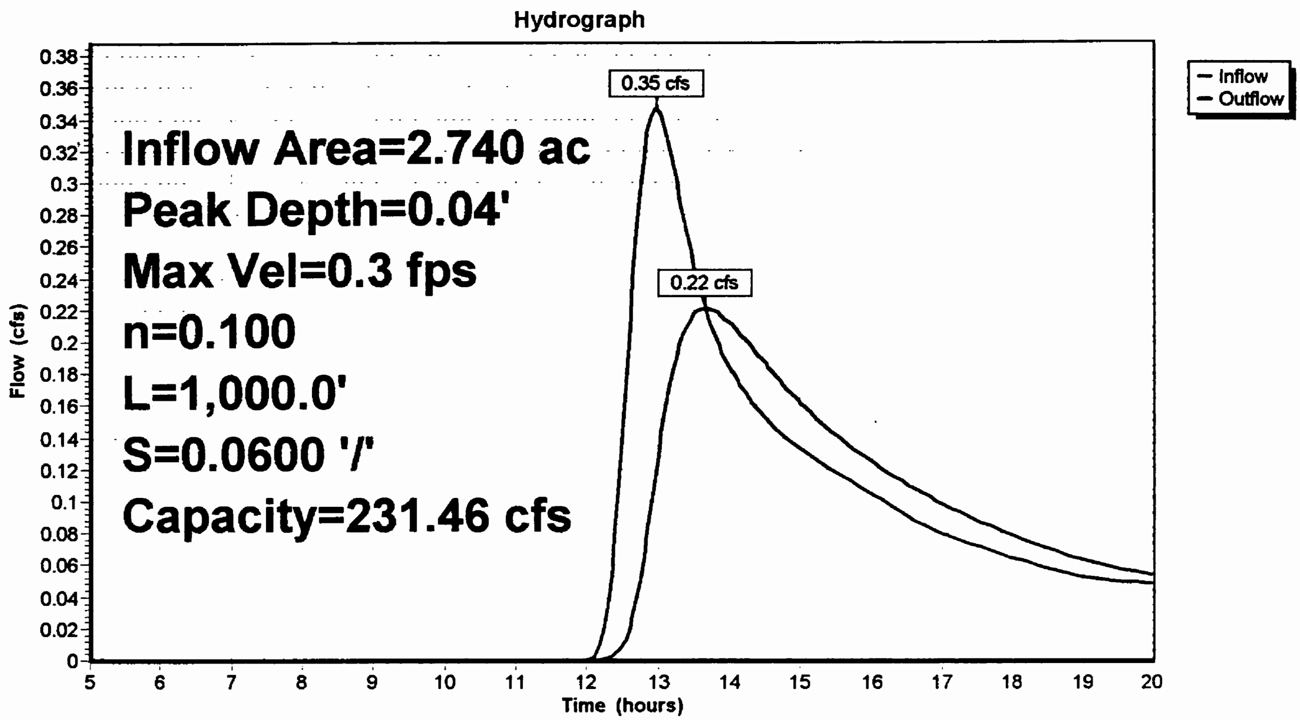
Reach r2: 18" pipe



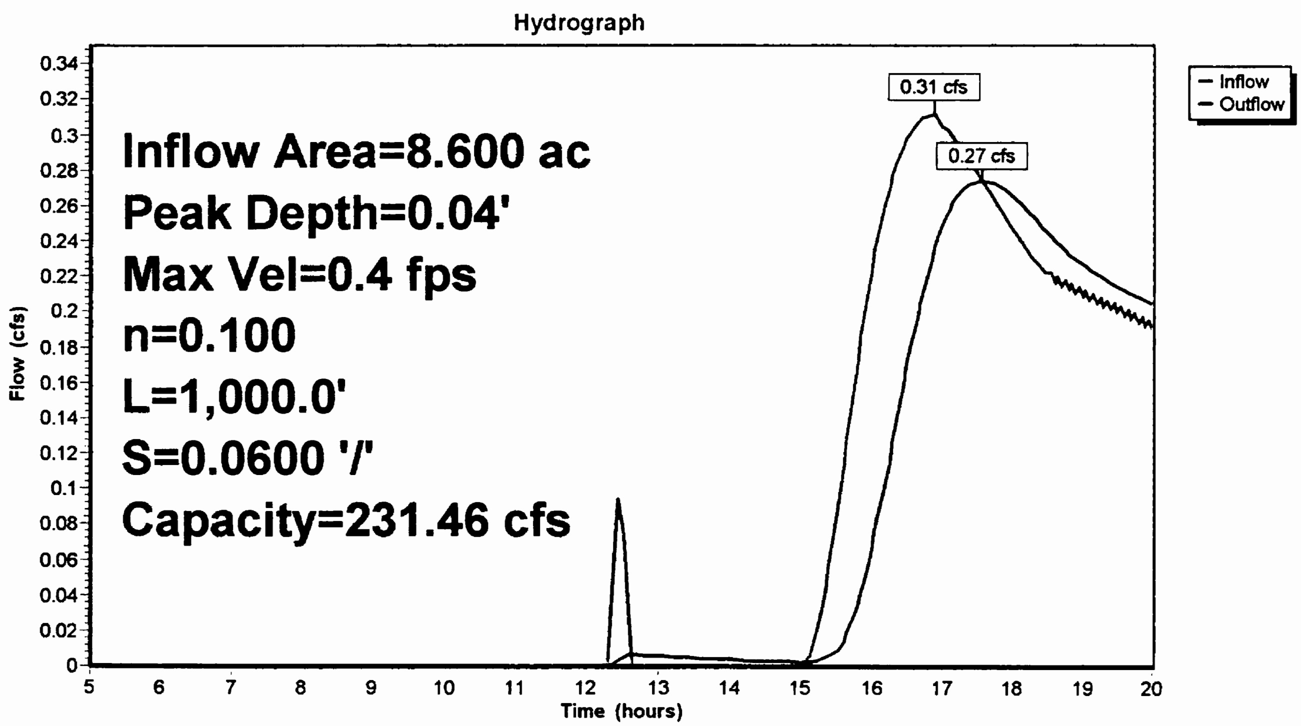
Reach r3: 18" pipe



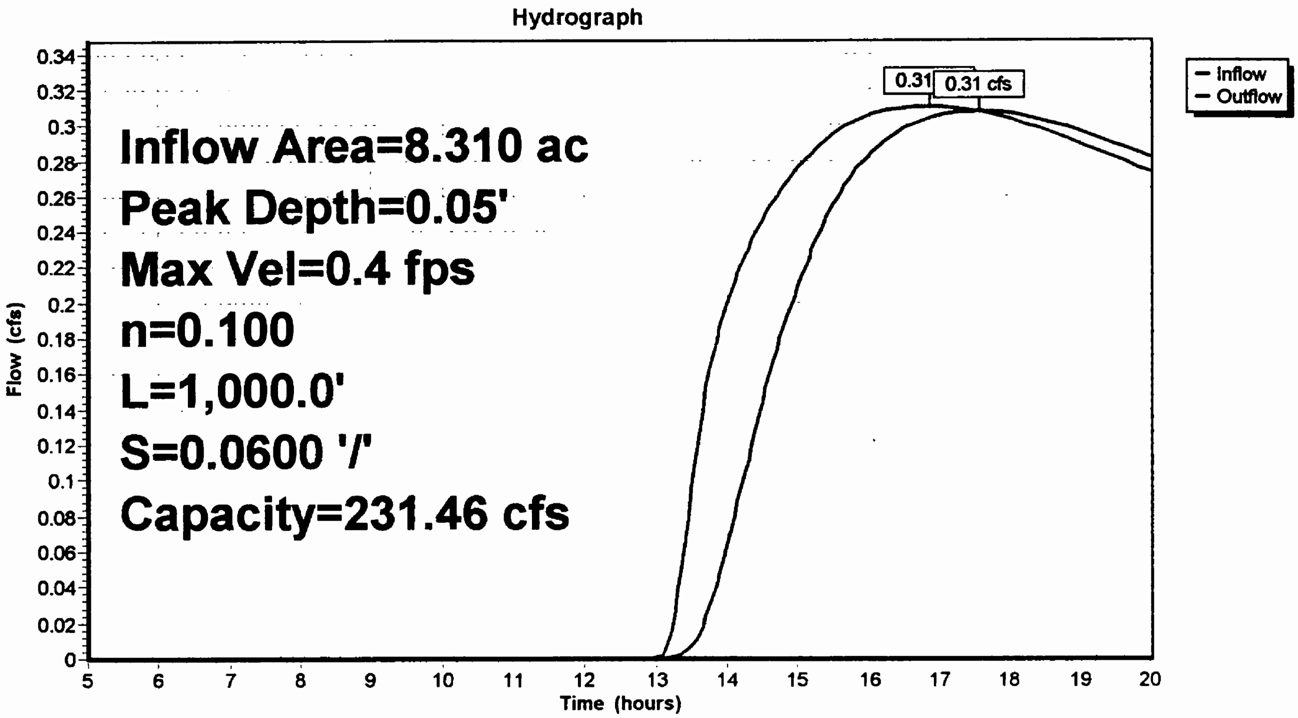
Reach r4: wetland reach



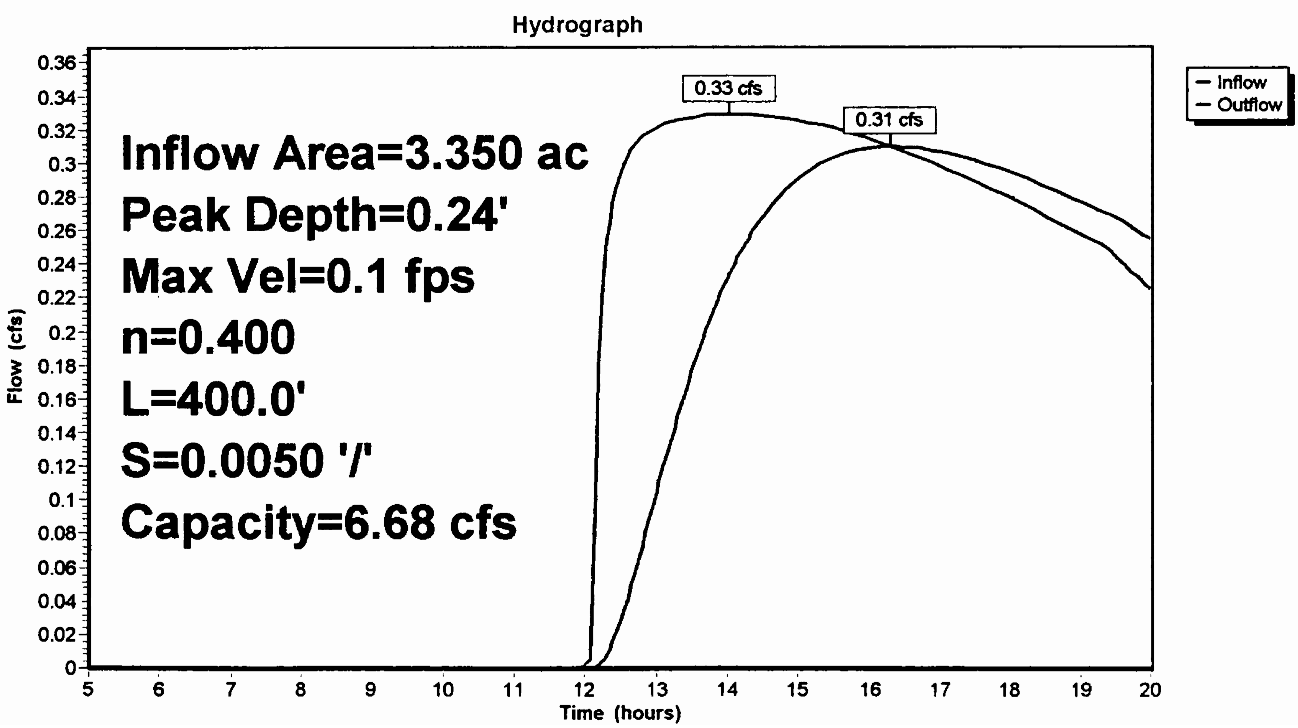
Reach r5: wetland reach



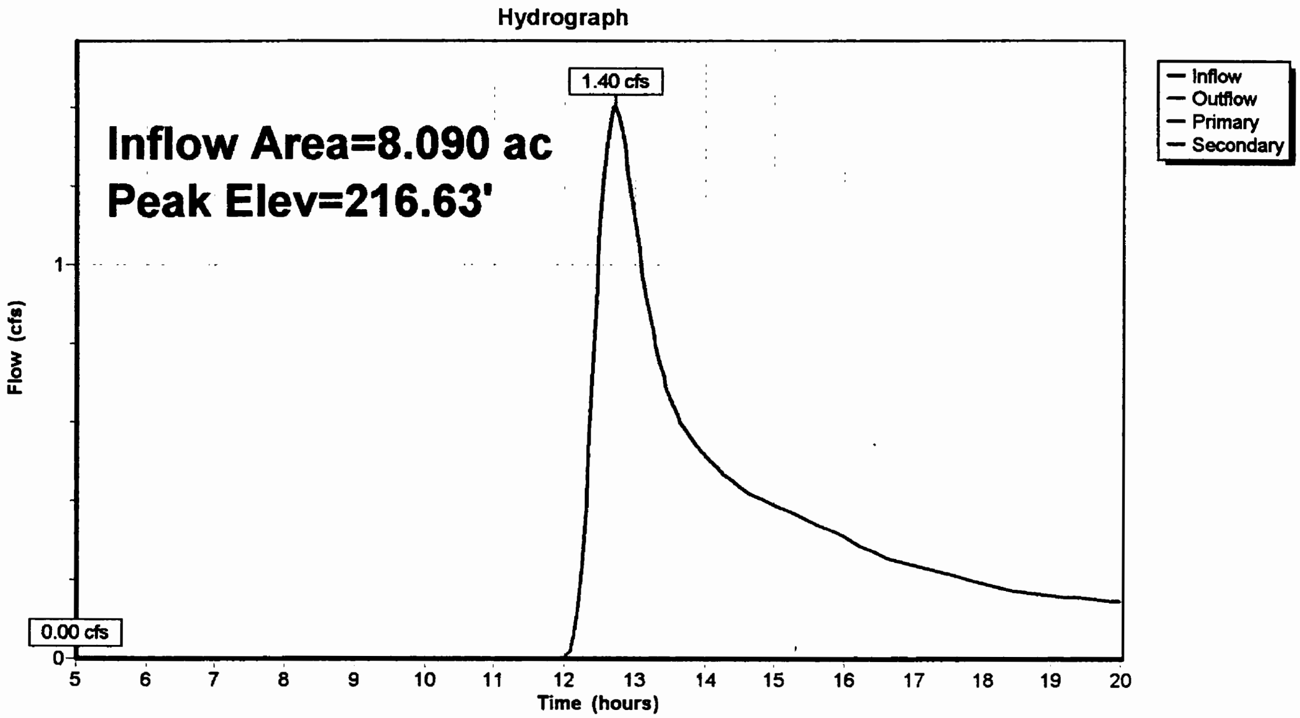
Reach r6: wetland reach



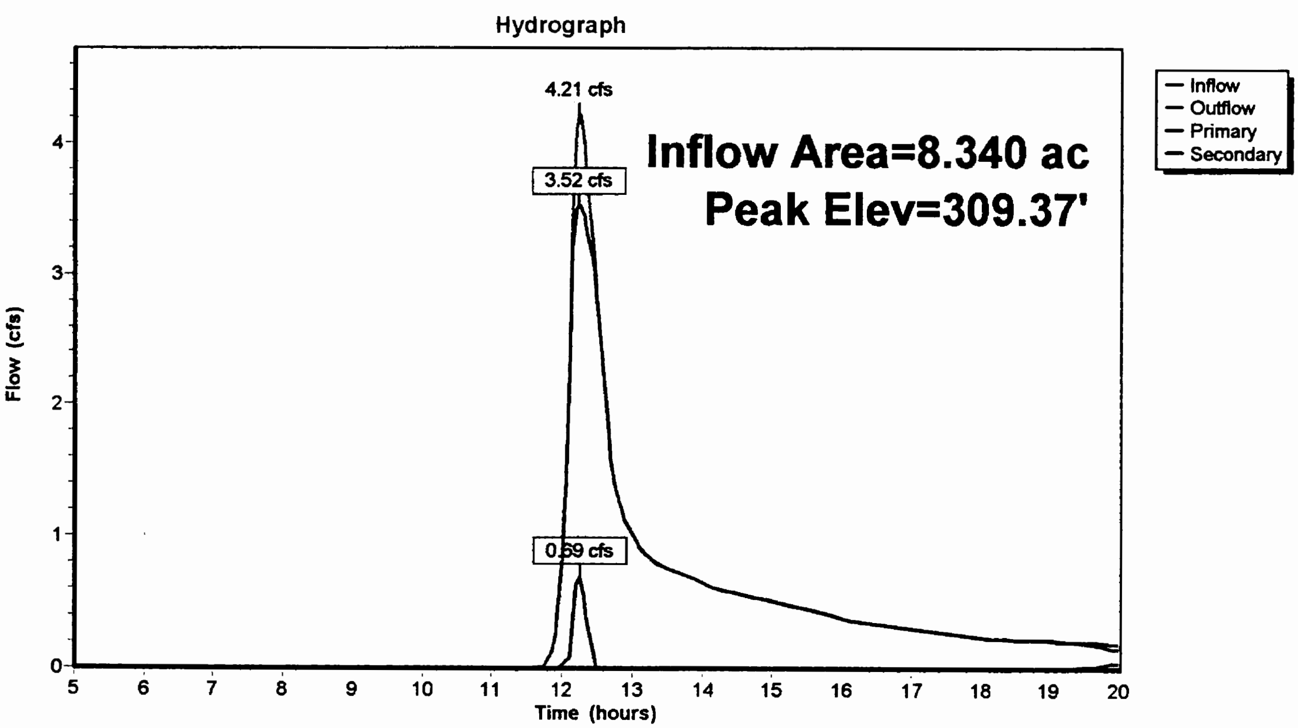
Reach r7: wetland reach



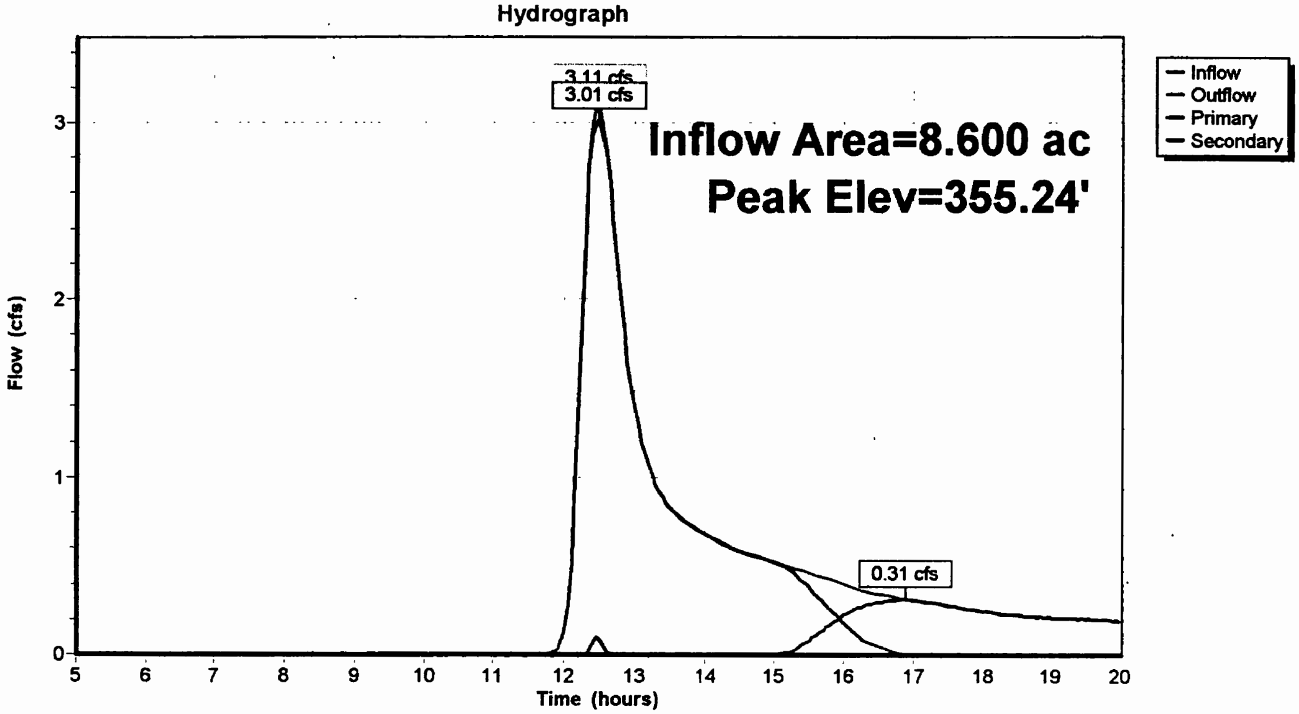
Pond cb12: splitter cb #12



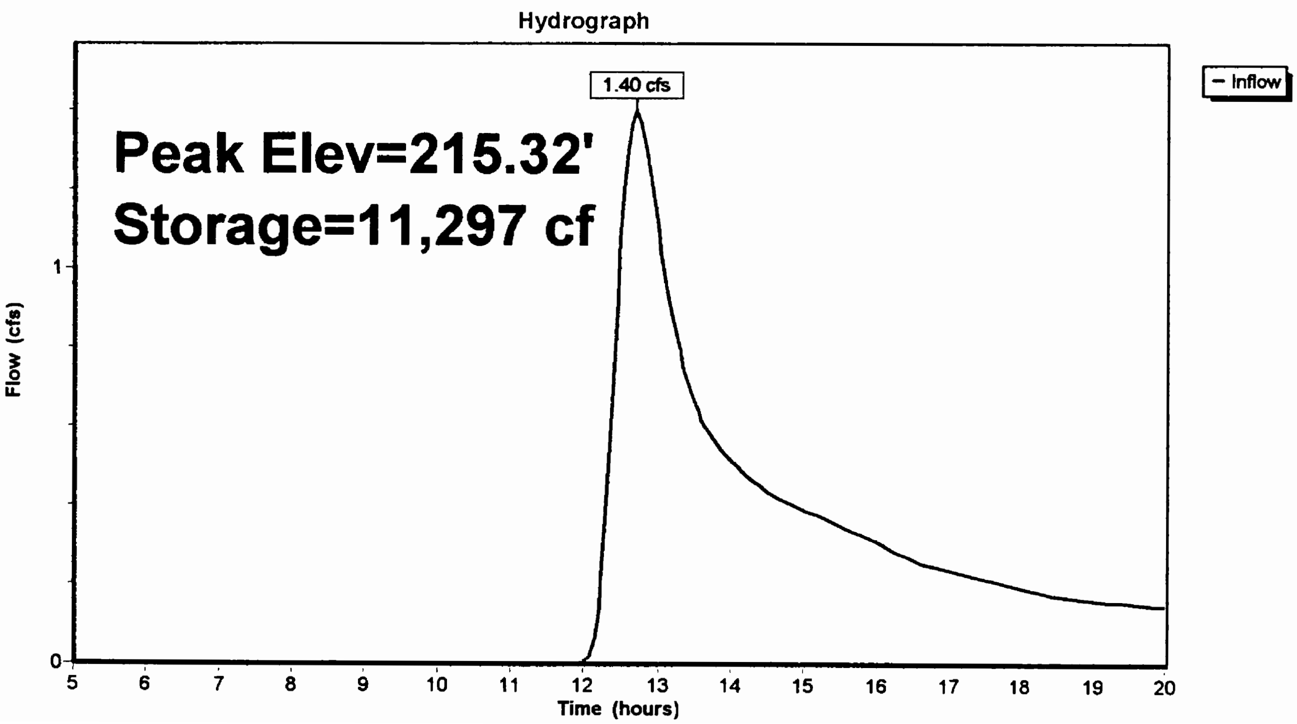
Pond cb20: splitter cb #20



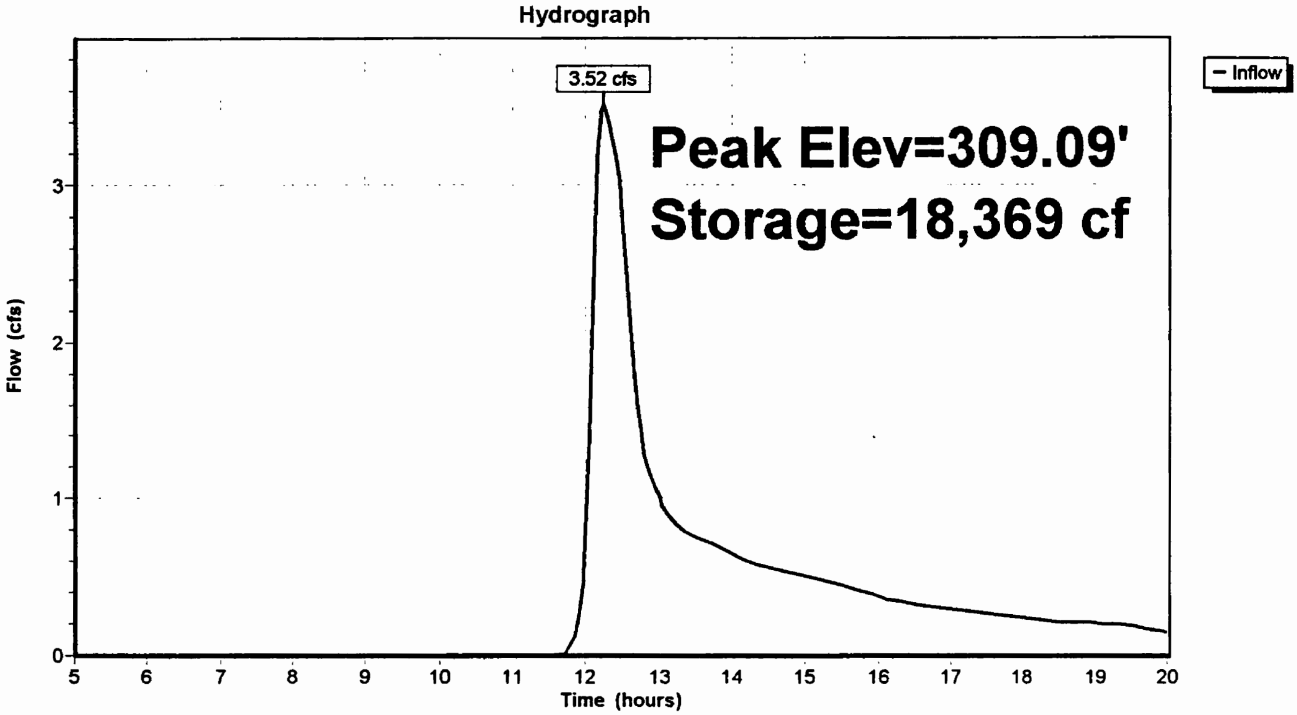
Pond cb29: splitter cb #29



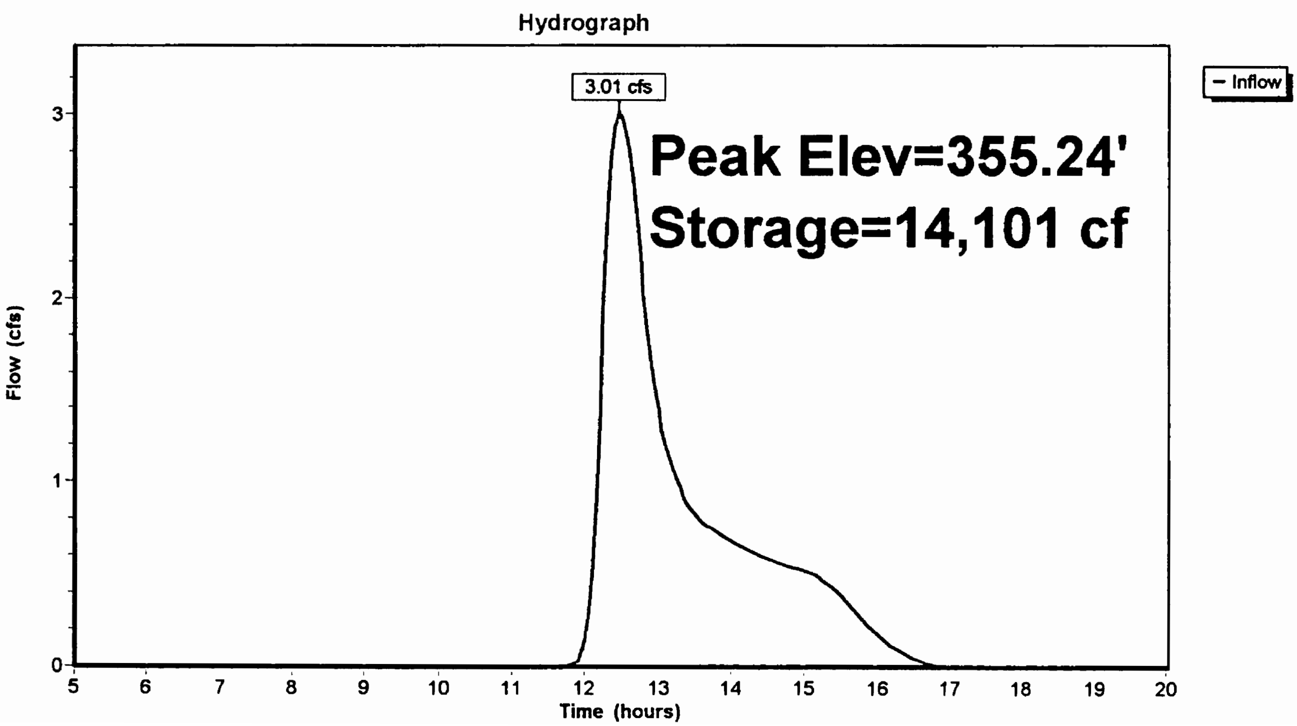
Pond p2: pond p2



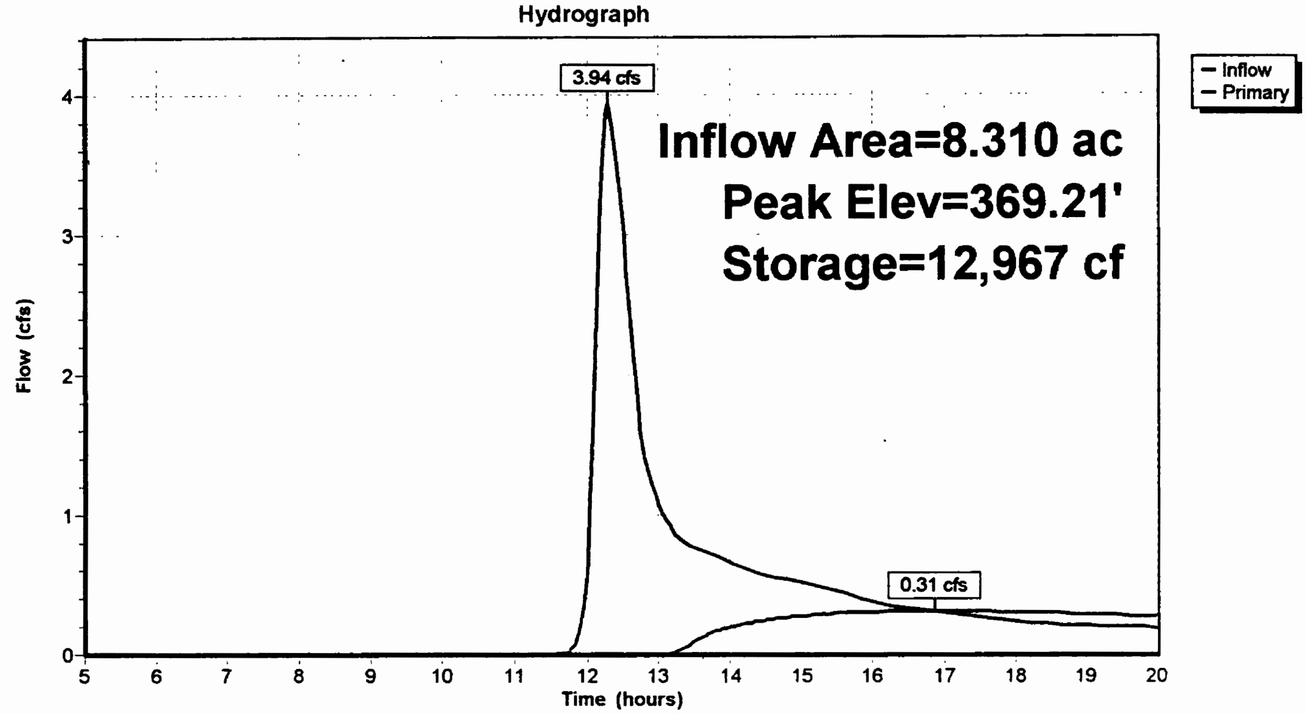
Pond p3a: pond p3a



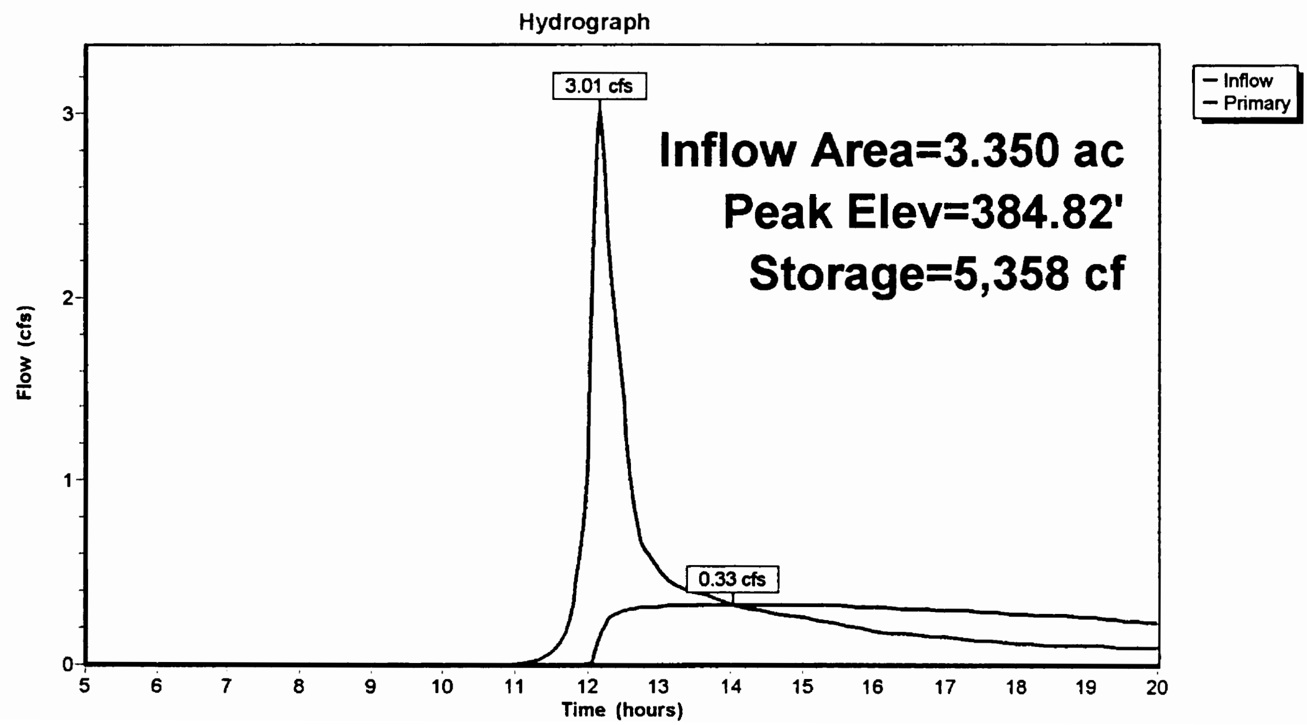
Pond p4a: pond 4a



Pond p4b: pond 4b



Pond p6a: pond 6a



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment b2: post basin b2 Runoff Area=8.090 ac Runoff Depth>1.03"
Flow Length=1,580' Tc=39.3 min CN=58 Runoff=4.77 cfs 0.696 af

Subcatchment b3: post basin b3 Runoff Area=13.770 ac Runoff Depth>0.98"
Flow Length=990' Tc=21.9 min CN=57 Runoff=9.73 cfs 1.126 af

Subcatchment b3a: post basin b3a Runoff Area=8.340 ac Runoff Depth>1.43"
Flow Length=1,200' Tc=14.3 min CN=64 Runoff=11.10 cfs 0.997 af

Subcatchment b3b: post basin b3b Runoff Area=8.340 ac Runoff Depth>0.98"
Flow Length=820' Tc=20.0 min CN=57 Runoff=6.09 cfs 0.683 af

Subcatchment b4a: post basin b4a Runoff Area=8.600 ac Runoff Depth>1.36"
Flow Length=880' Tc=27.4 min CN=63 Runoff=8.32 cfs 0.973 af

Subcatchment b4b: post basin b4b Runoff Area=8.310 ac Runoff Depth>1.43"
Flow Length=830' Tc=17.1 min CN=64 Runoff=10.31 cfs 0.992 af

Subcatchment b4c: post basin b4c Runoff Area=26.020 ac Runoff Depth>1.09"
Flow Length=1,830' Tc=37.2 min CN=59 Runoff=16.97 cfs 2.372 af

Subcatchment b4d: post basin b4d Runoff Area=2.740 ac Runoff Depth>0.96"
Flow Length=710' Tc=54.9 min CN=57 Runoff=1.24 cfs 0.220 af

Subcatchment b5: post basin b5 Runoff Area=40.860 ac Runoff Depth>0.97"
Flow Length=2,210' Tc=49.5 min CN=57 Runoff=19.68 cfs 3.290 af

Subcatchment b6a: post basin b6a Runoff Area=3.350 ac Runoff Depth>1.87"
Flow Length=765' Tc=11.4 min CN=70 Runoff=6.51 cfs 0.522 af

Subcatchment b6b: post basin 6b Runoff Area=6.550 ac Runoff Depth>0.96"
Flow Length=1,350' Tc=51.6 min CN=57 Runoff=3.08 cfs 0.527 af

Subcatchment b7: post basin b7 Runoff Area=10.830 ac Runoff Depth>0.97"
Flow Length=1,390' Tc=43.5 min CN=57 Runoff=5.61 cfs 0.875 af

Reach dp3: post design point 3 Inflow=20.88 cfs 2.477 af
Outflow=20.88 cfs 2.477 af

Reach dp4: post design pont 4 Inflow=19.40 cfs 3.681 af
Outflow=19.40 cfs 3.681 af

Reach dp5: post design point 5 Inflow=19.68 cfs 3.290 af
Outflow=19.68 cfs 3.290 af

Reach dp6: post design point 6 Inflow=4.01 cfs 0.907 af
Outflow=4.01 cfs 0.907 af

Reach dp7: post design point 7 Inflow=5.61 cfs 0.875 af
Outflow=5.61 cfs 0.875 af

Reach r1: 30" pipe Peak Depth=0.80' Max Vel=8.4 fps Inflow=11.61 cfs 1.355 af
D=30.0" n=0.011 L=900.0' S=0.0111 '/' Capacity=51.10 cfs Outflow=11.46 cfs 1.351 af

Reach r2: 18" pipe Peak Depth=0.41' Max Vel=15.5 fps Inflow=6.08 cfs 0.674 af
D=18.0" n=0.011 L=500.0' S=0.0920 '/' Capacity=37.65 cfs Outflow=6.01 cfs 0.673 af

Reach r3: 18" pipe Peak Depth=0.36' Max Vel=18.7 fps Inflow=6.07 cfs 0.524 af
D=18.0" n=0.011 L=600.0' S=0.1533 '/' Capacity=48.61 cfs Outflow=6.08 cfs 0.523 af

Reach r4: wetland reach Peak Depth=0.08' Max Vel=0.5 fps Inflow=1.24 cfs 0.220 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.91 cfs 0.210 af

Reach r5: wetland reach Peak Depth=0.12' Max Vel=0.7 fps Inflow=3.80 cfs 0.607 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=2.16 cfs 0.584 af

Reach r6: wetland reach Peak Depth=0.08' Max Vel=0.5 fps Inflow=0.99 cfs 0.548 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=0.99 cfs 0.514 af

Reach r7: wetland reach Peak Depth=0.44' Max Vel=0.1 fps Inflow=2.20 cfs 0.417 af
n=0.400 L=400.0' S=0.0050 '/' Capacity=6.68 cfs Outflow=1.16 cfs 0.380 af

Pond cb12: splitter cb #12 Peak Elev=217.46' Inflow=4.77 cfs 0.696 af
Primary=1.07 cfs 0.151 af Secondary=3.71 cfs 0.545 af Outflow=4.77 cfs 0.696 af

Pond cb20: splitter cb #20 Peak Elev=310.26' Inflow=11.10 cfs 0.997 af
Primary=6.07 cfs 0.524 af Secondary=5.02 cfs 0.474 af Outflow=11.10 cfs 0.997 af

Pond cb29: splitter cb #29 Peak Elev=355.93' Inflow=8.32 cfs 0.973 af
Primary=3.80 cfs 0.607 af Secondary=4.53 cfs 0.366 af Outflow=8.32 cfs 0.973 af

Pond p2: pond p2 Peak Elev=217.29' Storage=23,731 cf Inflow=3.71 cfs 0.545 af
Outflow=0.00 cfs 0.000 af

Pond p3a: pond p3a Peak Elev=309.47' Storage=20,626 cf Inflow=5.02 cfs 0.474 af
Outflow=0.00 cfs 0.000 af

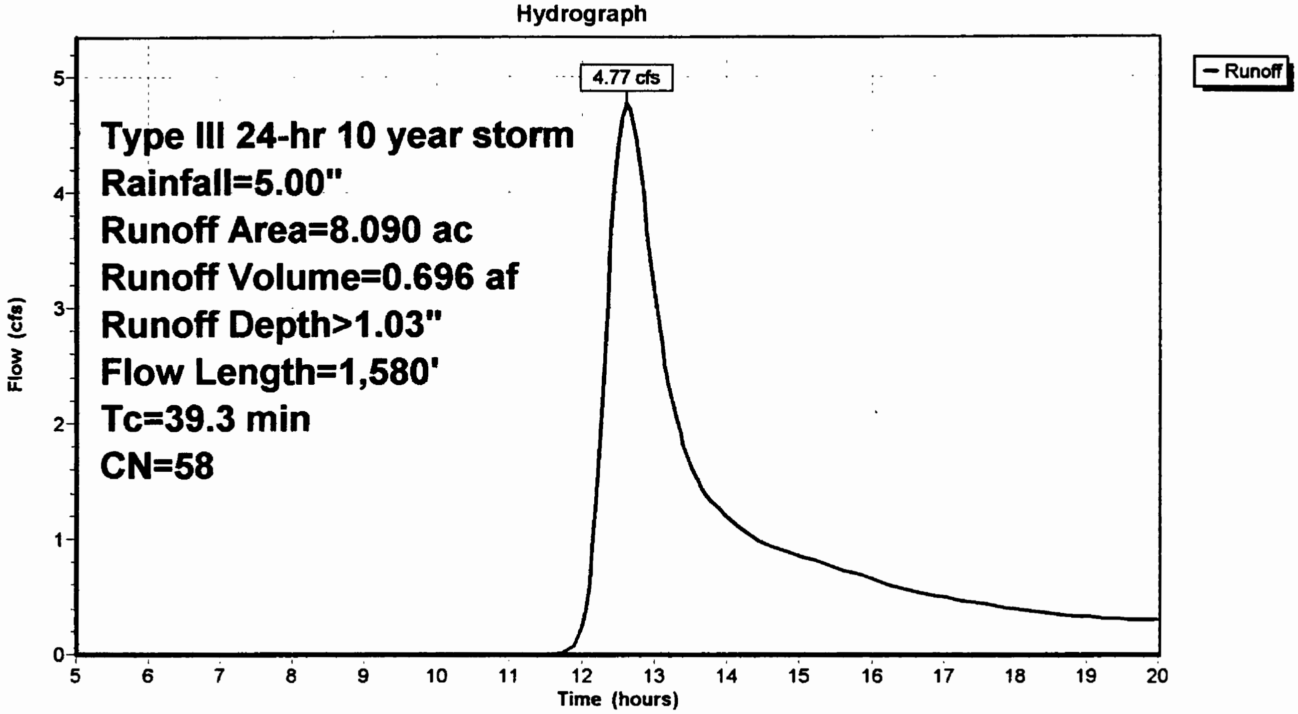
Pond p4a: pond 4a Peak Elev=355.56' Storage=15,959 cf Inflow=4.53 cfs 0.366 af
Outflow=0.00 cfs 0.000 af

Pond p4b: pond 4b Peak Elev=370.92' Storage=24,802 cf Inflow=10.31 cfs 0.992 af
Outflow=0.99 cfs 0.548 af

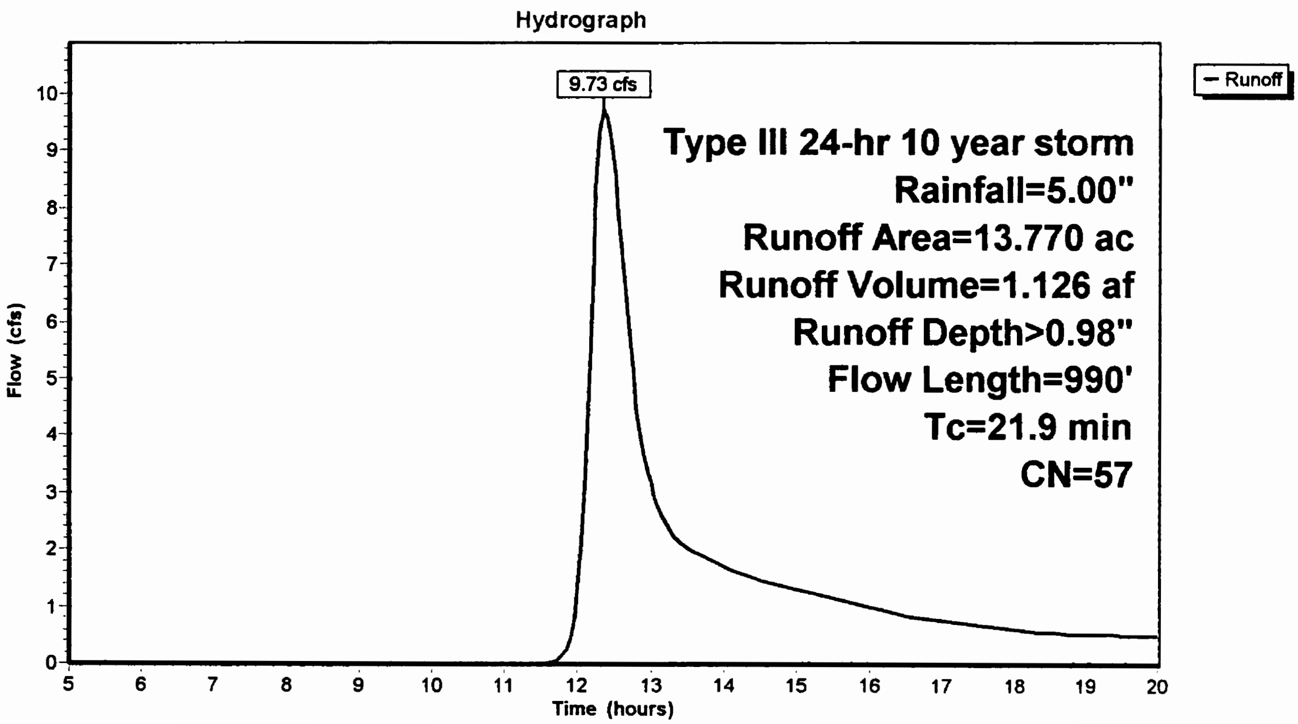
Pond p6a: pond 6a Peak Elev=386.11' Storage=9,177 cf Inflow=6.51 cfs 0.522 af
Outflow=2.20 cfs 0.417 af

Total Runoff Area = 145.800 ac Runoff Volume = 13.273 af Average Runoff Depth = 1.09"

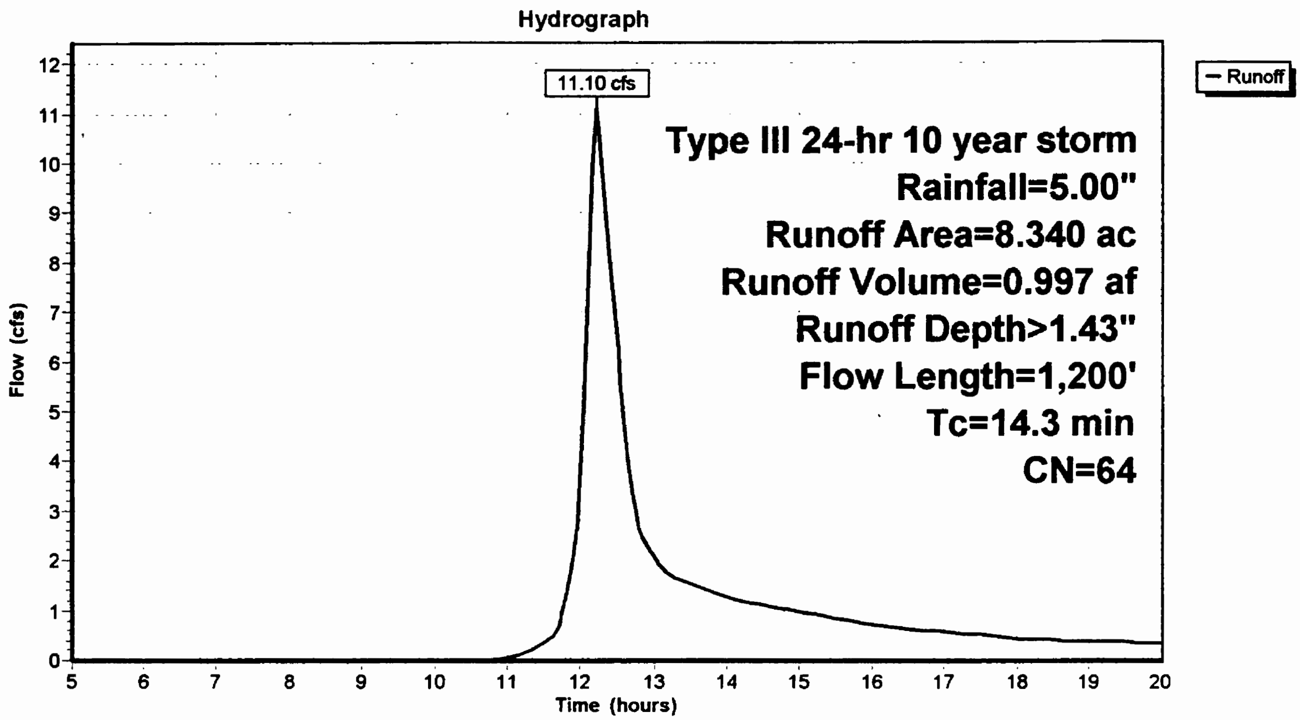
Subcatchment b2: post basin b2



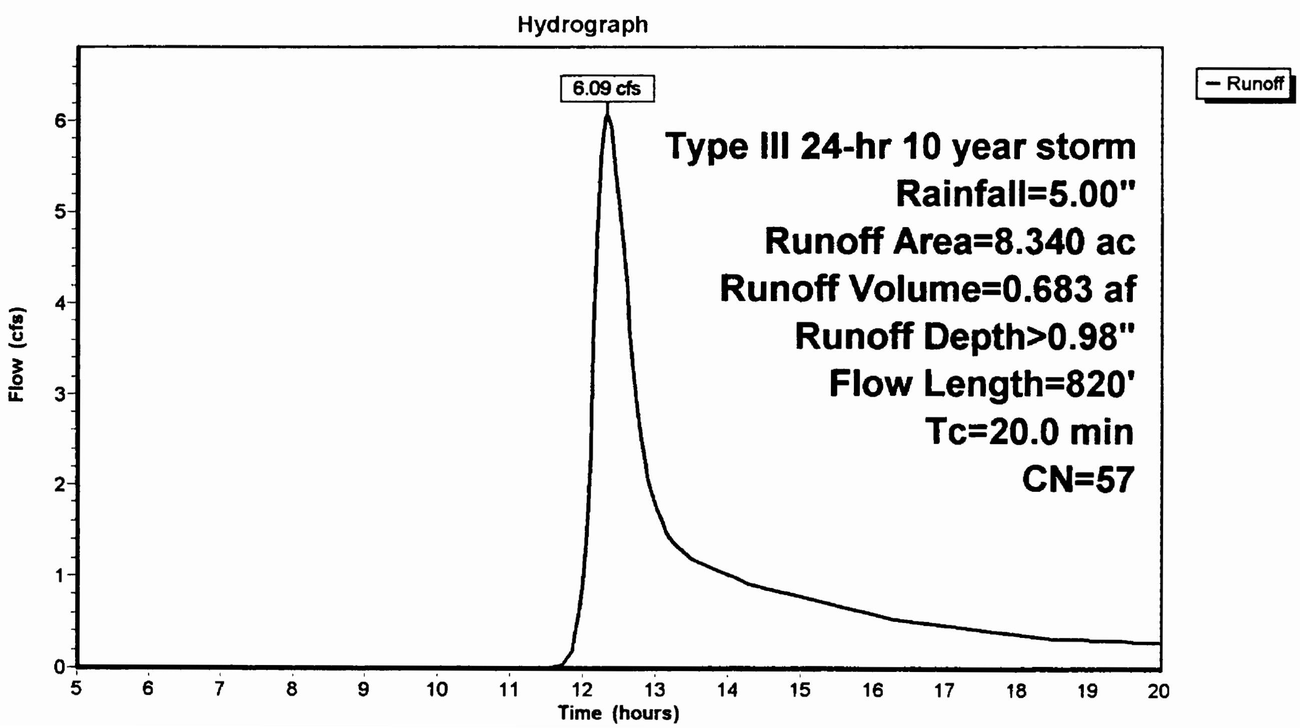
Subcatchment b3: post basin b3



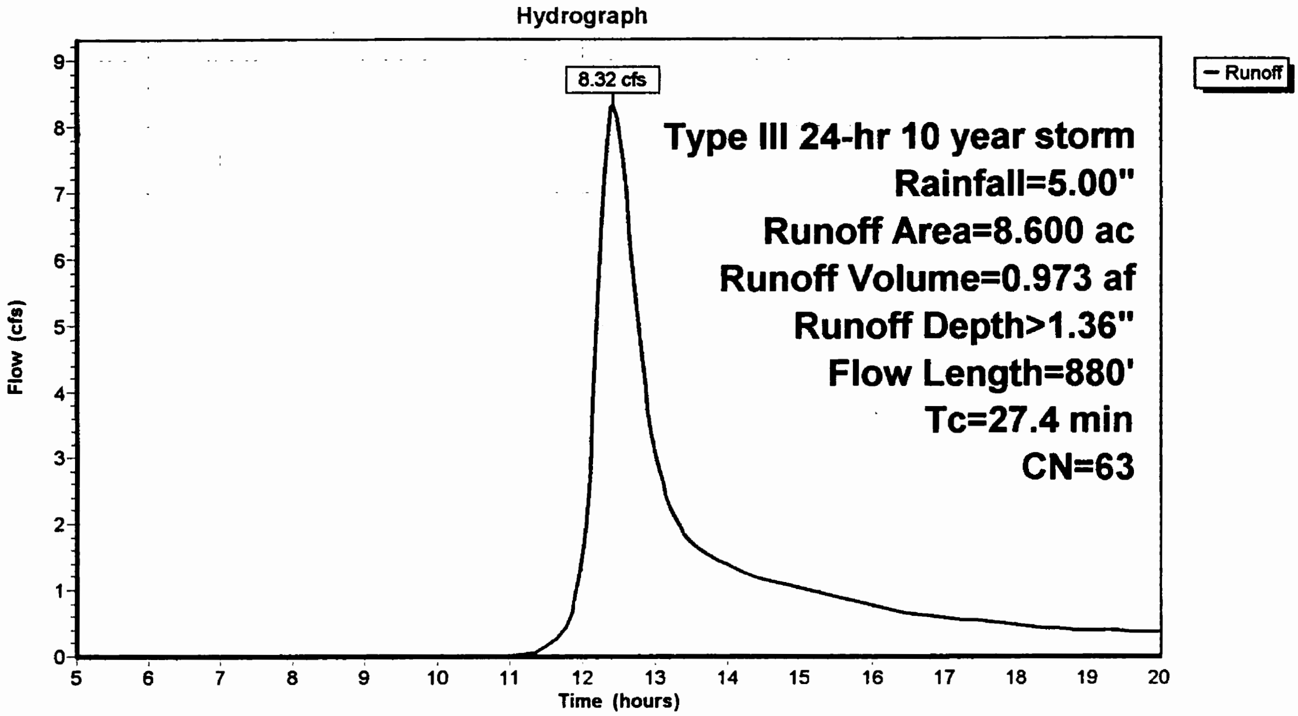
Subcatchment b3a: post basin b3a



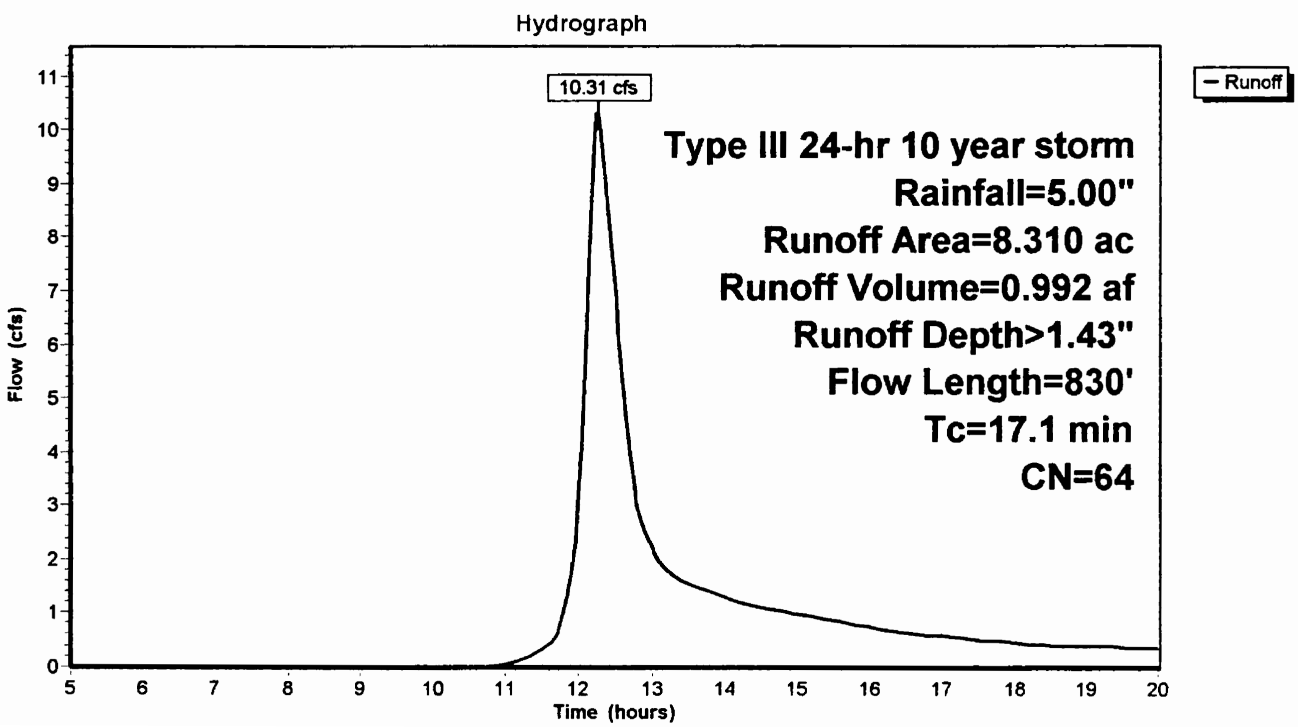
Subcatchment b3b: post basin b3b



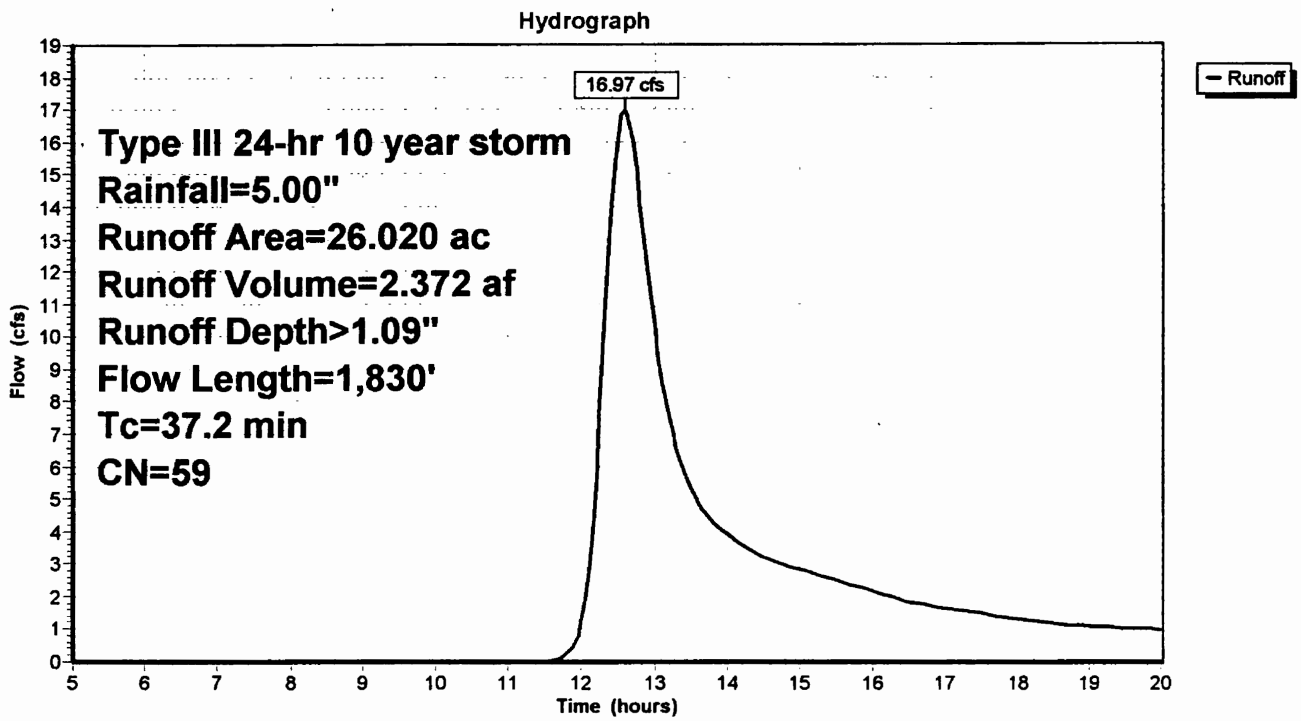
Subcatchment b4a: post basin b4a



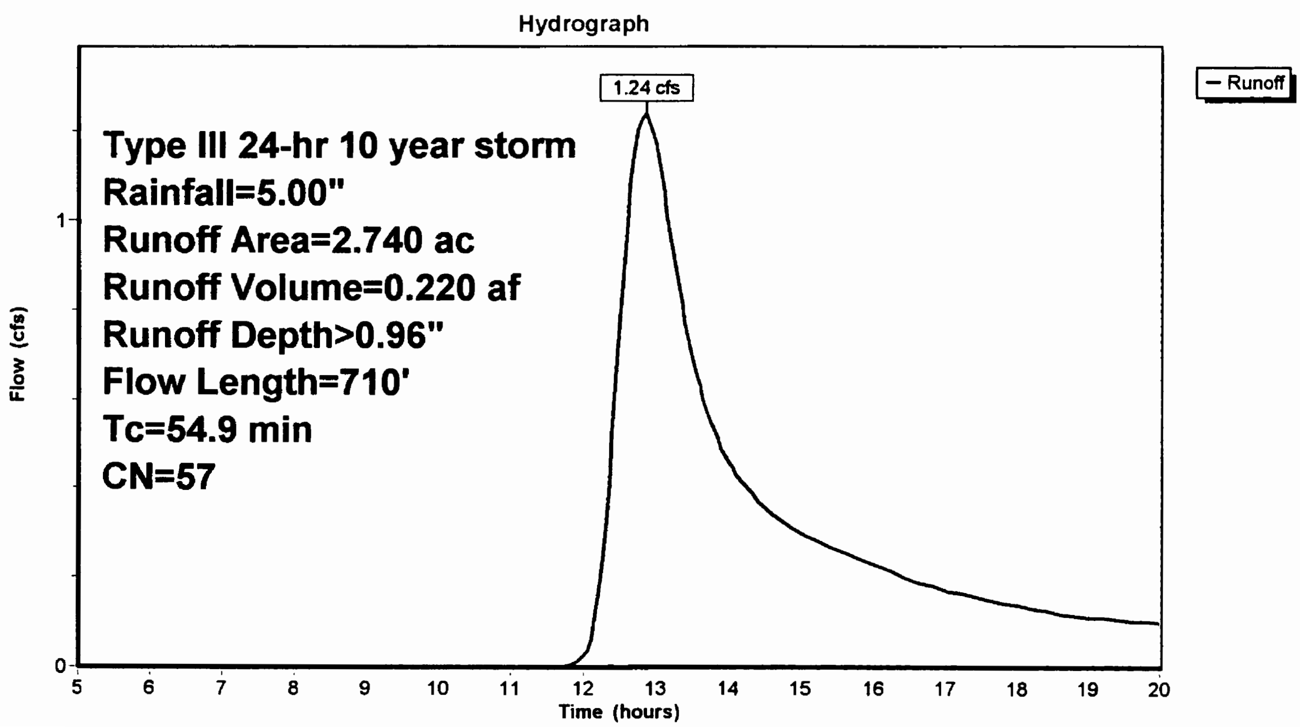
Subcatchment b4b: post basin b4b



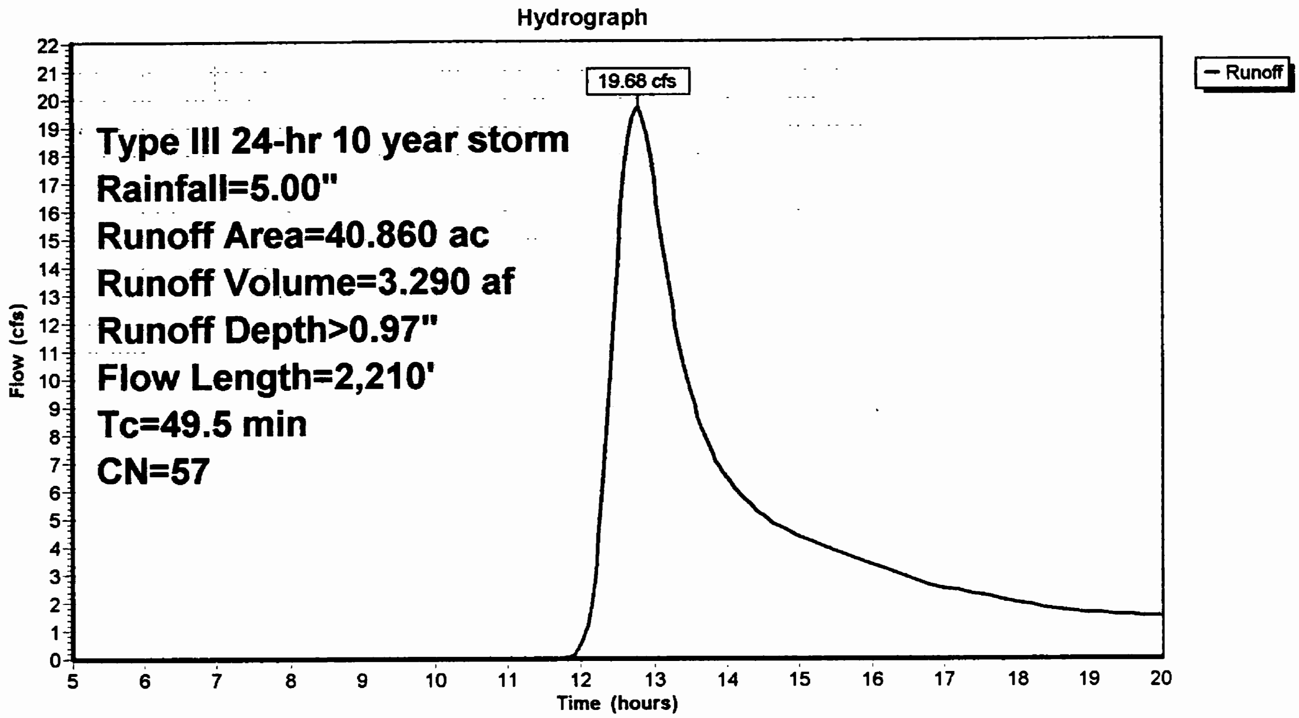
Subcatchment b4c: post basin b4c



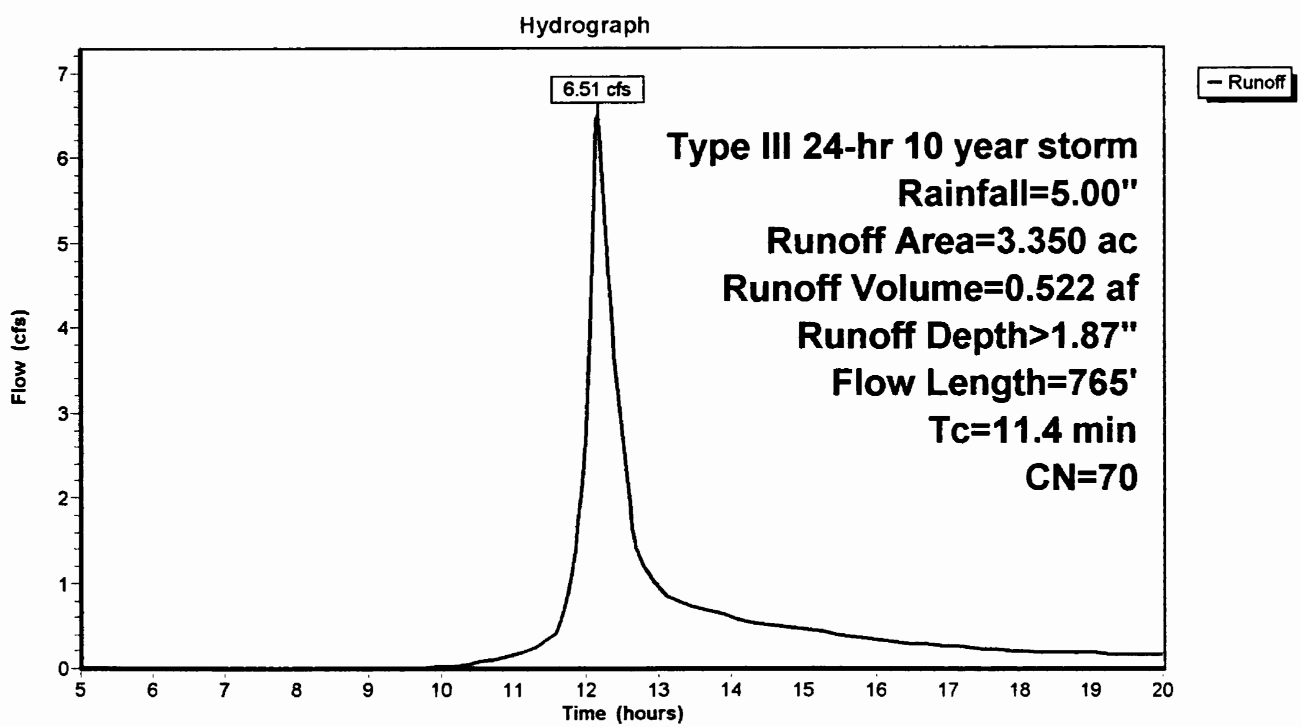
Subcatchment b4d: post basin b4d



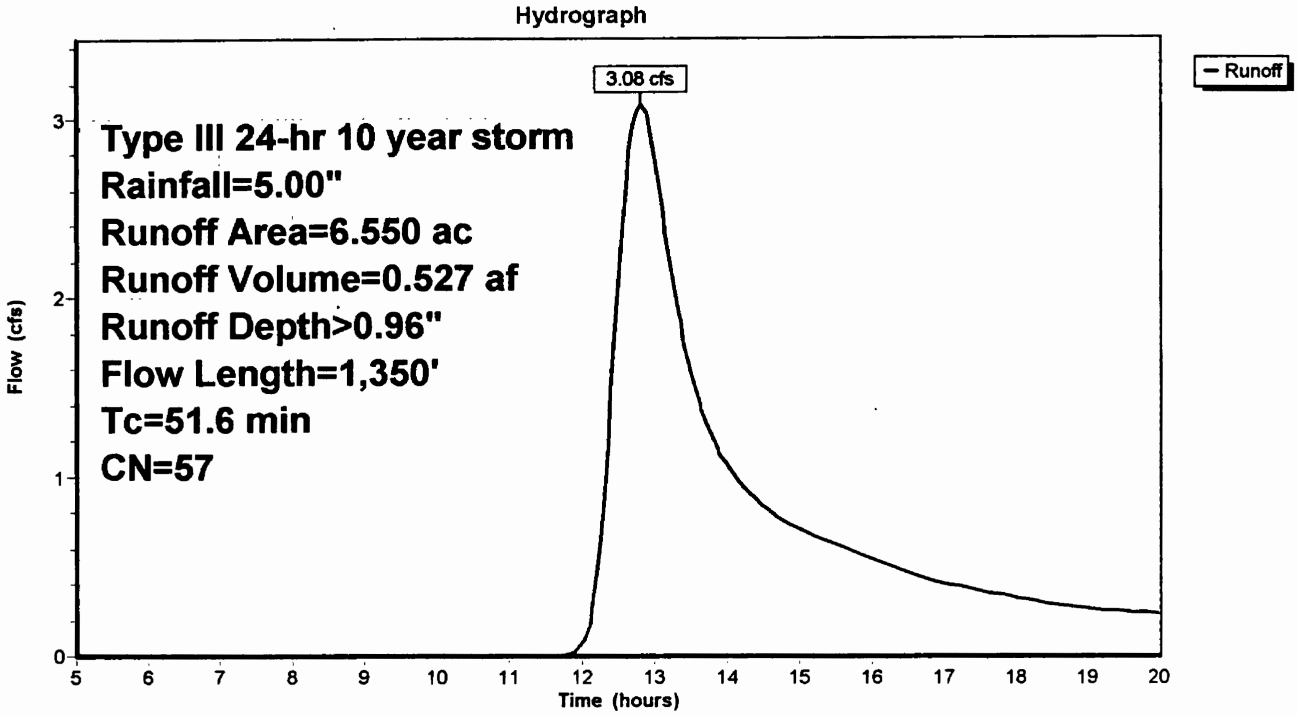
Subcatchment b5: post basin b5



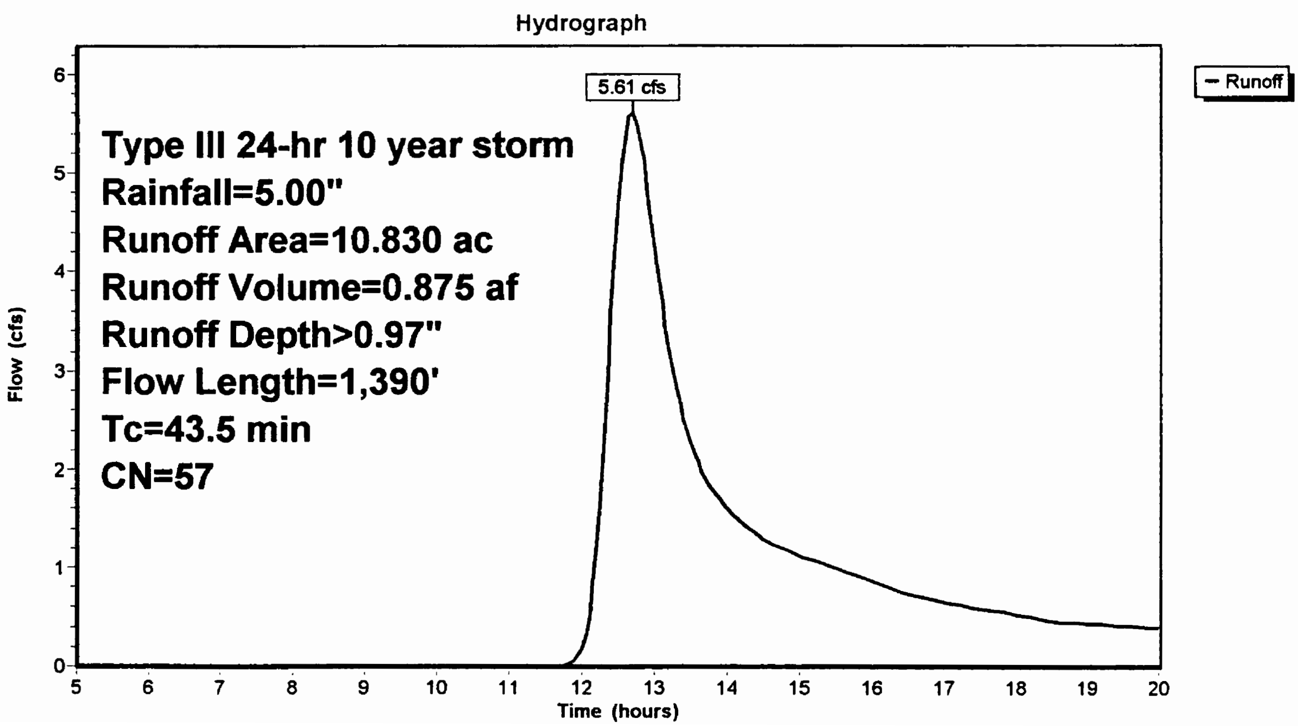
Subcatchment b6a: post basin b6a



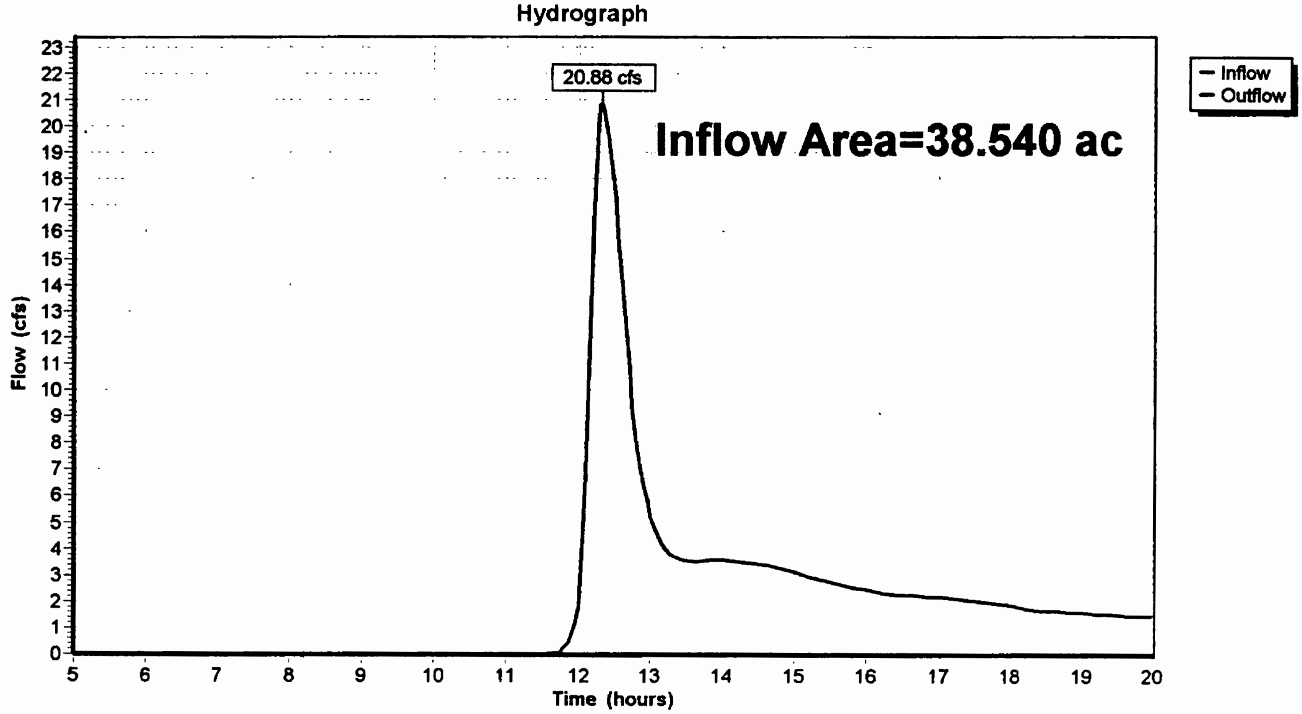
Subcatchment b6b: post basin 6b



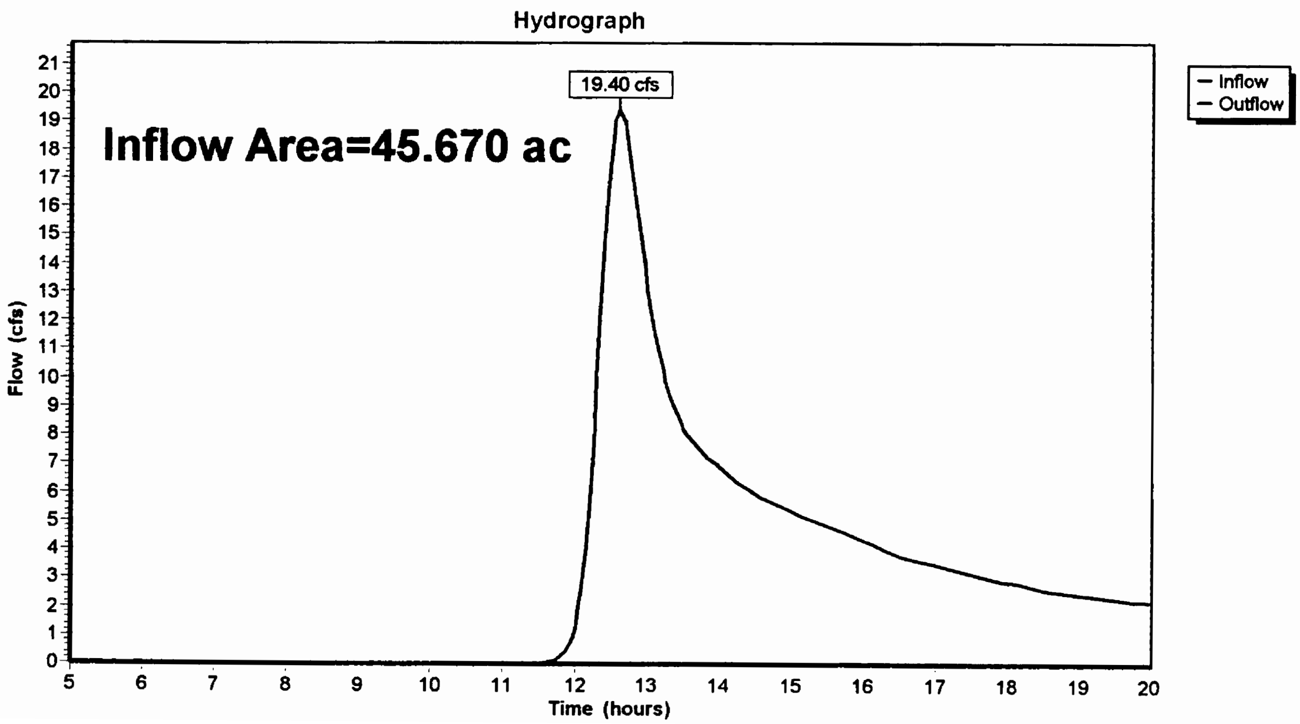
Subcatchment b7: post basin b7



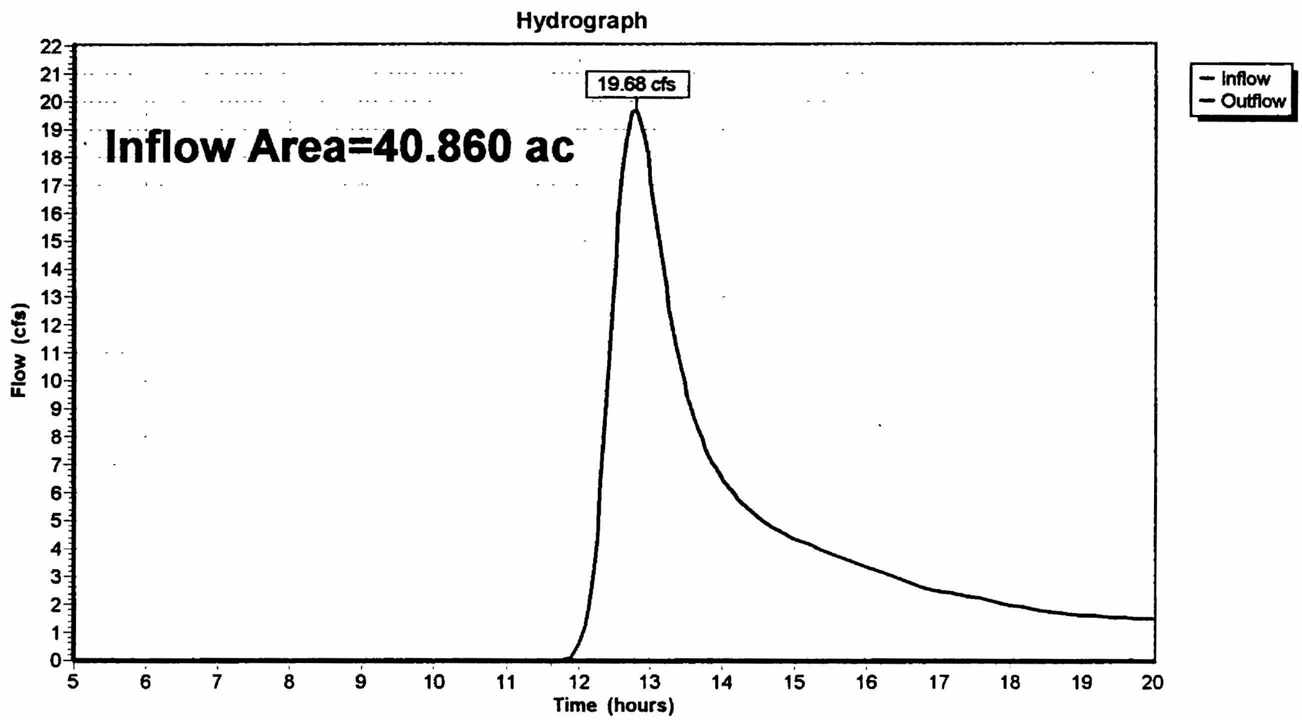
Reach dp3: post design point 3



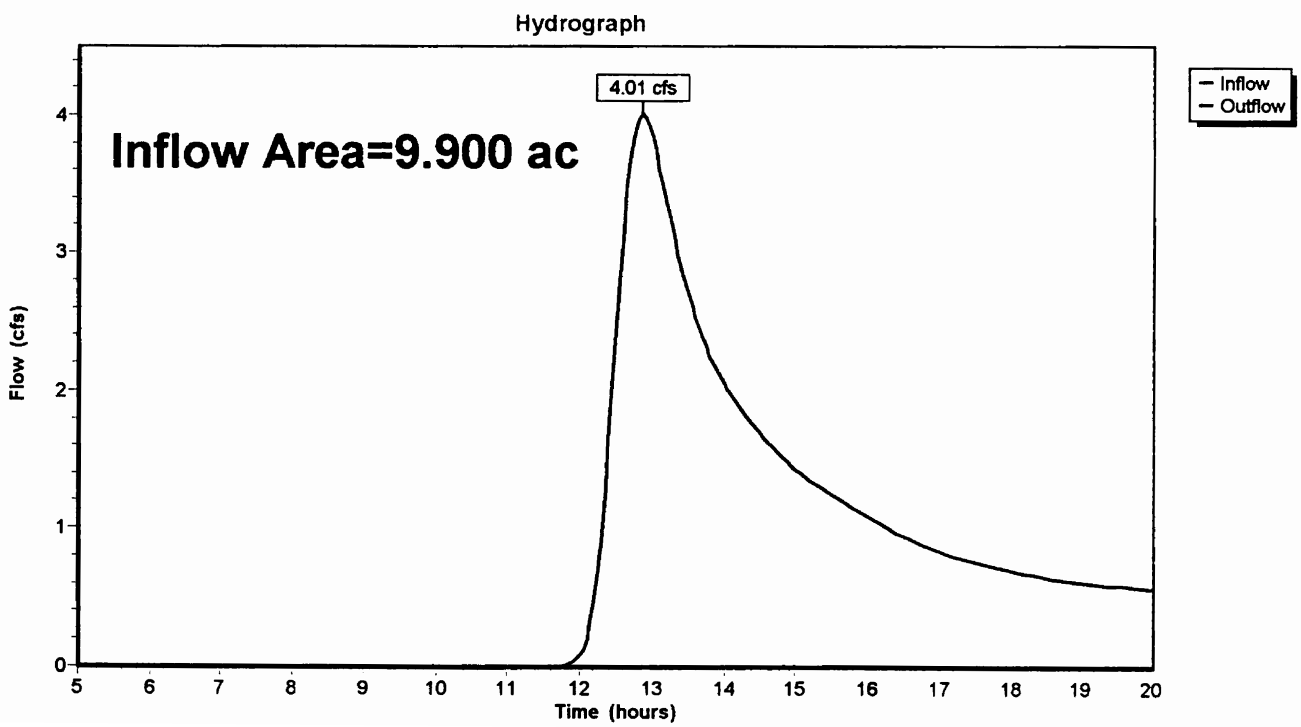
Reach dp4: post design pont 4



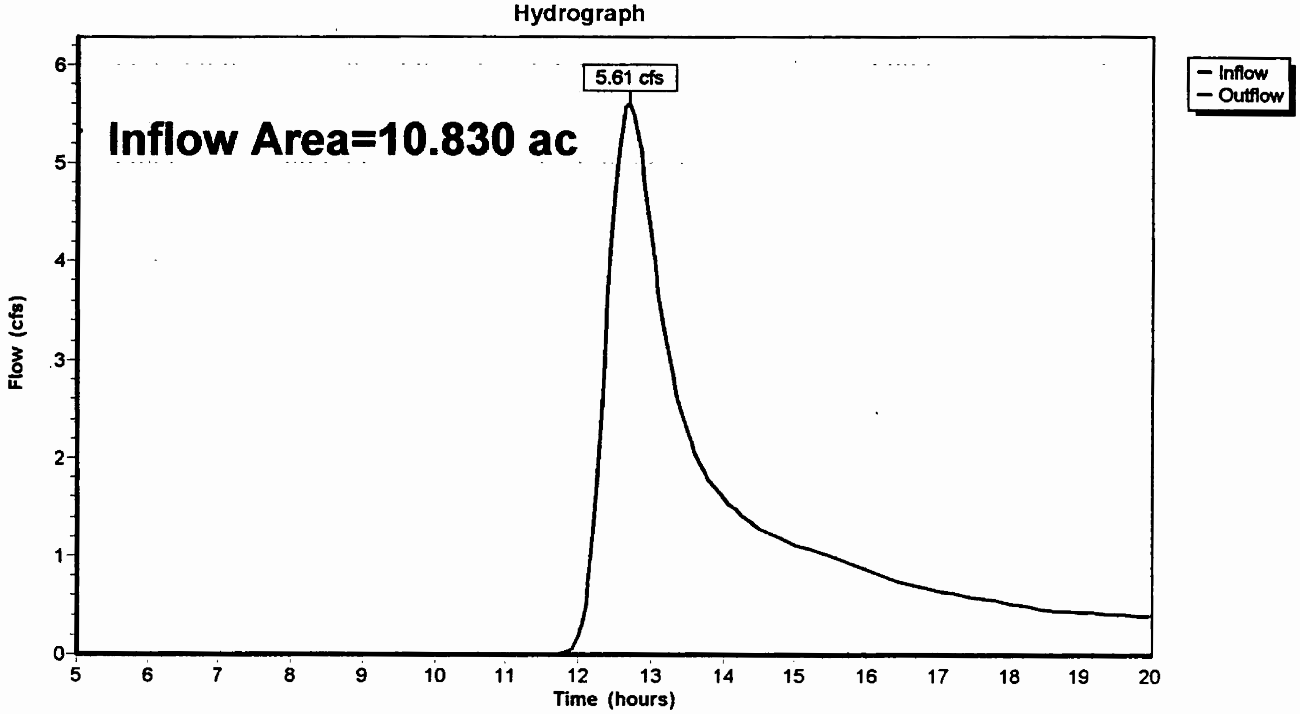
Reach dp5: post design point 5



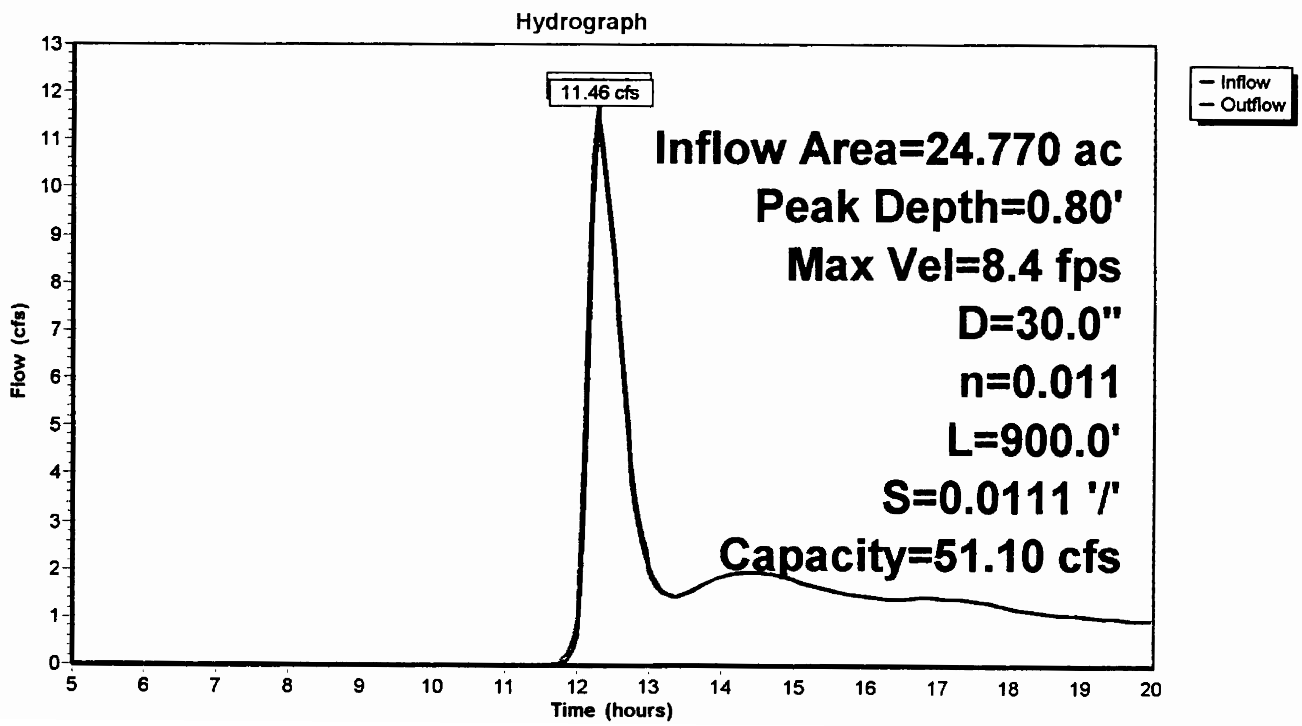
Reach dp6: post design point 6



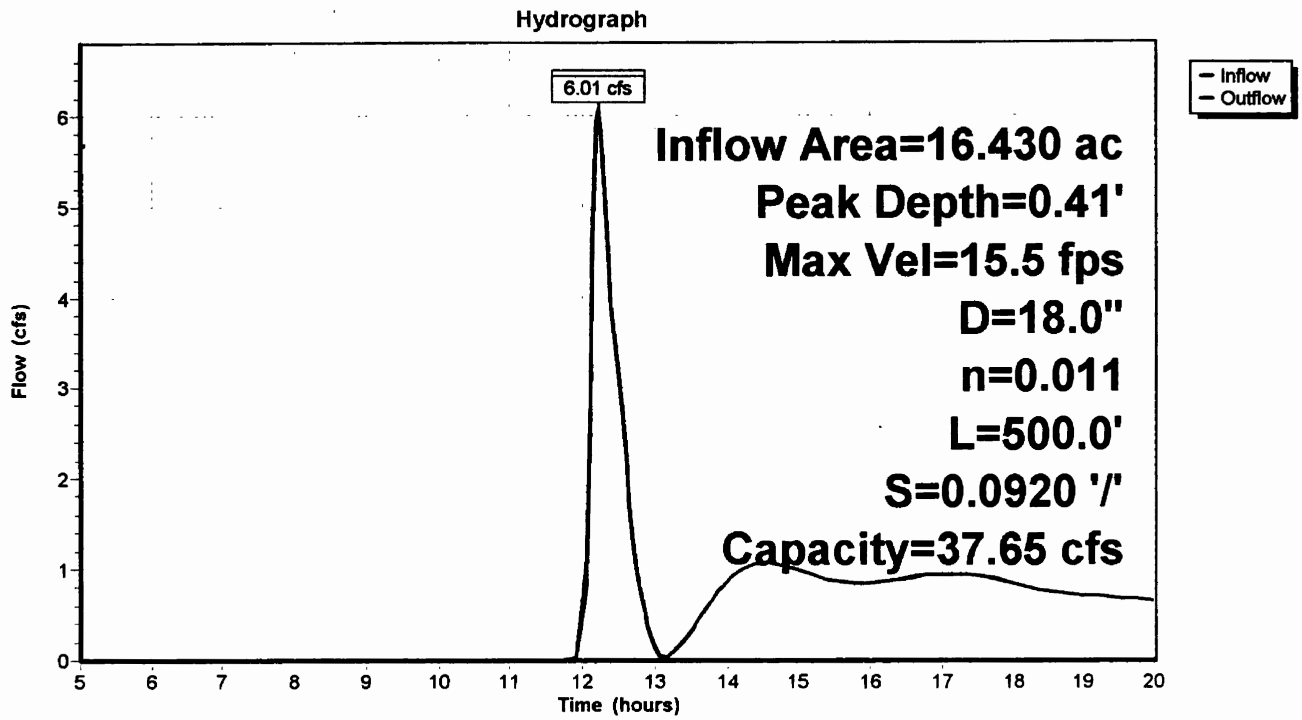
Reach dp7: post design point 7



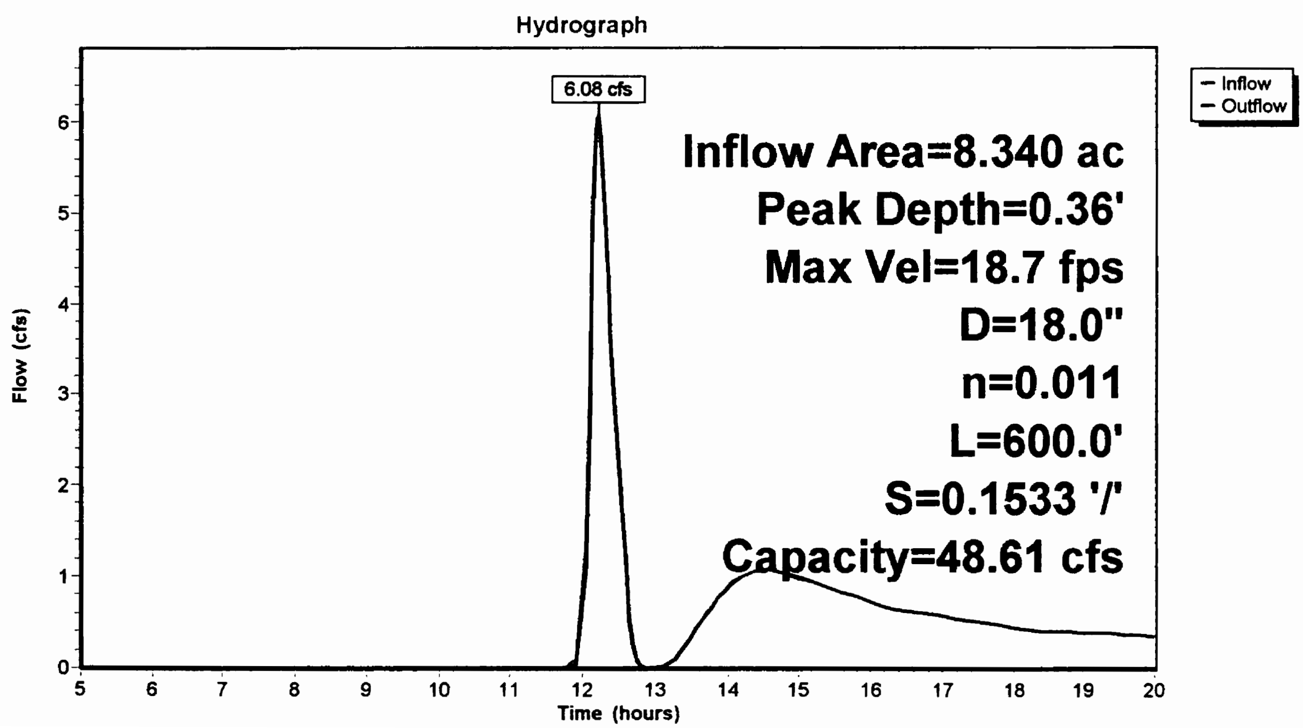
Reach r1: 30" pipe



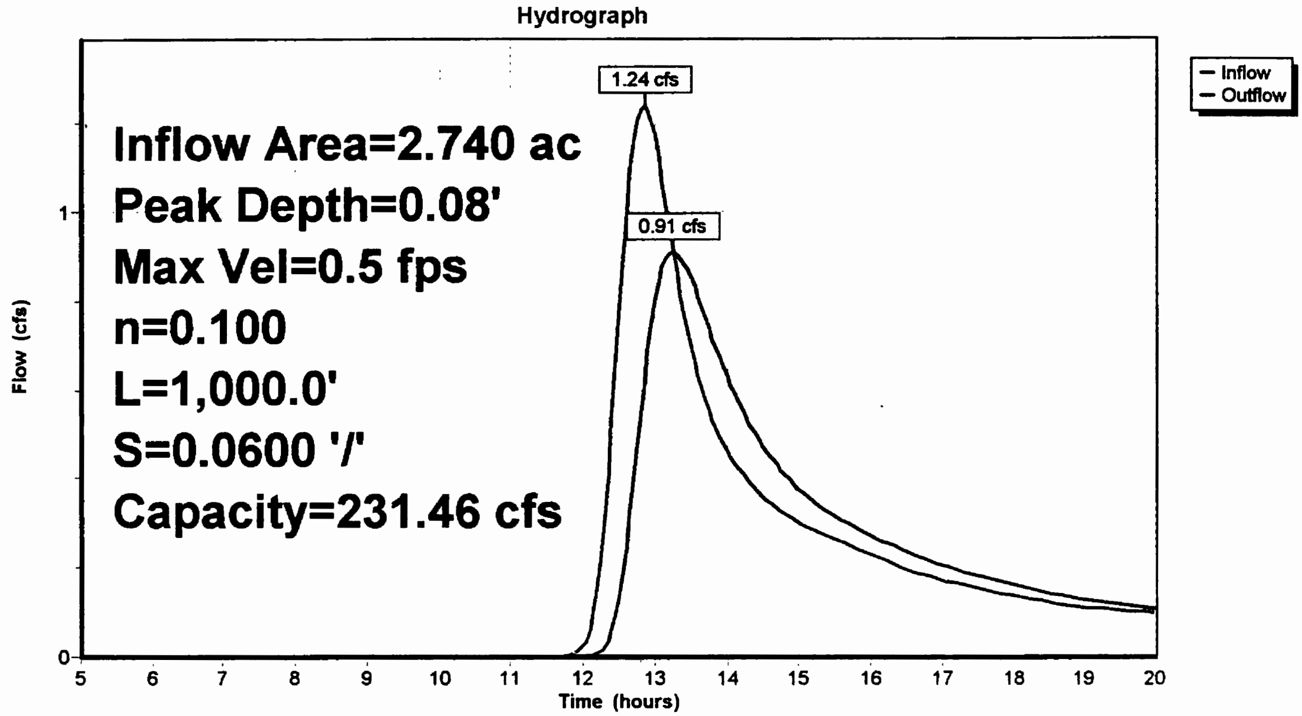
Reach r2: 18" pipe



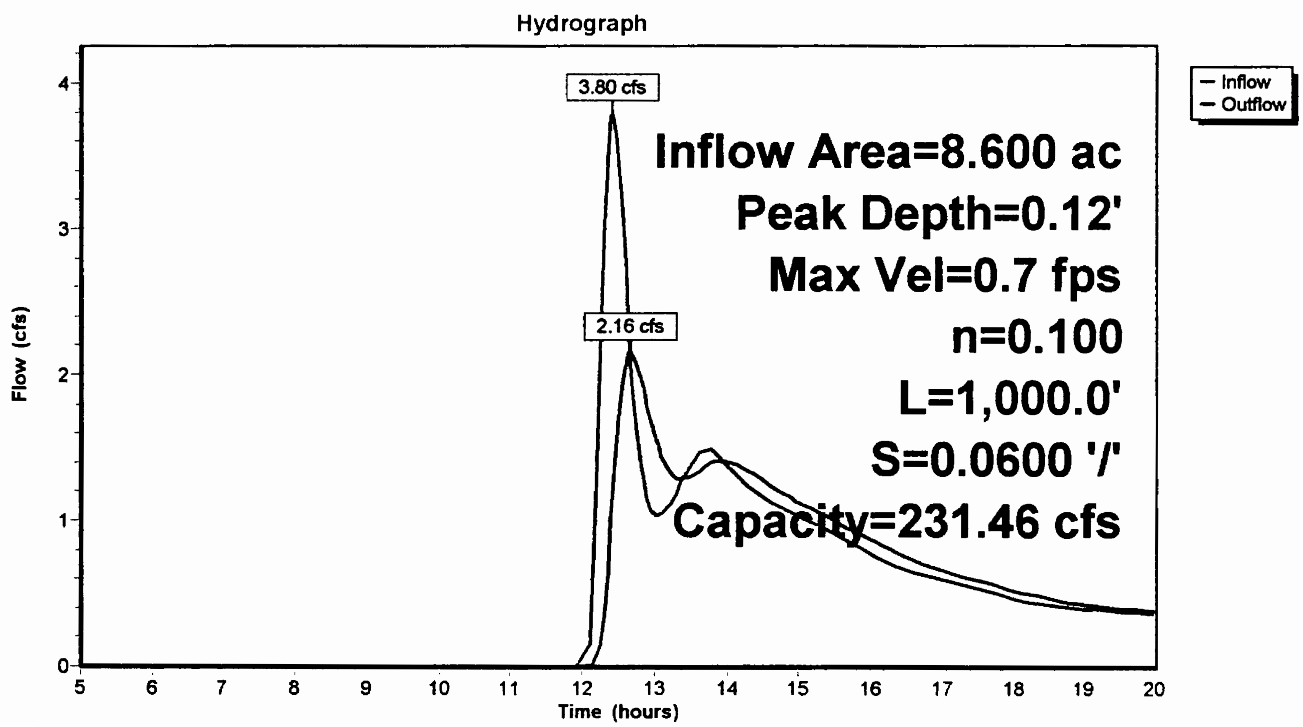
Reach r3: 18" pipe



Reach r4: wetland reach

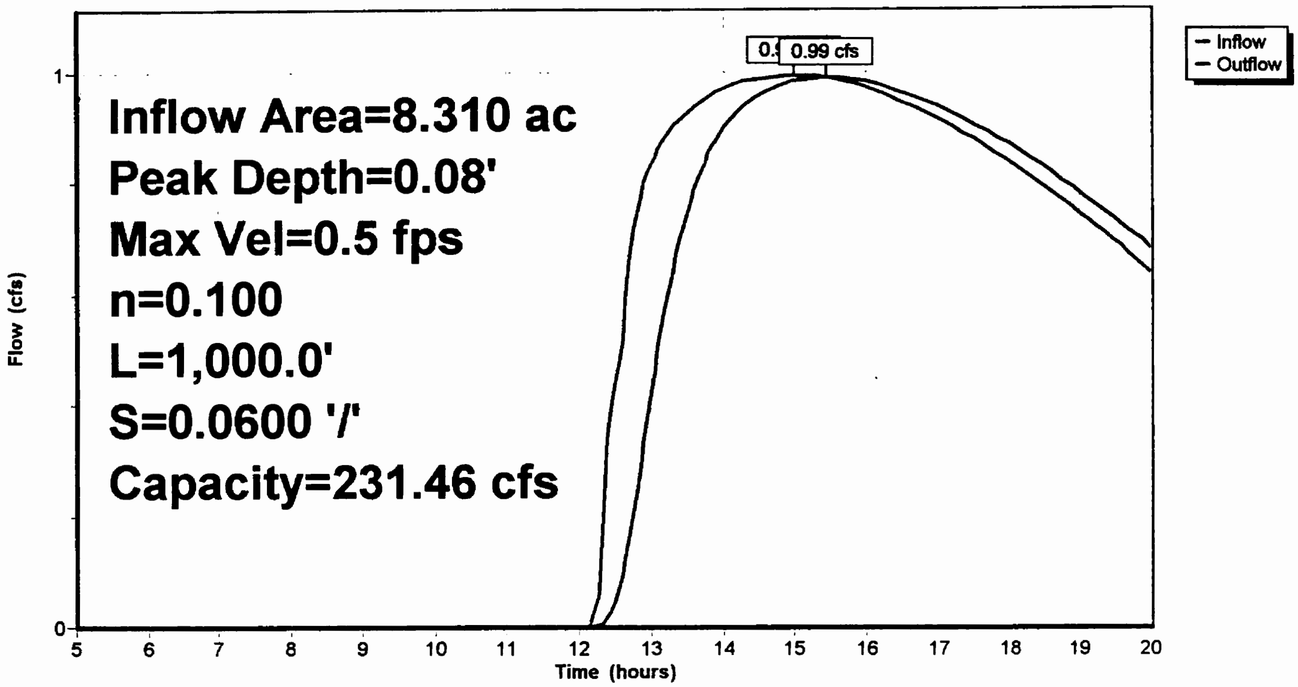


Reach r5: wetland reach



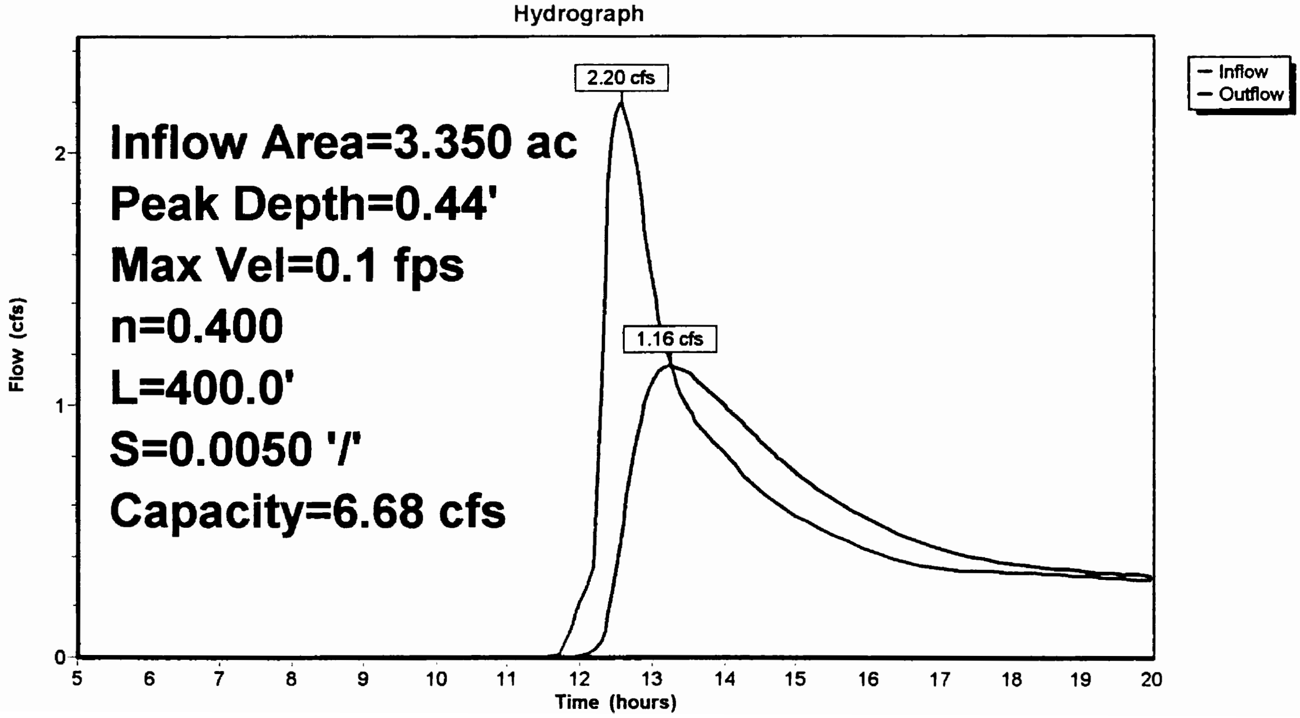
Reach r6: wetland reach

Hydrograph



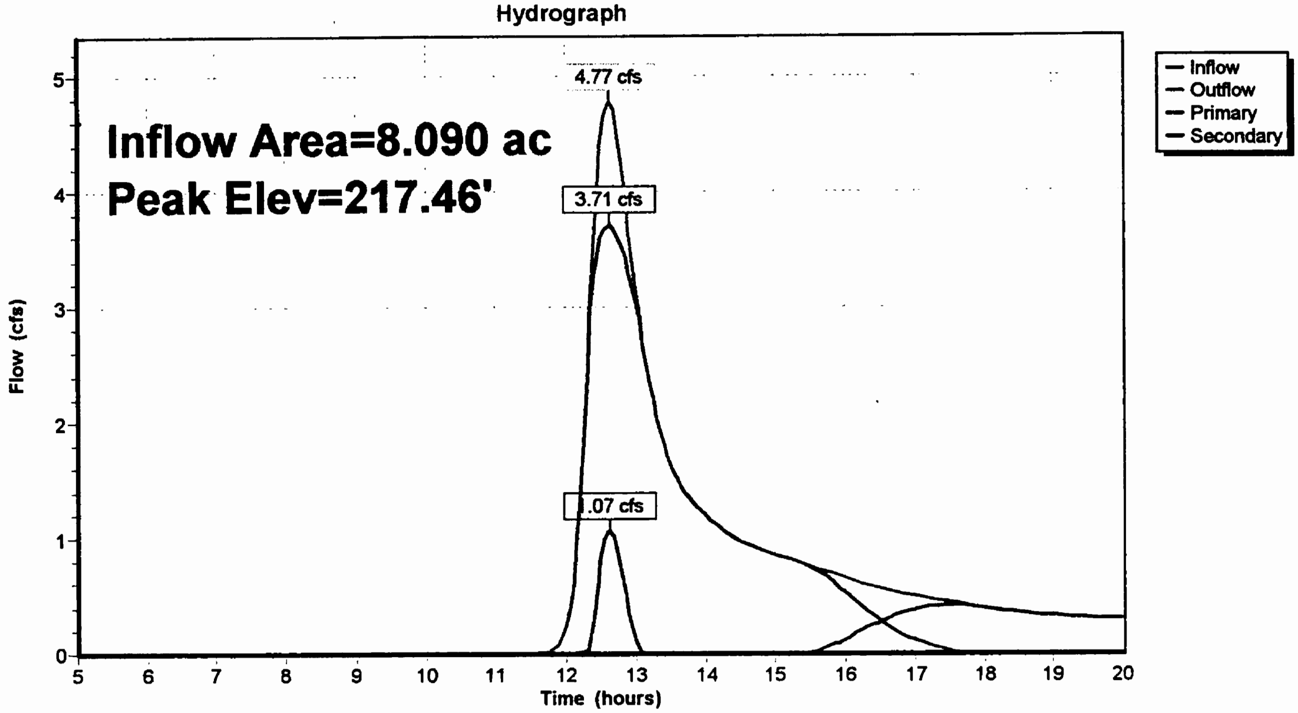
Reach r7: wetland reach

Hydrograph



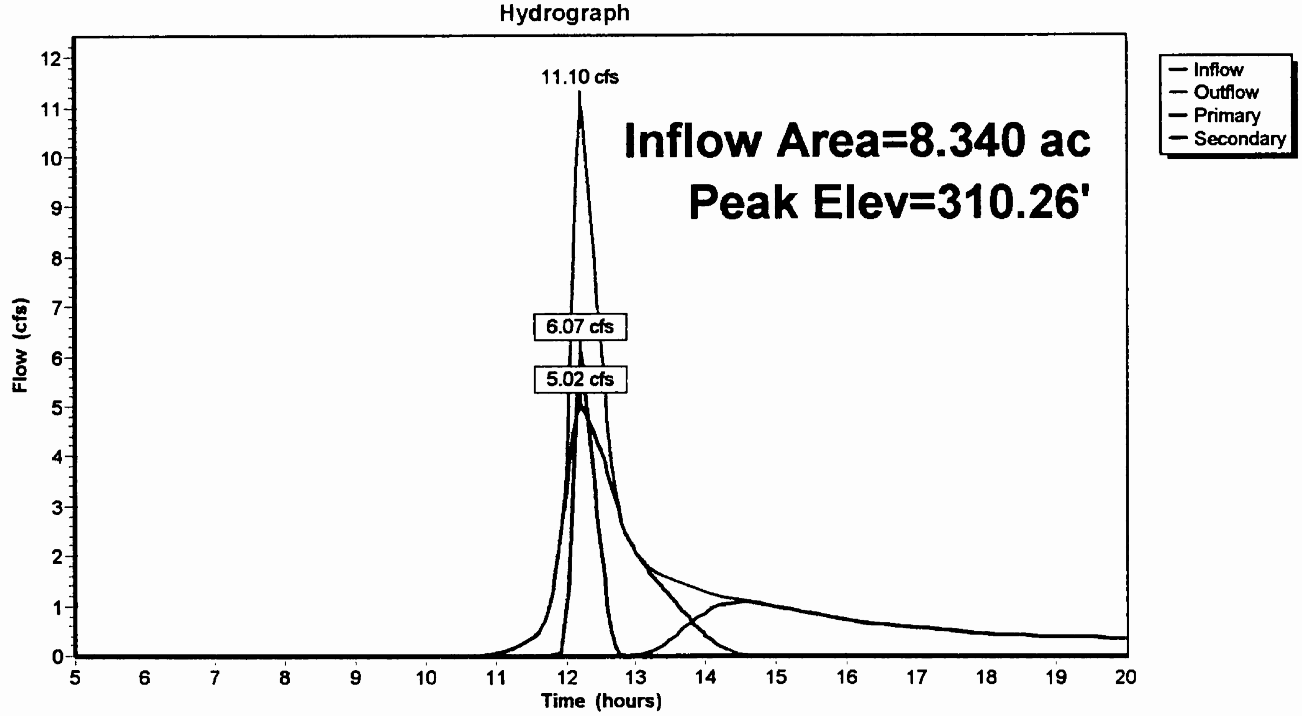
Pond cb12: splitter cb #12

Hydrograph

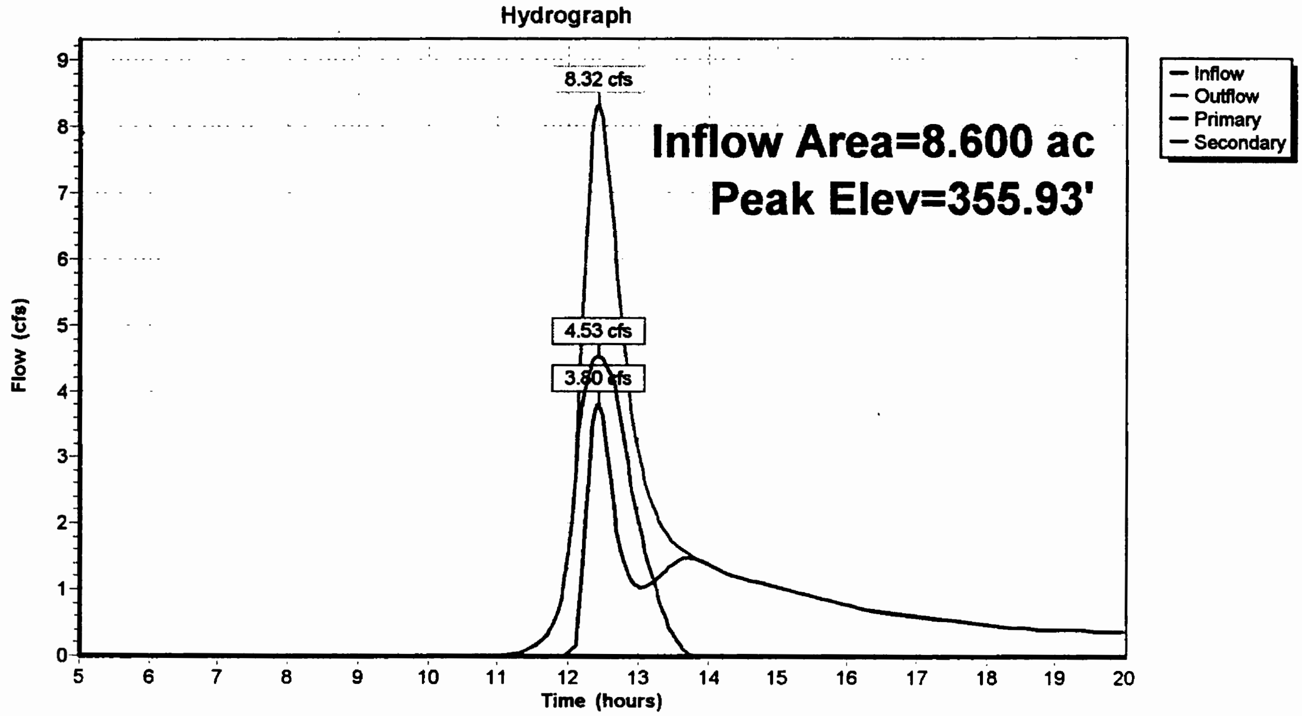


Pond cb20: splitter cb #20

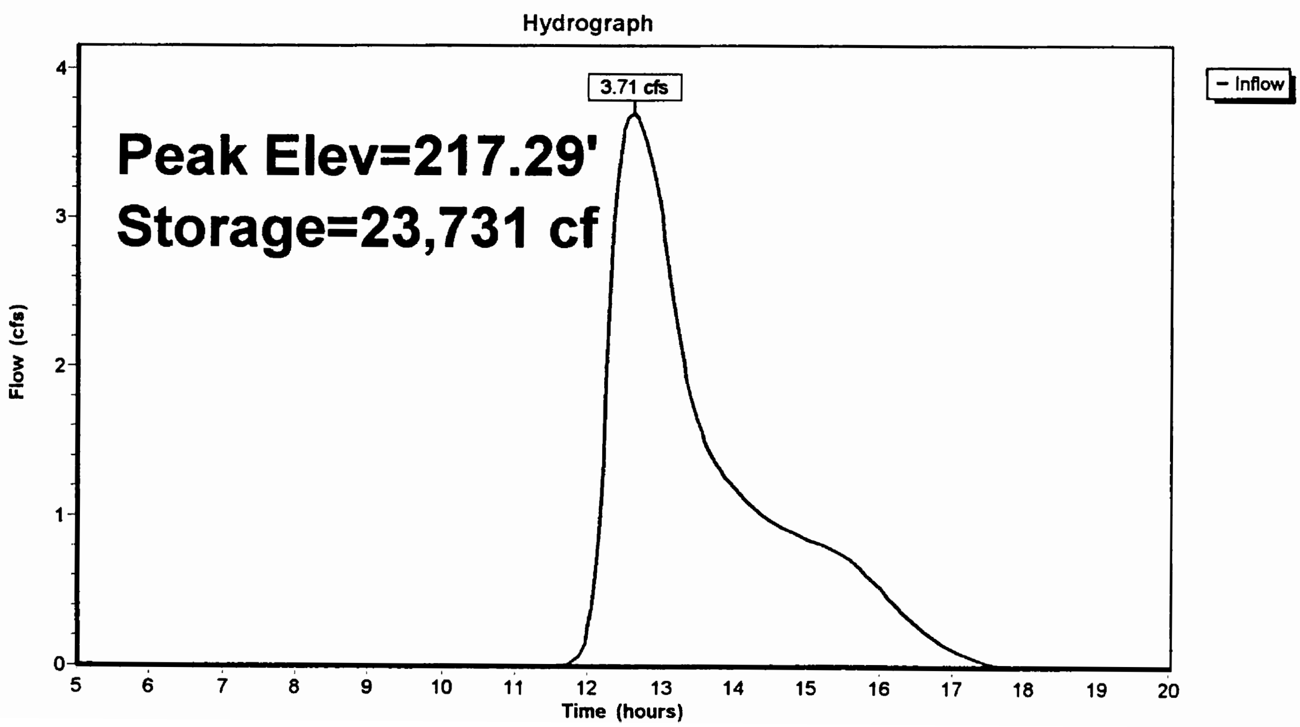
Hydrograph



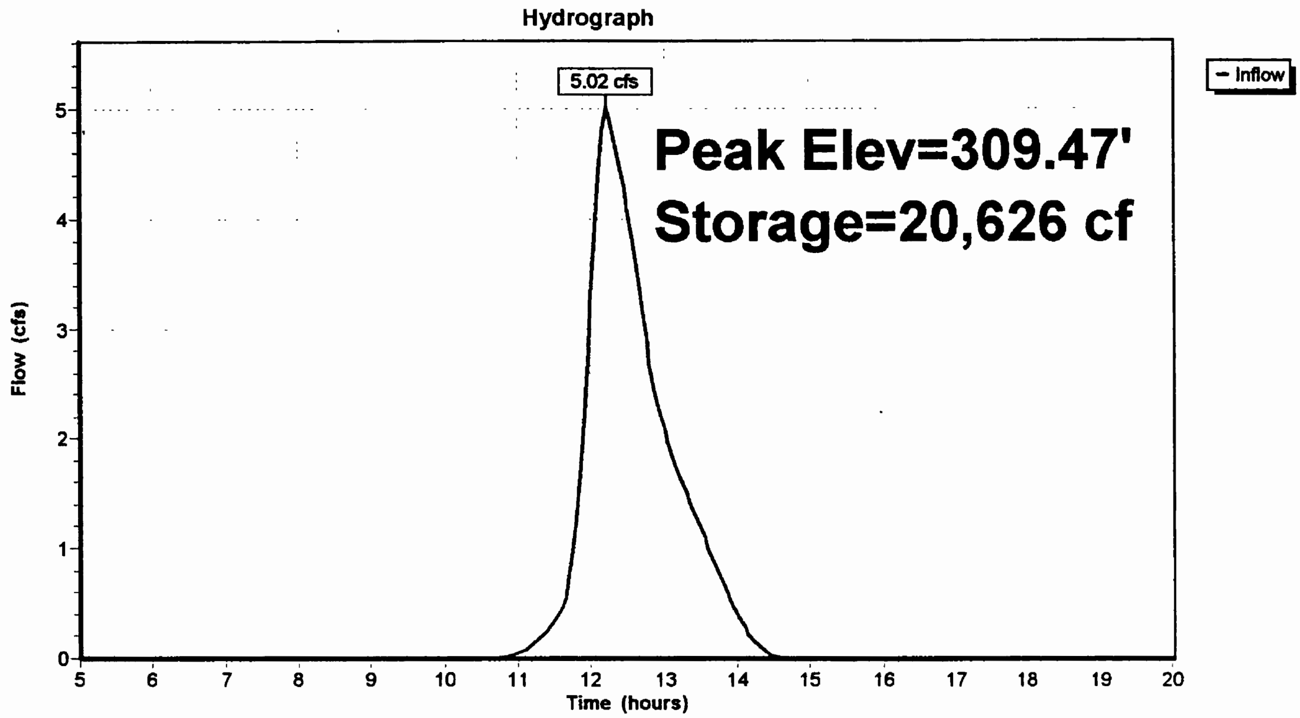
Pond cb29: splitter cb #29



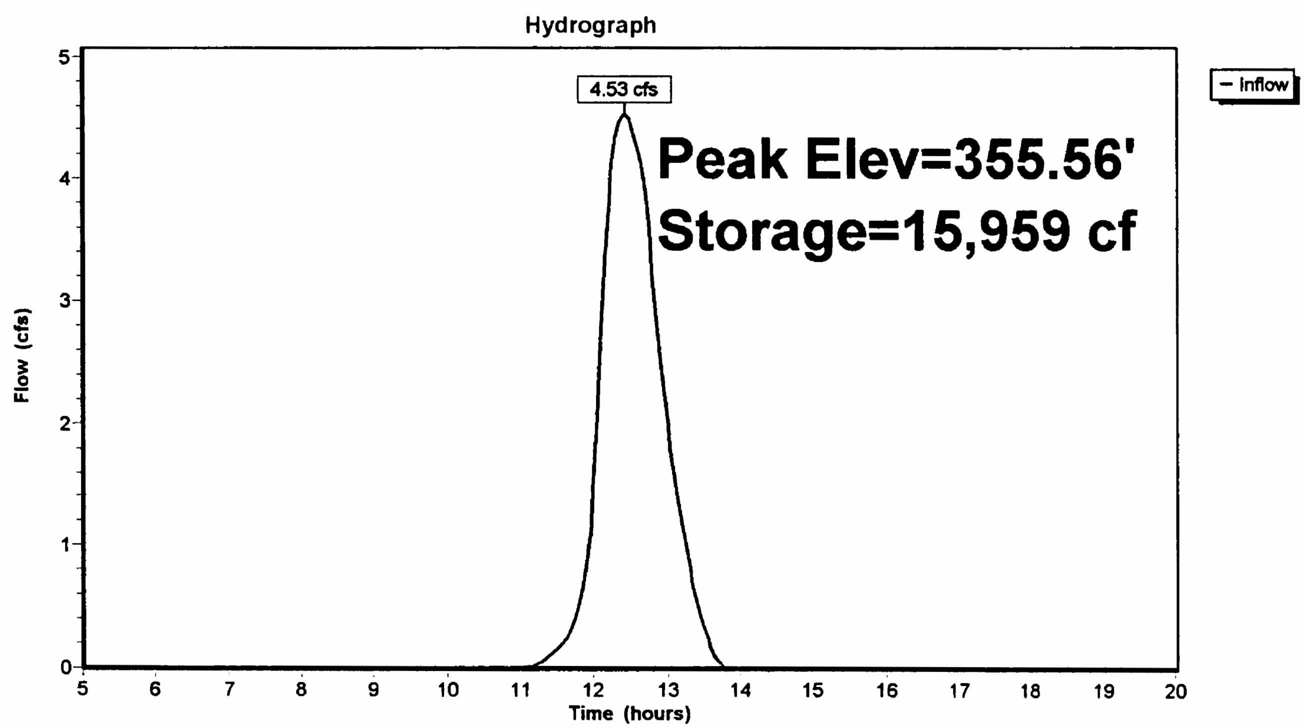
Pond p2: pond p2



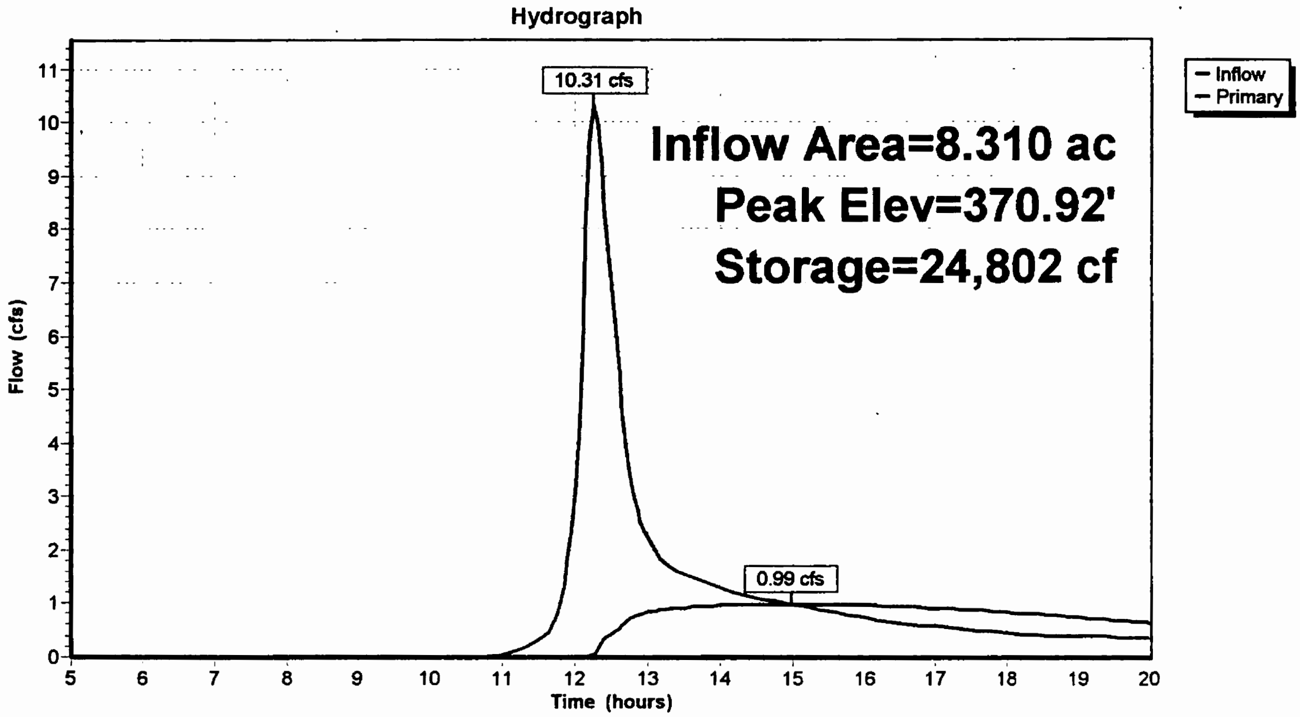
Pond p3a: pond p3a



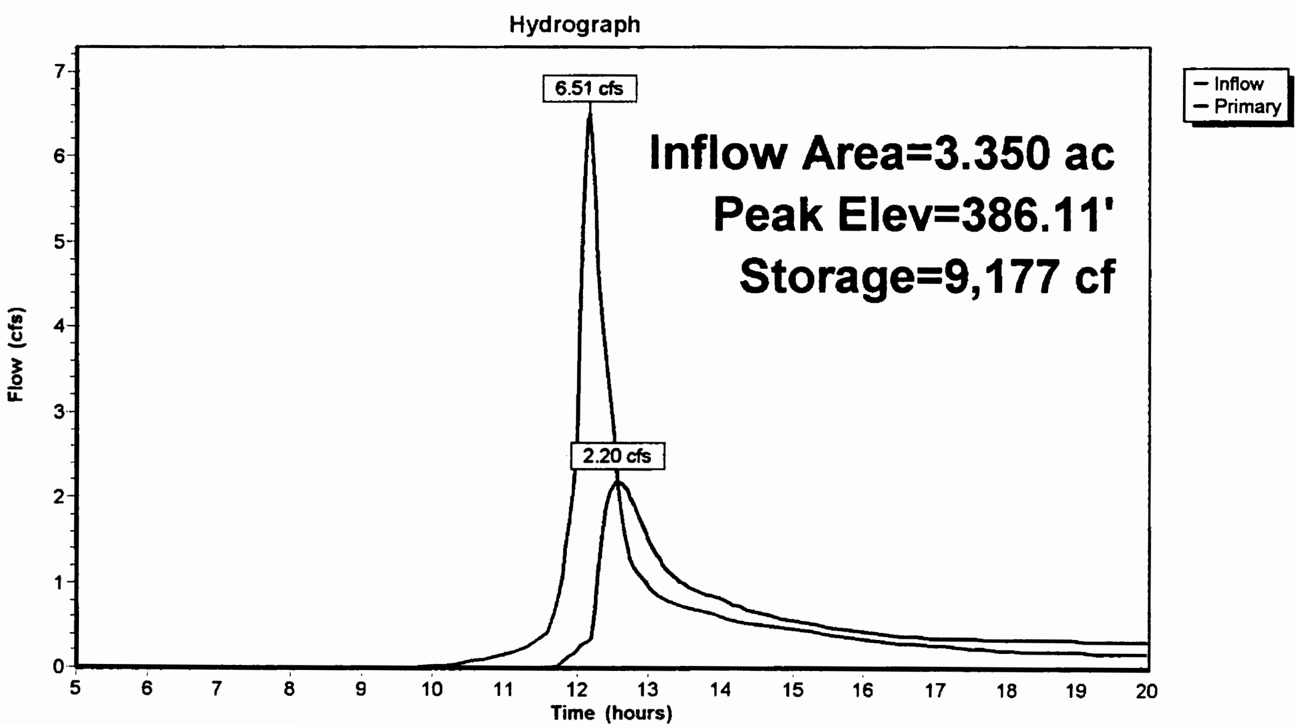
Pond p4a: pond 4a



Pond p4b: pond 4b



Pond p6a: pond 6a



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment b2: post basin b2 Runoff Area=8.090 ac Runoff Depth>1.57"
Flow Length=1,580' Tc=39.3 min CN=58 Runoff=7.64 cfs 1.058 af

Subcatchment b3: post basin b3 Runoff Area=13.770 ac Runoff Depth>1.51"
Flow Length=990' Tc=21.9 min CN=57 Runoff=15.92 cfs 1.729 af

Subcatchment b3a: post basin b3a Runoff Area=8.340 ac Runoff Depth>2.07"
Flow Length=1,200' Tc=14.3 min CN=64 Runoff=16.42 cfs 1.439 af

Subcatchment b3b: post basin b3b Runoff Area=8.340 ac Runoff Depth>1.51"
Flow Length=820' Tc=20.0 min CN=57 Runoff=10.01 cfs 1.048 af

Subcatchment b4a: post basin b4a Runoff Area=8.600 ac Runoff Depth>1.98"
Flow Length=880' Tc=27.4 min CN=63 Runoff=12.43 cfs 1.416 af

Subcatchment b4b: post basin b4b Runoff Area=8.310 ac Runoff Depth>2.07"
Flow Length=830' Tc=17.1 min CN=64 Runoff=15.26 cfs 1.432 af

Subcatchment b4c: post basin b4c Runoff Area=26.020 ac Runoff Depth>1.65"
Flow Length=1,830' Tc=37.2 min CN=59 Runoff=26.74 cfs 3.574 af

Subcatchment b4d: post basin b4d Runoff Area=2.740 ac Runoff Depth>1.48"
Flow Length=710' Tc=54.9 min CN=57 Runoff=2.02 cfs 0.338 af

Subcatchment b5: post basin b5 Runoff Area=40.860 ac Runoff Depth>1.49"
Flow Length=2,210' Tc=49.5 min CN=57 Runoff=32.10 cfs 5.060 af

Subcatchment b6a: post basin b6a Runoff Area=3.350 ac Runoff Depth>2.59"
Flow Length=765' Tc=11.4 min CN=70 Runoff=9.09 cfs 0.724 af

Subcatchment b6b: post basin 6b Runoff Area=6.550 ac Runoff Depth>1.48"
Flow Length=1,350' Tc=51.6 min CN=57 Runoff=5.02 cfs 0.810 af

Subcatchment b7: post basin b7 Runoff Area=10.830 ac Runoff Depth>1.49"
Flow Length=1,390' Tc=43.5 min CN=57 Runoff=9.15 cfs 1.345 af

Reach dp3: post design point 3 Inflow=35.48 cfs 4.194 af
Outflow=35.48 cfs 4.194 af

Reach dp4: post design pont 4 Inflow=32.51 cfs 5.679 af
Outflow=32.51 cfs 5.679 af

Reach dp5: post design point 5 Inflow=32.10 cfs 5.060 af
Outflow=32.10 cfs 5.060 af

Reach dp6: post design point 6 Inflow=6.83 cfs 1.375 af
Outflow=6.83 cfs 1.375 af

Reach dp7: post design point 7 Inflow=9.15 cfs 1.345 af
Outflow=9.15 cfs 1.345 af

Reach r1: 30" pipe Peak Depth=1.08' Max Vel=9.7 fps Inflow=19.85 cfs 2.471 af
D=30.0" n=0.011 L=900.0' S=0.0111 '/' Capacity=51.10 cfs Outflow=19.72 cfs 2.465 af

Reach r2: 18" pipe Peak Depth=0.53' Max Vel=18.1 fps Inflow=10.30 cfs 1.424 af
D=18.0" n=0.011 L=500.0' S=0.0920 '/' Capacity=37.65 cfs Outflow=10.22 cfs 1.423 af

Reach r3: 18" pipe Peak Depth=0.47' Max Vel=21.7 fps Inflow=10.22 cfs 0.943 af
D=18.0" n=0.011 L=600.0' S=0.1533 '/' Capacity=48.61 cfs Outflow=10.22 cfs 0.942 af

Reach r4: wetland reach Peak Depth=0.10' Max Vel=0.6 fps Inflow=2.02 cfs 0.338 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=1.58 cfs 0.327 af

Reach r5: wetland reach Peak Depth=0.17' Max Vel=0.9 fps Inflow=7.16 cfs 1.017 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=5.10 cfs 0.989 af

Reach r6: wetland reach Peak Depth=0.10' Max Vel=0.6 fps Inflow=1.52 cfs 0.836 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=1.51 cfs 0.789 af

Reach r7: wetland reach Peak Depth=0.60' Max Vel=0.1 fps Inflow=3.30 cfs 0.604 af
n=0.400 L=400.0' S=0.0050 '/' Capacity=6.68 cfs Outflow=2.19 cfs 0.564 af

Pond cb12: splitter cb #12 Peak Elev=217.85' Inflow=7.64 cfs 1.058 af
Primary=3.25 cfs 0.482 af Secondary=4.40 cfs 0.577 af Outflow=7.64 cfs 1.058 af

Pond cb20: splitter cb #20 Peak Elev=311.19' Inflow=16.42 cfs 1.439 af
Primary=10.22 cfs 0.943 af Secondary=6.20 cfs 0.496 af Outflow=16.42 cfs 1.439 af

Pond cb29: splitter cb #29 Peak Elev=356.45' Inflow=12.43 cfs 1.416 af
Primary=7.16 cfs 1.017 af Secondary=5.28 cfs 0.400 af Outflow=12.43 cfs 1.416 af

Pond p2: pond p2 Peak Elev=217.46' Storage=25,115 cf Inflow=4.40 cfs 0.577 af
Outflow=0.00 cfs 0.000 af

Pond p3a: pond p3a Peak Elev=309.63' Storage=21,602 cf Inflow=6.20 cfs 0.496 af
Outflow=0.00 cfs 0.000 af

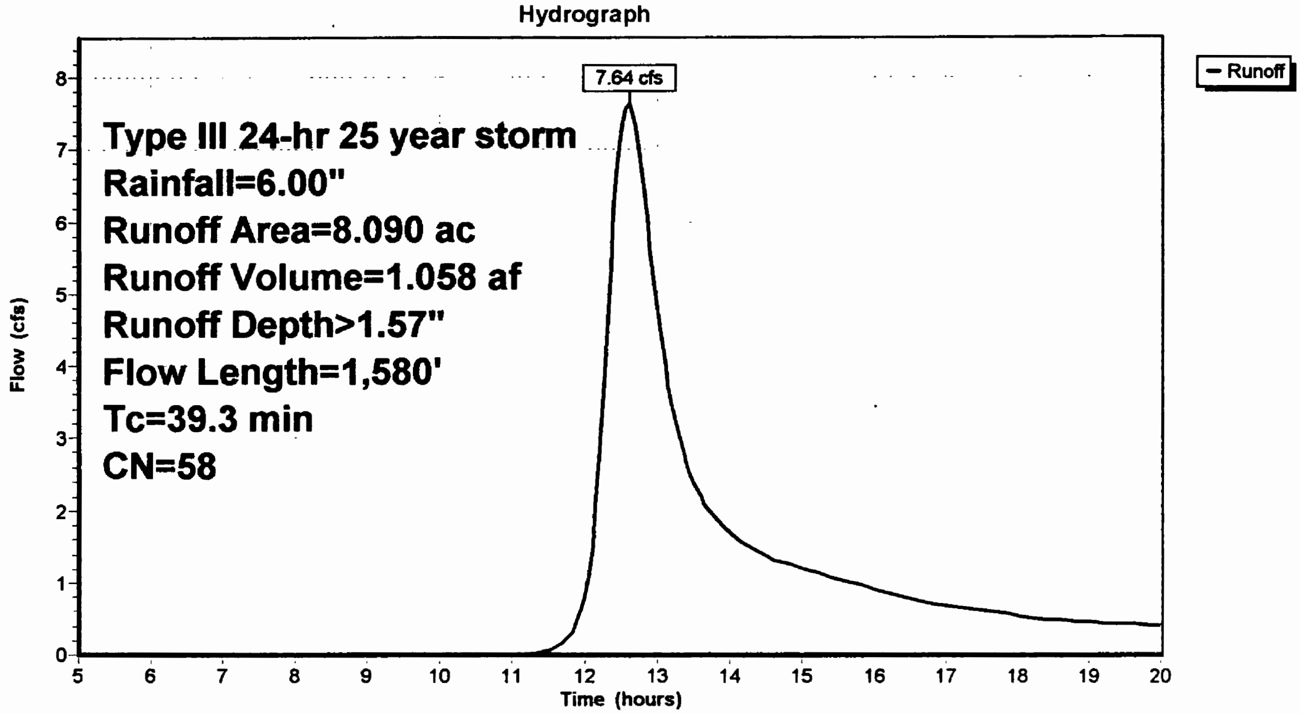
Pond p4a: pond 4a Peak Elev=355.80' Storage=17,406 cf Inflow=5.28 cfs 0.400 af
Outflow=0.00 cfs 0.000 af

Pond p4b: pond 4b Peak Elev=372.22' Storage=35,664 cf Inflow=15.26 cfs 1.432 af
Outflow=1.52 cfs 0.836 af

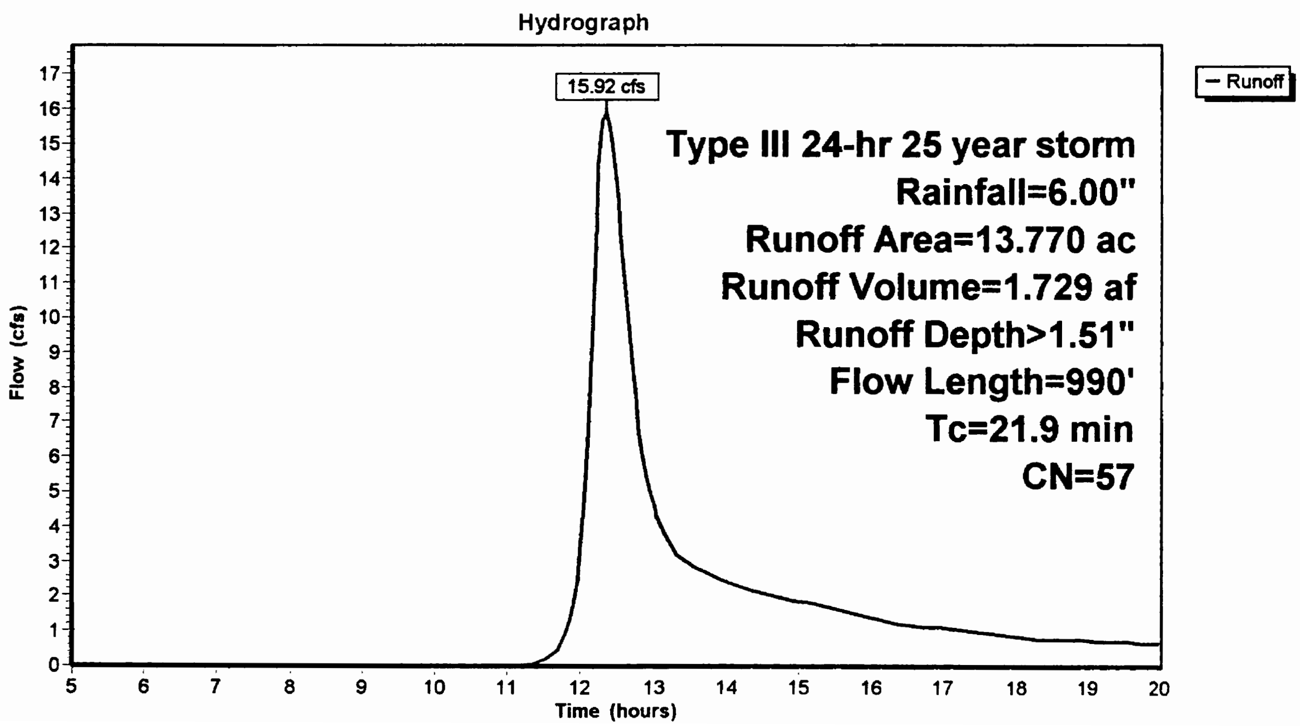
Pond p6a: pond 6a Peak Elev=386.80' Storage=12,043 cf Inflow=9.09 cfs 0.724 af
Outflow=3.30 cfs 0.604 af

Total Runoff Area = 145.800 ac Runoff Volume = 19.974 af Average Runoff Depth = 1.64"

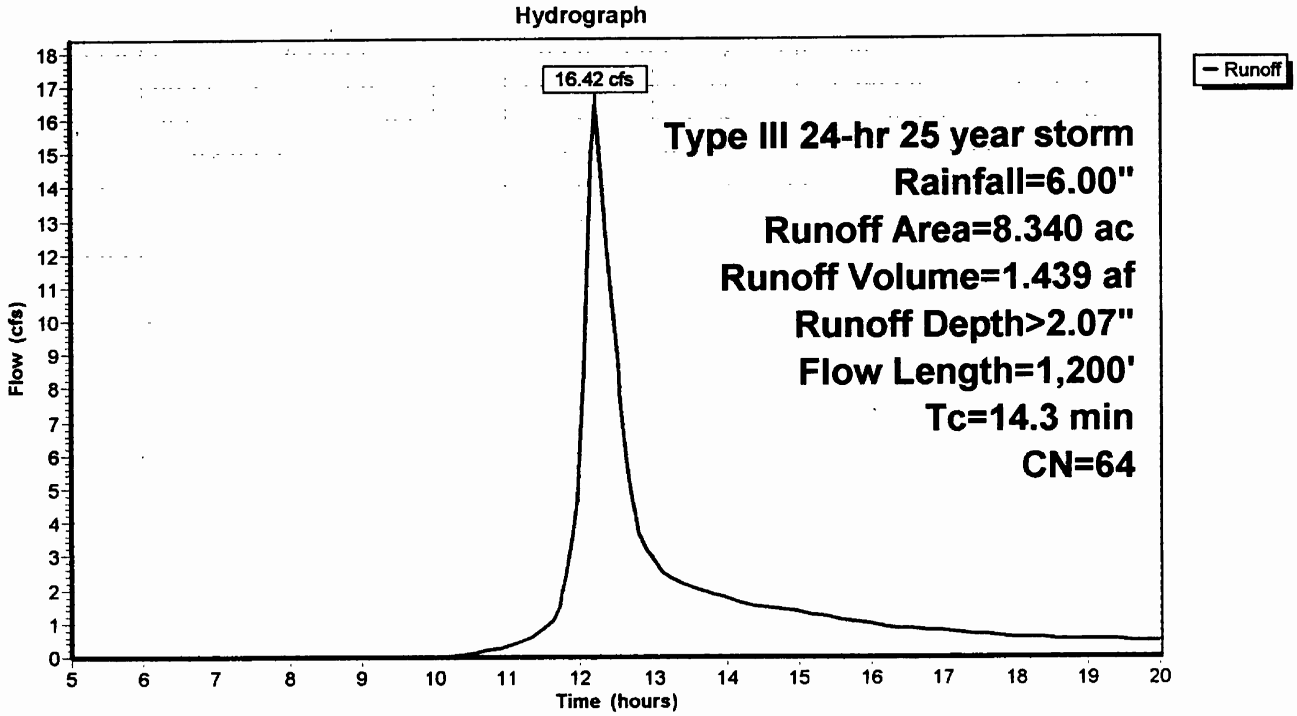
Subcatchment b2: post basin b2



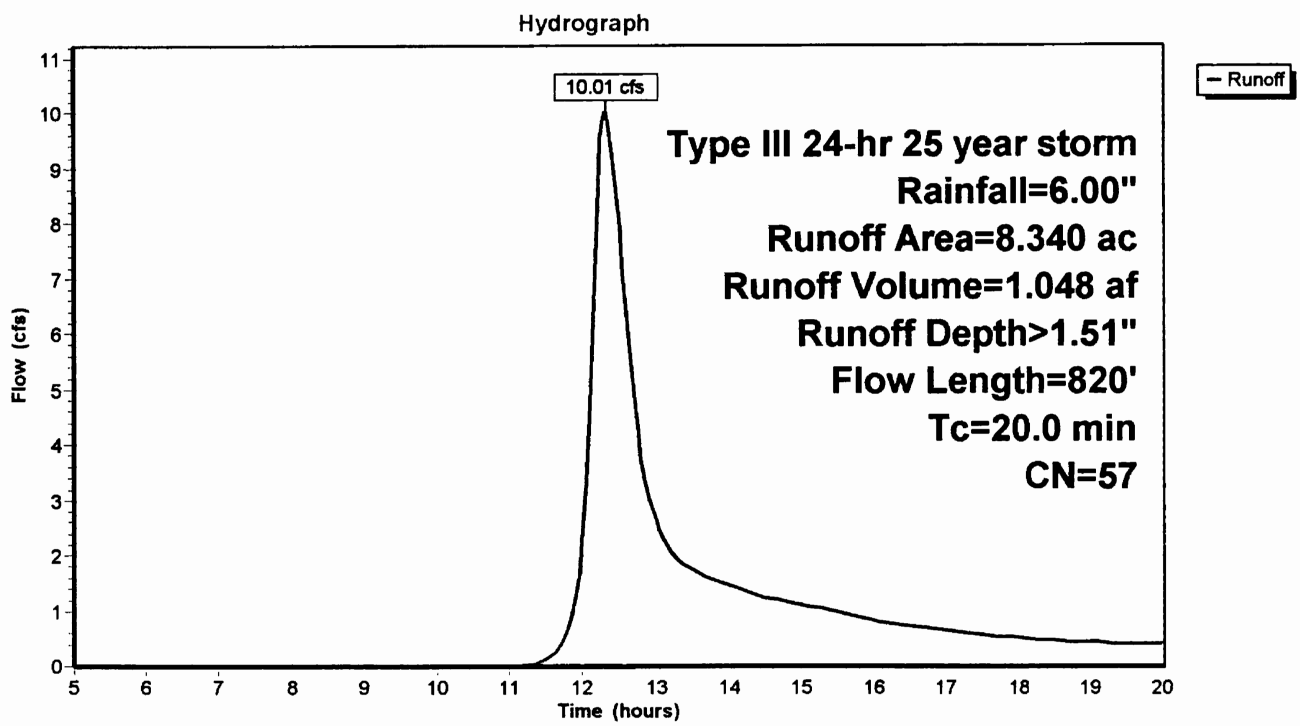
Subcatchment b3: post basin b3



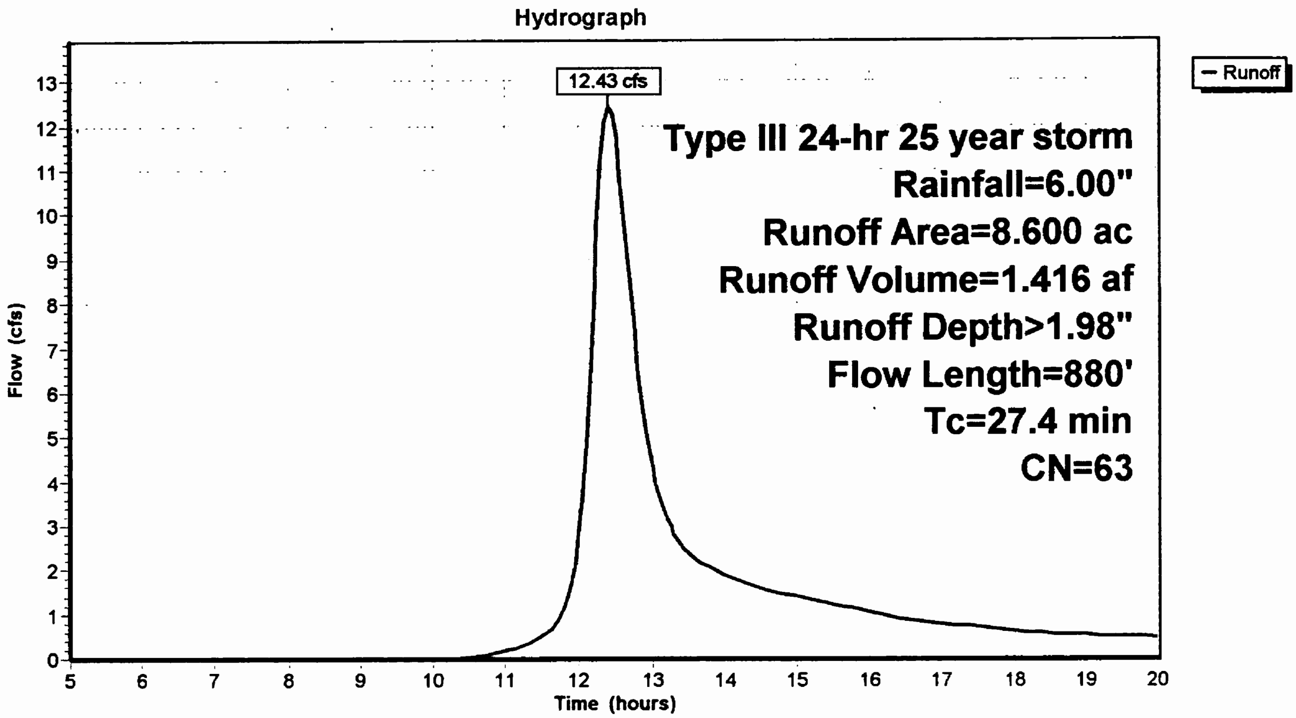
Subcatchment b3a: post basin b3a



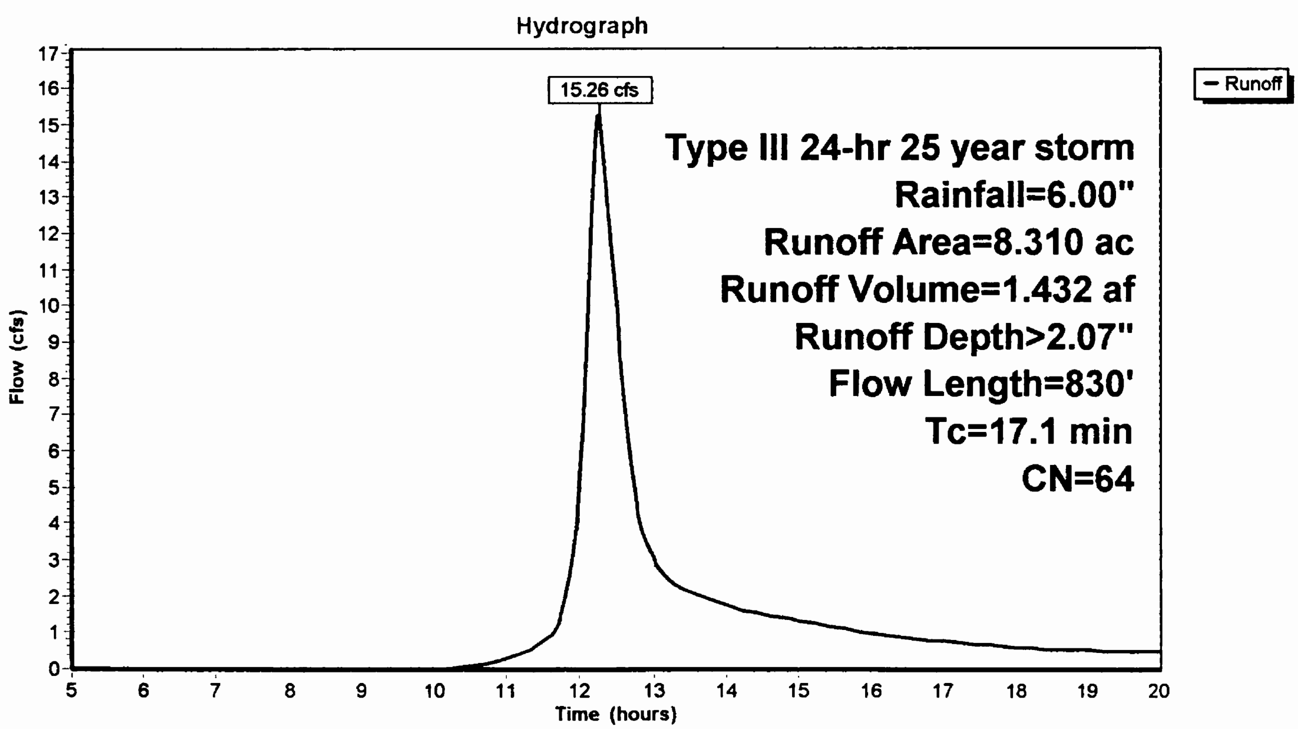
Subcatchment b3b: post basin b3b



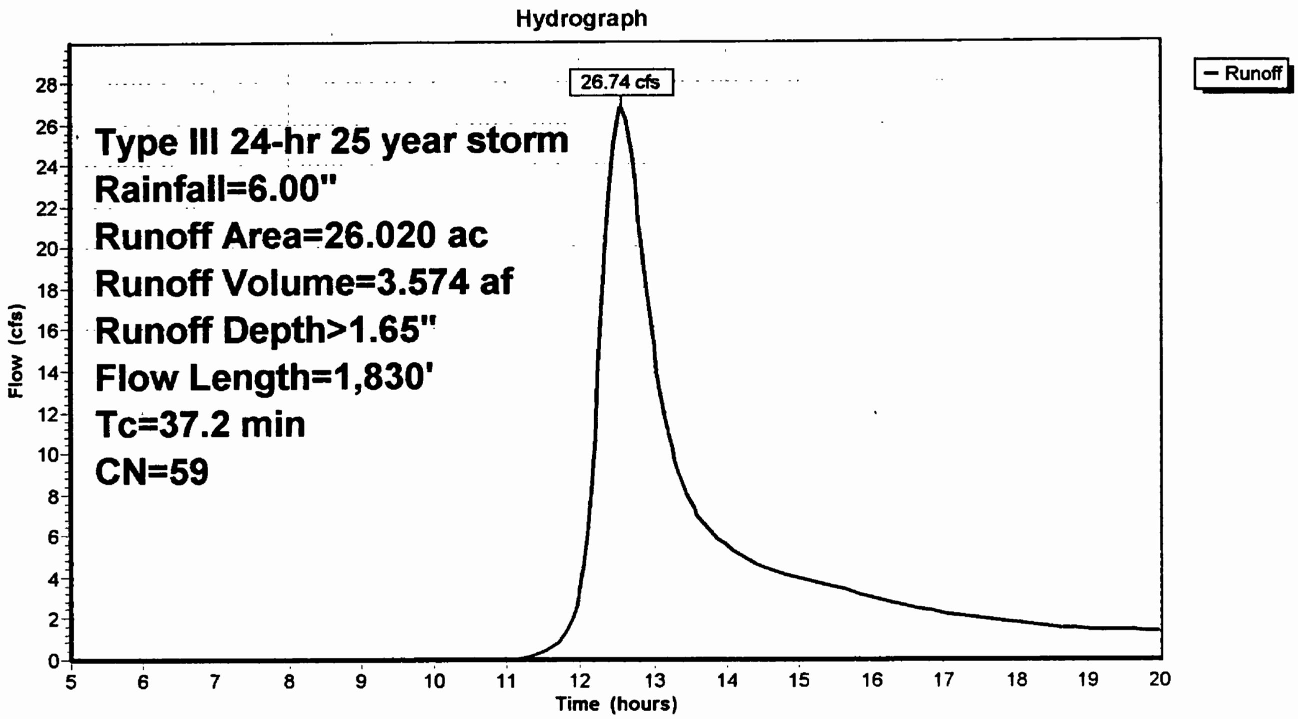
Subcatchment b4a: post basin b4a



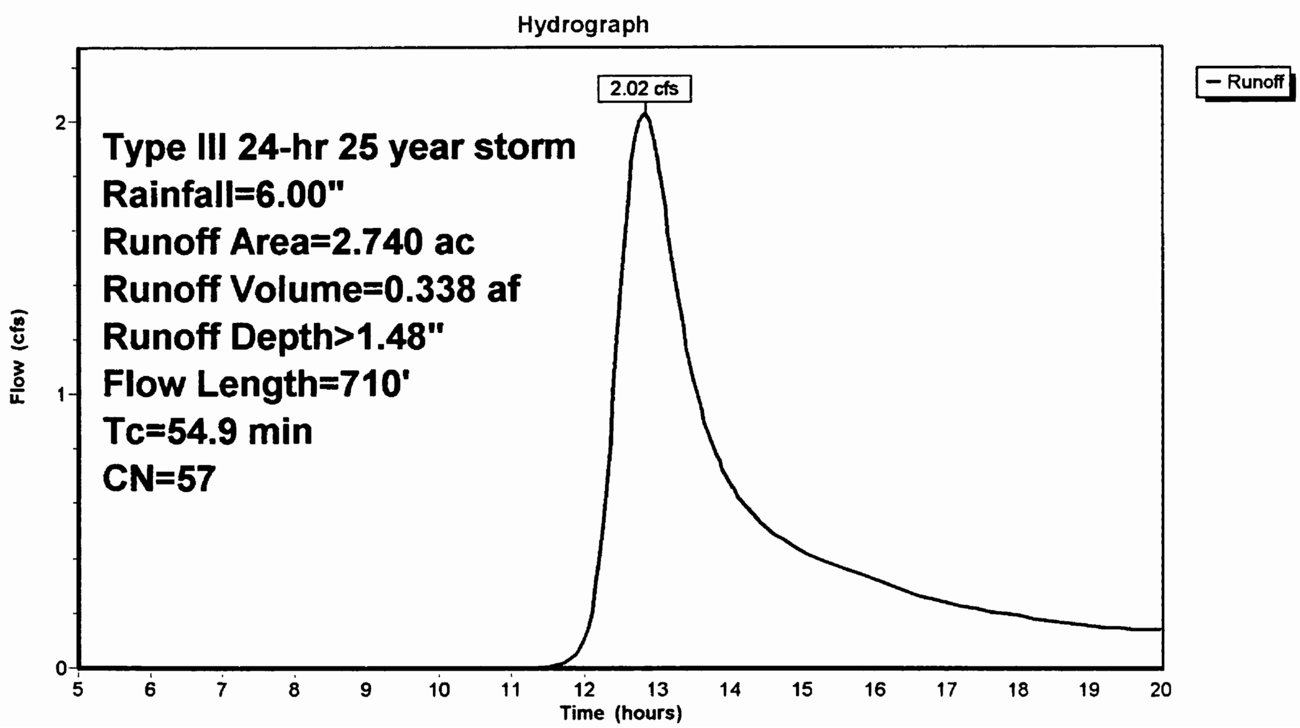
Subcatchment b4b: post basin b4b



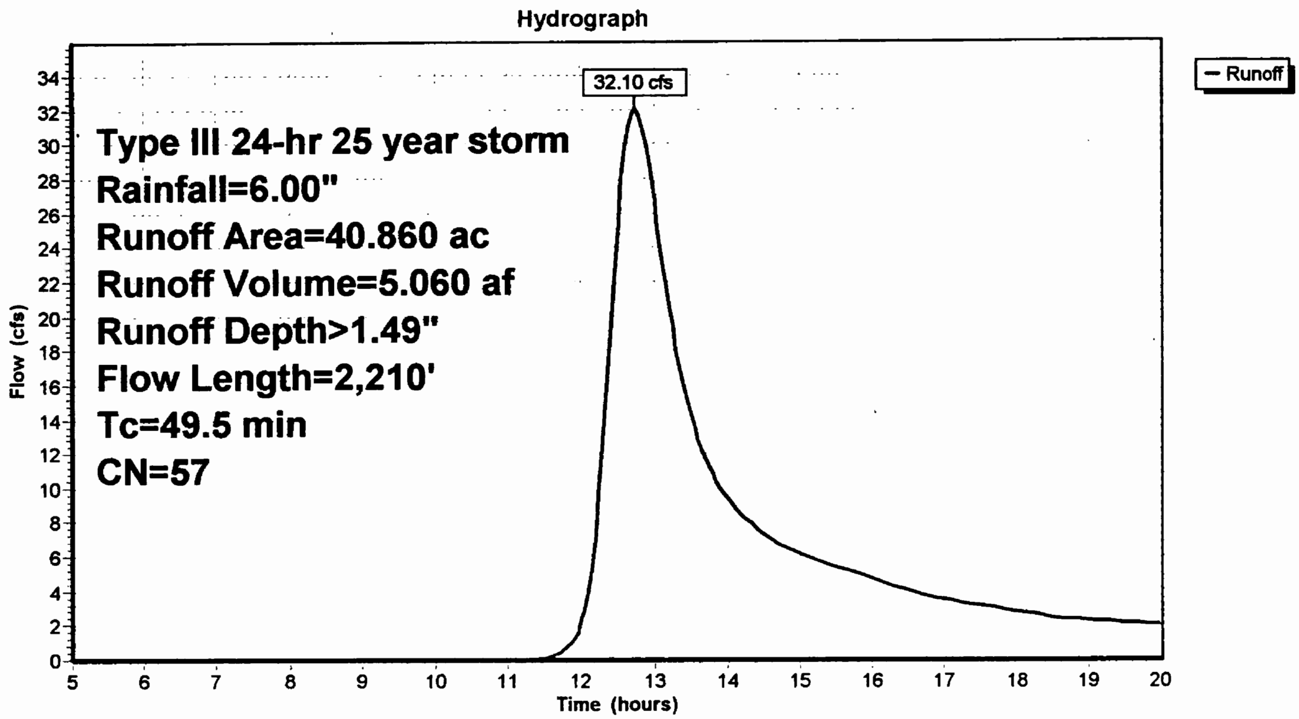
Subcatchment b4c: post basin b4c



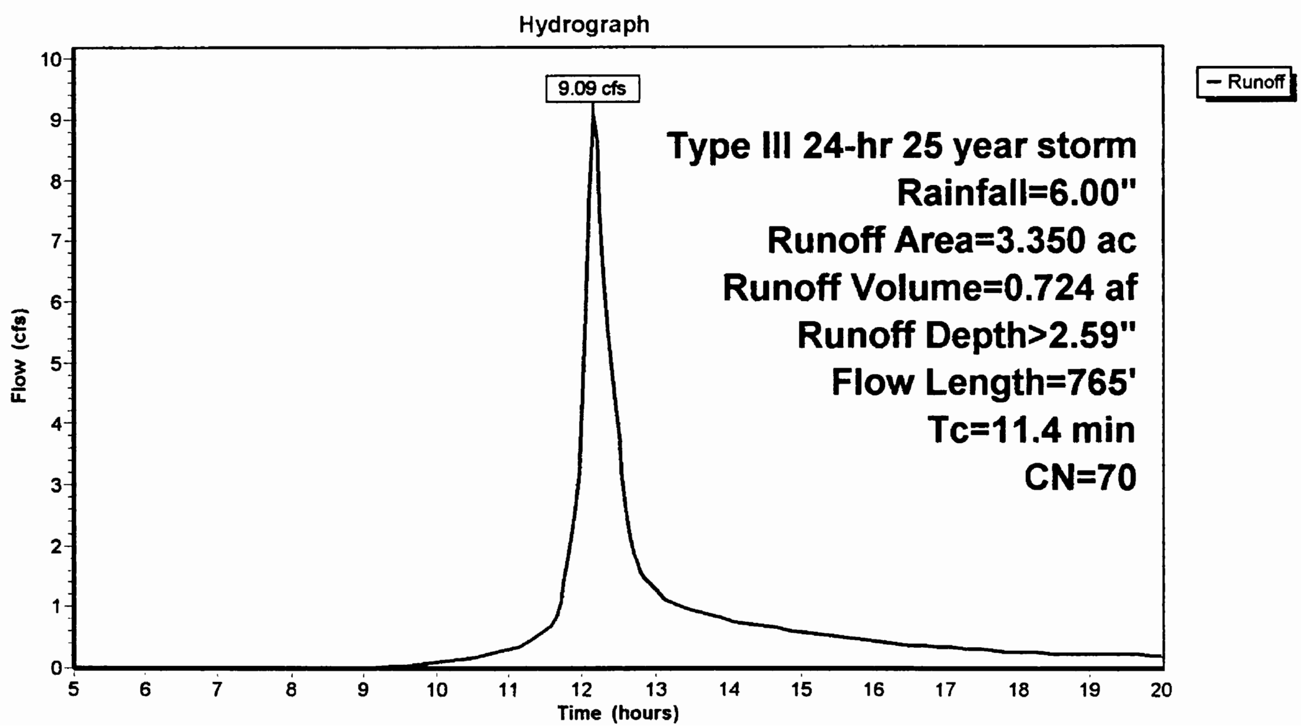
Subcatchment b4d: post basin b4d



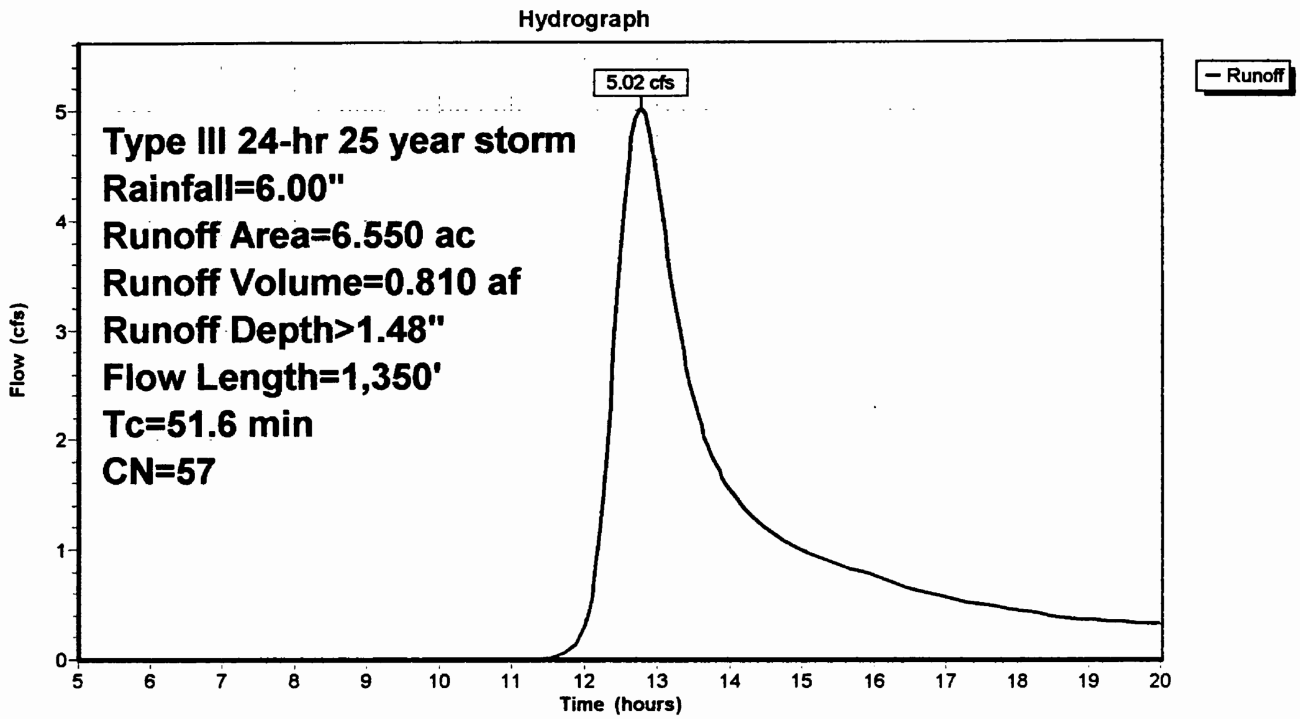
Subcatchment b5: post basin b5



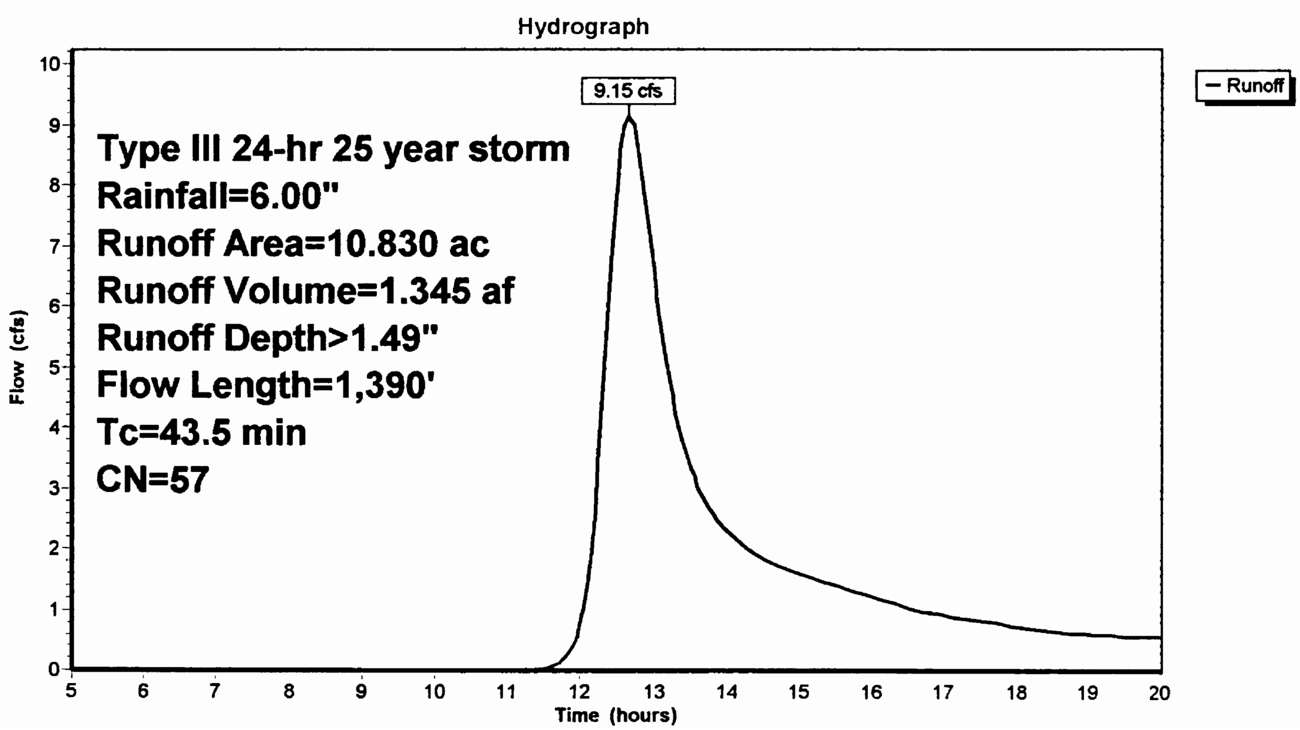
Subcatchment b6a: post basin b6a



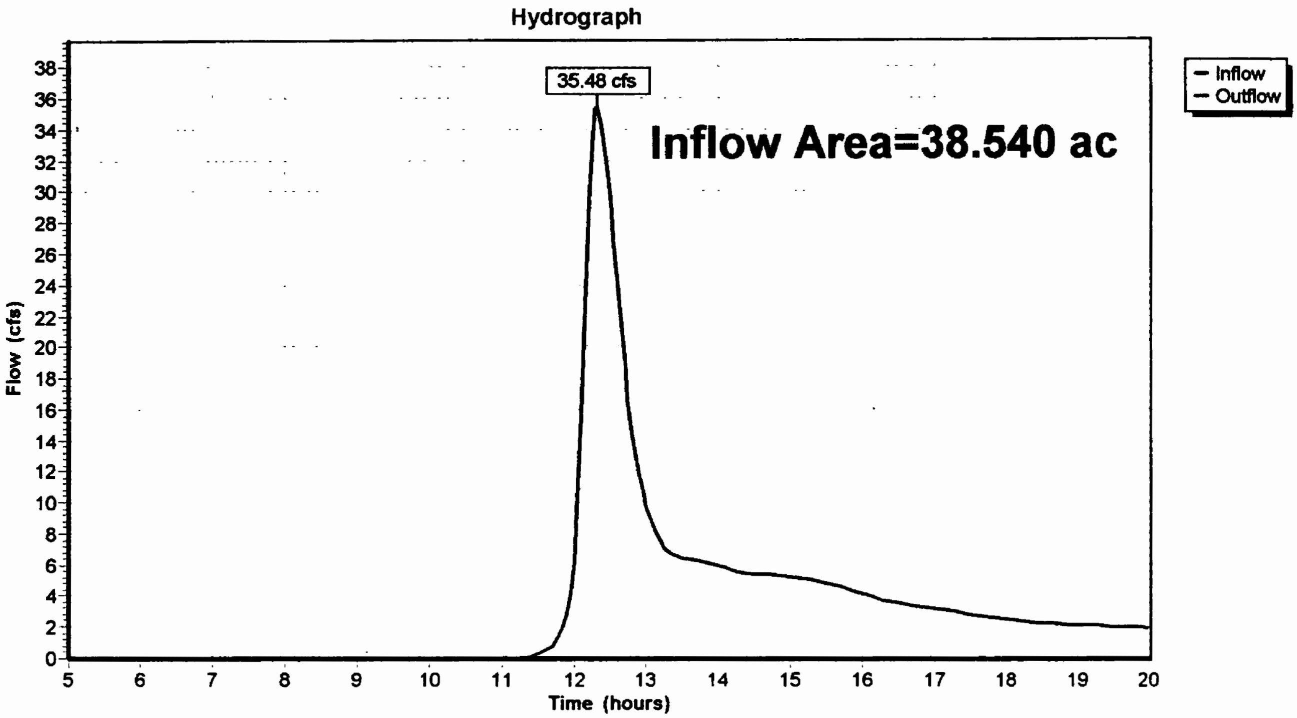
Subcatchment b6b: post basin 6b



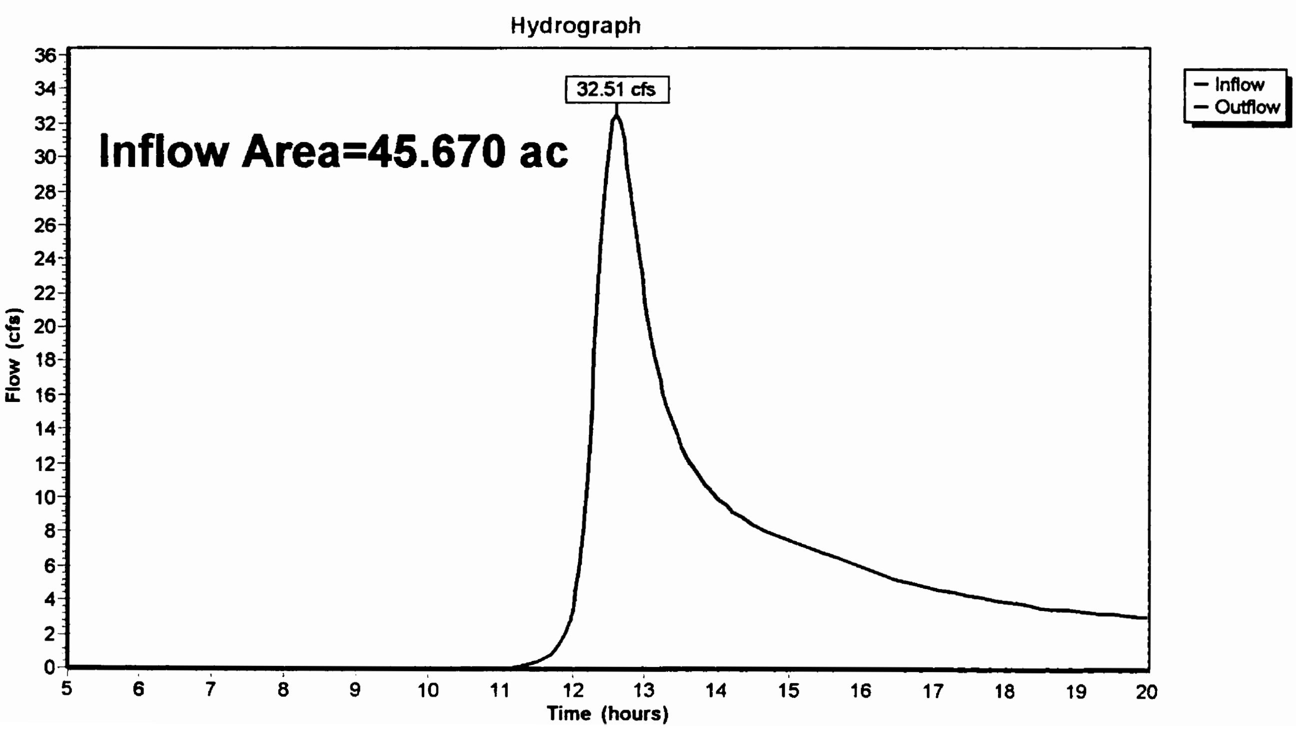
Subcatchment b7: post basin b7



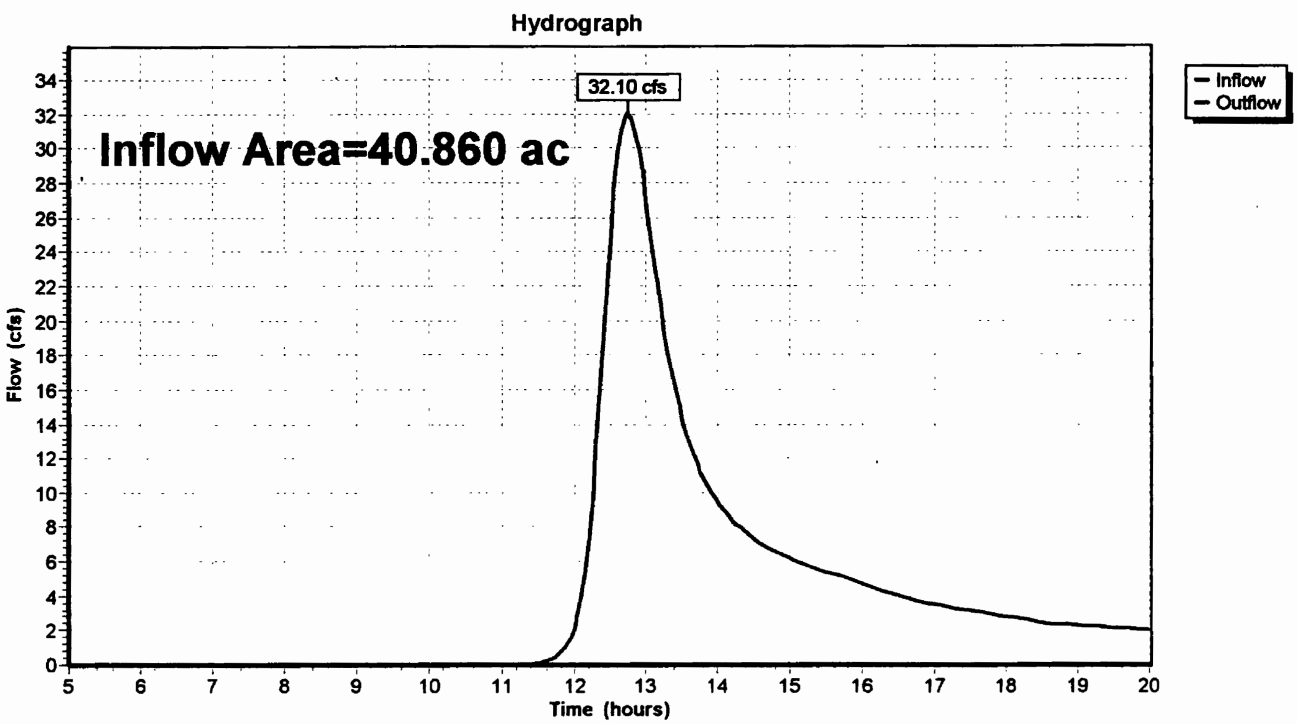
Reach dp3: post design point 3



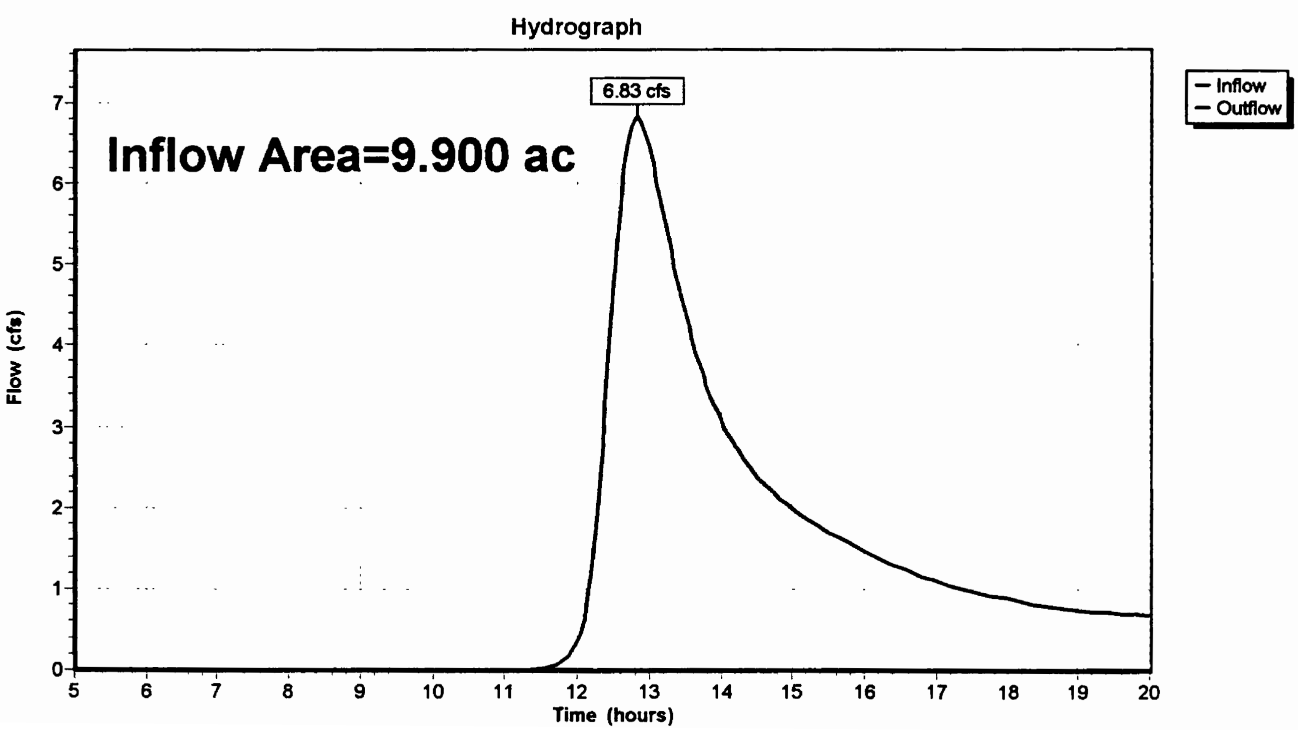
Reach dp4: post design pont 4



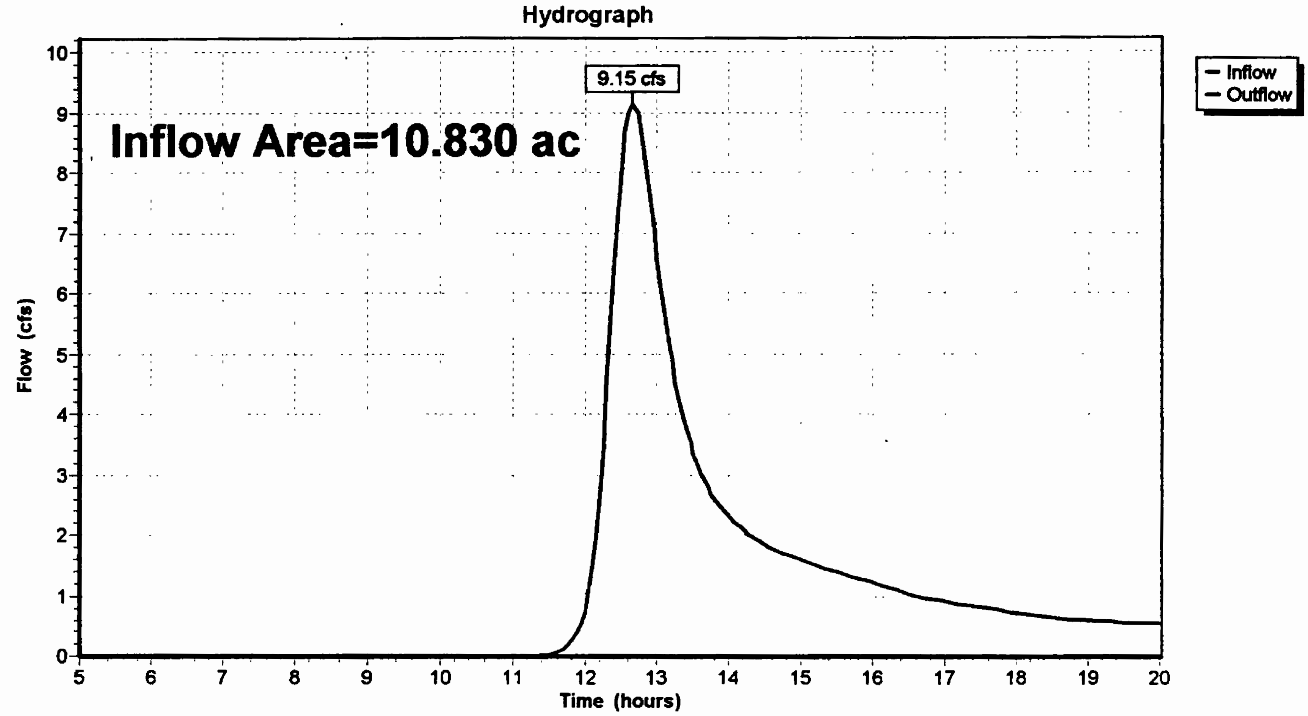
Reach dp5: post design point 5



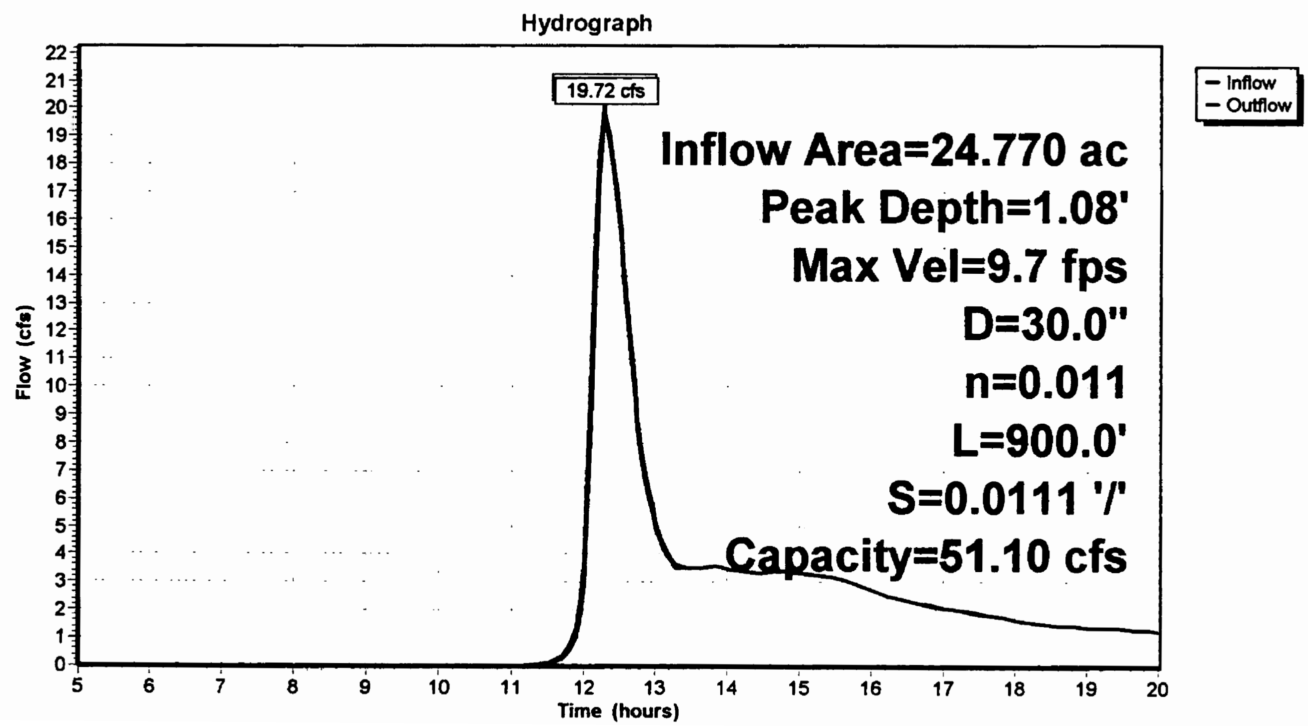
Reach dp6: post design point 6



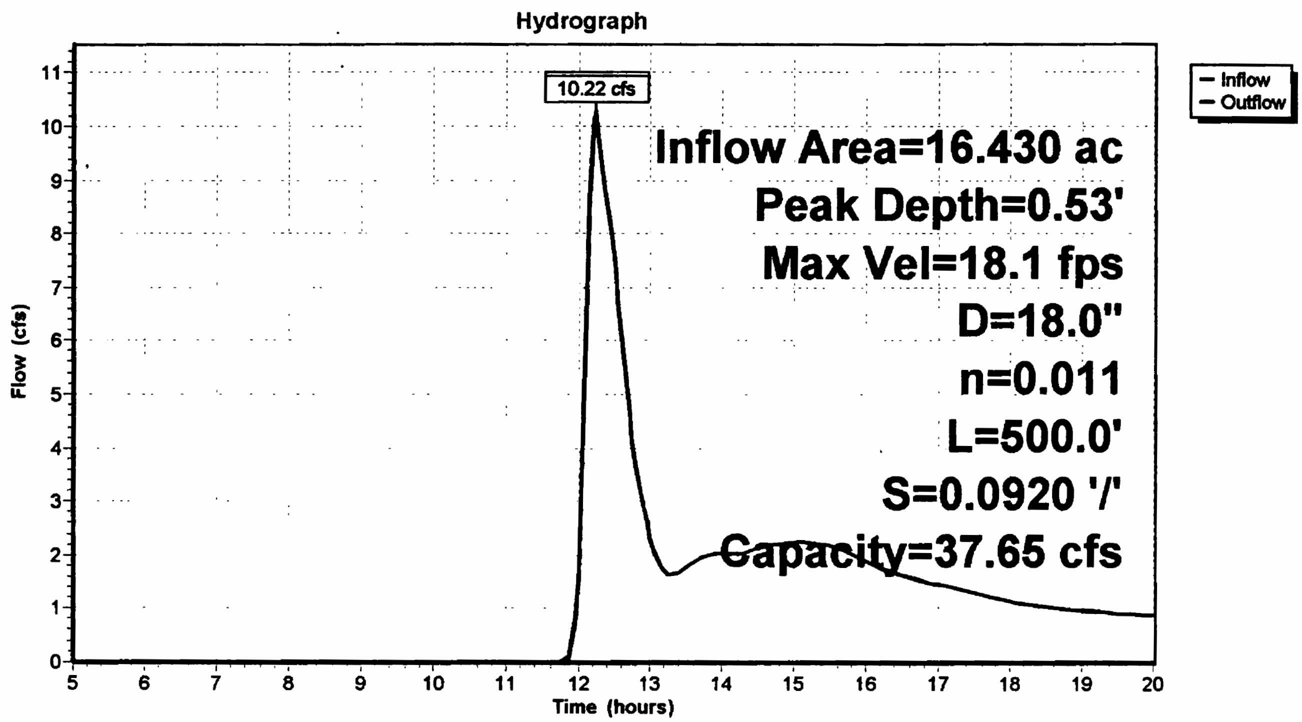
Reach dp7: post design point 7



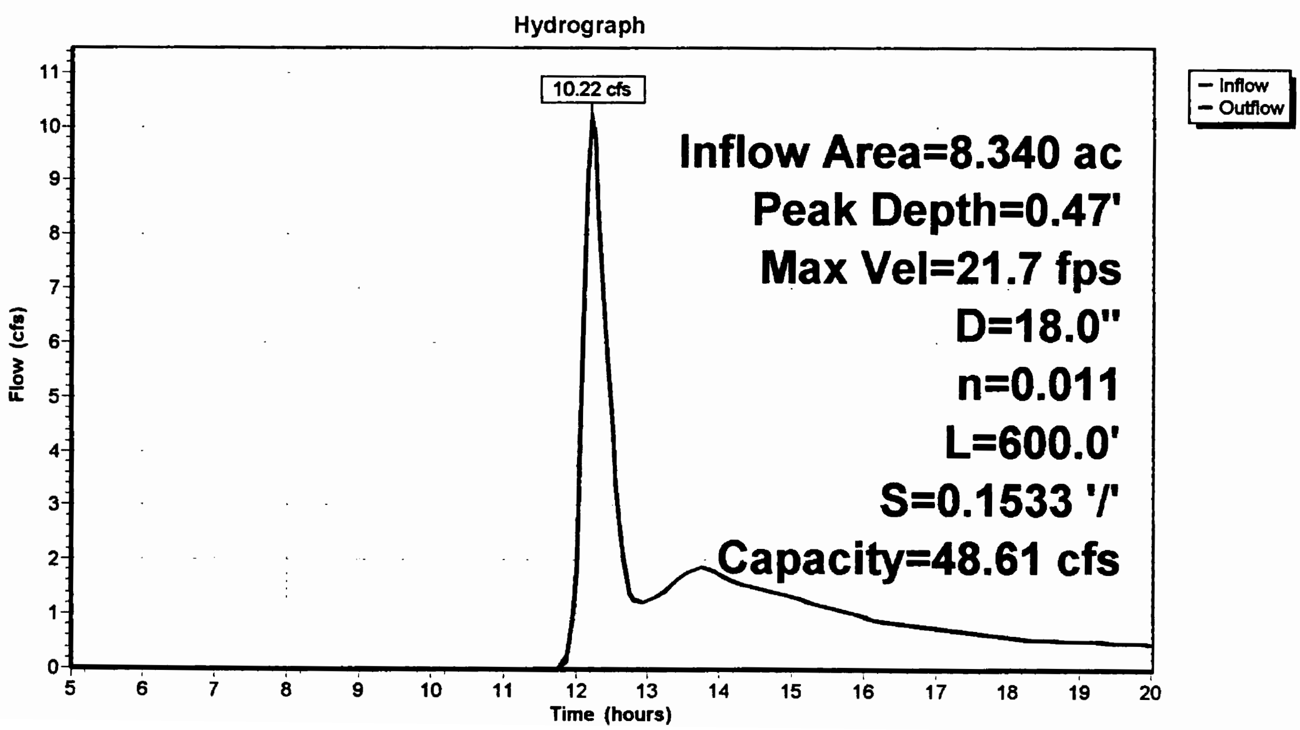
Reach r1: 30" pipe



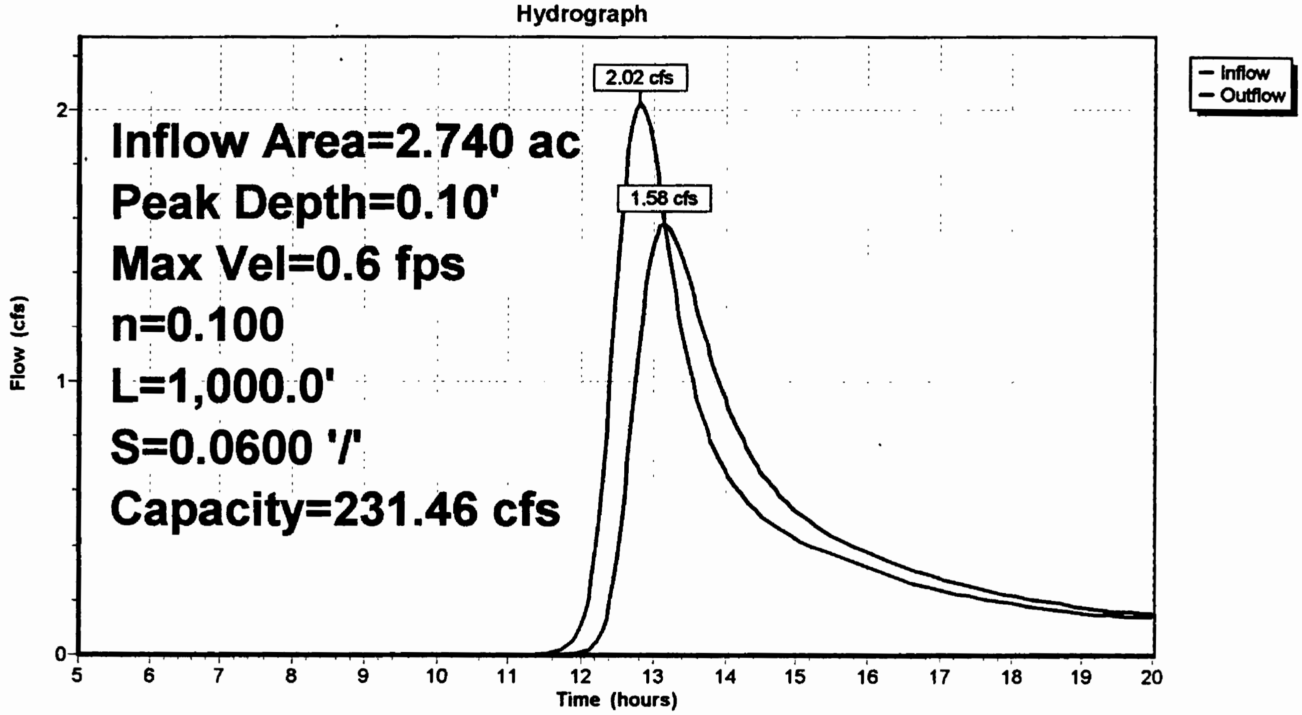
Reach r2: 18" pipe



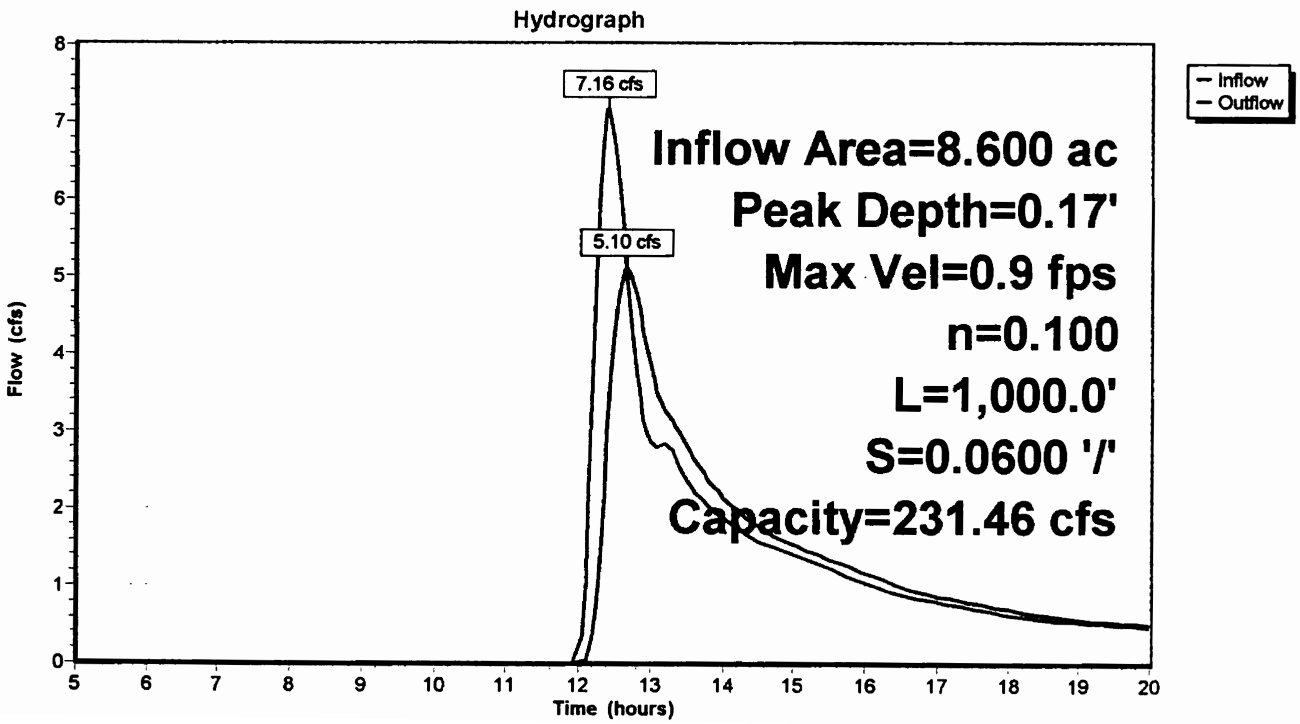
Reach r3: 18" pipe



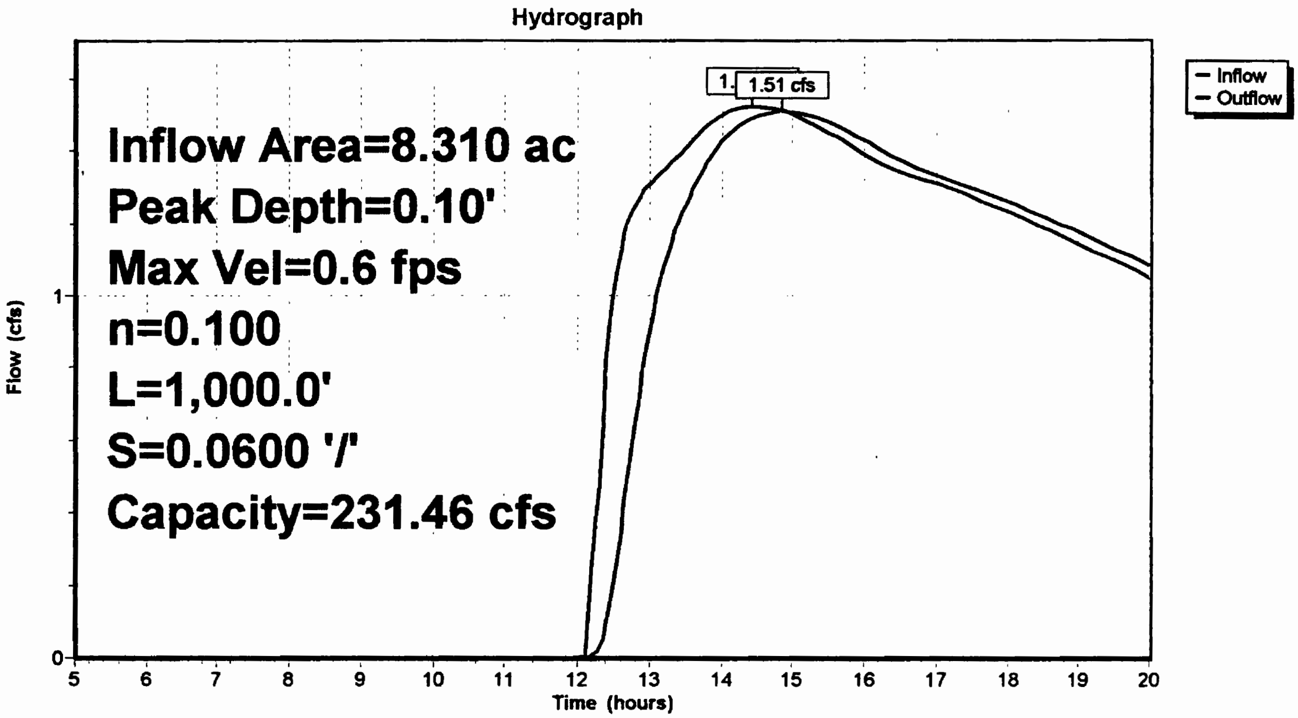
Reach r4: wetland reach



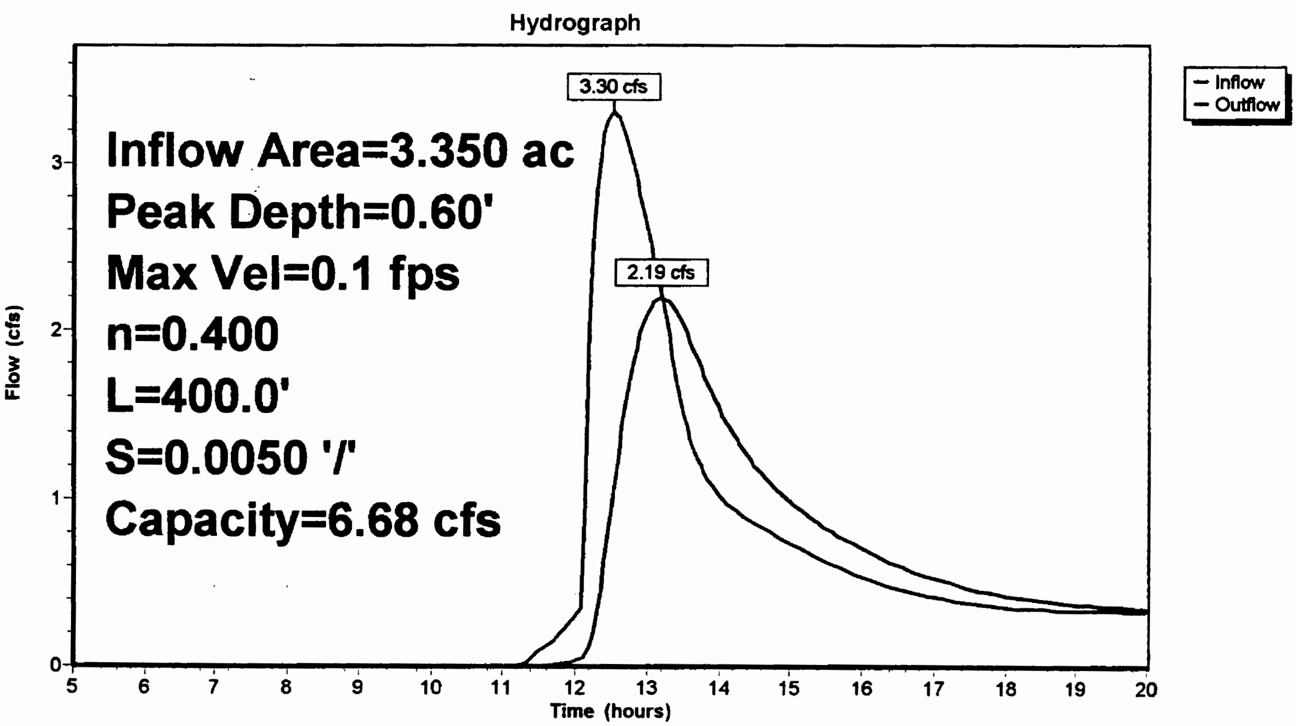
Reach r5: wetland reach



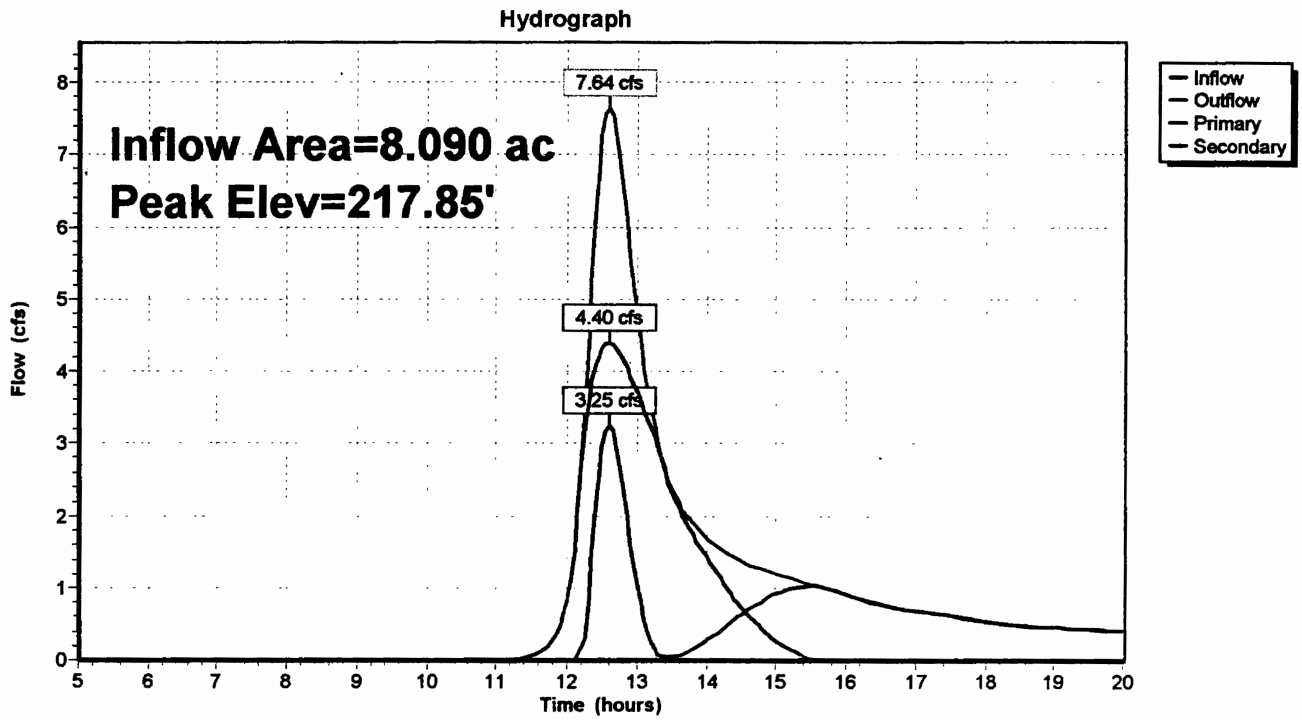
Reach r6: wetland reach



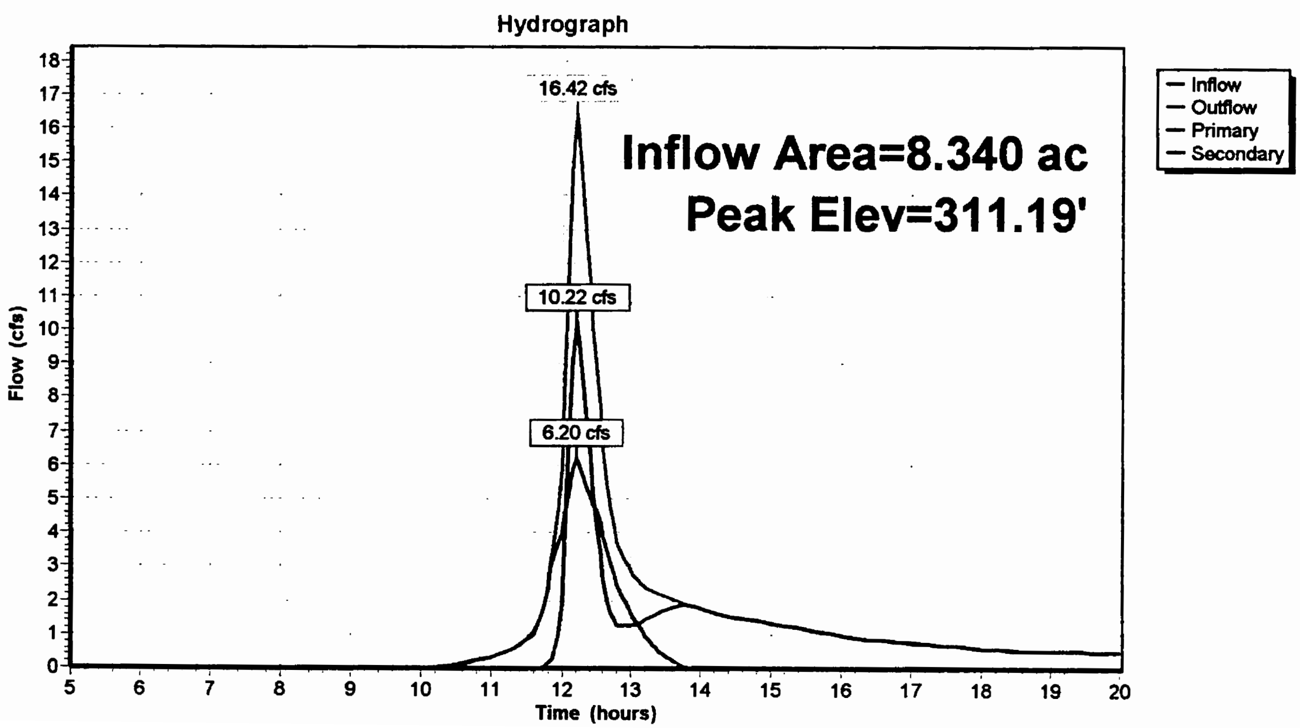
Reach r7: wetland reach



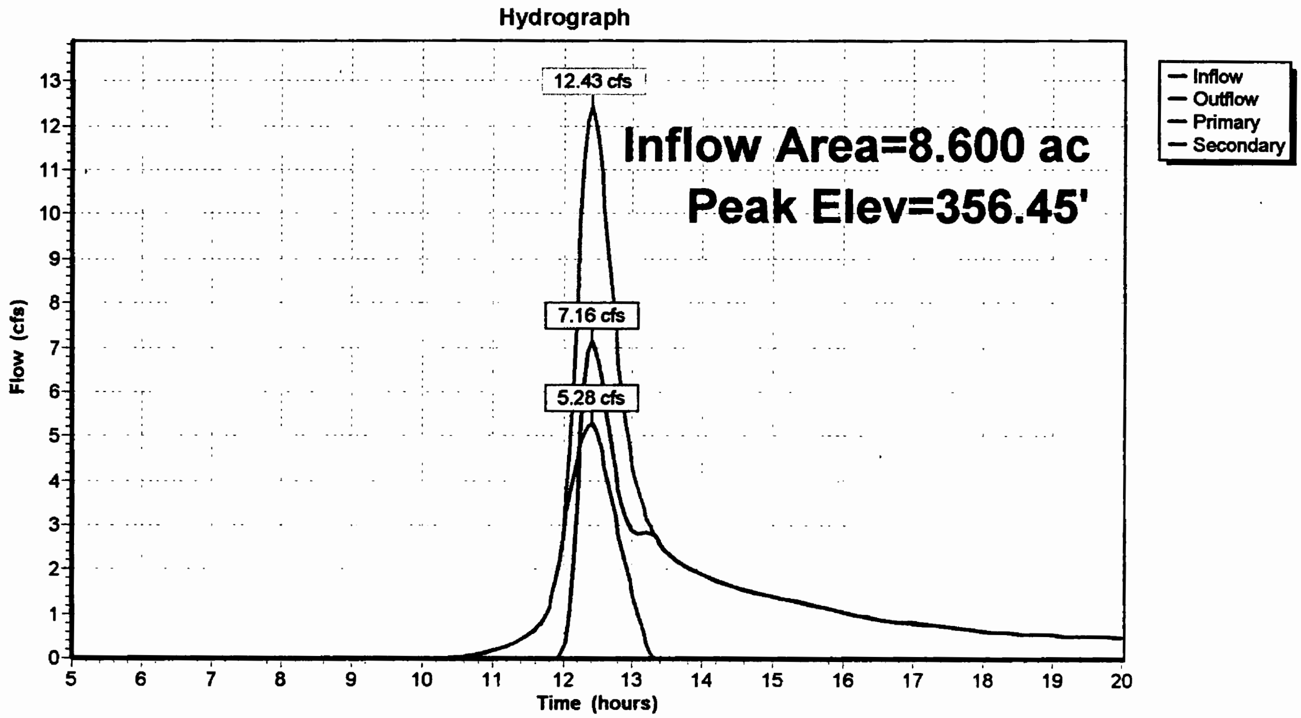
Pond cb12: splitter cb #12



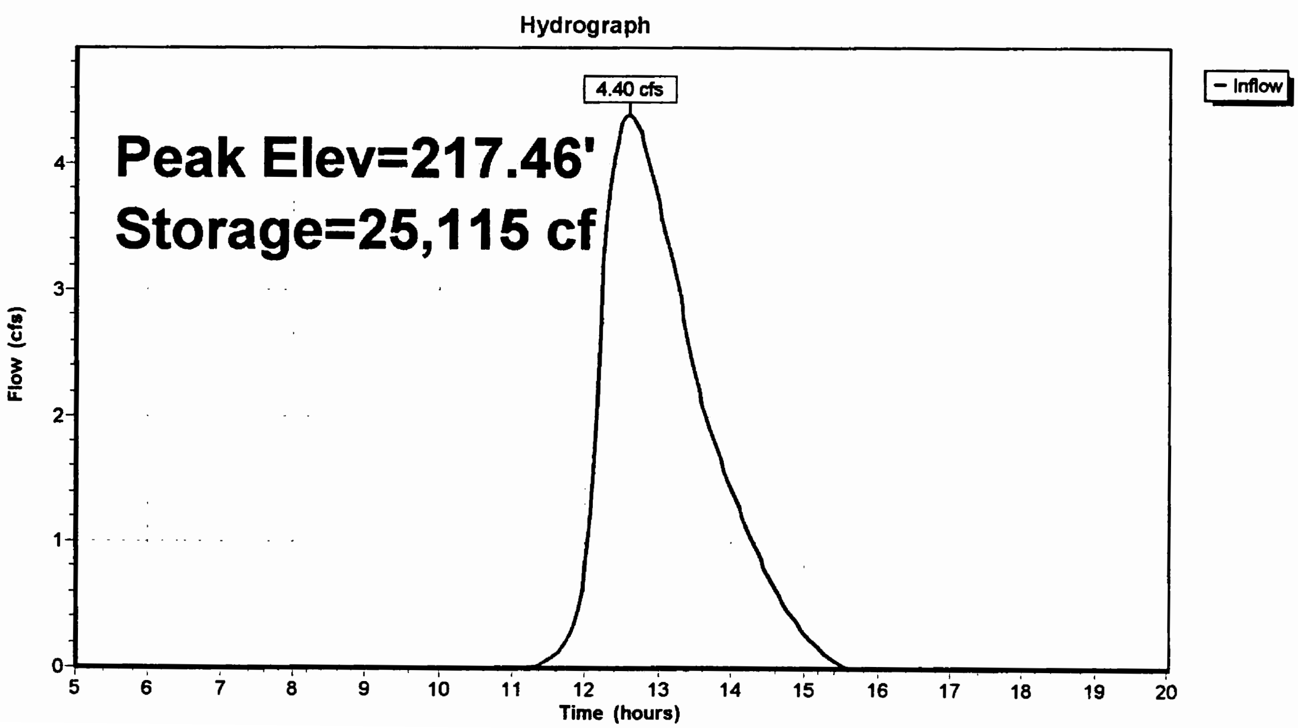
Pond cb20: splitter cb #20



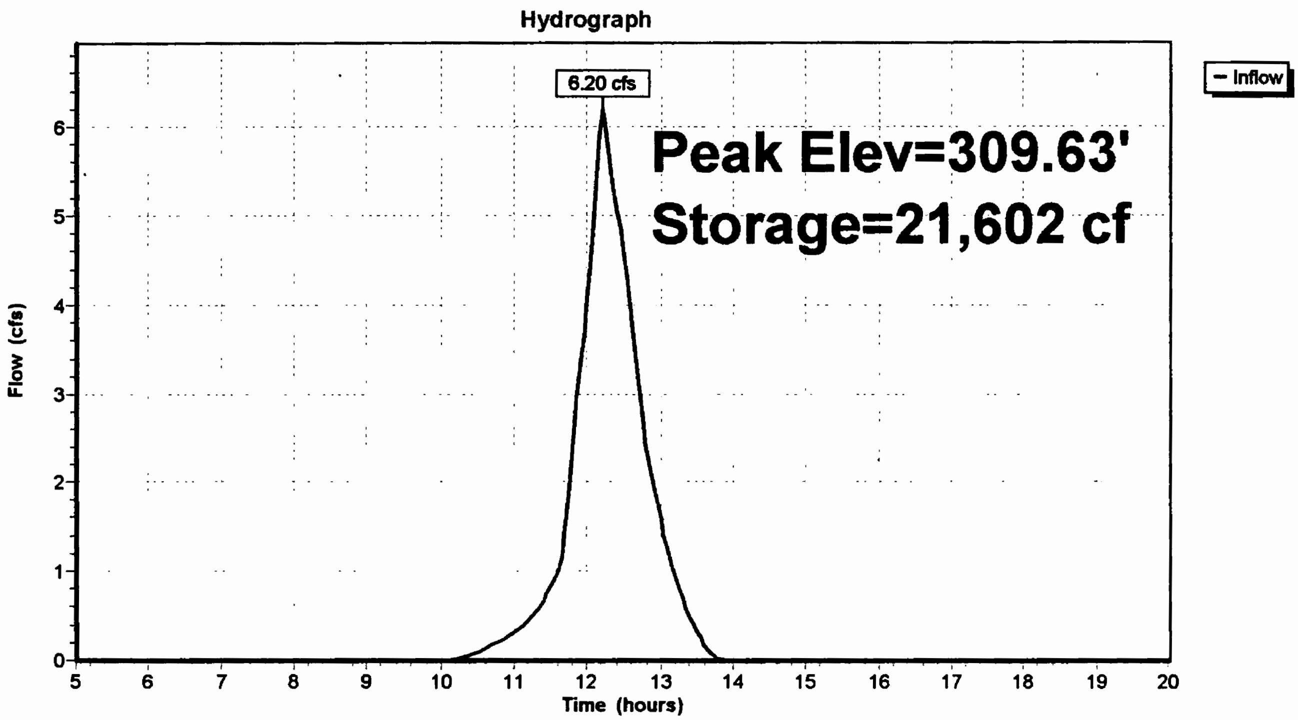
Pond cb29: splitter cb #29



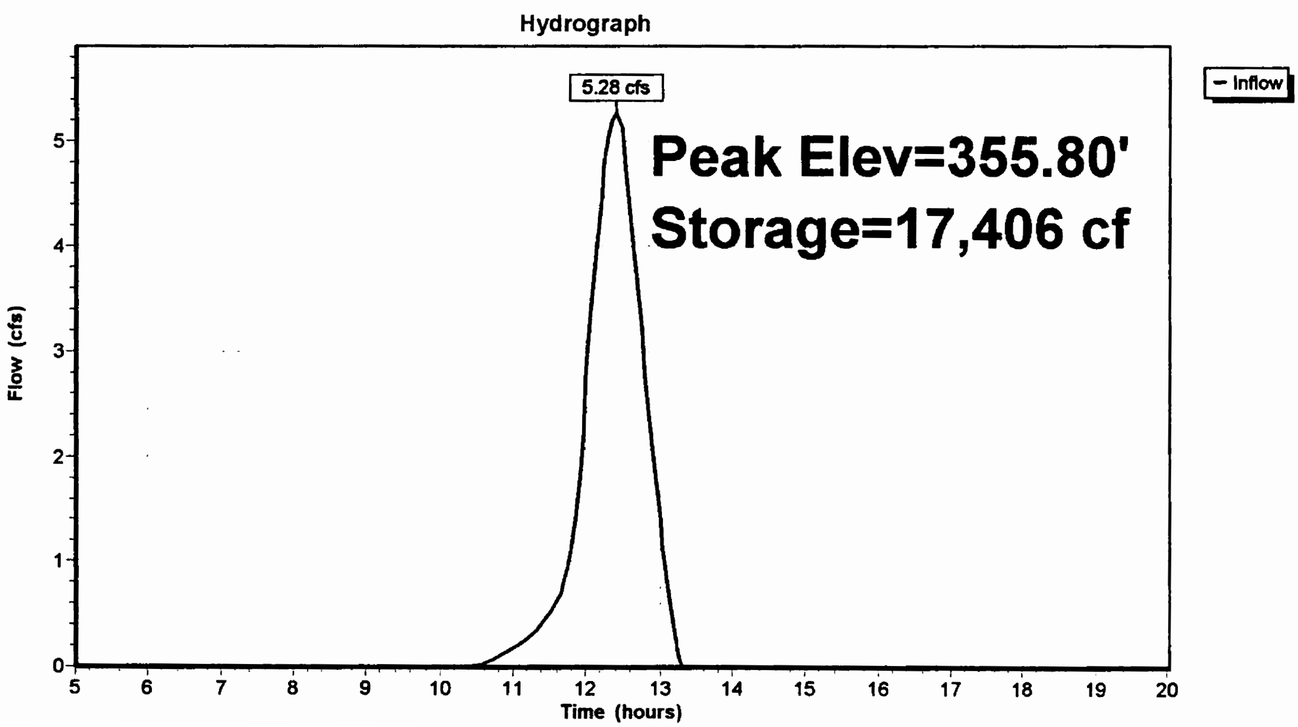
Pond p2: pond p2



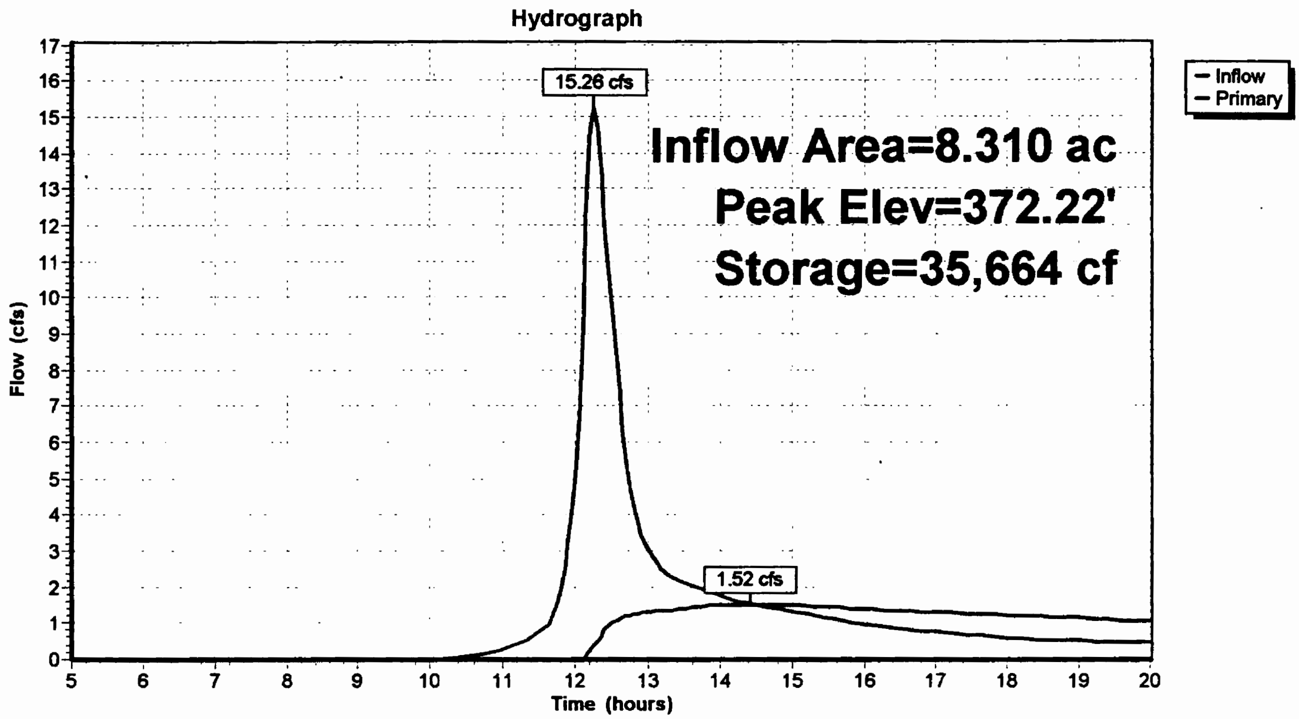
Pond p3a: pond p3a



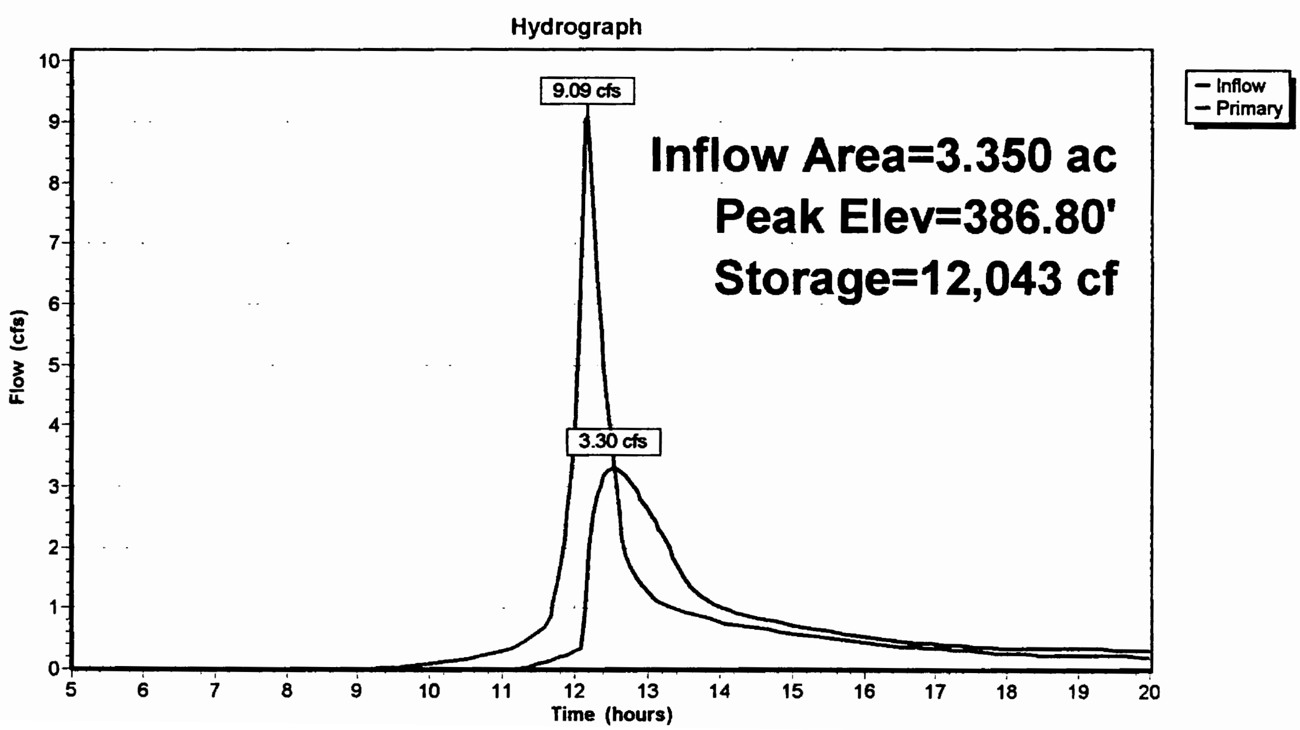
Pond p4a: pond 4a



Pond p4b: pond 4b



Pond p6a: pond 6a



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment b2: post basin b2 Runoff Area=8.090 ac Runoff Depth>2.49"
Flow Length=1,580' Tc=39.3 min CN=58 Runoff=12.52 cfs 1.679 af

Subcatchment b3: post basin b3 Runoff Area=13.770 ac Runoff Depth>2.41"
Flow Length=990' Tc=21.9 min CN=57 Runoff=26.56 cfs 2.767 af

Subcatchment b3a: post basin b3a Runoff Area=8.340 ac Runoff Depth>3.12"
Flow Length=1,200' Tc=14.3 min CN=64 Runoff=25.12 cfs 2.170 af

Subcatchment b3b: post basin b3b Runoff Area=8.340 ac Runoff Depth>2.41"
Flow Length=820' Tc=20.0 min CN=57 Runoff=16.68 cfs 1.677 af

Subcatchment b4a: post basin b4a Runoff Area=8.600 ac Runoff Depth>3.00"
Flow Length=880' Tc=27.4 min CN=63 Runoff=19.18 cfs 2.153 af

Subcatchment b4b: post basin b4b Runoff Area=8.310 ac Runoff Depth>3.12"
Flow Length=830' Tc=17.1 min CN=64 Runoff=23.33 cfs 2.160 af

Subcatchment b4c: post basin b4c Runoff Area=26.020 ac Runoff Depth>2.59"
Flow Length=1,830' Tc=37.2 min CN=59 Runoff=43.21 cfs 5.618 af

Subcatchment b4d: post basin b4d Runoff Area=2.740 ac Runoff Depth>2.38"
Flow Length=710' Tc=54.9 min CN=57 Runoff=3.37 cfs 0.542 af

Subcatchment b5: post basin b5 Runoff Area=40.860 ac Runoff Depth>2.38"
Flow Length=2,210' Tc=49.5 min CN=57 Runoff=53.49 cfs 8.108 af

Subcatchment b6a: post basin b6a Runoff Area=3.350 ac Runoff Depth>3.75"
Flow Length=765' Tc=11.4 min CN=70 Runoff=13.17 cfs 1.048 af

Subcatchment b6b: post basin 6b Runoff Area=6.550 ac Runoff Depth>2.38"
Flow Length=1,350' Tc=51.6 min CN=57 Runoff=8.35 cfs 1.298 af

Subcatchment b7: post basin b7 Runoff Area=10.830 ac Runoff Depth>2.39"
Flow Length=1,390' Tc=43.5 min CN=57 Runoff=15.21 cfs 2.155 af

Reach dp3: post design point 3 Inflow=61.33 cfs 7.120 af
Outflow=61.33 cfs 7.120 af

Reach dp4: post design pont 4 Inflow=55.43 cfs 9.150 af
Outflow=55.43 cfs 9.150 af

Reach dp5: post design point 5 Inflow=53.49 cfs 8.108 af
Outflow=53.49 cfs 8.108 af

Reach dp6: post design point 6 Inflow=11.26 cfs 2.169 af
Outflow=11.26 cfs 2.169 af

Reach dp7: post design point 7 Inflow=15.21 cfs 2.155 af
Outflow=15.21 cfs 2.155 af

Reach r1: 30" pipe Peak Depth=1.52' Max Vel=11.2 fps Inflow=35.08 cfs 4.361 af
D=30.0" n=0.011 L=900.0' S=0.0111 '/' Capacity=51.10 cfs Outflow=34.88 cfs 4.354 af

Reach r2: 18" pipe Peak Depth=0.74' Max Vel=21.2 fps Inflow=18.56 cfs 2.686 af
D=18.0" n=0.011 L=500.0' S=0.0920 '/' Capacity=37.65 cfs Outflow=18.59 cfs 2.684 af

Reach r3: 18" pipe Peak Depth=0.61' Max Vel=24.9 fps Inflow=16.79 cfs 1.619 af
D=18.0" n=0.011 L=600.0' S=0.1533 '/' Capacity=48.61 cfs Outflow=16.79 cfs 1.618 af

Reach r4: wetland reach Peak Depth=0.13' Max Vel=0.7 fps Inflow=3.37 cfs 0.542 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=2.81 cfs 0.527 af

Reach r5: wetland reach Peak Depth=0.24' Max Vel=1.1 fps Inflow=12.90 cfs 1.666 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=10.28 cfs 1.631 af

Reach r6: wetland reach Peak Depth=0.13' Max Vel=0.7 fps Inflow=2.88 cfs 1.427 af
n=0.100 L=1,000.0' S=0.0600 '/' Capacity=231.46 cfs Outflow=2.86 cfs 1.373 af

Reach r7: wetland reach Peak Depth=0.74' Max Vel=0.2 fps Inflow=4.47 cfs 0.913 af
n=0.400 L=400.0' S=0.0050 '/' Capacity=6.68 cfs Outflow=3.49 cfs 0.871 af

Pond cb12: splitter cb #12 Peak Elev=218.46' Inflow=12.52 cfs 1.679 af
Primary=7.22 cfs 1.068 af Secondary=5.30 cfs 0.611 af Outflow=12.52 cfs 1.679 af

Pond cb20: splitter cb #20 Peak Elev=313.64' Inflow=25.12 cfs 2.170 af
Primary=16.79 cfs 1.619 af Secondary=8.34 cfs 0.551 af Outflow=25.12 cfs 2.170 af

Pond cb29: splitter cb #29 Peak Elev=358.05' Inflow=19.18 cfs 2.153 af
Primary=12.90 cfs 1.666 af Secondary=6.37 cfs 0.487 af Outflow=19.18 cfs 2.153 af

Pond p2: pond p2 Peak Elev=217.64' Storage=26,619 cf Inflow=5.30 cfs 0.611 af
Outflow=0.00 cfs 0.000 af

Pond p3a: pond p3a Peak Elev=310.02' Storage=24,000 cf Inflow=8.34 cfs 0.551 af
Outflow=0.00 cfs 0.000 af

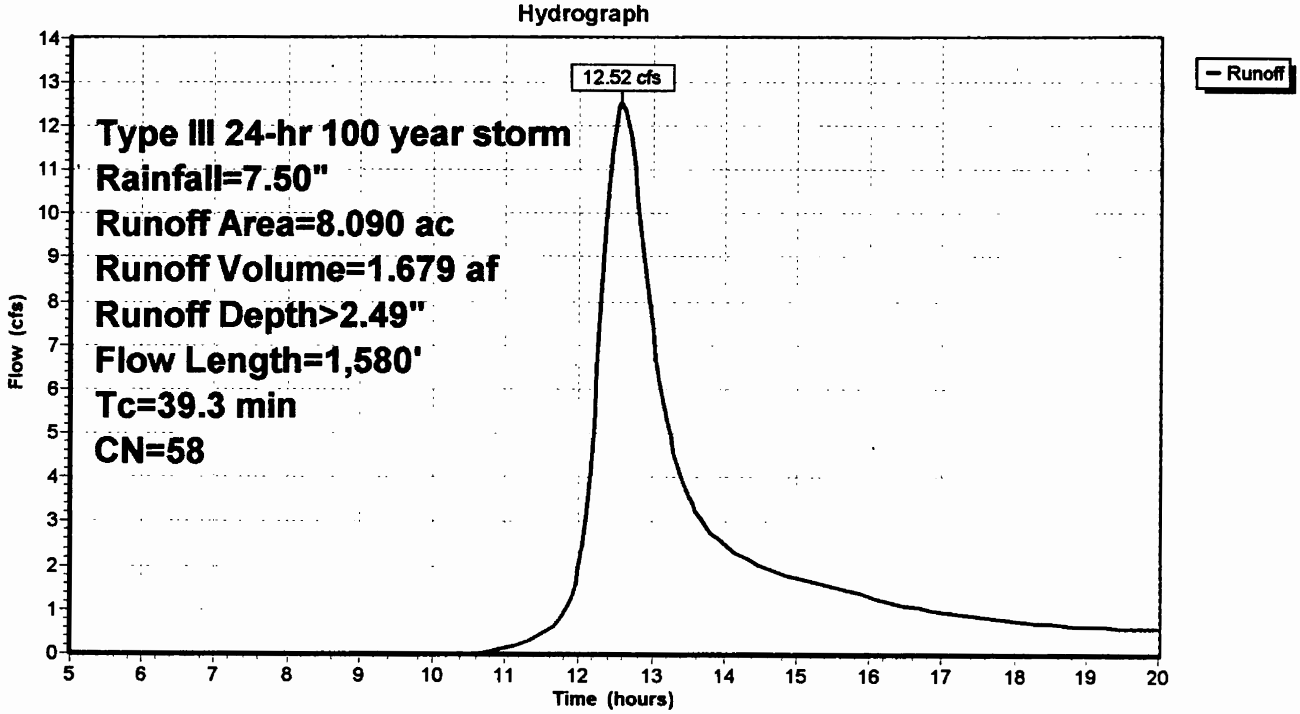
Pond p4a: pond 4a Peak Elev=356.41' Storage=21,228 cf Inflow=6.37 cfs 0.487 af
Outflow=0.00 cfs 0.000 af

Pond p4b: pond 4b Peak Elev=373.72' Storage=51,248 cf Inflow=23.33 cfs 2.160 af
Outflow=2.88 cfs 1.427 af

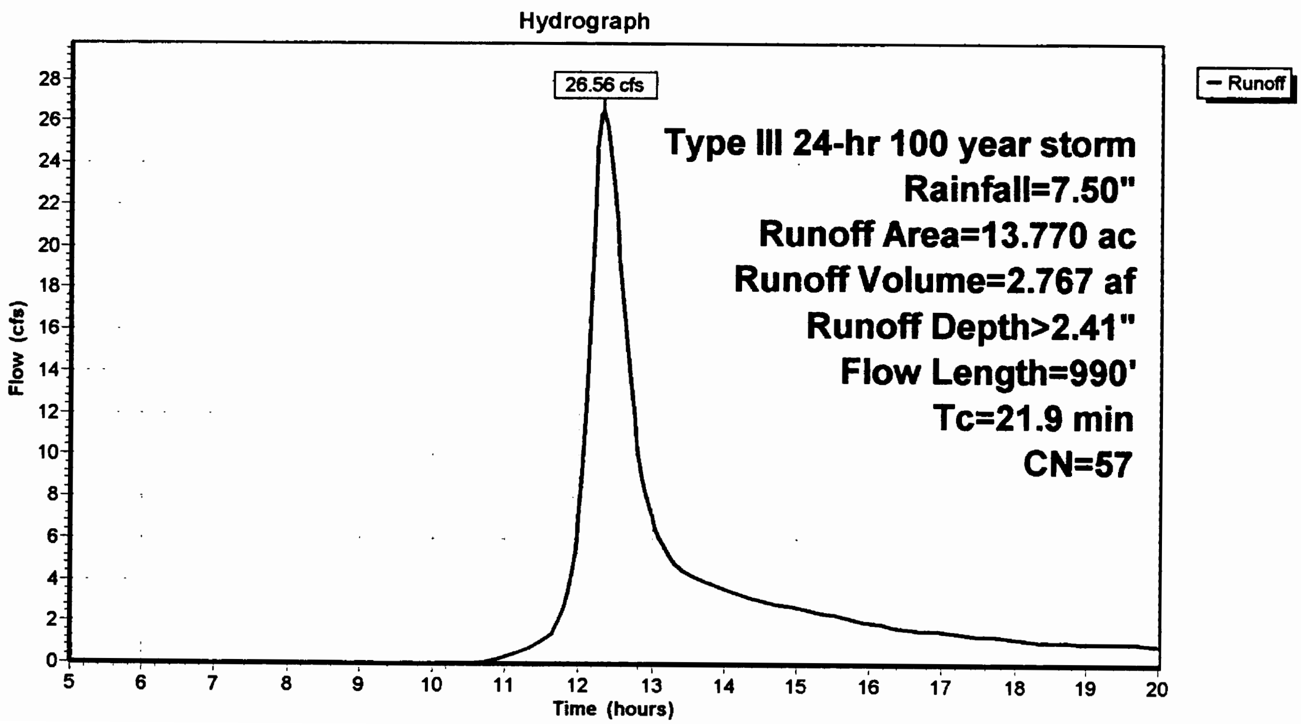
Pond p6a: pond 6a Peak Elev=387.88' Storage=17,470 cf Inflow=13.17 cfs 1.048 af
Outflow=4.47 cfs 0.913 af

Total Runoff Area = 145.800 ac Runoff Volume = 31.374 af Average Runoff Depth = 2.58"

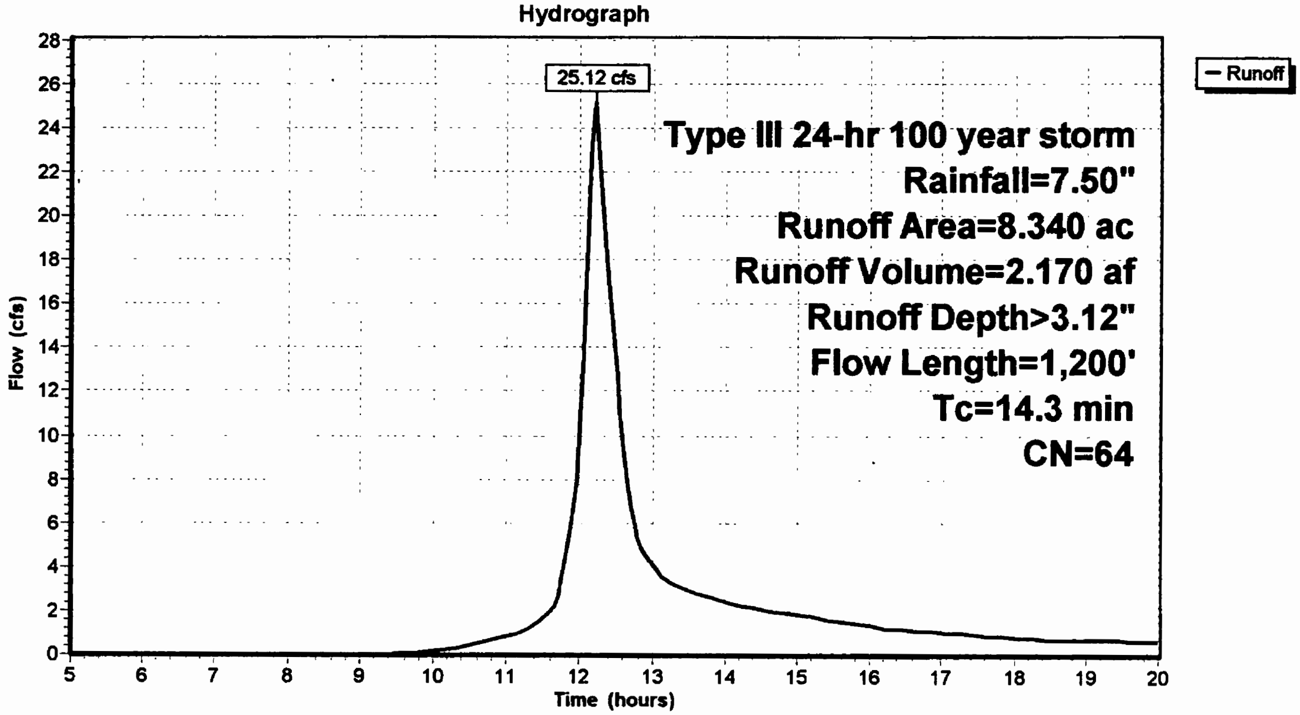
Subcatchment b2: post basin b2



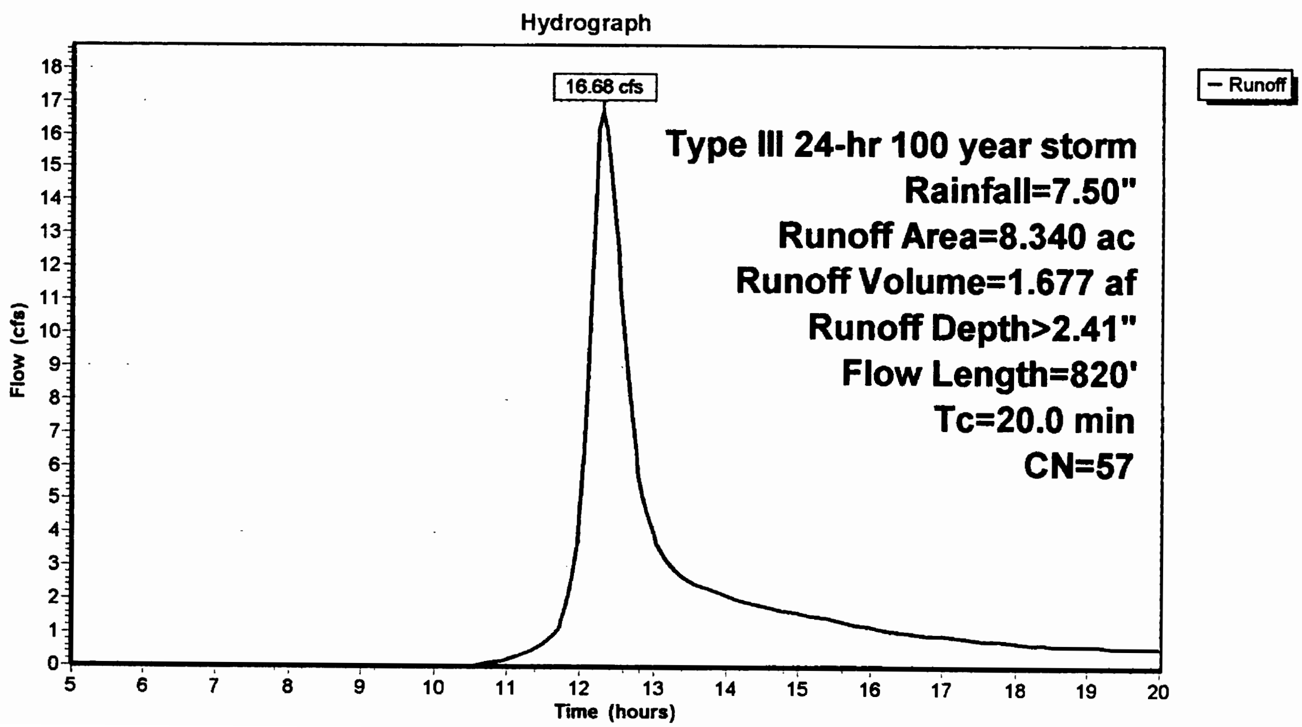
Subcatchment b3: post basin b3



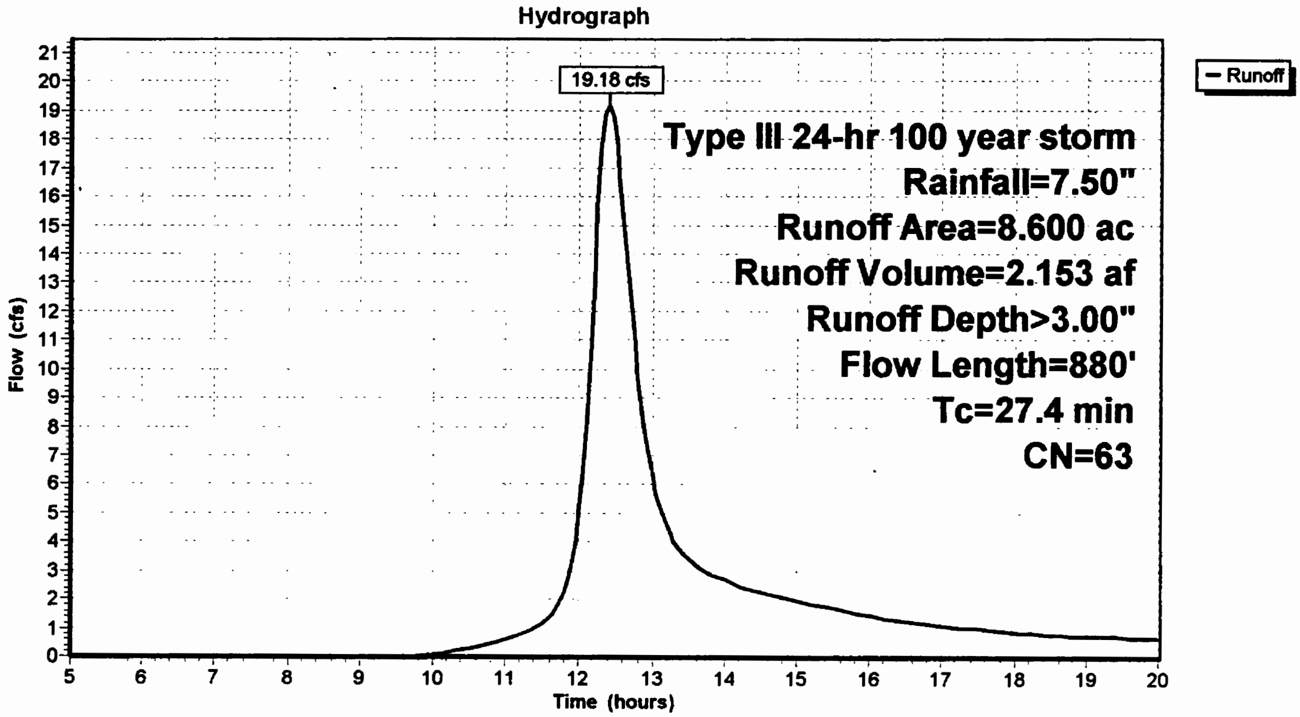
Subcatchment b3a: post basin b3a



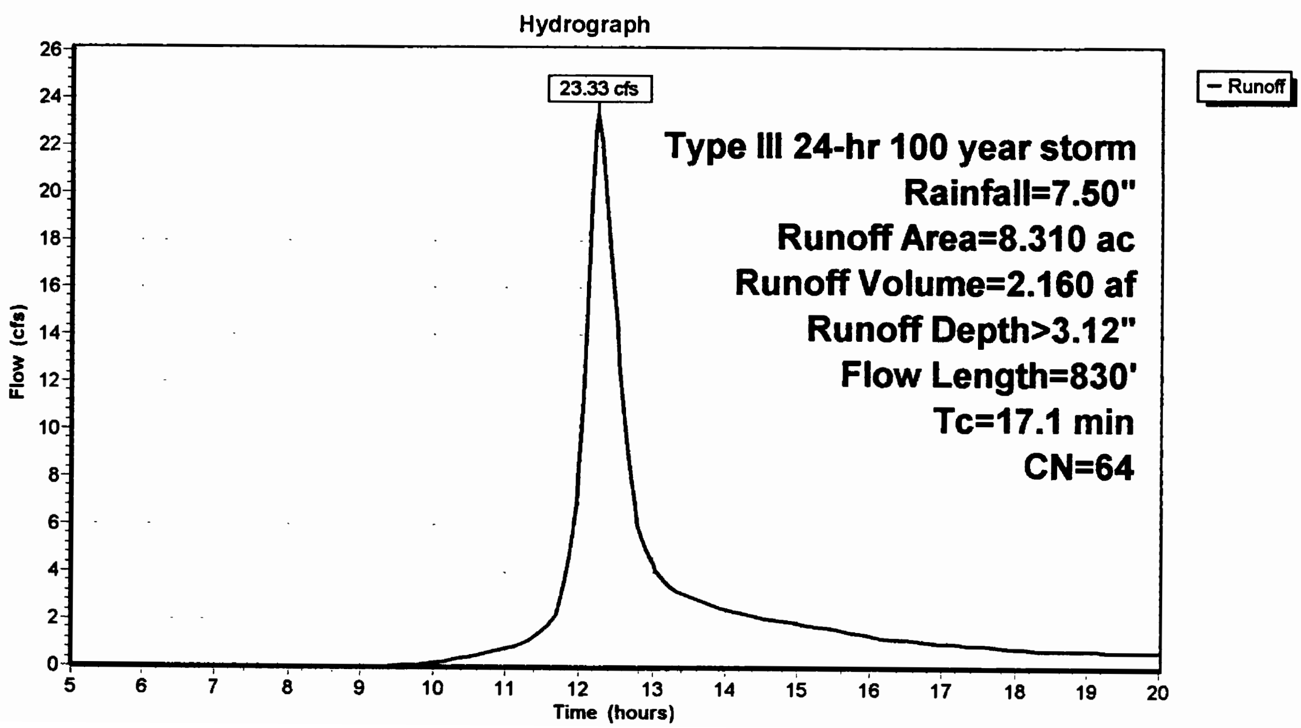
Subcatchment b3b: post basin b3b



Subcatchment b4a: post basin b4a

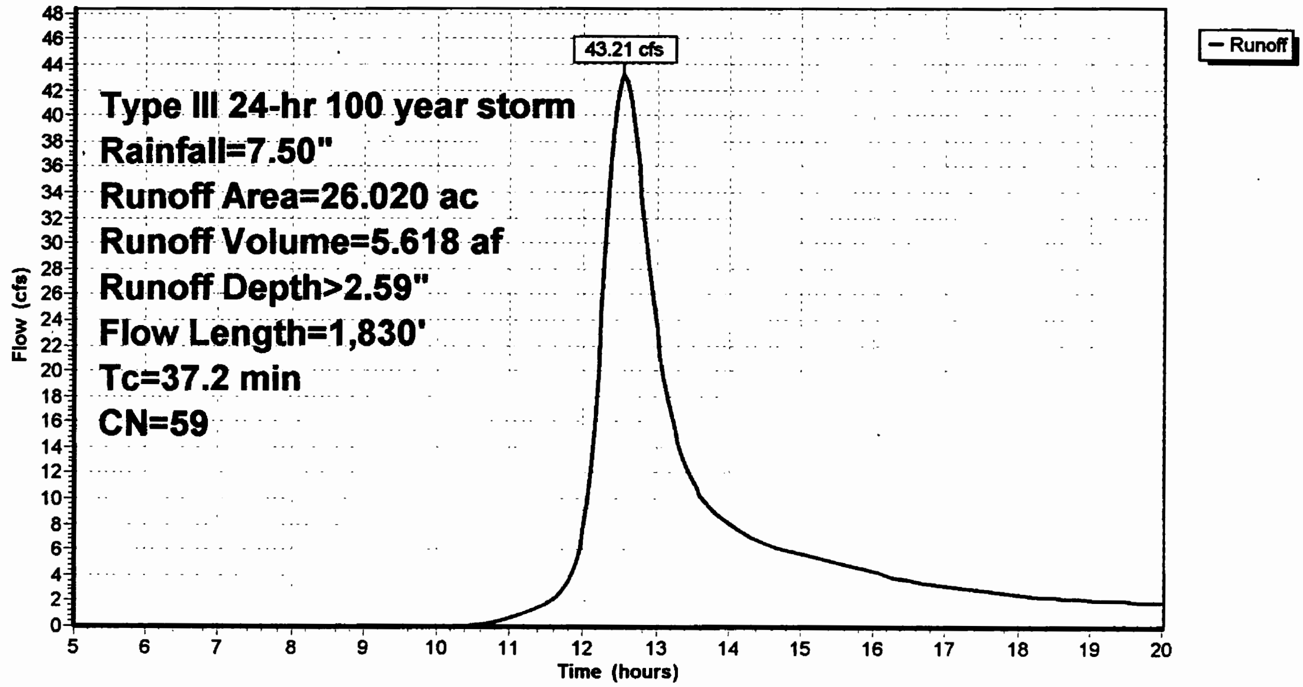


Subcatchment b4b: post basin b4b



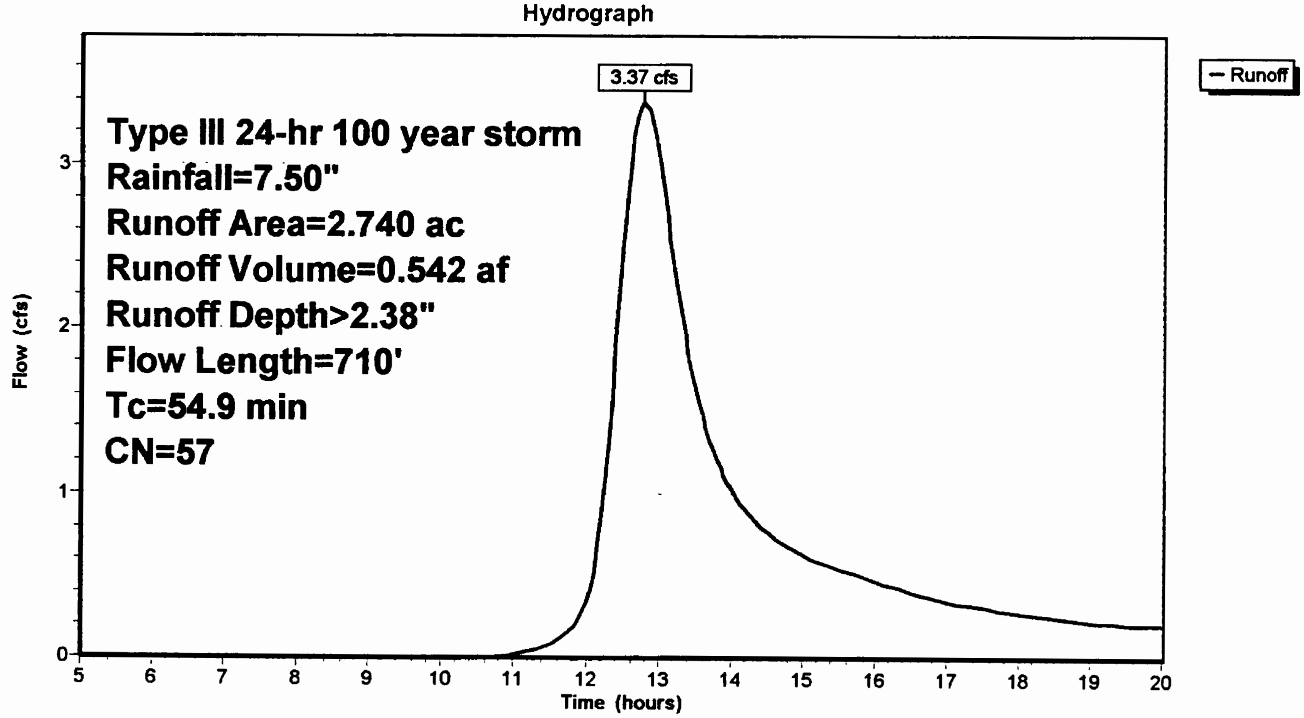
Subcatchment b4c: post basin b4c

Hydrograph

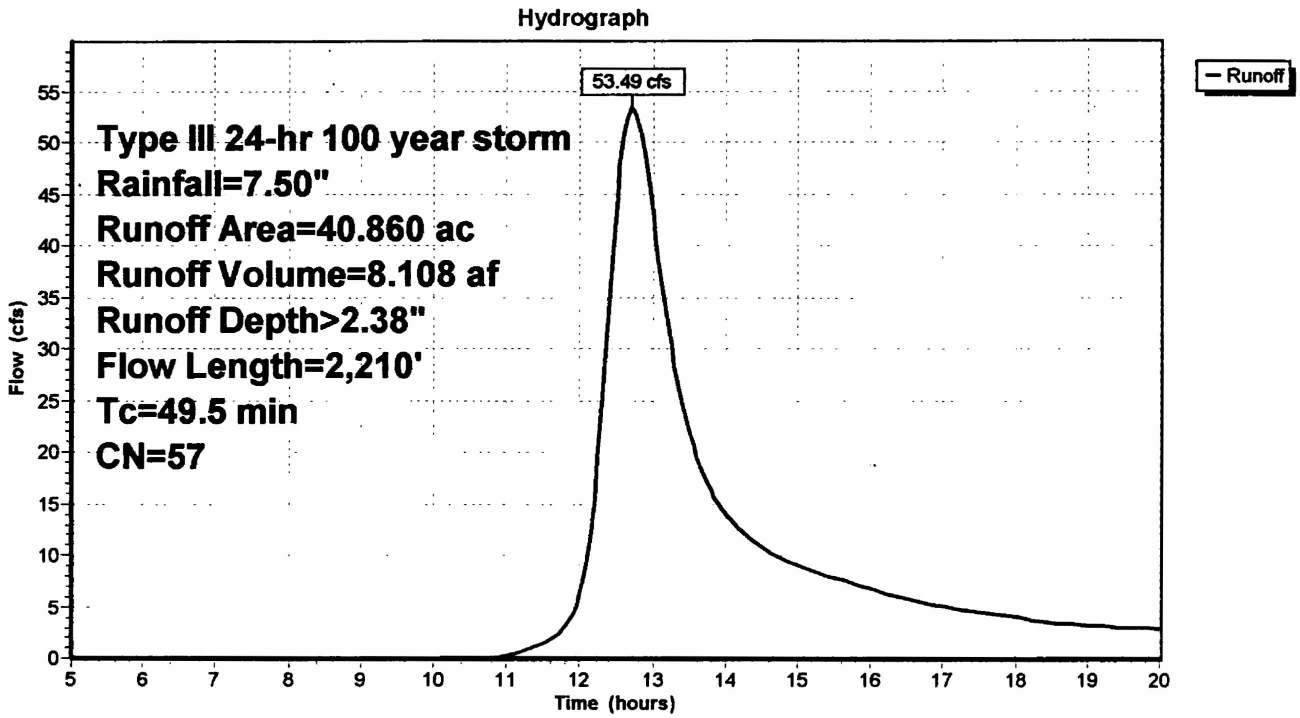


Subcatchment b4d: post basin b4d

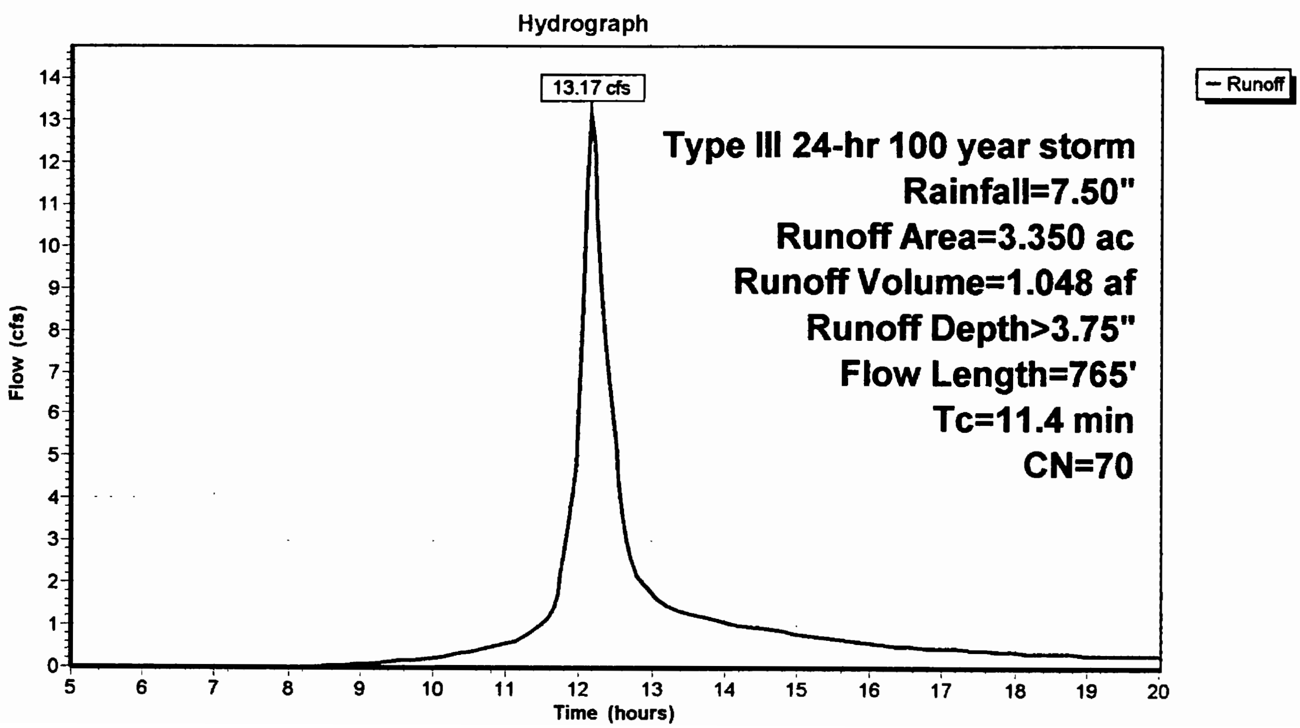
Hydrograph



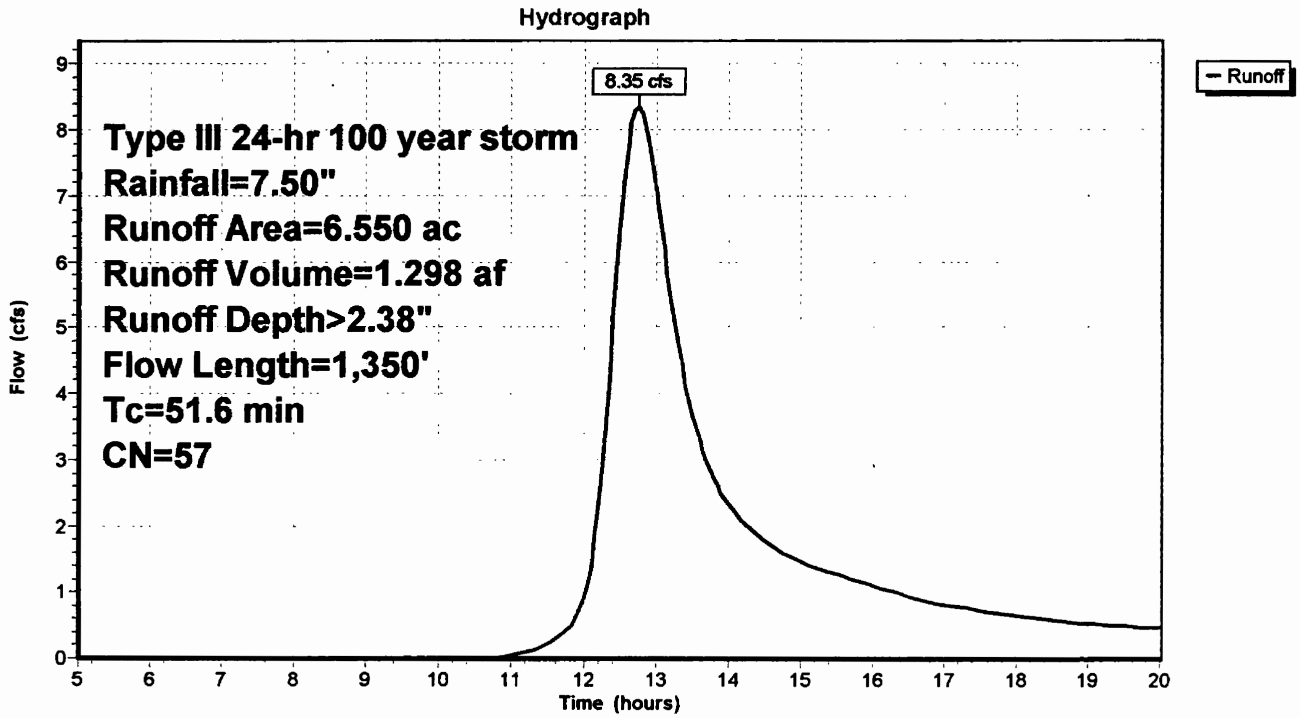
Subcatchment b5: post basin b5



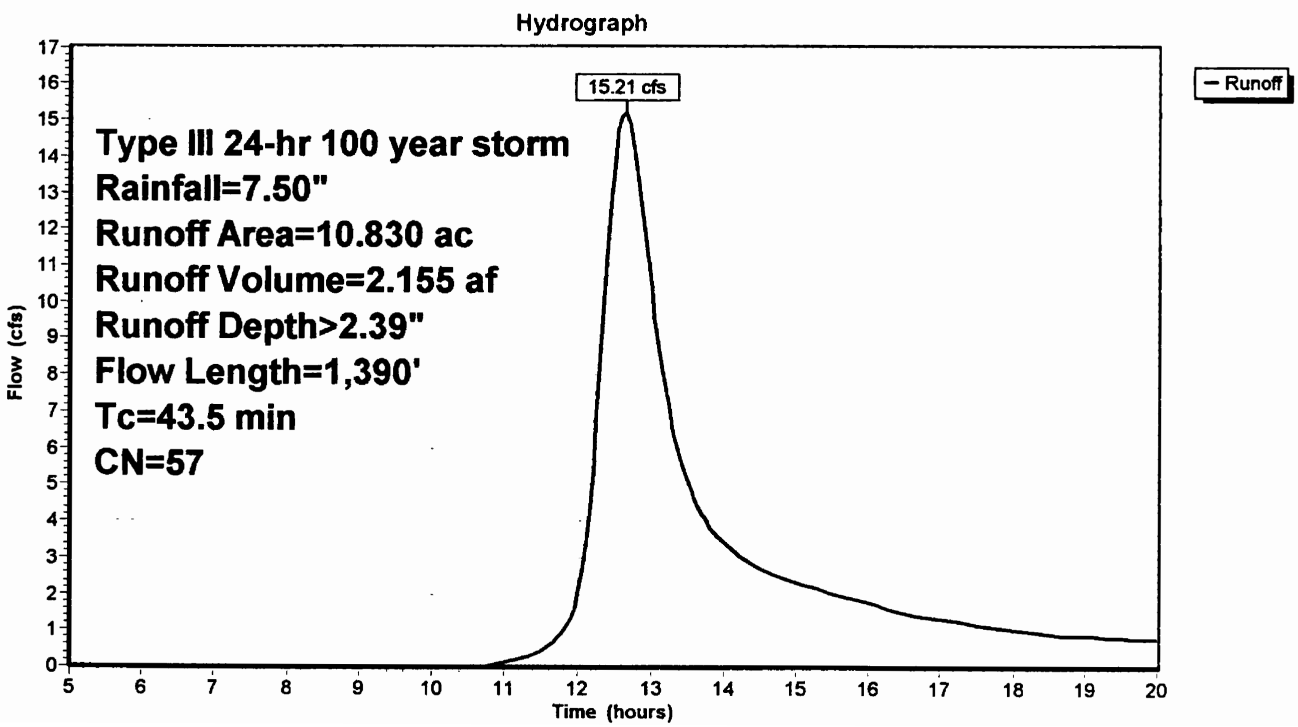
Subcatchment b6a: post basin b6a



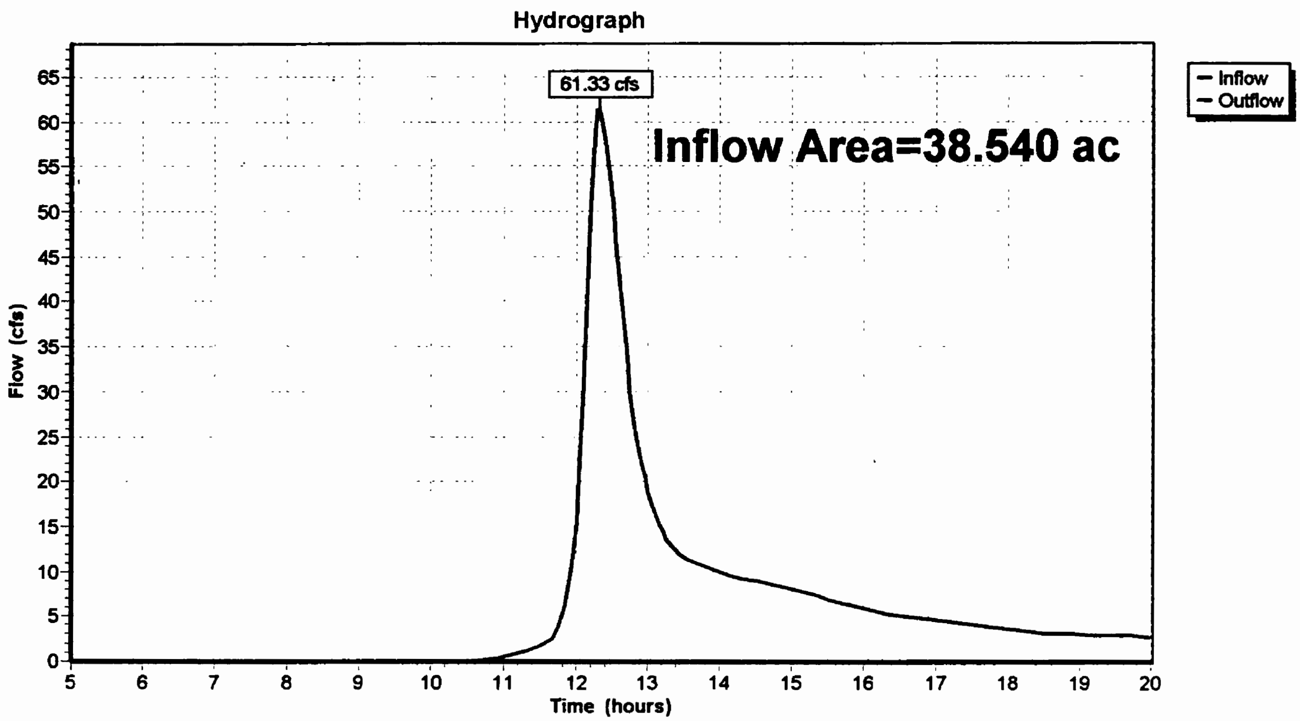
Subcatchment b6b: post basin 6b



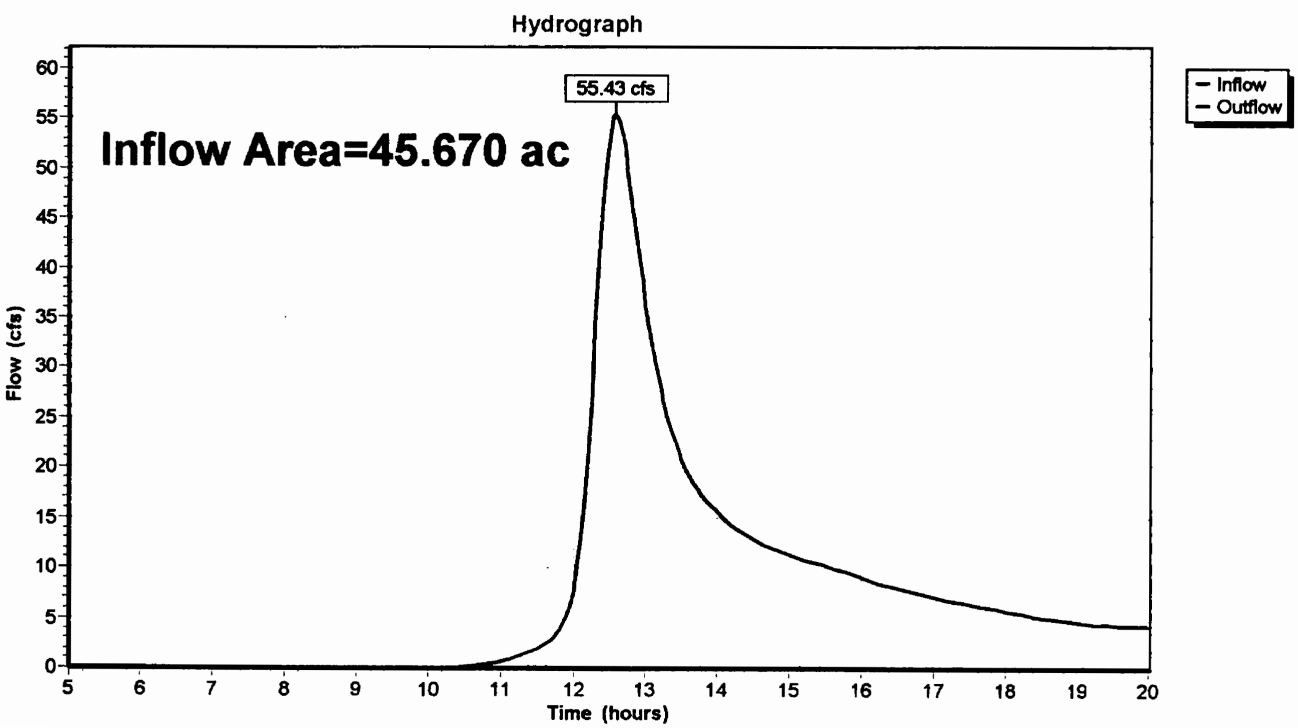
Subcatchment b7: post basin b7



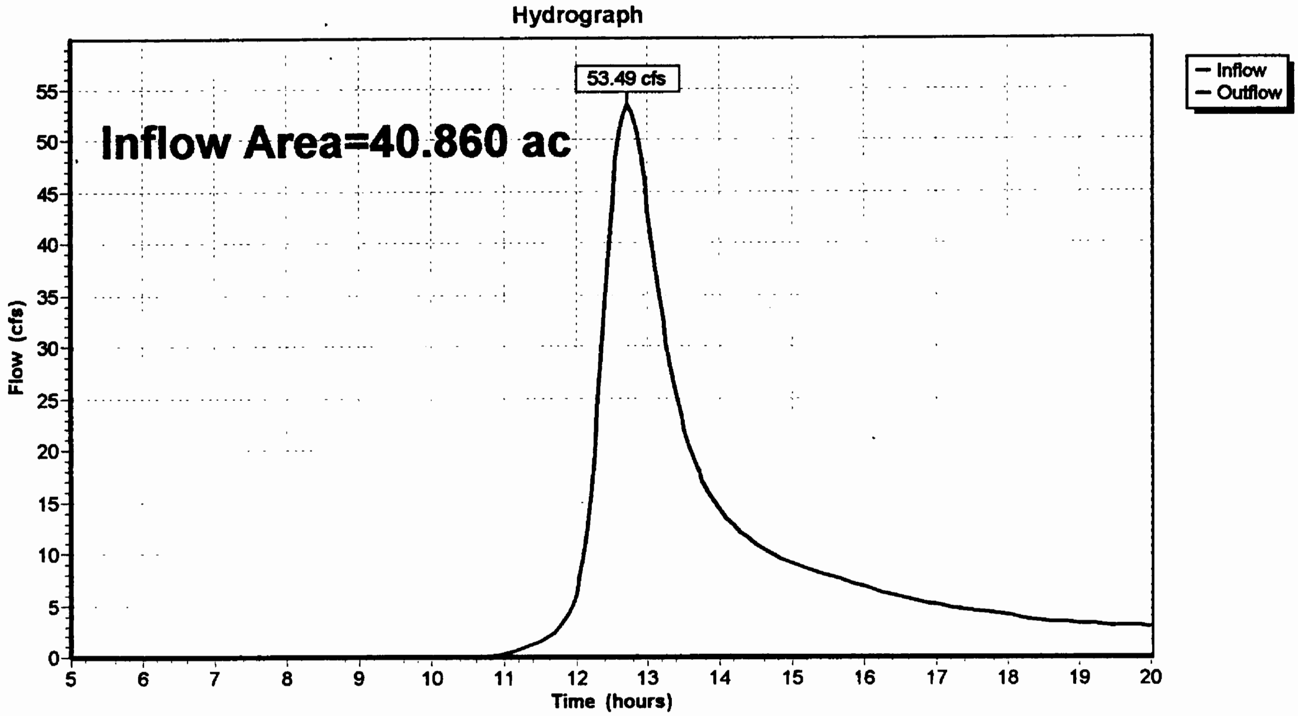
Reach dp3: post design point 3



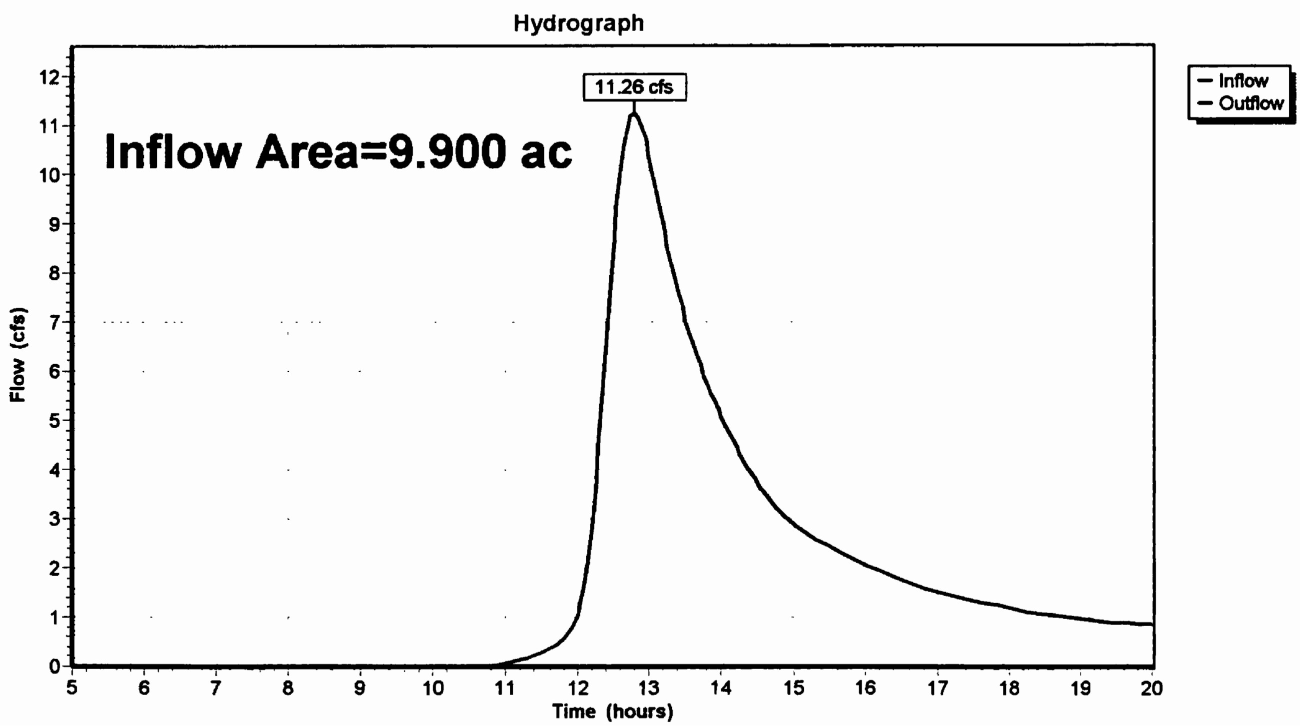
Reach dp4: post design pont 4



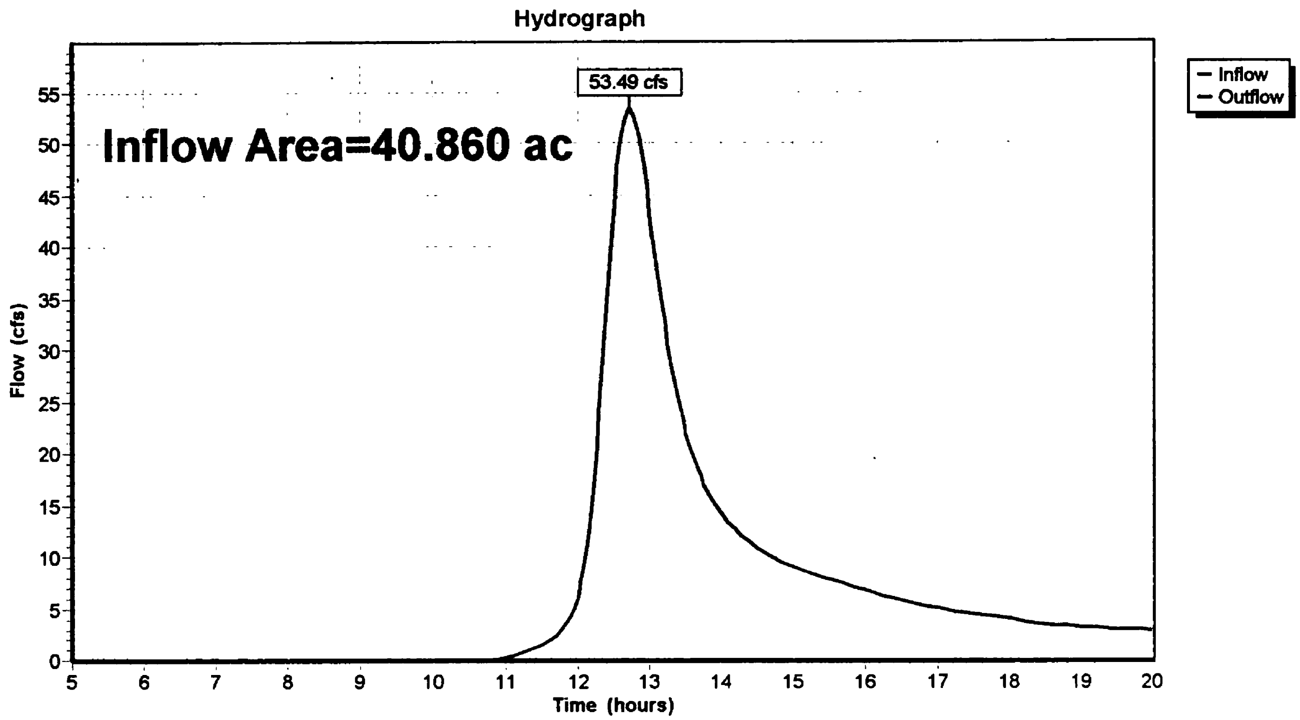
Reach dp5: post design point 5



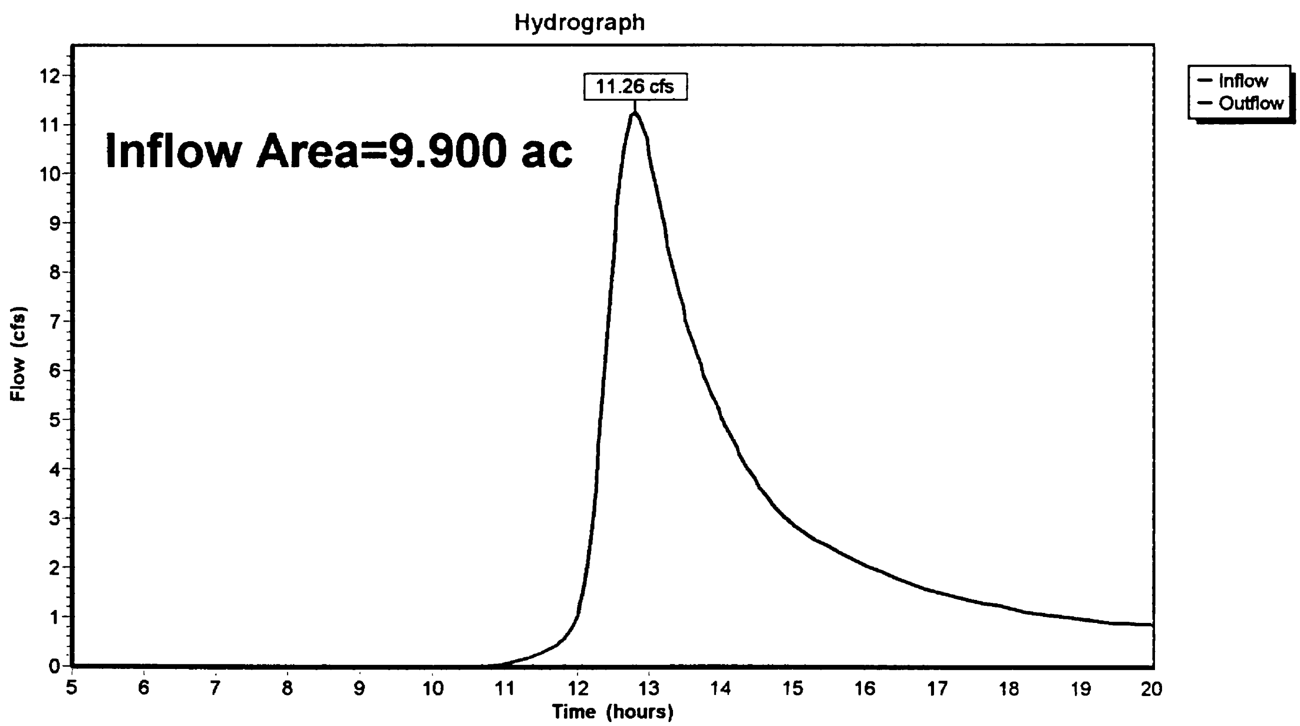
Reach dp6: post design point 6



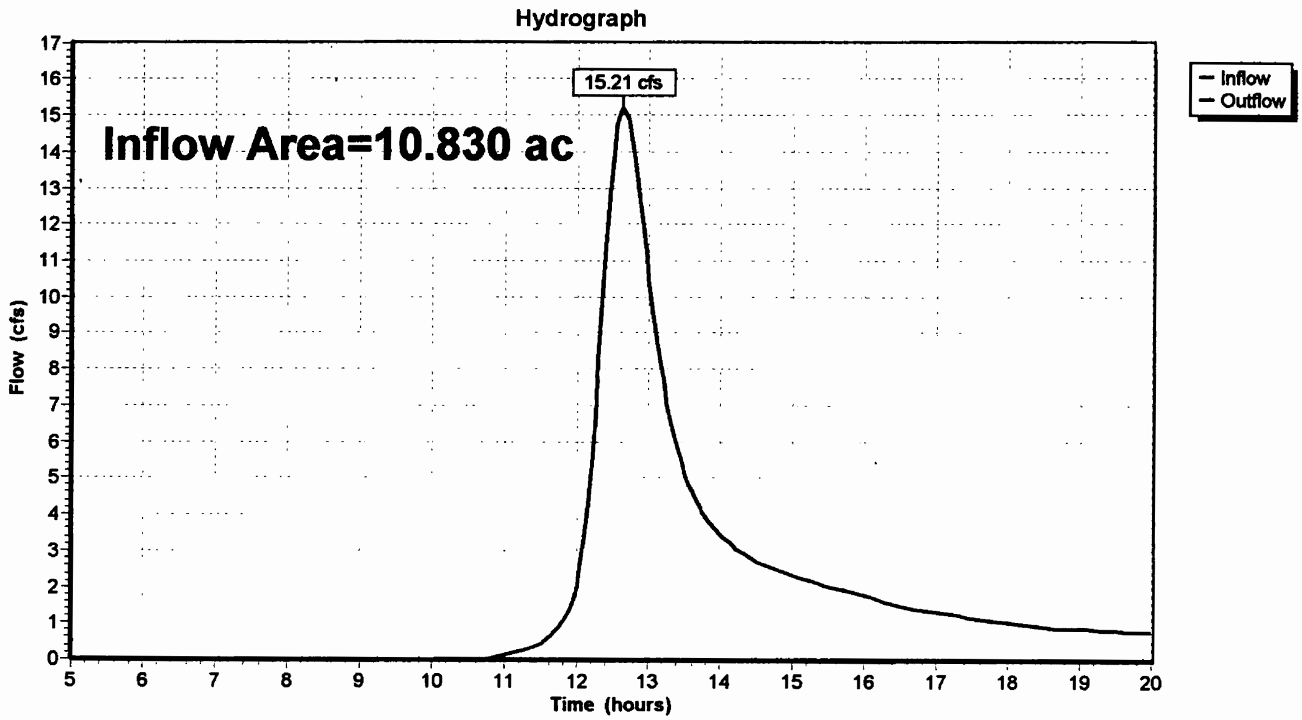
Reach dp5: post design point 5



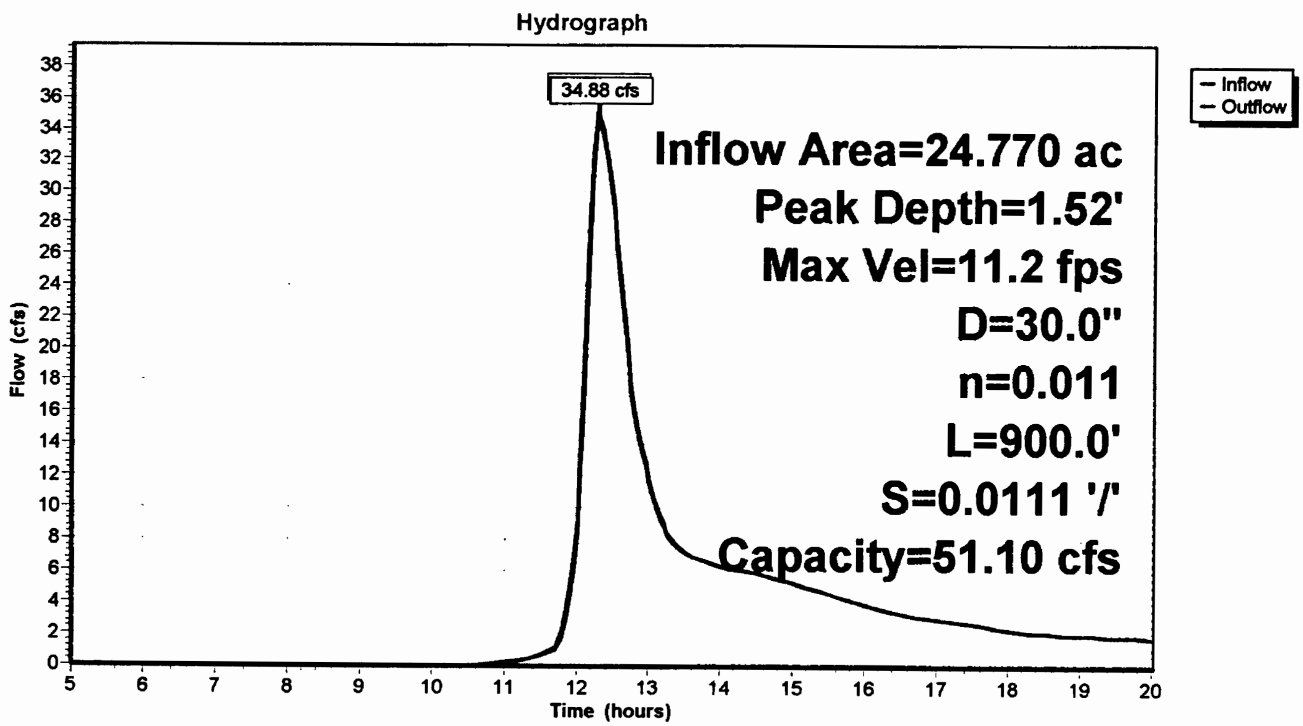
Reach dp6: post design point 6



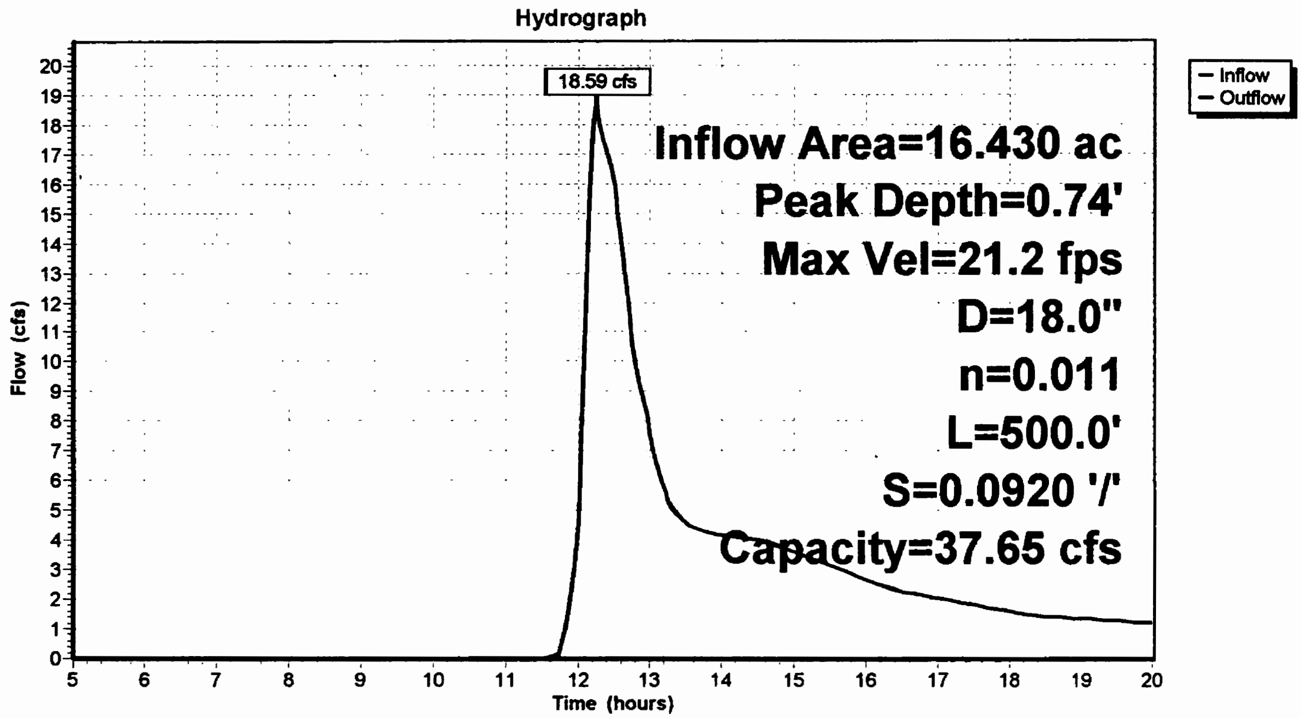
Reach dp7: post design point 7



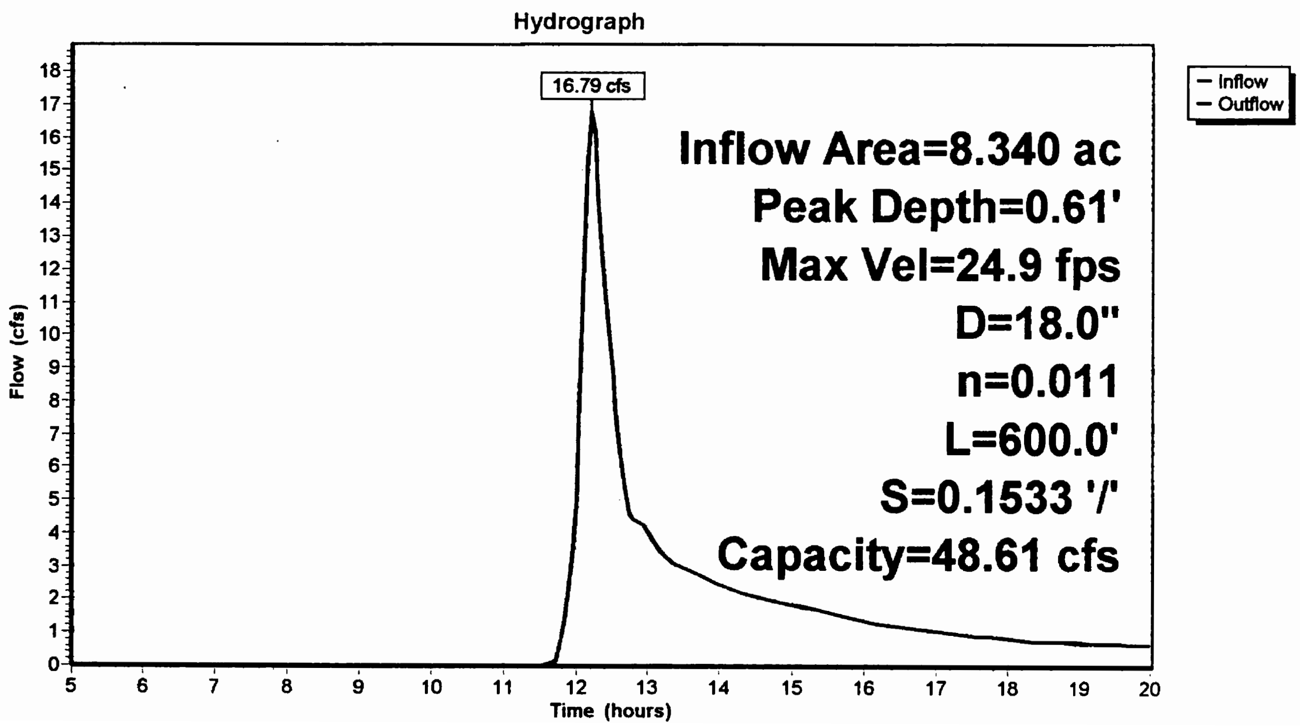
Reach r1: 30" pipe



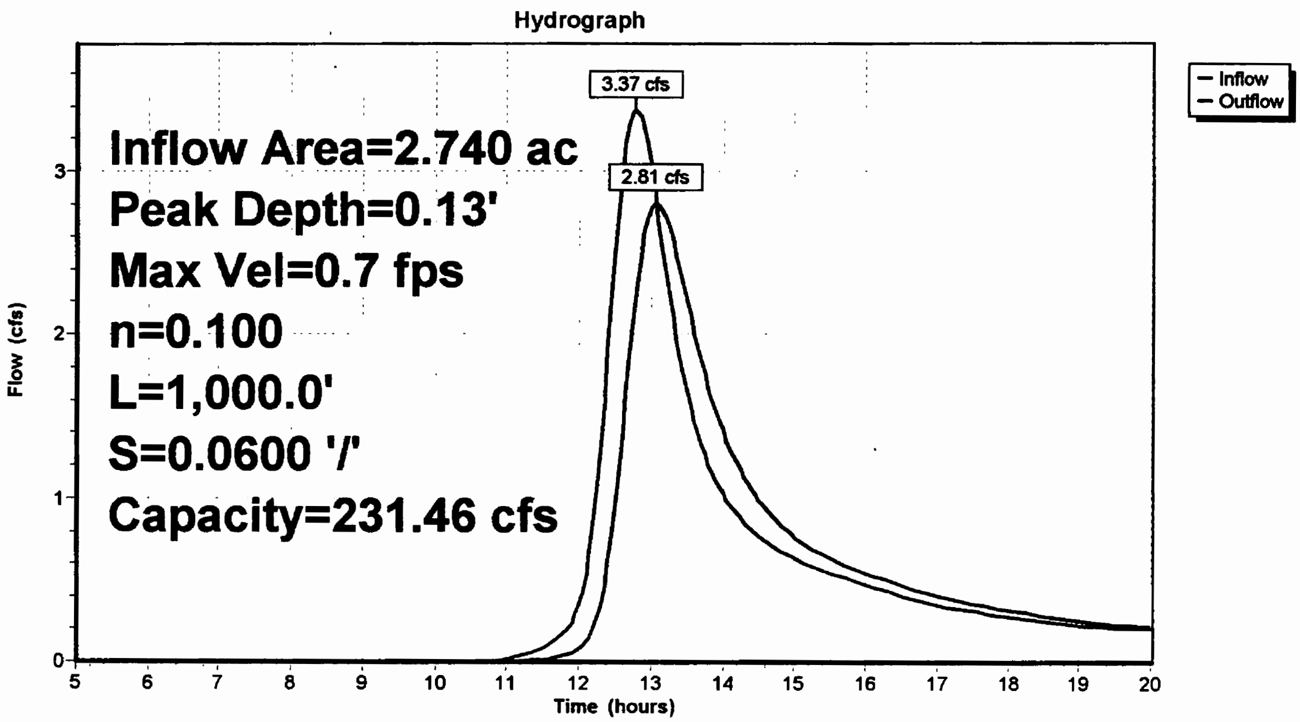
Reach r2: 18" pipe



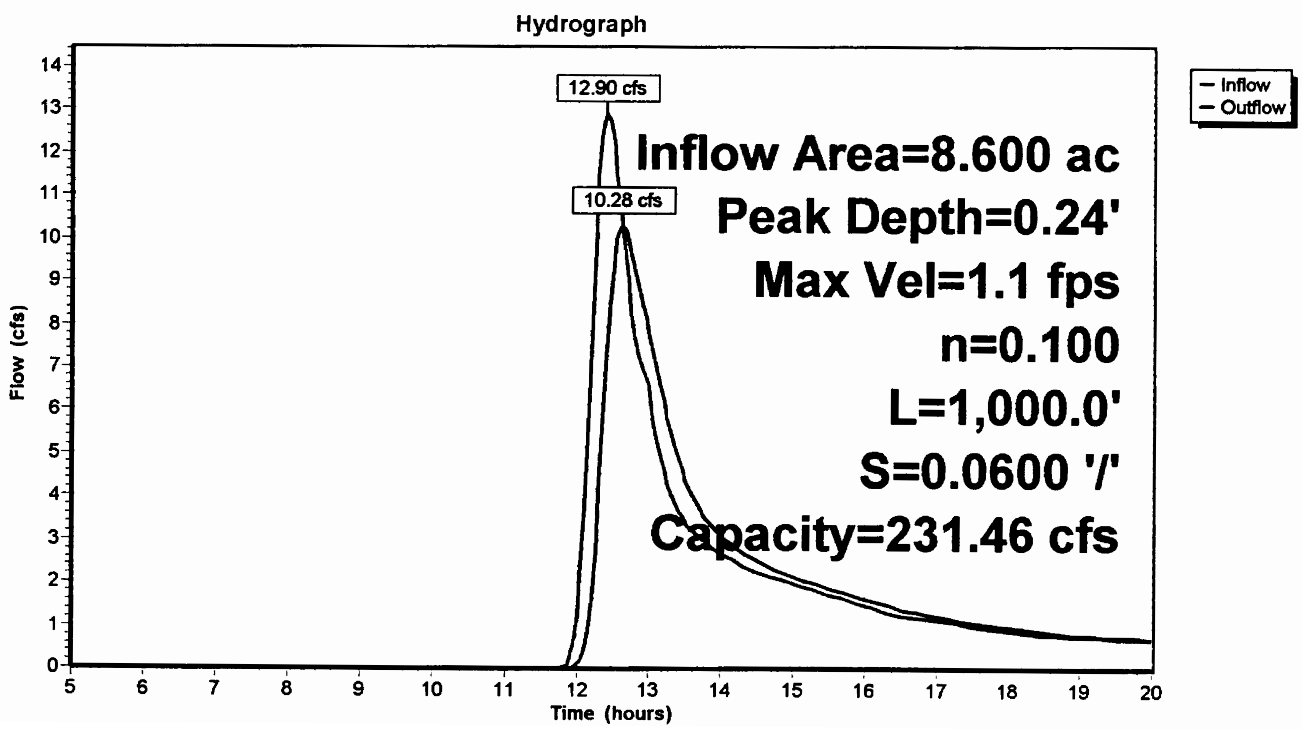
Reach r3: 18" pipe



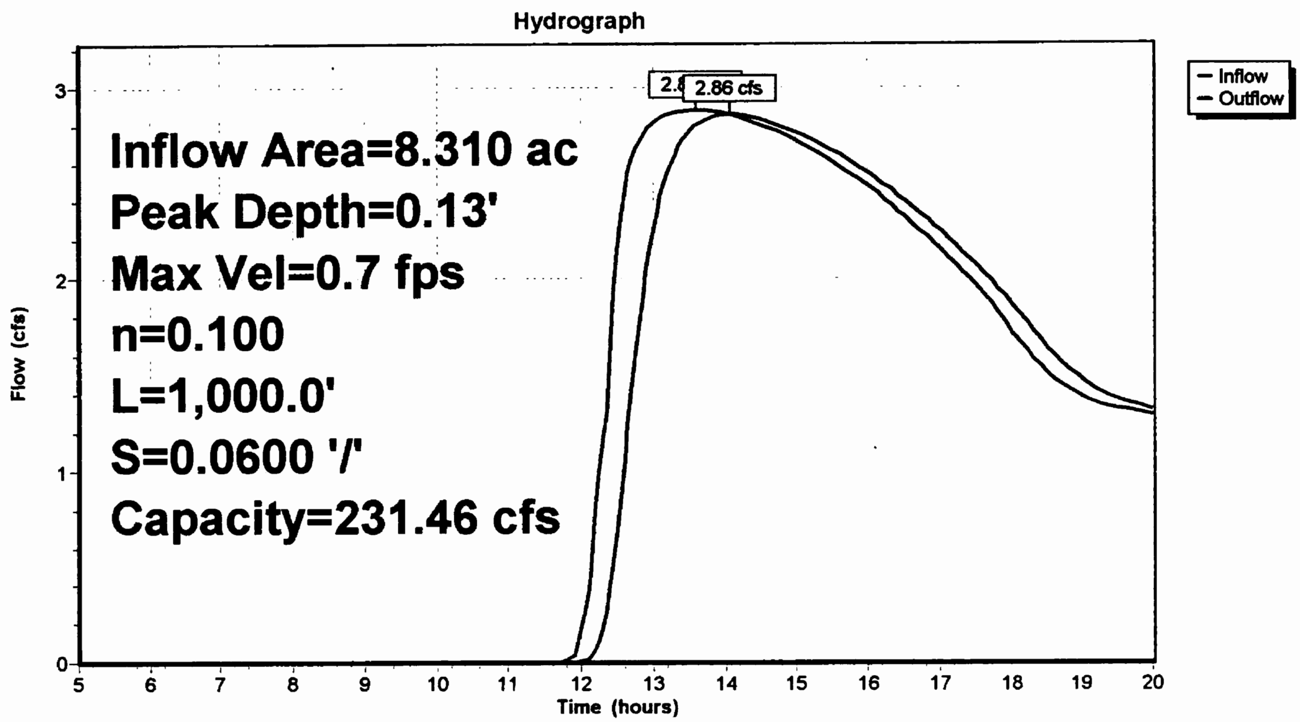
Reach r4: wetland reach



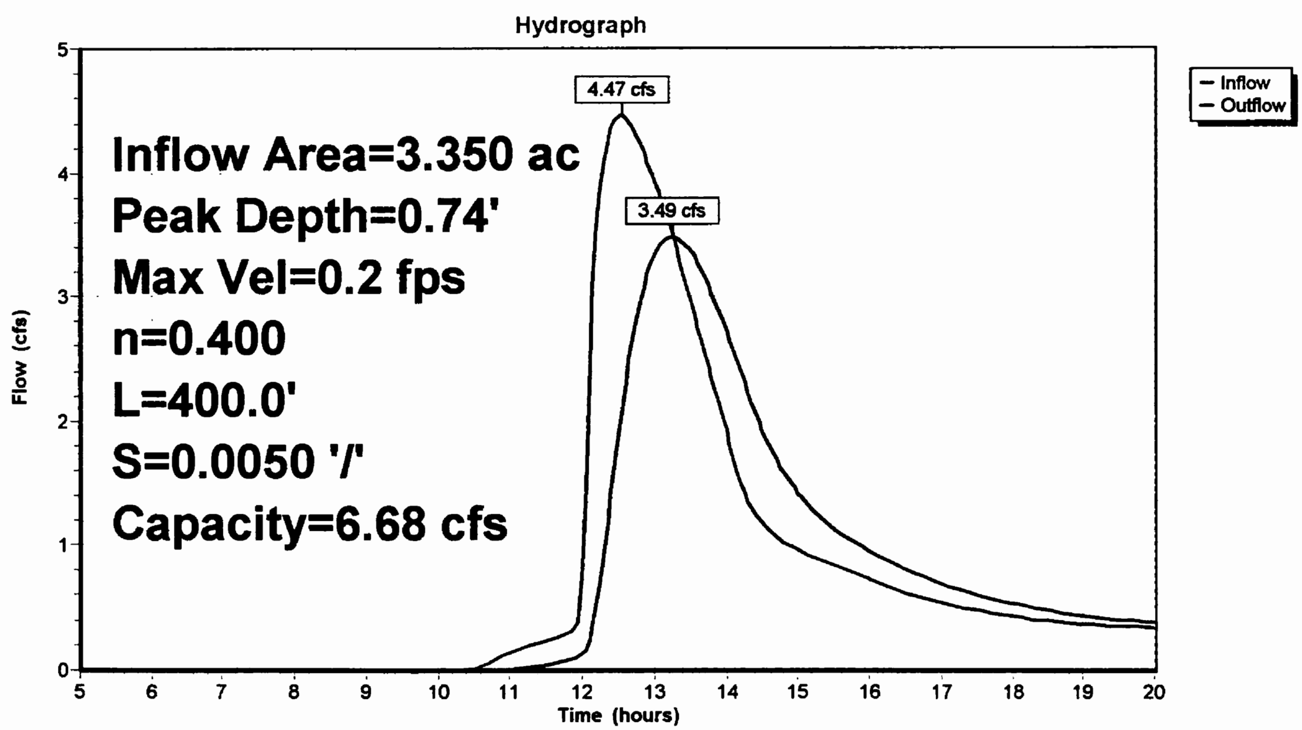
Reach r5: wetland reach



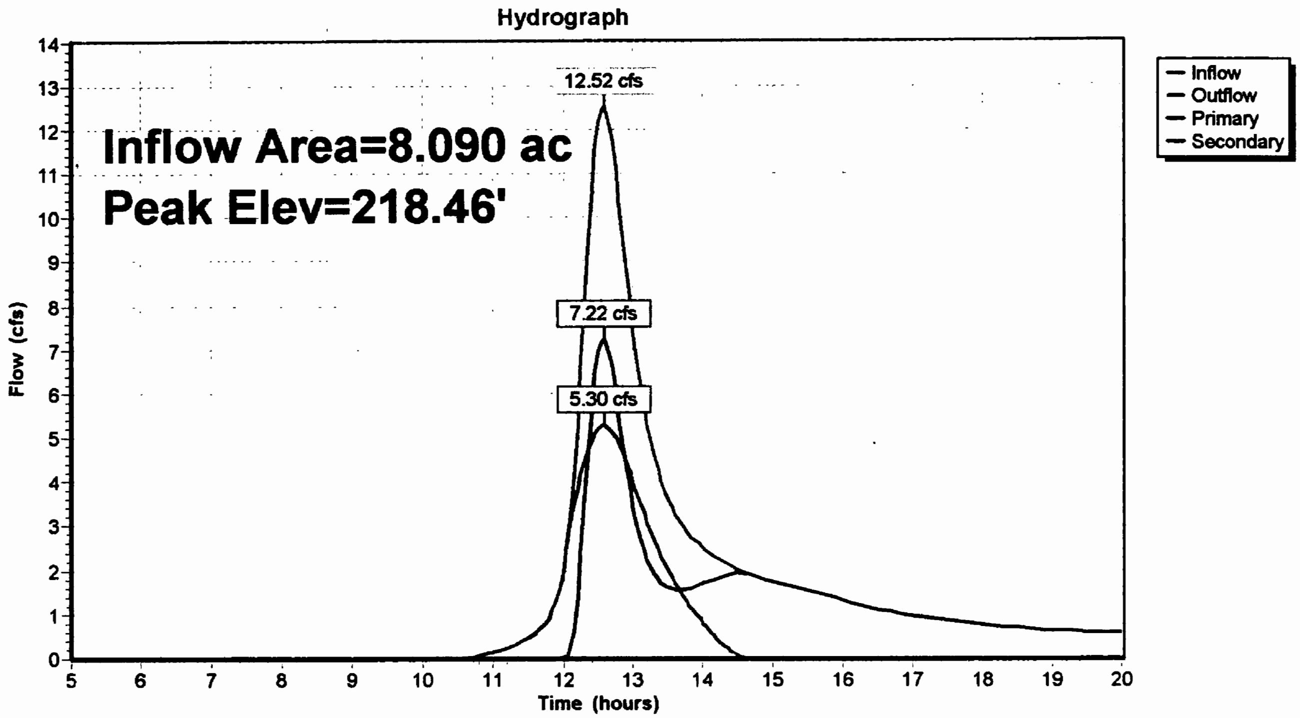
Reach r6: wetland reach



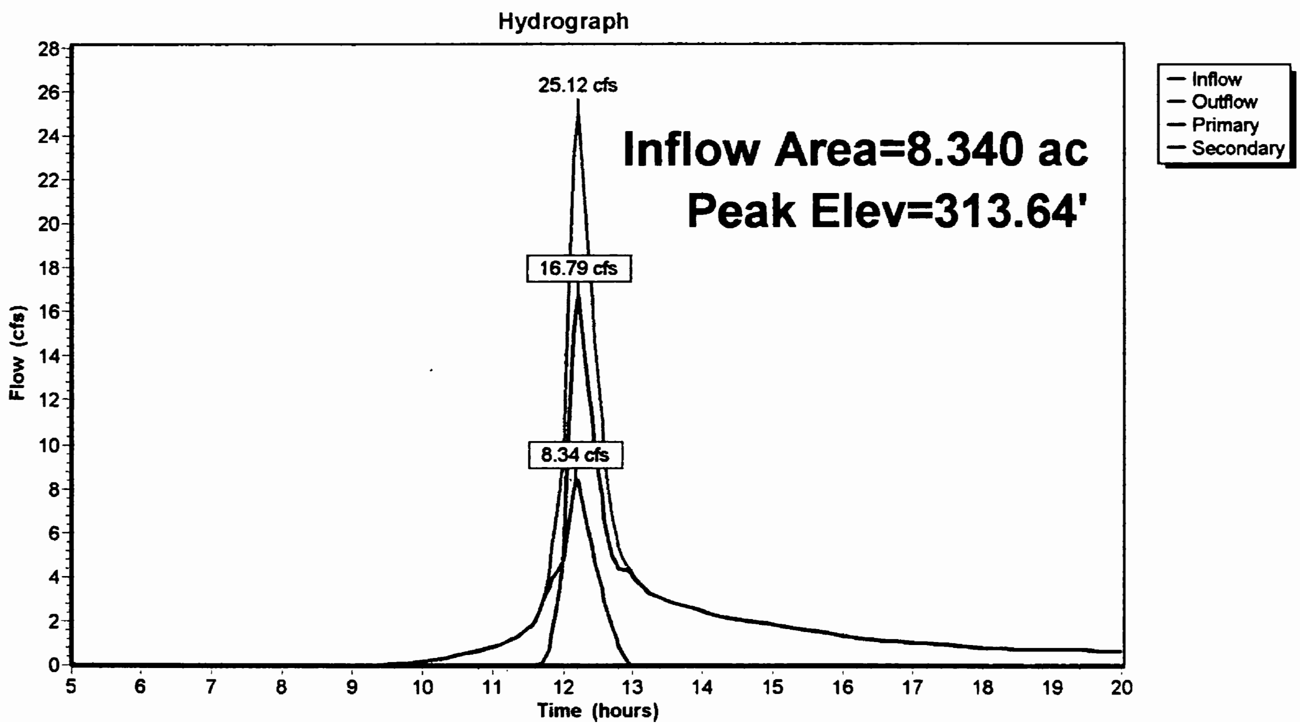
Reach r7: wetland reach



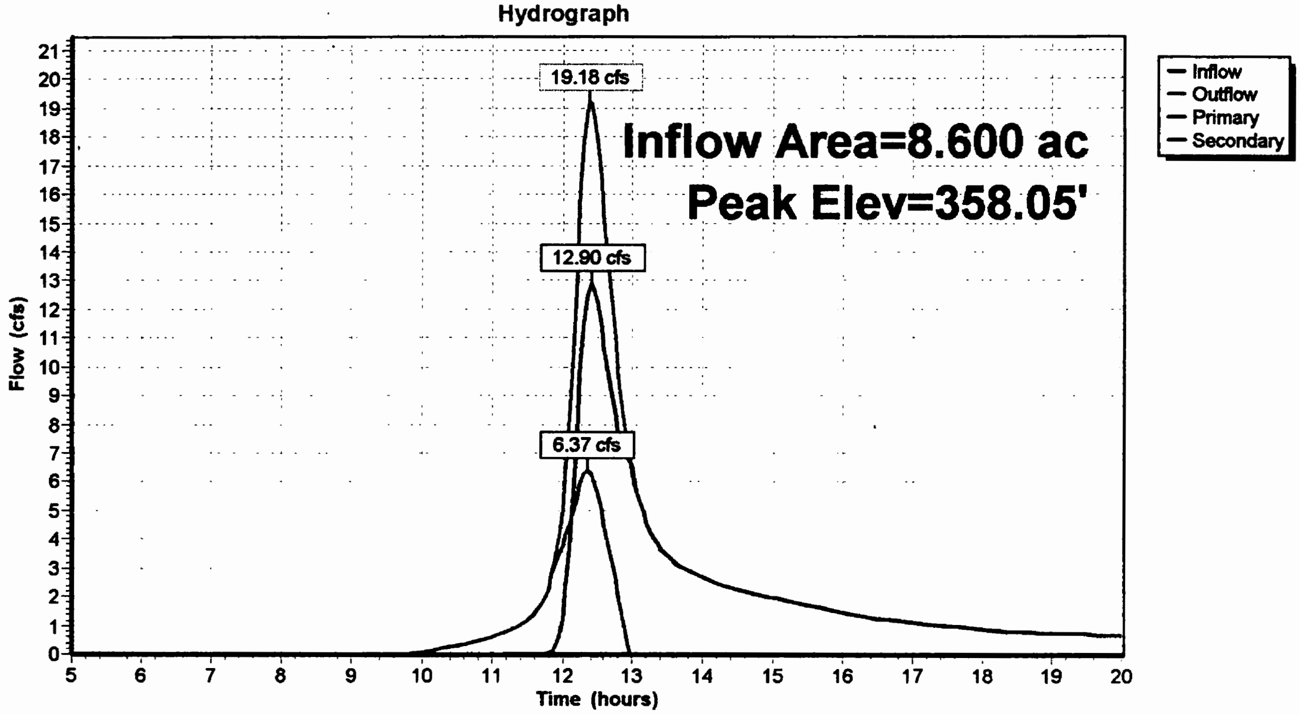
Pond cb12: splitter cb #12



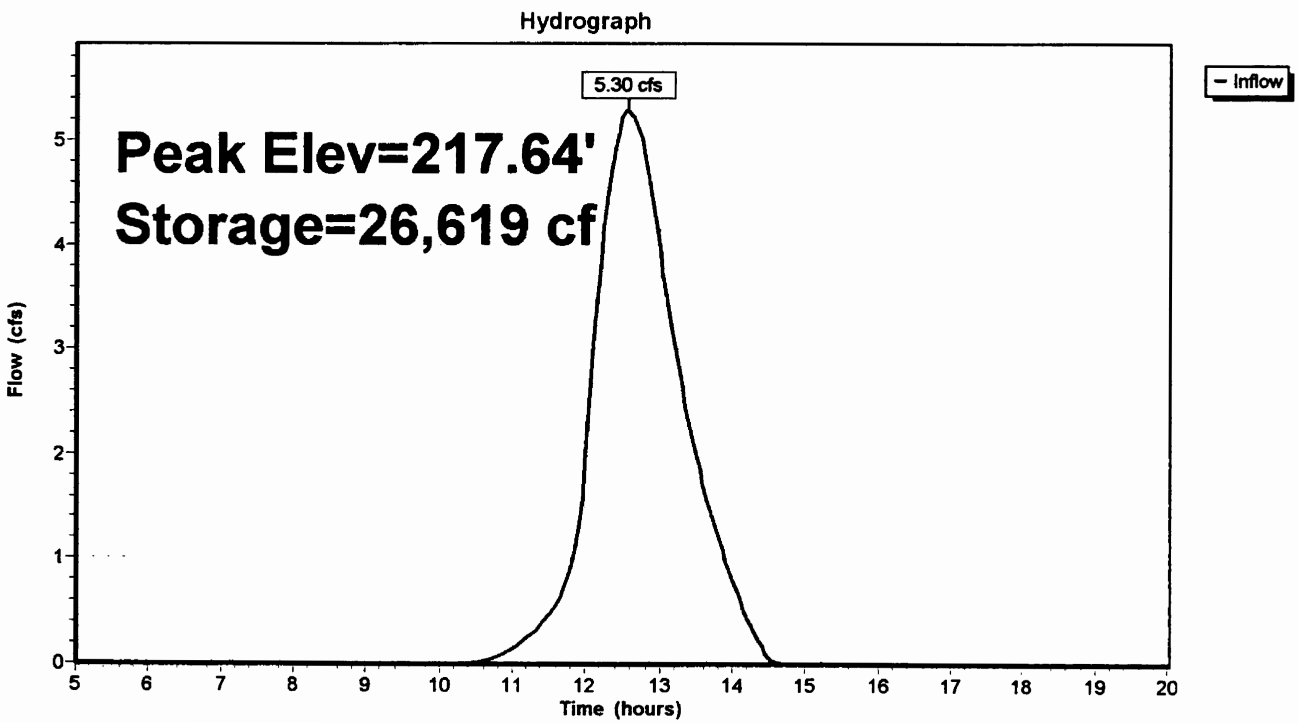
Pond cb20: splitter cb #20



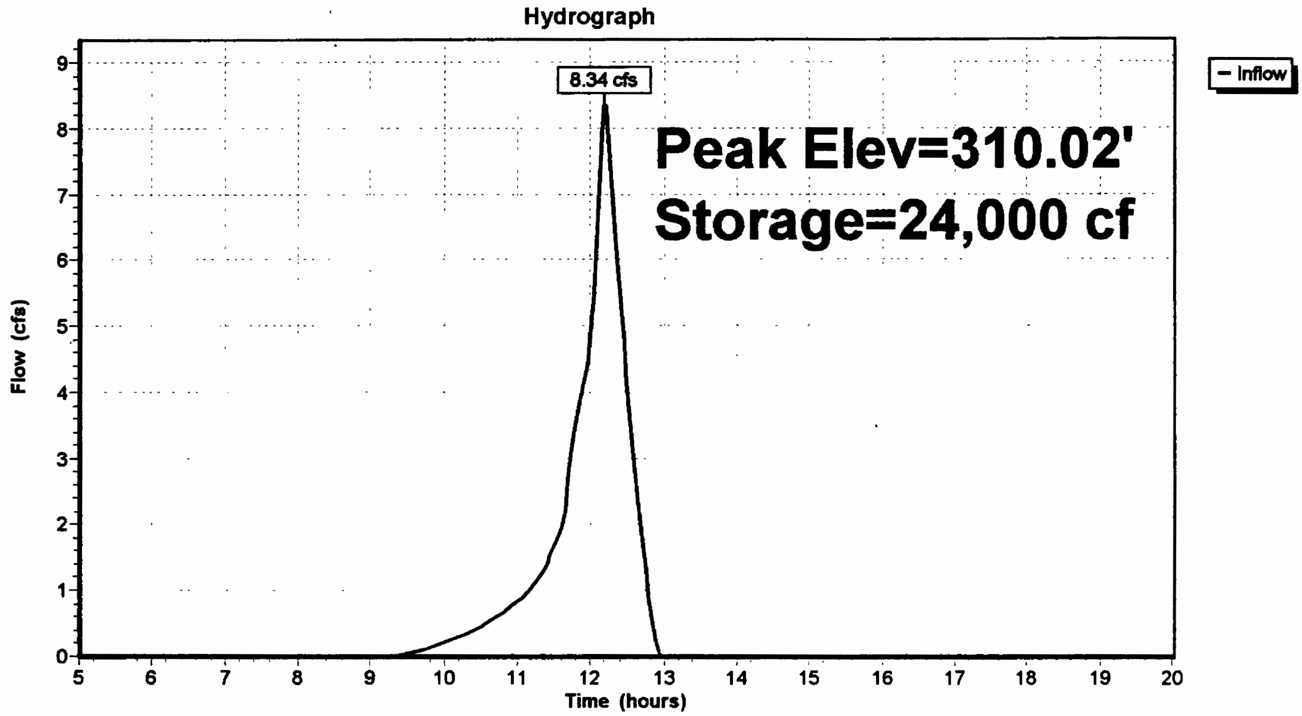
Pond cb29: splitter cb #29



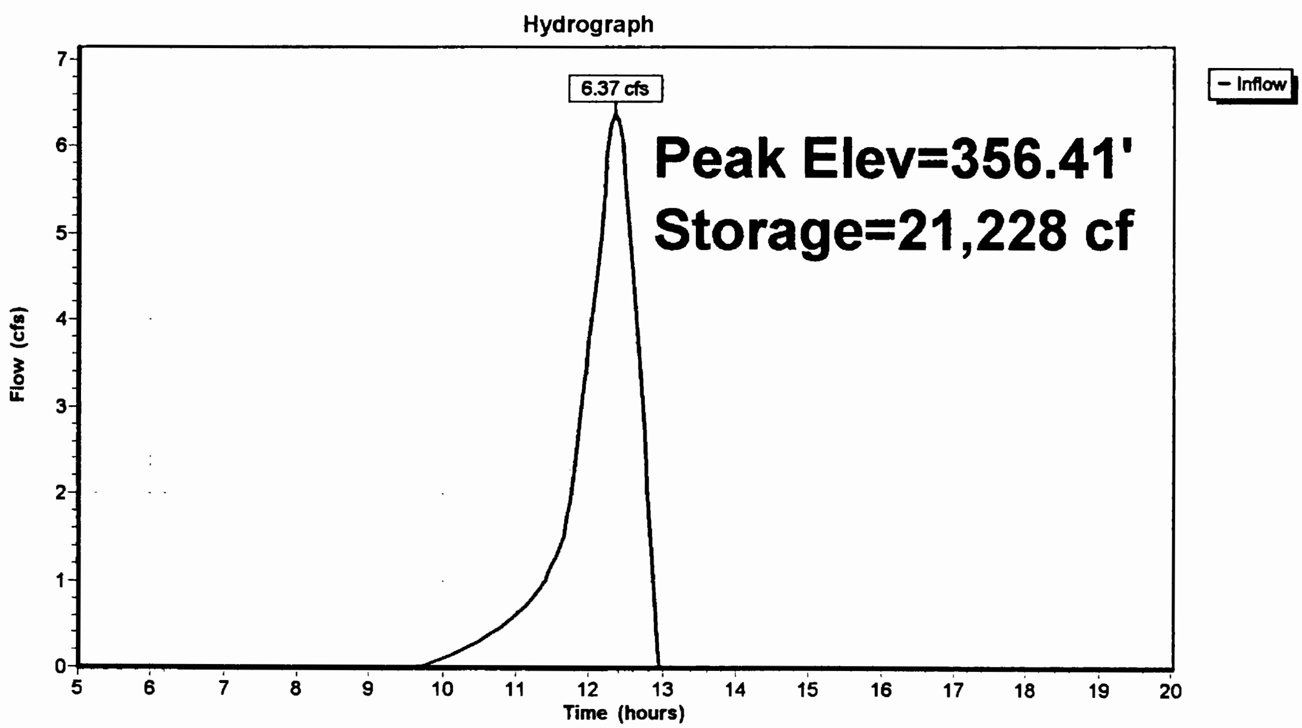
Pond p2: pond p2



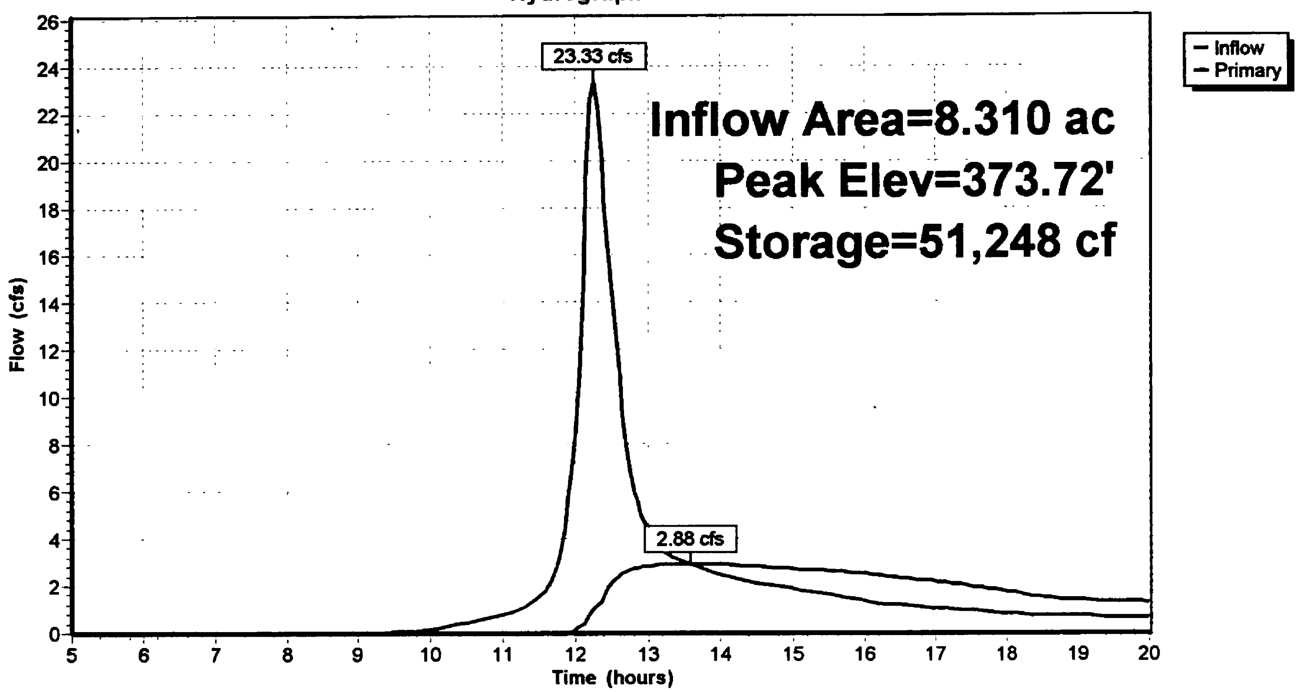
Pond p3a: pond p3a



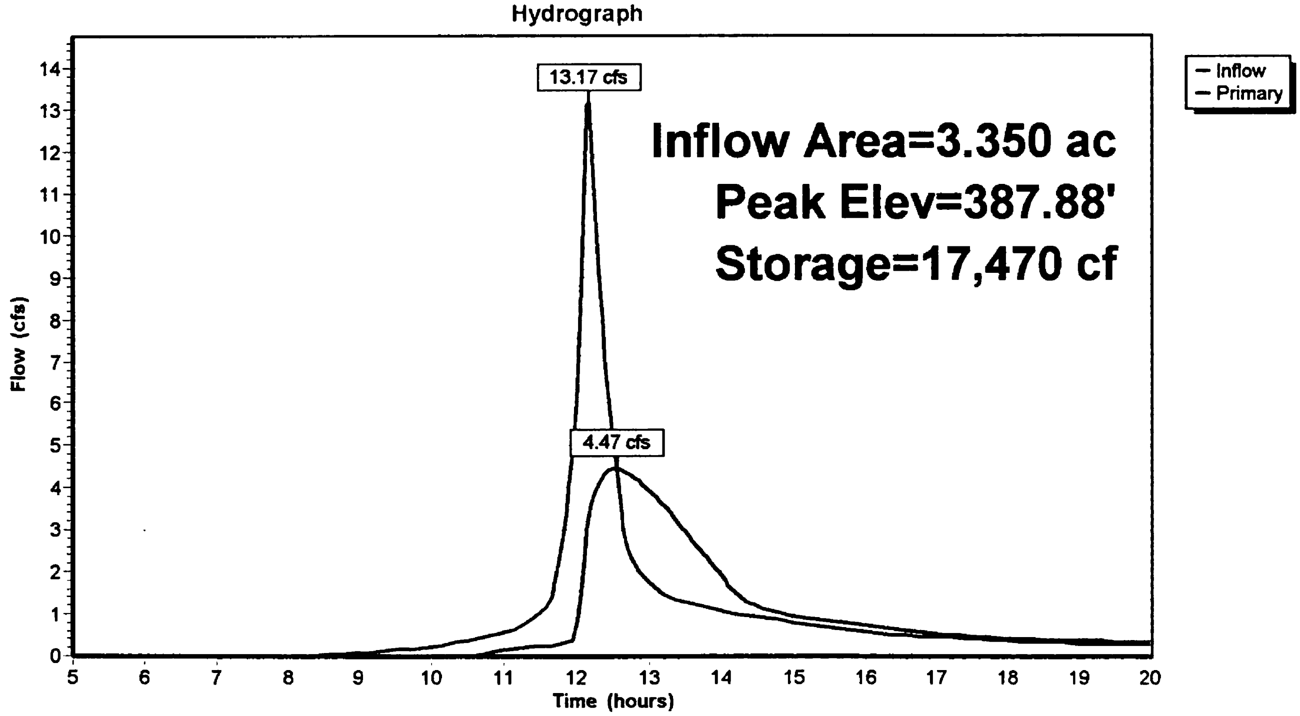
Pond p4a: pond 4a



Pond p4b: pond 4b



Pond p6a: pond 6a



APPENDIX E

Stormwater Soil Investigations

EMERALD RIDGE SUBDIVISION

The subdivision plans indicate the generalized soil boundaries as provided by the Soil Survey for Westchester and Putnam Counties, 1994, prepared by the USDA Soil Conservation Service. In general, the on site soils are classified as being in the B soil hydrologic group. The soil types include Charlton loams, Charlton-Chatfield complexes and Chatfield-Charlton complexes. The wetland areas contain soils classified as C and consist of Leicester loams.

The Stormwater Management Study proposes five stormwater basins for stormwater treatment. The soils in the areas proposed for these basins were tested via deep test pits and the soils encountered are consistent with the soils identified in the Soil Survey for Westchester and Putnam Counties. The on site soils investigations was performed on May 23 and May 24, 2005 and December 06, 2005. The soils tests performed in December were to deepen the existing deep test holes to ensure the viability for the use of the proposed water quality basins The original investigation included deep test pits and percolation tests in the areas of the proposed stormwater quality basins and micro-pool extended detention basins for the project.

The following is a summary of the soils for the stormwater management basins:

pond	hole number	soils description	groundwater	rock	percolation rate
wqa pond 2	St2	top soil to sandy loams to brown sand and gravel	none to 10'	none to 10'	8-10 min/in
wqa pond 3	St3	top soil to sandy loam to brown sand and gravel	none to 9'	none to 9'	1-7 min/in
wqa pond 4a	St4a	top soil to sandy loam to brown silty loam to brown sand and gravel	none to 12.5'	none to 12.5'	1-7 min/in
wqa pond 4b	St4b*	top soil to sandy loam to gray sand and gravel	none to 11'	none to 11'	1-7 min/in
wqa pond 6a	St6a	top soil to sandy loam to gray sand and gravel	none to 8.5'	none to 8.5'	1-7 min/in

*new deep test hole, basin shape and location were shifted slightly. Original hole location was shown incorrectly.

In addition to the stormwater test pits, deep test pits and percolation tests were performed on each lot for sewage treatment systems. All of the soils encountered for the sewage treatment systems are also consistent with the Soil Survey and can be seen on sheet NS of the subdivision plan set. In all a total of approximately 80 deep test pits and 50 percolation tests were performed on site and the soil characteristics are consistent with the Soil Survey for Westchester and Putnam Counties.

All of the soils tested on site are permeable with stabilized percolation rates ranging from approximately 5 minutes to 15 minutes per one inch drop. It is the belief of this office that the soils in the areas of the proposed stormwater basins and individual lot practices are suitable for the placement and operation of same. The soils types and permeability are conducive to the movement of groundwater.

For the purposes of the water quality basins, the following table indicates the average basin bottom existing grade, the proposed basin bottom grade, required depth of hole, depth of hole.

wq basin*	ave existing grade	prop bottom elev	req hole depth**	hole depth
P2	218	212	9'	10'
P3	307	304	6'	9'
P4a	360	352	11'	12.5'
P4b	370	366	7'	11'
P6a	387	382	8'	8.5'

* for infiltration basins p2, p3 and p4a, the holes are to be a minimum of three feet below the basin bottom and for the micro-pool extended detention basins p4b and p6a, the holes are to be a minimum of 1 foot below the basin bottom.

**the required hole depths shown are the existing grade elevations minus the proposed bottom elevations minus three feet. As shown, all holes achieved more than the minimum required and the extended detention basins only required a hole depth of one foot below the bottom where a minimum of three feet is provided.

Appendix K

Tree Survey Data Sheets

06	Apple	06AP	1463	15869.01518	13203.86507
06	Apple	06AP	1534	15903.99497	13322.50035
06	Ash	06AS	1720	16358.49697	13268.98103
06	Ash	06AS	1733	16371.20199	13371.35335
06	Ash	06AS	1922	16572.99533	13227.30835
06	Ash	06AS	1932	16583.99648	13252.34299
06	Ash	06AS	4781	16854.90491	12606.51484
06	Ash	06AS	4783	16800.21748	12613.96439
06	Ash	06AS	5437	17210.05879	13475.31175
06	Ash	06AS	5453	17206.08684	13498.64796
06	Ash	06AS	5539	17035.355	13677.05923
06	Ash	06AS	5827	17202.31879	12886.90326
06	Ash	06AS	5828	17196.42085	12892.35024
06	Ash	06AS	5911	17134.21654	12894.23303
06	Ash	06AS	6321	17591.95452	13128.77211
06	Beech	06BE	4861	16736.78963	12695.51597
06	Beech	06BE	4895	16839.47946	13062.00238
06	Beech	06BE	5085	16932.03007	13016.33141
06	Beech	06BE	5298	17120.60577	13122.8033
06	Beech	06BE	5423	17216.14313	13407.91958
06	Beech	06BE	5931	17085.53431	12917.76769
06	Beech	06BE	5970	17192.47336	13133.57279
06	Beech	06BE	6038	17231.08368	13191.6406
06	Beech	06BE	6703	17241.30494	13819.57901
06	Beech	06BE	7102	16609.21613	13795.67593
06	Beech	06BE	7344	16644.54569	14021.10456
06	Beech	06BE	7434	16591.37997	13992.10168
06	Beech	06BE	7580	16438.97296	14246.80472
06	Beech	06BE	7587	16472.13538	14280.46589
06	Beech	06BE	7844	16845.06966	14361.30201
06	Beech	06BE	7849	16849.18943	14395.30885
06	Beech	06BE	7899	16727.03031	14470.13037
06	Beech	06BE	8104	17147.46397	14014.85413
06	Beech	06BE	8144	17253.43307	14078.63296
06	Beech	06BE	8743	16955.33089	14570.92617
06	Black Birch	06BB	1683	16298.90881	13407.22962
06	Black Birch	06BB	5130	16939.73289	13063.97228
06	Black Birch	06BB	7182	16864.88329	13934.20187
06	Black Birch	06BB	7274	16957.89938	14046.94506
06	Black Birch	06BB	7276	16938.09162	14035.3563
06	Black Birch	06BB	7277	16939.05134	14058.25814
06	Black Birch	06BB	7319	16736.82186	14161.27674
06	Black Birch	06BB	7403	16519.40459	14022.90476
06	Black Birch	06BB	7407	16499.78158	14022.93254
06	Black Birch	06BB	7419	16548.46186	14037.53409
06	Black Birch	06BB	7519	16459.17369	14030.63435
06	Black Birch	06BB	7689	17099.30262	13858.75523
06	Black Birch	06BB	7712	16730.86805	14221.90444
06	Black Birch	06BB	7731	16712.07911	14301.64554
06	Black Birch	06BB	7768	16950.67594	14286.16145
06	Black Birch	06BB	7769	16947.93085	14285.5462
06	Black Birch	06BB	7806	16819.85266	14240.92391
06	Black Birch	06BB	7830	16776.91822	14286.63175
06	Black Birch	06BB	7833	16804.83603	14273.46411
06	Black Birch	06BB	7835	16800.2016	14290.66569
06	Black Birch	06BB	7855	16867.47788	14393.19757

06	Black Birch	06BB	7857	16885.31991	14373.50998
06	Black Birch	06BB	7862	16889.45754	14441.33308
06	Black Birch	06BB	7938	16881.67059	14473.27112
06	Black Birch	06BB	7940	16873.52041	14482.59199
06	Black Birch	06BB	8020	17085.57696	14375.36042
06	Black Birch	06BB	8043	16982.90383	14411.31103
06	Black Birch	06BB	8044	16982.50946	14423.87941
06	Black Birch	06BB	8053	17271.83001	14100.08978
06	Black Birch	06BB	8091	17131.89518	13994.44204
06	Black Birch	06BB	8092	17153.08614	13990.34683
06	Black Birch	06BB	8117	17357.27893	14046.58217
06	Black Birch	06BB	8118	17362.39156	14059.67041
06	Black Birch	06BB	8138	17222.74176	14051.28449
06	Black Birch	06BB	8164	17352.07653	14072.85323
06	Black Birch	06BB	8183	17199.91355	14194.99628
06	Black Birch	06BB	8197	17212.03784	14185.90183
06	Black Birch	06BB	8205	17246.96128	14243.92261
06	Black Birch	06BB	8218	17276.33318	14178.34055
06	Black Birch	06BB	8239	17383.05492	14127.87111
06	Black Birch	06BB	8385	17221.43056	14317.01008
06	Black Birch	06BB	8565	17020.65467	14256.17733
06	Black Birch	06BB	8657	17041.11446	14058.30682
06	Black Birch	06BB	8831	17056.01943	14620.9962
06	Black Birch	06BB	8852	17130.0684	14568.46539
06	Black Birch	06BB	8866	17157.31265	14571.72548
06	Black Birch	06BB	8867	17154.72087	14573.05065
06	Black Birch	06BB	8877	17173.95952	14673.35715
06	Black Birch	06BB	8879	17185.89029	14675.0546
06	Black Birch	06BB	8880	17192.25619	14683.11467
06	Black Birch	06BB	8922	17176.29017	14654.28263
06	Black Birch	06BB	9229	17571.18059	14623.49566
06	Black Birch	06BB	9433	17488.07829	14850.09356
06	Black Birch	06BB	9437	17481.25946	14835.45911
06	Black Birch	06BB	9652	17241.38936	14792.18159
06	Black Birch	6BB	7169	16760.85633	13908.44316
06	Black Walnut	06BW	6314	17637.5383	13091.36412
06	Cedar	06CE	1727	16363.12724	13325.01471
06	Cedar	06CE	1784	16352.13462	13174.00734
06	Cedar	06CE	5447	17141.35664	13521.93812
06	Cedar	06CE	5864	17063.62646	12763.19962
06	Cedar	06CE	6074	17234.73513	13109.80971
06	Cedar	06CE	6083	17282.06288	13056.39472
06	Cedar	06CE	6139	17299.14961	13048.70662
06	Cedar	06CE	6910	16852.8339	13809.43604
06	Cedar	06CE	6911	16855.72558	13821.7176
06	Cedar	06CE	7436	16604.87585	13954.33151
06	Dogwood	06DO	5463	17234.4764	13512.02147
06	Dogwood	06DO	7770	16946.41091	14330.91399
06	Elm	06EL	1385	15723.65745	13229.28594
06	Elm	06EL	6889	16793.09699	13836.78048
06	Elm	06EL	6915	16886.41549	13852.1895
06	Elm	06EL	6921	16954.78565	13832.92421
06	Elm	06EL	6924	16903.46016	13827.62694
06	Hemlock	06HE	5516	17063.7012	13789.58165
06	Hemlock	06HE	6669	17416.99719	13695.94597
06	Hemlock	06HE	7827	16781.17621	14330.71348

06	Hemlock	06HE	7842	16850.95605	14327.42467
06	Hemlock	06HE	7892	16786.1904	14477.52197
06	Hemlock	06HE	8018	17096.87394	14376.25423
06	Hemlock	06HE	8127	17305.69213	14066.28168
06	Hemlock	06HE	8180	17226.36596	14232.76128
06	Hemlock	06HE	8190	17197.3768	14156.61439
06	Hemlock	06HE	8332	17265.33569	14295.99351
06	Hemlock	06HE	8368	17246.81169	14301.03777
06	Hemlock	06HE	8380	17157.20487	14313.02725
06	Hemlock	06HE	8387	17223.08709	14332.66018
06	Hemlock	06HE	8391	17240.97045	14308.99412
06	Hemlock	06HE	8412	17184.66622	14462.92914
06	Hemlock	06HE	8427	17216.23671	14366.03662
06	Hemlock	06HE	8462	17156.51362	14327.43449
06	Hemlock	06HE	8463	17159.26085	14360.44719
06	Hemlock	06HE	8474	17128.26925	14393.05633
06	Hemlock	06HE	8485	17140.52216	14430.5891
06	Hemlock	06HE	8491	17123.53132	14453.04867
06	Hemlock	06HE	8501	17065.37187	14468.42654
06	Hemlock	06HE	8523	17164.71837	14484.79309
06	Hemlock	06HE	8566	16999.31043	14253.8457
06	Hemlock	06HE	8615	16963.12615	14241.72281
06	Hemlock	06HE	8620	16941.58546	14237.02956
06	Hemlock	06HE	8684	16985.73031	14497.65444
06	Hemlock	06HE	8693	16926.99623	14460.03819
06	Hemlock	06HE	8694	16927.59473	14450.41861
06	Hemlock	06HE	8711	16886.24049	14510.4753
06	Hemlock	06HE	8725	16954.38399	14548.89797
06	Hemlock	06HE	8734	16929.48545	14575.19678
06	Hemlock	06HE	8744	16954.84188	14582.98571
06	Hemlock	06HE	8745	16964.13176	14576.3573
06	Hemlock	06HE	8748	16971.09908	14557.4607
06	Hemlock	06HE	8753	17007.59665	14537.50399
06	Hemlock	06HE	8759	17012.42054	14572.3853
06	Hemlock	06HE	8760	17013.70665	14568.41181
06	Hemlock	06HE	8822	17054.1575	14641.49755
06	Hemlock	06HE	8823	17047.29228	14645.31641
06	Hemlock	06HE	8851	17114.39359	14562.77199
06	Hemlock	06HE	8857	17188.6952	14569.87433
06	Hemlock	06HE	8858	17199.17288	14573.66901
06	Hemlock	06HE	8881	17210.77072	14692.31111
06	Hemlock	06HE	8882	17219.96849	14702.17104
06	Hemlock	06HE	8965	17078.07538	14721.13117
06	Hemlock	06HE	8966	17085.57243	14728.48028
06	Hemlock	06HE	8996	17066.1626	14699.71703
06	Hemlock	06HE	9102	17427.05432	14615.24888
06	Hemlock	06HE	9108	17461.36974	14621.48954
06	Hemlock	06HE	9167	17352.12471	14550.80947
06	Hemlock	06HE	9293	17517.9943	14714.50195
06	Hemlock	06HE	9321	17559.87413	14725.67155
06	Hemlock	06HE	9327	17515.87845	14732.98757
06	Hemlock	06HE	9333	17456.80269	14733.20313
06	Hemlock	06HE	9432	17498.55756	14850.03344
06	Hemlock	06HE	9445	17496.71015	14788.65552
06	Hemlock	06HE	9447	17481.79663	14795.69293
06	Hemlock	06HE	9450	17477.47777	14791.05485

06	Hemlock	06HE	9452	17481.29295	14785.59738
06	Hemlock	06HE	9453	17478.28568	14784.81874
06	Hemlock	06HE	9458	17519.77906	14790.14771
06	Hemlock	06HE	9460	17506.20081	14807.45104
06	Hemlock	06HE	9624	17677.86734	14915.10239
06	Hemlock	06HE	9647	17219.19323	14796.74316
06	Hemlock	06HE	9669	17150.32934	14809.04216
06	Hemlock	06HE	9698	17327.2666	14703.67716
06	Hemlock	06HE	9702	17328.28591	14735.7037
06	Hemlock	06HE	9715	17388.07228	14737.29596
06	Hickory	06HI	1022	15328.50901	12823.68302
06	Hickory	06HI	1382	15736.40535	13245.54322
06	Hickory	06HI	1740	16305.9031	13340.55727
06	Hickory	06HI	5066	16987.16216	12990.42205
06	Hickory	06HI	5347	17139.47676	13279.78043
06	Hickory	06HI	5355	17172.90688	13341.58045
06	Hickory	06HI	5366	17153.54514	13350.69205
06	Hickory	06HI	5372	17155.37999	13329.03283
06	Hickory	06HI	5385	17085.57147	13484.366
06	Hickory	06HI	5409	17291.4348	13464.77091
06	Hickory	06HI	5410	17281.72979	13473.59672
06	Hickory	06HI	5418	17245.02309	13449.97131
06	Hickory	06HI	5443	17121.81889	13485.14526
06	Hickory	06HI	5582	17072.97555	13659.71251
06	Hickory	06HI	5594	17178.49589	13682.3765
06	Hickory	06HI	5598	17200.97563	13639.95746
06	Hickory	06HI	5638	16957.39404	13781.4033
06	Hickory	06HI	6512	17328.82338	13599.74082
06	Hickory	06HI	6688	17239.47436	13747.50224
06	Hickory	06HI	6690	17178.70244	13781.28264
06	Hickory	06HI	6914	16876.52353	13834.17663
06	Hickory	06HI	6919	16942.48377	13840.14789
06	Hickory	06HI	6925	16904.05868	13842.17611
06	Hickory	06HI	7077	16724.19726	13778.96225
06	Hickory	06HI	7262	16754.25633	14013.89502
06	Hickory	06HI	7440	16608.30872	14020.51072
06	Hickory	06HI	7484	16999.62658	13853.38661
06	Hickory	06HI	7491	17053.91663	13884.29443
06	Hickory	06HI	7704	17125.25158	13920.04325
06	Hickory	06HI	8148	17249.63097	14092.97581
06	Hickory	6HI	7115	16881.55498	13881.88288
06	Hickory	6HI	7119	16858.92603	13869.76811
06	Hickory	6HI	7120	16850.75733	13871.46005
06	Hickory	6HI	7121	16842.89799	13838.37704
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06	Maple	06MA	1033	15286.8142	12803.48871
06	Maple	06MA	1039	15242.73322	12841.43923
06	Maple	06MA	1040	15245.15555	12842.16527
06	Maple	06MA	1047	15213.68423	12869.74457
06	Maple	06MA	1055	15254.04223	12944.17619
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06	Maple	06MA	1103	15378.49707	12880.91874
06	Maple	06MA	1117	15424.77499	12901.13255
06	Maple	06MA	1121	15449.64735	12916.54642
06	Maple	06MA	1374	15740.36918	13306.32778

06	Maple	06MA	1375	15737.31702	13292.43845
06	Maple	06MA	1376	15714.39078	13304.79247
06	Maple	06MA	1378	15715.51075	13278.17126
06	Maple	06MA	1379	15731.36444	13275.36012
06	Maple	06MA	1387	15717.58136	13230.32208
06	Maple	06MA	1389	15703.20581	13221.15303
06	Maple	06MA	1390	15692.88483	13216.33198
06	Maple	06MA	1394	15718.2619	13175.30185
06	Maple	06MA	1395	15734.85791	13171.79942
06	Maple	06MA	1397	15737.75474	13195.15594
06	Maple	06MA	1398	15733.03817	13197.90163
06	Maple	06MA	1402	15660.30992	13202.85024
06	Maple	06MA	1410	15930.04799	13155.6339
06	Maple	06MA	1413	15951.53214	13148.0664
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06	Maple	06MA	1434	15917.3704	13170.68287
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06	Maple	06MA	1438	15906.22819	13157.34607
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06	Maple	06MA	1583	16174.38952	13121.31736
06	Maple	06MA	1702	16319.58683	13156.28022
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06	Maple	06MA	1719	16368.89945	13268.31551
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06	Maple	06MA	1952	16556.39961	13168.3988
06	Maple	06MA	4729	16810.11979	12529.82127
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06	Maple	06MA	4786	16789.42272	12626.35711
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06	Maple	06MA	4823	16888.11147	12649.84576
06	Maple	06MA	4832	16780.58812	12657.23768
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06	Maple	06MA	4913	16836.62146	13052.04918
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06	Maple	06MA	5005	16728.6065	13060.82339
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06	Maple	06MA	6533	17435.86221	13579.31697
06	Maple	06MA	6534	17426.46062	13571.84505
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06	Maple	06MA	8425	17203.53301	14374.5591
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06	Maple	06MA	8701	17009.10064	14473.97545
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06	Maple	06MA	9282	17522.51723	14632.04415
06	Maple	06MA	9289	17506.80706	14728.55205
06	Maple	06MA	9294	17514.89251	14689.33669
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06	Maple	06MA	9819	17189.58449	14854.31763
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06	Maple	6MA	7112	16883.10188	13902.87281
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06	Maple	6MA	7172	16807.95307	13901.9674
06	Oak	06OA	1684	16319.05229	13375.07941
06	Oak	06OA	1722	16350.66758	13286.20291
06	Oak	06OA	1897	16489.53492	13270.22218
06	Oak	06OA	1969	16388.22497	13338.32267
06	Oak	06OA	1983	16479.32898	13306.78571
06	Oak	06OA	4733	16812.79455	12598.74303
06	Oak	06OA	5288	17138.66219	13249.88624
06	Oak	06OA	5289	17140.71573	13246.84812
06	Oak	06OA	5325	17179.29742	13265.18934
06	Oak	06OA	5344	17166.22553	13251.32267
06	Oak	06OA	5351	17140.54062	13295.94892
06	Oak	06OA	5393	17166.32481	13441.51994
06	Oak	06OA	5456	17235.13569	13496.43857
06	Oak	06OA	5472	17220.23995	13547.6534
06	Oak	06OA	5475	17135.24147	13543.28868

06	Oak	06OA	5476	17161.5936	13559.74736
06	Oak	06OA	5486	17187.12009	13585.47623
06	Oak	06OA	5578	17076.05208	13641.96967
06	Oak	06OA	5584	17089.37502	13687.7169
06	Oak	06OA	5614	17119.94118	13580.13397
06	Oak	06OA	5863	17064.33372	12762.00061
06	Oak	06OA	5865	17056.00755	12757.80383
06	Oak	06OA	5992	17284.32006	13264.18129
06	Oak	06OA	5999	17348.39143	13241.92698
06	Oak	06OA	6000	17347.34617	13239.15432
06	Oak	06OA	6001	17339.06286	13236.1357
06	Oak	06OA	6331	17412.18047	13221.98108
06	Oak	06OA	6529	17491.2383	13588.97463
06	Oak	06OA	6551	17520.62598	13623.23294
06	Oak	06OA	6556	17487.77327	13536.63358
06	Oak	06OA	6651	17144.22628	13702.58051
06	Oak	06OA	6757	17336.38491	13826.96189
06	Oak	06OA	6892	16821.79894	13838.90573
06	Oak	06OA	7325	16663.67988	14158.05242
06	Oak	06OA	7401	16550.90006	13996.90582
06	Oak	06OA	7426	16605.17507	14054.84789
06	Oak	06OA	7433	16577.23753	13980.68843
06	Oak	06OA	7439	16630.75852	13993.27833
06	Oak	06OA	7441	16615.21922	14035.68256
06	Oak	06OA	7490	17049.3506	13883.93926
06	Oak	06OA	7521	16456.55623	14057.52461
06	Oak	06OA	7618	16622.68345	14239.70978
06	Oak	06OA	8089	17145.71847	13948.24731
06	Oak	06OA	8149	17240.68574	14087.47398
06	Oak	06OA	8184	17197.78666	14182.55048
06	Oak	06OA	8206	17251.62036	14249.49177
06	Oak	06OA	8208	17257.00315	14256.7041
06	Oak	06OA	8223	17261.19149	14158.13313
06	Oak	06OA	8467	17134.58175	14384.83473
06	Oak	06OA	8619	16942.99005	14237.61795
06	Oak	06OA	8686	16959.12122	14496.78958
06	Oak	06OA	8834	17087.53413	14490.77745
06	Oak	06OA	8901	17274.94419	14660.29652
06	Oak	06OA	9656	17209.95076	14823.07033
06	Oak	06OA	9679	17289.12208	14834.6441
06	Oak	6OA	7128	16813.63498	13945.30268
06	Wild Cherry	06WC	1485	15945.15498	13235.23233
06	Wild Cherry	06WC	1762	16480.88195	13119.35862
06	Wild Cherry	06WC	1763	16473.51751	13119.37598
06	Wild Cherry	06WC	1794	16357.78361	13223.52255
07	Ash	07AS	5058	16942.11022	12927.54976
07	Ash	07AS	5663	17007.23974	12667.52016
07	Ash	07AS	5906	17156.73219	12858.17068
07	Ash	07AS	6036	17247.08203	13198.24321
07	Ash	07AS	6683	17309.76998	13753.66204
07	Beech	07BE	5635	16977.92579	13773.44372
07	Beech	07BE	6037	17232.48506	13201.77801
07	Beech	07BE	7494	17081.98408	13901.60783
07	Beech	07BE	7825	16795.80275	14336.07384
07	Beech	07BE	8023	17097.71357	14398.00393
07	Beech	07BE	8656	17021.17957	14030.90199

07	Beech	07BE	8712	16873.92084	14528.125
07	Black Birch	07BB	5294	17172.87812	13161.47189
07	Black Birch	07BB	6069	17237.57424	13127.74379
07	Black Birch	07BB	6871	16800.95716	13745.96924
07	Black Birch	07BB	7495	17088.92021	13907.50972
07	Black Birch	07BB	8230	17340.0929	14160.1374
07	Black Birch	07BB	8242	17350.65891	14122.33996
07	Black Birch	07BB	8243	17346.87656	14110.83791
07	Black Birch	07BB	8426	17208.87784	14379.68164
07	Black Birch	07BB	8605	16939.76232	14116.35376
07	Black Birch	07BB	8700	16989.97908	14480.90111
07	Black Birch	07BB	9323	17546.13876	14730.06523
07	Black Birch	07BB	9457	17517.6608	14778.45873
07	Cedar	07CE	5321	17126.47056	13225.6663
07	Elm	07EL	6885	16775.08994	13834.51029
07	Elm	7EL	7126	16808.43255	13881.49663
07	Hemlock	07HE	8398	17191.7018	14347.60803
07	Hemlock	07HE	8409	17179.55991	14416.577
07	Hemlock	07HE	8423	17220.16365	14388.59663
07	Hemlock	07HE	8473	17132.52451	14397.58202
07	Hemlock	07HE	8487	17123.67567	14438.87728
07	Hemlock	07HE	8738	16933.82509	14565.26469
07	Hemlock	07HE	8848	17101.7625	14547.34562
07	Hemlock	07HE	8861	17194.14489	14581.60677
07	Hemlock	07HE	8924	17189.84786	14707.04769
07	Hemlock	07HE	9006	17190.321	14549.84721
07	Hemlock	07HE	9016	17203.16135	14548.22818
07	Hemlock	07HE	9285	17510.176	14678.78383
07	Hemlock	07HE	9438	17494.67197	14826.89665
07	Hemlock	07HE	9710	17358.0529	14748.47574
07	Hickory	07HI	5059	16933.84741	12938.22005
07	Hickory	07HI	5261	17048.39146	13324.94471
07	Hickory	07HI	5376	17114.81521	13311.00526
07	Hickory	07HI	5377	17104.85652	13315.83059
07	Hickory	07HI	5538	17010.04736	13694.37662
07	Hickory	07HI	5554	17086.86435	13704.1197
07	Hickory	07HI	5562	17214.87004	13680.16043
07	Hickory	07HI	5983	17305.98648	13333.51356
07	Hickory	07HI	6040	17223.31263	13162.32586
07	Hickory	07HI	6277	17446.57963	13277.15238
07	Hickory	07HI	6474	17370.46174	13422.41408
07	Hickory	07HI	6646	17234.74162	13653.0321
07	Hickory	07HI	9930	17164.03812	14871.89356
07	Maple	07MA	1411	15941.49873	13159.44559
07	Maple	07MA	1412	15952.96786	13162.75335
07	Maple	07MA	1542	15931.99005	13298.92973
07	Maple	07MA	1543	15932.75029	13288.3369
07	Maple	07MA	4868	16768.93102	12665.13674
07	Maple	07MA	5398	17246.14825	13366.82782
07	Maple	07MA	5411	17295.04123	13478.15418
07	Maple	07MA	5519	17113.25694	13754.34475
07	Maple	07MA	5530	17139.80655	13734.07515
07	Maple	07MA	5540	17002.13518	13688.63015
07	Maple	07MA	5605	17148.47914	13606.46814
07	Maple	07MA	5650	16962.19406	12636.56736
07	Maple	07MA	5781	16977.78468	12796.9033

07	Maple	07MA	5794	17270.63053	12941.0042
07	Maple	07MA	5795	17276.07368	12934.00998
07	Maple	07MA	5805	17178.28674	12824.56072
07	Maple	07MA	5974	17217.67626	13219.83585
07	Maple	07MA	5975	17219.5828	13242.00906
07	Maple	07MA	6016	17317.97504	13200.23675
07	Maple	07MA	6301	17687.33446	13112.20696
07	Maple	07MA	6535	17450.10198	13559.93344
07	Maple	07MA	6702	17247.0605	13827.41371
07	Maple	07MA	7252	16806.46062	14031.51912
07	Maple	07MA	8568	17007.78929	14241.30319
07	Maple	07MA	9797	17328.1701	14871.70224
07	Maple	7MA	7155	16747.35323	13962.5348
07	Maple	7MA	7170	16773.5723	13895.77849
07	Oak	07OA	5013	16715.60476	13020.96035
07	Oak	07OA	5508	17008.56318	13718.07833
07	Oak	07OA	5521	17140.86881	13777.14897
07	Oak	07OA	5585	17100.68262	13700.00565
07	Oak	07OA	5620	16967.34831	13728.81501
07	Oak	07OA	6011	17246.88637	13253.86315
07	Oak	07OA	6039	17223.72548	13204.49488
07	Oak	07OA	6288	17562.92503	13183.34448
07	Oak	07OA	6528	17474.39194	13586.62544
07	Oak	07OA	6532	17460.98721	13585.51786
07	Oak	07OA	8054	17293.55261	14078.52761
07	Oak	07OA	8128	17296.53573	14076.70263
07	Oak	07OA	8181	17227.00513	14215.38304
07	Oak	07OA	8715	16873.39626	14544.14108
08	Ailanthus	08AT	8878	17177.64569	14672.97535
08	Ash	08AS	1804	16426.71436	13186.6933
08	Ash	08AS	1905	16469.27544	13222.35393
08	Ash	08AS	1906	16466.85171	13219.48425
08	Ash	08AS	1908	16462.89095	13205.07017
08	Ash	08AS	1909	16475.41639	13210.49706
08	Ash	08AS	1926	16530.07709	13227.23904
08	Ash	08AS	1934	16587.97386	13240.05236
08	Ash	08AS	5010	16685.61267	13036.99026
08	Ash	08AS	5115	17068.98749	13093.68594
08	Ash	08AS	5899	17167.72558	12855.55167
08	Ash	08AS	5917	17132.92187	12917.41831
08	Ash	08AS	6222	17400.86594	12975.17115
08	Ash	08AS	7261	16728.01714	14027.81063
08	Ash	08AS	7340	16645.30852	14068.00165
08	Beech	08BE	5092	16982.72297	13041.40804
08	Beech	08BE	5412	17279.00924	13433.86404
08	Beech	08BE	5434	17268.31083	13494.80174
08	Beech	08BE	5465	17169.84595	13521.6507
08	Beech	08BE	5466	17180.87142	13514.058
08	Beech	08BE	5477	17183.47719	13555.94111
08	Beech	08BE	5913	17104.86529	12889.90338
08	Beech	08BE	6146	17378.35581	13043.17821
08	Beech	08BE	6557	17527.58264	13534.00748
08	Beech	08BE	7247	16810.33144	13979.34225
08	Beech	08BE	7260	16727.52834	14024.76532
08	Beech	08BE	7267	16699.90692	14022.06274
08	Beech	08BE	7279	16919.48578	14081.59584

08	Beech	08BE	7294	16799.52456	14058.08021
08	Beech	08BE	7342	16631.60971	14053.03196
08	Beech	08BE	7845	16855.56338	14362.69982
08	Beech	08BE	7885	16801.82352	14396.50893
08	Beech	08BE	7886	16816.75604	14428.36766
08	Beech	08BE	7893	16788.62448	14471.4298
08	Beech	08BE	8143	17247.24481	14062.05009
08	Beech	08BE	8146	17263.84068	14084.24281
08	Beech	08BE	8479	17162.65418	14389.17467
08	Beech	08BE	8595	17002.66858	14112.93892
08	Beech	08BE	8716	16880.74293	14541.40141
08	Beech	08BE	9147	17381.94072	14563.95199
08	Beech	8BE	7164	16775.91959	13941.89499
08	Black Birch	08BB	1815	16629.28659	13150.94941
08	Black Birch	08BB	1930	16586.58258	13278.26048
08	Black Birch	08BB	4782	16821.05647	12620.48523
08	Black Birch	08BB	5104	17122.20386	13100.74799
08	Black Birch	08BB	5138	16891.97344	13067.28525
08	Black Birch	08BB	5593	17153.78149	13692.52198
08	Black Birch	08BB	6398	17432.65936	13048.50332
08	Black Birch	08BB	6498	17271.67617	13608.51522
08	Black Birch	08BB	7070	16672.19022	13766.1955
08	Black Birch	08BB	7272	16969.46599	14025.49075
08	Black Birch	08BB	7273	16967.05865	14040.19392
08	Black Birch	08BB	7316	16755.04682	14129.99613
08	Black Birch	08BB	7354	16719.35662	14193.34315
08	Black Birch	08BB	7418	16536.18242	14041.23029
08	Black Birch	08BB	7435	16600.65973	13963.35137
08	Black Birch	08BB	7486	16988.36147	13812.80923
08	Black Birch	08BB	7713	16695.25994	14218.62675
08	Black Birch	08BB	7764	16960.94609	14313.48119
08	Black Birch	08BB	7767	16953.048	14275.5332
08	Black Birch	08BB	7812	16733.29232	14206.52842
08	Black Birch	08BB	7850	16854.41846	14404.68802
08	Black Birch	08BB	7859	16892.35104	14373.38769
08	Black Birch	08BB	7867	16755.63313	14398.08251
08	Black Birch	08BB	7939	16875.60843	14481.01396
08	Black Birch	08BB	8016	17101.20525	14372.69838
08	Black Birch	08BB	8022	17087.0491	14399.48857
08	Black Birch	08BB	8032	17049.1137	14421.64999
08	Black Birch	08BB	8062	17381.51609	14080.59593
08	Black Birch	08BB	8109	17256.23991	13998.15362
08	Black Birch	08BB	8112	17278.69872	13998.89541
08	Black Birch	08BB	8113	17294.07533	13999.7313
08	Black Birch	08BB	8126	17319.50374	14075.134
08	Black Birch	08BB	8193	17225.93772	14148.87601
08	Black Birch	08BB	8196	17220.19454	14192.4086
08	Black Birch	08BB	8388	17230.74004	14325.15088
08	Black Birch	08BB	8457	17150.46187	14361.73318
08	Black Birch	08BB	8476	17151.78287	14402.34497
08	Black Birch	08BB	8580	17007.4695	14219.54822
08	Black Birch	08BB	8637	16993.86391	14045.99558
08	Black Birch	08BB	8672	16981.58629	14524.5552
08	Black Birch	08BB	8723	16944.54685	14527.24468
08	Black Birch	08BB	8856	17184.1311	14566.84567
08	Black Birch	08BB	8864	17167.46261	14580.75541

08	Black Birch	08BB	8865	17159.28503	14571.59332
08	Black Birch	08BB	8929	17166.98208	14712.639
08	Black Birch	08BB	8930	17154.15639	14718.36424
08	Black Birch	08BB	9103	17429.91296	14619.10514
08	Black Birch	08BB	9434	17481.99505	14848.10243
08	Black Birch	08BB	9690	17304.18599	14822.32804
08	Black Birch	8BB	7138	16645.76512	13982.45937
08	Black Walnut	08BW	6416	17467.09214	13280.47734
08	Black Walnut	08BW	6417	17463.77697	13286.37566
08	Cedar	08CE	1682	16297.33558	13403.1332
08	Cedar	08CE	1718	16370.77468	13271.92533
08	Cedar	08CE	1726	16361.8729	13322.17626
08	Cedar	08CE	5286	17130.61056	13263.52881
08	Cedar	08CE	5436	17220.46263	13476.7627
08	Cedar	08CE	6009	17278.25963	13245.16846
08	Cedar	08CE	6019	17366.81795	13195.6193
08	Cedar	8CE	1687	16327.85526	13361.31881
08	Hemlock	08HE	7482	16991.20864	13864.00987
08	Hemlock	08HE	7720	16749.02528	14258.19075
08	Hemlock	08HE	7944	16866.75174	14540.76214
08	Hemlock	08HE	8199	17238.56462	14191.06237
08	Hemlock	08HE	8419	17208.77489	14446.51981
08	Hemlock	08HE	8504	17108.98192	14518.59158
08	Hemlock	08HE	8520	17148.80966	14492.68541
08	Hemlock	08HE	8674	16985.89237	14514.56683
08	Hemlock	08HE	8675	17017.30979	14526.36729
08	Hemlock	08HE	8678	17016.54009	14501.52729
08	Hemlock	08HE	8679	17013.60809	14491.04836
08	Hemlock	08HE	8721	16918.1831	14524.62906
08	Hemlock	08HE	8722	16938.31995	14527.82831
08	Hemlock	08HE	8747	16968.60745	14555.92888
08	Hemlock	08HE	8762	17015.98543	14579.90789
08	Hemlock	08HE	8825	17080.49313	14646.62125
08	Hemlock	08HE	8826	17101.97218	14646.79363
08	Hemlock	08HE	8835	17106.69387	14532.59685
08	Hemlock	08HE	8862	17194.63997	14588.3001
08	Hemlock	08HE	8886	17234.94175	14681.92587
08	Hemlock	08HE	8897	17252.46446	14687.11834
08	Hemlock	08HE	8903	17286.13331	14638.21545
08	Hemlock	08HE	8916	17180.22452	14631.23504
08	Hemlock	08HE	8931	17138.88133	14728.33749
08	Hemlock	08HE	8988	17095.56193	14678.11206
08	Hemlock	08HE	8997	17069.35254	14697.90889
08	Hemlock	08HE	9007	17204.44462	14558.8978
08	Hemlock	08HE	9071	17335.31917	14695.78867
08	Hemlock	08HE	9076	17383.38909	14704.09061
08	Hemlock	08HE	9077	17386.14989	14695.19317
08	Hemlock	08HE	9225	17547.80848	14608.7582
08	Hemlock	08HE	9231	17563.79577	14600.75058
08	Hemlock	08HE	9337	17434.15196	14723.73724
08	Hemlock	08HE	9340	17417.14512	14709.01803
08	Hemlock	08HE	9342	17448.80047	14693.28297
08	Hemlock	08HE	9355	17464.30899	14634.10807
08	Hemlock	08HE	9415	17533.43519	14873.90126
08	Hemlock	08HE	9416	17538.6239	14880.68486
08	Hemlock	08HE	9439	17495.91623	14821.50219

08	Hemlock	08HE	9446	17486.53552	14798.06382
08	Hemlock	08HE	9448	17479.40953	14796.1614
08	Hemlock	08HE	9451	17481.36604	14787.68711
08	Hemlock	08HE	9456	17512.11326	14785.31478
08	Hemlock	08HE	9662	17190.40847	14778.5685
08	Hemlock	08HE	9706	17351.14106	14716.00066
08	Hemlock	08HE	9709	17372.6114	14723.5372
08	Hemlock	08HE	9718	17404.32496	14727.29583
08	Hemlock	08HE	9719	17409.4488	14722.33567
08	Hemlock	08HE	9830	17290.71015	14872.57379
08	Hickory	08HI	1026	15312.4204	12817.05906
08	Hickory	08HI	1028	15297.51991	12807.94916
08	Hickory	08HI	1700	16279.01415	13170.68534
08	Hickory	08HI	1743	16302.28992	13294.4106
08	Hickory	08HI	1744	16299.57289	13282.26204
08	Hickory	08HI	1758	16516.62144	13134.97516
08	Hickory	08HI	1783	16221.49343	13132.13784
08	Hickory	08HI	1806	16458.99692	13175.77648
08	Hickory	08HI	1967	16392.43587	13334.37288
08	Hickory	08HI	5078	16977.47442	13010.39115
08	Hickory	08HI	5087	16932.97956	13031.11203
08	Hickory	08HI	5094	17001.96581	13056.63163
08	Hickory	08HI	5276	17065.45524	13327.87637
08	Hickory	08HI	5343	17161.35429	13262.83343
08	Hickory	08HI	5354	17181.38324	13328.413
08	Hickory	08HI	5408	17302.27985	13458.45278
08	Hickory	08HI	5425	17220.61419	13427.07705
08	Hickory	08HI	5524	17178.91783	13781.0514
08	Hickory	08HI	5537	17033.32384	13699.14177
08	Hickory	08HI	5619	16966.98996	13731.75851
08	Hickory	08HI	5623	16981.7032	13691.96271
08	Hickory	08HI	5637	16977.44177	13750.81942
08	Hickory	08HI	5984	17312.08331	13334.59418
08	Hickory	08HI	6073	17229.53749	13111.54369
08	Hickory	08HI	6468	17438.78403	13518.84127
08	Hickory	08HI	6485	17318.15311	13532.60685
08	Hickory	08HI	6559	17545.48363	13523.74294
08	Hickory	08HI	6759	17313.31416	13796.78543
08	Hickory	08HI	6901	16814.16106	13774.12551
08	Hickory	08HI	6903	16827.50439	13753.39408
08	Hickory	08HI	6904	16833.31562	13750.94576
08	Hickory	08HI	6912	16866.11425	13814.61917
08	Hickory	08HI	7181	16857.52186	13910.3366
08	Hickory	08HI	7330	16701.8332	14130.60786
08	Hickory	08HI	8041	16995.33562	14402.59533
08	Hickory	8HI	7114	16883.55173	13875.86994
08	Hickory	8HI	7116	16874.69571	13882.19929
08	Hickory	8HI	7122	16826.17224	13858.81664
08	Hickory	8HI	7124	16825.57693	13889.35029
08	Maple	08MA	1043	15237.97811	12876.23911
08	Maple	08MA	1060	15208.0963	12969.5132
08	Maple	08MA	1062	15224.05386	12989.75636
08	Maple	08MA	1063	15243.93958	12959.5287
08	Maple	08MA	1067	15272.64865	12981.52187
08	Maple	08MA	1115	15414.84953	12891.97067
08	Maple	08MA	1354	15800.43354	13119.64462

08	Maple	08MA	1373	15745.11168	13296.2249
08	Maple	08MA	1380	15721.53433	13262.82567
08	Maple	08MA	1381	15709.21482	13251.02687
08	Maple	08MA	1384	15737.4183	13233.87303
08	Maple	08MA	1386	15720.16989	13241.20568
08	Maple	08MA	1388	15699.58054	13228.80986
08	Maple	08MA	1391	15682.3884	13187.23966
08	Maple	08MA	1396	15734.17133	13177.46026
08	Maple	08MA	1414	15954.21642	13145.4047
08	Maple	08MA	1416	15992.91586	13159.85728
08	Maple	08MA	1426	15952.9606	13195.36413
08	Maple	08MA	1432	15918.38608	13162.36409
08	Maple	08MA	1436	15893.48859	13173.01091
08	Maple	08MA	1442	15907.92708	13123.45992
08	Maple	08MA	1446	15839.12142	13128.18104
08	Maple	08MA	1469	15891.4491	13201.85187
08	Maple	08MA	1479	15929.79604	13272.06477
08	Maple	08MA	1481	15954.96333	13253.85743
08	Maple	08MA	1486	15949.76519	13216.77806
08	Maple	08MA	1488	15972.86675	13226.69877
08	Maple	08MA	1489	15981.31101	13203.69975
08	Maple	08MA	1490	15991.81443	13211.09332
08	Maple	08MA	1554	15954.39032	13343.31609
08	Maple	08MA	1559	15950.2351	13377.9466
08	Maple	08MA	1565	15915.56073	13355.59197
08	Maple	08MA	1575	16039.16435	13107.30197
08	Maple	08MA	1576	16046.18124	13106.77778
08	Maple	08MA	1706	16302.78133	13180.01994
08	Maple	08MA	1724	16348.73703	13293.2535
08	Maple	08MA	1761	16482.06746	13122.40787
08	Maple	08MA	1769	16407.39284	13120.20007
08	Maple	08MA	1771	16378.46415	13117.42941
08	Maple	08MA	1836	16744.43753	13137.8563
08	Maple	08MA	1873	16573.44405	13294.82272
08	Maple	08MA	1899	16510.23122	13286.08465
08	Maple	08MA	1902	16524.75538	13253.51954
08	Maple	08MA	1904	16487.95994	13232.94514
08	Maple	08MA	1914	16527.33726	13188.6526
08	Maple	08MA	1915	16538.12363	13190.81089
08	Maple	08MA	1937	16584.89514	13211.5049
08	Maple	08MA	1953	16548.81795	13164.86563
08	Maple	08MA	1984	16510.16901	13343.0639
08	Maple	08MA	4780	16868.09755	12601.32918
08	Maple	08MA	4876	16836.37549	12689.27799
08	Maple	08MA	4939	16731.44548	12826.66437
08	Maple	08MA	4949	16735.52976	12864.18291
08	Maple	08MA	5018	16726.67618	13004.37322
08	Maple	08MA	5090	16956.94829	13032.714
08	Maple	08MA	5091	16971.20851	13030.79193
08	Maple	08MA	5293	17172.14401	13177.95257
08	Maple	08MA	5299	17137.75372	13149.42391
08	Maple	08MA	5329	17196.45421	13298.84392
08	Maple	08MA	5525	17187.65272	13771.36135
08	Maple	08MA	5657	16980.68428	12683.99453
08	Maple	08MA	5668	17039.86959	12636.86352
08	Maple	08MA	5711	17195.55691	12780.02216

08	Maple	08MA	5725	17047.26358	12730.64283
08	Maple	08MA	5809	17225.11998	12839.40903
08	Maple	08MA	5817	17221.98486	12861.91463
08	Maple	08MA	5824	17236.52989	12914.47912
08	Maple	08MA	5829	17196.54141	12894.4956
08	Maple	08MA	5886	16988.22903	12968.71327
08	Maple	08MA	5902	17143.29376	12829.86987
08	Maple	08MA	5916	17141.44381	12906.13792
08	Maple	08MA	5967	17179.20794	13127.34331
08	Maple	08MA	5971	17211.83138	13164.24157
08	Maple	08MA	6071	17216.44736	13128.99069
08	Maple	08MA	6302	17679.01434	13120.93122
08	Maple	08MA	6303	17663.27942	13135.89375
08	Maple	08MA	6304	17637.90463	13125.63043
08	Maple	08MA	6315	17627.89041	13101.34705
08	Maple	08MA	6322	17583.0456	13129.45953
08	Maple	08MA	6400	17402.25686	13026.35822
08	Maple	08MA	6478	17307.60794	13458.82372
08	Maple	08MA	6655	17241.13706	13729.42204
08	Maple	08MA	6762	17333.72191	13799.45905
08	Maple	08MA	6896	16810.96185	13794.46019
08	Maple	08MA	6916	16904.7186	13850.07285
08	Maple	08MA	6938	16943.33769	13810.08599
08	Maple	08MA	7074	16687.98139	13762.29719
08	Maple	08MA	7242	16861.48414	13970.61221
08	Maple	08MA	7257	16731.278	14043.70243
08	Maple	08MA	7268	16818.28628	13928.72839
08	Maple	08MA	7478	16955.07573	13857.7837
08	Maple	08MA	7577	16425.96784	14226.82882
08	Maple	08MA	7585	16468.12216	14278.62061
08	Maple	08MA	7637	16579.58079	14183.30213
08	Maple	08MA	7738	16630.64557	14355.04253
08	Maple	08MA	7756	16931.84665	14395.10417
08	Maple	08MA	7836	16806.16976	14303.53924
08	Maple	08MA	7870	16725.83367	14411.75729
08	Maple	08MA	7871	16711.59552	14423.68785
08	Maple	08MA	7934	16890.98989	14447.35969
08	Maple	08MA	8093	17157.12152	13976.61208
08	Maple	08MA	8159	17176.10862	14070.11485
08	Maple	08MA	8195	17233.29848	14169.37379
08	Maple	08MA	8224	17249.27541	14136.29764
08	Maple	08MA	8240	17372.18227	14122.55683
08	Maple	08MA	8241	17365.80955	14128.05125
08	Maple	08MA	8333	17266.23223	14280.16153
08	Maple	08MA	8399	17182.68733	14331.24564
08	Maple	08MA	8670	16966.28049	14522.59802
08	Maple	08MA	9101	17414.49856	14615.91103
08	Maple	08MA	9665	17171.45282	14799.42973
08	Maple	08MA	9825	17244.44093	14891.13459
08	Oak	08OA	1717	16385.27668	13262.34825
08	Oak	08OA	1725	16370.14814	13289.32517
08	Oak	08OA	1736	16343.18947	13322.71925
08	Oak	08OA	1982	16481.274	13311.73831
08	Oak	08OA	5287	17127.19821	13253.67221
08	Oak	08OA	5389	17138.10853	13437.95275
08	Oak	08OA	5461	17259.2214	13511.25881

08	Oak	08OA	5462	17250.7273	13523.24651
08	Oak	08OA	5512	17067.65258	13810.64703
08	Oak	08OA	5532	17110.61819	13742.05613
08	Oak	08OA	5790	17288.46721	12902.07149
08	Oak	08OA	5969	17202.34769	13143.40262
08	Oak	08OA	6002	17330.29792	13238.81251
08	Oak	08OA	6007	17283.01881	13257.08724
08	Oak	08OA	6076	17272.89274	13103.42739
08	Oak	08OA	6116	17261.83314	13004.57462
08	Oak	08OA	6137	17348.81289	13008.95871
08	Oak	08OA	6169	17298.63782	12860.32123
08	Oak	08OA	6286	17540.80582	13186.94991
08	Oak	08OA	6289	17565.24807	13176.38752
08	Oak	08OA	6326	17546.9702	13169.07025
08	Oak	08OA	6334	17397.12421	13219.63455
08	Oak	08OA	6477	17315.68965	13413.34297
08	Oak	08OA	6527	17456.6646	13595.83346
08	Oak	08OA	6552	17510.99335	13611.23908
08	Oak	08OA	6554	17500.90627	13590.02613
08	Oak	08OA	6679	17276.17284	13735.66743
08	Oak	08OA	6699	17203.98331	13814.61352
08	Oak	08OA	6874	16757.0303	13761.74971
08	Oak	08OA	6893	16807.03682	13829.22912
08	Oak	08OA	7010	16578.1747	13818.30979
08	Oak	08OA	7263	16752.16885	14005.54623
08	Oak	08OA	7347	16656.82915	14025.81062
08	Oak	08OA	7579	16427.59231	14248.98813
08	Oak	08OA	7623	16634.09307	14242.37309
08	Oak	08OA	7625	16648.41988	14233.99582
08	Oak	08OA	7729	16726.81468	14317.73488
08	Oak	08OA	8058	17345.20461	14081.45566
08	Oak	08OA	8120	17352.78841	14058.9289
08	Oak	08OA	8139	17214.75147	14042.75221
08	Oak	08OA	8160	17132.88073	14056.66034
08	Oak	08OA	8200	17247.28713	14187.34174
08	Oak	08OA	8229	17335.42412	14125.77386
08	Oak	08OA	8573	17054.9843	14184.66681
08	Oak	08OA	8618	16939.95638	14241.75035
08	Oak	08OA	8696	16972.57992	14488.60875
08	Oak	08OA	8698	16971.43734	14474.8897
08	Oak	08OA	8900	17279.03989	14670.56184
08	Oak	08OA	9358	17499.98678	14599.57018
08	Oak	08OA	9444	17497.69582	14789.94385
08	Oak	08OA	9708	17371.81796	14721.55747
08	Oak	8OA	7166	16779.62012	13926.69695
08	Oak	8OA	7173	16801.34161	13911.88668
08	Wild Cherry	08WC	1793	16373.20181	13221.8521
08	Wild Cherry	08WC	1795	16366.40949	13229.54167
08	Wild Cherry	08WC	1925	16538.13385	13229.2859
08	Wild Cherry	08WC	1929	16571.0562	13252.23027
08	Wild Cherry	08WC	1968	16397.37173	13335.59661
09	Ash	09AS	5111	17074.45442	13108.2579
09	Ash	09AS	5483	17231.12753	13586.71361
09	Ash	09AS	5652	16956.9466	12639.16143
09	Ash	09AS	5655	16990.4669	12661.99089
09	Ash	09AS	6119	17269.87189	12967.83048

09	Ash	09AS	6306	17654.2074	13101.33787
09	Beech	09BE	4699	16792.29701	12597.84625
09	Beech	09BE	5401	17267.39733	13368.10745
09	Beech	09BE	5629	17029.22279	13762.47604
09	Beech	9BE	7139	16656.62522	13968.02078
09	Black Birch	09BB	6026	17364.92437	13179.17629
09	Black Birch	09BB	6392	17465.31828	13031.94836
09	Black Birch	09BB	6396	17439.05382	13034.74644
09	Black Birch	09BB	7303	16774.44944	14087.57803
09	Black Birch	09BB	8389	17235.17232	14328.12636
09	Black Birch	09BB	8827	17104.13577	14639.5899
09	Black Birch	09BB	9606	17703.57844	14920.92224
09	Black Birch	09BB	9622	17650.94746	14913.70993
09	Elm	09EL	5905	17126.39576	12834.42467
09	Hemlock	09HE	6269	17556.57977	13201.04775
09	Hemlock	09HE	8119	17355.28112	14065.38061
09	Hemlock	09HE	8390	17236.95365	14328.65745
09	Hemlock	09HE	8513	17124.80555	14503.31604
09	Hemlock	09HE	9603	17676.56581	14892.5739
09	Hickory	09HI	4948	16718.21661	12856.19796
09	Hickory	09HI	5634	17003.81615	13802.21086
09	Hickory	09HI	6913	16864.18799	13836.22517
09	Hickory	09HI	7613	16588.66967	14226.81597
09	Maple	09MA	1037	15230.95417	12817.14961
09	Maple	09MA	4757	16889.39953	12519.19131
09	Maple	09MA	4833	16783.93334	12644.06213
09	Maple	09MA	4834	16761.30937	12641.43788
09	Maple	09MA	4889	16870.86657	13059.40089
09	Maple	09MA	5077	16989.88263	13015.307
09	Maple	09MA	5107	17105.17131	13097.98707
09	Maple	09MA	5108	17104.9009	13115.85291
09	Maple	09MA	5246	17061.4264	13199.68549
09	Maple	09MA	5309	17165.16475	13235.69003
09	Maple	09MA	5681	17074.57236	12664.25975
09	Maple	09MA	5806	17179.87582	12819.09703
09	Maple	09MA	5807	17200.41418	12822.68908
09	Maple	09MA	5819	17243.29207	12863.9217
09	Maple	09MA	5821	17235.75722	12882.98776
09	Maple	09MA	5822	17239.54582	12891.41668
09	Maple	09MA	5904	17119.02994	12832.6359
09	Maple	09MA	5918	17132.87095	12927.63166
09	Maple	09MA	5919	17143.87275	12935.87758
09	Maple	09MA	6015	17307.49384	13198.97389
09	Maple	09MA	6082	17292.34984	13052.61921
09	Maple	09MA	6105	17235.62665	13049.46807
09	Maple	09MA	6114	17253.76996	13009.11704
09	Maple	09MA	6136	17351.72862	13001.2392
09	Maple	09MA	6149	17394.43	13070.43166
09	Maple	09MA	6221	17414.5244	12973.47964
09	Maple	09MA	6347	17565.75861	13136.6428
09	Maple	09MA	6517	17360.45146	13570.52741
09	Maple	09MA	6686	17263.11753	13740.57986
09	Maple	09MA	8202	17256.28936	14195.29622
09	Maple	09MA	8207	17249.59782	14256.33563
09	Oak	09OA	5281	17077.13957	13270.01982
09	Oak	09OA	5440	17150.12995	13465.65339

09	Oak	09OA	5820	17251.20996	12874.62429
09	Oak	09OA	6017	17333.12012	13196.94149
09	Oak	09OA	6072	17226.17173	13120.29054
09	Oak	09OA	6108	17230.13404	13010.67512
09	Oak	09OA	7320	16733.06243	14137.57524
09	Tulip	09TU	5927	17098.04428	12916.00242
10	Ash	10AS	1064	15243.86321	12970.66884
10	Ash	10AS	1712	16326.10461	13221.63321
10	Ash	10AS	1747	16300.95252	13259.67135
10	Ash	10AS	1754	16555.98866	13152.39935
10	Ash	10AS	1767	16415.59698	13152.71989
10	Ash	10AS	1774	16364.82671	13133.01533
10	Ash	10AS	1775	16352.64342	13133.50152
10	Ash	10AS	1776	16354.0043	13128.66159
10	Ash	10AS	1791	16408.50827	13232.82146
10	Ash	10AS	1888	16471.92018	13284.49623
10	Ash	10AS	1901	16518.19642	13258.38449
10	Ash	10AS	1912	16504.83455	13169.83773
10	Ash	10AS	1970	16394.95148	13346.74611
10	Ash	10AS	4725	16779.75875	12532.36794
10	Ash	10AS	4761	16911.02793	12551.63743
10	Ash	10AS	4777	16886.74307	12599.09655
10	Ash	10AS	4867	16775.8436	12682.03129
10	Ash	10AS	4997	16735.18309	13088.77844
10	Ash	10AS	5029	16780.70466	13096.56604
10	Ash	10AS	5030	16776.11175	13097.77343
10	Ash	10AS	5076	16998.03831	13011.68299
10	Ash	10AS	5117	17058.47343	13105.33327
10	Ash	10AS	5907	17154.78038	12859.48252
10	Ash	10AS	6895	16826.28119	13807.53507
10	Ash	10AS	7633	16650.08502	14122.47082
10	Ash	10AS	9629	17592.82952	14894.69145
10	Beech	10BE	5632	17003.40841	13765.79797
10	Beech	10BE	6704	17232.44026	13819.01247
10	Beech	10BE	7100	16628.23399	13805.57609
10	Beech	10BE	7254	16765.69974	14025.42454
10	Beech	10BE	7351	16671.15669	14202.70847
10	Beech	10BE	7429	16561.51653	14006.67736
10	Beech	10BE	7772	16888.84406	14352.36499
10	Beech	10BE	7773	16875.22356	14337.8346
10	Beech	10BE	7848	16858.09779	14374.8921
10	Beech	10BE	7906	16752.87075	14501.82158
10	Beech	10BE	7907	16748.73546	14503.64159
10	Beech	10BE	8050	17284.76467	14117.34274
10	Beech	10BE	8110	17238.45192	14016.2338
10	Beech	10BE	8111	17261.45901	14024.0105
10	Beech	10BE	8563	17043.90302	14253.48927
10	Beech	10BE	8718	16919.30767	14542.16479
10	Beech	10BE	8970	17120.48901	14744.20775
10	Beech	10BE	9344	17468.11243	14703.99369
10	Beech	10BE	9604	17681.86694	14888.9415
10	Black Birch	10BB	1879	16525.90235	13290.62032
10	Black Birch	10BB	1880	16523.79801	13301.31577
10	Black Birch	10BB	4937	16722.7396	12804.03265
10	Black Birch	10BB	5016	16775.14165	13011.08133
10	Black Birch	10BB	5469	17271.29418	13564.4876

10	Black Birch	10BB	6075	17249.58901	13098.1489
10	Black Birch	10BB	6081	17287.70486	13067.53705
10	Black Birch	10BB	6399	17400.98699	13019.64899
10	Black Birch	10BB	7110	16896.77293	13890.90851
10	Black Birch	10BB	7290	16825.41132	14052.13061
10	Black Birch	10BB	7291	16815.81516	14047.7356
10	Black Birch	10BB	7298	16785.28502	14087.94745
10	Black Birch	10BB	7306	16724.08642	14080.07038
10	Black Birch	10BB	7317	16743.5247	14169.97956
10	Black Birch	10BB	7327	16656.86618	14131.72075
10	Black Birch	10BB	7771	16911.45596	14371.03857
10	Black Birch	10BB	7804	16839.23247	14264.15389
10	Black Birch	10BB	7805	16838.33845	14262.06465
10	Black Birch	10BB	7814	16753.59042	14276.34281
10	Black Birch	10BB	7818	16767.78842	14300.34945
10	Black Birch	10BB	7828	16798.47076	14321.97345
10	Black Birch	10BB	7832	16790.55077	14276.3146
10	Black Birch	10BB	7879	16716.30102	14433.86072
10	Black Birch	10BB	7935	16909.89138	14456.36232
10	Black Birch	10BB	7943	16858.68776	14521.47293
10	Black Birch	10BB	8015	17106.08241	14363.29316
10	Black Birch	10BB	8049	17266.54922	14107.99259
10	Black Birch	10BB	8209	17265.16621	14244.75592
10	Black Birch	10BB	8335	17278.59911	14280.34589
10	Black Birch	10BB	8383	17198.38672	14321.27083
10	Black Birch	10BB	8433	17236.21878	14464.22156
10	Black Birch	10BB	8464	17166.4218	14368.41932
10	Black Birch	10BB	8511	17131.90973	14505.41792
10	Black Birch	10BB	8562	17056.51004	14240.41357
10	Black Birch	10BB	8640	17013.24148	14039.02994
10	Black Birch	10BB	8659	17070.79951	14060.33187
10	Black Birch	10BB	8685	16961.61784	14495.56974
10	Black Birch	10BB	8687	16954.75202	14496.80746
10	Black Birch	10BB	8726	16935.99287	14548.19772
10	Black Birch	10BB	8755	16995.07612	14565.5808
10	Black Birch	10BB	8925	17191.1946	14709.49095
10	Black Birch	10BB	8946	17175.51512	14763.0872
10	Black Birch	10BB	8983	17110.95679	14677.27303
10	Black Birch	10BB	9051	17326.97885	14586.65009
10	Black Birch	10BB	9356	17452.19356	14630.06403
10	Black Birch	10BB	9410	17586.68393	14866.94819
10	Black Birch	10BB	9436	17495.67586	14839.5014
10	Black Birch	10BB	9599	17698.31138	14875.78692
10	Black Birch	10BB	9627	17626.98307	14856.01459
10	Black Birch	10BB	9678	17287.16858	14851.31425
10	Black Walnut	10BW	6418	17454.25766	13296.04838
10	Black Walnut	10BW	6685	17264.41157	13754.35819
10	Cedar	10CE	1731	16366.60634	13351.83577
10	Cedar	10CE	1738	16323.47888	13315.70189
10	Cedar	10CE	5257	17018.76168	13277.41911
10	Cedar	10CE	5349	17121.14914	13298.5701
10	Elm	10EL	1041	15259.75292	12867.13153
10	Elm	10EL	7202	16902.18815	13912.59955
10	Hemlock	10HE	5326	17187.19274	13276.5445
10	Hemlock	10HE	6205	17380.37879	12966.04487
10	Hemlock	10HE	6336	17394.86164	13211.53306

10	Hemlock	10HE	7245	16828.62135	13981.51914
10	Hemlock	10HE	7706	17101.37952	13934.83495
10	Hemlock	10HE	7823	16761.9754	14371.51306
10	Hemlock	10HE	7994	16993.49402	14313.65443
10	Hemlock	10HE	8191	17216.53616	14138.58053
10	Hemlock	10HE	8226	17308.92185	14111.47217
10	Hemlock	10HE	8396	17213.38831	14355.67817
10	Hemlock	10HE	8403	17181.9452	14361.32853
10	Hemlock	10HE	8481	17157.82493	14458.68853
10	Hemlock	10HE	8482	17155.59209	14461.24424
10	Hemlock	10HE	8483	17140.71608	14465.73266
10	Hemlock	10HE	8493	17120.04915	14453.23261
10	Hemlock	10HE	8515	17115.98434	14487.70124
10	Hemlock	10HE	8525	17160.8611	14473.27655
10	Hemlock	10HE	8682	17003.19196	14503.78069
10	Hemlock	10HE	8689	16943.97456	14490.92492
10	Hemlock	10HE	8699	16988.11022	14482.61688
10	Hemlock	10HE	8720	16911.98414	14530.99854
10	Hemlock	10HE	8724	16932.36467	14538.97651
10	Hemlock	10HE	8735	16934.38233	14573.82968
10	Hemlock	10HE	8737	16946.30212	14572.94415
10	Hemlock	10HE	8750	16974.4976	14543.05595
10	Hemlock	10HE	8754	17000.71869	14545.54716
10	Hemlock	10HE	8824	17050.94225	14652.93797
10	Hemlock	10HE	8833	17032.48555	14534.30429
10	Hemlock	10HE	8836	17101.5823	14528.08337
10	Hemlock	10HE	8853	17175.7532	14545.22939
10	Hemlock	10HE	8884	17225.20535	14698.95644
10	Hemlock	10HE	8899	17262.25888	14673.14474
10	Hemlock	10HE	8964	17072.78671	14723.62597
10	Hemlock	10HE	8977	17108.18624	14712.25291
10	Hemlock	10HE	8981	17137.01304	14699.38053
10	Hemlock	10HE	8992	17092.59411	14663.1896
10	Hemlock	10HE	8995	17076.58023	14702.56861
10	Hemlock	10HE	9014	17219.2307	14551.0316
10	Hemlock	10HE	9066	17265.44917	14699.2902
10	Hemlock	10HE	9069	17321.31687	14695.0137
10	Hemlock	10HE	9089	17380.89464	14675.37271
10	Hemlock	10HE	9091	17355.09074	14674.26986
10	Hemlock	10HE	9094	17365.85666	14630.58794
10	Hemlock	10HE	9099	17405.07867	14600.46581
10	Hemlock	10HE	9104	17438.57912	14624.49345
10	Hemlock	10HE	9109	17464.37782	14615.34505
10	Hemlock	10HE	9149	17380.17296	14545.04789
10	Hemlock	10HE	9161	17309.42765	14540.07123
10	Hemlock	10HE	9163	17331.21706	14554.6204
10	Hemlock	10HE	9164	17330.42076	14555.65978
10	Hemlock	10HE	9165	17335.98672	14545.64138
10	Hemlock	10HE	9170	17366.22117	14574.10723
10	Hemlock	10HE	9324	17530.19176	14737.95081
10	Hemlock	10HE	9325	17523.24071	14734.12879
10	Hemlock	10HE	9338	17435.76081	14712.43085
10	Hemlock	10HE	9345	17476.57495	14697.73427
10	Hemlock	10HE	9363	17562.75292	14741.87501
10	Hemlock	10HE	9411	17582.4972	14873.14172
10	Hemlock	10HE	9430	17489.69294	14853.51856

10	Hemlock	10HE	9455	17511.7312	14781.96842
10	Hemlock	10HE	9493	17535.94139	14749.52317
10	Hemlock	10HE	9637	17315.09697	14792.09164
10	Hemlock	10HE	9660	17195.35807	14795.68758
10	Hemlock	10HE	9682	17272.25499	14814.21674
10	Hemlock	10HE	9707	17357.67656	14719.65187
10	Hemlock	10HE	9711	17359.23925	14745.56153
10	Hemlock	10HE	9720	17410.55761	14727.47653
10	Hemlock	10HE	9932	17171.78409	14887.20977
10	Hickory	10HI	1563	15917.03408	13376.03896
10	Hickory	10HI	1574	16029.23796	13099.00523
10	Hickory	10HI	1728	16359.61573	13327.07488
10	Hickory	10HI	1756	16536.83898	13143.36078
10	Hickory	10HI	1764	16469.84184	13126.43683
10	Hickory	10HI	1787	16366.63044	13167.42263
10	Hickory	10HI	1870	16585.08468	13311.02582
10	Hickory	10HI	1935	16597.9418	13230.20526
10	Hickory	10HI	5267	17116.63758	13426.95582
10	Hickory	10HI	5275	17072.88544	13331.92001
10	Hickory	10HI	5284	17118.8108	13259.06778
10	Hickory	10HI	5330	17199.41136	13297.34455
10	Hickory	10HI	5352	17141.41647	13309.18661
10	Hickory	10HI	5529	17138.64405	13751.17693
10	Hickory	10HI	5548	17049.49062	13614.35184
10	Hickory	10HI	5581	17075.55175	13651.73524
10	Hickory	10HI	5586	17102.48424	13694.35786
10	Hickory	10HI	5587	17113.41357	13668.09325
10	Hickory	10HI	5627	16993.31406	13748.59076
10	Hickory	10HI	5631	17016.19956	13774.7186
10	Hickory	10HI	5639	16975.54134	13776.34447
10	Hickory	10HI	5977	17228.37266	13269.21621
10	Hickory	10HI	5981	17277.1789	13320.14585
10	Hickory	10HI	6460	17378.04188	13421.52253
10	Hickory	10HI	6476	17315.81069	13392.01955
10	Hickory	10HI	6479	17304.13399	13456.46227
10	Hickory	10HI	6516	17334.80365	13571.53759
10	Hickory	10HI	6810	17433.59274	13374.68813
10	Hickory	10HI	6920	16947.79605	13831.98604
10	Hickory	10HI	6945	16941.11973	13776.4677
10	Hickory	10HI	7125	16813.32222	13888.01846
10	Hickory	10HI	7346	16666.895	14001.57909
10	Hickory	10HI	7402	16540.48709	13995.46015
10	Hickory	10HI	7686	17087.99354	13873.1716
10	Hickory	10HI	7690	17107.84563	13862.29515
10	Hickory	10HI	7872	16685.28758	14430.34168
10	Hickory	10HI	7873	16664.28439	14437.48344
10	Hickory	10HI	8124	17332.18435	14055.96654
10	Hickory	10HI	8125	17333.64211	14061.86896
10	Hickory	10HI	9655	17195.36119	14829.46078
10	Hickory	10HI	9834	17319.4157	14883.72437
10	Maple	10MA	1048	15222.63816	12893.45086
10	Maple	10MA	1051	15253.49823	12890.63679
10	Maple	10MA	1377	15719.68901	13282.32352
10	Maple	10MA	1392	15694.49957	13184.65485
10	Maple	10MA	1393	15713.97608	13190.87236
10	Maple	10MA	1399	15746.1024	13158.37959

10	Maple	10MA	1408	15943.14368	13124.99387
10	Maple	10MA	1415	15980.08306	13158.16265
10	Maple	10MA	1424	15971.90525	13175.64282
10	Maple	10MA	1428	15923.60198	13189.4591
10	Maple	10MA	1470	15907.53396	13206.85387
10	Maple	10MA	1475	15927.24668	13230.44971
10	Maple	10MA	1573	16019.58539	13101.27359
10	Maple	10MA	1579	16102.07416	13106.68277
10	Maple	10MA	1701	16304.47503	13160.62479
10	Maple	10MA	1721	16347.77489	13283.46592
10	Maple	10MA	1729	16358.10891	13339.68828
10	Maple	10MA	1759	16492.94847	13149.31603
10	Maple	10MA	1765	16454.6517	13141.61584
10	Maple	10MA	1782	16243.12174	13128.17294
10	Maple	10MA	1835	16740.35532	13149.22644
10	Maple	10MA	1881	16533.55744	13313.72824
10	Maple	10MA	1883	16500.78566	13309.42662
10	Maple	10MA	1887	16479.38606	13283.91421
10	Maple	10MA	1896	16489.77517	13263.15912
10	Maple	10MA	1917	16518.69379	13191.47837
10	Maple	10MA	1920	16563.28774	13215.53749
10	Maple	10MA	1921	16570.99778	13220.59879
10	Maple	10MA	1927	16531.67105	13242.69053
10	Maple	10MA	1933	16577.85514	13250.80434
10	Maple	10MA	1936	16586.45577	13218.45785
10	Maple	10MA	1981	16482.33626	13322.05027
10	Maple	10MA	4874	16808.66062	12706.75601
10	Maple	10MA	4971	16753.66372	12952.17727
10	Maple	10MA	5000	16769.96155	13065.05379
10	Maple	10MA	5062	16970.61061	12972.97591
10	Maple	10MA	5323	17198.22853	13241.97958
10	Maple	10MA	5342	17157.20441	13283.6649
10	Maple	10MA	5371	17141.29648	13342.80213
10	Maple	10MA	5561	17199.3815	13663.88492
10	Maple	10MA	5653	16950.66802	12654.99452
10	Maple	10MA	5658	17001.57549	12691.67094
10	Maple	10MA	5660	17029.36913	12706.12226
10	Maple	10MA	5713	17203.0339	12789.16984
10	Maple	10MA	5727	17020.15461	12750.02083
10	Maple	10MA	5772	16930.22826	12853.3601
10	Maple	10MA	5780	16970.3936	12793.27119
10	Maple	10MA	5797	17252.00131	12924.01692
10	Maple	10MA	5826	17219.71978	12891.8314
10	Maple	10MA	5909	17139.77929	12887.38202
10	Maple	10MA	5914	17113.29983	12900.24458
10	Maple	10MA	6008	17278.18376	13247.26534
10	Maple	10MA	6012	17246.06467	13225.58794
10	Maple	10MA	6117	17244.53957	12985.09664
10	Maple	10MA	6168	17306.66803	12869.54229
10	Maple	10MA	6220	17422.30872	12981.85435
10	Maple	10MA	6413	17415.64515	13299.07177
10	Maple	10MA	6445	17439.24659	13340.0739
10	Maple	10MA	6497	17267.97648	13597.29876
10	Maple	10MA	6684	17227.56144	13772.32456
10	Maple	10MA	7278	16924.94317	14072.32102
10	Maple	10MA	7304	16746.61805	14082.29209

10	Maple	10MA	7398	16545.27977	13974.39756
10	Maple	10MA	7567	16474.07416	14198.45065
10	Maple	10MA	7571	16450.34224	14171.52524
10	Maple	10MA	7635	16600.19878	14119.84208
10	Maple	10MA	7641	16543.57768	14209.37246
10	Maple	10MA	8194	17229.70418	14160.43962
10	Maple	10MA	8468	17129.62951	14376.7119
10	Maple	10MA	8666	16912.90603	14506.53387
10	Maple	10MA	8749	16976.37766	14553.73177
10	Maple	10MA	9162	17320.58084	14546.63442
10	Maple	10MA	9329	17484.06489	14751.13567
10	Maple	10MA	9335	17445.50291	14722.44162
10	Maple	10MA	9431	17500.29021	14856.06095
10	Maple	10MA	9648	17225.91619	14799.6425
10	Maple	10MA	9680	17271.46554	14840.17436
10	Maple	10MA	9681	17276.3417	14831.57573
10	Maple	10MA	9695	17297.39819	14719.78477
10	Maple	10MA	9820	17197.21535	14863.89202
10	Maple	10MA	9829	17289.04919	14868.73906
10	Maple	10MA	9867	17261.5617	14950.57015
10	Maple	10MA	9939	17190.33638	14928.07627
10	Oak	10OA	1061	15209.76229	12978.75364
10	Oak	10OA	1713	16341.61366	13223.74721
10	Oak	10OA	1723	16350.74219	13288.43018
10	Oak	10OA	1732	16376.19181	13357.2183
10	Oak	10OA	1770	16384.98572	13137.70436
10	Oak	10OA	1790	16417.465	13225.60313
10	Oak	10OA	1916	16523.28851	13190.68995
10	Oak	10OA	1965	16407.55153	13313.13206
10	Oak	10OA	4735	16830.62349	12600.39724
10	Oak	10OA	5102	17130.31125	13079.79782
10	Oak	10OA	5127	16990.77817	13065.18088
10	Oak	10OA	5324	17181.64108	13258.70089
10	Oak	10OA	5350	17132.11695	13298.52835
10	Oak	10OA	5438	17190.43193	13467.65383
10	Oak	10OA	5444	17119.33465	13499.61772
10	Oak	10OA	5448	17152.38325	13513.06464
10	Oak	10OA	5451	17180.37212	13499.11784
10	Oak	10OA	5467	17272.34627	13557.16223
10	Oak	10OA	5468	17265.47519	13558.69067
10	Oak	10OA	5470	17256.08113	13572.12288
10	Oak	10OA	5480	17250.07992	13590.39703
10	Oak	10OA	5866	17044.0887	12780.42803
10	Oak	10OA	5867	17043.07075	12785.08294
10	Oak	10OA	5993	17299.177	13259.58444
10	Oak	10OA	6018	17344.98268	13191.23721
10	Oak	10OA	6028	17353.77233	13174.74045
10	Oak	10OA	6095	17184.242	13058.3811
10	Oak	10OA	6135	17345.42568	12977.38032
10	Oak	10OA	6142	17336.37794	13046.67915
10	Oak	10OA	6148	17396.93867	13061.73003
10	Oak	10OA	6335	17406.09073	13209.31176
10	Oak	10OA	6447	17396.43679	13348.86332
10	Oak	10OA	6459	17376.73359	13415.28364
10	Oak	10OA	6466	17425.04671	13491.46961
10	Oak	10OA	6470	17410.59779	13520.16284

10	Oak	10OA	6510	17385.22503	13621.66689
10	Oak	10OA	6531	17473.03321	13571.9608
10	Oak	10OA	6638	17521.38926	13672.50761
10	Oak	10OA	6761	17335.30354	13810.07738
10	Oak	10OA	6876	16738.7062	13788.18008
10	Oak	10OA	6897	16774.77971	13808.71847
10	Oak	10OA	6946	16927.6967	13769.76918
10	Oak	10OA	7157	16754.70151	13951.5511
10	Oak	10OA	7163	16772.20267	13948.53521
10	Oak	10OA	7167	16776.04383	13923.28801
10	Oak	10OA	7332	16695.84873	14122.06019
10	Oak	10OA	7338	16687.4456	14077.79893
10	Oak	10OA	7408	16489.10262	14043.64676
10	Oak	10OA	7428	16589.68846	14019.38477
10	Oak	10OA	7432	16585.30222	13965.41618
10	Oak	10OA	7560	16490.65903	14184.61216
10	Oak	10OA	7561	16491.23339	14203.51027
10	Oak	10OA	7568	16473.43717	14176.16597
10	Oak	10OA	7626	16655.0074	14233.31271
10	Oak	10OA	7629	16664.03198	14237.39362
10	Oak	10OA	7631	16649.29802	14159.77261
10	Oak	10OA	7696	17123.8399	13892.2579
10	Oak	10OA	7715	16718.56074	14228.27911
10	Oak	10OA	7758	16962.09809	14378.1382
10	Oak	10OA	8017	17103.14267	14379.42939
10	Oak	10OA	8024	17092.86038	14405.54629
10	Oak	10OA	8040	17003.43505	14429.3026
10	Oak	10OA	8135	17296.30365	14009.19033
10	Oak	10OA	8136	17251.59069	14033.05558
10	Oak	10OA	8171	17204.01626	14140.76737
10	Oak	10OA	8177	17192.55719	14239.49584
10	Oak	10OA	8192	17220.76684	14145.58897
10	Oak	10OA	8211	17270.05819	14226.0852
10	Oak	10OA	8418	17210.5085	14456.72361
10	Oak	10OA	8455	17140.16353	14361.59407
10	Oak	10OA	8465	17155.48216	14367.64071
10	Oak	10OA	8488	17112.17324	14438.12255
10	Oak	10OA	8507	17141.69837	14534.84383
10	Oak	10OA	8569	17015.93833	14240.52587
10	Oak	10OA	8636	16984.06129	14058.63464
10	Oak	10OA	8739	16940.2146	14563.98921
10	Oak	10OA	8883	17220.48184	14703.77866
10	Oak	10OA	8896	17258.46707	14694.95542
10	Oak	10OA	9020	17248.4122	14527.86133
10	Oak	10OA	9110	17461.41418	14600.57449
10	Oak	10OA	9123	17401.02499	14578.67991
10	Oak	10OA	9171	17361.3974	14590.39102
10	Oak	10OA	9280	17526.36475	14641.09815
10	Oak	10OA	9341	17446.27132	14696.35942
10	Oak	10OA	9636	17324.92005	14785.24529
10	Oak	10OA	9688	17290.14729	14816.48442
10	Tulip	10TU	1685	16336.90831	13383.92241
10	Tulip	10TU	1788	16393.42856	13174.54628
10	Tulip	10TU	1874	16557.6207	13282.79375
10	Tulip	10TU	6541	17437.47195	13547.8546
10	White Birch	10WB	5446	17123.01106	13513.36571

10	Wild Cherry	10WC	1419	16011.14534	13146.27043
10	Wild Cherry	10WC	1422	15992.1513	13169.85488
10	Wild Cherry	10WC	1429	15923.67061	13175.26241
10	Wild Cherry	10WC	1473	15919.6355	13215.62955
10	Wild Cherry	10WC	1540	15915.44506	13289.78083
10	Wild Cherry	10WC	5651	16972.59917	12641.2175
10	Wild Cherry	10WC	5901	17151.51058	12832.57124
11	Ash	11AS	5332	17228.05485	13294.14747
11	Ash	11AS	5816	17216.19432	12862.94441
11	Ash	11AS	6300	17670.99964	13102.74114
11	Beech	11BE	5898	17160.98734	12888.22969
11	Beech	11BE	8147	17243.89756	14094.36807
11	Black Birch	11BB	5237	17015.853	13199.53745
11	Black Birch	11BB	6120	17261.66657	12990.13211
11	Black Birch	11BB	6397	17436.08481	13049.51919
11	Black Birch	11BB	6483	17310.71645	13491.82285
11	Black Birch	11BB	7314	16746.76684	14145.43206
11	Black Birch	11BB	7315	16757.69512	14140.35471
11	Black Birch	11BB	7352	16675.18775	14213.29561
11	Black Birch	11BB	7878	16714.60245	14456.29041
11	Elm	11EL	5241	17019.23154	13234.18157
11	Hemlock	11HE	8369	17216.28722	14288.10861
11	Hickory	11HI	5274	17081.16552	13333.38731
11	Hickory	11HI	5348	17132.77926	13283.8092
11	Hickory	11HI	5415	17268.13249	13459.43143
11	Hickory	11HI	5419	17238.00361	13428.82879
11	Hickory	11HI	5543	17028.4145	13656.84195
11	Hickory	11HI	5557	17197.9803	13714.09847
11	Hickory	11HI	5595	17176.53608	13674.41577
11	Hickory	11HI	5596	17159.42317	13678.05796
11	Hickory	11HI	6486	17323.81732	13524.0468
11	Maple	11MA	4702	16772.92247	12551.61818
11	Maple	11MA	4785	16782.3038	12630.01957
11	Maple	11MA	4787	16802.56616	12631.81392
11	Maple	11MA	4828	16835.32383	12667.782
11	Maple	11MA	4831	16785.42261	12677.48432
11	Maple	11MA	5258	17032.38567	13265.24457
11	Maple	11MA	5328	17188.96643	13283.65268
11	Maple	11MA	5515	17094.36544	13805.48807
11	Maple	11MA	5676	17062.01718	12716.50708
11	Maple	11MA	5677	17067.32915	12712.83221
11	Maple	11MA	5729	17005.54607	12763.04645
11	Maple	11MA	5808	17207.5443	12831.7232
11	Maple	11MA	6041	17234.16139	13166.35953
11	Maple	11MA	6141	17330.90603	13038.5295
11	Maple	11MA	6511	17355.80188	13605.37203
11	Maple	11MA	7305	16727.75515	14078.91214
11	Maple	11MA	7479	16957.73764	13845.44372
11	Maple	11MA	7480	16979.83481	13857.30396
11	Oak	11OA	4732	16832.96942	12566.09381
11	Oak	11OA	5110	17088.23608	13109.51971
11	Oak	11OA	5279	17054.9655	13277.05507
11	Oak	11OA	5391	17150.04405	13440.24522
11	Oak	11OA	5442	17121.99832	13474.10924
11	Oak	11OA	5604	17144.63412	13609.72305
11	Oak	11OA	5792	17278.36518	12952.73709

11	Oak	11OA	5818	17230.71681	12874.55302
11	Oak	11OA	5965	17177.60662	13076.89521
11	Oak	11OA	6111	17242.28218	13037.7364
11	Oak	11OA	6469	17436.70789	13526.84227
11	Oak	11OA	6494	17296.15757	13556.83045
11	Oak	11OA	6522	17442.88691	13603.73462
11	Oak	11OA	6523	17453.36219	13637.72354
11	Oak	11OA	6687	17243.55156	13751.44023
11	Oak	11OA	7174	16807.0448	13916.09609
11	Oak	11OA	8402	17174.38777	14349.34516
12	Ailanthus	12AL	1549	15974.17669	13290.20881
12	Ash	12AS	1108	15400.96961	12888.73352
12	Ash	12AS	1477	15930.61037	13250.10352
12	Ash	12AS	1709	16308.78263	13204.06044
12	Ash	12AS	1746	16306.12902	13266.49426
12	Ash	12AS	1773	16389.33228	13114.13725
12	Ash	12AS	1781	16263.2851	13125.19785
12	Ash	12AS	1812	16598.4092	13147.95817
12	Ash	12AS	1900	16516.29793	13260.42421
12	Ash	12AS	4826	16862.21332	12665.66679
12	Ash	12AS	4827	16858.98621	12663.67247
12	Ash	12AS	4873	16802.62325	12711.62688
12	Ash	12AS	4875	16821.08343	12695.65604
12	Ash	12AS	4994	16676.84657	13130.51756
12	Ash	12AS	5075	17003.88754	13021.04957
12	Ash	12AS	5656	16996.88966	12675.27842
12	Ash	12AS	6908	16845.00746	13795.91694
12	Beech	12BE	4935	16742.82472	12760.05864
12	Beech	12BE	5439	17174.23193	13462.61755
12	Beech	12BE	5630	17018.86067	13781.20782
12	Beech	12BE	7162	16750.91311	13938.53397
12	Beech	12BE	7269	16825.96941	13934.4176
12	Beech	12BE	7400	16559.26011	13989.42509
12	Beech	12BE	7882	16797.73419	14430.87298
12	Beech	12BE	7905	16749.5392	14501.5035
12	Beech	12BE	8051	17288.00836	14116.26798
12	Beech	12BE	8131	17278.27235	14071.32455
12	Beech	12BE	8466	17157.7286	14384.57931
12	Beech	12BE	8579	17015.78024	14190.05642
12	Beech	12BE	8902	17288.6556	14647.34398
12	Beech	12BE	9065	17272.44585	14677.47878
12	Black Birch	12BB	4989	16649.41116	13054.9635
12	Black Birch	12BB	5311	17162.56789	13239.98927
12	Black Birch	12BB	6138	17309.28259	13020.61534
12	Black Birch	12BB	6145	17365.44229	13039.98498
12	Black Birch	12BB	6513	17337.58242	13590.12728
12	Black Birch	12BB	6548	17565.8274	13560.60842
12	Black Birch	12BB	7135	16626.58086	13944.65209
12	Black Birch	12BB	7246	16816.41346	13990.19836
12	Black Birch	12BB	7248	16803.34575	13961.16606
12	Black Birch	12BB	7253	16783.93784	14027.51558
12	Black Birch	12BB	7297	16788.91127	14080.81862
12	Black Birch	12BB	7307	16759.79211	14106.04191
12	Black Birch	12BB	7323	16699.33981	14154.29757
12	Black Birch	12BB	7492	17063.31122	13896.28936
12	Black Birch	12BB	7687	17093.05573	13826.62286

12	Black Birch	12BB	7761	16957.18923	14345.454
12	Black Birch	12BB	7829	16793.54224	14304.9279
12	Black Birch	12BB	7840	16840.94859	14356.23805
12	Black Birch	12BB	7841	16848.10952	14344.84971
12	Black Birch	12BB	7868	16760.74911	14408.91923
12	Black Birch	12BB	7902	16731.41413	14481.21561
12	Black Birch	12BB	7941	16862.00939	14499.8438
12	Black Birch	12BB	8076	17286.52304	13975.67848
12	Black Birch	12BB	8108	17259.23413	13992.23042
12	Black Birch	12BB	8114	17321.22196	14014.26557
12	Black Birch	12BB	8141	17221.21809	14073.78671
12	Black Birch	12BB	8210	17263.26345	14230.90827
12	Black Birch	12BB	8244	17356.41205	14110.50962
12	Black Birch	12BB	8386	17223.58488	14327.06794
12	Black Birch	12BB	8416	17178.68735	14501.34694
12	Black Birch	12BB	8478	17160.73806	14393.06079
12	Black Birch	12BB	8641	17013.54279	14028.25216
12	Black Birch	12BB	8660	17056.32446	14049.31157
12	Black Birch	12BB	8680	17023.03252	14484.00738
12	Black Birch	12BB	8704	16956.0766	14446.9633
12	Black Birch	12BB	8978	17111.81315	14702.16747
12	Black Birch	12BB	8986	17127.20426	14652.9419
12	Black Birch	12BB	8998	17054.64325	14680.09796
12	Black Birch	12BB	9442	17473.54413	14818.99357
12	Black Birch	12BB	9659	17160.47387	14818.06372
12	Cedar	12CE	1715	16347.0706	13254.24844
12	Cedar	12CE	5559	17184.90227	13662.10153
12	Hemlock	12HE	7255	16759.986	14027.3461
12	Hemlock	12HE	7945	16863.63066	14551.95206
12	Hemlock	12HE	8055	17320.57718	14090.45105
12	Hemlock	12HE	8134	17287.94192	14022.18881
12	Hemlock	12HE	8372	17193.18302	14271.07209
12	Hemlock	12HE	8381	17165.53534	14307.56894
12	Hemlock	12HE	8382	17195.25269	14306.70114
12	Hemlock	12HE	8410	17191.2972	14449.51881
12	Hemlock	12HE	8415	17182.79763	14486.7336
12	Hemlock	12HE	8508	17143.32507	14527.14818
12	Hemlock	12HE	8517	17124.07269	14478.35103
12	Hemlock	12HE	8518	17146.86211	14479.9529
12	Hemlock	12HE	8519	17155.64676	14486.1918
12	Hemlock	12HE	8522	17166.84333	14499.09238
12	Hemlock	12HE	8603	16967.7055	14113.13711
12	Hemlock	12HE	8667	16928.41751	14521.18922
12	Hemlock	12HE	8668	16944.16339	14513.65578
12	Hemlock	12HE	8671	16972.62276	14527.27108
12	Hemlock	12HE	8681	17001.65563	14495.0323
12	Hemlock	12HE	8688	16946.18152	14491.19132
12	Hemlock	12HE	8692	16929.21397	14475.12928
12	Hemlock	12HE	8697	16968.7548	14479.34856
12	Hemlock	12HE	8719	16892.10687	14540.42272
12	Hemlock	12HE	8727	16926.55658	14555.21714
12	Hemlock	12HE	8751	16978.95303	14538.48848
12	Hemlock	12HE	8763	17031.67302	14576.22722
12	Hemlock	12HE	8764	17030.20808	14584.72603
12	Hemlock	12HE	8840	17094.38539	14544.85066
12	Hemlock	12HE	8846	17076.26753	14571.70545

12	Hemlock	12HE	8855	17168.43526	14552.70518
12	Hemlock	12HE	8872	17123.11023	14617.92996
12	Hemlock	12HE	8889	17226.51272	14709.8396
12	Hemlock	12HE	8898	17252.49442	14684.36792
12	Hemlock	12HE	8968	17079.63874	14737.16223
12	Hemlock	12HE	8987	17111.29993	14660.42632
12	Hemlock	12HE	9008	17218.55863	14574.48567
12	Hemlock	12HE	9017	17207.91671	14531.00891
12	Hemlock	12HE	9033	17318.34969	14553.54072
12	Hemlock	12HE	9063	17296.63769	14677.75421
12	Hemlock	12HE	9073	17366.85972	14698.66216
12	Hemlock	12HE	9074	17372.06816	14696.72545
12	Hemlock	12HE	9075	17377.63397	14704.27144
12	Hemlock	12HE	9078	17418.14221	14695.2431
12	Hemlock	12HE	9090	17365.7311	14671.1725
12	Hemlock	12HE	9098	17388.69417	14607.973
12	Hemlock	12HE	9100	17404.05785	14610.41473
12	Hemlock	12HE	9121	17389.15397	14577.71257
12	Hemlock	12HE	9146	17388.75129	14551.75031
12	Hemlock	12HE	9148	17374.33493	14550.69656
12	Hemlock	12HE	9166	17344.67582	14547.83452
12	Hemlock	12HE	9222	17535.39021	14577.38322
12	Hemlock	12HE	9224	17537.0382	14591.6659
12	Hemlock	12HE	9226	17551.25234	14604.9728
12	Hemlock	12HE	9232	17560.21973	14592.17085
12	Hemlock	12HE	9283	17524.74997	14639.70098
12	Hemlock	12HE	9336	17438.56517	14727.05902
12	Hemlock	12HE	9364	17561.81698	14748.94459
12	Hemlock	12HE	9426	17511.68993	14862.7666
12	Hemlock	12HE	9440	17485.84713	14816.53892
12	Hemlock	12HE	9490	17531.88115	14768.79914
12	Hemlock	12HE	9497	17519.49216	14750.01467
12	Hemlock	12HE	9700	17343.81214	14724.78606
12	Hemlock	12HE	9713	17376.86007	14749.51242
12	Hemlock	12HE	9714	17389.46412	14751.05586
12	Hemlock	12HE	9716	17386.41681	14729.26698
12	Hemlock	12HE	9721	17416.0078	14738.5801
12	Hemlock	12HE	9722	17389.58244	14751.24359
12	Hemlock	12HE	9929	17174.40102	14863.79592
12	Hickory	12HI	1580	16116.77694	13107.45213
12	Hickory	12HI	4938	16727.10223	12826.1231
12	Hickory	12HI	4984	16669.08588	12961.83863
12	Hickory	12HI	5096	17022.23268	13070.552
12	Hickory	12HI	5264	17064.20888	13349.63129
12	Hickory	12HI	5265	17101.64185	13408.08898
12	Hickory	12HI	5273	17094.22463	13338.30839
12	Hickory	12HI	5334	17243.39996	13316.24564
12	Hickory	12HI	5336	17257.16623	13335.01678
12	Hickory	12HI	5399	17284.91546	13331.16715
12	Hickory	12HI	5417	17252.63287	13448.50913
12	Hickory	12HI	5430	17258.21596	13485.69818
12	Hickory	12HI	5433	17271.51131	13503.03667
12	Hickory	12HI	5445	17123.65497	13503.34403
12	Hickory	12HI	5459	17283.85312	13521.52567
12	Hickory	12HI	5507	16990.07979	13693.50852
12	Hickory	12HI	5510	17045.14236	13764.0905

12	Hickory	12HI	5533	17061.25104	13746.5448
12	Hickory	12HI	5626	16985.79958	13735.11002
12	Hickory	12HI	5979	17253.72685	13302.29211
12	Hickory	12HI	5980	17269.45689	13313.01902
12	Hickory	12HI	6493	17313.2281	13553.80484
12	Hickory	12HI	6875	16754.50101	13776.62755
12	Hickory	12HI	6890	16797.69089	13839.41082
12	Hickory	12HI	6891	16810.9815	13848.13593
12	Hickory	12HI	6894	16817.58472	13822.01094
12	Hickory	12HI	6899	16811.60444	13783.37094
12	Hickory	12HI	6900	16803.91725	13759.36548
12	Hickory	12HI	6906	16854.13725	13780.13722
12	Hickory	12HI	6936	16926.06511	13791.20294
12	Hickory	12HI	6944	16946.62332	13784.48507
12	Hickory	12HI	7113	16958.31994	13864.42077
12	Hickory	12HI	7117	16850.19993	13898.24808
12	Hickory	12HI	7118	16852.50807	13881.81319
12	Hickory	12HI	7123	16837.55621	13867.12879
12	Hickory	12HI	7328	16667.57588	14138.84956
12	Hickory	12HI	7329	16676.04073	14137.02058
12	Hickory	12HI	7442	16634.28884	14035.8555
12	Hickory	12HI	7475	16964.69653	13871.54956
12	Hickory	12HI	7476	16949.75626	13870.37405
12	Hickory	12HI	7481	16982.10076	13880.26342
12	Hickory	12HI	7483	16996.97781	13849.59806
12	Hickory	12HI	7489	17006.8696	13879.51269
12	Hickory	12HI	7639	16552.36866	14177.07426
12	Hickory	12HI	7856	16868.29408	14379.31238
12	Hickory	12HI	9933	17140.61304	14897.5237
12	Maple	12MA	1017	15406.66869	12845.60913
12	Maple	12MA	1038	15229.68031	12833.08526
12	Maple	12MA	1049	15238.79216	12904.57004
12	Maple	12MA	1056	15244.06271	12921.17966
12	Maple	12MA	1097	15293.93386	12855.26933
12	Maple	12MA	1409	15928.05855	13139.87307
12	Maple	12MA	1423	15995.40454	13178.03409
12	Maple	12MA	1539	15916.32956	13298.83031
12	Maple	12MA	1566	15925.36328	13334.85582
12	Maple	12MA	1585	16199.51609	13120.73427
12	Maple	12MA	1919	16549.13646	13201.93358
12	Maple	12MA	4698	16776.59483	12572.58523
12	Maple	12MA	4701	16804.21125	12568.36054
12	Maple	12MA	4759	16910.02124	12579.23216
12	Maple	12MA	4788	16822.10373	12634.2101
12	Maple	12MA	4790	16875.7405	12637.35215
12	Maple	12MA	4872	16781.53547	12722.58167
12	Maple	12MA	5001	16772.97092	13052.66821
12	Maple	12MA	5017	16756.2898	13007.78397
12	Maple	12MA	5020	16733.0269	12994.84912
12	Maple	12MA	5045	16811.31421	13069.1671
12	Maple	12MA	5064	16973.24577	12987.9251
12	Maple	12MA	5278	17047.65117	13282.19631
12	Maple	12MA	5283	17098.81747	13272.37442
12	Maple	12MA	5310	17157.03532	13244.60252
12	Maple	12MA	5339	17207.45912	13320.5468
12	Maple	12MA	5341	17168.34581	13305.89062

12	Maple	12MA	5783	16986.3339	12766.3134
12	Maple	12MA	5801	17248.69841	12854.62404
12	Maple	12MA	5802	17224.51921	12820.78701
12	Maple	12MA	5803	17189.25499	12810.88217
12	Maple	12MA	5810	17227.48936	12844.56575
12	Maple	12MA	5811	17214.44793	12843.11798
12	Maple	12MA	5830	17177.26873	12884.04673
12	Maple	12MA	5887	16998.17899	12979.26163
12	Maple	12MA	6223	17379.57603	12978.20007
12	Maple	12MA	6536	17482.55277	13547.78094
12	Maple	12MA	6873	16770.93767	13755.53054
12	Maple	12MA	7350	16682.90066	14028.40775
12	Maple	12MA	7562	16486.34666	14211.36251
12	Maple	12MA	7754	16937.48696	14393.57522
12	Maple	12MA	7903	16741.26168	14494.85613
12	Maple	12MA	7936	16902.08972	14474.26025
12	Maple	12MA	8105	17169.47552	14029.17436
12	Maple	12MA	8121	17338.71494	14029.5839
12	Maple	12MA	8461	17151.71082	14333.57529
12	Maple	12MA	8502	17061.91368	14466.45071
12	Maple	12MA	8548	17047.92771	14270.16768
12	Maple	12MA	8869	17153.47294	14618.88288
12	Maple	12MA	8920	17147.79621	14641.00834
12	Maple	12MA	9072	17334.95201	14698.34738
12	Maple	12MA	9425	17517.7412	14867.14035
12	Maple	12MA	9449	17468.91546	14801.87079
12	Maple	12MA	9496	17522.75368	14755.41426
12	Maple	12MA	9628	17610.47556	14868.47153
12	Maple	12MA	9673	17223.87255	14859.27708
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12	Maple	12MA	9818	17167.16	14839.13002
12	Maple	12MA	9824	17236.67334	14889.942
12	Maple	12MA	9826	17261.985	14905.38933
12	Maple	12MA	9866	17259.60973	14928.61301
12	Maple	12MA	9927	17145.87181	14855.32063
12	Maple	12MA	9936	17208.79335	14911.68677
12	Oak	12OA	1707	16304.45007	13189.80767
12	Oak	12OA	1730	16353.65222	13347.59457
12	Oak	12OA	1792	16399.31954	13229.28559
12	Oak	12OA	1818	16658.09741	13131.4944
12	Oak	12OA	1966	16398.97441	13326.62197
12	Oak	12OA	4726	16799.25158	12544.73718
12	Oak	12OA	4731	16835.88351	12557.11877
12	Oak	12OA	4792	16894.24266	12632.65481
12	Oak	12OA	5099	17065.82582	13069.49755
12	Oak	12OA	5242	17033.53157	13238.96081
12	Oak	12OA	5259	17027.50693	13300.34945
12	Oak	12OA	5290	17178.26212	13209.29197
12	Oak	12OA	5346	17143.94562	13265.73717
12	Oak	12OA	5357	17184.31438	13345.96838
12	Oak	12OA	5375	17115.76133	13328.38039
12	Oak	12OA	5384	17088.51484	13492.37175
12	Oak	12OA	5426	17194.96108	13440.57534
12	Oak	12OA	5427	17213.58441	13443.36491
12	Oak	12OA	5441	17145.63202	13483.18865
12	Oak	12OA	5455	17222.32033	13493.32369

12	Oak	12OA	5482	17234.54874	13594.47813
12	Oak	12OA	5527	17179.85442	13736.03891
12	Oak	12OA	5556	17103.34717	13718.01688
12	Oak	12OA	5592	17150.29546	13699.47294
12	Oak	12OA	5640	17005.64595	13819.9562
12	Oak	12OA	5793	17260.43198	12947.18053
12	Oak	12OA	5868	17038.48112	12796.0193
12	Oak	12OA	5972	17211.0765	13176.14542
12	Oak	12OA	5982	17299.18461	13324.28621
12	Oak	12OA	6115	17256.97762	13007.30796
12	Oak	12OA	6287	17550.07953	13185.75491
12	Oak	12OA	6389	17465.2376	13057.98559
12	Oak	12OA	6390	17462.78183	13044.25794
12	Oak	12OA	6415	17430.37105	13290.57917
12	Oak	12OA	6495	17278.83541	13584.17201
12	Oak	12OA	6530	17494.56678	13575.0629
12	Oak	12OA	6627	17575.20404	13620.18329
12	Oak	12OA	6636	17516.43446	13663.38016
12	Oak	12OA	6689	17191.02716	13783.56993
12	Oak	12OA	6763	17332.20397	13786.05276
12	Oak	12OA	6771	17439.66222	13732.65522
12	Oak	12OA	6878	16742.48717	13812.69527
12	Oak	12OA	6942	16962.40734	13788.31434
12	Oak	12OA	7067	16627.89512	13753.02998
12	Oak	12OA	7075	16694.27736	13769.75855
12	Oak	12OA	7168	16764.94587	13912.98208
12	Oak	12OA	7345	16649.59233	13994.53281
12	Oak	12OA	7410	16508.81763	14060.1299
12	Oak	12OA	7425	16610.24726	14056.34808
12	Oak	12OA	7566	16479.02604	14201.04403
12	Oak	12OA	7578	16424.55837	14234.52737
12	Oak	12OA	7586	16469.48218	14269.22677
12	Oak	12OA	7616	16612.29504	14227.82575
12	Oak	12OA	7695	17103.20046	13884.68559
12	Oak	12OA	7721	16741.25212	14259.15995
12	Oak	12OA	7755	16931.13379	14394.21129
12	Oak	12OA	7757	16956.19544	14381.79089
12	Oak	12OA	7843	16848.96127	14354.5273
12	Oak	12OA	7854	16876.78966	14403.83058
12	Oak	12OA	7900	16706.14534	14481.93075
12	Oak	12OA	7963	16644.02299	14421.61078
12	Oak	12OA	8035	17057.18738	14448.34441
12	Oak	12OA	8102	17156.37693	13997.29391
12	Oak	12OA	8103	17155.2983	14004.72287
12	Oak	12OA	8129	17293.47004	14069.72001
12	Oak	12OA	8130	17280.82027	14072.20961
12	Oak	12OA	8140	17196.49539	14043.31151
12	Oak	12OA	8189	17196.40292	14161.41884
12	Oak	12OA	8220	17292.37061	14164.64504
12	Oak	12OA	8400	17189.05208	14333.51435
12	Oak	12OA	8417	17210.68541	14488.2243
12	Oak	12OA	8432	17223.11638	14443.67103
12	Oak	12OA	8458	17136.8359	14340.45187
12	Oak	12OA	8471	17119.92768	14386.8911
12	Oak	12OA	8475	17143.15877	14399.71696
12	Oak	12OA	8494	17120.03189	14449.93057

12	Oak	12OA	8500	17067.78424	14467.53193
12	Oak	12OA	8561	17059.65426	14246.51844
12	Oak	12OA	8567	16979.61632	14258.33435
12	Oak	12OA	8588	17079.8526	14111.21744
12	Oak	12OA	8602	16977.40206	14107.42715
12	Oak	12OA	8612	16970.90232	14189.77718
12	Oak	12OA	8638	16986.42566	14030.08114
12	Oak	12OA	8639	17010.6663	14048.56609
12	Oak	12OA	8658	17051.311	14062.46575
12	Oak	12OA	8677	17023.37404	14502.76236
12	Oak	12OA	8736	16940.78489	14580.01457
12	Oak	12OA	8838	17079.2053	14513.7479
12	Oak	12OA	9223	17536.52407	14589.86253
12	Oak	12OA	9286	17501.9944	14682.2876
12	Oak	12OA	9326	17519.08593	14740.16824
12	Oak	12OA	9330	17464.77905	14763.63524
12	Oak	12OA	9491	17528.58746	14772.07484
12	Oak	12OA	9703	17337.74602	14731.70159
12	Oak	12OA	9705	17347.67906	14739.47547
12	Oak	12OA	9712	17367.5279	14737.3622
12	Oak	12OA	9725	17409.91816	14756.94127
12	Tulip	12TU	6324	17583.8317	13153.43097
12	Wild Cherry	12WC	1407	15979.59516	13131.53301
12	Wild Cherry	12WC	1471	15891.1766	13218.47826
12	Wild Cherry	12WC	1478	15923.60156	13255.46461
12	Wild Cherry	12WC	1492	16002.06025	13215.42096
12	Wild Cherry	12WC	1535	15904.43392	13331.00245
12	Wild Cherry	12WC	1544	15967.66473	13279.445
12	Wild Cherry	12WC	1898	16482.70148	13271.99467
12	Wild Cherry	12WC	5031	16753.89233	13086.10208
13	Ash	13AS	1584	16174.93362	13104.27846
13	Ash	13AS	5678	17085.92006	12742.70515
13	Ash	13AS	6519	17363.07563	13575.45574
13	Black Birch	13BB	8821	17049.97311	14642.95526
13	Hickory	13HI	5555	17090.53432	13717.09364
13	Hickory	13HI	5628	17012.30538	13758.17977
13	Hickory	13HI	9934	17159.33629	14906.96009
13	Maple	13MA	4791	16882.17731	12633.38671
13	Maple	13MA	4824	16870.43589	12654.90317
13	Maple	13MA	5796	17269.58779	12904.58128
13	Maple	13MA	6316	17602.59161	13113.64945
13	Oak	13OA	4737	16863.03866	12540.90701
13	Oak	13OA	5589	17125.22827	13678.18447
13	Oak	13OA	6070	17231.00693	13132.34354
13	Oak	13OA	6132	17339.20478	12973.40176
13	Oak	13OA	6333	17393.15121	13224.54026
14	Ash	14AS	1882	16509.64773	13298.38698
14	Ash	14AS	1893	16415.29607	13264.39119
14	Ash	14AS	1895	16475.67163	13253.12388
14	Ash	14AS	1924	16553.11465	13241.62942
14	Ash	14AS	1986	16539.90478	13348.94356
14	Ash	14AS	4880	16824.43118	12711.15981
14	Ash	14AS	5028	16796.07391	13085.36794
14	Ash	14AS	5116	17061.2575	13101.44661
14	Ash	14AS	5134	16900.52084	13025.48349
14	Ash	14AS	5137	16877.12412	13041.82739

14	Ash	14AS	6518	17358.94155	13577.61834
14	Ash	14AS	9920	17143.98287	14850.79811
14	Beech	14BE	5450	17159.74163	13472.00497
14	Beech	14BE	6094	17194.28118	13070.89456
14	Beech	14BE	6290	17588.57641	13174.66298
14	Beech	14BE	7573	16432.78153	14189.09782
14	Beech	14BE	7581	16443.00753	14244.27235
14	Beech	14BE	7904	16756.33495	14487.75689
14	Beech	14BE	8132	17281.00125	14066.62585
14	Beech	14BE	8695	16938.30817	14467.99981
14	Beech	14BE	8717	16890.31968	14554.66021
14	Beech	14BE	8830	17065.31529	14630.91892
14	Beech	14BE	8888	17232.44616	14689.26382
14	Black Birch	14BB	5105	17107.94872	13092.47566
14	Black Birch	14BB	5271	17101.6558	13361.64984
14	Black Birch	14BB	5449	17146.48938	13500.63541
14	Black Birch	14BB	6319	17601.22783	13163.23341
14	Black Birch	14BB	6323	17583.76759	13144.21309
14	Black Birch	14BB	7313	16757.38789	14165.43782
14	Black Birch	14BB	7326	16657.07243	14137.84584
14	Black Birch	14BB	7341	16644.29017	14054.93509
14	Black Birch	14BB	7487	17012.11287	13802.0147
14	Black Birch	14BB	7819	16766.05664	14321.1195
14	Black Birch	14BB	7822	16752.34069	14378.06434
14	Black Birch	14BB	7837	16833.86266	14310.25182
14	Black Birch	14BB	7897	16719.411	14467.3377
14	Black Birch	14BB	8025	17087.78896	14408.77108
14	Black Birch	14BB	8026	17067.55956	14405.02268
14	Black Birch	14BB	8150	17195.90761	14113.74693
14	Black Birch	14BB	8151	17184.54111	14102.26103
14	Black Birch	14BB	8336	17277.59513	14274.9863
14	Black Birch	14BB	8397	17201.07923	14356.76943
14	Black Birch	14BB	8404	17180.65007	14376.81574
14	Black Birch	14BB	8454	17128.86764	14358.05807
14	Black Birch	14BB	8610	16961.02905	14171.71907
14	Black Birch	14BB	8676	17034.59121	14526.27255
14	Black Birch	14BB	8702	17025.68419	14482.44317
14	Black Birch	14BB	8714	16859.34746	14526.75602
14	Black Birch	14BB	8761	17003.50647	14542.68337
14	Black Birch	14BB	8969	17100.65109	14747.5564
14	Black Birch	14BB	8982	17142.72433	14696.778
14	Black Birch	14BB	9018	17222.73144	14527.2751
14	Black Birch	14BB	9019	17234.98664	14541.19278
14	Black Birch	14BB	9670	17150.84119	14817.11225
14	Hemlock	14HE	6526	17473.28367	13614.39231
14	Hemlock	14HE	8056	17326.57004	14089.48226
14	Hemlock	14HE	8496	17101.95393	14452.78973
14	Hemlock	14HE	8498	17093.05095	14454.45137
14	Hemlock	14HE	8503	17103.00129	14522.13078
14	Hemlock	14HE	8505	17121.16329	14532.34923
14	Hemlock	14HE	8506	17131.77927	14532.86695
14	Hemlock	14HE	8510	17139.90831	14504.8311
14	Hemlock	14HE	8746	16964.32859	14572.44257
14	Hemlock	14HE	8828	17099.45163	14626.84085
14	Hemlock	14HE	8837	17097.26653	14531.17919
14	Hemlock	14HE	8841	17079.62506	14556.09494

14	Hemlock	14HE	8868	17151.88417	14622.65973
14	Hemlock	14HE	8876	17157.75571	14666.5615
14	Hemlock	14HE	8910	17253.2012	14631.74203
14	Hemlock	14HE	8963	17062.54158	14718.40971
14	Hemlock	14HE	8967	17087.45154	14726.19721
14	Hemlock	14HE	8976	17110.71546	14718.89197
14	Hemlock	14HE	8979	17123.20038	14697.57668
14	Hemlock	14HE	8980	17126.51129	14707.39048
14	Hemlock	14HE	8999	17054.07451	14689.41736
14	Hemlock	14HE	9015	17204.12673	14533.28104
14	Hemlock	14HE	9048	17351.94723	14587.01493
14	Hemlock	14HE	9061	17301.84466	14668.22347
14	Hemlock	14HE	9095	17365.62827	14606.88344
14	Hemlock	14HE	9152	17363.36043	14532.84789
14	Hemlock	14HE	9227	17561.97551	14616.78868
14	Hemlock	14HE	9287	17505.98835	14687.30774
14	Hemlock	14HE	9288	17502.4786	14725.75375
14	Hemlock	14HE	9291	17510.32713	14713.31202
14	Hemlock	14HE	9332	17463.06184	14736.95728
14	Hemlock	14HE	9346	17484.71519	14641.31877
14	Hemlock	14HE	9441	17482.98521	14810.9286
14	Hemlock	14HE	9602	17670.42977	14898.48697
14	Hemlock	14HE	9661	17194.69085	14778.4871
14	Hemlock	14HE	9672	17235.31776	14851.62492
14	Hemlock	14HE	9683	17269.61304	14804.73024
14	Hemlock	14HE	9692	17335.99542	14830.69327
14	Hemlock	14HE	9693	17318.55691	14816.68239
14	Hemlock	14HE	9694	17313.87863	14808.52361
14	Hemlock	14HE	9699	17338.05942	14717.93024
14	Hickory	14HI	1703	16327.93134	13166.54411
14	Hickory	14HI	1869	16583.70684	13318.55299
14	Hickory	14HI	1948	16628.62177	13174.18384
14	Hickory	14HI	5079	16974.00848	13014.70375
14	Hickory	14HI	5272	17099.55975	13348.51354
14	Hickory	14HI	5285	17121.28494	13275.06563
14	Hickory	14HI	5340	17179.98217	13313.57363
14	Hickory	14HI	5382	17091.39318	13505.47564
14	Hickory	14HI	5420	17255.45111	13418.9555
14	Hickory	14HI	5473	17170.42849	13538.41862
14	Hickory	14HI	5534	17052.59073	13719.90796
14	Hickory	14HI	5541	16997.29917	13668.77502
14	Hickory	14HI	5553	17064.66846	13674.23703
14	Hickory	14HI	5618	16959.73527	13729.63385
14	Hickory	14HI	6480	17300.04149	13479.42502
14	Hickory	14HI	6542	17386.11782	13543.06986
14	Hickory	14HI	6888	16773.29156	13853.52786
14	Hickory	14HI	6918	16937.46588	13852.08806
14	Hickory	14HI	8201	17251.60011	14189.25561
14	Hickory	14HI	9409	17600.9945	14852.2787
14	Hickory	14HI	9650	17247.54313	14822.9066
14	Hickory	14HI	9653	17224.90128	14828.294
14	Hickory	14HI	9674	17260.78528	14866.43026
14	Hickory	14HI	9691	17324.52658	14829.82781
14	Hickory	14HI	9919	17137.9452	14842.33047
14	Maple	14MA	1050	15253.11648	12898.81131
14	Maple	14MA	1054	15269.53382	12942.31961

14	Maple	14MA	1059	15209.17427	12950.19492
14	Maple	14MA	1443	15883.43831	13125.01318
14	Maple	14MA	1444	15869.79796	13126.71773
14	Maple	14MA	1472	15900.25063	13224.29032
14	Maple	14MA	1506	15764.30046	13325.73323
14	Maple	14MA	4829	16810.88313	12657.55337
14	Maple	14MA	4830	16801.64477	12663.02022
14	Maple	14MA	4870	16756.33194	12731.18188
14	Maple	14MA	4972	16751.94896	12947.98758
14	Maple	14MA	4973	16745.13695	12930.33096
14	Maple	14MA	4975	16725.62232	12888.42778
14	Maple	14MA	4993	16675.38732	13093.83965
14	Maple	14MA	5008	16698.66135	13061.73509
14	Maple	14MA	5019	16692.51145	13004.91238
14	Maple	14MA	5022	16749.74632	12980.34882
14	Maple	14MA	5132	16907.56434	13031.84574
14	Maple	14MA	5297	17123.81459	13122.28906
14	Maple	14MA	5320	17130.51083	13225.59012
14	Maple	14MA	5661	17031.00732	12683.44473
14	Maple	14MA	5814	17192.55833	12870.28766
14	Maple	14MA	5815	17196.04749	12874.01905
14	Maple	14MA	6107	17223.67952	13012.92972
14	Maple	14MA	6299	17655.57317	13081.52778
14	Maple	14MA	6671	17411.17698	13727.45764
14	Maple	14MA	7995	16986.41614	14302.18944
14	Maple	14MA	8408	17183.97006	14416.68242
14	Maple	14MA	8414	17181.48635	14482.2804
14	Maple	14MA	8845	17076.40172	14565.10685
14	Maple	14MA	8860	17203.73195	14583.57452
14	Maple	14MA	9428	17509.02283	14865.6774
14	Maple	14MA	9664	17195.59861	14767.97221
14	Maple	14MA	9676	17285.41377	14865.75352
14	Maple	14MA	9821	17240.85577	14875.55189
14	Maple	14MA	9940	17183.69963	14929.6138
14	Oak	14OA	1710	16312.97141	13206.53259
14	Oak	14OA	1711	16317.11936	13214.30123
14	Oak	14OA	1716	16377.44893	13245.02265
14	Oak	14OA	1741	16303.52821	13345.45844
14	Oak	14OA	1742	16307.26577	13308.21768
14	Oak	14OA	1810	16579.70063	13141.50862
14	Oak	14OA	1814	16620.78013	13143.006
14	Oak	14OA	4736	16853.48762	12589.73986
14	Oak	14OA	4998	16746.59297	13071.43245
14	Oak	14OA	5065	16981.45023	12990.37461
14	Oak	14OA	5074	17009.91178	13015.95514
14	Oak	14OA	5098	17057.25503	13072.27842
14	Oak	14OA	5143	16936.90271	13073.88691
14	Oak	14OA	5260	17048.15109	13320.28065
14	Oak	14OA	5327	17206.65466	13276.83354
14	Oak	14OA	5392	17158.90889	13431.40273
14	Oak	14OA	5421	17252.45916	13417.50372
14	Oak	14OA	5424	17213.64386	13427.2348
14	Oak	14OA	5460	17275.60582	13524.25098
14	Oak	14OA	5513	17078.57115	13818.68438
14	Oak	14OA	5600	17188.56264	13621.87781
14	Oak	14OA	5601	17179.76134	13616.2515

14	Oak	14OA	5976	17223.89105	13253.81778
14	Oak	14OA	6003	17326.71956	13216.13673
14	Oak	14OA	6118	17255.28688	12977.51046
14	Oak	14OA	6143	17358.48491	13061.4001
14	Oak	14OA	6271	17523.03003	13228.53945
14	Oak	14OA	6272	17502.15565	13243.87112
14	Oak	14OA	6325	17557.11438	13171.73933
14	Oak	14OA	6395	17440.29079	13043.07018
14	Oak	14OA	6410	17392.81587	13332.6549
14	Oak	14OA	6457	17389.43638	13373.27292
14	Oak	14OA	6883	16762.37207	13776.03332
14	Oak	14OA	7250	16782.73141	13995.10951
14	Oak	14OA	7275	16942.32436	14035.7983
14	Oak	14OA	7318	16751.9939	14193.56328
14	Oak	14OA	7321	16704.33851	14146.1769
14	Oak	14OA	7322	16703.16746	14144.69544
14	Oak	14OA	7335	16708.19724	14068.91825
14	Oak	14OA	7404	16524.77413	14027.05727
14	Oak	14OA	7405	16528.85861	14028.98212
14	Oak	14OA	7520	16434.4992	14045.67433
14	Oak	14OA	7523	16466.57245	14079.49858
14	Oak	14OA	7558	16524.26004	14197.15272
14	Oak	14OA	7559	16507.08684	14193.79505
14	Oak	14OA	7565	16486.87756	14201.1611
14	Oak	14OA	7742	16623.86722	14367.11377
14	Oak	14OA	7760	16964.13503	14343.26696
14	Oak	14OA	7763	16976.15909	14321.73674
14	Oak	14OA	7766	16976.38617	14276.72402
14	Oak	14OA	7817	16739.42483	14288.14561
14	Oak	14OA	7820	16749.27526	14344.92177
14	Oak	14OA	7831	16786.47181	14291.51098
14	Oak	14OA	7869	16731.68308	14407.96619
14	Oak	14OA	7898	16725.45253	14470.94421
14	Oak	14OA	7901	16713.84435	14495.76042
14	Oak	14OA	7942	16871.16907	14514.09076
14	Oak	14OA	8038	17070.56322	14433.93218
14	Oak	14OA	8227	17324.51749	14121.14999
14	Oak	14OA	8401	17177.38411	14345.02614
14	Oak	14OA	8429	17217.39592	14414.00018
14	Oak	14OA	8497	17098.88444	14450.51478
14	Oak	14OA	8581	16998.82953	14226.47068
14	Oak	14OA	8582	16993.27752	14233.76137
14	Oak	14OA	8593	17019.6588	14115.26088
14	Oak	14OA	8594	17011.67732	14104.56762
14	Oak	14OA	8611	16964.94841	14186.2143
14	Oak	14OA	8617	16955.79329	14251.21262
14	Oak	14OA	8621	16943.45954	14211.03145
14	Oak	14OA	8690	16931.21388	14490.01597
14	Oak	14OA	8740	16922.5367	14546.34355
14	Oak	14OA	8887	17229.09367	14686.99073
14	Oak	14OA	8984	17120.89158	14665.80667
14	Oak	14OA	9029	17274.94911	14550.59317
14	Oak	14OA	9097	17392.39995	14628.2858
14	Oak	14OA	9278	17581.52854	14622.07206
14	Oak	14OA	9290	17508.08604	14720.13918
14	Oak	14OA	9328	17496.07412	14751.80827

14	Oak	14OA	9343	17461.97577	14701.66592
14	Oak	14OA	9454	17485.95675	14773.96777
14	Oak	14OA	9663	17187.91254	14780.67063
14	Oak	14OA	9697	17315.74227	14726.02773
14	Oak	14OA	9723	17397.14473	14756.93785
14	Oak	14OA	9735	17357.73063	14812.80916
14	Oak	14OA	9736	17362.74864	14810.09036
14	Tulip	14TU	6109	17238.71186	13012.29965
14	Wild Cherry	14WC	1437	15900.45363	13158.8279
14	Wild Cherry	14WC	1536	15916.07134	13323.13504
14	Wild Cherry	14WC	1537	15897.98155	13304.9883
14	Wild Cherry	14WC	1798	16407.50461	13249.93032
15	Ash	15AS	1046	15225.85872	12855.36804
15	Ash	15AS	1816	16635.81712	13128.4808
15	Ash	15AS	1875	16561.12655	13276.18554
15	Ash	15AS	1877	16535.79183	13276.65857
15	Ash	15AS	4995	16686.20694	13111.22592
15	Ash	15AS	5577	17076.95172	13639.5682
15	Ash	15AS	5669	17048.00939	12625.5586
15	Ash	15AS	5679	17085.88383	12732.14589
15	Ash	15AS	5726	17035.96185	12737.15586
15	Ash	15AS	5758	16930.20449	12906.7417
15	Ash	15AS	6640	17475.4131	13678.56124
15	Beech	15BE	6831	17516.11954	13715.8309
15	Beech	15BE	7324	16675.55051	14176.40119
15	Beech	15BE	7894	16765.90041	14460.63456
15	Beech	15BE	9414	17550.41526	14870.78022
15	Beech	15BE	9443	17496.0444	14798.52018
15	Black Birch	15BB	1766	16445.07596	13123.91498
15	Black Birch	15BB	5131	16921.85925	13052.06789
15	Black Birch	15BB	6224	17380.94612	12984.58646
15	Black Birch	15BB	7011	16586.37714	13805.45228
15	Black Birch	15BB	7179	16847.25635	13916.81998
15	Black Birch	15BB	7180	16844.76005	13905.00691
15	Black Birch	15BB	7238	16833.20397	14023.87354
15	Black Birch	15BB	7239	16834.77974	14024.66113
15	Black Birch	15BB	7296	16809.58326	14095.88019
15	Black Birch	15BB	8709	16892.3771	14504.90646
15	Black Birch	15BB	8918	17157.25293	14632.19643
15	Black Birch	15BB	8993	17086.20858	14669.14813
15	Black Birch	15BB	8994	17072.12845	14701.2116
15	Black Birch	15BB	9625	17648.84672	14881.84143
15	Black Walnut	15BW	6273	17466.23582	13274.48611
15	Black Walnut	15BW	6274	17427.00167	13294.03099
15	Cedar	15CE	1878	16540.99716	13285.90906
15	Elm	15EL	1019	15387.33369	12850.79782
15	Hemlock	15HE	8179	17223.53829	14242.53893
15	Hemlock	15HE	8413	17183.59644	14465.28261
15	Hemlock	15HE	8480	17168.46426	14447.34744
15	Hemlock	15HE	8486	17137.30113	14432.56377
15	Hemlock	15HE	8683	17007.67614	14510.5197
15	Hemlock	15HE	8710	16893.47817	14521.77631
15	Hemlock	15HE	8847	17089.64663	14575.55394
15	Hemlock	15HE	8892	17286.98368	14746.88666
15	Hemlock	15HE	8893	17287.49378	14736.40404
15	Hemlock	15HE	8923	17201.45799	14663.29496

15	Hemlock	15HE	9030	17300.98078	14556.73097
15	Hemlock	15HE	9032	17316.93554	14561.10163
15	Hemlock	15HE	9107	17444.81113	14611.62531
15	Hemlock	15HE	9639	17307.37749	14782.27071
15	Hemlock	15HE	9654	17193.96367	14838.9597
15	Hemlock	15HE	9684	17278.53864	14807.95278
15	Hemlock	15HE	9686	17291.3532	14798.32057
15	Hemlock	15HE	9689	17291.11236	14826.32644
15	Hemlock	15HE	9717	17393.27022	14724.17255
15	Hickory	15HI	1027	15315.75355	12812.0943
15	Hickory	15HI	1785	16359.12722	13180.71341
15	Hickory	15HI	5060	16948.08823	12946.9831
15	Hickory	15HI	5335	17248.04119	13317.68962
15	Hickory	15HI	5353	17156.44114	13303.39704
15	Hickory	15HI	5378	17082.87117	13298.00935
15	Hickory	15HI	5622	16973.14401	13706.19896
15	Hickory	15HI	5973	17205.07454	13205.34025
15	Hickory	15HI	6487	17323.4653	13520.00665
15	Hickory	15HI	7012	16576.85523	13799.63342
15	Hickory	15HI	7068	16633.93965	13763.38571
15	Hickory	15HI	7477	16936.6595	13845.88628
15	Hickory	15HI	7632	16649.41694	14134.12115
15	Hickory	15HI	7707	17088.7114	13932.10964
15	Hickory	15HI	9621	17653.1277	14916.83179
15	Maple	15MA	1052	15277.98317	12923.67708
15	Maple	15MA	1058	15219.44141	12955.63699
15	Maple	15MA	1072	15276.21989	12998.97005
15	Maple	15MA	1352	15826.21721	13116.20408
15	Maple	15MA	1372	15759.65981	13278.15918
15	Maple	15MA	1401	15650.02699	13188.45545
15	Maple	15MA	4756	16896.45912	12549.1321
15	Maple	15MA	4981	16727.61856	12933.40904
15	Maple	15MA	5244	17057.68212	13217.22604
15	Maple	15MA	5292	17186.96804	13189.40788
15	Maple	15MA	5428	17241.86555	13469.27361
15	Maple	15MA	5454	17193.95827	13508.44664
15	Maple	15MA	9088	17382.1871	14672.08163
15	Maple	15MA	9640	17302.34319	14755.16232
15	Maple	15MA	9928	17154.19368	14865.63602
15	Oak	15OA	1714	16327.69357	13231.29697
15	Oak	15OA	5012	16696.73774	13015.88271
15	Oak	15OA	5036	16765.76099	13099.14893
15	Oak	15OA	5118	17062.66536	13093.54581
15	Oak	15OA	5345	17153.79571	13259.94869
15	Oak	15OA	5387	17089.98602	13477.36681
15	Oak	15OA	5403	17296.88068	13377.98829
15	Oak	15OA	5485	17211.33903	13594.42509
15	Oak	15OA	5966	17170.16872	13104.74905
15	Oak	15OA	6020	17385.79342	13177.82278
15	Oak	15OA	6411	17396.95369	13315.45375
15	Oak	15OA	6546	17607.17103	13554.33214
15	Oak	15OA	6654	17231.32525	13728.87315
15	Oak	15OA	6701	17249.81385	13813.93905
15	Oak	15OA	7165	16794.54985	13934.28839
15	Oak	15OA	7409	16499.66528	14054.31903
15	Oak	15OA	7430	16570.54961	14002.407

15	Oak	15OA	7522	16456.02948	14070.61205
15	Oak	15OA	7719	16738.57108	14246.00828
15	Oak	15OA	7866	16732.03975	14379.36534
15	Oak	15OA	8019	17087.49783	14378.20777
15	Oak	15OA	8036	17062.43058	14444.20256
15	Oak	15OA	8456	17143.33147	14358.18803
15	Oak	15OA	8669	16950.28406	14516.40013
15	Oak	15OA	8741	16964.68598	14548.5038
15	Oak	15OA	8742	16962.38661	14565.55929
15	Oak	15OA	8829	17070.53235	14641.30612
15	Oak	15OA	8843	17057.55997	14555.82806
15	Oak	15OA	9064	17279.91709	14680.85104
15	Oak	15OA	9111	17482.19195	14603.70774
15	Oak	15OA	9412	17574.31399	14868.56971
15	Oak	15OA	9413	17561.80139	14869.35829
15	Oak	15OA	9424	17528.98738	14869.1454
15	Oak	15OA	9638	17314.84878	14794.65232
15	Oak	15OA	9687	17297.09238	14809.40575
15	Pine	15PI	8832	17033.46991	14551.05099
15	Tulip	15TU	6670	17436.5373	13713.54149
15	Wild Cherry	15WC	1383	15745.47911	13246.56522
16	Ash	16AS	1586	16202.2468	13122.21662
16	Ash	16AS	1780	16301.67988	13103.5308
16	Ash	16AS	1911	16469.26046	13161.25183
16	Ash	16AS	1951	16578.90442	13176.54389
16	Ash	16AS	4912	16836.20648	13035.27298
16	Beech	16BE	7258	16708.05275	14047.84776
16	Beech	16BE	7293	16776.21393	14059.24495
16	Black Birch	16BB	4888	16877.08363	13065.13954
16	Black Birch	16BB	4986	16659.21751	12998.94006
16	Black Birch	16BB	5514	17074.93773	13839.61861
16	Black Birch	16BB	6147	17372.50685	13049.00274
16	Black Birch	16BB	6491	17362.33299	13545.02488
16	Black Birch	16BB	7243	16830.37308	13969.09248
16	Black Birch	16BB	7244	16832.88545	13986.16303
16	Black Birch	16BB	7256	16747.92864	14034.52098
16	Black Birch	16BB	7259	16714.82506	14034.74469
16	Black Birch	16BB	7570	16453.08001	14173.90049
16	Black Birch	16BB	7582	16473.44675	14236.11115
16	Black Birch	16BB	7638	16585.75916	14154.21698
16	Black Birch	16BB	7839	16813.79422	14360.72559
16	Black Birch	16BB	7883	16812.7934	14398.14007
16	Black Birch	16BB	7884	16815.78107	14403.04554
16	Black Birch	16BB	8434	17237.35598	14483.84461
16	Black Birch	16BB	8524	17163.71327	14478.51042
16	Black Birch	16BB	9600	17654.1593	14864.45869
16	Black Birch	16BB	9601	17663.95165	14878.98112
16	Black Birch	16BB	9657	17188.832	14817.927
16	Elm	16EL	1686	16339.87525	13366.65024
16	Hemlock	16HE	6520	17388.91022	13595.30349
16	Hemlock	16HE	6550	17550.96065	13597.5217
16	Hemlock	16HE	7264	16736.03424	13995.39142
16	Hemlock	16HE	8436	17219.1452	14473.43818
16	Hemlock	16HE	8512	17128.54991	14513.24879
16	Hemlock	16HE	8752	17004.85655	14534.04176
16	Hemlock	16HE	8849	17116.13951	14548.57847

15	Oak	15OA	7522	16456.02948	14070.61205
15	Oak	15OA	7719	16738.57108	14246.00828
15	Oak	15OA	7866	16732.03975	14379.36534
15	Oak	15OA	8019	17087.49783	14378.20777
15	Oak	15OA	8036	17062.43058	14444.20256
15	Oak	15OA	8456	17143.33147	14358.18803
15	Oak	15OA	8669	16950.28406	14516.40013
15	Oak	15OA	8741	16964.68598	14548.5038
15	Oak	15OA	8742	16962.38661	14565.55929
15	Oak	15OA	8829	17070.53235	14641.30612
15	Oak	15OA	8843	17057.55997	14555.82806
15	Oak	15OA	9064	17279.91709	14680.85104
15	Oak	15OA	9111	17482.19195	14603.70774
15	Oak	15OA	9412	17574.31399	14868.56971
15	Oak	15OA	9413	17561.80139	14869.35829
15	Oak	15OA	9424	17528.98738	14869.1454
15	Oak	15OA	9638	17314.84878	14794.65232
15	Oak	15OA	9687	17297.09238	14809.40575
15	Pine	15PI	8832	17033.46991	14551.05099
15	Tulip	15TU	6670	17436.5373	13713.54149
15	Wild Cherry	15WC	1383	15745.47911	13246.56522
16	Ash	16AS	1586	16202.2468	13122.21662
16	Ash	16AS	1780	16301.67988	13103.5308
16	Ash	16AS	1911	16469.26046	13161.25183
16	Ash	16AS	1951	16578.90442	13176.54389
16	Ash	16AS	4912	16836.20648	13035.27298
16	Beech	16BE	7258	16708.05275	14047.84776
16	Beech	16BE	7293	16776.21393	14059.24495
16	Black Birch	16BB	4888	16877.08363	13065.13954
16	Black Birch	16BB	4986	16659.21751	12998.94006
16	Black Birch	16BB	5514	17074.93773	13839.61861
16	Black Birch	16BB	6147	17372.50685	13049.00274
16	Black Birch	16BB	6491	17362.33299	13545.02488
16	Black Birch	16BB	7243	16830.37308	13969.09248
16	Black Birch	16BB	7244	16832.88545	13986.16303
16	Black Birch	16BB	7256	16747.92864	14034.52098
16	Black Birch	16BB	7259	16714.82506	14034.74469
16	Black Birch	16BB	7570	16453.08001	14173.90049
16	Black Birch	16BB	7582	16473.44675	14236.11115
16	Black Birch	16BB	7638	16585.75916	14154.21698
16	Black Birch	16BB	7839	16813.79422	14360.72559
16	Black Birch	16BB	7883	16812.7934	14398.14007
16	Black Birch	16BB	7884	16815.78107	14403.04554
16	Black Birch	16BB	8434	17237.35598	14483.84461
16	Black Birch	16BB	8524	17163.71327	14478.51042
16	Black Birch	16BB	9600	17654.1593	14864.45869
16	Black Birch	16BB	9601	17663.95165	14878.98112
16	Black Birch	16BB	9657	17188.832	14817.927
16	Elm	16EL	1686	16339.87525	13366.65024
16	Hemlock	16HE	6520	17388.91022	13595.30349
16	Hemlock	16HE	6550	17550.96065	13597.5217
16	Hemlock	16HE	7264	16736.03424	13995.39142
16	Hemlock	16HE	8436	17219.1452	14473.43818
16	Hemlock	16HE	8512	17128.54991	14513.24879
16	Hemlock	16HE	8752	17004.85655	14534.04176
16	Hemlock	16HE	8849	17116.13951	14548.57847

16	Hemlock	16HE	8885	17216.00532	14689.05485
16	Hemlock	16HE	9058	17312.79399	14635.03827
16	Hemlock	16HE	9096	17371.81163	14618.3094
16	Hemlock	16HE	9168	17350.36937	14557.94489
16	Hemlock	16HE	9169	17358.31592	14566.10747
16	Hemlock	16HE	9331	17447.10429	14747.47043
16	Hemlock	16HE	9339	17422.6086	14713.84616
16	Hickory	16HI	5266	17099.82427	13427.07732
16	Hickory	16HI	5331	17208.63672	13299.05344
16	Hickory	16HI	5528	17154.97688	13747.02361
16	Hickory	16HI	5978	17240.34699	13290.02001
16	Hickory	16HI	6680	17287.77867	13755.95182
16	Hickory	16HI	6939	16940.90786	13794.09582
16	Hickory	16HI	7343	16643.55297	14043.25669
16	Hickory	16HI	7427	16573.06188	14026.72043
16	Hickory	16HI	8060	17372.14581	14095.64438
16	Hickory	16HI	8137	17224.0042	14020.70602
16	Maple	16MA	1065	15249.13821	12971.47341
16	Maple	16MA	1096	15282.38176	12873.39562
16	Maple	16MA	1400	15733.53319	13148.82017
16	Maple	16MA	4700	16817.82519	12574.87185
16	Maple	16MA	4894	16826.33949	13072.58571
16	Maple	16MA	4914	16827.90692	13053.61083
16	Maple	16MA	5282	17084.80669	13252.94357
16	Maple	16MA	5489	17104.07782	13530.47218
16	Maple	16MA	5712	17182.60235	12786.62326
16	Maple	16MA	5714	17235.7902	12806.55059
16	Maple	16MA	5771	16937.64287	12860.75244
16	Maple	16MA	5831	17174.60967	12899.89152
16	Maple	16MA	8514	17122.00358	14496.58463
16	Oak	16OA	1745	16298.7283	13279.2769
16	Oak	16OA	1748	16303.18997	13253.15892
16	Oak	16OA	1749	16305.48314	13245.576
16	Oak	16OA	1819	16659.12848	13150.9289
16	Oak	16OA	4730	16820.54672	12551.57851
16	Oak	16OA	5416	17254.33366	13453.73903
16	Oak	16OA	5481	17248.11051	13605.31295
16	Oak	16OA	6013	17268.2078	13218.381
16	Oak	16OA	6092	17224.78616	13067.00374
16	Oak	16OA	6096	17199.2654	13043.79511
16	Oak	16OA	6106	17228.08825	13039.51352
16	Oak	16OA	6391	17463.24464	13033.76521
16	Oak	16OA	6458	17372.39759	13386.52717
16	Oak	16OA	6525	17477.75975	13613.75096
16	Oak	16OA	6672	17398.87832	13725.0873
16	Oak	16OA	6673	17395.46069	13722.07866
16	Oak	16OA	6760	17319.59707	13811.72002
16	Oak	16OA	6898	16786.03157	13784.58356
16	Oak	16OA	6905	16833.55889	13773.41988
16	Oak	16OA	7111	16892.3755	13895.98842
16	Oak	16OA	7136	16633.00363	13974.7201
16	Oak	16OA	7353	16706.96534	14202.01827
16	Oak	16OA	7493	17070.49343	13894.16176
16	Oak	16OA	7728	16702.69893	14314.81994
16	Oak	16OA	7744	16638.93498	14398.93317
16	Oak	16OA	7762	16985.57581	14327.02805

16	Oak	16OA	7826	16793.26486	14334.92389
16	Oak	16OA	7865	16713.40908	14369.52632
16	Oak	16OA	7877	16705.70996	14457.77681
16	Oak	16OA	7895	16761.22749	14463.38854
16	Oak	16OA	8027	17056.00097	14408.81635
16	Oak	16OA	8028	17049.03263	14404.8265
16	Oak	16OA	8029	17034.04375	14406.64211
16	Oak	16OA	8170	17214.45985	14137.37632
16	Oak	16OA	8614	16979.48871	14243.54682
16	Oak	16OA	8616	16960.72819	14243.56746
16	Oak	16OA	8703	16987.83004	14460.19831
16	Oak	16OA	8947	17170.20123	14770.05397
16	Oak	16OA	8990	17084.6856	14683.08912
16	Oak	16OA	9062	17291.91384	14664.13754
16	Oak	16OA	9122	17396.76738	14577.19165
16	Oak	16OA	9281	17526.19091	14638.43642
16	Oak	16OA	9607	17692.67134	14921.22653
17	Beech	17BE	8145	17254.98498	14085.12794
17	Hemlock	17HE	9279	17538.94984	14622.54845
17	Hickory	17HI	9935	17193.3343	14901.30302
17	Maple	17MA	5536	17052.30145	13691.90005
17	Maple	17MA	5670	17067.27008	12618.09554
17	Oak	17OA	5791	17279.11175	12920.05023
17	Oak	17OA	6412	17407.82321	13303.11392
17	Oak	17OA	7714	16708.21615	14225.31148
17	Oak	17OA	8090	17140.87648	13957.58968
17	Oak	17OA	8564	17009.3793	14264.73861
18	Ash	18AS	5782	16984.53067	12783.76496
18	Black Birch	18BB	1777	16345.4442	13112.32846
18	Black Birch	18BB	1778	16327.57675	13106.15372
18	Black Birch	18BB	1811	16591.96152	13159.24151
18	Black Birch	18BB	5027	16798.20839	13064.32283
18	Black Birch	18BB	5097	17042.48389	13072.15609
18	Black Birch	18BB	5388	17116.61183	13454.63205
18	Black Birch	18BB	6484	17304.52745	13538.61822
18	Black Birch	18BB	7583	16442.41782	14267.62078
18	Black Birch	18BB	7642	16536.20512	14171.81236
18	Black Birch	18BB	7881	16773.6232	14410.30952
18	Black Birch	18BB	8499	17072.81724	14480.39071
18	Black Birch	18BB	8854	17170.61647	14550.32791
18	Black Walnut	18BW	5912	17116.93455	12875.94747
18	Hemlock	18HE	8490	17120.42075	14419.29038
18	Hemlock	18HE	8492	17125.03613	14461.45702
18	Hemlock	18HE	8919	17137.33181	14629.21652
18	Hemlock	18HE	8985	17134.40712	14653.85732
18	Hemlock	18HE	8989	17090.84027	14688.93066
18	Hemlock	18HE	9010	17238.60793	14587.84084
18	Hemlock	18HE	9049	17340.23357	14597.40552
18	Hemlock	18HE	9050	17335.87024	14601.16291
18	Hemlock	18HE	9057	17317.70029	14625.5304
18	Hemlock	18HE	9059	17319.59058	14646.58125
18	Hemlock	18HE	9635	17333.62911	14780.337
18	Hemlock	18HE	9696	17310.09627	14732.22651
18	Hickory	18HI	1760	16486.68616	13148.15849
18	Hickory	18HI	1805	16453.02353	13170.71008
18	Hickory	18HI	1949	16609.25319	13178.22105

18	Hickory	18HI	5471	17241.71014	13557.22282
18	Hickory	18HI	5474	17140.21946	13539.18517
18	Hickory	18HI	5518	17111.63459	13773.98839
18	Hickory	18HI	5551	17044.18919	13639.45739
18	Hickory	18HI	7424	16621.68101	14061.5753
18	Hickory	18HI	9823	17223.01386	14887.31302
18	Maple	18MA	1098	15317.46861	12857.97363
18	Maple	18MA	5003	16747.22587	13056.85029
18	Maple	18MA	5800	17261.84463	12866.21667
18	Maple	18MA	8495	17116.27141	14453.09227
18	Maple	18MA	8870	17137.96752	14601.31968
18	Oak	18OA	1708	16307.88893	13195.53756
18	Oak	18OA	1950	16590.68505	13184.1864
18	Oak	18OA	1972	16413.86558	13353.12233
18	Oak	18OA	1973	16413.93045	13352.68994
18	Oak	18OA	5126	16985.2476	13076.88146
18	Oak	18OA	5291	17189.54246	13197.03599
18	Oak	18OA	5383	17095.35504	13490.92418
18	Oak	18OA	5390	17146.11797	13437.70271
18	Oak	18OA	5479	17216.88088	13567.09263
18	Oak	18OA	5558	17190.41301	13699.26377
18	Oak	18OA	5602	17182.80348	13603.87195
18	Oak	18OA	5603	17148.51906	13615.49846
18	Oak	18OA	5823	17241.16339	12911.52504
18	Oak	18OA	5968	17187.31098	13131.8856
18	Oak	18OA	6140	17313.05617	13050.30752
18	Oak	18OA	6394	17418.36757	13038.76848
18	Oak	18OA	6492	17339.93813	13556.19727
18	Oak	18OA	6496	17262.06483	13601.51287
18	Oak	18OA	6547	17569.4435	13543.89122
18	Oak	18OA	6553	17518.89249	13601.72623
18	Oak	18OA	6870	16816.22266	13736.49468
18	Oak	18OA	6941	16979.2002	13817.44227
18	Oak	18OA	7496	17075.47789	13921.03886
18	Oak	18OA	7518	16456.76978	14022.53209
18	Oak	18OA	7569	16461.20149	14166.06813
18	Oak	18OA	7705	17118.8208	13922.08501
18	Oak	18OA	7807	16820.44685	14236.0662
18	Oak	18OA	7821	16734.20079	14350.75249
18	Oak	18OA	7874	16679.71808	14434.95995
18	Oak	18OA	7880	16738.89758	14439.70759
18	Oak	18OA	7992	16985.56067	14369.15863
18	Oak	18OA	8033	17050.68628	14432.33136
18	Oak	18OA	8034	17048.35645	14436.52784
18	Oak	18OA	8052	17288.14288	14102.87099
18	Oak	18OA	8622	16937.51164	14212.69025
18	Oak	18OA	8705	16951.01332	14441.08304
18	Oak	18OA	8839	17074.03977	14522.73103
18	Oak	18OA	8842	17066.96093	14547.76722
18	Oak	18OA	9056	17316.92924	14617.563
18	Oak	18OA	9677	17289.93415	14869.59938
18	Oak	18OA	9724	17410.19547	14763.38804
18	Oak	18OA	7127	16812.75012	13898.07302
18	Tulip	18TU	9605	17701.18059	14898.52657
19	Hickory	19HI	5306	17170.32813	13186.23072
19	Oak	19OA	5531	17118.4671	13737.34301

19	Tulip	19TU	6317	17615.61976	13126.61159
20	Ash	20AS	1427	15953.24486	13192.08531
20	Beech	20BE	7861	16890.52343	14421.52031
20	Beech	20BE	8509	17157.7908	14525.61706
20	Black Birch	20BB	9626	17625.44307	14916.29291
20	Black Birch	20BB	9874	17156.37516	14953.00251
20	Hemlock	20HE	8521	17159.31331	14497.55277
20	Hemlock	20HE	8871	17136.91848	14599.07148
20	Hemlock	20HE	8909	17249.42004	14617.94889
20	Hemlock	20HE	8921	17162.12854	14645.41419
20	Hemlock	20HE	9031	17301.6061	14566.5556
20	Hemlock	20HE	9070	17345.48328	14680.59319
20	Hemlock	20HE	9891	17147.48566	14933.53771
20	Hickory	20HI	1057	15223.47134	12929.72243
20	Hickory	20HI	5517	17076.34341	13770.30413
20	Hickory	20HI	7617	16612.78675	14239.02174
20	Hickory	20HI	9931	17167.34036	14881.54619
20	Maple	20MA	1099	15329.09167	12869.17081
20	Maple	20MA	4758	16911.24796	12582.74952
20	Maple	20MA	4789	16867.43716	12627.33544
20	Maple	20MA	5004	16732.35131	13055.03972
20	Maple	20MA	5021	16742.08053	12984.97166
20	Oak	20OA	1739	16317.70217	13334.1904
20	Oak	20OA	5128	16966.56382	13064.29082
20	Oak	20OA	5432	17285.86526	13494.08911
20	Oak	20OA	5478	17195.56493	13550.95462
20	Oak	20OA	5873	17000.01511	12818.48094
20	Oak	20OA	6006	17295.75955	13245.23716
20	Oak	20OA	6872	16788.95496	13747.8876
20	Oak	20OA	6917	16922.66726	13852.46756
20	Oak	20OA	7071	16673.47552	13757.83099
20	Oak	20OA	7076	16716.1273	13774.20716
20	Oak	20OA	7249	16782.55309	13982.66728
20	Oak	20OA	7280	16916.94256	14058.96479
20	Oak	20OA	7747	16659.15747	14351.16904
20	Oak	20OA	8906	17265.92005	14633.98531
20	Oak	20OA	8907	17254.60227	14620.10902
20	Oak	20OA	8914	17209.02726	14632.63454
20	Oak	20OA	9068	17307.17715	14699.76067
20	Oak	20OA	9737	17358.65583	14792.00251
20	Tulip	20TU	5998	17364.52655	13234.63025
20	Wild Cherry	20WC	1476	15936.44562	13241.48255
22	Black Birch	22BB	7640	16549.03976	14203.1991
22	Black Birch	22BB	8395	17219.10378	14356.56623
22	Hemlock	22HE	8435	17224.98396	14487.17639
22	Hemlock	22HE	8477	17154.20174	14411.34554
22	Hemlock	22HE	8484	17152.32584	14437.08418
22	Hemlock	22HE	8489	17115.43971	14430.73062
22	Hemlock	22HE	8844	17058.87956	14563.40815
22	Hemlock	22HE	8863	17190.92529	14609.39352
22	Hemlock	22HE	8911	17244.42271	14639.49112
22	Hemlock	22HE	8912	17239.01324	14644.10816
22	Hemlock	22HE	8913	17223.72194	14641.58104
22	Maple	22MA	4982	16713.30416	12952.03025
22	Maple	22MA	5239	17026.52374	13214.39824
22	Maple	22OAMA	5296	17163.65908	13136.78481

22	Maple	22MA	5659	17021.50074	12714.01823
22	Maple	22MA	5728	17012.68361	12765.42958
22	Oak	22OA	1045	15231.68206	12870.35141
22	Oak	22OA	1809	16579.42704	13147.41278
22	Oak	22OA	5400	17282.85148	13365.05718
22	Oak	22OA	5526	17183.81167	13761.89192
22	Oak	22OA	6549	17547.07198	13587.83652
22	Oak	22OA	6637	17503.33027	13664.55234
22	Oak	22OA	6700	17210.41394	13797.48705
22	Oak	22OA	6909	16859.28569	13798.85701
22	Oak	22OA	7688	17105.90766	13847.05999
22	Oak	22OA	7722	16700.09309	14262.36139
22	Oak	22OA	8101	17170.71319	13992.75523
22	Oak	22OA	8370	17205.50323	14269.94659
22	Oak	22OA	8587	17090.95892	14100.90189
22	Oak	22OA	8917	17174.48295	14627.36808
22	Tulip	22TU	5862	17071.82176	12767.90773
24	Ash	24AS	5682	17085.7677	12668.36419
24	Black Birch	24BB	7251	16805.74342	13999.07626
24	Hemlock	24HE	8420	17202.51375	14444.04009
24	Hemlock	24HE	8516	17106.27876	14481.14642
24	Hemlock	24HE	8850	17107.86397	14565.35092
24	Hemlock	24HE	9021	17252.72531	14525.61505
24	Hemlock	24HE	9067	17285.55978	14699.04082
24	Hickory	24HI	1786	16364.55102	13172.78796
24	Hickory	24HI	5509	17029.26158	13729.81957
24	Hickory	24HI	7183	16874.1817	13943.28916
24	Maple	24MA	1587	16131.71793	13137.61424
24	Maple	24MA	4866	16758.22897	12702.62771
24	Maple	24MA	4974	16734.60836	12919.5914
24	Maple	24MA	5007	16704.36317	13048.60968
24	Maple	24MA	5023	16683.26845	12982.79776
24	Maple	24MA	5900	17165.85552	12840.28498
24	Oak	24OA	1036	15225.18448	12808.16785
24	Oak	24OA	1688	16292.64665	13368.5114
24	Oak	24OA	1750	16327.83667	13263.39757
24	Oak	24OA	1872	16559.0234	13314.32681
24	Oak	24OA	4691	16772.34063	12588.03841
24	Oak	24OA	4734	16821.13681	12602.87058
24	Oak	24OA	4754	16877.16901	12530.88934
24	Oak	24OA	4755	16873.88543	12571.35483
24	Oak	24OA	4983	16692.5453	12963.18448
24	Oak	24OA	5243	17040.96655	13242.88255
24	Oak	24OA	5280	17090.49728	13270.84839
24	Oak	24OA	5397	17202.30512	13394.77943
24	Oak	24OA	5422	17230.3041	13393.11021
24	Oak	24OA	5431	17292.47099	13485.72682
24	Oak	24OA	5452	17189.06675	13492.15976
24	Oak	24OA	5804	17152.82826	12806.71925
24	Oak	24OA	6639	17505.89017	13708.31688
24	Oak	24OA	6668	17410.96616	13680.52374
24	Oak	24OA	6728	17267.71545	13848.68733
24	Oak	24OA	6877	16731.6792	13807.19232
24	Oak	24OA	7066	16614.75212	13783.50388
24	Oak	24OA	7069	16652.77158	13781.25896
24	Oak	24OA	7627	16651.69135	14243.07671

24	Tulip	24TU	5910	17142.29557	12898.32419
~~26~~	Ash	26AS	5014	16723.32009	13013.93126
26	Maple	26MA	5002	16759.58113	13043.67384
26	Oak	26OA	5080	16942.5515	13006.35602
26	Oak	26OA	5402	17282.35447	13377.87959
26	Oak	26OA	5511	17054.48092	13788.9156
26	Oak	26OA	5590	17143.62608	13682.86646
26	Oak	26OA	7746	16651.67088	14365.89212
27	Hickory	27HI	5100	17098.38263	13062.94187
28	Black Birch	28BB	8133	17275.83215	14037.58914
28	Hemlock	28HE	9675	17258.37023	14853.72626
28	Oak	28OA	5406	17302.86541	13410.50212
28	Oak	28OA	8176	17190.28592	14222.2182
30	Hemlock	30HE	8859	17211.23418	14587.98039
30	Hickory	30HI	9651	17227.80709	14802.89387
30	Oak	30OA	1021	15344.30358	12823.56139
30	Oak	30OA	5404	17287.42047	13396.11343
30	Oak	30OA	5487	17145.45722	13571.7207
30	Oak	30OA	6409	17356.65988	13361.53111
33	Oak	33OA	6414	17432.096	13309.79651
34	Oak	34OA	7095	16648.44947	13805.34724
36	Maple	36MA	1355	15784.26563	13118.53599
38	Ash	38AS	4992	16641.73989	13081.15684
48	Oak	48OA	7094	16669.20757	13797.7827
Quadruple 06	Black Birch	QU06BB	8158	17153.70223	14061.53049
Quadruple 12	Wild Cherry	QU12WC	1480	15950.23431	13266.17087
Triple 06	Maple	TR06MA	7838	16809.84676	14353.21681
Triple 06	Oak	TR06OA	7604	16502.06342	14260.27087
Triple 08	Hemlock	TR08HE	8673	16980.22986	14515.34537
Triple 09	Hemlock	TR09HE	6346	17553.75087	13153.98544
Triple 10	Black Birch	TR10BB	6641	17456.38746	13694.99049
Triple 10	Hemlock	TR10HE	9334	17466.81278	14724.33671
Triple 10	Hickory	TR10HI	4860	16731.12361	12721.37028
Triple 10	Maple	TR10MA	4778	16869.41889	12593.88521
Triple 12	Black Birch	TR12BB	5106	17083.7279	13101.40839
Triple 12	Maple	TR12MA	1910	16473.97177	13184.31252
Triple 14	Ash	TR14AS	1122	15450.93342	12917.26431
Triple 15	Ash	TR15AS	1955	16545.12399	13167.56055
Triple 15	Black Birch	TR15BB	1821	16646.81043	13168.95304
Triple 15	Oak	TR15OA	7438	16623.21712	13978.2869
Triple 15	Oak	TR15OA	8182	17213.04158	14209.01398
Triple 16	Oak	TR16OA	7748	16672.22477	14364.39282
Twin 06	Black Birch	TW06BB	7860	16908.53093	14398.1623
Twin 06	Cedar	TW06CE	1985	16526.62807	13336.29219
Twin 06	Hemlock	TW06HE	8371	17203.33747	14268.56264
Twin 06	Hemlock	TW06HE	9276	17581.43726	14619.21943
Twin 06	Hemlock	TW06HE	9292	17511.27629	14720.26722
Twin 06	Hemlock	TW06HE	9297	17532.79112	14717.47424
Twin 06	Hemlock	TW06HE	9671	17236.81991	14841.23869
Twin 06	Hickory	TW06HI	5063	16949.2968	12982.07199
Twin 06	Hickory	TW06HI	5086	16938.35152	13022.93179
Twin 06	Maple	TW06MA	1789	16402.43893	13197.83644
Twin 06	Maple	TW06MA	5560	17202.25977	13672.43925
Twin 06	Maple	TW06MA	7156	16756.34154	13956.99575
Twin 06	Maple	TW06MA	7858	16887.03173	14378.05372
Twin 06	Maple	TW06MA	7896	16745.23167	14456.22994

Twin 06	Maple	TW06MA	8061	17388.86447	14083.97729
Twin 06	Maple	TW6MA	7171	16791.1654	13909.91577
Twin 07	Black Birch	TW07BB	8422	17215.07811	14402.89689
Twin 07	Hemlock	TW07HE	9230	17571.37357	14608.53909
Twin 07	Maple	TW07MA	5295	17164.60809	13149.81894
Twin 08	Ash	TW08AS	1913	16513.91916	13167.46345
Twin 08	Beech	TW08BE	8572	17037.44044	14215.03616
Twin 08	Black Birch	TW08BB	7101	16627.6977	13786.88837
Twin 08	Black Birch	TW08BB	7834	16806.34853	14267.01452
Twin 08	Black Birch	TW08BB	8057	17334.73585	14069.28122
Twin 08	Black Birch	TW08BB	8115	17362.04289	14026.18963
Twin 08	Black Birch	TW08BB	8586	17096.71355	14100.77473
Twin 08	Hemlock	TW08HE	8077	17284.63161	13977.23927
Twin 08	Hemlock	TW08HE	8411	17188.71579	14457.20751
Twin 08	Hemlock	TW08HE	8691	16924.97362	14480.8539
Twin 08	Maple	TW08MA	1301	15254.60435	12992.49321
Twin 08	Maple	TW08MA	1445	15849.04661	13117.67245
Twin 08	Maple	TW08MA	5636	16983.50286	13763.80498
Twin 08	Maple	TW08MA	7745	16679.3052	14404.9558
Twin 08	Maple	TW08MA	8063	17377.35168	14060.21013
Twin 08	Maple	TW08MA	8222	17270.63815	14169.30403
Twin 08	Oak	TW08OA	1817	16648.24765	13127.09178
Twin 08	Oak	TW08OA	4899	16929.37534	12955.12844
Twin 08	Oak	TW08OA	8577	17047.84867	14179.20667
Twin 10	Ash	TW10AS	5506	16993.42056	13676.03503
Twin 10	Beech	TW10BE	7846	16875.46327	14354.85712
Twin 10	Black Birch	TW10BB	7014	16566.74415	13778.11938
Twin 10	Black Birch	TW10BB	8161	17119.96963	14054.54789
Twin 10	Black Birch	TW10BB	8472	17117.86181	14406.07926
Twin 10	Hemlock	TW10HE	9267	17575.43948	14600.44823
Twin 10	Hickory	TW10HI	5429	17256.0416	13482.77925
Twin 10	Maple	TW10MA	5649	17003.19519	12634.30337
Twin 10	Maple	TW10MA	8245	17380.30292	14106.28366
Twin 10	Maple	TW10MA	8571	17024.28454	14220.04711
Twin 10	Oak	TW10OA	8613	16983.85022	14208.47011
Twin 10	Wild Cherry	TW10WC	1474	15932.5494	13218.68364
Twin 11	Black Birch	TW11BB	6381	17380.43857	13008.69946
Twin 11	Hickory	TW11HI	5333	17225.63923	13313.57736
Twin 12	Ash	TW12AS	1772	16384.26714	13111.18574
Twin 12	Beech	TW12BE	8655	17016.67519	14022.54168
Twin 12	Beech	TW12BE	8890	17233.16914	14712.48251
Twin 12	Black Birch	TW12BB	1980	16496.43001	13332.1852
Twin 12	Black Birch	TW12BB	5034	16733.76299	13114.04989
Twin 12	Black Birch	TW12BB	9623	17679.88366	14913.14546
Twin 12	Hickory	TW12HI	7331	16715.27998	14123.52845
Twin 12	Maple	TW12MA	1066	15259.27706	12976.29331
Twin 12	Maple	TW12MA	4877	16840.60269	12691.85662
Twin 12	Maple	TW12MA	6653	17215.98012	13752.45237
Twin 12	Oak	TW12OA	5035	16761.2359	13097.138
Twin 12	Oak	TW12OA	7730	16722.07137	14295.10568
Twin 12	Oak	TW12OA	8578	17033.40294	14194.96259
Twin 12	Wild Cherry	TW12WC	1519	15891.02181	13261.12377
Twin 13	Hemlock	TW13HE	8225	17251.91526	14131.15758
Twin 14	Black Birch	TW14BB	7611	16585.51077	14217.61477
Twin 14	Hemlock	TW14HE	8894	17271.40226	14720.32137
Twin 14	Hemlock	TW14HE	8895	17274.35573	14714.4606

Twin 14	Hemlock	TW14HE	8915	17202.27709	14635.87889
Twin 14	Maple	TW14MA	1018	15422.60778	12858.83557
Twin 14	Maple	TW14MA	1042	15266.12842	12883.3031
Twin 14	Maple	TW14MA	1044	15238.7381	12863.77861
Twin 14	Maple	TW14MA	5009	16676.53955	13070.99465
Twin 14	Oak	TW14OA	5089	16960.85193	13038.2078
Twin 14	Oak	TW14OA	6446	17405.65968	13356.0099
Twin 14	Oak	TW14OA	7717	16725.4777	14237.06992
Twin 14	Oak	TW14OA	7718	16723.47058	14241.71959
Twin 14	Oak	TW14OA	7749	16685.17423	14356.03733
Twin 15	Ash	TW15AS	1116	15422.58024	12895.02871
Twin 15	Hickory	TW15HI	5322	17210.98741	13246.63754
Twin 15	Oak	TW15OA	5088	16954.0478	13045.38602
Twin 16	Maple	TW16MA	5654	16981.59521	12648.00863
Twin 17	Oak	TW17OA	8570	17034.97331	14232.32472
Twin 18	Black Birch	TW18BB	7853	16857.52854	14430.69988
Twin 18	Hickory	TW18HI	4890	16858.48734	13065.15335
Twin 18	Oak	TW18OA	5484	17223.13072	13618.43536
Twin 18	Oak	TW18OA	7816	16726.41551	14283.31478
Twin 18	Oak	TW18OA	7875	16661.07807	14451.34049
Twin 19	Ash	TW19AS	5680	17074.66526	12713.27785
Twin 20	Maple	TW20MA	5648	17046.58435	12595.36386
Twin 20	Oak	TW20OA	5103	17130.36495	13093.23377
Twin 20	Oak	TW20OA	6884	16772.83577	13823.72468
Twin 20	Oak	TW20OA	7779	16937.12331	14266.82311
Twin 24	Black Birch	TW24BB	4996	16706.81556	13098.0576

Appendix L

Putnam Valley Central School District
2005-2006 Budget

PVCSD 2005-2006 Budget Summary

	2004-05	2005-06	Percent Change
High School			
Supervision*	369,347	393,797	6.62%
Teaching Regular School	3,270,949	3,547,998	8.47%
School Library & Educational Television	202,705	190,019	-6.26%
Computer Education	153,805	162,521	5.67%
Guidance	325,863	379,489	16.46%
Health Services	54,915	57,166	4.10%
Co-curricular Activities	74,775	84,103	12.47%
Total High School	$4,452,359	$4,815,093	8.15%
Middle School			
Supervision*	336,395	357,277	6.21%
Teaching Regular School	3,045,816	3,200,859	5.09%
School Library	10,900	70,798	549.52%
Computer Education	128,017	142,127	11.02%
Guidance	82,796	88,440	6.82%
Health Services	42,295	46,666	10.33%
Co-curricular Activities	27,000	31,500	16.67%
Total Middle School	$3,673,219	$3,937,667	7.20%
Elementary School			
Supervision*	340,923	362,283	6.27%
Teaching Regular School	3,262,797	3,425,851	5.00%
School Library	100,249	110,601	10.33%
Computer Education	101,766	107,781	5.91%
Health Services	52,693	51,915	-1.48%
Co-curricular Activities	11,162	6,995	-37.33%
Total Elementary School	$3,869,590	$4,065,426	5.06%
Special Education	$5,623,247	$5,870,679	4.40%
District Wide Instructional Support Services			
Supervision*	240,882	253,548	5.26%
Inservice Training	188,381	246,776	31.00%
Regular School Tuitions, BOCES, Contractual	1,252,724	1,137,584	-9.19%
School Library	12,378	16,328	31.91%
Computer Education	381,808	509,699	33.50%
Guidance	0	0	
Health Services	116,386	121,861	4.70%
Psychological Services	193,773	187,430	-3.27%
Pupil Personnel	219,893	222,921	1.38%
Co-curricular Activities	0	1,000	
Interscholastic Athletics	636,991	757,091	18.85%
Pupil Transportation	1,945,628	2,061,257	5.94%
Total District Wide Instructional Support Services	$5,188,844	$5,515,495	6.30%
Administrative & District Support Services			
Board of Education	22,113	24,888	12.55%
Central Administration	343,430	347,223	1.10%
Financial Administration	407,986	417,700	2.38%
Legal, Personnel & Public Information	197,553	219,561	11.14%
Operations & Maintenance	2,093,088	2,172,384	3.79%
Liability Insurance, Tax Refunds, BOCES Admin.	351,950	380,267	8.05%
Total Administrative & District Support Services	$3,416,120	$3,562,023	4.27%
Undistributed Expenditures			
Employee Benefits	5,816,327	6,949,975	19.5%
Debt Service	2,447,046	2,520,498	3.0%
Total Undistributed Expenditures	$8,263,373	$9,470,473	14.6%
TOTAL Proposed Budget	**$34,486,752**	**$37,236,856**	**7.97%**

* *Includes salaries for administrators and clerical staff, equipment, supplies, and contractual expenses.*

Appendix M

Town of Putnam Valley Preliminary
2006 Budget

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TOWN OF PUTNAM VALLEY

FUND		2006 APPROPRIATIO	LESS EST. REVENUE	LESS APPROPRI FUND BAL	2006 AMOUNT RAISED BY TAXES	2005 AMOUNT RAISED BY TAXES	$ DIFF	% CHANGE	ASSESSED VALUE	2006 TAX RATE	2005 TAX RATE	$ CHANGE	%CHANGE
			TOWN OF PUTNAM VALLEY			PRELIMINARY	2006		2,006.00				
			PRELIMINARY BUDGET										
A	TOWN GENERAL	4,655,465	2,350,880	700,000	1,604,585	1,576,436	28,149	1.79	1,808,971.118	0.887015	1.0072	-0.12	-11.93%
DA	HIGHWAY	3,050,220	277,000	100000	2,673,220	2,486,395	186,825	7.51	1,808,971.118	1.477757	1.5886	-0.11	-6.98%
TTL	TOWN TAXES	7,705,685	2,627,880	800,000	4,277,805	4,062,831	214,974	5.29		2.364772	2.595800	-0.231028	-8.90%
SD01	PUTNAM CHASE	2,041	30	0	2,011	1,996	15	0.75		100.550000	99.8000	0.75	0.75%
SD02	STRAWBERRY KNOLLS	2,041	30		2,011	1,996	15	0.75		100.550000	99.8000	0.75	0.75%
SF01	FIRE PROTECTION	709,900		0	709,900	683,240	26,660	3.90	1,840,231.907	0.385767	0.4292	-0.04	-10.12%
SM1	LAKE PEEKSKILL	770325	13,500	60,000	696,825	666,397	30,428	4.57	221,775.129	3.142034	3.534300	-0.39	-11.10%
SM02	BROOKDALE GDNS	13379	100	0	13,279	12,830	449	3.50	5,839.899	2.273841	2.599400	-0.33	-12.52%
SM03	HILLTOP	40,176	400	2,500	37,276	36,336	940	2.59	20,059.830	1.858241	2.063400	-0.21	-9.94%
SM04	ABELE	46,470	400	1,000	45,070	43,695	1,375	3.15	20,931.071	2.153258	2.399400	-0.25	-10.26%
SM05	LOOKOUT	55,858	600	500	54,758	53,272	1,486	2.79	41,182.676	1.329637	1.515400	-0.19	-12.26%
SM06	WILDWOOD	44,360	1,500	1,000	41,860	40,024	1,836	4.59	23,166.998	1.806881	1.990600	-0.18	-9.23%
SM07	NORTHVIEW	7,325	50	0	7,275	7,092	183	2.58	6,279.642	1.158506	1.451400	-0.29	-20.18%
SM08	ROARING BROOK	168,665	1,600	2,500	164,565	160,617	3,948	2.46	131,664.313	1.249883	1.390700	-0.14	-10.13%
SM09	GLENMAR	31,040	400	2,000	28,640	27,589	1,051	3.81	7,429.200	3.855058	4.398300	-0.54	-12.35%
SM10	BARGER POND	9,500	75	0	9,425	7,467	1,958	26.22	24,960.82	0.377592	0.342900	0.03	10.12%
SM11	OSCAWANA	99,039	6,500	40,000	52,539	30,015	22,524	75.04	265,957.848	0.197546	0.130520	0.07	51.35%
	TIER 1A				0		0		6,207.484		0.1033	-0.10	-100.00%
	TIER 1				0		0		136,455.897		0.1368	-0.14	-100.00%
	TIER 2				0		0		19,475.496		0.2079	-0.21	-100.00%
	TIER 3				0		0		67,828.410		0.3465	-0.35	-100.00%
SM12	PUTNAM ACRES	2107	50		2,057	2370	-313	-13.21	24,004.80	0.085691	0.1148	-0.03	-25.36%
SP20	CONTINENTAL VILL	11,744			11,744	11744	0	0.00	29,948.86				
SS02	SEWER DISTRICT	126915	1000	10000	115,915	114729	1,186	1.03	N/A			0.00	
SW01	MILL PONDS	49585	35250		14,335	9286	5,049	54.37	41.00	349.634146	226.48	123.15	54.38%

Appendix N

Emerald Ridge Drainage District
Engineer's Report

EMERALD RIDGE DRAINAGE DISTRICT

ENGINEER'S REPORT

EMERALD RIDGE SUBDIVISION

TOWN OF PUTNAM VALLEY, PUTNAM COUNTY

DECEMBER 09, 2005

GENERAL

The proposed Emerald Ridge Drainage District will consist of twenty five single family residential lots (lots 1-25) as described on the Subdivision Plat known as "Emerald Ridge", which plat is to be filed at the Putnam County Clerk's Office, Division of Land Records.

The Emerald Ridge Subdivision consists of 3,025 linear foot of proposed road way and 2,025 linear feet of the existing Marsh Hill Road. The new road will be dedicated to the Town of Putnam Valley and upon successful construction will become a public road owned by the Town. As part of the road construction, a drainage infrastructure is required to collect and convey stormwater runoff. The drainage infrastructure discharges to five separate stormwater quality basins prior to exiting to natural drainage ways on the site proper or conveyed off site. The drainage improvements within the proposed road right of way will be dedicated to the Town as part of the road dedication and will be in the ownership of the Town.

For drainage structures (pipes, catch basins, water quality basins, etc.) outside of the public right of way, easements are provided for the benefit of the Town of Putnam Valley and these easements shall also be dedicated to the Town. The easements are described as follows:

Lot 1 drainage easement in favor of the Town for the location, maintenance and repair of the water quality infiltration basin and appurtenances.

Lot 9 drainage easement in favor of the Town for the location, maintenance and repair of the water quality infiltration basin and appurtenances.

Lot 22 drainage easement in favor of the Town for the location, maintenance and repair of the micro-pool extended detention basin and appurtenances.

Lot 17 drainage easement in favor of the Town for the location, maintenance and repair of the water quality infiltration basin and appurtenances.

Lot C drainage easement in favor of the Town for the location, maintenance and repair of the water quality infiltration basin and appurtenances.

All stormwater leaving any portion of the site have eventual flows to the Peekskill Hollow Brook that then discharges into the Hudson River. Reference is made to the map prepared by this office entitled "District Map, Plan and Description for Emerald Ridge Drainage District" dated December 09, 2005.

The lower section of the proposed drainage system will be constructed along Peekskill Hollow Road, within the Putnam County Department of Highways and Facilities right of way and therefore will be in their ownership and maintenance program.

WATER QUALITY BASINS

As part of the drainage infrastructure, five water quality detention basins are proposed to collect the stormwater runoff associated with the development improvements. Two of the basins are single stage micro-pool extended detention basins that will provide both water quality treatment as well as increase the detention time of the stormwater. The other three basins are strictly water quality infiltration basins to capture and treat the required water quality volume for the developed portions of the site. All of the basins will allow for the removal of stormwater pollutants. The pollutants will be removed primarily through settling and infiltration into the surrounding soils. The settling will enable pollutants such as suspended sediments, phosphorous, nitrogen, organic matter, and trace metals to settle out at varying rates. Additional removal rates may be achieved with the implementation of various plant types planted within the basin.

The micro-pool extended detention basins will have a control structure that has the low level outlet above the basin bottom elevation. All stormwater up to these levels will discharge through an underdrain. The underdrains will be 30" deep gravel trenches with a 6" perforated pipe. The drains will discharge at the basin control structure discharge points.

This design will ensure that during storm events, the runoff from the roads will be collected in the basins and detained for a period of up to 24 hours.

The subdivision plans propose an integrated landscaping plan that will provide not only an aesthetic appearance of the basins from the roadways and individual lots, but will also provide plantings designed for nutrient uptake that will aid in the pollutant removal process..

Where control structures are provided for the outflow basins, protection from clogging will be required. This will be accomplished with the use of steel grates being placed in front of the structures, forming a steel mesh box, which will increase the surface area for water to enter the structure. In the event the low level openings get clogged, each structure will have a high flow weir which will accommodate the flows. Additionally, if there is a failure with a control structure, the pond will fill up to the level of the emergency weir, at which point stormwater will flow over the berm to a designated discharge point.

CATCH BASINS AND PIPES

All stormwater piping proposed is HDPE pipe with a minimum diameter of 15" except where noted. Calculations for the pipe sizing will be based on the Rational Method of determining the instantaneous peak rate of flow for those areas tributary to the pipe runs. In utilizing the Rational Method, a design storm of 10 years will be modeled with an intensity of rainfall of 6.2" based on the Intensity-Duration Frequency Curve for Central Westchester County. The rainfall intensity is based on the time of concentration for each tributary area and in the case of this analysis, a time of concentration of five minutes was utilized.

The areas tributary to the pipe runs were delineated, sized in acres and given a runoff coefficient, C, value. All of the pipe runs proposed for this development are sized, at a minimum, to convey the peak flow rates anticipated for the year design storm.

MAINTENANCE PROGRAM

While the stormwater structures and appurtenances have been designed to accommodate anticipated stormwater flows, maintenance of these structures is required to ensure that they function as designed and to ensure longevity. The maintenance schedule for the proposed stormwater infrastructure shall be implemented by the Town of Putnam Valley with either Town employees or subcontracted to a person or corporation. Following is a suggested stormwater maintenance plan for the Emerald Ridge Drainage District:

1. The catch basin grates and sumps shall be checked four times per year (once every three months). The grates should be cleaned free of any debris and the sumps cleaned out of silt and debris at this time.

2. The extended detention basin control structures shall be checked four times per year (once every three months). The structure inlets should be cleaned of any debris, silt removed from the front of the control structure inlets, and the interior and sump should be cleaned of debris and silt at this time.

3. The extended detention basin shall be checked four times per year (once every three months). The underdrains shall be cleaned free and clear of debris and the basin bottom cleaned of debris and silt at this time. The interior and exterior side slopes should be checked for any soil breach or failure and repaired as necessary. All plantings should be checked and replaced if found to be dead or in a dying condition at this time.

4. The water quality basins shall be checked four times per year (once every three months). The under drain shall be free and clear of debris and silt build up at the basin bottom surface. The interior and exterior side slopes should be checked for any soil breach or failure and repaired as necessary. All plantings should be checked and replaced if found to be dead or in a dying condition.

5. Each pipe outfall shall be checked four times per year (once every three months). The pipe end sections, rip rap dissipation pads, and level spreaders shall be cleaned of any debris and silt build up and the dissipation pads shall be checked for any breach or erosion down slope. Any breach in the pad where water would concentrate shall be replaced with stone to ensure proper functioning.

6. In the event major storm events are forecast, i.e. greater than 2" rainfall / 24 hours, the above inspections should be performed and any necessary repairs or clean up shall be performed to ensure the stormwater management system will function properly during such a storm. Similarly, after a major storm event, the same inspections and necessary repairs, replacement or clean up shall be performed so the system will be in proper condition prior to the next storm event.

7. The areas in and around both stormwater quality basins shall be kept in a neat and free of debris with the landscape plantings kept in a vigorous growing fashion so their appearances do not become unsightly.

8. All drainage easement areas shall be checked four times per year (once every three months). These areas shall be kept clear of any obstructions (fallen trees, logs, personal property, etc.) and any plant growth other than grass or landscape items shall be removed or cut down at this time.

PREPARED BY:

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Appendix O

Rock Removal and Blasting Program

EMERALD RIDGE

Rock Removal and Blasting Program

The rock removal and blasting program presented herein is a guide for the removal of ledge rock and bedrock from those areas of the proposed development where rock is believed to interfere with the construction. The intent of this program is to enable the applicant to safely, systematically, and environmentally accomplish the removal of the rock to prepare the site for the construction of the road and infrastructure as well as the individual home sites. The rock removal for this project is required only to complete the proposed development and is not a vehicle for the production of material items for sale or use elsewhere.

Rock removal may be required for the construction of portions of the road and infrastructure and several home sites. This is primarily based on numerous site inspections of the property, extensive exploratory deep test hole borings conducted for the placement of separate sewage treatment systems, survey stakeout of the road and lot corners and exploratory excavations in those areas deemed to have potential for rock removal. Based on these, a map has been prepared indicating potential blast zones and is presented as Figure 1. The blast zone locations for the road construction are where the proposed cut is generally greater than five feet deep and in those areas identified to contain rock at or near the surface. The same rationale was also used for the several house sites identified as potential blast zones. Areas of cut not included in the potential blast zones are believed to contain deep soil profiles based on the deep test hole borings, visual observations and topography.

It is believed that rock removal will be required for the construction several portions of the proposed roadway and several homes on site. These locations can also be seen on Figure 1. The rock removal will only be required for the installation of portions the footings and foundation walls of the homes and a portion of some driveways.

Rock removal does necessarily mean blasting. It is not the intent of the developer to blast rock to achieve the desired grade. Blasting is costly with potential liability. In addition, the lots are large enough such that the developer may shift the location of the house slightly to avoid rock, if encountered, to avoid removing rock and increasing costs. The developer will also attempt other, less intrusive methods to remove the rock including the use of a large excavator to rip or pull the rock or the use of a hydraulic ram hoe (hammer). These two methods will be primarily used to exhaustion to extricate the rock from the ground and if these methods prove ineffective, then blasting will be utilized as the last option. The developer will utilize the most efficient and cost effective method to remove the rock, with blasting being the last resort.

Potenetial Blast Zones

The areas identified as potential blast sites generally consist of glacial till soils over crystalline metamorphic bedrock consisting mainly of amphilobite and gneiss (Fisher et al, 1970). Most of the blast sites have an overburden of the glacial till mixed with large boulders overlying the bedrock and some areas the bedrock crops out at the surface.

The potential blast sites are generally located around the loop and cul-de-sac portions of the road and house/driveway sites for lots 9, 11, 12, 24 and 25. These areas are a considerable distance from any existing structures as evidences by the table below. The potential blast zones have been labeled as blast zone 1 through 9b (bz1-bz9b).

Table 1 – distances from blast zones to on-site structures

blast zone	description	distance to nearest on-site structure (ft)	structure description
1	Road sta 38+00	1,020	Venezia residence lot 10.1
2	End of cul-de-sac	1,010	Venezia garage lot 10.3
3	Road sta 44+50/lot 14 drive	550	Venezia residence lot 10.1
4	Road sta 49+00	770	existing residence lot 18
5	House-lot 9	1,070	Venezia garage lot 10.3
6	House-lot 11	880	Venezia garage lot 10.3
7	House-lot 12	810	Venezia residence lot 10.1
8	House-lot 24	880	Venezia residence lot 10.1
9a	House-lot 25	920	Venezia residence lot 10.1
9b	Driveway lot 25	1,030	Venezia residence lot 10.1

* Venezia structures are Brooksfalls Cottages, Inc., applicant for the lot line change
* Existing residence on lot 18 is owned by the subdivision applicant

Table 2 – distances from blast zones to off-site structures

blast zone	description	distance to nearest on-site structure (ft)	structure description
3	Road sta 44+50/lot 14 drive	1,540	Mandelbaum residence
4	Road sta 49+00	1,420	Mandelbaum residence
4	Road sta 49+00	960	Marazino garage
4	Road sta 49+00	1,250	Marazino residence
4	Road sta 49+00	1,350	House across from lot 17

All of the above distances exceed the minimum recommended distance of 500 feet to perform a pre-blast survey and nearly all of the off-site structures are double the minimum distance of 500 feet. While blasting will occur in the identified areas, it is strongly believed that there will be minimal impacts, if any to any on-site or off-site structure.

Since the construction of the subdivision improvements will occur in phases and phase 1 and phase 2 will involve the completion of the road system and drainage system, the majority of blasting will occur prior to the construction of any new homes on site. Therefore, there are not likely to be any impacts to the new residences.

Based on the identified blast zones, field reconnaissance was performed and some exploratory holes were dug to assess the areas. The amount of rock removal has been estimated and is shown in table 3 below.

Table 3 – estimated rock removal

blast zone	Description	total cut (cy)	rock amt (cy)	25% exp (cy)	total rock (cy)	
1	road sta 38+00	3,370	3,370	4,210	4,210	
2	end of cul-de-sac	3,420	2,750	3,440	3,440	
3	road sta 44+50/lot 14 drive	1,050	1,050	1,310	1,310	
4	road sta 49+00	1,500	1,500	1,875	1,875	
5	house-lot 9	948	600	740	740	
6	house-lot 11	948	600	740	740	
7	house-lot 12	948	600	740	740	
8	house-lot 24	948	600	740	740	
9a	house-lot 25	948	600	740	740	
9b	driveway lot 25	118	118	148	148	
total		14,198	11,788	14,683	14,683	

Pre-Construction Schedule

Prior to any construction of the development, the developer shall comply with the following schedule:

1. Satisfy all applicable conditions of Development Plan Approval by the Planning Board and identify what other applicable permits for site development are required.
2. File pertinent documents with the County Department of Health, County Department of Highways and Facilities, affected utility companies, the Town of Putnam Valley, NYSDEC, and any other involved agency, for necessary reviews and approvals.
3. Obtain the services of a Site Engineer, licensed in the State of New York and as approved by the Town of Putnam Valley for the construction of the road and infrastructure.
4. Post all necessary Performance Bonds for the proposed site work and pay all required fees.
5. Submit all required insurance riders to the appropriate authorities.
6. Stake the property lines as necessary, flag the work limits, identify trees to be protected, if any, and establish elevation reference points (bench marks) on site as necessary.
7. Meet with representatives from the appropriate Town Departments, and Putnam County Department of Highways and Facilities to establish the construction protocol.
8. Contact the Underground Line Location Service (Code 53) at 800-245-2828.
9. Secure the site with required fencing and gates, as necessary.
10. Confirm utility mark outs with the Site Engineer and Contractor.

With the completion of the Pre-Construction Schedule, the on-site construction of the development may proceed pursuant to the construction sequencing program prepared for the project. In the event, during the course of construction, blasting is required the following protocol shall be followed by the developer:

Quantities, Trucking and Hours of Operation

The areas delineated as potential blast zones for both the road and infrastructure and the residences have been quantified. For the potential blast zones, it is estimated that approximately 14,680 cubic yards of rock will be generated. This includes using an expansion factor of 25%.

It is the intent of the developer that all of the rock removed will be utilized on site for the construction of the roadway (fill sections) and/or for fill sections required on individual lots. It is not believed that the developer will remove the material from the site. Doing so is an additional cost and is not necessary. Additionally, much of the rock will be crushed on site with the use of a mobile crusher. The crushed rock will be used for road base and or driveway bases.

In the event material is removed from the site, it will take place during the established hours of operation. All trucks used for the transport of material from the site shall meet all the necessary requirements of the New York State Department of Transportation and shall have the necessary permits to do such work. All trucks shall have covers (for the material for transportation) and the truck exteriors shall be clean and free of all loose material (rocks, dirt, mud, etc.) prior to leaving the site. The trucks shall be cleaned or hosed down as necessary to comply with this requirement. The contractor, at the end of each day is required to inspect Mill Street for any material that may have fallen off the trucks (rocks, dirt, mud clods, etc.) and shall clean the road accordingly.

If 25% of the rock were to be removed from the site, which is not proposed, the following would apply:

Total cubic yards (after expansion)	3,670
Total yards per truck (10 wheeler)	20
Total yards per truck (18 wheeler)	35
Total number of trucks (10 wheeler only)	184
Total number of trucks (18 wheeler only)	105

It is anticipated that some combination of 10-wheel dump trucks, with a capacity of 20 cubic yards and 18-wheel tractor trailers with a capacity of 35 cubic yards will be used to remove material from the site, if removed at all. There may be any combination of truck types used on a daily basis.

Trucking routes to and from the site will be limited to mitigate any potential impacts of truck loads of material leaving the site. To that end, the trucking routes are identified below:

- from Site to Peekskill Hollow Road north to Mill Street south to Route 6* Permitted always*
- from Site to Peekskill Hollow Road south to Oscawana Lake Road Limited use**
- from Site to Peekskill Hollow Road north of Mill Street Limited use**
- from Site to Peekskill Hollow Road north to Church Street to all other local roads Limited use**
-

*Trucks will not be permitted to exit the site onto Peekskill Hollow Road before 9:00 am and after 3:00 p.m. to minimize the project's construction impact on this location during the busy evening hours.

*The applicant has a site location for the deposit of material (rock or earth) on Curry Street off of Route 6 in the Town of Yorktown. This site will be the destination should material leave the site.

**Limited use indicates that these roads are not to be used unless a specific destination on or via these roads is required. Trucks are not to utilize these roads as short cuts or a matter of convenience. The primary route for trucks shall be Mill Street south to Route 6.

The above-described trucking information is provided to indicate the maximum potential impact of rock removal from the site. As stated above, it is not likely that the developer will remove the rock material from the site, and if rock is removed from the site, it would only be a percentage of the estimated total rock amount.

Rock removal either by blasting or hammering shall only take place between the hours of 8:00 am and 5:00 pm, Mondays through Fridays. There shall not be any blasting on Saturdays or Sundays or any holiday recognized by the Town of Putnam Valley.

Project Equipment

Below is an estimated equipment list for the construction of the development. The exact type and number may vary depending on the rate of construction and time of year. However, the list is provided to indicate the anticipated equipment required to facilitate the construction.

1. Two bulldozers
2. Three to four excavators (325 or larger)
3. One hydraulic ram hoe (hammer)
4. Two front end loaders (track or rubber tire)
5. Four tri-axle dump trucks (20+ yards) for on site use to move material
6. One rubber tire backhoe
7. One Uke (large articulated dump truck for on site use to move material)
8. One mobile crusher (temporary for rock crushing)

Explosives And Blasting

In the event blasting is required to achieve the necessary final grades, blasting operations shall strictly adhere to the following requirements:

1. Prior to any drilling or blasting, a pre-blast survey must be prepared and shall include all structures (houses, garages, sheds, individual water wells, or other structures) within 600 feet of any proposed blast site. The pre-blast survey shall include photos, video, sketches, detailed notes and a written report to completely document the affected properties and shall be conducted by qualified personnel. Every structure shall be carefully examined for cracks, deformation from any cause, and other damage that could be claimed.
2. It shall be the responsibility of the blaster to ensure that the particle velocity of the blasts shall be kept to a minimum (2 in/sec) with a 'scaled distance' of 8 or larger. A seismograph shall be provided for each blast and placed in an appropriate location for best measurements. All seismograph readings shall be recorded an maintained as part of the record.

3. All blasting and blasting operations shall be in conformity with the Code of Federal Regulations, Title 29-Labor, Part 1926, Section 1926.900
4. The provisions of Article 16 of the labor Law of the State of New York, as well as Industrial Code Rules contained in Title 12, Part 39 of the New York Code of Rules and Regulations are recognized as applicable to the possession, handling, storage and transportation of explosives and shall be complied with by all blasters.
5. No person, firm or corporation shall detonate explosives unless it is licensed pursuant to Section 458 of the Labor Law of the State of New York, and in addition to such licensing, has obtained permission for such blasting from the Building Inspector of the Town of Putnam Valley.
6. No person shall blast or cause to be blasted any rock or other substance with any explosive or store explosives in the Town of Putnam Valley without having first submitting the proper documentation, as required by the Town of Putnam Valley, and obtaining permission from the Building Inspector.
7. Before any blasting is permitted, the blasting contractor shall submit evidence in the form of a certificate of insurance issued by an insurance company authorized to do business in the state of New York and in a form acceptable to the Town of Putnam Valley Town Attorney, guaranteeing that the applicant has in full force and effect a policy of public liability insurance.
8. No person shall use in a blasting operation a quantity of explosives greater than necessary to properly start the rock or other substances or use such an amount as will endanger persons or property.
9. All blasts scheduled to take place within 600 feet of any roadway or structure, including residential structures and individual water wells, before firing, shall be covered with metal matting or other suitable screens of sufficient size, weight and strength to prevent the escape of broken rock or other material in a manner liable to cause injury or damage to persons or property. No person shall fire or explode or direct or cause to be fired or exploded any blast in or near any highway or public place in the Town of Putnam Valley unless competent men, carrying a red flag, shall have been placed at a reasonable distance on all sides of the blast to give proper warning thereof at least three minutes in advance of the firing.
10. No person shall conduct blasting operations within the Town of Putnam Valley after the hour of 5:00 pm and before 8:00 am, or at any time on Saturday, Sunday or any holiday recognized by the Town of Putnam Valley.
11. Whenever blasting is to occur within 600 feet of any structure, including residential dwellings and individual water wells, the inhabitants of such structure or residential dwelling shall be personally notified of the date and approximate time that blasting will occur. Said notice shall be received no less than 24 hours prior to blasting.
12. All blasting operations shall be in accordance with the Town of Putnam Valley requirements.
13. No person shall conduct blasting operations without a seismograph located at the property lines and all blast locations shall be provided with steel mats or similar material, as approved by the Town of Putnam Valley.
14. Blasting operations in the proximity of overhead power lines, communication lines, utility services, or other services shall not be carried on until the operators and/or owners have been notified and measures for safe controls have been taken.
15. When blasting is done within 600 feet of any structure (house, shed, water well, etc.), the blaster shall take special precautions in the loading, delaying, initiation and confinement of each blast with steel mats or similar approved method.
16. All blast holes shall be stemmed to the collar or to a point that will confine the charge.
17. No loaded holes shall be left unattended or unprotected.
18. The blaster shall keep an accurate, up-to-date record of explosives, blasting agents and blasting supplies used in a blast and shall keep an accurate running inventory of all explosives and blasting agents stored on the site, if any.

19. Any storage of blasting material (explosives, blasting caps, etc.) shall comply with the American Table of Distances for Storage of Explosives and shall be stored in a suitable container and properly barricaded with an earthen berm or other similar method. In no event shall explosives be stored within 300 of any residence or structure.
20. Prior to any blasting the blasting contractor will contact the Putnam Valley Building Department.

Air and Noise

All operations of the project, blasting, rock ripping, rock crushing and trucking (if applicable) shall be in accordance with the Town of Putnam Valley Town Code, Chapter 82, Noise Ordinance. No work shall be performed on Saturdays or Sundays or any holiday recognized by the Town of Putnam Valley. All work on site shall take place between the hours of 7:00 am and 4:00 pm, Monday through Friday, except for the above days.

Reclamation

Following the rock removal in those areas of the proposed road right of way or at driveway entrances where there are exposed rock faces, the rock faces, if any, shall be cleaned of all loose material and stable. Areas where the rock is not stable, the loose rock shall be ripped out or re-blasted to achieve a stable side slope.

All areas of exposed rock with a slope less than 1 foot vertical to 3 foot horizontal (1:3) shall be provided with a minimum 4" layer of loamy soil, covered by a minimum of 4" of top soil prior to seeding and mulching. Areas of exposed rock greater than a 1:3 slope may be left exposed. The rock however shall be clean of dirt and loose rocks shall be removed such that the rock is stable and attractive. All other areas of rock removal (i.e., trench rock, foundation rock) will be covered as required to complete the applicable construction.

The topsoil used shall be free of stones >2", trash, debris, and have less than 10% gravel by volume. The soil shall have > 6% by weight fine textured stable organic material, muck soil will not be considered topsoil. The topsoil shall not be placed in a frozen or muddy condition. Topsoil shall be uniformly distributed over the target areas and evenly spread to a depth of 4". After the topsoil installation is complete, ground limestone (calcium carbonate) shall be spread uniformly and thoroughly over the topsoil at a rate of approximately 100 lbs per 1000 square feet or to achieve a soil ph of 6.0. Upon completion of the lime, the site soil shall be fertilized with 600 lbs of 5-10-10 or equivalent per acre. Immediately after the soil has been prepared, permanent seeding shall be applied. The seed mix shall contain the following ratios:

Kentucky Blue Grass	65%
Perennial Rye Grass	20%
Fine Fescue	15%

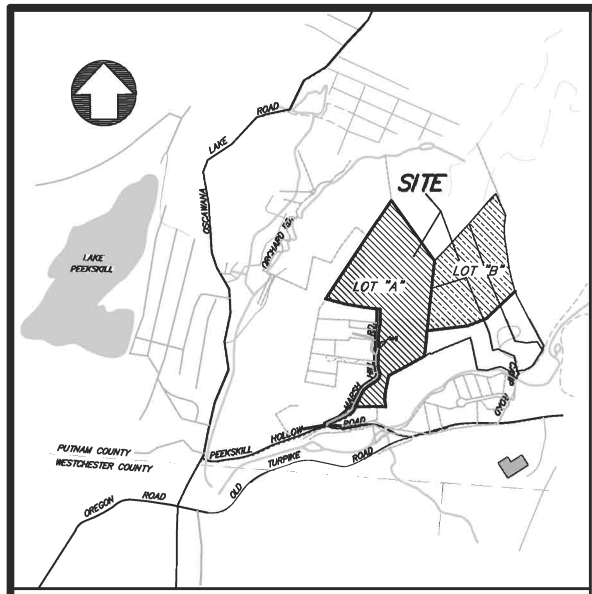
This seed mixture shall be applied at a rate of 175-200 lbs per acre within a day of the completion of the soil placement. Upon placement of the seed mixtures, the entire seeded area shall be mulched. The mulch shall consist of hay or straw and shall be applied at a rate of 2 tons per acre or 100-200 bales per acre.

The erosion controls in place for the construction of the development shall remain until a stable vegetative (grass) cover is established. The removal of the erosion control barriers shall be at the direction of the site engineer only. The above described critical area seeding as well as the establishment of trees and shrubs shall be in conformance with the approved subdivision plans and the standards presented in current edition of "New York Guidelines for Urban Erosion and Sediment Control".

Complete reclamation of the site will occur upon completion of all construction and landscaping as per the approved subdivision plans.

Appendix P

Wetland Validation Plan

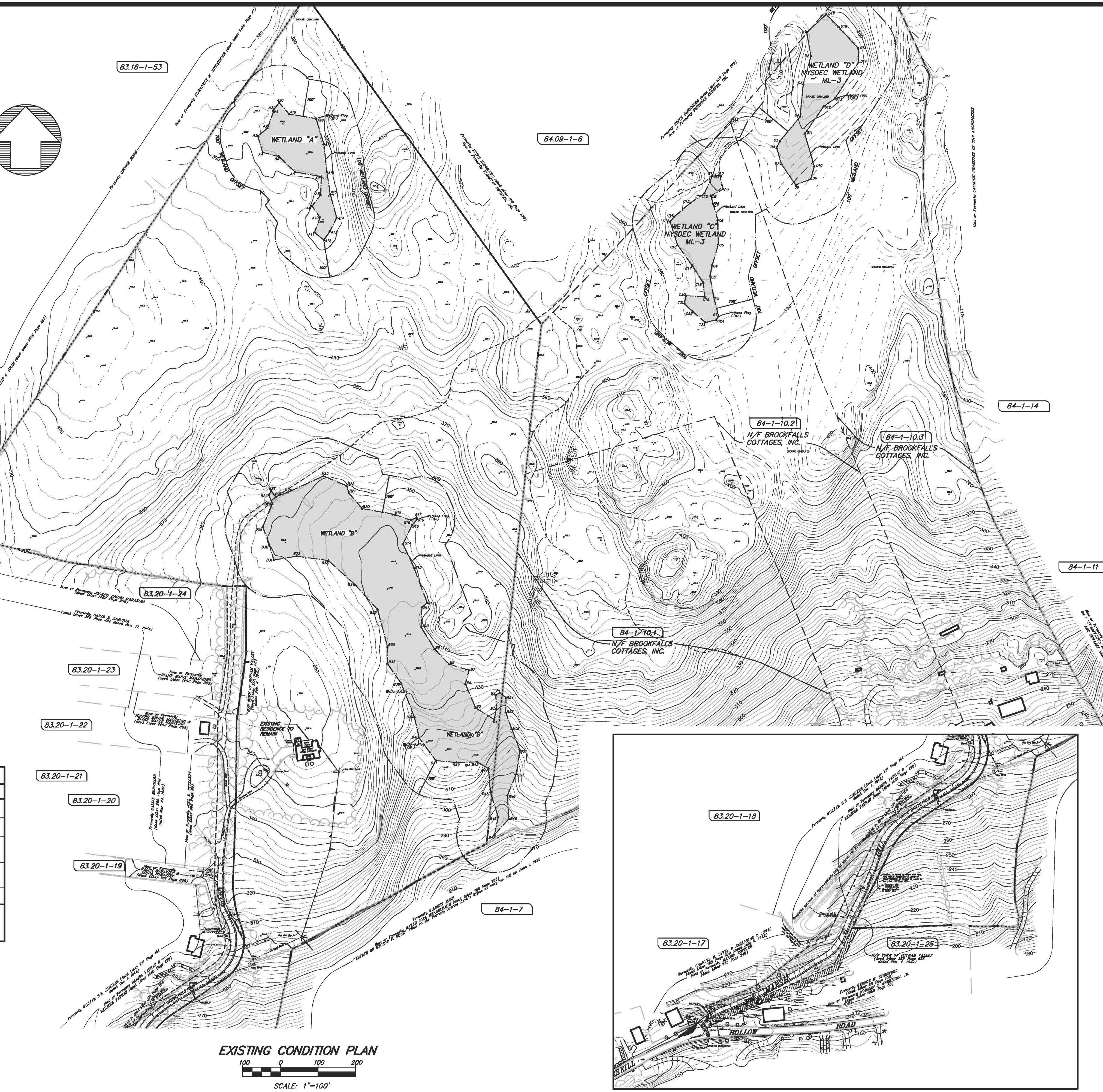


LOCATION MAP

APPROX. SCALE: 1"=1,000'

LEGEND

- SPOT ELEVATIONS
- EXISTING CONTOURS
- STONE WALLS
- EXISTING DIRT TRAILS
- ROCK OUTCROPPINGS
- WETLAND BOUNDARIES
- CONTROLLED AREA BOUNDARY (100')
- WETLAND AREA
- EXISTING TREE LINES
- EXISTING ROAD / PAVEMENT
- EXISTING RETAINING WALL
- EXISTING TREES
- OVERHEAD WIRES
- EXISTING DRAINAGE STRUCTURE, PIPE
- EXISTING POLE
- ADJOINER PROPERTY LINE



EXISTING CONDITION PLAN

100 0 100 200

SCALE: 1"=100'

NYSDEC FRESHWATER WETLAND BOUNDARY VALIDATION

THE FRESHWATER WETLAND BOUNDARY AS REPRESENTED ON THESE PLANS ACCURATELY DEPICTS THE LIMITS OF FRESHWATER WETLAND ______ AS DELINEATED BY ______ ON ______.

DEC STAFF: ______ SURVEYOR/ENGINEER: ______.

DATE: ______ SEAL

WETLAND BOUNDARY DELINEATIONS AS VALIDATED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION REMAIN VALID FOR 10 YEARS UNLESS EXISTING EXEMPT ACTIVITIES, AREA HYDROLOGY, OR LAND USE PRACTICES CHANGE (E.G., AGRICULTURAL TO RESIDENTIAL). AFTER 10 YEARS THE BOUNDARY MUST BE REVALIDATED BY DEC STAFF. REVALIDATION MAY INCLUDE A NEW DELINEATION AND SURVEY OF THE WETLAND BOUNDARY.

ANY PROPOSED CONSTRUCTION, GRADING, FILLING, EXCAVATING, CLEARING OR OTHER REGULATED ACTIVITY IN THE FRESHWATER WETLAND OR WITHIN 100 FEET OF THE WETLAND BOUNDARY AS DEPICTED ON THIS PLAN REQUIRES A PERMIT FROM THE NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION UNDER ARTICLE 24 OF THE ENVIRONMENTAL CONSERVATION LAW (FRESHWATER WETLAND ACT) PRIOR TO COMMENCEMENT OF WORK.

WETLAND AREAS

WETLAND DESCRIPTION	AREA (S.F.)	AREA (AC.)
WETLAND "A" (A1 TO A21)	27,736	0.637
WETLAND "B" (B1 TO B54)	167,382	3.842
WETLAND "C" - NYSDEC WETLAND ML-3 (C1 TO C24)	25,669	0.589
WETLAND "D" - NYSDEC WETLAND ML-3 (D1 TO D17)	37,112	0.852
TOTAL	257,899 S.F.	5.920 AC.

NOTES:
- ALL WETLANDS FLAGGED BY THE TOWN OF PUTNAM VALLEY WETLAND INSPECTOR ON APRIL 3, 2004.
- WETLANDS "C" AND "D" WERE FIELD CONFIRMED ON JULY 22, 2004 BY DOUG GAUGLER OF THE NYSDEC AS BEING PART OF NYSDEC WETLAND "ML-3".

NYSDEC FRESHWATER WETLAND BOUNDARY VALIDATION

THE FRESHWATER WETLAND BOUNDARY AS REPRESENTED ON THESE PLANS ACCURATELY DEPICTS THE LIMITS OF FRESHWATER WETLAND ML-3 AS DELINEATED BY STEPHEN COLEMAN ON 4/3/04.

DEC STAFF: [signature] DOUGLAS GAUGLER ~~SURVEYOR~~/ENGINEER: [signature]

DATE: 8/9/04 TIMOTHY L. CRONIN III SEAL

STATE OF NEW YORK TIMOTHY L. CRONIN 62980 LICENSED PROFESSIONAL ENGINEER

WETLAND BOUNDARY DELINEATIONS AS VALIDATED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION REMAIN VALID FOR 10 YEARS UNLESS EXISTING EXEMPT ACTIVITIES, AREA HYDROLOGY, OR LAND USE PRACTICES CHANGE (E.G., AGRICULTURAL TO RESIDENTIAL). AFTER 10 YEARS THE BOUNDARY MUST BE REVALIDATED BY DEC STAFF. REVALIDATION MAY INCLUDE A NEW DELINEATION AND SURVEY OF THE WETLAND BOUNDARY.

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NOTE

UNAUTHORIZED ALTERATION OR ADDITIONS TO THIS MAP ARE A VIOLATION OF SECTION 7209 (2) OF THE NEW YORK STATE EDUCATION LAW.

SDEC 3/14/20

CIVIL ENGINEER

CRONIN ENGINEERING P.E. P.C.

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1929 COMMERCE STREET
YORKTOWN HEIGHTS, NY 10598
PHONE: (914) 962-2215
FAX: (914) 962-2209

OWNER/APPLICANT

VS CONSTRUCTION CORP
37 CROTON DAM ROAD
OSSINING, NEW YORK 10562

TIMOTHY L. CRONIN III, P.E.
LICENSE #062980

#	REASON	DATE
1.	FIELD WITH NYSDEC	07-22-04

REVISIONS

TAX MAP #: SEC:84 BLK: 1 LOT: 5 AND PORTIONS OF: SEC:84 BLK: 1 LOTS: 10.1, 10.2, 10.3

DRAWN:	KCS/LH
CHECKED:	KCS
DATE:	07-01-2004
DWG. FILE:	SubdConv1A.DWG
JOB #:	031103

WETLAND VALIDATION PLAN

SUBDIVISION AND SITE DEVELOPMENT FOR EMERALD RIDGE

LOCATION:
MARSH HILL ROAD, TOWN OF PUTNAM VALLEY

SP-1.0

SANTUCCI, V - 031103, SH 1 OF 1

Appendix Q

Scoping Public Hearing Transcript

COPY

TOWN OF PUTNAM VALLEY
PLANNING BOARD

---x

SCOPING SESSION
MAJOR SUBDIVISION
LOT LINE CHANGE
VS CONSTRUCTION CORP.
"EMERALD RIDGE"
MARSH HILL ROAD

---x

November 15, 2004
Putnam Valley Town Hall
265 Oscawana Lake Road
Putnam Valley, New York
5:57 p.m.

B E F O R E:

MEMBERS:

John M. Zarcone, JR., Chairman
Michael Raimondi, JR.
Richard Tully
Thomas Patterson
Eugene T. Yetter, Jr.
William Zutt, ESQ., Town Attorney
Jan K. Johannessen, Town Planner

A P P E A R A N C E S:

BONNIE FRANSON, Planning Director

TIM MILLER & ASSOCIATES

KEITH STAUDOHAR,

CRONIN ENGINEERS

CHAIRMAN ZARCONE: I'm going to open up the public hearing for the scoping session. Major subdivision R2, lot line change, VS Construction Corp., Emerald Ridge, Marsh Hill Road.

I'm just going to give a basic statement. I'll turn it over to the applicant to address any statements they wish to put on the record, and then I'll open it up for public comment.

What we're here for tonight is a draft scoping document; to take public input to what is considered a -- classified as a table of contents under SEQRA, and what is to be studied by the applicant along with the Board.

So we have a Draft Scoping Document, Emerald Ridge Subdivision town of Putnam Valley, Putnam County, New York. The lead agency would be the Planning Board for Putnam Valley. The involved agencies: the Town of Putnam Valley Town Board, the Putnam County Department of Health, Putnam County Department of

Highways and Facilities, Town of Putnam Valley Highway Department, New York State Department of Environmental Conservation, United States Army Corps of Engineers.

The interested agencies: Town of Putnam Valley Town Engineer, Town of Putnam Valley Planning Board Attorney, Town of Putnam Valley Town Planner, Town of Putnam Valley Building and Zoning Inspector, Town of Putnam Valley Wetlands Inspector, Putnam Valley Volunteer Fire Department, Putnam Valley Volunteer Ambulance Corps., Putnam Valley School District, Putnam Valley Environmental Commission, Putnam Valley Advisory Board of Architectural and Community Appearance, Putnam County Soil and Water Conservation District, Putnam County Planning Department, City of Peekskill City Planner, Putnam Valley Library.

The draft scoping document is being submitted to the Town of Putnam Valley Planning Board, hereinafter Planning Board, as lead agency for the

State Environment Quality Review Act review of the proposed Emerald Ridge subdivision.

This document is intended to serve as the foundation for the identification of all potentially significant adverse impacts pertinent to the proposed action and appropriate mitigation measures. It is also intended to eliminate consideration of any impacts that are irrelevant or non-significant.

The description of the proposed action: The applicant, 37 Croton Dam Corp., proposes a 24-unit single-family detached residential subdivision to be located on Marsh Hill Road in the unincorporated Town of Putnam Valley, Putnam County, New York. The site plan proposes 23 new residences with one existing residence to remain. The project site is approximately 85.5 acres in size and consists of Tax Map 84, Block 01, Lots 5, 10.1, 10.2 and 10.3.

At this point I will turn it

over to the applicant for any specific statements they would wish to make and then we will open it up to the public. When I open it up to the public, to let everyone know, there is a copy of this document up here, if you would like to take it. Before you speak, please sign in on our sheet, and when addressed, please state your name and address for the record.

MR. STAUDOHAR: Good evening. I'm Keith Staudohar with Cronin Engineering. We're here representing the applicant, VS Construction. And with me tonight is Tim Miller Associates, Inc., Bonnie Franson; they are the planning consultants for the project. I'm going to just give a brief description of the project and then hand it over to Bonnie and she will go through the draft scope for everybody to comment on.

As stated in the description, this is a proposed subdivision and lot line, which involves four tax lots.

Ultimately you will end up with at least 85 acres of land; subdivided into -- we're showing 25 lots at the moment, due to the change in the alignment that we had previously shown the Board.

What it involves is we're using the existing town road, Marsh Hill Road, which terminates at a point near and around the existing stone house on this parcel. We're extending that road into a loop with 24 new residences. Previously we had a plan that showed a crossing this wetland. Through discussions with board and other concerned agencies, we decided that this wouldn't be a good way to go, so we decided to do the loop. The town superintendent of highways is in favor of this type of layout.

In order to do this development, the project is going to require improvements to the existing Marsh Hill Road, and I will be proposing an improvement package to this road, whereby we will be realigning it both horizontally and vertically, to more closely meet the town standards as best we can. We received a positive declaration from the Planning Board on October 18th, at which time they set up this scoping hearing.

And with that, I will hand it over to Bonnie to discuss the pertinent issues that we believe this project will entail.

MS. FRANSON: Good evening, Board.

Good evening, my name is Bonnie Franson; I'm planning director with Tim Miller Associates. We have been retained by the applicant to assist in the State Environmental Quality Review Process, which is the purpose of this evening's meeting.

Just to give you an overview of the process to date: The application for this major subdivision was submitted back in June of 2004, and along with that application, it was accompanied with an environmental assessment form, which detailed some of the facts and information about the proposed project and the site itself.

The Putnam Valley Planning Board declared its intent to be lead agency on June 30, 2004. And at that time, as Keith was indicating, the original application also included and proposed an extension of Marsh Hill Road. However, there was a much larger loop road that was proposed and essentially it would have gone through this wetland B that's shown on the map.

MR. STAUDOHAR: Let me show that. This is what we had shown previously.

MS. FRANSON: You can see this is a larger loop road. The wetlands were delineated. There would have been a wetland park in here. This arrangement proposed a total of 24 lots, which would consist of one existing residence, one lot with an existing residence, and then 23 lots with 23 new homes.

Through the process, and as we have been going through the SEQRA process, the initial stages, through meetings with the town, it was determined that this potential layout, which has this loop here and cul de sac, is one that avoids this wetland and wetland crossing.

In rearranging the subdivision, it resulted in one additional lot. So the action is a total of 25 lots, one lot would have an existing residence and there would be 24 new homes in the subdivision.

Notices have been sent to the various involved and interested agencies. After the lead -- after the Planning Board became the lead agency, they issued a positive declaration, meaning that they think that this action might have a potential significant adverse impact on the environment, and would like the applicant to prepare a Draft Environmental Impact Statement outlining the impact of the development. The -- again, notices were sent to the involved and interested agencies as well as the draft scoping outline, which is available for the public here if you want to follow along. And we also did send out notices of the scoping session to those involved and interested agencies as well as various adjoiners.

I would like to go through briefly and quickly through this draft scoping document to outline what, at this point in time, would be the content of the draft environmental impact statement.

The Draft Environmental Impact Statement is required to include the description of the proposed action; so we would describe the action, the acreage, the zoning and land uses in and around the project site, description where it is located, and the general description of what is proposed as far as the major subdivision. We would also detail all approvals, reviews and permits required in order to construct this project, if approved.

The major section of the Draft Environmental Impact Statement is chapter three, which details the existing environmental conditions, potential impact, and any mitigation methods that would be required to reduce any impact.

The first topic would be soils and topography. We would look at the existing soils on the project site, as well as topography, whether there are steep slopes, whether the potential cut and fill, look at the proposed disturbance area and then as part of the overall plan for the project we would include a soil erosion sediment control plan to control any construction related impact from the construction of the homes and what might occur as a result of disturbing the existing topography and soils.

The next section, surface water resources, essentially looks at any impacts that might occur to the 100 year flood plain, if it's located on a project site, as well as a drainage study. The drainage study or storm water runoff report examines what the existing conditions are, in terms of storm water coming off the site, and then you can calculate any increases in that runoff, as a result of the proposed project. We are also required to look at the quality of the run off, which is important for this particular project, because of its proximity to the Peekskill Hollow brook which is south of the site.

So we will be preparing storm water management report and pollution prevention plan in accordance with the New York State DEC standards. We will also include in the DEIS, the information on the examination of ground water resources. The proposed project does -- it proposes individual wells. We would do a monitoring program, drill three to four wells, pump them to determine what the yields will be, and this pumping test would be done in consultation that the town's hydro-geologist, as well as (inaudible) in accordance with the New York State and Department of Health standards.

We will also consider the impacts associated with the proposed septic systems which are located on the individual lots. We will do that in accordance with Putnam County Health Department standards, and that will be disclosed in the DEIS.

The project will also -- the DEIS will also examine the potential impact to the ecology of the site both terrestrial, and aquatic. We will also consider any kind of impact to the wetlands that are located on the site which you see here in the light green shaded area.

And we will do -- have a traffic study to determine what the potential impacts would be on the area roadway network. We will specifically look at three intersections to examine and evaluate traffic impacts. Those would include Peekskill Hollow Road, the intersection with Oscawana Lake Road, the intersection with Marsh Hill Road with Peekskill Hollow Road and then the intersection of Old Turnpike Road with Peekskill Hollow Road. So then traffic implications of the proposed project will be examined with the DEIS. And the analysis is typically done for the a.m. and p.m. peak hour, peak hours of traffic on the roadway network.

We will examine the proposed project's potential effect on community facilities and services. In particular, the community would be concerned about the need for emergency services and access the site, fire protection, ambulance service as well as considering the potential impact on the school district. This is a residential development. The homes will introduce students into the school district and what the effect is on the school district.

Associated with the community facilities report we will look at the fiscal impact. What would be the revenues generated by the project and what would be anticipated costs to service it.

Cultural resources: that is an examination of both the historic and archeological resources. We will submit information to the New York State Office of Parks, Recreation and Historic Preservation; get their comments to determine whether they feel a cultural resource study is necessary, and what level of detail, if one is necessary to be provided to them.

And then lastly, we will look at the construction related noise and air resource impacts. The construction impacts, there may be higher noise levels of equipment on the site; short term air impacts as a result of dust that emanate from construction site. So we will address those potential concerns.

Also I just want to point out; there are sections that we will address that are required by the quality review process. As one of these requirements, we are to look at alternatives and the alternative that we will look at and compare to this particular layout will be the layout that is on this plan, which illustrates the larger ring road. It would require wetlands crossings and proposes one less home. We will compare the impact of this particular project to the one of the alternative layout as part of this examination.

We do have a stenographer here to take public comment, so that we're assured that all the public comments make it into the record and are available for the Planning Board's consideration. Ultimately, those comments will be integrated in the scoping outline, it will be finalized, that will become the official table of contents for the DEIS, and we will submit that document when the evaluations are done. With that, I guess we can take public comment.

CHAIRMAN ZARCONE: When I open it up to the public, there is a copy here, we will open up the public hearing. Anybody from the public, I just need you to sign in.

AUDIENCE SPEAKER: My name is Sam Davis. I live in Lake Peekskill, Putnam Valley. I have a number of questions. Firstly, I would like to know how many buildable acres are there. Anyone have an answer to that?

MR. STAUDOHAR: Buildable acres? I mean, off the top of my head, it's probably half, 40 acres, 50 acres.

AUDIENCE SPEAKER: And what is that zoned for, in terms of housing?

CHAIRMAN ZARCONE: R2.

MS. FRANSON: R2.

AUDIENCE SPEAKER: How much of the site is wooded and how much of it is not.

MR. STAUDOHAR: These are all things that we would put in --

MS. FRANSON: We would examine -- DEIS. We would respond to your questions in the environmental impact statement. To the extent we have answers tonight, we can give that but that is the purpose of the --

AUDIENCE SPEAKER: All right. Do you have an answer to that tonight?

MS. FRANSON: It's probably in the DEIS, but I have to pull that out to give you that.

AUDIENCE SPEAKER: I think anything, projects of this size is going to be very deleterious to Putnam Valley, for a number of reasons. First of all, my guess is a large part of it is wooded, and it's going to be -- I would imagine denuded of a large number of trees in the construction process. That is a very serious problem for us in terms of the way the water filters through the soil to the aquifer, and in terms of runoff ultimately. It also destroys habitat, obviously, which is something we need to conserve. It's been well documented that the destruction of habitat damages our own quality of life.

I think that that kind of number of

houses will obviously create more traffic, and our roads are already in trouble. Our infrastructure is not built to sustain that number of new cars. It obviously also threatens our water supply, which is tenuous, and both in quantity and quality, because if the septic systems fail, it creates more problems for us.

Additionally, my understanding that these are going to be four bedroom homes; is that right?

MS. FRANSON: Uh-huh.

AUDIENCE SPEAKER: That invites large numbers of children, and the likelihood is, most of those homes are going to have school-age children; at least two, probably more. The impact to the school system and taxes that will create is immense, and unless those homes are selling for a million dollars or so, which I imagine they are not, it's going to cost our taxpayers a fortune.

CHAIRMAN ZARCONE: I'm curious, Mr. Santucci, what do you think the price range will be, if you know?

MR. SANTUCCI: At this point, we're looking around a 600 number.

CHAIRMAN ZARCONE: All right.

AUDIENCE SPEAKER: That will not come close to supporting the costs of educating the children that are likely to come out of that subdivision. So I think for many reasons, that this project will be a horrible burden to this town, will damage the town and will threaten the town, and should not be allowed.

CHAIRMAN ZARCONE: Okay. Anybody else?

AUDIENCE SPEAKER: My name is Joel Edelson. I have lived in Putnam Valley for 27 years in this house, which borders this project.

CHAIRMAN ZARCONE: Where up there Mr. Edelson, are you?

AUDIENCE SPEAKER: There is two stone houses up here, one Mr. Santucci is going to leave in the project, and one across from it which is the sister house;

that is mine.

CHAIRMAN ZARCONE: Okay. I know where you are talking about.

AUDIENCE SPEAKER: My grandfather owned the house for 20 years before me, so I have been in this area for a long time. I have a few concerns. I have a question first. The zoning is for two acres per house?

CHAIRMAN ZARCONE: Correct.

AUDIENCE SPEAKER: I think that the two acres zoning should be enforced to maintain a level of population density that in keeping with the area, and the privacy of the present tenants. I don't think it should be permitted to build, for example, ten houses on five acres while putting 15 acres of unbuildable swamp land aside, with a promise that it will not be built in the future. This would circumvent the intent of the zoning laws. My question is: Will each house have two acres, as the zoning law requires?

CHAIRMAN ZARCONE: You are talking

about just two acres for each house, and that's it?

MR. STAUDOHAR: Right. We're not proposing a cluster. So every lot has a minimum of two acres, Mr. Chairman. They range from, basically, two and a quarter acres on up.

AUDIENCE SPEAKER: And the zoning for the area requires two acres or three acres?

MR. STAUDOHAR: Two acres.

CHAIRMAN ZARCONE: And the -- just so you know the way it reads, I respect what you are saying about the two acres, but what the code says, it's a minimum of two acres. All right?

AUDIENCE SPEAKER: I understand. I just wouldn't want to see it become a promise of putting away land and over-developing the remaining land with that promise as the --

MR. STAUDOHAR: What you are saying, you don't want to see a clustered development where we group the houses and leave a lot of land vacant.

AUDIENCE SPEAKER: Right. The nature of the area up there is full of wildlife; deer, fox, wild turkeys, coyotes, and it's been that way forever. It's not an area that has ever been developed; it was a farm going back to the 1700's. It's also marsh land. As you know, it's called Marsh Land Road. It's one of the steepest roads in the town.

The entrance at the bottom of the road off Peekskill Hollow Road is a blind hairpin when you are coming from the north towards Oregon Corners. If you are coming from Oregon Corners, it's a clear shot, except you have to cross the lane, just before a blind right-hand turn --

CHAIRMAN ZARCONE: That's right.

AUDIENCE SPEAKER: -- which might be dangerous to some people. It's a little bit of a dangerous intersection. The people who have the house at the bottom of the hill park their cars there and make it tighter still. I don't think you are supposed to in winter, but they do.

CHAIRMAN ZARCONE: By the way, this document here sort of like what Dr. Davis may have raised on some of his points and what you're raising. I'm not stopping you, please continue, but that is this document here. What they are doing is taking these items, okay, they are saying, Planning Board, public, we're going to study all these, which includes the traffic aspect, includes the aesthetic aspect, and then it gets into a more complete document in the next phase, which is the Draft Environmental Impact Statement. Okay.

Also, at the end of tonight, whatever comments that Dr. Davis may want to present, which you may want to present, you can do so in writing as well, as long as it's not repetitive. We get ten people saying traffic, traffic, traffic. The traffic is going to be done. And let's say there is an item that is missing. Okay? It's taken and incorporated to try and pick up on that topic in the document. So I just wanted to let you know.

AUDIENCE SPEAKER: I understand. It might be repetitive but I --

CHAIRMAN ZARCONE: No. No. I just wanted to let you know. Please. Put it on the record. That is what we're here for.

AUDIENCE SPEAKER: All right. I have a comment to make about the Hollow brook which runs through Putnam Valley, and will be affected by this in terms of runoff, as you were indicating, less trees filtering the water, and more pollution from the people living there. The golf course that is along the road to Peekskill, that is also on the Hollow brook.

CHAIRMAN ZARCONE: Oregon Road?

AUDIENCE SPEAKER: Yeah, on Oregon Road. All of that water ends up in Annsville Circle, which stinks when it's low tide, and it has gotten worse over the years, and is probably going to get worse as a result of this kind of development. I just want to point that out.

If each house up here has two cars per household, and there probably will be more, the increase in traffic on this winding steep Marsh Hill Road might create a safety hazard for all those who are using it. It goes back to what you are saying about developing plans for this road. My question is: Is the road suitable for this kind of development, because of its steep nature and its difficult access onto Peekskill Hollow Road.

I'm also personally concerned about the value of my house. When I came up here, I was paying something like $3000 a year in taxes, now I'm paying something like $15,000 a year in taxes. With this kind of development, it will have some affect on the salability or the value of my property. And I don't know whether it will be for the better or worse. I'm concerned about that because it's my retirement fund.

I understand that development is inevitable, but I have enjoyed living up there for 27 years, with a limited amount of development, which has always reminded me of what Putnam Valley was like when I was a boy. People come up here from the city, and had little cottages. I like Putnam Valley and I see it becoming something else, something much more densely populated, that is not where I have enjoyed raising my kids. I would like somebody else's kids to live and be raised in a community where there is open spaces and woodlands and paths. There is one of the nicest paths in Putnam Valley that goes from the beginning of that property over to -- eventually to the elementary school. There is a lot of wildlife on the road, and a lot of marshes that are actual standing water marshes up above some of the communities over there.

That's about it.

CHAIRMAN ZARCONE: Thank you very much.

AUDIENCE SPEAKER: I am Joel Mandelbaum, and I own the land immediately below the development, basically from the brook, Peekskill Hollow Road, I guess to here, this whole area. My father bought the land and had our house built in 1935. I was three at the time, and have enjoyed living here in the summers ever since.

And I'm very grateful to the Town of Putnam Valley for all of the years that we have had this open space, and above all, for the cleanness of Peekskill Hollow Brook, which still -- our dog can drink from it, the fish still live in it, it's been very good. And I trust the town will make sure whatever they approve here, it will remain that way.

I'm grateful also to the developers for having kept so much of our border dark green and not white. My main concern, and I'm aware of the population pressures making it impossible to expect an area like this to remain pristine forever. So I don't want to be seen as totally opposing the project at all. I'm very much concerned about the water below the ground. We have a well. And 25, 24 new wells, all going into a water uphill of us scares me. And I want to make sure that whatever happens, we still have a well that works when it's finished.

The other thing I'm concerned about is the construction itself, and above all, lot 17, which is the one that is right near our house. And if there is any thought of thinning the project down, my candidate for thinning the project is lot 17. I'm sure these people have their candidates. So basically, the one thing that really worries me is the matter of the well and I trust the hydrologists and the people --.

I suppose when you are testing the yield it might be an idea to pump from our wells at the same time to make sure it doesn't diminish. Our well is connected to the house. It's turned off during the winter, since it's a summer house, it will probably have to be tested between April and October, thank you.

CHAIRMAN ZARCONE: Anybody else?

BOARD MEMBER: Just real quick to answer you about the well. There was another project that was done here in the town; in fact it was Santucci who had done it. And with that project, at the end of it, the wells had to be monitored, and certain neighbors had to have their wells monitored. So that may be an option here, based on the number of houses, your neighbor's house, your house below, that they monitor the well making sure that there is no major draw down.

AUDIENCE SPEAKER: And if there isn't then what happens? Is there some relief that the owner can have?

CHAIRMAN ZARCONE: The problem that we have is you have to go back and really tie it back. I don't know exactly what --

if the wells went dry based upon the drawdown from up there, there is an issue to be raised. Okay? The monitoring system doesn't run forever. It would be, let's say for a year or two. And to ensure, like I said, that your well and the neighbors' wells do not go dry. Okay? And as long as we don't have a problem, of course, nobody is going to have a problem. Whether it be the owner, applicant, builder or yourself as the neighbor to replace the well, but that is just an option that would be open us as well. I just wanted to let you know. I'm sorry.

AUDIENCE SPEAKER: I just had a couple of environmental concerns but also -- My name is Chris Rosen.

I wanted to address something that the previous gentleman mentioned, which people mention a lot about population pressures. Development is outpacing population by eight to ten times in this area, so there is no population pressure. It's a misconception. I just thought I'd mention that.

Anyway, I'm mostly concerned about isolating the different wetlands, especailly between those two, it's nice that the road doesn't go through it anymore, but it's an environmental concern. The other gentleman mentioned all the marsh lands, and there is more up above here, and it's an extremely important, as the Board knows, we have some laws addressing it. It's an extremely important environmental feature, these wetlands, marshlands, animals that live in there that have a huge effect on the whole ecosystem of the area, and I'm concerned about this being isolated from the other areas. So I would love for that to be addressed somehow.

I'm not sure how it's planned for the road to be developed, but there are what they call best development practices that can be done for the road to be designed in a way that animals can transverse the roads, especially small amphibians, turtles, salamanders, and all the kinds of animals that live in the wetlands can get from wetland to wetland. And there is design of the road (inaudible).

Oh, the only other thing was lawns. I would love for it to be addressed, and there has been a proposal of the town code about addressing lawns as part of the calculation for buildable area, because there have been shown almost as impervious as driveways, the roofs, the house itself, once you change the landscaping, and do landscaping, they become quite impervious. I would like that to be included in the impervious area.

CHAIRMAN ZARCONE: Thank you. Will you Steve Colman's memo --

MS. FRANSON: I have a copy. Thank you.

CHAIRMAN ZARCONE: Okay, as long as that is added to it as well. Anybody else?

AUDIENCE SPEAKER: Good evening. Anthony Ruggerio with the City of Peekskill. First, I'm glad to see at least the proposed road and culvert are not going through the wetland B and that the septics have been moved further away. Our major concern from the City, as usual, is the watershed and the Peekskill Hollow Brook. And the second location section, we would like or request that the boundaries of the watershed and Peekskill Hollow Brook are described and mentioned.

In the discussion of the surface water you mentioned the drainage study and the storm pollution prevention plan, I mean, we would like the water shed from Peekskill Hollow Brook mentioned, potential impacts, potential mitigations. Just briefly looking at the plans today, it looked like the wetland and everything kind of flows toward the Hollow Brook.

Again, also I think you

mentioned earlier regarding the septics, if there are any failures, again, a study of where that would flow to. Would they flow to the Hollow Brook and any mitigation plans for that.

I just have some general comments tonight, then I would like to follow up in written form. You had mentioned the alternative was, I guess, the original plan with the road. When I looked through the plan today there was a cluster development. I don't know if that is still on or off or part of the alternatives? Just a comment. I looked at the plans today.

MR. JOHANNESSEN: I think they submitted a cluster plan --

MR. STAUDOHAR: Yeah, they may have but it was --

BOARD MEMBER: It was in sketch form.

AUDIENCE SPEAKER: I just didn't know if it was still one of the alternatives.

I think for tonight, that is probably my major comment.

CHAIRMAN ZARCONE: Thank you. Okay. Anybody else? Any comments from our Board?

MR. PATTERSON: I would like one more intersection if it could possibly be done. Foot Hill Street.

CHAIRMAN ZARCONE: Foot Hill. If you are at the bottom of Marsh Hill, you make a left; you go up right past the high school, on the right side. There is Foot Hill, right there.

MR. RAIMONDI: John, the next actual major intersection would be Mill Street with a light.

CHAIRMAN ZARCONE: That is taking it --

MR. STAUDOHAR: Foot Hill/Peekskill Hollow Road?

MR. PATTERSON: Yes. A lot of people cut back through there. Pretty busy in the mornings.

AUDIENCE SPEAKER: I just want to

add one thing about this proposal does go through for something like it. Is there some way to guarantee that the homes won't use chemicals on their lawns, because that becomes more runoff into the Hollow Brook and into our aquifer, and threatens our water.

CHAIRMAN ZARCONE: Isn't that part of the code now?

MR. JOHANNESSEN: It's in surface water protection.

MR. YETTER: It's in the code.

CHAIRMAN ZARCONE: It's there. You know what it becomes, it's a policing issuing. You can say you are not going to do it, and then who is out there doing it, that is the whole thing.

MR. STAUDOHAR: Generally about three quarters of the town is in the watershed protection issue. So three quarters of the population should not be fertilizing their lawn based on the town code.

MR. PATTERSON: We put that in every

resolution anyhow.

CHAIRMAN ZARCONE: Yeah, it's there. But again, it goes back to a policing issue. Nobody can say -- the owner can say, yeah, no problem, we're going to use whatever and then they don't.

AUDIENCE SPEAKER: But it does make a difference if people are told that it's just not allowed and the landscaping place is told up front.

CHAIRMAN ZARCONE: In fact, it's part of our -- we have done that. But then it is just a matter, again, you have to keep up with it.

AUDIENCE SPEAKER: If it's not said up front --

CHAIRMAN ZARCONE: I agree with you on that. And it is. It is.

MR. STAUDOHAR: We place a note on the files.

MR. ZUTT: John, you know what could be done in the circumstance, is that the plat itself could contain a note referencing the ground and surface water protection issue.

CHAIRMAN ZARCONE: That is what we're talking about.

MR. ZUTT: And so it will find its way, ultimately, into the title report.

MR. JOHANNESSEN: It has been our practice.

CHAIRMAN ZARCONE: Anybody else from the Board?

AUDIENCE SPEAKER: What is the date for written comments?

CHAIRMAN ZARCONE: I believe it's ten days from today. So ten days from today, so we have --

MR. PATTERSON: Thanksgiving Day.

CHAIRMAN ZARCONE: You know what, I'm going to extend that, because based upon Thanksgiving, people take off that Wednesday, Thursday -- let's extend it to the 29th, which is a Monday. So if people are away, they can come back, and the first thing they focus on are their comments after eating a lot of turkey.

AUDIENCE SPEAKER: It's not

necessary to repeat spoken comments in writing, is it?

CHAIRMAN ZARCONE: No. Unless there is a point you want to get across, it's solely up to you. Okay. It's solely up to you. And then, you know, the public will get notice, once the scope is accepted, the next step, of course, is turning it over to the DEIS, and the public will be noticed for that public hearing. Okay.

Anybody else?

MR. YETTER: John, we were talking a little bit about in past resolutions regarding biodiversity evaluation and biodiversity for major subdivisions. I see a lot of it kind of laid out here. Are you going to have a guideline or will you come up with some kind of guideline about biodiversity requirements and evaluations?

CHAIRMAN ZARCONE: Did you read Coleman's memo?

MR. YETTER: Yes.

CHAIRMAN ZARCONE: You have to take that in conjunction with what is here. You have to understand; SEQRA goes and breaks down the environmental issues. SEQRA doesn't say, do a biodiversity. Okay. To me, they're accompanied here. If you want to add it as a complete biodiversity, you can, but I think that it's here.

MR. RAIMONDI: Page 7, Section C kind of in a round about way talks about biodiversity. Doesn't say the word --

CHAIRMAN ZARCONE: Which page?

MR. YETTER: 2C on page 7.

CHAIRMAN ZARCONE: Yeah. You have here terrestrial and aquatic.

MR. RAIMONDI: It doesn't actually have the title.

MS. FRANSON: We're going to incorporate Mr. Coleman's comments and refer to biodiversity.

CHAIRMAN ZARCONE: I think you guys need to make a separate topic of biodiversity. Correct.

AUDIENCE SPEAKER: The environmental commission has offered to the town, I don't know if you guys have that, a short page of guidelines for these kinds of you don't have that?

AUDIENCE SPEAKER: I have one more comment, and that is, I would like to find out or have it shown that the buildable acres would support the R2.

CHAIRMAN ZARCONE: That will come. That is coming. Okay. Because you have to show -- even though there is a subdivision, each house has to be handled on an individual basis. The basics, you know. Your house is sitting with the proper setbacks, proper road frontage. And then shown on each lot is the proper buildable areas pursuant to the code. So those calculations will be there. It's not here tonight but eventually they will get there and --

MR. STAUDOHAR: Each lot has a minimum requirement of 30,000 square feet of buildable area that is outside of these wetlands and steep slopes, and we will have an analysis for each lot in the report on that.

AUDIENCE SPEAKER: Thank you.

CHAIRMAN ZARCONE: Anything else. Okay. Going to close. Motion to close the public hearing?

MR. TULLY: Motion to close the public hearing.

CHAIRMAN ZARCONE: Second?

MR. PATTERSON: Second.

CHAIRMAN ZARCONE: All in favor?

MR. RAIMONDI: Aye.

MR. PATTERSON: Aye.

MR. YETTER: Aye.

MR. TULLY: Aye.

MR. STAUDOHAR: The written comment period?

CHAIRMAN ZARCONE: The 29th.

(The hearing concluded at 6:35 p.m.)

C E R T I F I C A T I O N

STATE OF NEW YORK)

) ss.

COUNTY OF PUTNAM)

I, DIANNA FERRIERI, a Court Reporter and Notary Public within and for the County of Putnam, State of New York, do hereby certify:

That I reported the proceedings that are hereinbefore set forth, and that such transcript is a true and accurate record of said proceedings.

AND, I further certify that I am not related to any of the parties to this action by blood or marriage, and that I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand.

Dianna Ferrieri

DIANNA FERRIERI

Court Reporter

Appendix R

Building Area and Open Area Calculations for Conventional Subdivision

EMERALD RIDGE SUBDIVISION - CONVENTIONAL LAYOUT

Lot	Gross Lot Area (sf)	Gross Lot Area (ac)	Roadway, Easements (sf)	Net Lot Area (sf)*	Net Lot Area (ac)	Wetlands (sf)	Lakes, Ponds & Watercourses (sf)	Slopes 20%+ (sf)	Rock Outcroppings >20,000 (sf)	Building Area (sf) **	Impervious Area Total (sf)	Minimum Open Area (%)
Minimum	n/a	n/a	n/a	87,120	2.00	n/a	n/a	n/a	n/a	30,000	n/a	75%
Lot 1	128,280	2.94	15,196	113,084	2.60	0	0	2,890	0	110,194	9,186	93%
Lot 2	104,392	2.40	0	104,392	2.40	0	0	8,860	0	95,532	7,896	92%
Lot 3	101,085	2.32	0	101,085	2.32	0	0	1,324	0	99,761	6,392	94%
Lot 4	106,115	2.44	0	106,115	2.44	0	0	0	0	106,115	6,048	94%
Lot 5	169,115	3.88	0	169,115	3.88	8,792	0	0	0	160,323	4,325	97%
Lot 6	212,656	4.88	0	212,656	4.88	18,944	0	24,048	0	169,664	6,707	97%
Lot 7	108,749	2.50	0	108,749	2.50	0	0	11,253	0	97,496	4,431	96%
Lot 8	108,749	2.50	0	108,749	2.50	4,394	0	13,199	0	91,156	3,985	96%
Lot 9	237,871	5.46	17,579	220,292	5.06	34,517	0	58,701	0	127,074	5,066	98%
Lot 10	235,134	5.40	0	235,134	5.40	23,870	0	75,332	0	135,932	4,160	98%
Lot 11	120,081	2.76	0	120,081	2.76	0	0	32,816	0	87,265	4,112	97%
Lot 12	119,318	2.74	0	119,318	2.74	0	0	45,635	0	73,683	4,771	96%
Lot 13	94,617	2.17	0	94,617	2.17	0	0	58,295	0	36,322	4,186	96%
Lot 14	140,625	3.23	0	140,625	3.23	0	0	104,676	0	35,949	4,127	97%
Lot 15	110,177	2.53	0	110,177	2.53	0	0	51,080	0	59,097	4,334	96%
Lot 16	97,240	2.23	9,252	87,988	2.02	290	0	48,797	0	38,901	4,383	95%
Lot 17	188,307	4.32	24,274	164,033	3.77	0	0	58,104	0	105,929	4,185	98%
Lot 18***	144,184	3.31	0	144,184	3.31	19,001	0	36,993	0	88,190	8,762	94%
Lot 19	132,247	3.04	0	132,247	3.04	36,335	0	8,360	0	87,552	4,495	97%
Lot 20	127,606	2.93	0	127,606	2.93	40,508	0	2,181	0	84,917	4,118	97%
Lot 21	144,432	3.32	913	143,519	3.29	30,217	0	16,042	0	97,260	4,411	97%
Lot 22	147,565	3.39	47,074	100,491	2.31	5,532	0	13,461	0	81,498	5,084	97%
Lot 23	131,994	3.03	0	131,994	3.03	21,767	0	25,847	0	84,380	4,198	97%
Lot 24	89,703	2.06	0	89,703	2.06	0	0	34,561	0	55,142	5,204	94%
Lot 25	96,122	2.21	0	96,122	2.21	0	0	29,540	0	66,582	5,932	94%
Right of Way	186,362	4.28	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TOTALS	**3,582,726**	**82.25**	**114,288**	**3,282,076**	**75.35**	**244,167**	**0**	**761,995**	**0**	**2,275,914**		

NOTES
* Net Lot Area = Gross Lot Area - Right of ways & Easements
** Buildable Area = Gross Lot Area - Wetlands - Lakes, Ponds & Watercourses - Slopes > 20% - Rock Outcroppings > 20,000 sf
** Minimum contiguous building area indicates that each lot as a minimum contiguous buildable area > 15,000 sf
*** Existing house & driveway to remain

Appendix S

Zoning Compliance Chart for Cluster 1 and Cluster 2

EMERALD RIDGE SUBDIVISION - CLUSTER 1 LAYOUT

Lot	Lot Area (sf)	Lot Area (ac)	Front Yard (ft.)	Side Yard (ft.)	Rear Yard (ft.)	Lot Width (ft.)	Building Height (Max.)	Building Coverage % (Max.)
Minimum	43,560	1.0000	50	25	50	100	35' or 2-1/2 Stories	15%
Lot 1	102,654	2.3566	476	25	100	190	< 35'	2.4%
Lot 2	66,363	1.5235	308	27	171	120	< 35'	3.8%
Lot 3	55,667	1.2779	251	26	154	120	< 35'	4.5%
Lot 4	48,376	1.1106	217	26	153	120	< 35'	5.2%
Lot 5	51,823	1.1897	221	33	126	135	< 35'	4.8%
Lot 6	72,189	1.6572	254	32	116	180	< 35'	3.5%
Lot 7	108,490	2.4906	96	37	332	160	< 35'	2.3%
Lot 8	163,814	3.7607	70	39	531	205	< 35'	1.5%
Lot 9	130,541	2.9968	222	41	193	180	< 35'	1.9%
Lot 10	67,836	1.5573	77	27	205	140	< 35'	3.7%
Lot 11	55,070	1.2642	158	45	60	200	< 35'	4.5%
Lot 12	86,855	1.9939	170	34	347	140	< 35'	2.9%
Lot 13	112,006	2.5713	207	32	281	190	< 35'	2.2%
Lot 14	121,525	2.7898	220	47	295	190	< 35'	2.1%
Lot 15	118,450	2.7192	246	28	254	160	< 35'	2.1%
Lot 16	71,091	1.6320	233	29	158	160	< 35'	3.5%
Lot 17	46,042	1.0570	129	27	145	240	< 35'	5.4%
Lot 18	90,450	2.0764	140	45	127	300	< 35'	3.7%
Lot 19	72,690	1.6687	144	27	418	120	< 35'	3.4%
Lot 20	88,379	2.0289	154	54	218	200	< 35'	2.8%
Lot 21	121,096	2.7800	51	25	156	720	< 35'	2.1%
Lot 22	125,619	2.8838	51	198	361	320	< 35'	2.0%
Lot 23	144,432	3.3157	64	60	370	240	< 35'	1.7%
Lot 24	100,674	2.3112	57	60	548	250	< 35'	2.5%
Lot 25	123,362	2.8320	51	198	201	350	< 35'	2.0%
Open Space Parcel	1,117,012	25.6431	-	-	-	-	-	-
Right of Way	128,866	2.9584	-	-	-	-	-	-
TOTALS	**3,591,372**	**82.4466**						

NOTES

1. Open Space Parcel shall be 30% (minimum) of the total project area.
2. Maximum coverage for impervious area of the total site shall not exceed 35%.
3. All proposed buildings shall be a minimum of 150' from an existing public road.
4. All proposed buildings shall be a minimum of 100' from the project boundary.
5. All proposed buildings shall be a minimum of 500' from a public recreation area.
6. Lot 20 contains the existing house and driveway which are to remain.

Area of Lot "A" (Subdivision Area)	3,591,293	82.4447	-	-	-	-	-	-

EMERALD RIDGE SUBDIVISION - CLUSTER 2 LAYOUT

Lot	Lot Area (sf)	Lot Area (ac)	Front Yard (ft.)	Side Yard (ft.)	Rear Yard (ft.)	Lot Width (ft.)	Building Height (Max.)	Building Coverage % (Max.)
Minimum	43,560	1.0000	50	25	50	100	35' or 2-1/2 Stories	15%
Lot 1	122,735	2.8176	382	33	152	195	< 35'	2.0%
Lot 2	90,658	2.0812	272	57	152	180	< 35'	2.8%
Lot 3	58,481	1.3425	267	41	102	150	< 35'	4.3%
Lot 4	61,883	1.4206	256	43	101	160	< 35'	4.0%
Lot 5	62,567	1.4363	264	40	102	170	< 35'	4.0%
Lot 6	72,634	1.6674	286	43	133	160	< 35'	3.4%
Lot 7	199,873	4.5885	67	65	453	200	< 35'	1.3%
Lot 8	153,694	3.5283	232	50	250	210	< 35'	1.6%
Lot 9	115,135	2.6431	125	94	98	270	< 35'	2.2%
Lot 10	60,867	1.3973	55	35	103	270	< 35'	4.1%
Lot 11	135,964	3.1213	468	111	50	263	< 35'	1.8%
Lot 12	73,206	1.6806	377	59	83	210	< 35'	3.4%
Lot 13	80,197	1.8411	52	48	108	249	< 35'	3.1%
Lot 14	58,437	1.3415	59	67	94	260	< 35'	4.3%
Lot 15	65,168	1.4961	66	49	142	240	< 35'	3.8%
Lot 16	59,028	1.3551	78	74	113	230	< 35'	4.2%
Lot 17	75,925	1.7430	131	93	136	240	< 35'	3.3%
Lot 18	65,382	1.5010	154	45	81	210	< 35'	5.1%
Lot 19	54,405	1.2490	91	47	155	190	< 35'	4.6%
Lot 20	49,230	1.1302	52	43	128	210	< 35'	5.1%
Lot 21	55,907	1.2834	66	60	123	240	< 35'	4.5%
Lot 22	59,569	1.3675	126	76	51	270	< 35'	4.2%
Lot 23	69,665	1.5993	53	75	106	220	< 35'	3.6%
Lot 24	89,703	2.0593	112	157	55	250	< 35'	2.8%
Lot 25	96,122	2.2067	170	152	55	430	< 35'	2.6%
Open Space Parcel	1,349,486	30.9799	-	-	-	-	-	-
Right of Way	155,361	3.5666	-	-	-	-	-	-
TOTALS	**3,591,282**	**82.4445**						

NOTES

1. Open Space Parcel shall be 30% (minimum) of the total project area.
2. Maximum coverage for impervious area of the total site shall not exceed 35%.
3. All proposed buildings shall be a minimum of 150' from an existing public road.
4. All proposed buildings shall be a minimum of 100' from the project boundary.
5. All proposed buildings shall be a minimum of 500' from a public recreation area.
6. Lot 18 contains the existing house and driveway which are to remain.

Area of Lot "A" (Subdivision Area)	3,591,293	82.4447	-	-	-	-	-	-

Appendix T

Tree Report

TREE REPORT

on

Emerald Ridge

Location: Marsh Hill Rd., Putnam Valley, NY
Prepared by: Joshua Tree Forestry Consulting, Inc.
Prepared for: Putnam Valley Planning Board & VS Construction Corp.

3/7/06

Joshua Kowan, CF	Date

General Information

Introduction

This tree report was prepared under the recommendation and direction from the Putnam Valley Planning board as part of their local ordinance as stated in the Putnam Valley Town Code, 165-2.1. tree plan; tree removal; replacement of trees, Article VA. The purpose of this report is to determine the environmental impact, if any, of the proposed tree removal operations. Trees proposed to be removed include those identified on maps entitled, "TREE PLAN: SUBDIVISION AND APPROVAL PLAN FOR EMERALD RIDGE". As referenced on this map, trees proposed for removal were identified by Donnelly Land Surveying, P.C. The plan itself was produced by Cronin Engineering, P.E., P.C. The following description of this parcel and recommendations are based upon a detailed overview of the entire property. Although stand analyses has been performed, there may still be attributes that may not be observed during field visits.

General Property Description

Emerald Ridge, owned by VS Construction Corp., is located on Marsh Hill Rd., just off Peekskill Hollow Rd. in the Southern end of the town of Putnam Valley, County of Putnam, NY. Its tax map #'s are 84.-1-5 and portions of 84-1-10.1, 10.2 and 10.3. It can be located on the USGS Quadrangle Map: Mohegan Lake. A section of this map is included in this report showing topographic features and stand delineation.

Emerald Ridge comprises of approximately 85 acres facing generally a southeast direction. Typical of much of the Hudson Valley and specifically Putnam Valley, the forestland is abandoned agriculture or pastureland which is denoted by the presence of stone walls throughout the parcel. Currently the parcel is vacant with the exception of one house site and existing structure located at the end of Marsh Hill Dr., labeled lot # 18 of the proposed plan. The rest of this property is 100% wooded by common species and stand types found here in the Hudson Valley. Ages of the trees range from young, less dominant individuals of +/-30-40 years represented by pole size classes to older, more dominant individuals of 80-120 years represented by saw timber size classes. There is an average of approximately 300 trees per acre of trees that are at least 4 inches in diameter at breast height.

Evidence of a timber harvest from old stumps suggests former forest management. It is estimated this was a commercial harvest of mainly red oak from roughly 25 years ago. Many of the existing paths through the woods are old skid trails grown in over time.
As a whole, quality of the trees is average to below average with the exception of a few specimen individuals. An average site has produced a slow growing, shorter population with little uniqueness. There are no areas of trees with unusual size or species with ages approaching near old growth.

Stand Description and Analysis

For the purposes of this report, this property has been divided into stands or populations of contiguous trees sufficiently uniform in species composition, arrangement of age classes, and condition to be a distinguishable unit. A common method of evaluating size is to measure its diameter at roughly four and a half feet above the ground. This location is referred to as "diameter at breast height" or "DBH." The quadrangle map shows the approximate delineation of the stands on this parcel.

STAND 1

- Acres: 73
- Size Class: Small Sawtimber
- DBH Range: 4"- 24"
- Forest Type: Mixed Hardwood
- Basal Area per Acre: 47 sq. ft.
- Site Class: II

Stand 1 is the largest in acres of the stands on this parcel. It is comprised of mixed hardwoods including but not limited to its top four species: black oak *Quercus velutina*, white oak *Quercus alba*, black birch *Betula lenta*, and red maple *Acer rubrum*. Stocking or the amount of trees utilizing the available growing space is low to desirable or considered adequately stocked. Lot "21" has a 24" black oak on its eastern edge which may be a likely candidate for cavity nesters. The common line between lots "1" and "2" have a 16" and a 20" dominant oaks and a 23" dominant maple.

There are three wetlands located in this stand and are identified as wetlands "A" which consists of +/-.6 ac, wetlands "C" which consists of +/- .5 ac. and wetlands "D" which consists of +/-.8 ac. Wetland "A" consists of larger diameter red and white oak. All of the wetlands have designated surrounding buffer zones which adequately preserves the individuals within them.

STAND 2

- Acres: 5
- Size Class: Small Sawtimber
- DBH Range: 4"- 30"
- Forest Type: Mixed Hardwood
- Basal Area per Acre: 53 sq. ft.
- Site Class: II

Stand 2 is comprised of mixed hardwoods including but not limited to its top four species: red maple, tulip poplar *Liriodendron tulipfera*, white ash *Fraxinus americana* and black birch. The largest deciduous individuals are in this stand and as a result it has the largest basal area on the property and an adequate stocking level. This stand is nearly all wetland "b" and what is not wetland is within the buffer. All of Stand 2 is in the proposed conservation easement.

STAND 3

- Acres: 5
- Size Class: Small Sawtimber
- DBH Range: 4"- 20"
- Forest Type: Hemlock - Mixed Hardwood
- Basal Area per Acre: 45 sq. ft.
- Site Class: II

Stand 3 is comprised of hemlock- mixed hardwood including but not limited to its top four species: red maple, black oak, black birch and hemlock *Tsuga canadensis*. Hemlock in this stand dominates the canopy creating a wetter, shadier site. The hemlocks are exhibiting signs of elongate scale which is one of several common pathogens to the decline of hemlock in the Hudson Valley region. Included in this report is description and recommended treatment for scale.

Recommendations and Conclusions

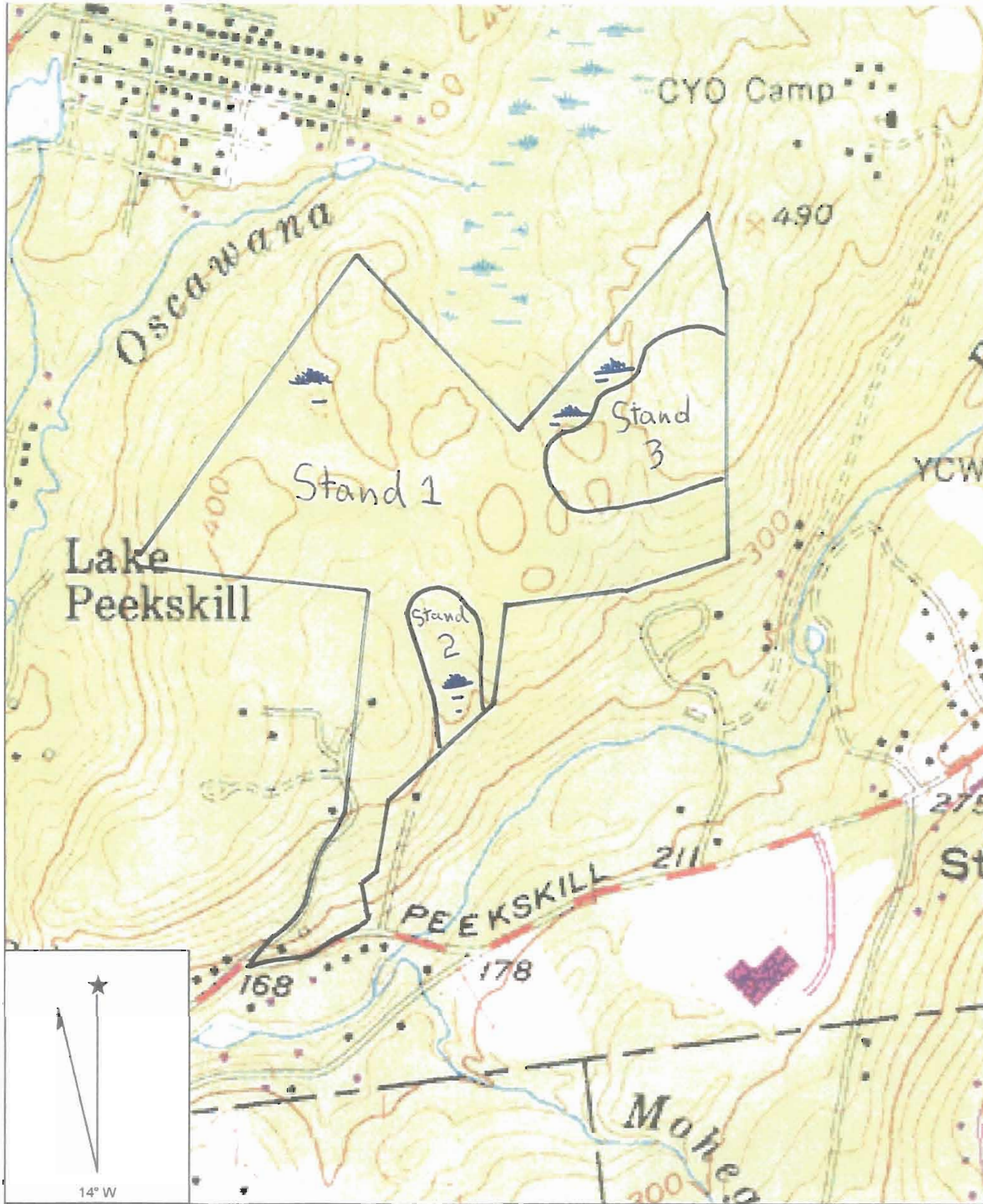
Because of the poor quality of the site, many of these individuals do not stand out. There are a so few specimen trees that the ones that are there should to be preserved and protected with great care. The individuals in Stand 1 mentioned located on the common line of lots 1 and 2 pose a particular aesthetic and seed tree value to the residual stand. The 24" oak in lot 21 may have cavity nesting value. The root system of a tree can extend up to three times the diameter of the drip line on the crown. There should be no disturbance of any kind to these trees. Fencing should be placed around the maximum area of the root system to prevent disturbance. Larger trees in Stand 2 will be protected in the conservation easement and wetland buffer and wetlands. In contrast, the more hemlocks that are disturbed the healthier the forest, as a whole will probably be. The scale infecting the hemlocks is hard to control because of the amount of trees and the topography and ultimately these trees will die. Favoring more of the hardwoods in Stand 3 is recommended. Since the foot print of the project is kept to a relative minimum compared to the size and scope of the project, relatively little to no impact will be placed on the residual stand.

Credentials

Joshua Tree Forestry Consulting, Inc.
- Joshua Kowan, Proprietor
- B.S. Forest Management, Colorado State University
- Society of American Foresters Certified Forester
- Certified Wetlands Delineator
- 10 years experience in the field of Forestry and the Forest Products Industry including the management of several projects to the completion and satisfaction of the landowners and the town in Putnam Valley

Lands of Emerald Ridge

Putnam Valley, NY



Name: MOHEGAN LAKE
Date: 3/7/2006
Scale: 1 inch equals 666 feet

Location: 041° 20' 27.7" N 073° 51' 50.8" W
Caption: Lands of Emerald Ridge
Putnam Valley, NY