APPENDIX C

Geotechnical Report

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

MEMO

River Drive Center 1 Elmwood Park, NJ 07407 T: 201.794.6900 F: 201.794.0366

To: Bruce Katona (Bergstol Enterprises)

From: Chris Woods, P.E. (Langan) cgw

Date: 15 March 2006

Re: Response to Geotechnical Item No. 4
Minisceongo Park "To Do" List
Langan Project Number: 1879901

This memorandum provides a response to Geotechnical Item No. 4, as outlined in a memorandum from Tim Miller Associates, dated 27 February 2006. The memo outlined additional information required to complete the DEIS for the Minisceongo Park project.

Comment: Provide updated geotech assessment of most recent grading plan vis-à-vis settlement issues.

In our Geotechnical Engineering Report for the Minisceongo Park site, dated 5 November 2003, we outlined a two-part subgrade improvement program which is necessary to allow for shallow foundation and slab-on-grade construction at the site. Because of the variable nature of the fill material, and the compressible nature of the organics underlying the western portion of the site, ground improvement measures that address both concerns will be necessary. The first phase consists of a surcharge program designed to improve the organic material underlying the western portion of the site. The second phase consists of heavy surface compaction to improve the existing fill material across the site.

At the time of our 2003 report, proposed site grades were not available, and as such, our ground improvement recommendations were subject to review once proposed site grades had been established. The most recent grading plan provided by Atzl, Scatassa, & Zigler, dated 23 November 2005 shows fills of as much as 8 feet are anticipated throughout the site. Based on the proposed grading plan, we offer the following updated ground improvement recommendations:

Surcharge Program

The proposed surcharge program will consist of all areas of roadway and building construction west of the proposed entrance to the development on Route 202, with the exception of an area which was previously surcharged during historic site development. A test surcharge section will be constructed in the previously surcharged area to determine if further improvement is necessary in this area. The extents of the proposed surcharge area, along with the approximate extents of the previously surcharged area are shown on Langan's Surcharge Plan, dated 13 March 2006. A description of the proposed surcharge program in both the building and roadway areas is given below.

Building Surcharge Program – We recommend a surcharge program for the proposed buildings that would consist of approximately 7 feet of surcharge above the finished floor elevations of the townhomes be placed for a period of approximately three to four months. The top of the surcharge should extend a minimum of 10 feet past the building limits.

Roadway Surcharge Program – We recommend a surcharge program for the proposed roadways that would consist of approximately 3 feet of surcharge above the finished roadway elevations of the townhomes be placed for a period of approximately three months.

The progress of the surcharge program will be monitored using settlement plates. Langan will determine the actual duration of the surcharge based on the results of the settlement monitoring. The surcharge may be removed when sufficient settlement has been obtained.

Surface Compaction

Throughout the site, footing subgrade locations must be surface compacted with at least 6 passes of a smooth drum vibratory roller having a minimum static drum weight of 7-tons. This will densify loose areas within the uncontrolled fill and improve the overall engineering properties of the material. Any soft or wet areas exhibiting excessive pumping, rutting, or other evidence of poor subgrade, must be removed to competent material and replaced with granular fill as described in our Geotechnical Engineering Report. Once exposed, individual footing locations will then be proofrolled with at least 6 passes of a 1-ton walk-behind roller to confirm the absence of soft or deleterious material prior to construction.

Conclusions

If the recommended ground improvement program is followed, we expect total long-term settlements for the proposed structures to be on the order of 1 inch. Differential settlements between adjacent columns are expected to be less than ¾-inch. All other recommendations provided in our 5 November 2003 Geotechnical Engineering Report still apply.

NJ Certificate of Authorization No: 24GA27996400
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Bernard F. Langan, P.E.
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George P. Kelley, P.E.
Michael A. Semeraro, Jr., P.E.
David T. Gockel, P.E.
Nicholas De Rose, P.G.
Cabot M. Hudson, P.E.
Andrew J. Ciancia, P.E.
George E. Leventis, P.E.

Gerard M. Coscia, P.E.
Colleen Costello, P.G.
Rudolph P. Frizzi, P.E.
Ronald A. Fuerst, C.L.A.
Michael M. Goldstein
Cristina M. Gonzalez, P.E.
Sam B. Ishak, M.C.S.E
William G. Lothian, P.E.
Leonard D. Savino, P.E.
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Gerald J. Zambrella, C.E.M.

Roger A. Archabal, P.E.
Gregory L. Biesiadecki, P.E.
Michael E. Cotreau, P.E.
Gregory M. Elko, P.E.
Edward H. Geibert, M.S.
Joel B. Landes, P.E.
John J. McElroy, Jr., Ph.D., P.E.
R. S. Murali, M.S.
John D. Plante, P.E.
Alan R. Poeppel, P.E.
George A. Reeves
Joseph E. Romano, P.L.S.

5 November 2003
1879900

Mr. Bruce Katona
Bergstol Enterprises
475 Route 304
New City, New York 10956

Re: **Geotechnical Engineering Report**
Pomona Park
Haverstraw and Pomona, New York

Dear Mr. Katona,

This letter report presents the results of our geotechnical engineering study for the Pomona Park project in Haverstraw and Ramapo, New York. The purpose of this study was to review existing documents, investigate subsurface conditions, and develop recommendations for subgrade improvements and other geotechnical aspects of design and construction. This work was performed in accordance with our approved 2 September 2003 proposal.

SITE DESCRIPTION

The Pomona Park site is located at the northwest corner of the intersection of Route 202 and the Palisades Interstate Parkway in the towns of Haverstraw and Ramapo, New York. The site is bounded by Route 202 to the south, the Palisades Interstate Parkway to the east, Mount Ivy Swamp to the west, and existing warehouse facilities to the north. A Site Location Map is shown in Figure 1.

The site is approximately 52.5 acres in size, and is generally level with elevations ranging from approximately el. 402 to el. 410. Stockpiles of miscellaneous materials were once scattered throughout the site as a result of previous quarrying of sand and gravel and proposed site development. In the late 1980's a shopping center had been proposed for this site and subgrade improvements consisting of a surcharge program were implemented over a portion of the site. Currently, the site remains undeveloped and covered with grass and brush.

PROPOSED SITE DEVELOPMENT

We understand that the proposed development at the site is to include the construction of several 3-story townhomes, totaling approximately 296 residential units. This work would include the development of parking areas and the construction of two detention basins in the western portion of the proposed site. At this time, a proposed grading scheme and anticipated column loadings have not been determined. Significant changes to the existing site grades could have an impact on the proposed subgrade improvement program. We assume that should you decide to move forward with this project, this information will be provided to us for our review.

SUBSURFACE INVESTIGATION

A total of 4 soil borings were advanced to a depth of 27 feet during our subsurface investigation between 12 and 15 September 2003. Additional subsurface data available included 4 soil borings previously advanced by Langan in 1988, along with data from previous investigations which you provided us with. In total, 73 borings and 37 test pits have been performed to date. The locations of these borings and test pits are shown in the attached Figure 2. A table summarizing the subsurface investigations performed to date is attached as Table A. The logs of these explorations are given in Appendices A through H.

The borings performed ranged from 7 to 82 feet in depth. All samples were obtained with a split spoon sampler used in conjunction with Standard Penetration Testing (SPT). The SPT consists of repeatedly dropping a 140-pound weight from a height of 30-inches.

The test pits excavated at the site ranged from approximately 5 to 12.5 feet in depth. The test pits were excavated to determine both the general nature of the fill material on-site and the overall thickness of the fill layer.

SUBSURFACE CONDITIONS

Results of the subsurface investigations done to date indicate that the general subsurface conditions consist of miscellaneous fill underlain by glacial materials which consist of sands and silty sands with varying amounts of gravel, silt, and clay throughout the site. However, the available subsurface data indicates that the fill material on the western portion of the site is underlain by a layer of highly compressible organic material followed by a layer of clay and silt prior to encountering the glacial materials described above. Bedrock was not encountered in any of the borings, the deepest of which extended to 82 feet. A more specific description of each strata encountered in the borings is given below in descending order from the ground surface.

<u>Miscellaneous Fill</u> – The fill layer generally consists of brown to greenish brown coarse to fine sand to silty sand with varying amounts of silt, gravel, cobbles, boulders, and debris. The fill layer is approximately 2 to 13 feet in thickness, and is thickest on the western portion of the site. Standard Penetration Test (SPT) N-values range from 4 to over 100 blows/foot (bl/ft) within the fill layer. It should be noted, however, that the higher N-values

are most likely the result of the presence of gravel, cobbles, and boulders within the fill material.

Organic Layer –The fill material on the western portion of the site is underlain by a layer of highly compressible organic material which ranges in thickness from approximately 1 to 6 feet. The organic layer generally consists of a combination of both highly compressible brown fibrous peat and brown to black organic silts. The moisture content within this layer ranged from as low as 21% in the organic silts to as high as 553% in the peat. A single set of Atterberg Limits testing in the organic silt resulted in a plastic limit of 30% and a liquid limit of 56%.

Silt and Clay Layer - The organic layer in the southwestern portion of the site is underlain by a layer of silt and clay which generally consists of silty clay to clayey silt with trace amounts of fine sand, gravel, and vegetation. The silt and clay layer ranges in thickness from approximately 4 to 29 feet, averaging approximately 14 feet, with the layer thickness increasing towards the southwestern most portion of the site. SPT N-values for this layer ranged from WOH to 31 bl/ft. The moisture content for this layer ranged from approximately 22 to 32%. Atterberg Limits testing resulted in an average plastic limit of 18% and an approximate liquid limit of 34%.

Glacial Materials – The underlying glacial materials generally consist of medium dense to dense sand to silty sand with varying amounts of gravel, and silt and clay seams, throughout the site. The glacial material was encountered at depths ranging from 2 to 39 feet. SPT N-values in this material vary widely from 3 to over 100 bl/ft.

Groundwater – Groundwater was encountered at depths ranging from 1 to 10 feet across the site. Overall, the data seems to indicate that the groundwater table elevation varies between approximately el. 394 and el. 400 across the site. The water encountered at shallower depths may be trapped on localized impermeable layers or buried obstructions. It is expected that the groundwater elevation will fluctuate with the weather as well as seasonal conditions.

EVALUATION AND RECOMMENDATIONS

A subgrade improvement program is necessary for the proposed construction. The existing subsurface conditions include uncontrolled fill and underlying compressible organic soils. Without a subgrade improvement program, construction of the existing soils would result in unacceptable settlement of the structures. Upon completion of the proposed subgrade improvement program, the proposed residences would be constructed on shallow foundations founded in the improved fill material. While post-construction settlements would still be accepted, the magnitude of such settlement is not expected to exceed two inches and should be relatively uniform across each unit.

We recommend a two-part subgrade improvement program for the support of the proposed townhomes and the accompanying infrastructure. The program would consist of a combination of a surcharge program in the area of the western portion of the site which has not previously been surcharged, combined with surface compaction throughout the site.

Our recommendations regarding the proposed subgrade improvement program, other aspects of construction, and a final geotechnical investigation are presented below.

Subgrade Improvement Program

The proposed surcharge program would consist of all areas of roadway and building construction west of the proposed entrance to the development on Route 202, except for the area which was previously surcharged as a result of proposed site development. The extents of the proposed surcharge area, along with the approximate extents of the previously surcharged area are shown on the attached Figure 2. A description of the proposed surcharge program in both the building and roadway areas is given below.

> Building Surcharge Program – Based on the assumption that the proposed site grades would not be raised by more than 12 inches, we recommend a surcharge program for the proposed buildings that would consist of approximately 7 to 10 feet of surcharge above the finished floor elevations of the townhomes be placed for a period of approximately three to four months. The 10 feet of surcharge would be necessary in the areas of thicker peat material, where settlements would be much greater.
>
> Roadway Surcharge Program – Based on the assumption that the proposed site grades would not be raised more than 12 inches, we recommend a surcharge program for the proposed roadways that would consist of approximately 3 feet of surcharge above the finished roadway elevations of the townhomes be placed for a period of approximately three months.

The actual duration will be determined by the Geotechnical Engineer based on settlement monitoring. As this program will likely require a significant volume of soil, a plan which would allow surcharge to be "rolled" in 3 stages from section to section within the proposed surcharge area should be considered. This will extend the overall time of the total surcharge program, but will significantly reduce the volume of material required. Available on-site materials may be used for the surcharge program.

Settlement plates should be installed and monitored by the Geotechnical Engineer during the course of the surcharge period to ensure that the majority of the settlement has been completed prior to construction of utilities and surface features.

Once a proposed grading plan is prepared, it should be forwarded to us so that its impact on the above outlined surcharge program be evaluated, and modifications be made, if necessary.

Surface Compaction – Throughout the site, footing subgrades must be surface compacted with at least 6 passes of a smooth drum vibratory roller having a minimum static drum weight of 7-tons. This will densify loose areas within the uncontrolled fill and improve the overall engineering properties of the material. Any soft or wet areas exhibiting excessive pumping, rutting, or other evidence of poor subgrade, must be removed to competent material and replaced with granular fill as described below.

Foundation Construction

The proposed townhomes may be supported on shallow spread footings bearing on the fill material after the subgrade improvement measures outlined above are completed. The spread footings may be designed for an allowable bearing pressure of 3,000 psf. Individual spread footings should have a minimum dimension of 3 feet and strip footings should have a minimum width of 2 feet, even if smaller dimensions can be justified using the allowable bearing capacity provided above. All footings must be constructed below the frost line at a minimum depth of 3.5 feet.

Fill Placement

Based on proposed site grading, it may be required to raise grades within the site. The fill should be granular material with no more than 15% fines (passing the #200 sieve) and no pieces larger than 6 inches. The fill must not contain wood, metal, or other deleterious materials. It is likely that a portion of any excavated soils will meet these requirements, should grade changes be necessary, and can be reused for the engineered fill. The fill should be placed in loose lifts not exceeding 12 inches and should be compacted to 95% of its maximum dry density as determined by ASTM D1557. Care should be taken to keep the moisture within a few points of the optimum moisture content, as significant changes in moisture content could result in the material being unacceptable to use as a structural fill.

Floor Slab Construction

Prior to construction of the slab-on-grade, we recommend that the subgrade be compacted with at least 6 passes with a vibratory roller having a minimum static drum weight of at least 5-tons. Any soft or wet areas shall be removed and replaced with engineered fill as described above. A minimum modulus of subgrade reaction of 250 psi/inch may be used for the design of the slab-on-grade.

Utility Construction

New utilities should be placed on a bed of ¾ inch clean crushed shone up to the spring line of the pipe, unless otherwise required by the utility supplier. Backfill around utility trenches should be accomplished using fill material previously excavated from the trench in loose lifts not exceeding 12-inches in thickness. Each lift of fill should be compacted using a 1-ton vibratory walk-behind roller to 95% of maximum dry density (ASTM D1557). Compaction of all fill should be verified by the Geotechnical Engineer as meeting the above criteria through visual inspection and the performance of in-place density tests.

Construction Documents and Construction Quality Assurance

We recommend the construction documents for the foundation construction be reviewed by Langan to ensure that all of the recommendations are properly incorporated into the design document. We also recommend other geotechnical related construction documents be reviewed by Langan. All the construction work related to geotechnical engineering, foundation construction, and earthwork should be subject to full-time engineering inspection provided by Langan.

Final Geotechnical Investigation

Should you decide to move forward with this project, a final geotechnical engineering investigation should be performed by Langan. This investigation would include a series of test pits to better identify the general nature of the fill in the area of the proposed detentions basins on the western portion of the site. Additionally, a final series of borings should be advanced within the proposed surcharge area to obtain undisturbed samples that would be used for final design of the surcharge program.

LIMITATIONS

At the time this report was completed, the proposed Grading Plan for the project had not yet been completed. Once the Grading Plan is done, it should be forwarded to our office so that we can reassess the recommendations provided herein and make any necessary modifications. The conclusions and recommendations provided herein are based on information obtained through our field investigation, the subsurface information with which you provided us, and the preliminary site development information provided to us. The recommendations given are contingent upon one another and no recommendation shall be followed independently of the others. This report has been prepared to assist you in your due diligence process. Langan should review the final foundation design and construction documents to ensure all the recommendations are properly incorporated. It is intended for use with regard to the given information and any changes in structures or locations should be brought to our attention so that we may determine how such changes may affect our recommendations. No environmental assessment of soil or groundwater was performed during our geotechnical investigation or evaluation and is expressly excluded.

This report has presented our findings and recommendations for the Pomona Park project in Haverstraw and Ramapo, New York. We have appreciated working with you on this project, and look forward to the work ahead. If you have any questions, please call us.

Very truly yours,

Langan Engineering and Environmental Services

Christian B. Woods

David T. Gockel, P.E.

cc: Ken Huber (Langan)

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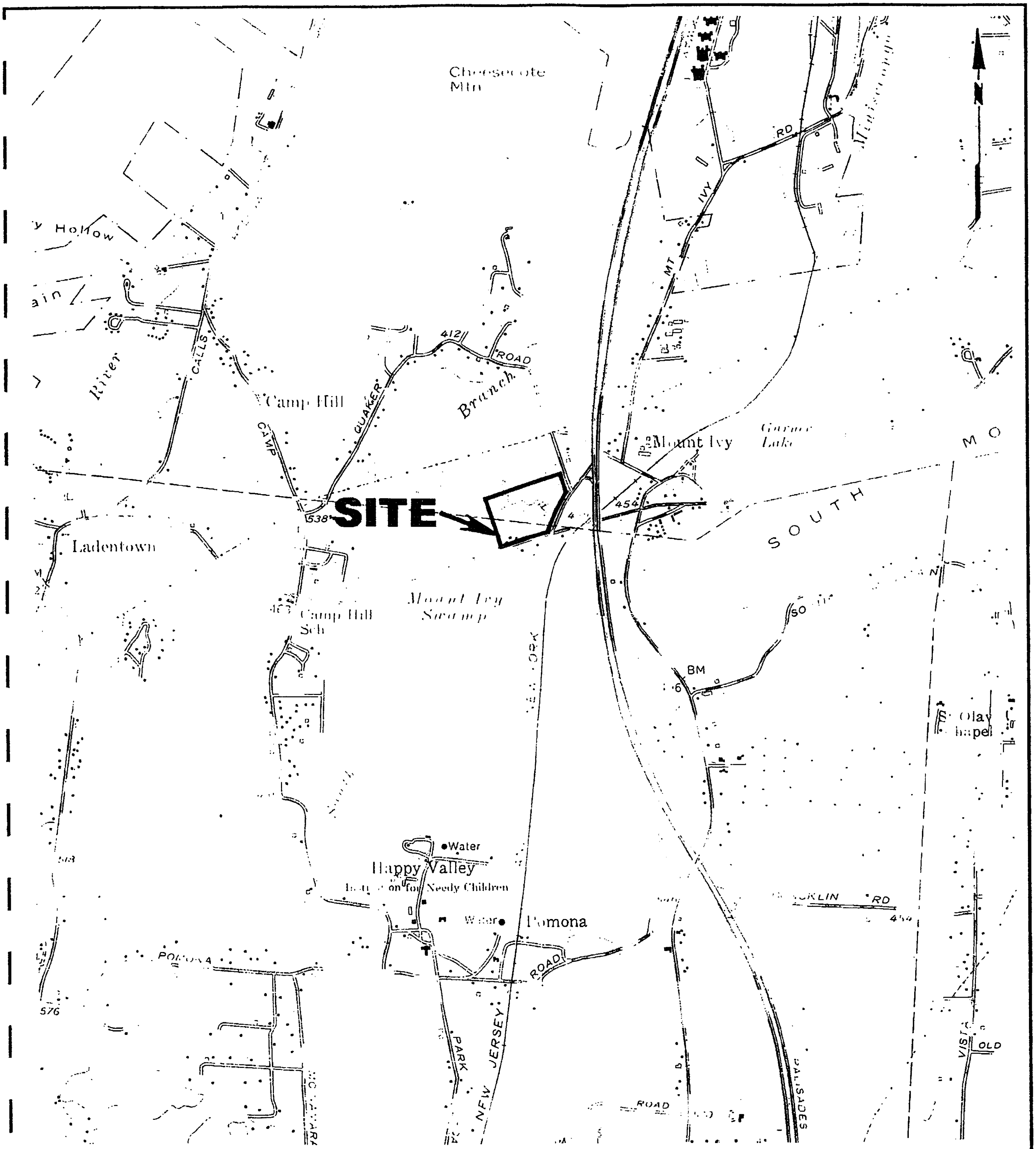
Summary of Previous Investigations
Pomona Park
Haverstraw and Ramapo, New York
1879900

Date	Firm	Field Investigation	Laboratory Investigation
September 2003	Langan Engineering	4 Soil Borings	-
November 2000	Tectonic Engineering Consultants	17 Soil Borings	Atterberg Limits, Grain Size Analyses
June 1995	R. W. Gillespie & Associates, Inc.	18 Soil Borings	-
October 1994	R. W. Gillespie & Associates, Inc.	8 Soil Borings	-
October 1994	R. W. Gillespie & Associates, Inc.	16 Test Pits	-
December 1988	Langan Engineering	4 Soil Borings	-
June 1988	Melick-Tully and Associates	16 Soil Borings	-
March 1987	Melick-Tully and Associates	6 Soil Borings	-
February 1987	Melick-Tully and Associates	21 Test Pits	-

TABLE A



Map Reference: Thiellis, N.Y. U.S.G.S. Quadrangle Map

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ELMWOOD PK, NJ • NEW YORK, NY • PHILADELPHIA, PA • DOYLESTOWN, PA
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Project

POMONA PARK
SITE LOCATION MAP

HAVERSTRAW AND RAMAPO **NEW YORK**

JOB NO.	DATE	SCALE	FIGURE NO.
1879900	10/15/2003	1" = 2000'	1

Document1

APPENDIX A
BORINGS BY LANGAN
September 2003

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Engineering and Environmental Services, Inc.

Log of Boring LB-1-03 Sheet 1 of 2

Project: Pamona Park		Project No.: 1879900	
Location: Haverstraw/Ramapo, N.Y.		Elevation and Datum: 403.5	
Drilling Agency: Jersey Boring		Date Started: 9/12/03	Date Finished: 9/12/03
Drilling Equipment: Truck Mounted Rig		Completion Depth: 27 ft.	Rock Depth: -
Size and Type of Bit: 3 7/8" Hollow Stem Auger		Number of Samples: Disturbed 9; Undisturbed -; Core -	
Casing Diameter (in): -	Casing Depth (ft): -	Water Level (ft.): First ▽ 7; Completion ▼ 7; 24 HR. ▼ -	
Casing Hammer	Weight (lbs): - ; Drop (in): -	Drilling Foreman: Joe	
Sampler: 2" O.D. Split Spoon		Inspecting Engineer: Joe Petrucci	
Sampler Hammer: Safety	Weight (lbs): 140 ; Drop (in): 30		

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	PID (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Brown c-f SAND, some silt, some c-f gravel, trace asphalt [FILL] (moist)	▨	1 2	S-1	SS	10	14 23 22 20		Started boring at 11:00 AM
	Brown c-f SAND, some black asphalt, some silt trace c-f gravel [FILL] (moist)	▨	3 4	S-2	SS	12	24 10 100/5"		Slight odor in sample
	Gray-brown silty c-f SAND, trace f gravel [FILL] (moist)	▨	5 6	S-3	SS	14	24 16 8 8		Hit boulder. Moved bore hole 4' to the west. Auger to 4' Slight odor in sample
	Gray m-f SAND, some silt, trace m-f gravel, trace roots [FILL] (wet) ▼	▨	7 8	S-4	SS	14	5- 5 18 27		
	Gray and brown m-f SAND, trace silt [SP] (wet)	░	9 10	S-5	SS	24	24 19 12 12		Slight odor
	Brown m-f SAND, trace silt [SW] (wet)	░	11 12	S-6	SS	24	4 5 6 6		Auger to 10'
		░	13 14 15						Auger to 15'
	Brown m-f SAND, some silt [SP] (wet)	░	16 17	S-7	SS	24	12 7 7 7		
		░	18 19						Auger to 20'

Log of Boring LB-1-03 Sheet 2 of 2

Project Pamona Park	Project No. 1879900
Location Haverstraw/Ramapo, N.Y.	Elevation and Datum 403.5

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data				PID (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr. resist BL/6in		
	Brown m-f SAND, trace silt [SP] (wet)	░	21 22	S-8	SS	22	15 8 8 10		
		░	22 23 24						Auger to 25'
	Brown m-f SAND, trace silt [SW] (wet)	░	25 26	S-9	SS	24	21 15 15 21		Ended boring at 12:40 PM. Backfilled with cuttings
	End of boring at 27'		27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45						

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Log of Boring **LB-2-03** Sheet 1 of 2

Project Pamona Park			Project No. 1879900		
Location Haverstraw/Ramapo, N.Y.			Elevation and Datum 403.5		
Drilling Agency Jersey Boring			Date Started 9/12/03	Date Finished 9/12/03	
Drilling Equipment Truck Mounted Rig			Completion Depth 27 ft.	Rock Depth -	
Size and Type of Bit 3 7/8" Hollow Stem Auger			Number of Samples	Disturbed 9	Undisturbed -
				Core -	
Casing Diameter (in) -	Casing Depth (ft) -		Water Level (ft.)	First ▽ 7	Completion ▼ 7
				24 HR. ▼ -	
Casing Hammer	Weight (lbs) -	Drop (in) -	Drilling Foreman Joe		
Sampler 2" O.D. Split Spoon			Inspecting Engineer Joe Petrucci		
Sampler Hammer Safety	Weight (lbs) 140	Drop (in) 30			

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data				PID (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr. resist BL/6in		
	Brown c-f SAND, some silt, trace f gravel [FILL] (dry)	▨	1	S-1	SS	24	28 21 25 100/3"		Started boring at 1:00 PM
	Brown c-f SAND, some silt, trace f gravel [FILL] (dry)	▨	2 3	S-2	SS	24	52 36 17 24		
	Light brown silty m-f SAND [SM] (moist)	░	4 5	S-3	SS	16	11 20 15 13		Auger to 4'
	Gray and brown c-f SAND, trace silt, trace f gravel [SW] (wet) ▼	░	6 7	S-4	SS	18	9 14 14 16		
	Brown m-f SAND, trace silt [SP] (wet)	░	8 9	S-5	SS	24	13 13 10 9		Auger to 8'
	Brown c-f SAND, trace silt [SW] (wet)	░	10 11	S-6	SS	24	4 4 5 7		Auger to 10'
		░	12 13 14						Auger to 15'
	Brown c-f SAND, trace silt, trace f gravel [SW] (wet)	░	15 16	S-7	SS	24	3 4 3 5		
		░	17 18 19						Auger to 20'

Langan
Engineering and Environmental Services, Inc. Log of Boring **LB-2-03** Sheet 2 of 2

Project Pamona Park	Project No. 1879900
Location Haverstraw/Ramapo, N.Y.	Elevation and Datum 403.5

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				Number	Type	Recov. (in)	Penetr. resist BL/6in	PID (ppm)	
	Brown c-f SAND, trace silt [SW] (wet)	░	21	S-8	SS	24	5 9 9 8		
		░	22 23 24						Auger to 25'
	Brown c-f SAND, trace silt [SW] (wet)	░	25 26	S-9	SS	20	6 8 12 12		Ended boring 2:30 PM. Backfilled with cuttings
	End of boring at 27'		27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45						

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Engineering and Environmental Services, Inc.

Log of Boring **LB-3-03** Sheet 1 of 2

Project Pamona Park		Project No. 1879900	
Location Haverstraw/Ramapo, N.Y.		Elevation and Datum 400.5	
Drilling Agency Jersey Boring		Date Started 9/15/03	Date Finished 9/15/03
Drilling Equipment Truck Mounted Rig		Completion Depth 27 ft.	Rock Depth -
Size and Type of Bit 3 7/8" Hollow Stem Auger		Number of Samples	Disturbed 9 / Undisturbed - / Core -
Casing Diameter (in) -	Casing Depth (ft) -	Water Level (ft.)	First ▽ 7 / Completion ▼ 7 / 24 HR. ▼ -
Casing Hammer	Weight (lbs) - / Drop (in) -	Drilling Foreman Joe	
Sampler 2" O.D. Split Spoon		Inspecting Engineer Joe Petrucci	
Sampler Hammer Safety	Weight (lbs) 140 / Drop (in) 30		

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	PID (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Brown c-f SAND, trace f gravel, some silt [FILL] (wet)	▩	1 2	S-1	SS	4	8 17 16 11		Started boring at 7:50 AM Safety hammer being used
	Gray m-f SAND, some silt, trace wood [FILL] (wet)	▩	3 4	S-2	SS	18	9 8 7 10		Auger to 4'
	Gray brown silty m-f SAND, trace wood [SW] (wet)	▩	5 6	S-3	SS	20	13 9 7 10		
	Gray m-f SAND, some silt, trace wood [SW] (wet) ▼	▩	7 8	S-4	SS	20	12 9 10 11		Auger to 8'
	Gray f sandy SILT, trace wood [FILL] (wet)	▩	9 10	S-5	SS	20	6 3 4 6		Auger to 10'
	Grayish brown SILT, some organics [MH] (wet)	×	11 12	S-6	SS		1 1 1 2		
	Black PEAT [PT] (wet)	⩛	13 14 15						Auger to 15'
	Gray organic SILT [OL] (wet)	‖	16 17 18	S-7	SS	14	4 6 4 4		Auger to 20'
		▨	19						

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Engineering and Environmental Services, Inc.

Log of Boring **LB-3-03** Sheet 2 of 2

Project Pamona Park	Project No. 1879900
Location Haverstraw/Ramapo, N.Y.	Elevation and Datum 400.5

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	PID (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Gray silty CLAY, trace f sand [CL] (wet)	▨	21	S-8	SS	24	3 3 4 6		
		▨	22						Auger to 25'
		▨	23						
			24						
	Gray SILT, trace f sand [ML] (wet)		25						
			26	S-9	SS		5 9 8 7		Ended boring at 8:55 AM. backfilled with cuttings
	End of boring at 27'		27						
			28						
			29						
			30						
			31						
			32						
			33						
			34						
			35						
			36						
			37						
			38						
			39						
			40						
			41						
			42						
			43						
			44						
			45						

Langan
Engineering and Environmental Services, Inc.

Log of Boring **LB-4-03** Sheet 1 of 2

Project: Pamona Park		Project No.: 1879900	
Location: Haverstraw/Ramapo, N.Y.		Elevation and Datum: 397.5	
Drilling Agency: Jersey Boring		Date Started: 9/15/03	Date Finished: 9/15/03
Drilling Equipment: Truck Mounted Rig		Completion Depth: 27 ft.	Rock Depth: -
Size and Type of Bit: 3 7/8" Hollow Stem Auger		Number of Samples: Disturbed 9	Undisturbed - Core -
Casing Diameter (in): -	Casing Depth (ft): -	Water Level (ft.): First ▽ 6	Completion ▼ 6 24 HR. ▼ -
Casing Hammer	Weight (lbs): - Drop (in): -	Drilling Foreman: Joe	
Sampler: 2" O.D. Split Spoon		Inspecting Engineer: Joe Petrucci	
Sampler Hammer: Safety	Weight (lbs): 140 Drop (in): 30		

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	PID (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Brown red c-f SAND, some silt, trace c-f gravel [FILL] (moist)	▩	1	S-1	SS	12	5 4 6 11		Started boring at 9:45 AM safety hammer being used
	Brown red & gray c-f SAND, some silt, trace c-f gravel, trace wood, trace roots [FILL] (moist)	▩	2 3	S-2	SS	14	5 7 5 5		
	Tan silty f SAND, trace wood [FILL] (moist)	▩	4 5	S-3	SS	14	4 4 4 5		Auger to 4'
	▼ Gray c-f SAND, trace silt, trace f gravel [FILL] (wet)	▩	6 7	S-4	SS	22	5 18 17 15		
	Gray m-f SAND, trace silt, trace organics [SW] (wet)	▩	8 9	S-5	SS	22	4 2 2 3		Auger to 8'
	Brown PEAT, trace sand, trace silt [OL] (wet) Brown ORGANICS, trace sand, trace silt [OL] (wet)	⩛	10 11	S-6 a&b	SS	24	1 1 2 1		Auger to 10'
	Gray silty CLAY, trace f sand, trace organics [CL] (wet)	▨	12 13 14						Auger to 15'
	Gray clayey SILT, trace f sand, trace organics [MH] (wet)	▥	15 16	S-7	SS	24	WH WH WH 2		
		▥	17 18 19						Auger to 20'

Langan
Engineering and Environmental Services, Inc.

Log of Boring **LB-4-03** Sheet 2 of 2

Project Pamona Park	Project No. 1879900
Location Haverstraw/Ramapo, N.Y.	Elevation and Datum 397.5

Env. Sample No.	Sample Description	Symbol Log	Depth Scale	Sample Data					Remarks
				Number	Type	Recov. (in)	Penetr. resist BL/6in	PID (ppm)	(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Gray clayey SILT, trace f sand, trace organics [MH] (wet)	▥	21	S-8	SS	24	4 4 4 4		
			22						Auger to 25'
			23						
			24						
	Gray clayey SILT, trace f sand [MH] (wet)	▥	25						
			26	S-9	SS	24	3 3 4 5		Ended boring at 10:50 AM Backfilled with cutings
	End of boring at 27'		27						
			28						
			29						
			30						
			31						
			32						
			33						
			34						
			35						
			36						
			37						
			38						
			39						
			40						
			41						
			42						
			43						
			44						
			45						

APPENDIX B
BORINGS BY TECTONIC
November 2000

TECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-101

SHEET No. 1 of 2

LIENT: Ginsburg Development LLC
ONTRACTOR: Craig Test Boring Co., Inc.

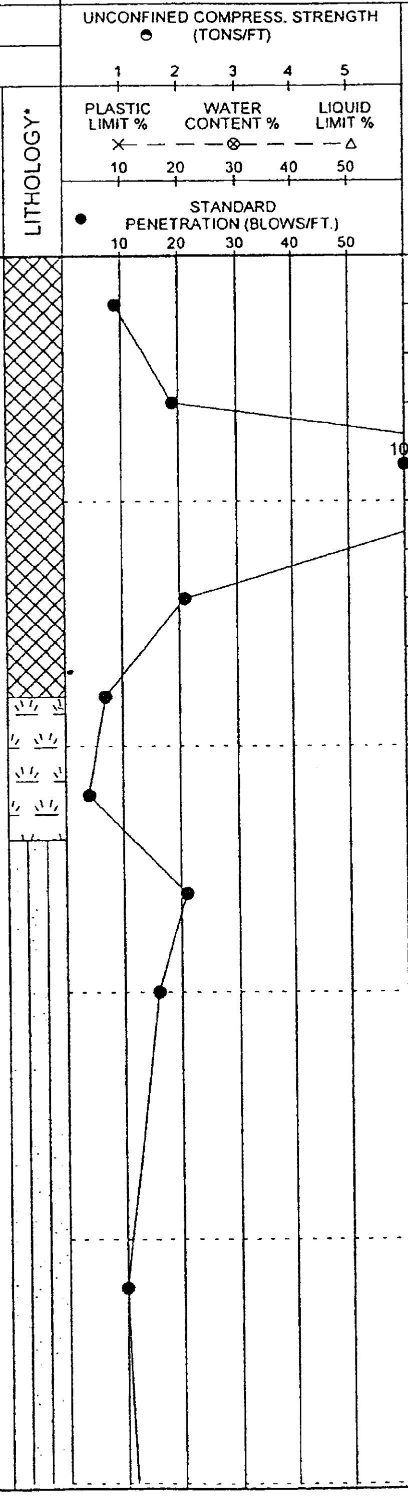
THOD OF ADVANCING BORING	DIA.	DEPTH		
OWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	40'
ASING:	4"	0	TO	15'
IAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH
			•
			•

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: TO
WEATHER: Overcast TEMP: 50 F
DEPTH TO ROCK: Not Encountered
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Barry Ouimet
DRILLER: Tom Ward
SURFACE ELEVATION: 403.9
DATUM: See Remarks
DATE START: 11/28/00
DATE FINISH: 11/28/00

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	9	1 3 6 13	S-1	3			SM	Gy Tn c-f SAND and Silt, some c-f Gravel (FILL)	
2									
3	19	10 11 8 9	S-2	8		M	SM	Gy Bwn c-f SAND, some c-f Gravel, some Clayey Silt, organics, wood fibers (FILL)	
4	100+	100/5	S-3	0				No Recovery	
5									398.9
6									
7	21	8 10 11 11	S-4	14		M	SM	Gy c-f SAND, some f Gravel, little Silt (FILL)	
8									
9	7	8 5 2 5	S-5	19		M	SM Pt	Same (FILL) Bottom 3" Bwn PEAT	
10									393.9
11	4	1 2 2 3	S-6	19		M	Pt	Blk FIBROUS PEAT Bottom 1" Gy m-f SAND, some Silt	
12									
13	21	3 11 10 14	S-7	15				Tn m-f SAND, some Silt	
14									
15	16	6 8 8 9	S-8	17		W	SM	Tn m-f SAND, little Silt with occasional 2" seams of Silty Clay	388.9
16									
17									
18									
19									
20									383.9
21	10	3 5 5 6	S-9	14		W	SM	Tn c-f SAND, little Silt with occasional seams of Silty Clay	
22									
23									
24									
25									378.9



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

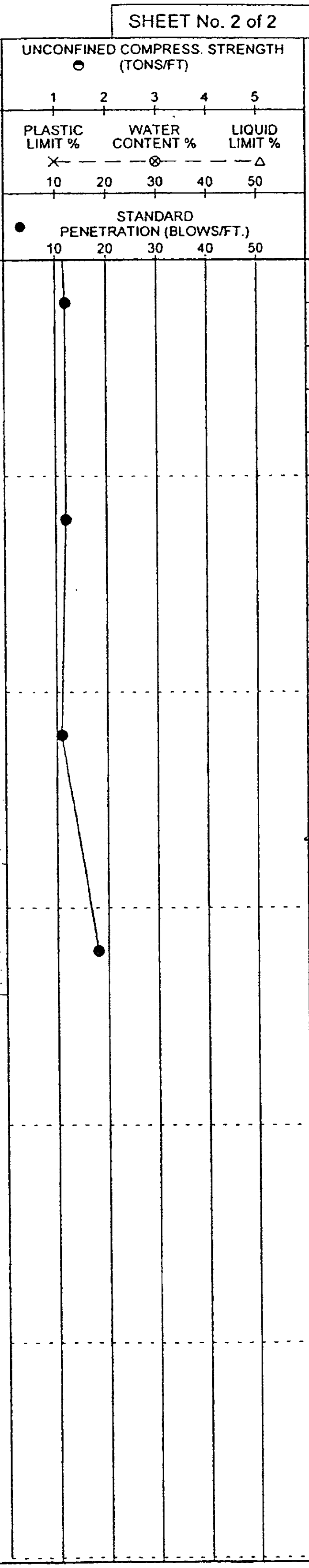
BORING No. B-101

SHEET No. 2 of 2

IENT: Ginsburg Development LLC

CONTRACTOR: Craig Test Boring Co., Inc.

PTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	12	5 5 7 7	S-10	14		W	SM	Tn m-f SAND, some Silt with frequent Silt partings and seams		
27										
28										
29										
30										373.9
31	12	5 6 6 8	S-11	19		W	SM	Tn m-f SAND, little Silt		
32										
33										
34										
35										368.9
36	11	4 4 7 7	S-12	16		W	SM	Tn Gy f SAND, some Silt with frequent partings & seams of Silty Clay		
37										
38										
39										
40										363.9
41	18	6 8 10 10	S-13	14		W	SM	Gy f SAND, some Silt with occasional seams of Silty Clay		
42								End of Boring at 42'		
43										
44										
45										358.9
46										
47										
48										
49										
50										353.9
51										
52										
53										
54										
55										348.9



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

TECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

BORING No. B-103

SHEET No. 1 of 2

LIENT: Ginsburg Development LLC

CONTRACTOR: Craig Test Boring Co., Inc.

THOD OF ADVANCING BORING	DIA.	DEPTH		
OWER AUGER:			TO	
ROT. DRILL:	6 1/4"	0	TO	35'
ASING:			TO	
DIAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH
	11/17/00	7:50 am	6.7'
	11/29/00	9:50 am	6.1'

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: TO

WEATHER: Clear TEMP: 50 F

DEPTH TO ROCK: Not Encountered

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Barry Ouimet

DRILLER: Dave Cooke

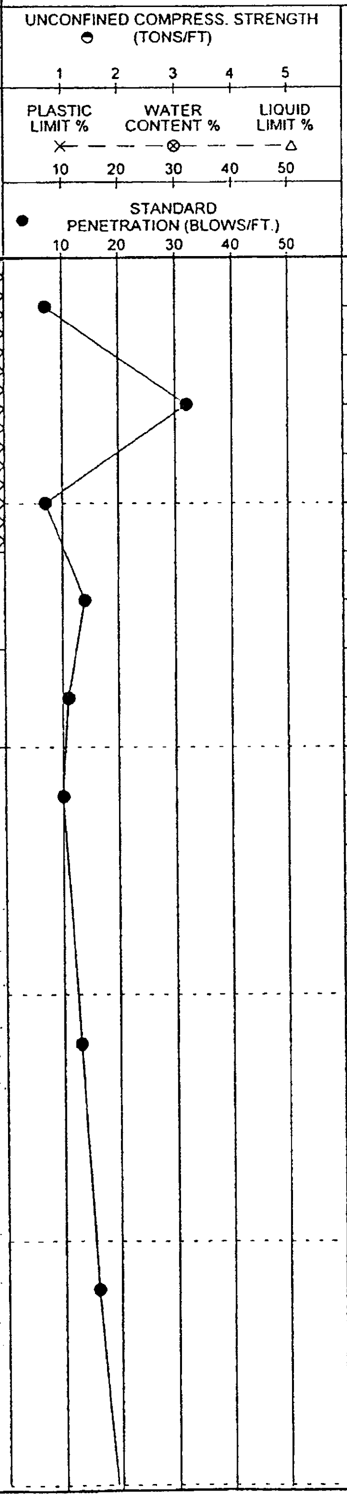
SURFACE ELEVATION: 404.7

DATUM: See Remarks

DATE START: 11/16/00

DATE FINISH: 11/16/00

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	7	2 3 4 6	S-1	12		M	SC	Gy Tn Rd m-f SAND, some f Gravel, little Silty Clay (FILL)		
2										
3	32	10 16 16 100/5"	S-2	9		M	SM	Gy Tn c-f SAND and c-f Gravel, little Silt (FILL)		
4										
5	7	5 4 3 3	S-3	10		M	SM	Gy c-f SAND, little f Gravel, little Clayey Silt, organics, root fibers (FILL)		399.7
6								∇ ▼		
7	14	2 5 9 9	S-4	12		W	SM	Same, organic fibers		
8										
9	11	8 5 6 8	S-5	12		W	SP-SM	Gy c-f SAND, little c-f Gravel, trace Silt		
10										394.7
11	10	6 5 5 5	S-6	6		M	SM	Gy Tn m-f SAND, little c-f Gravel, little Silt		
12										
13										
14										
15										389.7
16	13	5 6 7 7	S-7	11		M	SM	Tn m-f SAND, little Silt, trace f Gravel		
17										
18										
19										
20										384.7
21	16	5 8 8 9	S-8	12		M	SM	Tn m-f SAND, little Silt		
22										
23										
24										
25										379.7



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC ENGINEERING CONSULTANTS P.C.

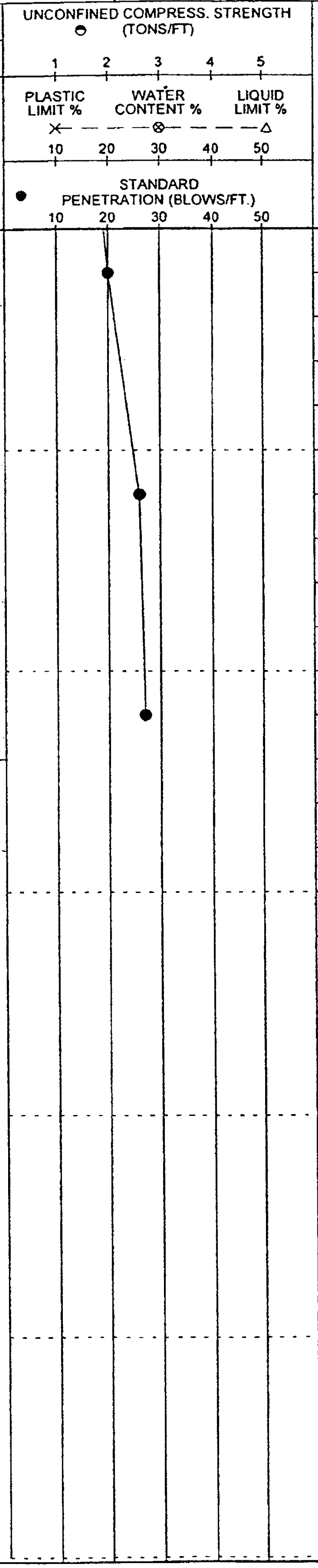
PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-103

SHEET No. 2 of 2

IENT: Ginsburg Development LLC
ONTRACTOR: Craig Test Boring Co., Inc.

EPTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	20	8 10 10 12	S-9	9		W	SM	Gy Tn m-f SAND		
7										
28										
9										
30										374.7
1	26	9 12 14 13	S-10	17		M	SM	Tn m-f SAND, some Silt with frequent Silty Clay seams in top 6"		
32										
3										
34										
5										369.7
6	27	10 14 13 16	S-11	13		M	SM	Tn m-f SAND, some Silt		
37								End of Boring at 37'		
8										
39										
0										364.7
41										
2										
43										
4										
45										359.7
6										
47										
8										
9										
50										354.7
1										
52										
3										
54										
5										349.7



EMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC *ENGINEERING CONSULTANTS P.C.*

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

BORING No. B-111

SHEET No. 1 of 2

IENT: Ginsburg Development LLC				GROUND WATER	DATE	TIME	DEPTH
ONTRACTOR: Craig Test Boring Co., Inc.							
HOD OF ADVANCING BORING	DIA.	DEPTH					
WER AUGER:		TO		MON. WELL	☐ YES	☒ NO	
ROT. DRILL:	3 7/8"	0 TO 35'		SCREEN DEPTH:		TO	
SING:	4"	0 TO 10'		WEATHER: Overcast		TEMP: 50 F	
IAMOND CORE:		TO		DEPTH TO ROCK: Not Encountered			
				*CHANGES IN STRATA ARE INFERRED			

INSPECTOR: Barry Ouimet

DRILLER: Tom Ward

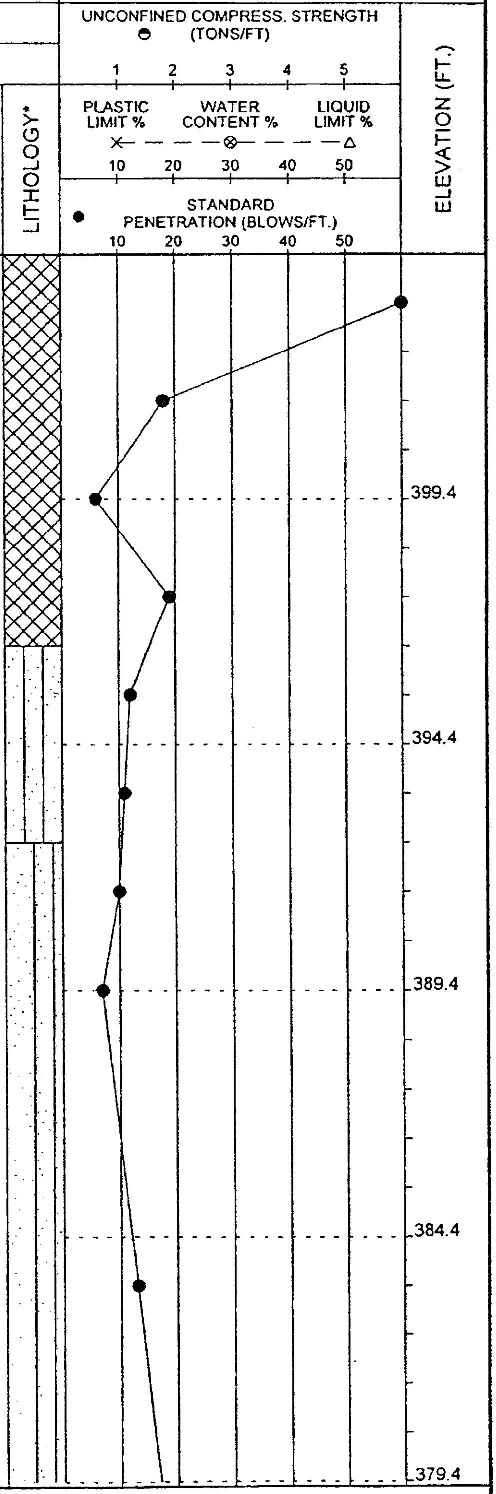
SURFACE ELEVATION: 404.4

DATUM: See Remarks

DATE START: 11/28/00

DATE FINISH: 11/28/00

H (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	60	2 35 25 58	S-1	7		W	SM	Bwn c-f SAND and c-f Gravel,some Silt (FILL)	
3 4	18	8 8 10 26	S-2	11		M	SM	Gy c-f SAND, some Silt, some c-f Gravel (FILL)	
5 6	6	8 3 3 2	S-3	8		M	SM	Gy c-f SAND, some f Gravel, some Silt (FILL)	399.4
7 8	19	5 7 12 13	S-4	16		M	SM	Gy c-f SAND, little f Gravel, little Silt with brick fragments (FILL)	
9 0	12	5 6 6 8	S-5	22		W	SM	Tn f SAND, some Silt	394.4
11 2	11	3 5 6 7	S-6	15		W	SM	Tn c-f SAND, little Silt	
13 14	10	3 5 5 6	S-7	16		W	SP-SM	Tn c-f SAND, trace Silt, trace f Gravel	
15 6	7	3 3 4 8	S-8	16		W	SP-SM	Tn c-f SAND, trace Silt	389.4
17 8									
9 0									384.4
1 22	13	4 5 8 10	S-9	15		W	SP-SM	Same	
3 24									
5									379.4



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

BORING No. B-115

SHEET No. 1 of 2

LIENT: **Ginsburg Development LLC**

CONTRACTOR: **Craig Test Boring Co., Inc.**

THOD OF ADVANCING BORING	DIA.	DEPTH		
OWER AUGER:			TO	
ROT. DRILL:		0	TO	40'
ASING:	4"	0	TO	10'
DIAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH
			•
		•	•

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: TO

WEATHER: Clear TEMP: 50 F

DEPTH TO ROCK: Not Encountered

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**

DRILLER: **Dave Cooke**

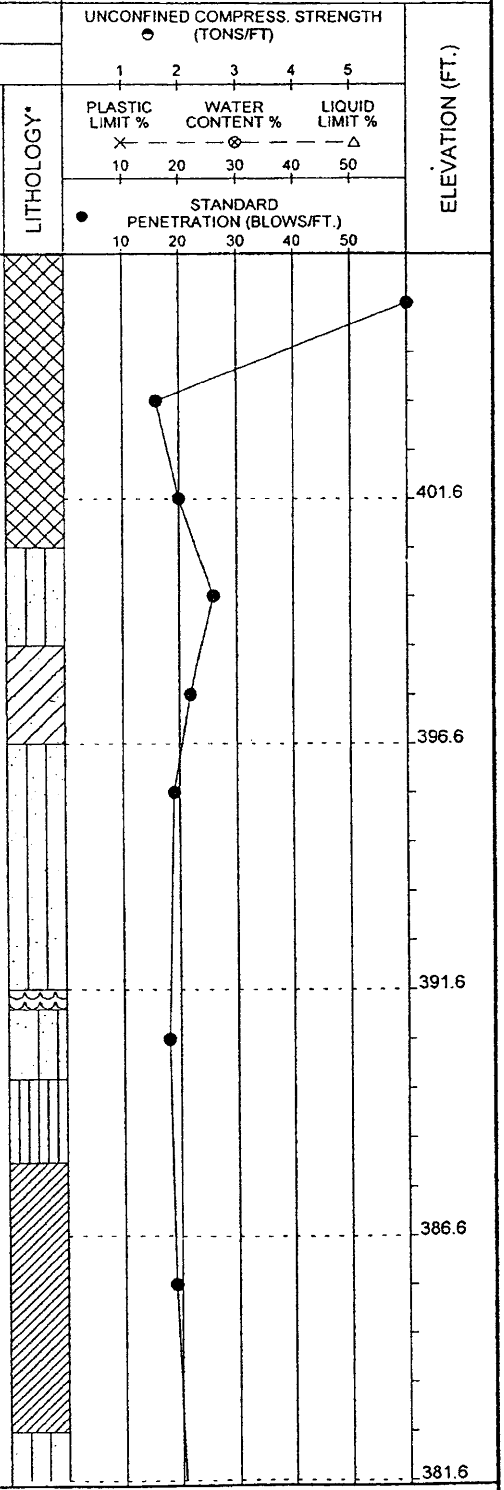
SURFACE ELEVATION: **406.6**

DATUM: **See Remarks**

DATE START: **11/16/00**

DATE FINISH: **11/16/00**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1	60	10 28 32 38	S-1	13		M	SM	Tn Gy m-f SAND and silt, some c-f Gravel, trace organics (wood fibers) (FILL)
2								
3	16	8 4 12 5	S-2	11		M	SM	Gy m-f SAND, some f Gravel, some Silt with brick particles
4								
5	20	8 9 11 11	S-3	10		M	SC	Gy m-f SAND, some Silty Clay, little f Gravel, trace organics (FILL)
6								
7	26	9 11 15 17	S-4	15		M	SM	Lt Tn c-f SAND, some Silt, some f Gravel, trace organics, mottled
8								
9	22	14 14 8 9	S-5	10		M	SC	Tn Gy c-f SAND, some Silty Clay, some c-f Gravel, trace organics (fine roots)
10								
11	19	12 10 9 9	S-6	15		M	SM	Gy m-f SAND, some Silt, trace organics
12								
13								
14								
15								
16	18	3 8 10 12	S-7	22		W	SM	Top 5" Bwn (PEAT) Gy f SAND, some Silt, trace f Gravel Bottom 2" Dk Gy SILT and f Sand
17								
18								
19								
20								
21	19	6 8 11 14	S-8	18		M	CL	Lt Tn Gy SILTY CLAY and f Sand, layered with frequent seams & partings
22								
23								
24								
25								



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.
Note: B-115 location was moved 3' south after encountering obstacle at 4'.

ECTONIC ENGINEERING CONSULTANTS P.C.

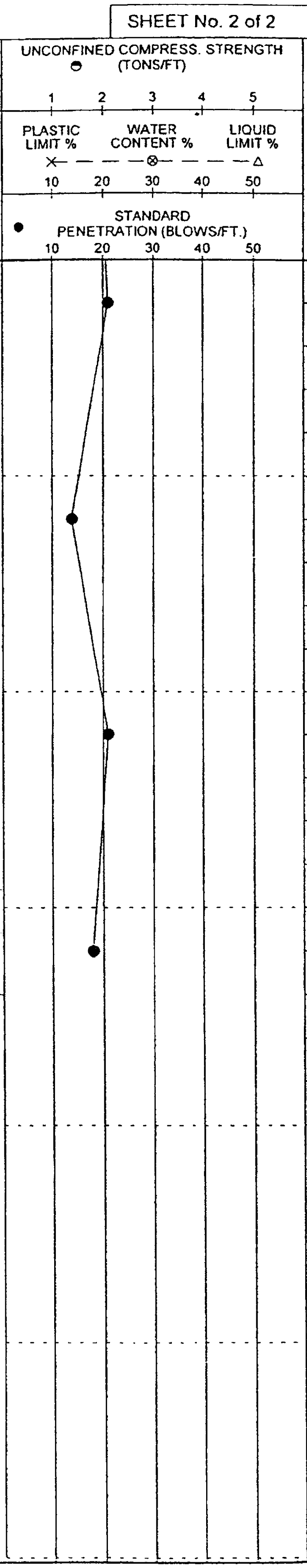
PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-115

SHEET No. 2 of 2

IENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

PTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE				
26	21	9 9 12 14	S-9	16		W	SM	Tn m-f SAND, little Silt		
7										
28										
9										
30										376.6
1	14	6 7 7 10	S-10	19		M	SM	Same		
32										
3										
34										
5										371.6
6	21	7 11 10 11	S-11	15				Tn Gy Same		
7										
8										
39										
0										366.6
41	18	9 9 9 11	S-12	15		M	SM	Tn Gy m-f SAND, little Silt with occasional Silty Clay parting		
2								End of Boring at 42'		
43										
4										
45										361.6
6										
47										
8										
49										
0										356.6
1										
52										
3										
54										
5										351.6



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.
Note: B-115 location was moved 3' south after encountering obstacle at 4'.

TECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

BORING No. B-117

SHEET No. 1 of 2

LIENT: Ginsburg Development LLC

CONTRACTOR: Craig Test Boring Co., Inc.

THOD OF ADVANCING BORING	DIA.	DEPTH		
OWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	40'
ASING:	4"	0	TO	10'
DIAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH
			•
			•

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: TO

WEATHER: Clear TEMP: 50 F

DEPTH TO ROCK: Not Encountered

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Barry Ouimet

DRILLER: Dave Cooke

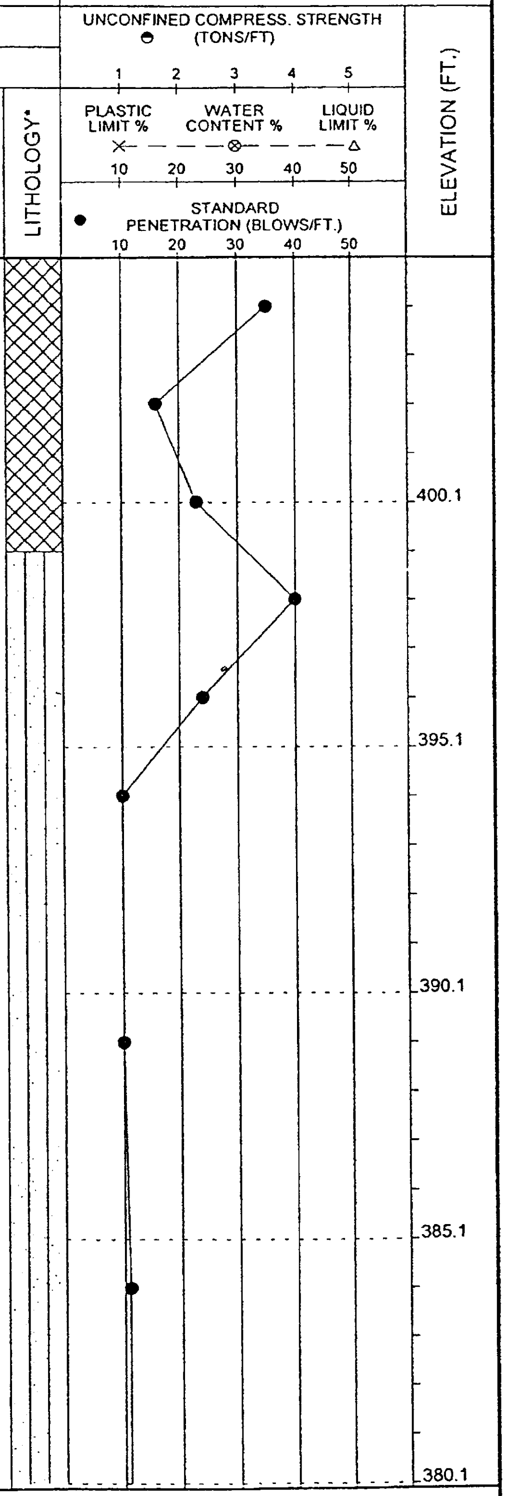
SURFACE ELEVATION: 405.1

DATUM: See Remarks

DATE START: 11/17/00

DATE FINISH: 11/17/00

EPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1	35	10 14 21 17	S-1	17		M	SM	Tn m-f SAND, some Silt, some f Gravel, trace organic fibers (FILL)
2								
3	16	11 8 8 8	S-2	13		M	SM	Gy Tn m-f SAND, some f Gravel, little Silt (FILL)
4								
5	23	7 11 12 14	S-3	0		W		No recovery, c Gravel fragment lodged in spoon tip (FILL)
6								
7	40	13 18 22 22	S-4	14		M	SM	Gy m-f SAND, little Silt, trace c-f Gravel
8								
9	24	7 12 12 9	S-5	12		W	SM	Tn m-f SAND, little Silt with occasional Silt parting
10								
11	10	4 4 6 7	S-6	4		W	SM	Same
12								
13								
14								
15								
16	10	3 4 6 7	S-7	14		W	SM	Tn m-f SAND, little Silt
17								
18								
19								
20								
21	11	4 5 6 8	S-8	16		W	SM	Same
22								
23								
24								
25								



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. **2900.01**

PROJECT: **Crystal Village**

LOCATION: **Haverstraw, New York**

BORING No. B-117

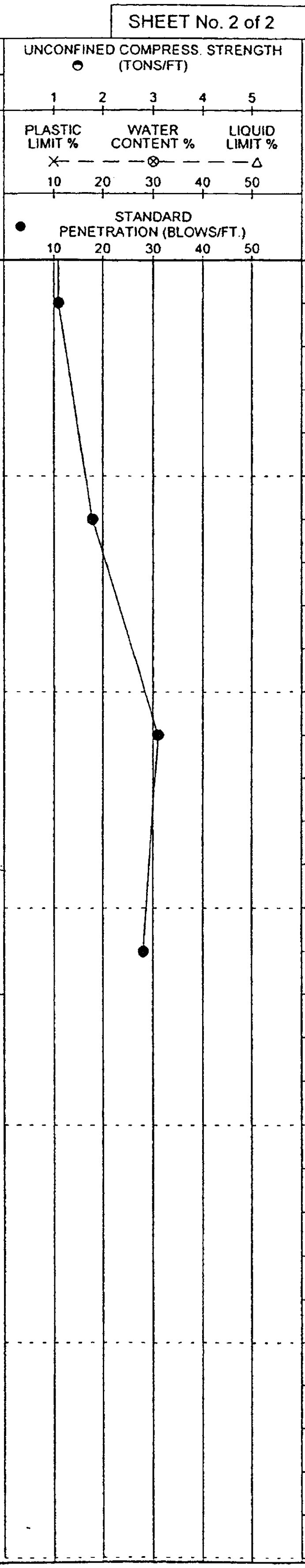
SHEET No. 2 of 2

IENT: **Ginsburg Development LLC**

CONTRACTOR: **Craig Test Boring Co., Inc.**

EPTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
26	11	4 5 6 6	S-9	18		W	SM	Tn m-f SAND, little Silt, occasional Silt parting	
7									
28									
9									
30									375.1
1	18	6 8 10 12	S-10	17		W	SM	Tn m-f SAND, little Silt with frequent Silty Clay seams & partings	
32									
3									
34									
5									370.1
6	31	9 15 16 18	S-11	16		W	SM	Same	
37									
8									
39									
0									365.1
41	28	8 14 14 15	S-12	16		W	SM	Tn m-f SAND, little Silt with occasional Silty Clay seams and partings	
2								End of Boring at 42'	
43									
4									
45									360.1
6									
47									
8									
9									
0									355.1
1									
52									
3									
54									
5									350.1

LITHOLOGY*



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No.	2900.01
PROJECT:	Crystal Village
LOCATION:	Haverstraw, New York

BORING No. B-123

SHEET No. 1 of 1

IENT: Ginsburg Development LLC		GROUND WATER	DATE	TIME	DEPTH
ONTRACTOR: Craig Test Boring Co., Inc.			11/29/00	9:20 am	N/A'

HOD OF ADVANCING BORING	DIA.	DEPTH	
WER AUGER:		TO	
OT. DRILL:	3 7/8"	0 TO	15'
SING:		TO	
AMOND CORE:		TO	

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: TO

WEATHER: Overcast TEMP: 50 F

DEPTH TO ROCK: Not Encountered

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Barry Ouimet

DRILLER: Tom Ward

SURFACE ELEVATION: 410.4

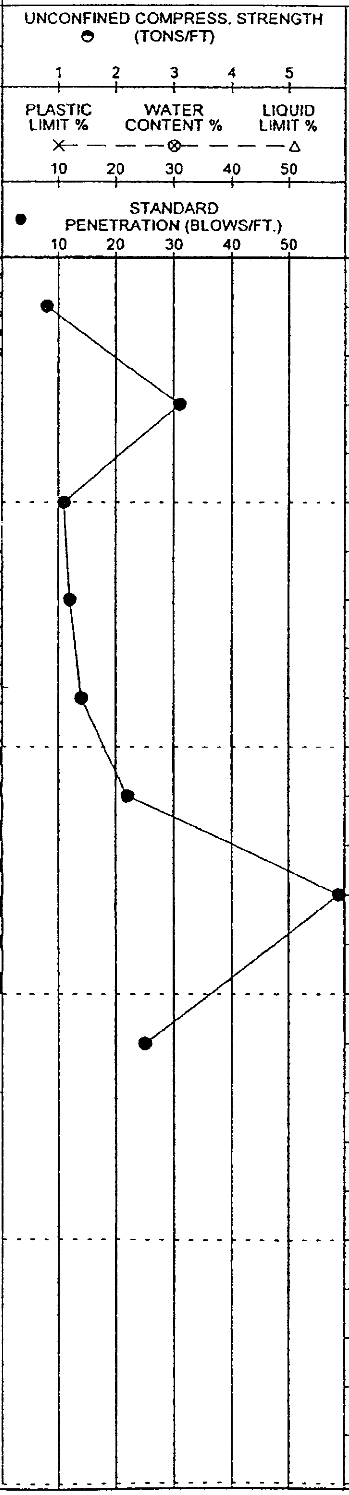
DATUM: See Remarks

DATE START: 11/29/00

DATE FINISH: 11/29/00

H (FT	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	8	2 3 5 8	S-1	16		M	SM	Rd Bwn c-f SAND, some c-f Gravel, some Clayey Silt with trace organics (FILL)	
2									
3	31	9 20 10 12	S-2	22		M	SM	Rd Bwn c-f SAND, some Silt, some f Gravel	
4									
5	11	5 5 6 6	S-3	18		M	SM	Rd Gy c-f SAND, some Clayey Silt, some c-f Gravel	405.4
5									
7	12	8 4 8 12	S-4	7		M	SC	Rd Gy c-f SAND, some Silty Clay, some f Gravel	
8									
9	14	5 7 7 7	S-5	7		M	SC	Same	
0									400.4
11	22	9 10 12 14	S-6	6		W	GM	Gy Tn c-f GRAVEL, some c-f Sand, little Clayey Silt	
2									
13	59	19 23 36 32	S-7	14				Tn c-f GRAVEL, some c-f Sand, little Silt	
4									
15									395.4
5	25	10 8 17 21	S-8	11		W	SP-SM	Tn m-f SAND, little f Gravel, trace Silt	
17								End of Boring at 17'	
3									
9									
20									390.4
1									
22									
3									
24									
5									385.4

LITHOLOGY*



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

.ECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-126

SHEET No. 1 of 2

IENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

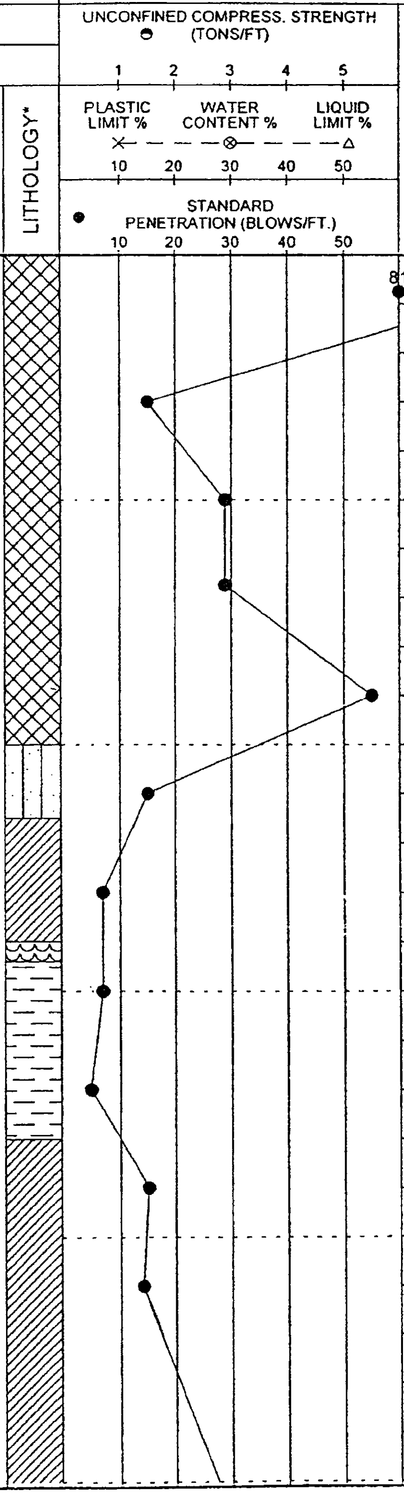
~HOD OF ADVANCING BORING	DIA.	DEPTH		
)WER AUGER:			TO	
ROT. DRILL:	3 3/4"	0	TO	40'
\SING:	4"	0	TO	10'
DIAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: TO
WEATHER: Overcast TEMP: 50 F
DEPTH TO ROCK: Not Encountered
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Jim Upright
DRILLER: Dave Cooke
SURFACE ELEVATION: 404.1
DATUM: See Remarks
DATE START: 11/13/00
DATE FINISH: 11/14/00

H (FT.	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	81	42 29 52	S-1	19		M	GM	Gy c-f GRAVEL and c-f Sand, little Silt, trace concrete (FILL)	
2									
3	15	15 9 6 9	S-2	0		M		Piece of c Gravel stuck in sampler tip, no recovery	
4									
5	29	9 11 18 15	S-3	6		M	SM	Gy c-f SAND,some Silt, little c-f Gravel (FILL)	399.1
6									
7	29	9 17 12	S-4	8		W	SM	Same (FILL)	
8									
9	55	19 27 28 16	S-5	7		W	GM	Gy c-f GRAVEL,some c-f Sand, little Clayey Silt (FILL)	
0									394.1
11	15	12 9 6 3	S-6	12		W	SM CL	Gy f SAND,some Silt, trace organics Bottom 2" Gy Bwn SILTY CLAY, trace organics	
'2									
13	7	3 5 2 2	S-7	1		W	CL	Gy Bwn SILTY CLAY, trace partially decomposed vegetation	
'4									
15	7	3 4 3 4	S-8	5		W	Pt OL	Dk Bwn PEAT over 2" layer of organic Silt, trace c Gravel	389.1
6									
'7	5	2 2 3 3	S-9	0		W		No recovery, but based on cuttings, same	
'8									
'9	15	6 8 7 7	S-10	14		W	CL	Gy SILTY CLAY, trace root and trace partially decomposed vegetation	
'0									384.1
'1	14	3 6 8 10	S-11	14		W	CL	Gy SILTY CLAY, trace m-f Sand, pps= 5 tsf	
22									
'3									
24									
'5									379.1



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.
PPS=pocket penetrometer strength in tons per square foot.

ECTONIC ENGINEERING CONSULTANTS P.C.

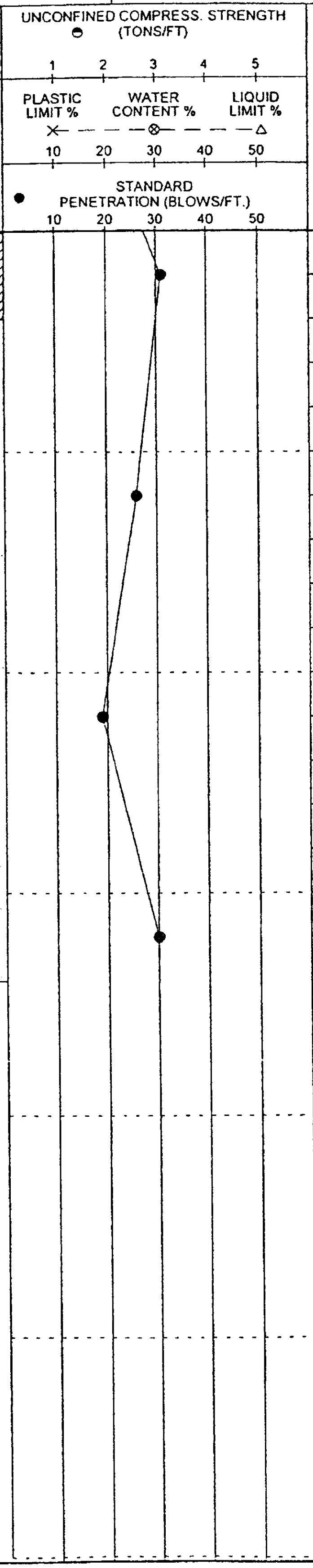
PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-126

SHEET No. 2 of 2

IENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

EPTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	31	12 15 16 15	S-12	0				No recovery but cuttings indicate same	▨	
27										
28										
29										
30										374.1
31	26	9 13 13 13	S-13	13		W	SM	Gy m-f SAND, some Silt with frequent seams of gy Silt		
32										
33										
34										
35										369.1
36	19	11 11 8 10	S-14	13		W	SM	Same		
37										
38										
39										
40										364.1
41	30	12 15 15 18	S-15	15		W	SM	Same		
42								End of Boring at 42'		
43										
44										
45										359.1
46										
47										
48										
49										
50										354.1
51										
52										
53										
54										
55										349.1



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor. PPS=pocket penetrometer strength in tons per square foot.

'ECTONIC *ENGINEERING CONSULTANTS P.C.*

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-129

SHEET No. 1 of 2

ENT: Ginsburg Development LLC
:UNTRACTOR: Craig Test Boring Co., Inc.

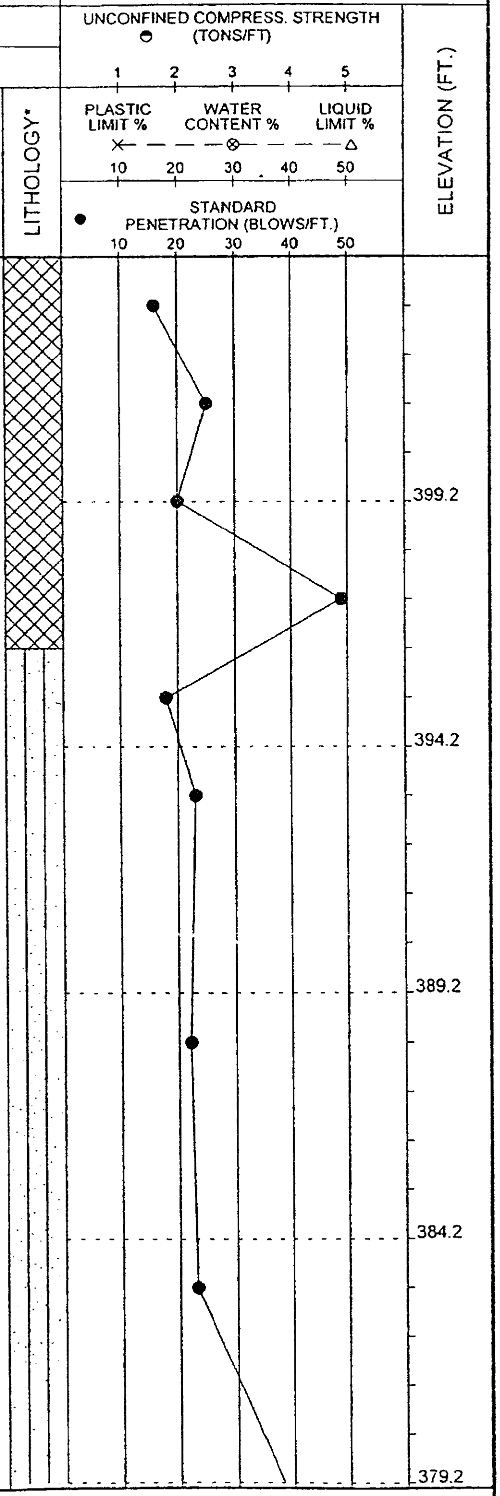
:THOD OF ADVANCING BORING	DIA.	DEPTH		
WER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	25'
SING:	4"	0	TO	10'
..MOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH
			*
			*

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: TO
WEATHER: Clear TEMP: 30 F
DEPTH TO ROCK: Not Encountered
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Jim Upright
DRILLER: Dave Cooke
SURFACE ELEVATION: 404.2
DATUM: See Remarks
DATE START: 11/15/00
DATE FINISH: 11/15/00

TH (F	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES	RECOV.		MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
			SAMPLE NUMBER	LENGTH (IN.)	RQD (%)			
1 2	16	2 6 10 45	S-2	10		W M	SM	Rd Bwn c-f SAND, some Silt, trace c-f Gravel,trace roots (FILL)
3 4	25	4 11 14 14	S-2	12		M	SM	Gy c-f SAND, some Clayey Silt, little c-f Gravel (FILL)
5	20	9 10 10 18	S-3	14		M	SM	Gy Bwn c-f SAND and Silt & Clay, some c-f Gravel
7	49	5 9 40 24	S-4	5		W	SM	Same, and c-f Gravel (FILL)
9	18	12 9 9 9	S-5	5		W	SM	Bwn c-f SAND, little Silt, trace c-f Gravel
11 2	23	11 11 12 11	S-6	8		W	SM	Same
13								
15	22	15 11 11 12	S-7	14		W	SM	Same
9								
20 1	23	14 14 9 11	S-8	8		W	SM	Same, little c-f Gravel
22 3								
24								



..MARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01

PROJECT: Crystal Village

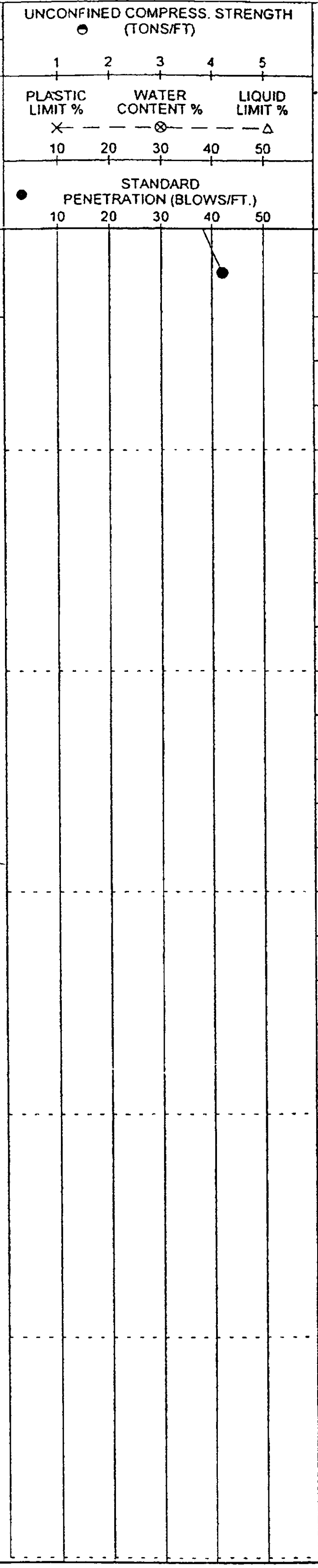
LOCATION: Haverstraw, New York

BORING No. B-129

SHEET No. 2 of 2

ENT: **Ginsburg Development LLC**

CONTRACTOR: **Craig Test Boring Co., Inc.**



EPTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	42	18 16 26 21	S-9	15		W	SM	Same		
7								End of Boring at 27'		
28										
9										
30										374.2
1										
32										
3										
4										
35										369.2
6										
37										
8										
39										
0										364.2
41										
2										
43										
4										
45										359.2
6										
7										
8										
9										
50										354.2
1										
52										
3										
54										
5										349.2

EMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-132

SHEET No. 1 of 2

IENT: Ginsburg Development LLC
ONTRACTOR: Craig Test Boring Co., Inc.

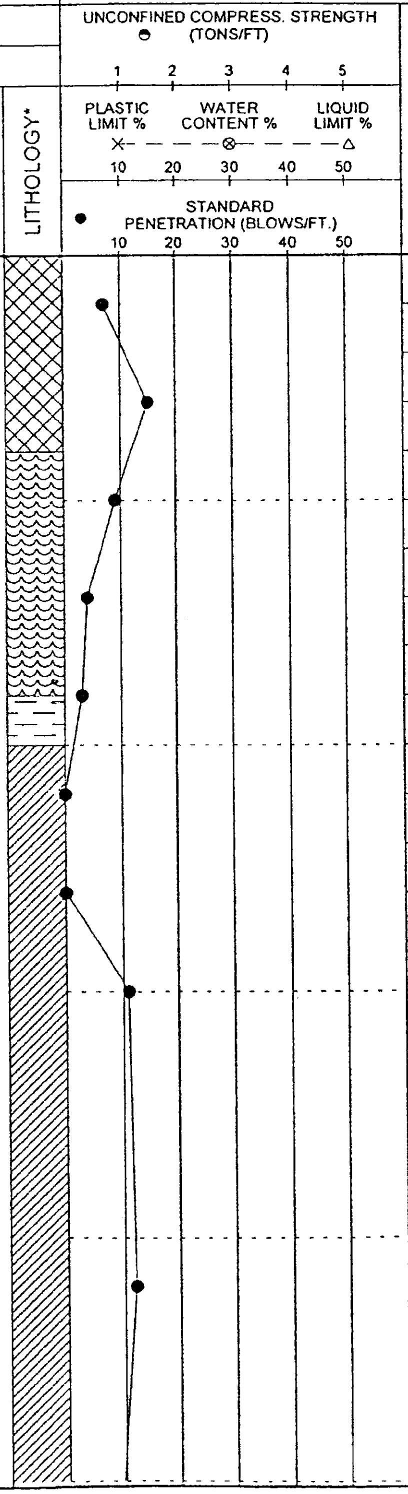
ETHOD OF ADVANCING BORING	DIA.	DEPTH
WER AUGER:		TO
ROT. DRILL:	3"	0 TO 40'
SING:		TO
AMOND CORE:		TO

GROUND WATER	DATE	TIME	DEPTH
	11/27/00	11:00 am	1.4'

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: TO
WEATHER: Overcast TEMP: 25 F
DEPTH TO ROCK: Not Encountered
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Jim Upright
DRILLER: Paul Mullins
SURFACE ELEVATION: 397.9
DATUM: See Remarks
DATE START: 11/25/00
DATE FINISH: 11/25/00

TH (F	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES					DESCRIPTION OF MATERIAL	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.		
1	7	3 2 5 5	S-1	12		M	SM	Gy f SAND and Silt, trace organics, trace roots ▼ (FILL)	
2									
3	15	5 7 8 9	S-2	8		M	SM	Same (FILL)	
4									
5	9	3 4 5 5	S-3	9		W	SM	Gy f SAND, some Silt with frequent seams of Gy Silt	392.9
6									
7	4	3 2 2 2	S-4	12		W	SM	Same	
8									
9	3	1 1 2 1	S-5A S-5	8 7		W W	Pt OL	Blk PEAT, some Silt Dk Gy ORGANIC SILT with roots	
10									387.9
11	0	WOH WOH WOH WOH	S-6	24		W	CL	Gy ORGANIC SILTY CLAY (pps= 0 tsf)	
12									
13	0	WOH WOH WOH WOH	S-7	20		W	CL	Same (pps= 0 tsf)	
14									
15	11	3 5 6 7	S-8	18		W	CL	Gy CLAY & SILT (pps= 1.5 tsf)	382.9
16									
17									
18									
19									
20									377.9
21	12	5 5 9 5	S-9	16		W	CL	Bwn Gy CLAY & SILT, trace f Sand alternating with partings of Silt	
22									
23									
24									
25									372.9



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor. PPS= pocket penetrometer strength in tons per square foot.

TECTONIC ENGINEERING CONSULTANTS P.C.

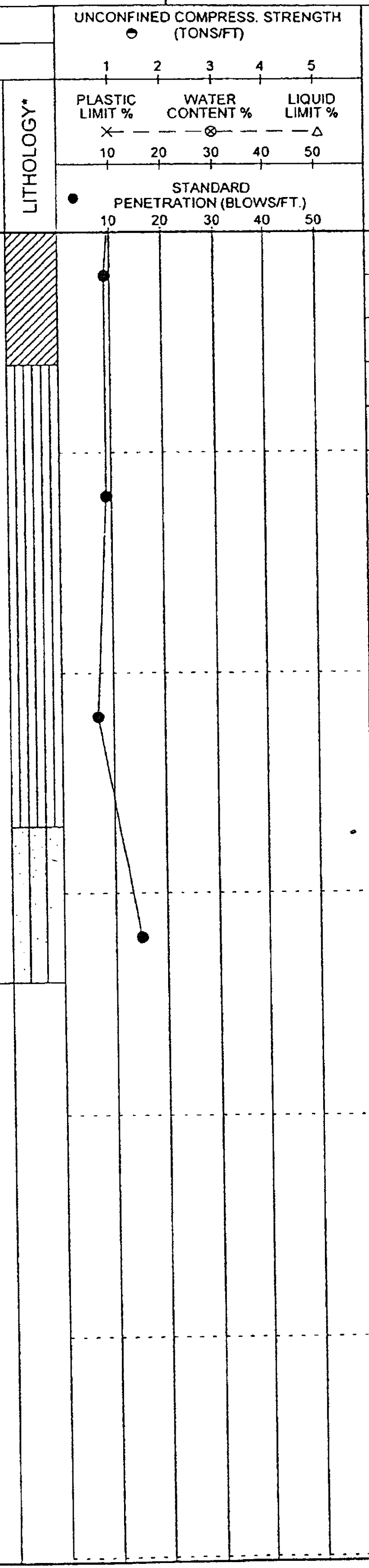
PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-132

SHEET No. 2 of 2

IENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

EPTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
26	9	5 5 4 7	S-10	13		W	CL		
27									
28									
29									
30									367.9
31	9	4 4 5 6	S-11	16		W	ML	Gy CLAYEY SILT, little f Sand with frequent thin seams of Silty Clay	
32									
33									
34									
35									362.9
36	7	5 4 3 6	S-12	16		W	ML	Same, pps=1.5 tsf	
37									
38									
39									
40									357.9
41	15	6 7 8 7	S-13	15		W	SM	Gy Bwn f SAND, some Silt	
42								End of Boring at 42'	
43									
44									
45									352.9
46									
47									
48									
49									
50									347.9
51									
52									
53									
54									
55									342.9



EMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.
PPS= pocket penetrometer strength in tons per square foot.

TECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-135

SHEET No. 1 of 2

IENT: Ginsburg Development LLC
ONTRACTOR: Craig Test Boring Co., Inc.

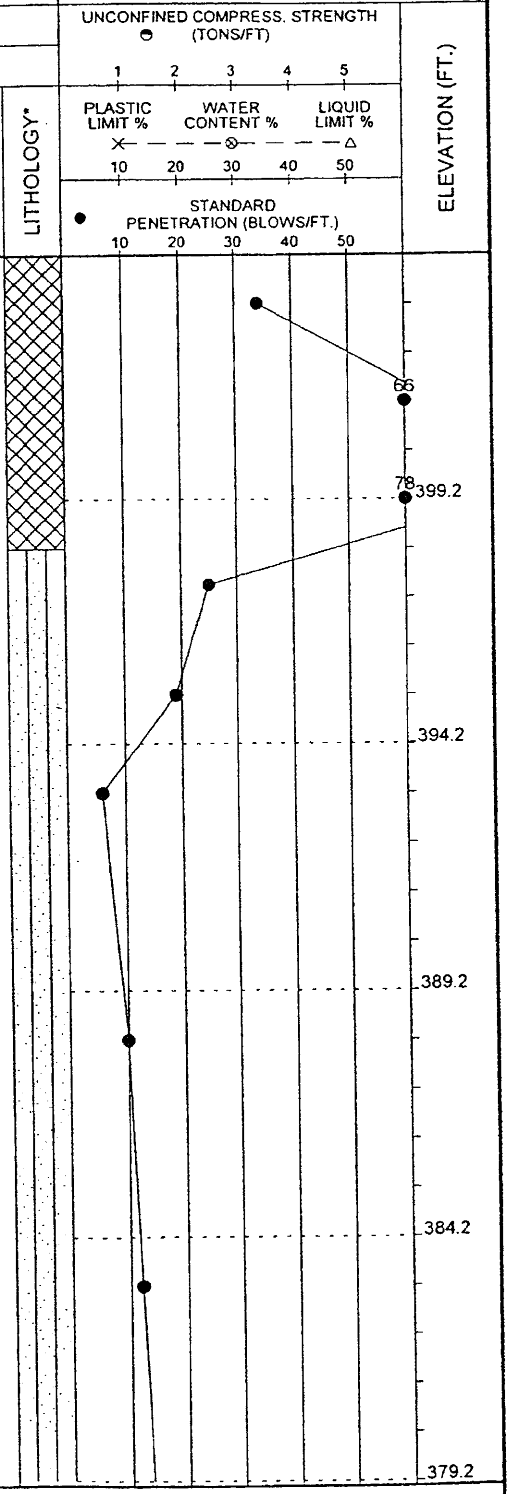
THOD OF ADVANCING BORING	DIA.	DEPTH		
WER AUGER:			TO	
ROT. DRILL:	3 3/4"	0	TO	30'
ASING:	4"	0	TO	10'
AMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH
			•
		-	•

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: TO
WEATHER: Overcast TEMP: 50 F
DEPTH TO ROCK: Not Encountered
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Jim Upright
DRILLER: Dave Cooke
SURFACE ELEVATION: 404.2
DATUM: See Remarks
DATE START: 11/13/00
DATE FINISH: 11/13/00

TH (F	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1 2	34	2 9 25 34	S-1	20		M	SM	Gy Bwn m-f SAND, little Silt, little c-f Gravel (FILL)
3 4	66	56 34 42 36	S-2	16		M	SM	Same (FILL)
5 6	78	17 42 36 27	S-3	12		M	SM	Gy Bwn c-f SAND, little c-f Gravel, little Silt (FILL)
7	25	11 12 13	S-4	6		W	SM	Bwn m-f SAND, little Silt, trace f Gravel
8								
9 10	19	11 10 9 12	S-5	0				No recovery
11 12	6	3 3 3 3	S-6	10		W	SM	Top 1" Same as S-4 Bwn c-f SAND, little Silt, trace f Gravel
13 14 15								
16 17	10	5 5 5 5	S-7	9		W	SM	Same, little c-f Gravel
18 19 20								
21 22	12	4 5 7 8	S-8	13		W	SM	Bwn m-f SAND, little Silt
23 24 25								



EMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

TECTONIC ENGINEERING CONSULTANTS P.C.

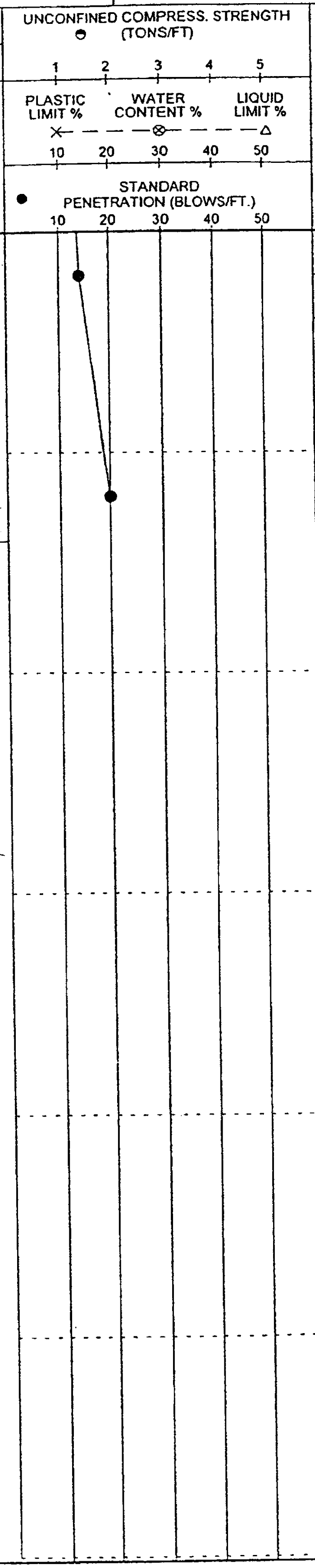
PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-135

SHEET No. 2 of 2

LIENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

EPTH	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	14	9 7 7 7	S-9	12		W	SM	Same		
27										
28										
29										
30										374.2
31	20	7 9 11 12	S-10	15		W	SM	Same		
32								End of Boring at 32'		
33										
34										
35										369.2
36										
37										
38										
39										
40										364.2
41										
42										
43										
44										
45										359.2
46										
47										
48										
49										
50										354.2
51										
52										
53										
54										
55										349.2



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

TECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

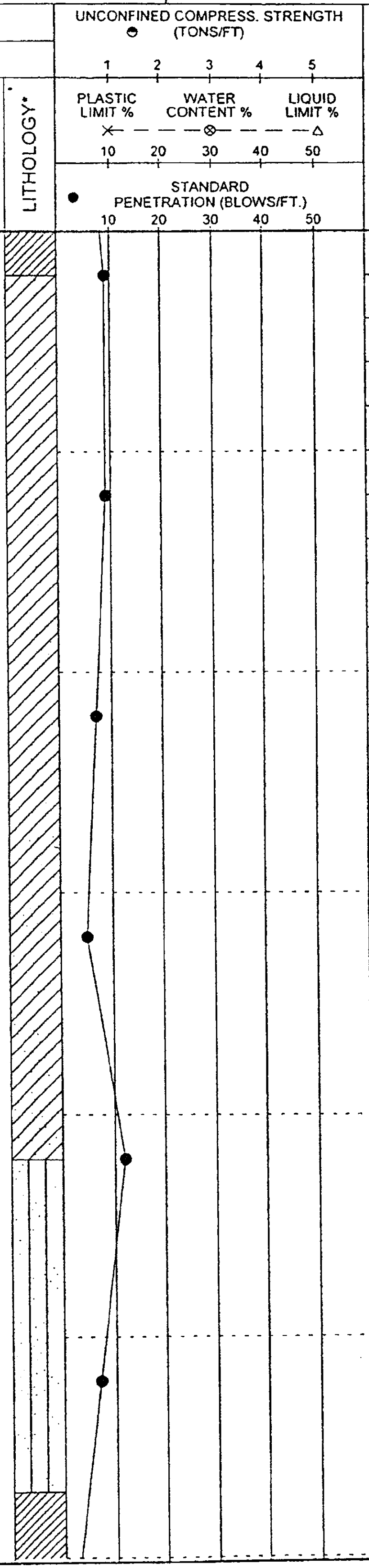
BORING No. B-138

SHEET No. 2 of 3

LIENT: Ginsburg Development LLC

ONTRACTOR: Craig Test Boring Co., Inc.

EPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE			
26	9	2 4 5 6	S-10	16		M	CL SC	Top 8" Gy to Tn CLAY & SILT with f Sand partings Bottom 8" Gy f SAND and Silty Clay with frequent partings & seams alternating between Silty Clay and Silt	
27									
28									
29									
30									368.0
31	9	3 4 5 5	S-11	17		W	SC	Gy f SAND and Silty Clay with frequent partings and seams alternating between SILTY CLAY and Silt	
32									
33									
34									
35									363.0
36	7	2 3 4 3	S-12	21		W	SC	Same	
37									
38									
39									
40									358.0
41	5	3 2 3 3	S-13	16		W	SC	Same	
42									
43									
44									
45									353.0
46	12	4 6 6 6	S-14	15 15		W	SC SM	Top 6" Same Gy f SAND, some Silt with frequent partings and seams of SILTY CLAY and Silt	
47									
48									
49									
50									348.0
51	7	3 3 4 4	S-15	14		W	SM	Gy f SAND, some Silt with occasional seam of Silty Clay	
52									
53									
54									
55									343.0



EMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation visually estimated relative to other boring locations.

TECTONIC *ENGINEERING CONSULTANTS P.C.*

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

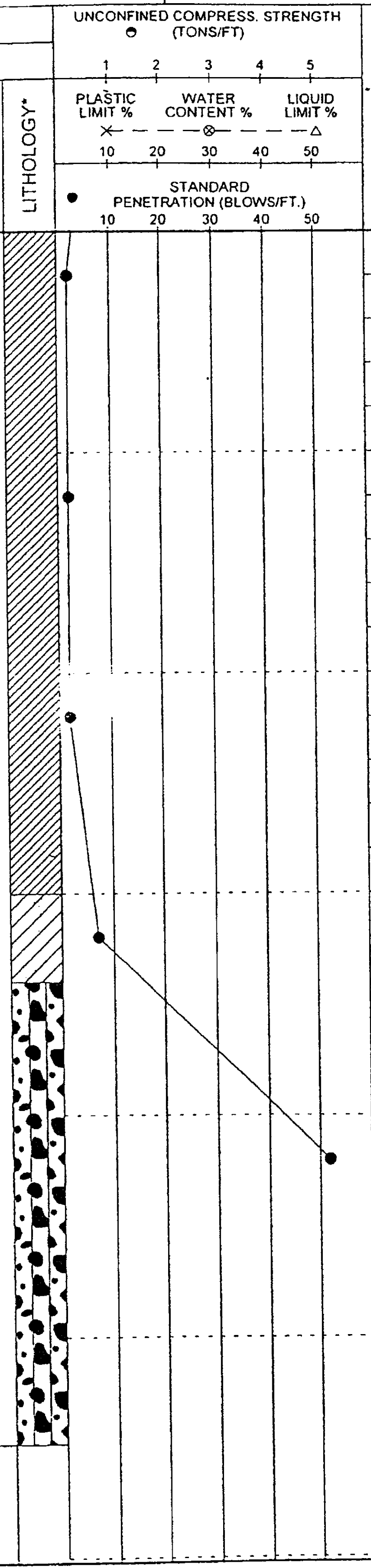
BORING No. B-138

SHEET No. 3 of 3

LIENT: Ginsburg Development LLC

ONTRACTOR: Craig Test Boring Co., Inc.

EPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
56	2	1 1 1 1	S-16	21		W	CL	Gy SILTY CLAY, some f Sand with frequent seams & partings alternating between f Sand and Silt	
57									
58									
59									
60									338.0
61	2	1 1 1 1	S-17	22		W	CL	Gy SILTY CLAY with frequent partings & seams alternating between f Sand and Silt	
62									
63									
64									
65									333.0
66	2	1 1 1 3	S-18	20		W		[illegible] varved with frequent partings and seams alternating between f Sand and Silt	
67									
68									
69									
70									328.0
71	7	2 3 4 5	S-19	18		W	SC	Gy f SAND and Silty Clay with frequent seams alternating between Silty Clay and Silt	
72								Transition in drilling resistance at 72'	
73									
74									
75									323.0
76	52	17 19 33 84	S-20	11		M	GM	Gy to Rd c-f GRAVEL and c-f Sand, little Silt	
77									
78									
79									
80									318.0
81		100/3"	S-21	3		W	GM	Gy c-f GRAVEL, some c-f Sand, little Silt	
82		100/0"		0					
								End of Boring at 82.4'	
83									
84									
85									313.0



EMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation visually estimated relative to other boring locations.

TECTONIC *ENGINEERING CONSULTANTS P.C.*

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-140

SHEET No. 1 of 2

CLIENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

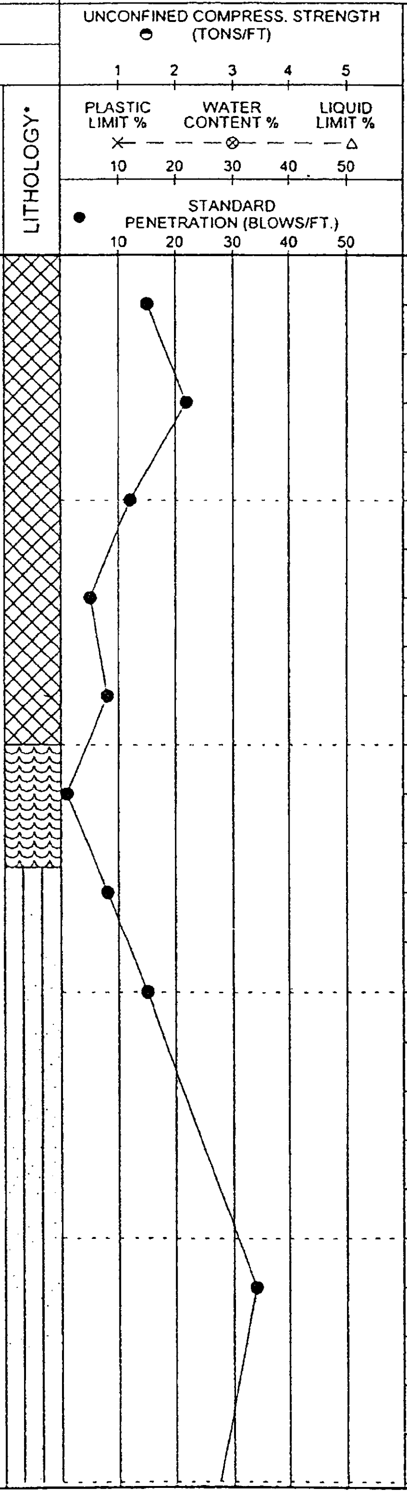
METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	3 7/8"	0 TO 30'
CASING:		TO
DIAMOND CORE:		TO

GROUND WATER	DATE	TIME	DEPTH
			•
			•

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: TO
WEATHER: Clear TEMP: 50 F
DEPTH TO ROCK: Not Encountered
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Barry Ouimet
DRILLER: Dave Cooke
SURFACE ELEVATION: 402.7
DATUM: See Remarks
DATE START: 11/17/00
DATE FINISH: 11/17/00

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES	RECOV.		MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
			SAMPLE NUMBER	LENGTH (IN.)	RQD (%)				
1	15	3 4 11 17	S-1	21		M	SM	Tn m-f SAND, little Silt (FILL)	
2									
3	22	15 12 10 10	S-2	22		M	ML SM	Top 6" Gy SILT and m-f Sand (FILL) Gy m-f SAND, some Silt with frequent Silt partings & seams horizontally layered (FILL)	
4									
5	12	7 7 5 5	S-3	14		W	SM	Gy m-f SAND, some Silt, trace organic fibers (FILL)	397.7
6									
7	5	2 2 3 3	S-4	14		W	SM	Same, trace organic fibers (FILL)	
8									
9	8	3 4 4 4	S-5	13		W	SM	Gy m-f SAND, some Silt (FILL)	
10									392.7
11	1	1 0 1 1	S-6	11		M	PT	Blk FIBROUS PEAT	
12									
13	8	2 2 6 8	S-7	16		M	PT SM	Top 5" same, trace f Gravel Gy m-f SAND, little Silt, trace organic fibers	
14									
15	15	5 7 8 10	S-8	18		W	SM	Gy c-f SAND, little f Gravel,little Silt (coarsening downward)	387.7
16									
17									
18									
19									
20									382.7
21	34	14 18 16 16	S-9	12		M	SM	Lt Tn m-f SAND, some Silt with frequent Silty Clay seams & partings and Silt and partings	
22									
23									
24									
25									377.7



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

TECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01

PROJECT: Crystal Village

LOCATION: Haverstraw, New York

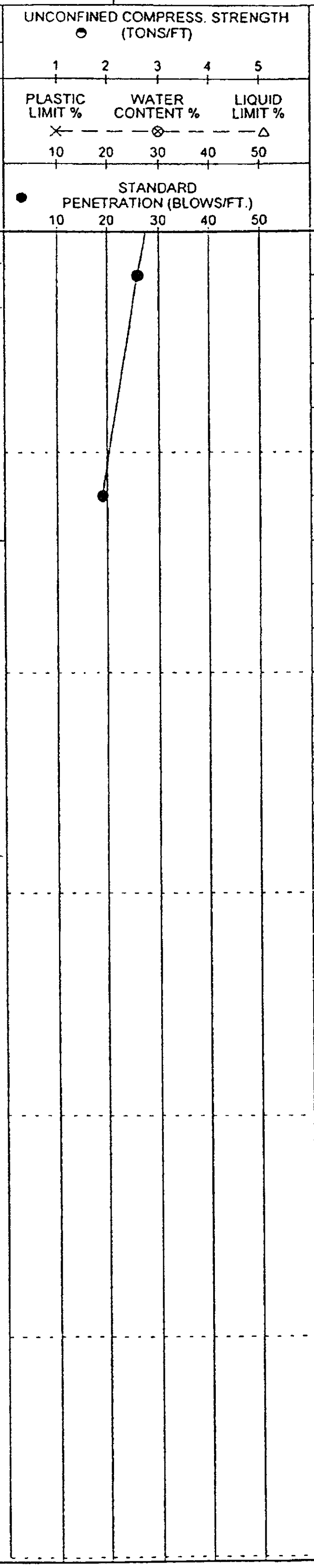
BORING No. B-140

SHEET No. 2 of 2

LIENT: **Ginsburg Development LLC**

ONTRACTOR: **Craig Test Boring Co., Inc.**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)					
26	26	10 12 14 14	S-10	17		M	SM	Gy c-f SAND, little Silt		
27										
28										
29										
30										372.7
31	19	9 9 10 10	S-11	15		W	SM	Gy m-f SAND, little Silt occasional seams of Clay		
32								End of Boring at 32'		
33										
34										
35										367.7
36										
37										
8										
39										
40										362.7
41										
42										
43										
44										
45										357.7
46										
47										
48										
49										
50										352.7
51										
52										
53										
54										
55										347.7



EMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

ƮECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

BORING No. B-143

SHEET No. 1 of 2

LIENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

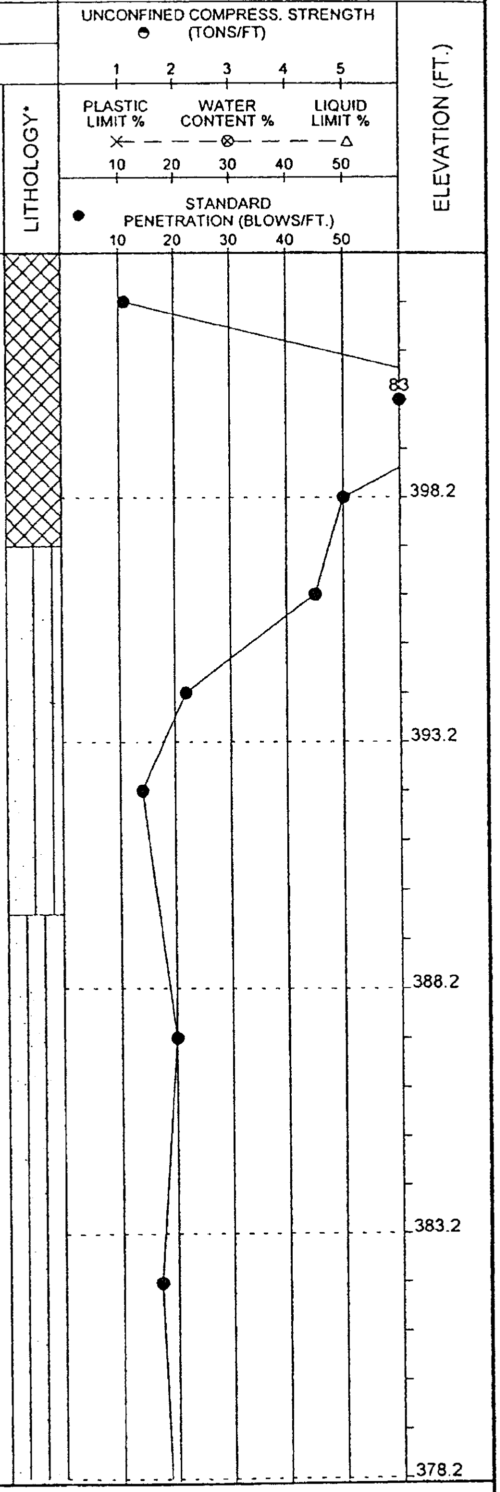
ETHOD OF ADVANCING BORING	DIA.	DEPTH
OWER AUGER:		TO
ROT. DRILL:	3"	0 TO 30'
ASING:		TO
IAMOND CORE:		TO

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: TO
WEATHER: Clear TEMP: 40 F
DEPTH TO ROCK: Not Encountered
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: Barry Ouimet
DRILLER: Paul Mullins
*SURFACE ELEVATION: 403.2
DATUM: See Remarks
DATE START: 11/25/00
DATE FINISH: 11/25/00

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1 2	11	4 4 7 25	S-1	11		M	SM	Bwn Tn m-f SAND,some Silt, some c-f Gravel (FILL)
3 4	83+	26 33 50/2"	S-2	10		M	SM	Same with wood fragments (FILL)
5 6	50+	32 50/4"	S-3	6			SM	Gy c-f SAND and c-f Gravel, little Silt (FILL)
7 8	45	25 27 18 25	S-4	12		[illegible]	[illegible]	[illegible] c-f SAND, some c-f Gravel, trace Silt
9 10	22	20 11 11 8	S-5	12		W	SP-SM	Tn Same
11 12	14	9 7 7 6	S-6	7		W	SP-SM	Same
13 14 15								
16 17	20	6 10 10 10	S-7	8		W	SM	Tn c-f SAND, little Silt, little f Gravel
18 19 20								
21 22	17	13 11 6 7	S-8	7		W	SM	Tn & Or c-f SAND, little c-f Gravel, little Silt
23 24 25								



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

TECTONIC ENGINEERING CONSULTANTS P.C.

PROJECT No. 2900.01
PROJECT: Crystal Village
LOCATION: Haverstraw, New York

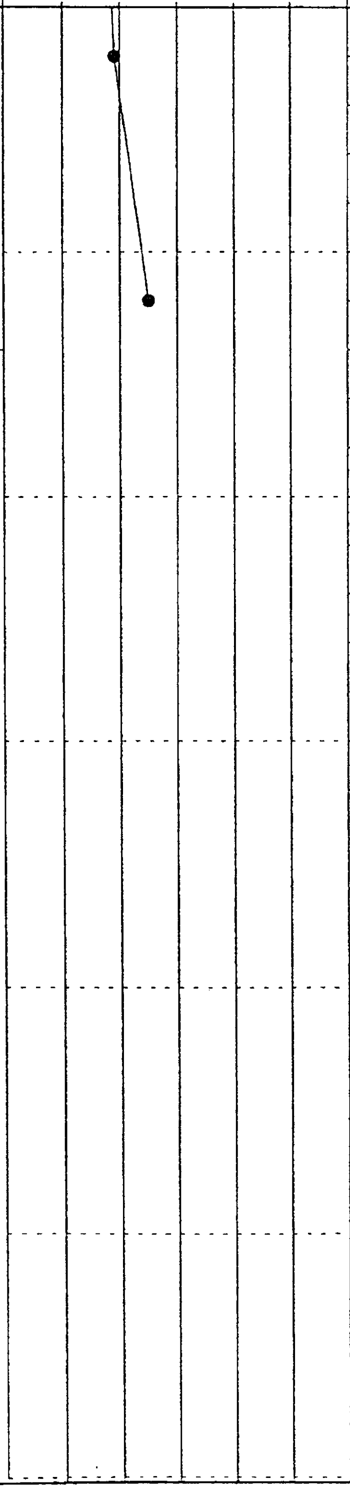
BORING No. B-143

SHEET No. 2 of 2

LIENT: Ginsburg Development LLC
CONTRACTOR: Craig Test Boring Co., Inc.

UNCONFINED COMPRESS. STRENGTH ⊖ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ — WATER CONTENT % ⊗ — LIQUID LIMIT % △
10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES* SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
26	19	9 9 10 13	S-9	13		W	SM	Tn m-f SAND, little Silt,little f Gravel		
27										
28										
29										
30										373.2
31	25	16 11 14 21	S-10	12		M	SM	Tn m-f SAND, some Silt		
32								End of Boring at 32'		
33										
34										
35										368.2
36										
37										
38										
39										
40										363.2
41										
42										
43										
44										
45										358.2
46										
47										
48										
49										
50										353.2
51										
52										
53										
54										
55										348.2



REMARKS: Groundwater level not measured due to introduction of drilling fluids during rotary drilling. Surface elevation provided by client's surveyor.

APPENDIX C
BORINGS BY R. W. GILLESPIE
June 1995

TEST BORING LOG B-1

Project: New Retail Center
Location: Haverstraw, NY
Client: DeLuca-Hoffman Associates, Inc.

Approximate Surface Elevation: 405.1 +-
Ground Water Depth: 7.1
Date: 6-12-95

Project No. 303-74

Sheet No. 1 of 30

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0				FILL; gravelly cobbly silt, loose, moist, red above gray brown.					
5			S-1	Becomes medium dense and gray green, evidence of wood chips and bituminous pavement.	20	3 2 10 14	12	15.6	MC
				SAND (SP); medium dense, saturated, coarse to fine, mostly medium to fine, trace of fine gravel, brown.					
10			S-2		24	5 6 7 6	13		G
15			S-3	Becomes GRAVELLY SAND (SP); mostly medium.	12	7 9 11 13	20	20.6	MC
20			S-4	Becomes mostly fine with less gravel. Coarse sand in the cuttings.	12	7 14 11 13	25		G
25			S-5	Returns to SAND(SP); dense, saturated, fine, brown.	12	10 15 16 21	31	17.3	MC
30			S-6		12	10 17 18 18	35	24.6	MC

TEST BORING LOG B-1

Project: New Retail Center
Location: Haverstraw, NY
Client: DeLuca-Hoffman Associates, Inc.

Approximate Surface Elevation: 405.1+-
Ground Water Depth: 7.1
Date: 6-12-95

Project No. 303-74

Sheet No. 2 of 30

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
35			S-7		16	8			G
						16			
				Trace of clay in cuttings, some coarse sand also.		21	37		
						27			
				SILTY SANDY GRAVEL (GL); very dense, saturated, coarse to fine (both gravel and sand,) gray, (TILL).					
40									
			S-8		8	22		4.6	MC
						31			
						23	54		
						20			
45			S-9		1	100/ 4"	100+	6.0	MC
				Bottom of Exploration at 45.5 feet. Spoon refusal.					
50									
55									
60									
65									

TEST BORING LOG B-2

Project: New Retail Center
Location: Haverstraw, NY
Client: DeLuca-Hoffman Associates, Inc.

Approximate Surface Elevation: 402.2+-
Ground Water Depth: 5.5+/-
Date: 6-13-95

Project No. 303-74

Sheet No. 3 of 30

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0				FILL; gravelly sand silt with cobbles and boulders, loose, moist, brown.					
5 ▽			S-1	SAND (SP); medium dense, wet, fine, trace organics, gray.	12	3 5 13 19	18		G
10			S-2	Becomes coarse to fine, mostly coarse to medium.	8	4 5 6 11	11	21.3	MC
15			S-3	Returns to fine with coarse to medium seams, and fine gravel seams.	10	11 11 14 15	25	26.7	MC
20			S-4	Coarse sand and fine gravel in cuttings.	12	9 13 12 15	25		G
				Trace of clay in cuttings.					
25			S-5		18	9 13 14 19	27	23.0	MC
				A little clay in cuttings, probably seams.					
30			S-6	Transition to medium to fine and dense.	20	11 18 18 17	36	18.7	MC

TEST BORING LOG B-2

Project: New Retail Center
Location: Haverstraw, NY
Client: DeLuca-Hoffman Associates, Inc.

Approximate Surface Elevation: 402.2+-
Ground Water Depth: 5.5+/-
Date: 6-13-95

Project No. 303-74

Sheet No. 4 of 30

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
35			S-7	1" layer of CLAYEY SILT (ML-CL); medium dense, saturated, light brown.	18	10 14 17 17	31		G
40			S-8	Returns to fine.	22	13 19 18 20	37	21.7	MC
45			S-9	1" layer of SILTY CLAY (CL); stiff, saturated, gray. SILTY SAND (SM); medium dense, saturated, fine, gray.	24	6 10 9 9	19		G
				SILTY GRAVELLY SAND (SW); very dense, saturated, coarse to fine (both sand and gravel,) gray, (TILL).					
50			S-10		12	43 30 31 31	61	4.1	MC
				Bottom of Exploration at 52.0 feet.					
55									
60									
65									

TEST BORING LOG B-3

Project: New Retail Center
Location: Haverstraw, NY
Client: DeLuca-Hoffman Associates, Inc.

Approximate Surface Elevation: 401.7+-
Ground Water Depth: 6.7+/-
Date: 6-14-95

Project No. 303-74

Sheet No. 5 of 30

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0				FILL; sandy gravelly silt with cobbles and boulders, medium dense, moist, brown and red.					
5			S-1		12	5		7.5	MC
				3" piece of bituminous pavement.		15 30 22	45		
				SAND (SP); medium dense, saturated, coarse to fine mostly, medium to fine, trace of gravel, brown.					
10			S-2	Becomes interbedded with layers of GRAVELLY SAND (SW); medium dense, saturated, coarse to fine sand, fine gravel, brown.	24	6 7 10 8	17		G
				Gravel evident by action of drill.					
15			S-3	Layers are approx. 1' thick.	20	10 11 12 10	23	17.1	MC
20			S-4		8	14 13 16 19	29	17.1	MC
25			S-5		10	18 8 8 17	16	21.5	MC
30			S-6	Sand now mostly fine, coarse layers less frequent approx. every 2-3 feet.	20	7 9 13 12	22		G
				Trace of clay and silt in cuttings.					

APPENDIX H
TEST PITS BY MELICK-TULLY
February 1987

TEST PIT NO. 1

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
	■			FILL-Green-brown fine to medium sand, and silt (medium dense)
5	■		ML	Green-gray slightly organic silt, some fine sand (medium dense)
	■			
10	■			
15				TEST PIT COMPLETED @ 12'-0" SLIGHT GROUNDWATER SEEPAGE ENCOUNTERED @ 8'-0"

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 2

SURFACE ELEV. +400.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
	■			FILL-Green-gray silt, and fine sand, little fine to coarse gravel with occasional cobbles and boulders (medium dense) -grading with roots @ 3'-0"
5				
	■	185	OL	Black organic silt (medium to stiff)
10	■	64	ML	Blue-gray silt, trace fine sand, trace roots (medium to stiff)
15				TEST PIT COMPLETED @ 12'-0" GROUNDWATER NOT ENCOUNTERED

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3A

TEST PIT NO. 3

SURFACE ELEV. +400.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				FILL-Green-brown fine to medium sand, little silt, little fine gravel with occasional cobbles (medium dense)
5			ML	FILL-Green-gray silt, some fine gravel (medium)
10			OL	Black organic silt (medium)
			SP	Blue-gray fine sand, trace silt (medium)
15				TEST PIT COMPLETED @ 12'-0" GROUNDWATER NOT ENCOUNTERED

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 4

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				FILL-Green-brown fine to medium sand, some silt, little fine to coarse gravel with occasional cobbles and boulders (medium dense)
5	■			
	■	553		
10	■		OL	Black organic silt (medium)
			SM	Blue-gray fine sand, little silt (medium dense)
15				TEST PIT COMPLETED @ 12'-0" GROUNDWATER NOT ENCOUNTERED

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3B

TEST PIT NO. 5

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0 5				FILL-Green-brown fine to medium sand, little silt, some fine to coarse gravel with occasional concrete fragments (medium dense)
	■		SM	Green-brown fine to medium sand, little silt (medium dense)
10 15				TEST PIT COMPLETED @ 10'-0" MODERATE TO RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 7'-0" NOTE: Sloughing of sidewalls encountered @ 8'-0"

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 6

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■ ■		SP/SM	FILL-Green-gray fine to medium sand, some silt, little fine to coarse gravel with occasional cobbles, boulders and concrete fragments (medium dense)
5				Green-brown fine to medium sand, trace silt, little fine to coarse gravel (medium dense to dense)
10 15				TEST PIT COMPLETED @ 8'-0" RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 5'-0" NOTE: Sloughing of sidewalls encountered @ 6'-0"

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3C

TEST PIT NO. 7

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
	■			FILL-Green-brown fine to medium sand, some silt, some fine to coarse gravel (medium dense)
			OL	6" Black organic silt (medium)
5	■		SP/SM	Green-brown fine to medium sand, trace silt, little fine to coarse gravel (medium dense to dense)
10				TEST PIT COMPLETED @ 6'-0" RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 4'-6" NOTE: Sloughing of sidewalls encountered @ 4'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 8

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				16" Topsoil-Dark brown silt with roots
5			SM	Green-brown fine to medium sand, little silt, little fine to coarse gravel (medium dense to dense)
10				TEST PIT COMPLETED @ 8'-0" RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 3'-6" NOTE: Sloughing of sidewalls encountered @ 5'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3D

TEST PIT NO. 9

SURFACE ELEV. +403.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				FILL-Green-brown fine to medium sand, some silt, little fine to coarse gravel (medium dense)
			OL	6" Dark brown silt with roots (medium)
5			SP/SM	Green-brown fine to medium sand, trace silt, some fine to coarse gravel (medium dense to dense)
10				TEST PIT COMPLETED @ 7'-6" RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 7'-0" NOTE: Sloughing of sidewalls encountered @ 6'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 10

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■ ■			FILL-Green-brown fine to medium sand, little silt, little fine to coarse gravel (medium dense)
5			SP/SM	Green-brown fine to medium sand, trace silt (medium dense)
10				TEST PIT COMPLETED @ 6'-6" RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 5'-0" NOTE: Sloughing of sidewalls encountered @ 6'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3E

TEST PIT NO. 11

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/18/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
	■ ■	15		FILL-Green-brown fine to medium sand, some silt, little fine gravel with occasional cobbles (medium dense)
			OL/ML	Green-gray slightly organic sandy silt (medium)
5	■		SM	Green-gray fine to medium sand, little silt (medium dense)
10				TEST PIT COMPLETED @ 8'-0" MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 7'-0" NOTE: Sloughing of sidewalls encountered @ 7'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 12

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
	■			FILL-Green-brown fine to medium sand, and silt, little fine to coarse gravel with occasional cobbles, boulders, wood and concrete fragments (medium dense)
5	■		SW	Gray-brown fine to coarse sand, trace silt, fine to coarse gravel (medium dense to dense)
10				TEST PIT COMPLETED @ 8'-0" MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 2'-0" NOTE: Sloughing of sidewalls encountered @ 7'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3F

TEST PIT NO. 13

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				FILL-Brown fine to medium sand, little silt with occasional cobbles (loose to medium dense)
5			SM	Green-brown fine to medium sand, little silt, some fine to coarse gravel (medium dense to dense)
10				TEST PIT COMPLETED @ 8'-6" MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 6'-0" NOTE: Sloughing of sidewalls encountered @ 7'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 14

SURFACE ELEV. +407.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■		SM	Green-brown fine to medium sand, little silt (medium dense)
5				
10				TEST PIT COMPLETED @ 9'-0" MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 7'-0" NOTE: Sloughing of sidewalls encountered @ 7'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3G

TEST PIT NO. 15

SURFACE ELEV. +398.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
	■ ■	76 509	OL/ML	FILL-Green-gray slightly organic silt (medium)
5			OL	Black organic silt (medium dense)
10	■		SP/SM	Blue-gray fine to medium sand, trace silt (medium dense)
15				TEST PIT COMPLETED @ 12'-0" SLIGHT TO MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 4'-0"

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 16

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
5				FILL-Green-brown fine to medium sand, some silt, some fine to coarse gravel (medium dense)
			OL	Black organic silt (medium)
10			SP/SM	Blue-gray fine to medium sand, trace silt (medium dense)
15				TEST PIT COMPLETED @ 11'-0" SLIGHT TO MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 7'-0"

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3H

TEST PIT NO. 17

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■		SM	Green-brown fine to medium sand, little silt (medium dense)
5				
10				TEST PIT COMPLETED @ 6'-0" RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 4'-0" NOTE: Sloughing of sidewalls encountered @ 5'-0"
15				

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 18

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				FILL-Green-brown fine to medium sand, some silt, little fine to coarse gravel (medium dense)
5			SP/SM	Green-brown fine to medium sand, trace silt, little fine gravel (medium dense)
10				TEST PIT COMPLETED @ 10'-0" RAPID GROUNDWATER SEEPAGE ENCOUNTERED @ 7'-6"
15				

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 19

SURFACE ELEV. +405.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				FILL-Green-brown fine to medium sand, some silt with concrete, bricks, and asphalt fragments (medium dense)
5				FILL-Gray silt, little fine sand (medium)
10	■	290	OL	FILL-Gray fine sand, some silt (loose)
				Black organic silt (medium dense)
15				TEST PIT COMPLETED @ 12'-0" SLIGHT GROUNDWATER SEEPAGE ENCOUNTERED @ 9'-0"

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO. 20

SURFACE ELEV. +402.0 ft. (±) COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
5	■			FILL-Green-brown fine to medium sand, some silt, little fine to coarse gravel with occasional cobbles (medium dense)
10	■ ■ ■		OL	Black organic silt with vegetation (medium)
15				TEST PIT COMPLETED @ 12'-6" MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 9'-0"

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3J

TEST PIT NO. 21

SURFACE ELEV. +404.0 ft. (±)

COMPLETION DATE: 2/19/87

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				Rubble FILL-concrete, wood, bricks, and asphalt
5				FILL-Green-brown fine to medium sand, some silt, little fine to coarse gravel (medium dense)
10			OL	Black organic silt (medium)
15				TEST PIT COMPLETED @ 12'-6" SLIGHT TO MODERATE GROUNDWATER SEEPAGE ENCOUNTERED @ 7'-0"

MELICK-TULLY and ASSOCIATES, INC.

TEST PIT NO.

SURFACE ELEV.

COMPLETION DATE:

DEPTH FT	SAMPLES	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0				
5				
10				
15				

MELICK-TULLY and ASSOCIATES, INC.

PLATE 3K

BORING NO. 5A
SURFACE ELEV. Not Available
COMPLETION DATE 6/6/88

WATER LEVEL: 4'-0"
DATE : 6/6/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	9			FILL-Green-brown silty fine to medium sand, some fine to coarse gravel with occasional cobbles and boulders (loose to medium dense)
	■	11			
5					
	■	8	18		
10				OL	Black organic silt, with vegetation (soft)
	■	13	21	SM	Blue-gray fine sand, little silt, trace roots (medium dense)
15					
	■	12	27	SM/ML	Gray-brown fine sand, little silt, with thin layers of clayey silt (medium dense to stiff)
20					
	■	5	25		-grading with occasional layers of silt
25					
	■	8			
30					
	■	8			
35					
					BORING COMPLETED @ 32'-0"
40					
45					
50					

BORING NO. 6A
SURFACE ELEV. Not Available
COMPLETION DATE 6/6/88

WATER LEVEL: 7'-0"
DATE : 6/6/88
JOB NUMBER : 3175-008

DEPTH, FT	SAMPLES	STANDARD PENETRATION RESISTANCE N	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	38			
	■	18	13		FILL-Green-gray silty fine to coarse sand, some fine to coarse gravel (medium dense to dense)
5					
	■	3	28		
				OL	Black organic silt, with thin layers of fine sand (soft)
10				SP	Gray-green fine to medium sand, trace silt (medium dense)
	■	11	26		
15					
	■	9	23	SP/SM	Gray-brown fine sand, trace silt, with thin layers of silt (medium dense)
20					
					BORING COMPLETED @ 17'-0"
25					
30					
35					
40					
45					
50					

BORING NO. 7A
SURFACE ELEV. Not Available
COMPLETION DATE 6/7/88

WATER LEVEL: 4'-0"
DATE : 6/7/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0–					
	■	14	6		FILL-Dark gray-brown silty fine gravel, some fine to coarse sand (medium dense) -grading with trace vegetation @ 2'-0" -grading to green-gray sandy silt, little fine to coarse gravel, trace roots (medium dense) @ 4'-5"
	■	18			
5–					
	■	27	31		
10–					
	☐	P			
	■	2	178	OL	Black organic silt, with vegetation (soft)
15–				ML	Gray sandy silt, trace roots (loose)
	■	15		SM	Blue-gray fine to medium sand, little silt (medium dense)
20–					
	■	15			
25–					
	■	14	26		-grading with thin layers of silt
30–					
	■	8		SM/ML	Gray fine sand, little silt, with thin layers of silt (medium dense) (stiff)
35–					
	■	10	25		
40–					
	■	13			
45–					
	■	10	24		
50–					
	■	11			
55–					BORING COMPLETED @ 52'-0"

BORING NO. 8A
SURFACE ELEV. Not Available
COMPLETION DATE 6/7/88

WATER LEVEL: 15'-0"
DATE : 6/7/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	20			
	■	8	14		FILL-Green-brown silty fine to coarse sand, little fine to coarse gravel, with occasional cobbles and boulders (loose to medium dense)
5					
	■	6			
10					
	■	6	34		-grading green-gray sandy silt, trace roots (medium) @ 9'-0"
	■	3	178		
15				OL	Black organic silt, with vegetation (soft)
	■	6	40		
				ML	Blue-gray clayey silt (medium)
				SM	Blue-gray fine to medium sand, little silt (medium dense)
20					
	■	14	15		
				SM/ML	Green-brown fine sand, little silt, with layers of silt (medium dense)
25					
	■	15			
30					
	■	13	24		
35					
	■	12			
40					
	■	10	27		
45					
	■	13			
50					
	■	12	29		
					BORING COMPLETED @ 52'-0"

BORING NO. 9A
SURFACE ELEV. Not Available
COMPLETION DATE 6/7/88

WATER LEVEL: 7'-0"
DATE : 6/7/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	28			
	■	31	8		FILL-Green-brown silty fine to medium sand, trace fine to coarse gravel (medium dense to dense)
5					
	■	8	29		
					-grading to gray fine sand, trace silt, trace vegetation @ 6'-5"
10					
	■	3	234	OL	Black organic silt, with vegetation (soft)
	■	22	23	SP/SM	Green-gray fine to medium sand, trace silt (medium dense)
15					
	■	18	22		
				SP	Brown fine to medium sand, trace silt (medium dense)
20					
	■	6			-grading with occasional layers of silt (medium)
25					
	■	10	21		
30					
	■	15			
35					
	■	11		SP/ML	Gray-brown fine sand, trace silt, with thin layers of silt (medium dense/stiff)
40					
	■	8			
45					
	■	15			
50					
	■	11			
					BORING COMPLETED @ 52'-0"
55					

BORING NO. 10A
SURFACE ELEV. Not Available
COMPLETION DATE 6/7/88

WATER LEVEL: 8'-0"
DATE : 6/8/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	4			FILL-Brown fine to medium sand, little silt (loose to medium dense) -grading to gray fine sand, some silt, trace vegetation (medium dense) @ 2'-0"
	■	13			
5	■	15	19		
10					
	■	5			
	■	5	75	OL	Black organic silt, with vegetation (medium)
15				ML	Blue-gray clayey silt, trace vegetation (medium)
	■	6	28		
20					
					BORING COMPLETED @ 17'-0"
25					
30					
35					
40					
45					
50					

MELICK-TULLY AND ASSOCIATES, INC.

PLATE 2J

BORING NO. 11A
SURFACE ELEV. Not Available
COMPLETION DATE 6/8/88

WATER LEVEL: 6'-0"
DATE : 6/8/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE N	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■	37			FILL-Green-brown silty fine to coarse sand, some fine to coarse gravel (dense)
	■	12	40	ML	Green-gray silt, trace roots (medium dense)
5	■	17	27	SP/ML	Gray-brown fine sand, trace silt, with thin layers of silt (medium dense/stiff)
10	■	10	28		
15	■	8	26		
20					
					BORING COMPLETED @ 17'-0"
25					
30					
35					
40					
45					
50					

BORING NO. 12A
SURFACE ELEV. Not Available
COMPLETION DATE 6/8/88

WATER LEVEL: 6'-0"
DATE : 6/8/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■	3	21		FILL-Dark brown silty fine to coarse sand, trace vegetation (loose)
	■	25			-grading to green-brown silty fine to coarse sand, little fine to coarse gravel (medium dense) @ 2'-0"
5	■	10	21		-grading to gray-green fine sand, little silt, trace roots (loose to medium dense) @ 5'-0"
10				OL	Black organic silt, with vegetation (soft)
	■	18	22	SP	Gray fine to medium sand, trace silt (medium dense)
15	■	11	23	SP	Brown fine to medium sand, trace silt (medium dense)
20	■	9			
				SP/ML	Gray-brown fine sand, trace silt, with thin layers of silt (medium dense/stiff)
25	■	7	29		
30	■	8			
35					BORING COMPLETED @ 32'-0"
40					
45					
50					

BORING NO. 13A
SURFACE ELEV. Not Available
COMPLETION DATE 6/6/88

WATER LEVEL: 7'-0"
DATE : 6/6/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE N	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	48			FILL-Gray-brown silty fine to coarse sand, little fine to coarse gravel, with fragments of asphalt and concrete (loose to dense) -grading with pockets of slightly organic silt @ 5'-0"
5					
	■	5	16		-grading to green-brown silt, and fine sand, trace vegetation (medium) @ 8'-5"
10					
	■	5	30		
	☐	P		OL	Black organic silt, with vegetation (soft)
15					
	■	10	22	SM	Blue-gray fine to medium sand, little silt (medium dense)
20					
	■	10	26	ML/SP	Gray-brown silt, with thin layers of fine sand (medium/medium dense)
25					
	■	7			
30					
	■	11			
35					
					BORING COMPLETED @ 32'-0"
40					
45					
50					

MELICK-TULLY AND ASSOCIATES, INC.

BORING NO. 14A
SURFACE ELEV. Not Available
COMPLETION DATE 6/8/88

WATER LEVEL: 6'-0"
DATE : 6/8/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE N	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	12			FILL-Green-gray silty fine to medium sand, little fine to coarse gravel, with fragments of asphalt and concrete (medium dense to very dense) -grading to green-gray slightly organic silt (soft) @ 4'-5".
	■	56			
5					
	■	4	24		
10					
	■	13	223	OL	Black organic silt, with vegetation (soft to medium)
				SM	Blue-gray fine to medium sand, little silt (medium dense)
15					
	■	10	27	SP/ML	Green-brown fine sand, trace silt with thin layers of silt (medium dense/stiff)
20					
	■	8			
25			25		
	■	8			
30					
	■	10			
35					
					BORING COMPLETED @ 32'-0"
40					
45					
50					

MELICK-TULLY AND ASSOCIATES, INC.

PLATE 2N

BORING NO. 13A
SURFACE ELEV. Not Available
COMPLETION DATE 6/9/88

WATER LEVEL: 7'-0"
DATE : 6/9/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■	42	9		FILL-Gray-brown silty fine to coarse sand, little fine to coarse gravel (dense)
5	■	50	8		-grading to green-brown slightly organic silt, and fine sand (soft to medium) @ 6'-5"
10	■	3	38		
				OL	Black organic silt with vegetation (soft)
15	■	17	12	SM	Blue-gray fine to medium sand, little silt (medium dense)
20	■	15		SM/ML	Gray-brown fine to medium sand, trace silt with thin layers of silt (medium dense to stiff)
25	■	13	23		
30	■	11			
35	■	11	27		
40	■	10			
45	■	11	27		
50	■	12		SP/ML	Gray fine sand, trace silt, with thin layers of silt (medium dense/stiff)

(CONTINUED ON FOLLOWING PAGE)

BORING NO. 15A
SURFACE ELEV.
COMPLETION DATE

WATER LEVEL:
DATE :
JOB NUMBER :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION (CONTINUED FROM PREVIOUS PAGE)
50	■	12		SP/ML	Gray fine sand, trace silt with thin layers of silt (medium dense/stiff)
55	■	12	20		
60	■	9			
65	■	9			
70	■	10			
75					BORING COMPLETED @ 72'-0"
80					
85					
90					
95					
100					

BORING NO. 16A
SURFACE ELEV. Not Available 402
COMPLETION DATE 6/9/88

WATER LEVEL: 6'-0"
DATE : 6/9/88
JOB NUMBER : 3175-008

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	12	14		FILL-Green-brown fine to coarse sand, little silt with pockets of silt (medium dense) -grading to green-gray silt, trace roots (medium dense) @ 4'-0"
5					
	■	15	24		
10				OL	Black organic silt, with vegetation (soft)
	■	17	23	SM	Blue-gray fine to medium sand, little silt (medium dense)
				SP/SM	Gray-brown fine to medium sand, trace silt (medium dense)
15					
	■	10	27		
20					
	■	8		SP/ML	Gray-brown fine sand, trace silt with thin layers of silt (medium dense/stiff)
25					
	■	8			
30					
	■	7	26		
35					
	■	9			
40					
	■	8			
45					
	■	6			
50					
	■	4	27		

(CONTINUED ON FOLLOWING PAGE)

BORING NO. 16A
SURFACE ELEV.
COMPLETION DATE

WATER LEVEL:
DATE :
JOB NUMBER :

DEPTH FEET	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION (CONTINUED FROM PREVIOUS PAGE)
50					
	■	4	27		
55					
	■	7			
60					
	■	8			
65					
	■	6			
70					
	■	10	27		
75					
80					BORING COMPLETED @ 72'-0"
85					
90					
95					
100					

APPENDIX G
BORINGS BY MELICK-TULLY
March 1988

BORING NO. 1
SURFACE ELEV. +402.0 ft. (±)
COMPLETION DATE 3/17/87

WATER LEVEL : [illegible]
DATE : 3/17/87
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	35			FILL-Gray-green fine to medium sand, little silt, little fine to coarse gravel (dense to very dense)
5	■	63			-grading with occasional cobbles and boulders
10					FILL-Gray-green silt, some fine sand (medium dense)
	■	13			
15					
	■	9		OL	Black organic silt with vegetation (stiff)
20					
	■	12		SM	Blue-gray fine to medium sand, little silt (medium dense)
25					
	■	28		ML	Gray and red-brown silt, trace fine sand (medium dense)
30					BORING COMPLETED @ 27'-0"
35					
40					
45					
50					

MELICK-TULLY AND ASSOCIATES, INC.

PLATE 2A

BORING NO. 2
SURFACE ELEV. +402.0 ft. (±)
COMPLETION DATE 3/17/87

WATER LEVEL :
DATE : 3/17/87
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■	36			FILL-Green-gray fine to medium sand, little silt, little fine coarse gravel (dense)
5	■	50/4"		ML	Green-gray silt, some fine sand, little fine to coarse gravel with occasional cobbles and boulders (very dense)
10	■	6			-grading with thin layers of slightly organic silt and fine to medium sand (loose)
	■	35			
15	■	31		SM	Gray-brown fine to medium sand, little silt (medium dense to dense)
20	■	23			
25	■	20			
30	■	10			
35	■	14			-grading with occasional thin layers of clayey silt
40	■	14			
45					BORING COMPLETED @ 42'-0"
50					

MELICK-TULLY AND ASSOCIATES, INC.

PLATE 2B

BORING NO. 3
SURFACE ELEV. +402.0 ft. (±)
COMPLETION DATE 3/18/87

WATER LEVEL : 6'-6"
DATE : 3/18/87
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	75			FILL-Rock fragments intermixed with silty fine to medium sand (dense)
5					
	■	45			FILL-Green-brown fine to medium sand, some silt, little fine gravel (dense)
10					
	■	24		ML/SM	Green-gray slightly organic silt with occasional thin layers of silty fine to medium sand (medium dense)
15					
	■	22			
	■	15			
20					
	■	29		ML	Blue-gray silt, trace fine sand (medium dense)
25					
	■	21		SM	Gray-brown fine to medium sand, little silt (medium dense)
30					BORING COMPLETED @ 27'-0"
35					
40					
45					
50					

BORING NO. 4
SURFACE ELEV. +402.0 ft. (±)
COMPLETION DATE 3/18/87

WATER LEVEL : 3'-0"
DATE : 3/17/87
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■	38			FILL-Green-brown fine to medium sand, some silt, little fine gravel (dense)
5	■	12		SM	Green-gray fine to medium sand, little silt, trace roots (medium dense)
10	■	13		SM	Green-brown fine to medium sand, little silt (medium dense)
15	■	16		SP/SM	Green-gray fine to medium sand, trace silt (medium dense)
20					BORING COMPLETED @ 17'-0"
25					
30					
35					
40					
45					
50					

BORING NO. 5
SURFACE ELEV. +402.0 ft. (±)
COMPLETION DATE 3/18/87

WATER LEVEL : 3'-0"
DATE : 3/18/87
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0	■	25			FILL-Green-brown fine to medium sand, some silt, little fine to coarse gravel (medium dense)
5	■	29		SP/SM	Gray-green fine to medium sand, trace silt, little fine to coarse gravel (medium dense)
10	■	18			
15	■	27			
20					BORING COMPLETED @ 17'-0"
25					
30					
35					
40					
45					
50					

MELICK-TULLY AND ASSOCIATES, INC.

PLATE 2E

BORING NO. 6
SURFACE ELEV. +402.0 ft. (±)
COMPLETION DATE 3/18/87

WATER LEVEL : 3'-0"
DATE : 3/18/87
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	MOISTURE CONTENT %	SYMBOL	DESCRIPTION
0					
	■	50			FILL-Green-brown fine to medium sand, some silt, little fine to coarse gravel (dense)
5				SM	Gray-brown fine to medium sand, some silt (medium dense)
	■	20			
10				SP/SM	Gray-green fine to medium sand, trace silt, trace fine gravel (medium dense)
	■	18			
15					
	■	20			
20					BORING COMPLETED @ 17'-0"
25					
30					
35					
40					
45					
50					

MELICK-TULLY AND ASSOCIATES, INC.

PLATE 2F

APPENDIX D

Stormwater Management Report

RA Associates • CONSULTING ENGINEERS / PLANNER

STORMWATER MANAGEMENT REPORT
&
DRAINAGE SYSTEM DESIGN

Prepared For:

MINISCEONGO PARK

ROUTE 202
TOWN OF HAVERSTRAW, TOWN OF RAMAPO
ROCKLAND COUNTY, NEW YORK

Date: October 14, 2005
Job No. 1560

Ray Ahmadi, Ph.D., P.E.   NYS#59392
New York State Professional Engineer

227 South Mountain Road • New City, New York 10956 • Tel. (845) 634-1351 • Fax (845) 634-1351
E-Mail: RAAssoc@optonline.net • Web Site: RA-Engineers.com

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RA Associates

CONSULTING ENGINEERS / PLANNER

Ray Ahmadi, Ph.D., P.E.
227 South Mountain Road
New City, New York 10956
Tel.: (845) 634-1351
Fax/Ans. 634-1351
E-Mail: RAAssoc@optonline.net
RA-Engineers.com

INTRODUCTION:

The hydrology and hydraulics study for the project, Minisceongo Park has been undertaken to examine the pre and post construction drainage conditions. The study will also provide the impact of the proposed impervious area to the drainage system.

In general, the runoff from a basin depends on the precipitation, type of the soil, and characteristic of the terrain, type of land cover and geographic location of the property. The hydrology of a site changes during the initial clearing and grading that occur during construction. Trees and vegetated land covers that have intercepted rainfall are removed, and natural depressions that had absorbed rainfall is scarped off, eroded or severely compacted. The impervious areas such as rooftops, roads, parking lots, driveways, etc. surfaces do not allow rainfall to soak into the ground. Consequently, most of the rainfall is converted into storm water runoff. Therefore, the volume of runoff from a developed site will increase sharply with increment of impervious cover. This is due to decrease inability of rainfall to percolate into the ground and recharge the aquifer. As the result, the increase in storm water runoff can be too much for the existing drainage system to handle. Post- developed runoff is attenuated to pre- developed runoff and diverted to the existing drainage system with or without improvement. The "Zero Net Increase of Peak Flow" is referring to the above techniques, which is mandated by local and state regulation.

Impervious surfaces accumulate pollutants deposited from the atmosphere, leaked from vehicles, or windblown in from adjacent areas. During the storm events, these pollutants quickly wash off, and are rapidly delivered to downstream waters.

The source of sediment includes wash off of particles that are deposited on impervious surfaces, erosion from stream banks and site construction.

The frequency and magnitude of storm will increase dramatically per increase of impervious areas due to developments. In addition, the discharge associated bank full storm event reaches beyond the "critical erosive velocity" and flow's velocity increases substantially after development occurs. The impacts to the stream channel must be addressed in this report.

Flow events that exceed the capacity of the stream channel spill out into the adjacent floodplain. The "Over bank" flooding will be maintained to pre-development peak discharge rates for both the two-year and ten-year frequency storm after developments, thus keeping the level of over bank flooding the same over time. This management technique prevents costly damage or maintenance for culverts, drainage structures, and swales.

As with over bank floods, development sharply increases the peak discharge rate associated with the 100-year design storm. As a consequence, the elevation stream's 100-year floodplain becomes higher and the boundaries of its floodplain expand. In some instances, property and structures that had not previously been subject to flooding are now at risk. Additionally, such a shift in a floodplain's hydrology can degrade wetland and forest. To minimize the impact, the 100-year storm will be routed through a proposed pond to match the peak developed flow with pre-developed.

The decline in the physical habitat of the stream, coupled with lower base flows and higher storm water pollutant loads, has a severe impact on aquatic community. To meet water quality treatment goals, reduced secondary environmental impacts of facilities and maximum pollutant removal, permanent pools and landscaping are necessary.

The following report provide a comprehensive of the site for the pre-developed, during the fill placement phase and post development per New York State Stormwater Management Design Manuel dated August 2003 and New York Guidelines for Urban Erosion & Sediment Control dated April 1997.

SITE OVERVIEW:

The project is located at Route 202 on the Northwest side of Palisades Interstate Parkway and Westerly side of Quaker Road. The watershed area consists of 50.9 acres as shown on a subdivision plat prepared by Atzl, Scatassa & Zigler P.C. South Minisceongo Creek is flowing from South to North at the west corner of the property. There are patches of wetlands both side of the stream.

The site is a former sand and gravel pits. The site is forty feet (40') lower than Quaker Road and approximately two feet above the 100-year flood elevation at South Minisceongo Creek. The site fairly flat, less than 1% slopes from Quaker Road to the stream.

DRAINAGE STUDY:

Section 1:

Existing Condition:

The pre-developed (existing condition) drainage study shows the current peak flows at a point of interest (P.O.I.) located at Northwest corner of the watershed on Minisceongo Creek. These data are required to compare with the post developed (developed condition).

Developed Condition:

The revised conceptual plans show 271 town houses & two commercial building sites to be developed. The runoff will be increased due to the proposed impervious area.

In terms of mitigation of the developed (New houses, road, driveways etc) site, drainage facility (detention Pond) is proposed to prevent downstream flooding. Three detention ponds are proposed at the site, which will function as sediment control basins during construction.

Water Quality:

The purpose of water quality study is to control the flow and treat runoff's chemical constituents, hydrocarbons, bacteria, debris etc. before released to local water body as outlined in the New York State Stormwater Management Design Manual dated August 2003.

Section 2:

Hydrology/Hydraulic during Fill Placement:

The grading plan shows that a considerable some of fill material to be brought up to the site. Hydrology of the site during fill placement is studied and designed soil erosion devices to trap sediments eroding from the stockpile. Ponds are over excavated during the fill placement by two feet. The extra room is for accumulated sediments laden.

MINISCEONGO PARK

N. Y. S. ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY
NEW YORK

HYDROLOGY & HYDRAULIC OF EXISTING & DEVELOPED CONDITION

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
JULY 07, 2005

REVISED
OCTOBER 14, 2005

Section 1: Table of Contents

RA Associates
CONSULTING ENGINEERS / PLANNER

Ray Ahmadi, Ph.D., P.E.
227 South Mountain Road
New City, New York 10956
Tel.: (845) 634-1351
Fax/Ans. 634-1351
E-Mail: RAAssoc@optonline.net
RA-Engineers.com

Revision October 14, 2005

July 7, 2005

Town of Haverstraw
Town Hall
One Rosman Rd.
Haverstraw, NY 10920

Att.: Mr. Joseph Caruso, P.E.
Village Engineer
Maser Consulting Engineering

Re: Minisceongo Park
Town of Haverstraw
Town of Ramapo
Rockland County, New York

Sub: Preliminary Hydraulic and Hydrological Study approximate required volume of storage for "zero net increase of peak flow".

INTRODUCTION:

The following drainage study has been prepared for Minisceonge Park in order to design a system to provide a zero net increase of peak runoff as well as water quality for a proposed townhouses in the town of Haverstraw, town of Ramapo, New York. The project is located at Route 202 on the Northwest side of Palisades Interstate Parkway and Westerly side of Quaker Road. The watershed area consists of 50.9 acres as shown on a subdivision plat prepared by Atzl, Scatassa & Zigler P.C.

The revised conceptual plans show 271 town houses & two commercial buildings to be developed. The disturbed areas' runoff will flow into proposed pond#1 southwest of the project next to Minisceongo Creek, pond#2 northwest of the Quaker Road close to Barr Laboratories, Inc. and pond#3 northwest of Palisades Interstate Parkway next to northeast property line. Those ponds are designed to function as water quality ponds as well as detention basins.

WATERSHEDS AND DRAINAGE PATTERNS:

The existing site is located on two watersheds (WS#1 & WS#2). At the present, the direction of the runoff from the WS#1 is from east to west toward the wetland. The runoff from WS#2 flows almost parallel to the north property line toward the Minisceongo Creek. The direction of the runoff is shown in the existing condition of the watershed map.

The proposed developed areas are located on six different watersheds (WS#1, 2, 3, 4, 5 & 6). The WS#1 contains the central portion of the site. The runoff from WS#1 drains into the Pond#1. The WS#2 consists of northeast portion of the site, which the runoff drains into the Pond#2. The WS#3 consists of east portion of the developed areas, which the runoff drains into the pond#3. The WS#4 consists of the slope areas between Barr Lab and north property line. The runoff flows along a proposed berm. The accumulated runoff from WS#4 flows through WS#5 and then flows to the outlet. The WS#5 is located at the northwest wetland area. The runoff from WS#5 will drain into Minisceongo Creek. The WS#6 consists southeast portion of the site. The runoff flows to the west toward Minisceongo Creek. The direction of the runoff is shown in the developed condition of the watershed map.

The outflow from the pond#1, pond#2 and pond#3 will be routed and then released to outlet (Minisceongo Creek). The schematic reach flow is shown in page 1-39.

HYDROLOGICAL SOIL GROUP:

The soil at the site is "Pits" with soil map symbols of "Pt" and Hydrological Soil Group of "C". See sheet 35 of Soil Survey of Rockland County, New York, United States Department of Agriculture Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station dated October 1990.

The soil at the site is gravel. This unit consists of areas that have been excavated for sand and gravel. The areas area irregular in shape or rectangular and range from 5 to 100 acres. Many of the pits have short steep slopes along the edges.

The rate of permeability in this unit is rapid or very rapid. In some areas the water table is at or near the surface most of the year. A few areas are adjacent to streams and are subject to periodic flooding.

Included with this unit in mapping are small areas of undisturbed soils, mainly excessively drained Hinckley soils and well drained Riverhead soils. Spots of wetter fredon soils are in some areas. Also included areas of spoils consisting of sandy or gravelly overburden, areas of exposed bedrock, and a few small ponds.

DRAINAGE STUDY:

We have prepared the attached Hydrological – Hydraulics analysis for the existing and developed areas. The existing site consists of two watersheds. With the exception of the edge of property lines, the entire area is flat. The area used to be a sand pits, which the materials were excavated and used elsewhere.

As the result of developing the site, the runoff from the developed area will be increased due to the proposed impervious areas. The 100-years peak runoff storm from the combined watersheds will increase from 135.97 CFS to 230 ± CFS. Three detention ponds are proposed in the site in order to attenuate the peak runoffs from post development to pre-developed condition. The 100-years peak runoff storm for the developed condition (after the flow is released from ponds) is 92.6 CFS, which is much less than the existing runoff (135.97 CFS).

The location of the ponds is shown in the drainage map. The storage volume of the pond#1, pond#2 and pond#3 are 3.57 acs-ft., 1.14 acs-ft. and 1.94 acs-ft respectively (See page 1-21 to 1-23 for detail calculation).

The summary flow table and hydrographs of 1, 2, 5, 10, 25, 50 and 100-year storms for existing and developed conditions and preliminary calculations are attached for your reference.

Very truly yours,

Ray Ahmadi, Ph.D., P.E.

C: Primary share\Hydrology TR-55\1560\Drainage Report\Revised Drainage Study

SUMMARY OF FLOW

1-YEAR STORM FREQUENCY

Q (CFS)	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	REMARK
Q_i	26.68	8.50	9.50	0.48	3.44	2.84	$\Sigma Q_i = 51.44$
Q_o	3.79	2.78	2.09	0.48	3.44	2.84	$Q_{Existing} = 15.42$ CFS

SUMMARY OF FLOW

2-YEARS STORM FREQUENCY

Q (CFS)	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	REMARK
Q_i	39.06	12.64	14.31	0.95	6.75	5.45	$\Sigma Q_i = 79.16$
Q_o	10.48	4.19	3.32	0.95	6.75	5.45	$Q_{Existing} = 31.14$ CFS

SUMMARY OF FLOW

5-YEARS STORM FREQUENCY

Q (CFS)	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	REMARK
Q_i	54.88	17.95	20.51	1.63	11.58	9.19	$\Sigma Q_i = 115.74$
Q_o	21.29	5.83	4.82	1.63	11.58	9.19	$Q_{Existing}$ = 54.34 CFS

SUMMARY OF FLOW

10-YEARS STORM FREQUENCY

Q (CFS)	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	REMARK
Q_i	62.85	20.62	23.64	1.99	14.18	11.18	$\Sigma Q_i = 134.46$
Q_o	27.2	6.66	5.55	1.99	14.18	11.18	$Q_{Existing}$ = 66.76 CFS

SUMMARY OF FLOW

25-YEARS STORM FREQUENCY

Q (CFS)	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	REMARK
Q_i	78.70	25.95	29.97	2.75	19.63	15.36	$\Sigma Q_i = 172.36$
Q_o	40.17	8.34	7.03	2.75	19.63	15.36	$Q_{Existing}$ = 93.28 CFS

SUMMARY OF FLOW

50-YEARS STORM FREQUENCY

Q (CFS)	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	REMARK
Q_i	94.47	31.28	36.28	3.54	25.30	19.71	$\Sigma Q_i = 210.58$
Q_o	53.87	10.03	8.52	3.54	25.30	19.71	$Q_{Existing}$ = 120.97 CFS

SUMMARY OF FLOW

100-YEARS STORM FREQUENCY

Q (CFS)	**WS#1**	**WS#2**	**WS#3**	**WS#4**	**WS#5**	**WS#6**	**REMARK**
Q_i	102.35	33.97	39.42	3.94	28.23	21.93	$\Sigma Q_i = 229.84$
Q_o	61.72	10.88	9.27	3.94	28.23	21.93	$Q_{Existing}$ = 135.97 CFS

MINISCEONGO PARK

N. Y. S. ROUTE 202
TOWN OF HAVERSTRAW
ROCKLAND COUNTY
NEW YORK

LOCATION MAPS

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
JULY 05, 2005

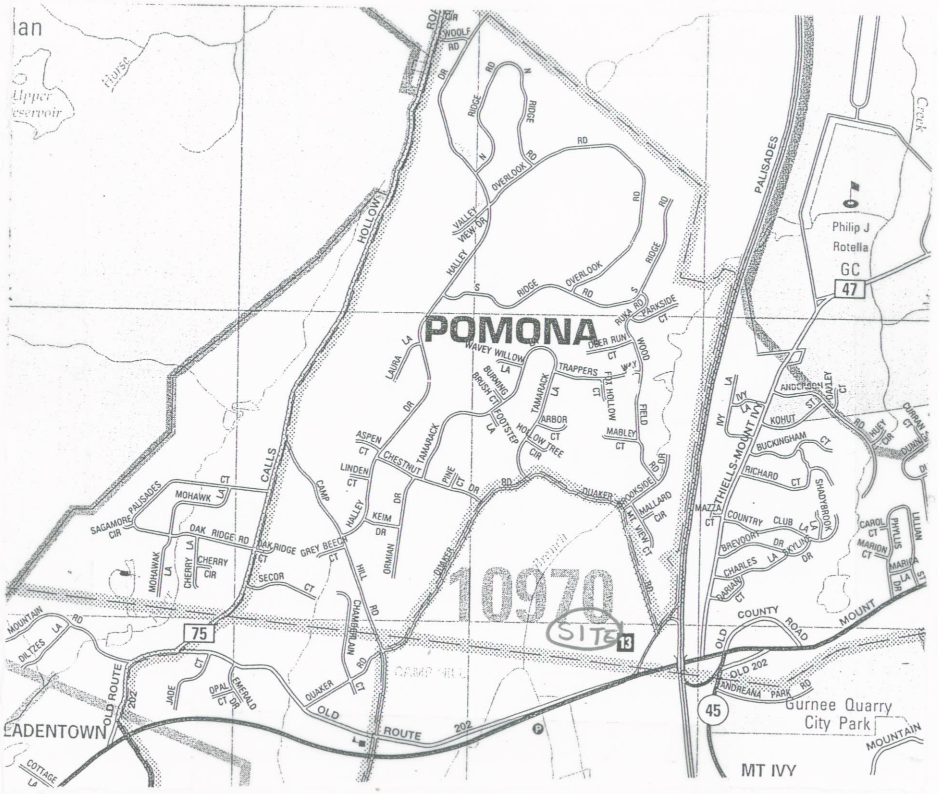
REVISED
JULY 07, 2005

RA Associates

CONSULTING ENGINEERS / PLANNER

Ray Ahmadi, Ph.D., P.E.
227 South Mountain Road
New City, New York 10956
Tel Fax/Ans..: (845)634-1351
E-Mail: RAAssoc@optonline.net

NORTH



WATERSHED STREET MAP
TOWN OF HAVERSTRAW
ROCKLAND COUNTY
NEW YORK

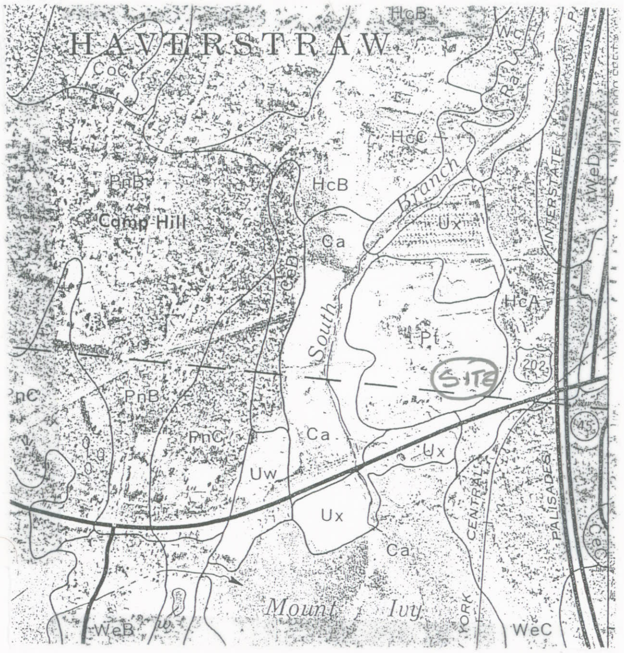
REF: SOIL SURVEY OF ROCKLAND COUNTY, NY, DATED OCT. 1990

RA Associates

CONSULTING ENGINEERS / PLANNER

Ray Ahmadi, Ph.D., P.E.
227 South Mountain Road
New City, New York 10956
Tel Fax/Ans..: (845)634-1351
E-Mail: RAAssoc@optonline.net

NORTH



WATERSHED SOIL MAP
SCALE: 1"=2,000' +/-
TOWN OF HAVERSTRAW
ROCKLAND COUNTY
NEW YORK

REF: SOIL SURVEY OF ROCKLAND COUNTY, NY, DATED OCT. 1990

MINISCEONGO PARK

N. Y. S. ROUTE 202
TOWN OF HAVERSTRAW
ROCKLAND COUNTY
NEW YORK

TR-55 INPUT DATA
FOR
EXISTING CONDITION
AND
SITE DEVELOPED CONDITION

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
JULY 05, 2005

REVISED
JULY 07, 2005

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB 1560

SHEET NO. ① OF ①

CALCULATED BY RA DATE 6/29/05

CHECKED BY DATE

SCALE

LOCATION: NORTH-WEST OF THE INTERSECTION OF RTE 202 WITH PIP, IN THE TOWN OF HAVERSTRAW, NY.

SOILS: SAND PIT, HYDROLOGICAL SOIL GROUP OF "C".

WATERSHEDS: THE SITE USED TO BE A SANDPIT. THEREFORE, THE EAST & SOUTH EDGES OF THE PROPERTY HAVE STEEP slopes AND THE REST OF THE AREAS ARE FLAT UPTO THE SO. MINICEONGO CREEK.

THE DEVELOPED AREA will BE RAISED @ A slope OF 1%, SOUTH WEST TO NORTH EAST OF THE SITE.

JOB 1560

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CALCULATED BY DATE

CHECKED BY DATE

SCALE

EXISTING CONDITION

THE LIMIT OF THE WATERSHED IS SHOWN ON THE DRAINAGE MAP.

WS # 1

THE AREA OF THE WS # 1

$$\Rightarrow A = 34.85 \text{ ACS} \begin{cases} 0.24 & \text{GRAVEL RD.} \\ 34.61 \end{cases}$$

$L_1 = 100$ FT (OVER LAND FLOW)

$$S_1 = \frac{449 - 411.8}{100} = 0.372$$

$L_2 = 350$ FT (CONCENTRATED FLOW)

$$S_2 = \frac{411.8 - 406}{350} = 0.0166$$

$L_3 = 1525$ FT (CONCENTRATED FLOW)

$$S_3 = \frac{406 - 396}{1525} = 0.0065$$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB 1560

SHEET NO. ③ OF

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SCALE

$L_4 = 120$ FT (CHANNEL FLOW)

$$S_4 = \frac{396-392}{120} = 0.033$$

THE CROSS SECTIONAL AREA OF THE CHANL

$$A = \frac{1}{2}(2+6)\times 1$$

$$\Rightarrow A = 4 \text{ SQ.FT.}$$

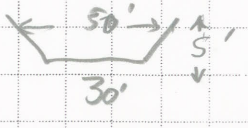
$$WP = 2 + 2\times\left(\sqrt{2^2+1^2}\right)$$

$$\Rightarrow WP = 6.5 \text{ FT}$$

$$n = 0.035$$

$L_5 = 1,250$ LF TO P.O.I IN MINICEONGO CRK.

$S_5 = 0.001$



$A_{CHL} = 200$

$W_p = 52.4$

$n = 0.035$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB 1560
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CHECKED BY DATE
SCALE

WS #2

THE AREA OF THE WS #2,

$A = 16.02$ ACS

$L_1 = 100$ FT (OVER LAND FLOW)

$$S_1 = \frac{440 - 407}{100} = 0.33$$

$L_2 = 530$ FT (CONCENTRATED FLOW)

$$S_2 = \frac{407 - 402}{530} = 0.0094$$

$L_3 = 925$ FT. (CONCENTRATED FLOW)

$$S_3 = \frac{402 - 400.1}{925} = 0.0021$$

$L_4 = 140$ FT. (CHANNEL FLOW)

$$S_4 = \frac{400.1 - 392}{140} = 0.0579$$

$A = 4$ # $W_p = 6.5$ FT $n = 0.035$

JOB

SHEET NO 5 OF

CALCULATED BY DATE

CHECKED BY DATE

SCALE

$L_5 = 100$ FT TO P.O.I ALONG MINICEONGO CRK

$S_5 = 0.001$

$A = 200$ S.F.

$WP = 52.4$ FT

$n = 0.035$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINISCEONGO PARK (1560)
SHEET NO. 8 OF
CALCULATED BY RN DATE 10/12/05
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SCALE

DEVELOPED CONDITION

WS #1

$$A = 19.13 \text{ ACS} \begin{cases} A_{IMP} = 10.13 \text{ ACS} & \text{“C”} \\ A_{LAWN} = 9.0 \text{ ACS} & \text{“C” GOOD CONDITION} \end{cases}$$

$L_1 = 100$ LF (OVERLAND FLOW)

$$S_1 = \frac{419 - 416.3}{100} = 0.027$$

$L_2 = 75$ LF (SHALLOW CONCENTRATED FLOW)

$$S_2 = \frac{416.3 - 414.9}{75} = 0.0186$$

$L_3 = 1025$ LF (PIPE FLOW)

$$S_3 = \frac{411.9 - 396}{1025} = 0.0155$$

DIAMETER OF THE PIPE.

$D = 24''$ (RCP)

$$A = \frac{\pi}{4} \times \left(\frac{24}{12}\right)^2 = 3.14 \text{ SQ.FT}$$

$$W_p = \pi \times \frac{24}{12} = 6.28 \text{ LF}$$

$$n = 0.015$$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINISCEONGO PARK (1560)
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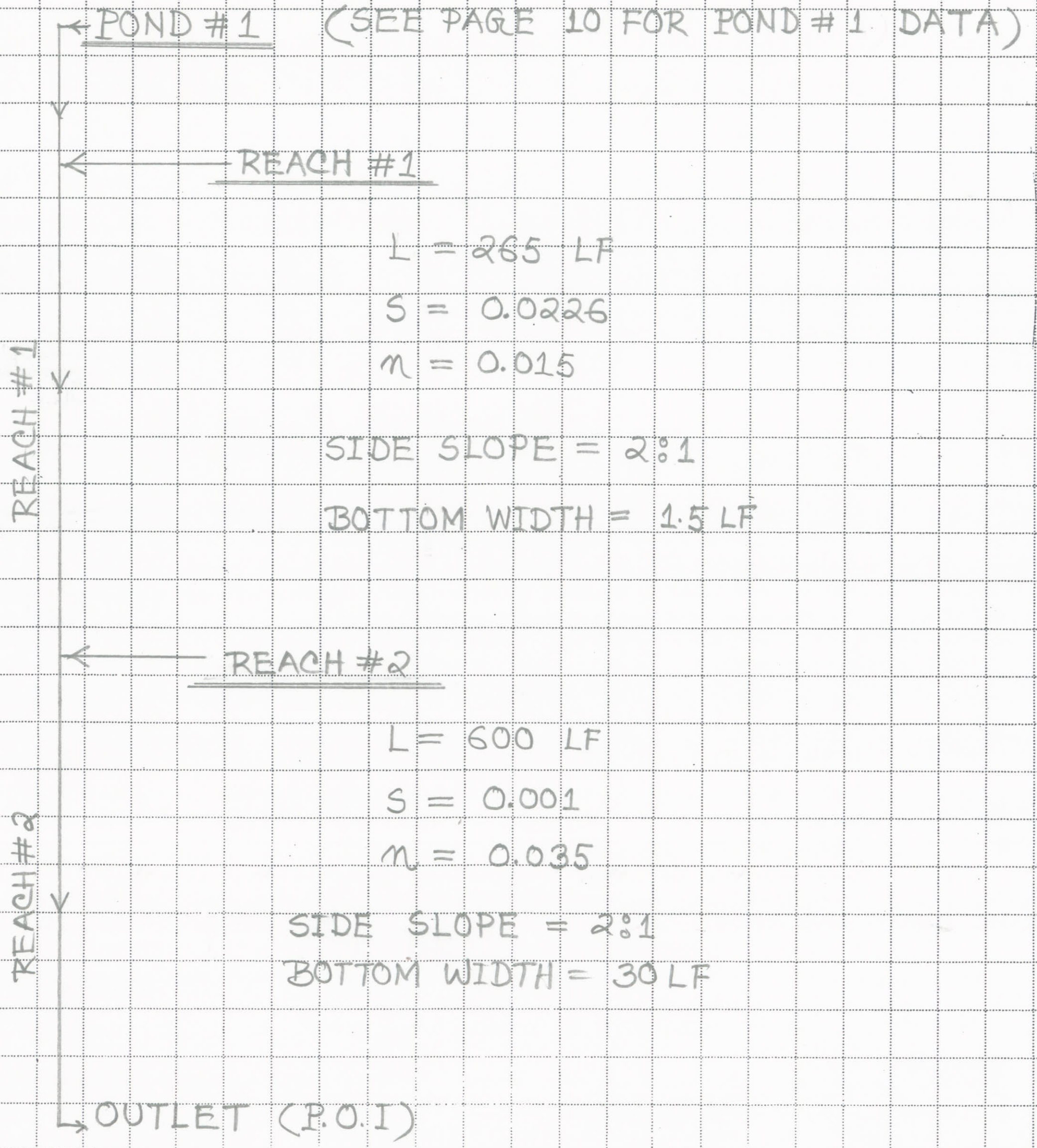
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

THE FLOW IS RECEIVED BY POND #1 AND ROUTED THROUGH REACH #1 AND REACH #2 RESPECTIVELY. FINALLY IT GOES TO OUTLET.



POND #1 (SEE PAGE 10 FOR POND #1 DATA)

REACH #1

L = 265 LF
S = 0.0226
n = 0.015

SIDE SLOPE = 2:1

BOTTOM WIDTH = 1.5 LF

REACH #2

L = 600 LF
S = 0.001
n = 0.035

SIDE SLOPE = 2:1
BOTTOM WIDTH = 30 LF

OUTLET (P.O.I)

1-13

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINISCEONGO PARK (1560)
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SCALE

WS #2

$A = 6.65$ ACS $\begin{cases} A_{IMP} = 3.42 \text{ ACS "C"} \\ A_{LAWN} = 3.23 \text{ ACS "C" GOOD CONDITION} \end{cases}$

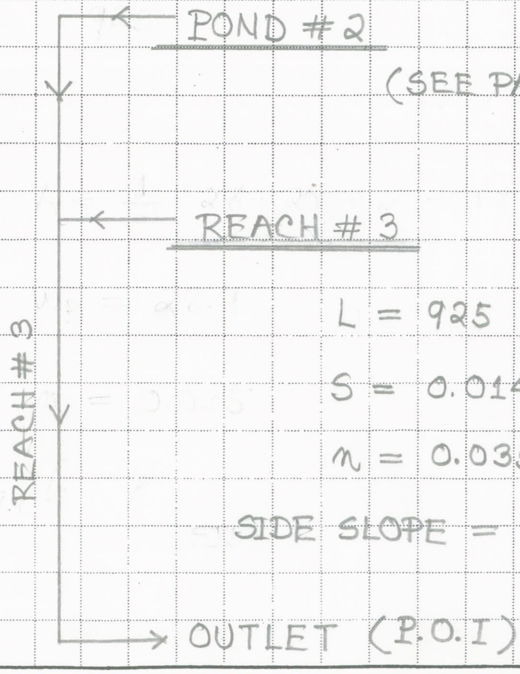
$L_1 = 100$ LF (OVERLAND FLOW)

$$S_1 = \frac{417.5 - 416.5}{100} = 0.01$$

$L_2 = 125$ LF (SHALLOW CONCENTRATED FLOW)

$$S_2 = \frac{416.5 - 408}{125} = 0.068$$

THE FLOW IS RECEIVED BY POND #2 AND ROUTED THROUGH REACH # 3. FINALLY, IT GOES TO THE OUTLEL (P.O.I).



(SEE PAGE 11 FOR POND #2 DATA)

$L = 925$ LF

$S = 0.0145$

$n = 0.035$

SIDE SLOPE = 10:1 ; BOTTOM WIDTH = 30 LF

JOB MINISCEONGO PARK (1560)
SHEET NO. 11 OF
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WS#3

$$A = 8.05 \text{ ACS} \begin{cases} A_{IMP} = 3.72 \text{ ACS "C"} \\ A_{NATURAL} = 0.69 \text{ ACS "C" FAIR} \\ A_{LAWN} = 3.64 \text{ ACS "C" GOOD CONDITION} \end{cases}$$

$L_1 = 100$ LF (OVERLAND FLOW)

$$S_1 = \frac{420.1 - 419.1}{100} = 0.01$$

$L_2 = 80$ LF (SHALLOW CONCENTRATED FLOW)

$$S_2 = \frac{419.1 - 418.5}{80} = 0.0075$$

$L_3 = 480$ LF (PIPE FLOW)

$$S_3 = \frac{415.5 - 408}{480} = 0.0156$$

DIAMETER $D = 18''$ (RCP)

$$A = \frac{\pi}{4} \times \left(\frac{18}{12}\right)^2 = 1.77 \text{ S.F}$$

$$W_p = \pi \times \frac{18}{12} = 4.71 \text{ LF}$$

$$n = 0.015$$

THE ACCUMULATED FLOW IS RECEIVED BY POND #3 AND ROUTED THROUGH REACH #4, REACH #5 RESPECTIVELY. THEN IT FLOWS

JOB MINISCEONGO PARK (1560)
SHEET NO. 12 OF
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

TO THE OUTLET (POINT OF INTEREST)

POND # 3 (SEE PAGE 12 FOR POND # 3 DATA)

REACH # 4

L = 1180 LF
S = 0.0131
n = 0.025
SIDE SLOPE = 2:1
BOTTOM WIDTH = 30 LF

REACH # 4

REACH # 5

L = 1400 LF
S = 0.001
n = 0.035
SIDE SLOPE = 2:1
BOTTOM WIDTH = 30 LF

REACH # 5

OUTLET (P.O.I)

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINISCEONGO PARK (1560)
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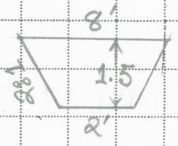
WS#4

A = 0.95 ACS "C"

(SHURBS, FAIR CONDITION)

$L_1 = 85$ LF (OVERLAND FLOW)

$$S_1 = \frac{440 - 408}{85} = 0.3765$$



(N.T.S)

$L_2 = 740$ LF (CHANNEL FLOW)

$$S_2 = \frac{408 - 402}{740} = 0.0081$$

A = 7.50 S.F
Wp = 8.7 LF
n = 0.035

THE FLOW FROM WS #4 GOES TO OUTLET THROUGH REACH # 6.

REACH #6

(SAME AS REACH #3)

L = 925 LF

S = 0.0145

n = 0.035

SIDE SLOPE = 10:1, BOTTOM WIDTH = 30 LF

OUTLET (P.O.I)

JOB MINISCEONGO PARK (1560)
SHEET NO. 14 OF
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

WS#5

$A = 9.98$ ACS
$A_{IMP} = 0.35$ ACS "C"
$A_{LAWN} = 0.36$ ACS "C" GOOD
$A_{NATURAL} = 9.27$ ACS "C" FAIR

$L_1 = 100$ LF (OVERLAND FLOW)

$$S_1 = \frac{402.5 - 402}{100} = 0.005$$

$L_2 = 650$ LF (SHALLOW CONCENTRATED FLOW)

$$S_2 = \frac{402 - 400}{650} = 0.003$$

$L_3 = 75$ LF (SHALLOW CONCENTRATED FLOW)

$$S_3 = \frac{400 - 392}{75} = 0.106$$

$L_4 = 75$ LF (CHANNEL FLOW)

$S_4 = 0.001$

$A = 200$ S.F

$W_p = 52.4$ L.F

$n = 0.035$

THE ACCUMULATED FLOW GOES TO THE OUTLET (P.O.I)

(N.T.S)

JOB MINISCEONGO PARK (1560)
SHEET NO. 15 OF
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

WS # 6

$A = 6.14$ ACS $\left\{ \begin{array}{l} A_{IMP} = 0.26 \text{ ACS "C".} \\ A_{LAWN} = 0.68 \text{ ACS "C" (GOOD)} \\ A_{NATURAL} = 5.2 \text{ ACS "C" (FAIR)} \end{array} \right.$

$L_1 = 100$ LF (OVERLAND FLOW)

$$S_1 = \frac{409-406}{100} = 0.03$$

$L_2 = 85$ LF (SHALLOW CONCENTRATED FLOW)

$$S_2 = \frac{406-398}{85} = 0.0941 \quad \text{(TOP C.B)}$$

$L_3 = 925$ LF (CHANNEL + PIPE FLOW)

$$S_3 = \frac{395-391}{925} = 0.0043$$

$$A = \frac{1}{2}(7+1) \times 1.5$$

$$\Rightarrow A = 6 \text{ S.F}$$

$$W_p = 7.71 \text{ LF}$$

$$n = 0.025$$

(N.T.S)

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINISCEONGO PARK (1560)
SHEET NO. 16 OF
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

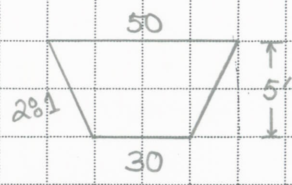
$L_4 = 775$ LF (CHANNEL FLOW)

$S_4 = 0.001$

A = 200 S.F

$W_p = 52.4$ LF

$n = 0.035$



THE ACCUMULATED FLOW FROM WS # 6 IS RECEIVED BY REACH # 7 AND GOES TO THE POINT OF INTEREST (OUTLET)

REACH # 7 (SAME AS REACH # 2)

L = 600

S = 0.001

$n = 0.035$

SIDE SLOPE = 2:1

BOTTOM WIDTH = 30 LF

REACH # 7

OUTLET (P.O.I)

JOB MINISCEONGO PARK (1560)
SHEET NO. 17 OF
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

STORAGE CALCULATION

IN ORDER TO PROVIDE ZERO NET INCREASE OF PEAK RUNOFF, THREE DETENTION PONDS ARE PROPOSED AT WS#1, WS#2 & WS#3 RESPECTIVELY. THOSE PONDS ARE DESIGNED TO FUNCTION AS WATER QUALITY PONDS AS WELL AS DETENTION BASINS.

POND #1

THE BOTTOM AREA @ 396 FT. EL. = 19166 S.F

THE TOP AREA @ 402 FT. EL. = 32670 S.F

THE STORAGE VOLUME,

$$V = \left(\frac{19166 + 32670}{2}\right) \times 6$$

$$\Rightarrow \boxed{V = 3.57 \text{ ACS FT}}$$

THE POND #1 IS CONNECTED REACH #1.

(SEE PAGE 2 FOR REACH #1 DATA)

JOB MINISCEONGO PARK (1560)
SHEET NO. 18 OF
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

POND #2

THE BOTTOM AREA @ 402 FT. EL. = 4185 S.F

THE TOP AREA @ 406 FT. EL = 20653 S.F

THE STORAGE

$$V = \left(\frac{4185 + 20653}{2}\right) \times 4$$

$$\Rightarrow \boxed{V = 1.14 \text{ AC.FT}}$$

THE ACCUMULATED FLOW FROM WS #2 IS RECEIVED BY POND #2. THE REACH #3 IS CONNECTED TO THE POND #2. THIS IS THE WAY THE FLOW GOES TO THE P.O.I.

(SEE PAGE 3 FOR REACH #3 DATA)

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINISCEONGO PARK (1560)
SHEET NO. 19 OF
CALCULATED BY RN DATE 10/12/05
CHECKED BY DATE
SCALE

POND #3

THE BOTTOM AREA @ 406 FT. EL. = 8254 S.F

THE TOP AREA @ 410 FT. EL. = 34022 S.F.

THE STORAGE VOLUME,

$$V = \left(\frac{8254 + 34022}{2}\right) \times 4$$

$$\Rightarrow \boxed{V = 1.94 \text{ AC.FT}}$$

THE FLOW FROM WS #3 GOES TO POND #3. THE REACH #4 IS CONNECTED TO THE POND #3. THE FLOW GOES THROUGH REACH #4, REACH #5 AND OUTLET RESPECTIVELY.

(SEE PAGE 5 FOR REACH #4 DATA)

MINISCEONGO PARK

N.Y.S. ROUTE 202
TOWN OF HAVERSTRAW
ROCKLAND COUNTY
NEW YORK

TR-55 OUTPUT DATA
AND
HYDROGRAPHS
FOR
EXISTING CONDITION
(1, 2, 5, 10, 25, 50 & 100-YEAR STORMS)

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
JULY 05, 2005

REVISED
JULY 07, 2005

```
                        WinTR-55 Current Data Description

                         --- Identification Data ---

User:     RA Assoc.                              Date:        7/8/2005
Project:  Miniceongo Park (1560)                 Units:       English
SubTitle: Existing Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                                                 Areal Units: Acres
State:    New York
County:   Rockland
Filename: \\Server\primary share\hydrology TR-55\1560\Existing Condition.w55


                             --- Sub-Area Data ---

Name           Description              Reach        Area(ac)     RCN     Tc
------------------------------------------------------------------------------
WS#1          Watershed #1             Outlet          34.85       70    .533
Ws#2          Watershed #2             Outlet          16.02       70    .506

Total area: 50.87 (ac)


                             --- Storm Data  --

                   Rainfall Depth by Rainfall Return Period

   2-Yr        5-Yr        10-Yr       25-Yr       50-Yr       100-Yr      1-Yr
   (in)        (in)        (in)        (in)        (in)        (in)        (in)
--------------------------------------------------------------------------------
    3.5         4.5         5.0         6.0         7.0         7.5         2.7


Storm Data Source:              Rockland County, NY  (NRCS)
Rainfall Distribution Type:     Type III
Dimensionless Unit Hydrograph:  <standard>
```

```
RA Assoc.                    Miniceongo Park (1560)
           Existing Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                          Rockland County, New York

                                 Storm Data

                   Rainfall Depth by Rainfall Return Period

    2-Yr        5-Yr        10-Yr       25-Yr       50-Yr       100-Yr      1-Yr
    (in)        (in)        (in)        (in)        (in)        (in)        (in)
--------------------------------------------------------------------------------
     3.5         4.5         5.0         6.0         7.0         7.5         2.7


Storm Data Source:              Rockland County, NY  (NRCS)
Rainfall Distribution Type:     Type III
Dimensionless Unit Hydrograph:  <standard>
```

```
RA Assoc.                    Miniceongo Park (1560)
           Existing Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                        Rockland County, New York

                           Watershed Peak Table

 Sub-Area            Peak Flow by Rainfall Return Period
 or Reach       2-Yr      5-Yr     10-Yr     25-Yr     50-Yr    100-Yr      1-Yr
Identifier     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)
----------------------------------------------------------------------------------
SUBAREAS
WS#1           21.24     36.95     45.53     63.57     82.49     92.06     10.51

Ws#2            9.99     17.39     21.43     29.90     38.79     43.35      4.94


REACHES

OUTLET         31.14     54.34     66.76     93.28    120.97    135.14     15.42
```

```
RA Assoc.                   Miniceongo Park (1560)
           Existing Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                       Hydrograph Peak/Peak Time Table

 Sub-Area       Peak Flow and Peak Time (hr) by Rainfall Return Period
 or Reach       2-Yr      5-Yr     10-Yr     25-Yr     50-Yr    100-Yr      1-Yr
Identifier     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)
            (hr)      (hr)      (hr)      (hr)      (hr)      (hr)      (hr)
----------------------------------------------------------------------------------

SUBAREAS
WS#1           21.24     36.95     45.53     63.57     82.49     92.06     10.51
           12.41     12.39     12.39     12.39     12.38     12.39     12.45

Ws#2            9.99     17.39     21.43     29.90     38.79     43.35      4.94
           12.40     12.39     12.37     12.37     12.36     12.36     12.44


REACHES

OUTLET         31.14     54.34     66.76     93.28    120.97    135.14     15.42
```

```
RA Assoc.                    Miniceongo Park (1560)
           Existing Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                         Rockland County, New York

                          Sub-Area Summary Table

 Sub-Area   Drainage      Time of      Curve   Receiving      Sub-Area
Identifier    Area    Concentration  Number    Reach       Description
              (ac)         (hr)
--------------------------------------------------------------------------------

WS#1           34.85     0.533         70     Outlet    Watershed #1
Ws#2           16.02     0.506         70     Outlet    Watershed #2

Total Area:   50.87 (ac)
```

```
RA Assoc.                   Miniceongo Park (1560)
           Existing Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                    Sub-Area Time of Concentration Details

 Sub-Area      Flow            Mannings's    End     Wetted               Travel
Identifier/   Length    Slope      n        Area    Perimeter   Velocity   Time
               (ft)    (ft/ft)             (sq ft)    (ft)      (ft/sec)   (hr)
--------------------------------------------------------------------------------
WS#1
  SHEET          100   0.3720     0.150                                    0.048
  SHALLOW        350   0.0166     0.050                                    0.047
  SHALLOW       1525   0.0065     0.050                                    0.326
  CHANNEL        120   0.0330     0.035      4.00      6.50     5.556      0.006
  CHANNEL       1250   0.0010     0.035    200.00     52.40     3.276      0.106

                                                 Time of Concentration      .533
                                                                        ========

Ws#2
  SHEET          100   0.3300     0.150                                    0.051
  SHALLOW        530   0.0094     0.050                                    0.094
  SHALLOW        925   0.0021     0.050                                    0.348
  CHANNEL        140   0.0579     0.035      4.00      6.50     7.778      0.005
  CHANNEL        100   0.0010     0.035    200.00     52.40     3.472      0.008

                                                 Time of Concentration      .506
                                                                        ========
```

```
RA Assoc.                   Miniceongo Park (1560)
           Existing Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                  Sub-Area Land Use and Curve Number Details

 Sub-Area                                               Hydrologic  Sub-Area   Curve
Identifier           Land Use                              Soil      Area     Number
                                                          Group      (ac)
--------------------------------------------------------------------------------
WS#1      Gravel (w/ right-of-way)                         C          .24       89
          Brush - brush, weed, grass mix      (fair)       C        34.61       70

          Total Area / Weighted Curve Number                        34.85       70
                                                                    =====       ==

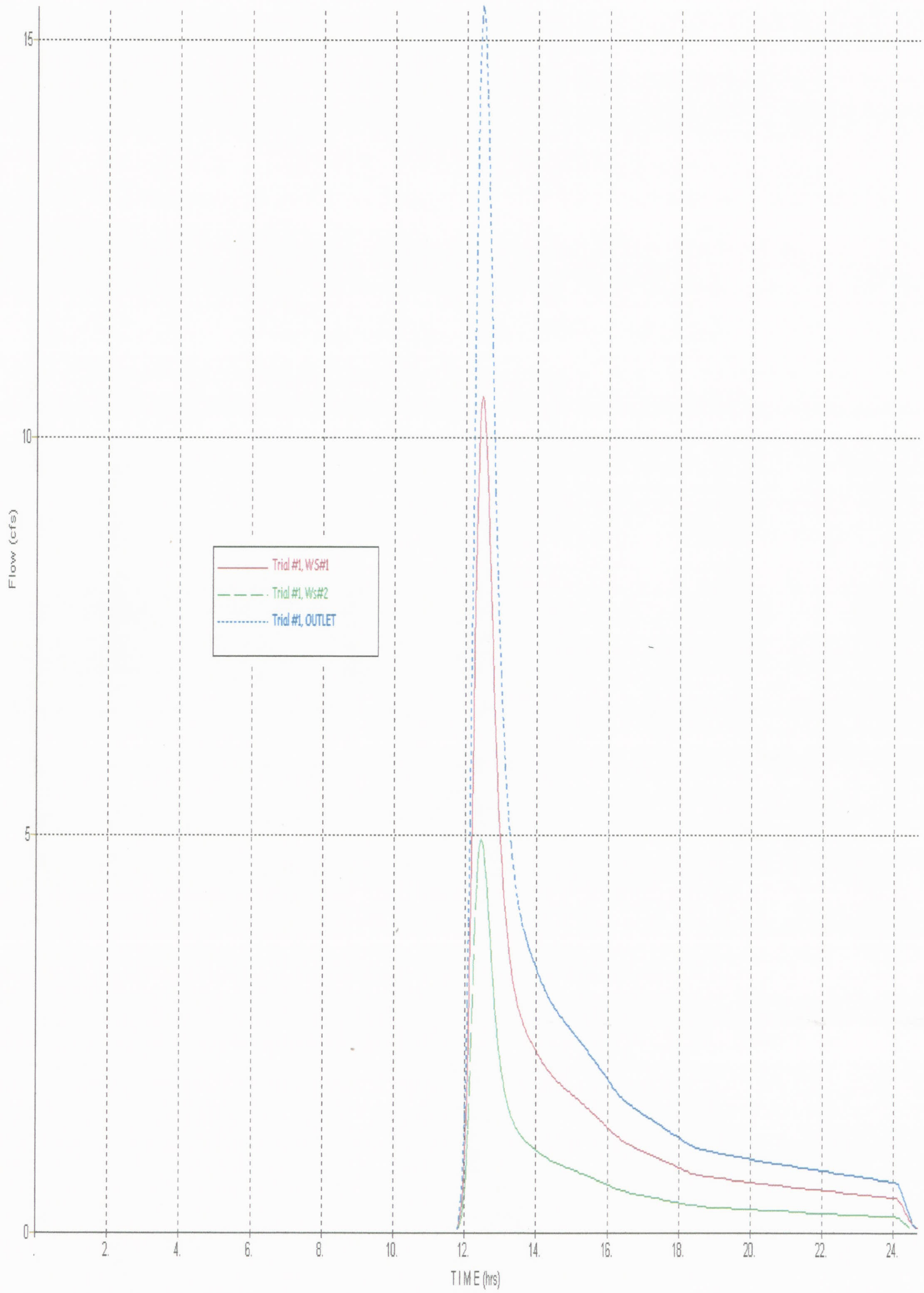
Ws#2      Brush - brush, weed, grass mix      (fair)       C        16.02       70

          Total Area / Weighted Curve Number                        16.02       70
                                                                    =====       ==
```

Project: Miniceongo Park (1560)

Subareas: (WS#1, Ws#2, Outlet) Storm: 1-Yr

\\Server\primary share\hydrology TR-55\1560\Existing Condition.w55



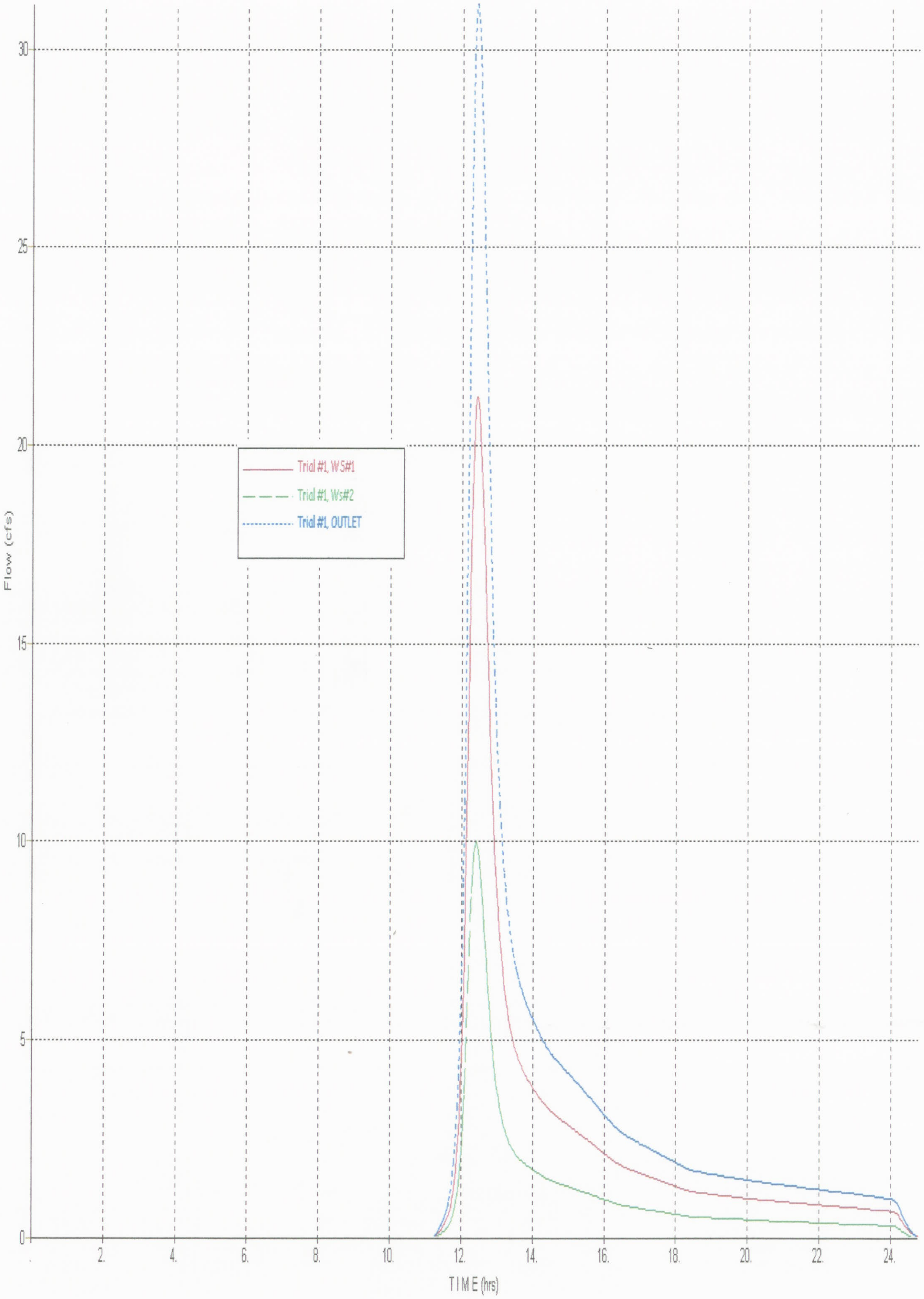
WinTR-55 Output Hydrograph

7/8/2005

Project: Miniceongo Park (1560)

Subareas: (WS#1, Ws#2, Outlet) Storm: 2-Yr

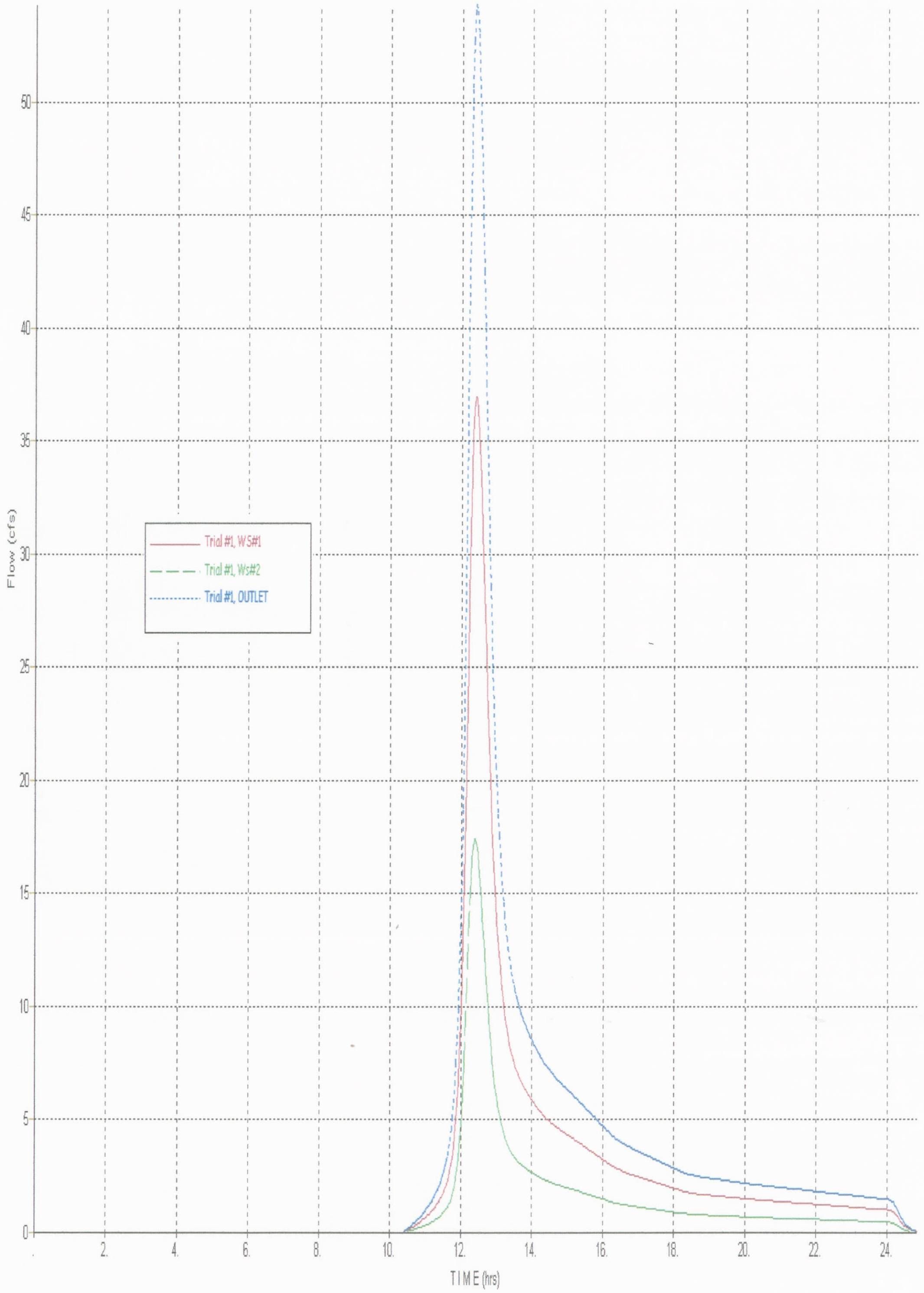
\\Server\primary share\hydrology TR-55\1560\Existing Condition.w55



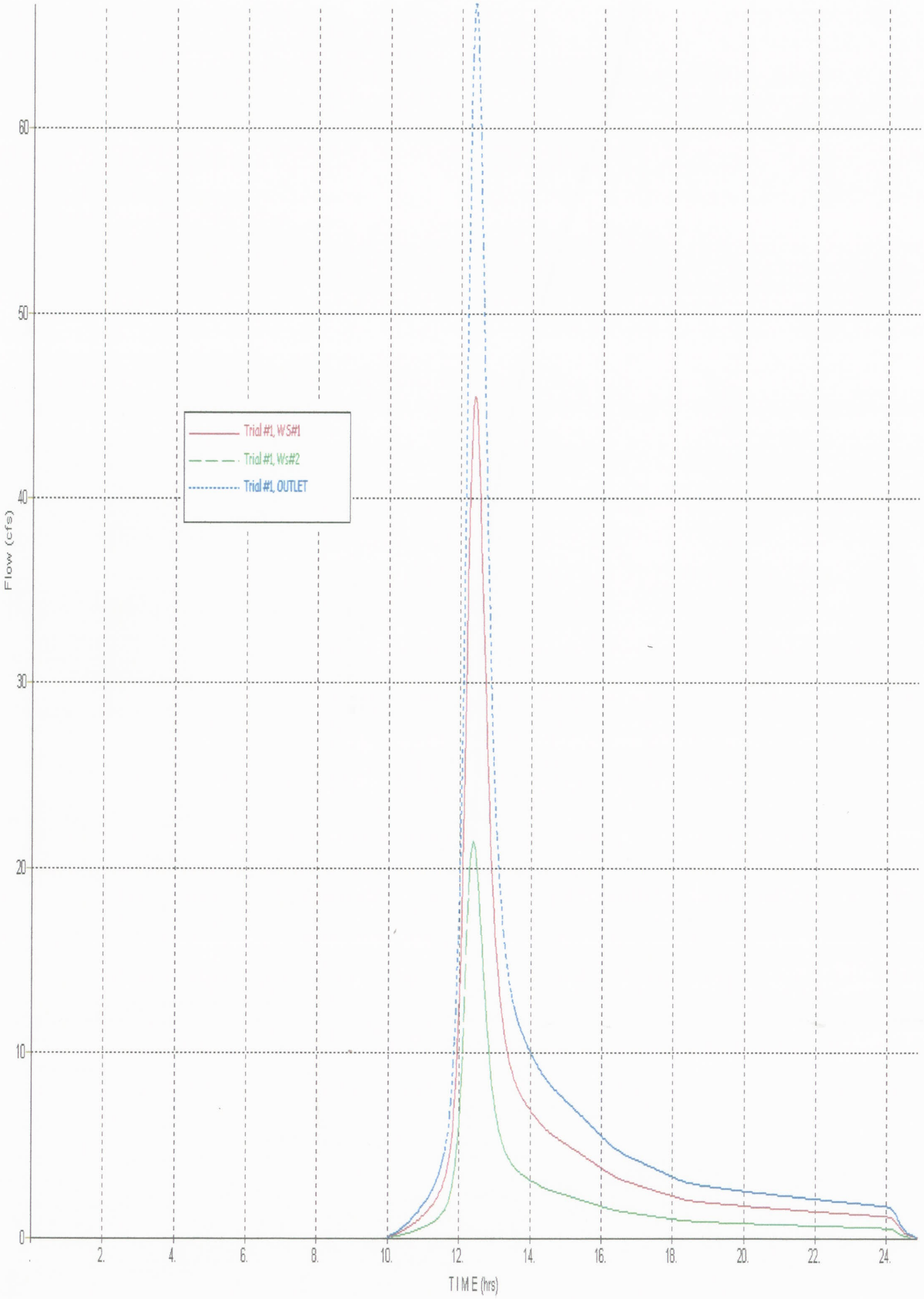
WinTR-55 Output Hydrograph

7/8/2005

Project: Miniceongo Park (1560)
Subareas: (WS#1, Ws#2, Outlet) Storm: 5-Yr
\\Server\primary share\hydrology TR-55\1560\Existing Condition.w55



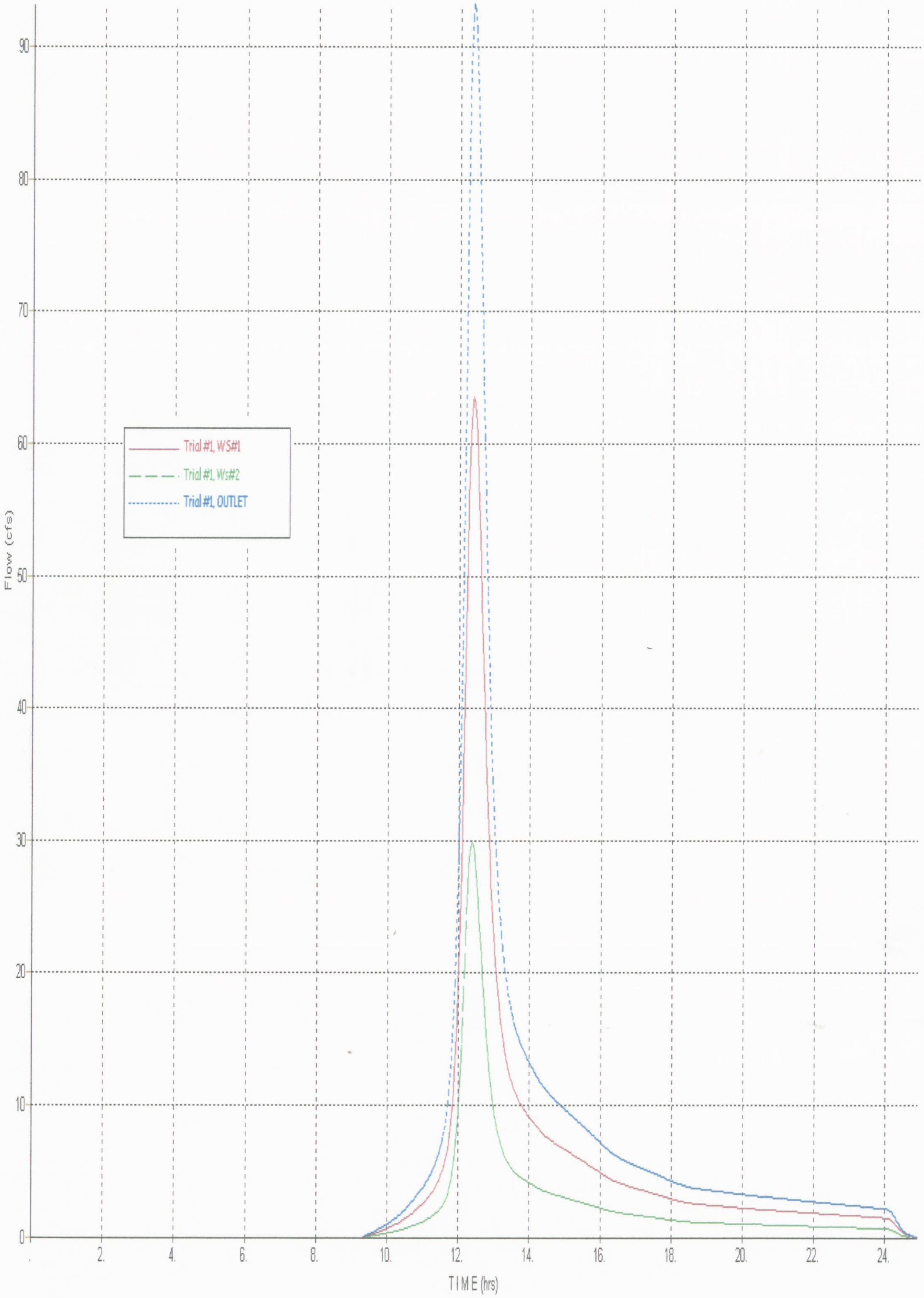
Project: Miniceongo Park (1560)
Subareas: (WS#1, Ws#2, Outlet) Storm: 10-Yr
\\Server\primary share\hydrology TR-55\1560\Existing Condition.w55



WinTR-55 Output Hydrograph

Project: Miniceongo Park (1560)
Subareas: (WS#1, Ws#2, Outlet) Storm: 25-Yr
\\Server\primary share\hydrology TR-55\1560\Existing Condition.w55

7/8/2005



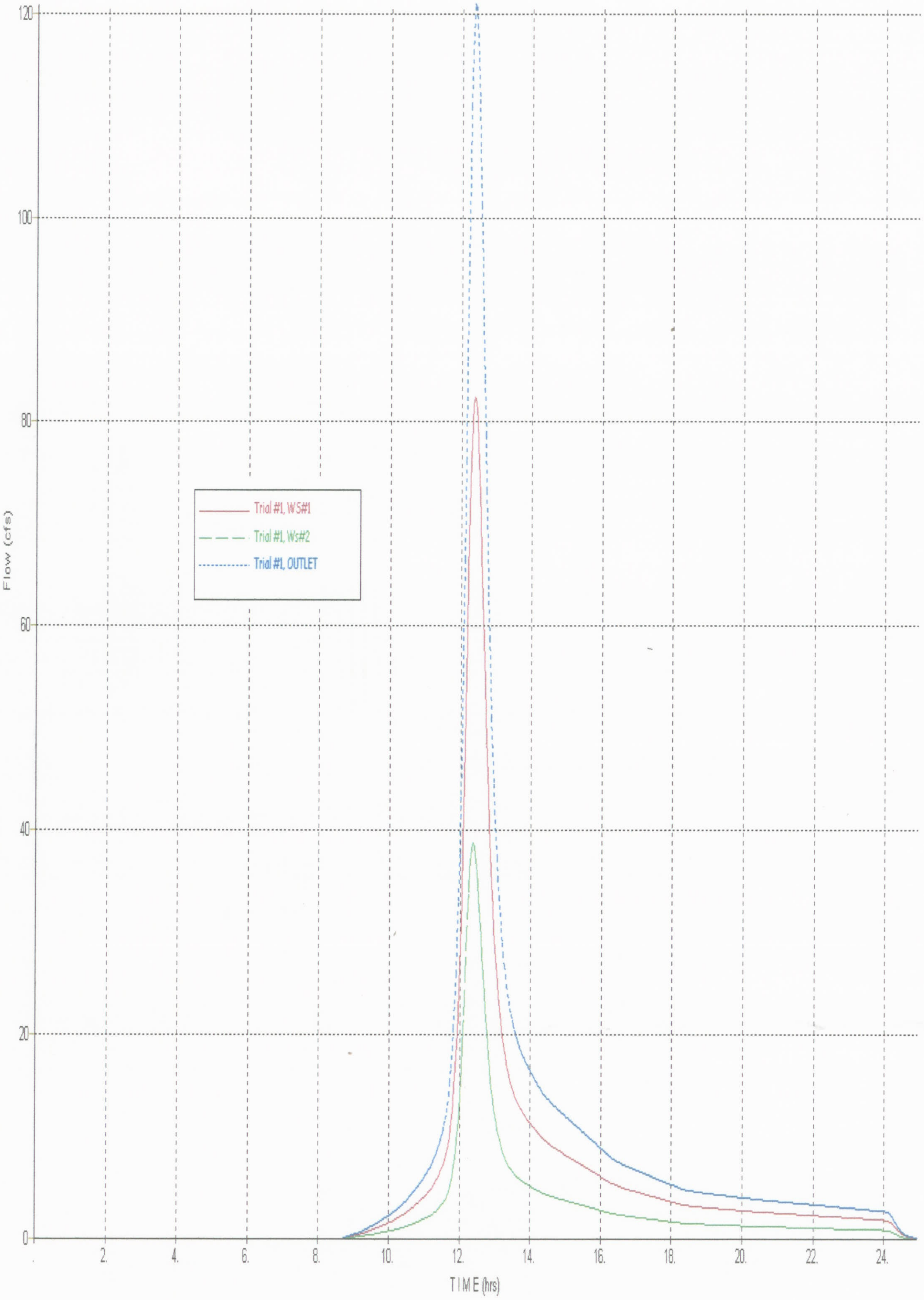
WinTR-55 Output Hydrograph

7/8/2005

Project: Miniceongo Park (1560)

Subareas: (WS#1, Ws#2, Outlet) Storm: 50-Yr

\\Server\primary share\hydrology TR-55\1560\Existing Condition.w55



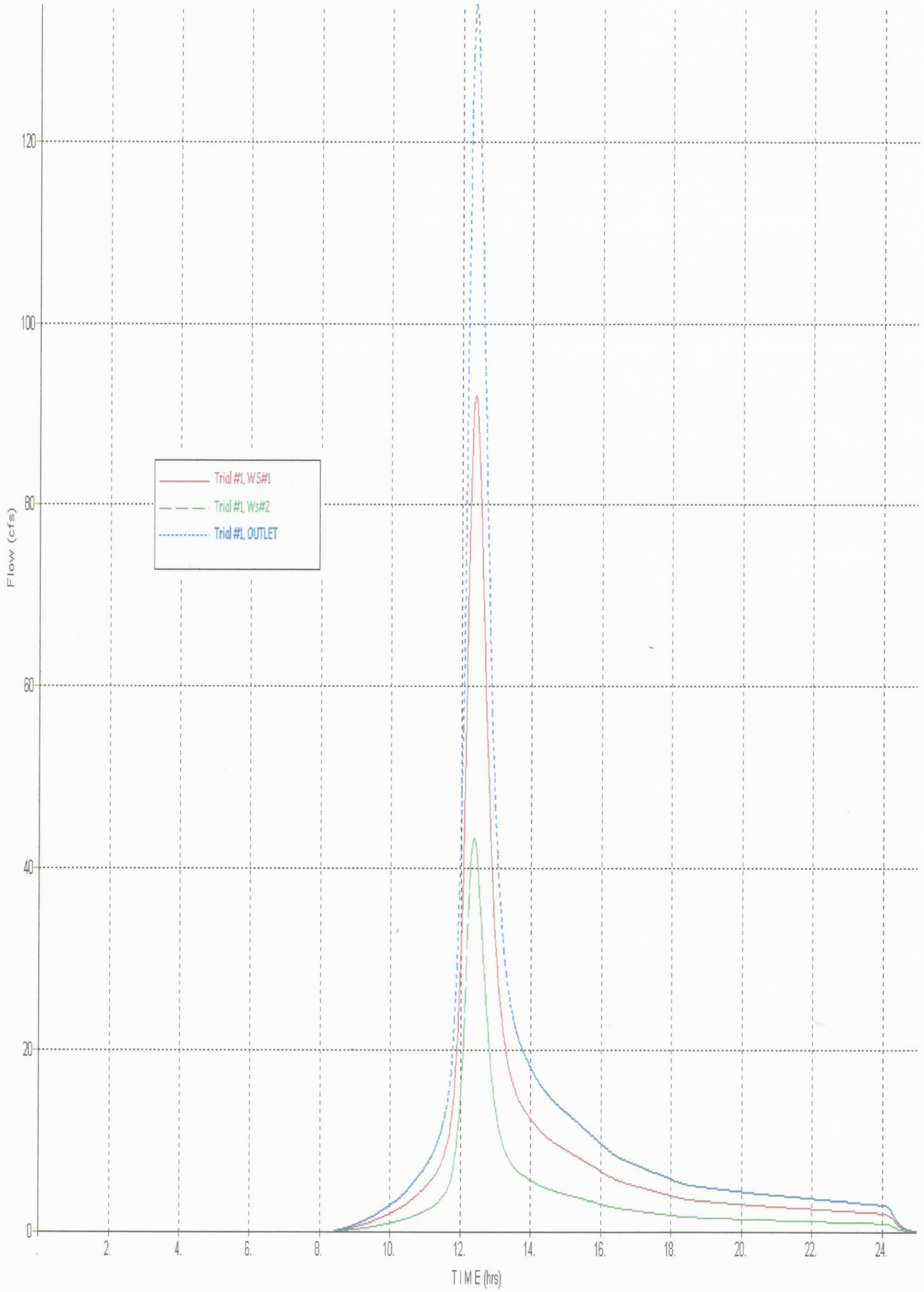
WinTR-55 Output Hydrograph

Project: Miniceongo Park (1560)

Subareas: (WS#1, Ws#2, Outlet) Storm: 100-Yr

\\Server\primary share\hydrology TR-55\1560\Existing Condition.w55

7/8/2005



MINISCEONGO PARK

N.Y.S. ROUTE 202
TOWN OF HAVERSTRAW
ROCKLAND COUNTY
NEW YORK

TR-55 OUTPUT DATA AND HYDROGRAPHS FOR SITE DEVELOPED WITH STORAGE (1, 2, 5, 10, 25, 50 & 100-YEAR STORMS)

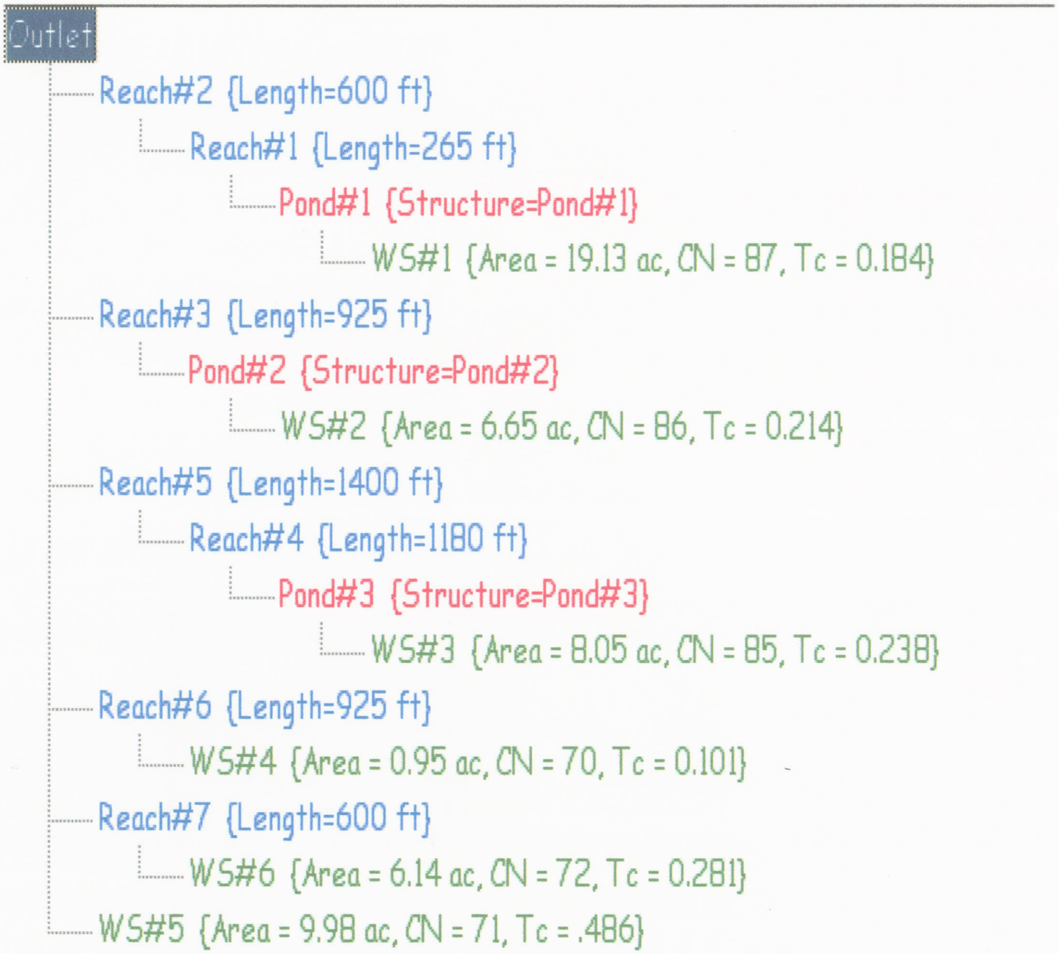
BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
JULY 05, 2005

REVISED
JULY 07, 2005

REACH FLOW PATH



- Outlet
  - Reach#2 {Length=600 ft}
    - Reach#1 {Length=265 ft}
      - Pond#1 {Structure=Pond#1}
        - WS#1 {Area = 19.13 ac, CN = 87, Tc = 0.184}
  - Reach#3 {Length=925 ft}
    - Pond#2 {Structure=Pond#2}
      - WS#2 {Area = 6.65 ac, CN = 86, Tc = 0.214}
  - Reach#5 {Length=1400 ft}
    - Reach#4 {Length=1180 ft}
      - Pond#3 {Structure=Pond#3}
        - WS#3 {Area = 8.05 ac, CN = 85, Tc = 0.238}
  - Reach#6 {Length=925 ft}
    - WS#4 {Area = 0.95 ac, CN = 70, Tc = 0.101}
  - Reach#7 {Length=600 ft}
    - WS#6 {Area = 6.14 ac, CN = 72, Tc = 0.281}
  - WS#5 {Area = 9.98 ac, CN = 71, Tc = .486}

```
RA Assoc.                   Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                  Sub-Area Land Use and Curve Number Details


 Sub-Area                                           Hydrologic   Sub-Area   Curve
Identifier           Land Use                          Soil        Area     Number
                                                      Group        (ac)
--------------------------------------------------------------------------------
WS#1      Open space; grass cover > 75%       (good)    C             9       74
          Paved parking lots, roofs, driveways          C         10.13       98

          Total Area / Weighted Curve Number                      19.13       87
                                                                  =====       ==

Ws#2      Open space; grass cover > 75%       (good)    C          3.23       74
          Paved parking lots, roofs, driveways          C          3.42       98

          Total Area / Weighted Curve Number                       6.65       86
                                                                   ====       ==

WS#3      Open space; grass cover > 75%       (good)    C          3.64       74
          Paved parking lots, roofs, driveways          C          3.72       98
          Brush - brush, weed, grass mix      (fair)    C           .69       70

          Total Area / Weighted Curve Number                       8.05       85
                                                                   ====       ==

WS#4      Brush - brush, weed, grass mix      (fair)    C           .95       70

          Total Area / Weighted Curve Number                        .95       70
                                                                    ===       ==

WS#5      Open space; grass cover > 75%       (good)    C           .36       74
          Paved parking lots, roofs, driveways          C           .35       98
          Brush - brush, weed, grass mix      (fair)    C          9.27       70

          Total Area / Weighted Curve Number                       9.98       71
                                                                   ====       ==

WS#6      Open space; grass cover > 75%       (good)    C           .68       74
          Paved parking lots, roofs, driveways          C           .26       98
          Brush - brush, weed, grass mix      (fair)    C           5.2       70

          Total Area / Weighted Curve Number                       6.14       72
                                                                   ====       ==
```

```
RA Assoc.                    Miniceongo Park (1560)
          Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                          Rockland County, New York

                    Sub-Area Time of Concentration Details


 Sub-Area       Flow             Mannings's    End      Wetted                Travel
Identifier/    Length    Slope       n         Area    Perimeter   Velocity    Time
                (ft)    (ft/ft)              (sq ft)     (ft)      (ft/sec)    (hr)
--------------------------------------------------------------------------------------
WS#1
  SHEET          100    0.0270     0.150                                      0.138
  SHALLOW         75    0.0186     0.050                                      0.009
  CHANNEL       1025    0.0155     0.015       3.14       6.28      7.695     0.037

                                             Time of Concentration           0.184
                                                                           ========


Ws#2
  SHEET          100    0.0100     0.150                                      0.206
  SHALLOW        125    0.0680     0.050                                      0.008

                                             Time of Concentration           0.214
                                                                           ========


WS#3
  SHEET          100    0.0100     0.150                                      0.206
  SHALLOW         80    0.0150     0.050                                      0.011
  CHANNEL        480    0.0156     0.015       1.77       4.71      6.349     0.021

                                             Time of Concentration           0.238
                                                                           ========


WS#4
  SHEET           85    0.3765     0.150                                      0.042
  CHANNEL        740    0.0081     0.035       7.50       8.70      3.484     0.059

                                             Time of Concentration           0.101
                                                                           ========


WS#5
  SHEET          100    0.0050     0.150                                      0.272
  SHALLOW        650    0.0030     0.050                                      0.204
  SHALLOW         75    0.1060     0.050                                      0.004
  CHANNEL         75    0.0010     0.035     200.00      52.40      3.472     0.006

                                             Time of Concentration            .486
                                                                           ========


WS#6
  SHEET          100    0.0300     0.150                                      0.133
  SHALLOW         85    0.0941     0.050                                      0.005
  CHANNEL        925    0.0043     0.025       6.00       7.71      3.294     0.078
  CHANNEL        775    0.0010     0.035     200.00      52.40      3.312     0.065

                                             Time of Concentration           0.281
                                                                           ========
```

```
                    WinTR-55 Current Data Description

                        --- Identification Data ---

User:     RA Assoc.                                Date:        10/13/2005
Project:  Miniceongo Park (1560)                   Units:       English
SubTitle: Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                                                   Areal Units: Acres
State:    New York
County:   Rockland
Filename: P:\hydrology TR-55\1560\Sto-10-10-05 (Check_ss).w55


                           --- Sub-Area Data ---

Name           Description              Reach        Area(ac)     RCN     Tc
------------------------------------------------------------------------------
WS#1          Fully Developed TownhousePond#1          19.13        87    0.184
Ws#2          North Section of TownhousPond#2          6.65         86    0.214
WS#3          South sec. of Townhouses Pond#3          8.05         85    0.238
WS#4          Barr Lab embankment     Reach#6          0.95         70    0.101
WS#5          North Wetland Area      Outlet           9.98         71    .486
WS#6          South-West Wetland      Reach#7          6.14         72    0.281

Total area: 50.90 (ac)


                           --- Storm Data  --

                   Rainfall Depth by Rainfall Return Period

   2-Yr         5-Yr        10-Yr        25-Yr        50-Yr       100-Yr       1-Yr
   (in)         (in)        (in)         (in)         (in)         (in)        (in)
--------------------------------------------------------------------------------
    3.5          4.5         5.0          6.0          7.0          7.5         2.7


Storm Data Source:              Rockland County, NY  (NRCS)
Rainfall Distribution Type:     Type III
Dimensionless Unit Hydrograph:  <standard>
```

```
RA Assoc.                    Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                            Rockland County, New York

                             Sub-Area Summary Table

 Sub-Area   Drainage      Time of      Curve   Receiving     Sub-Area
Identifier    Area     Concentration  Number     Reach      Description
              (ac)          (hr)
--------------------------------------------------------------------------------
WS#1          19.13       0.184         87      Pond#1    Fully Developed Townhouse
Ws#2           6.65       0.214         86      Pond#2    North Section of Townhous
WS#3           8.05       0.238         85      Pond#3    South sec. of Townhouses
WS#4            .95       0.101         70      Reach#6   Barr Lab embankment
WS#5           9.98       0.486         71      Outlet    North Wetland Area
WS#6           6.14       0.281         72      Reach#7   South-West Wetland

Total Area:   50.90 (ac)
```

```
RA Assoc.                    Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                         Rockland County, New York

                                 Storm Data

                   Rainfall Depth by Rainfall Return Period

    2-Yr        5-Yr        10-Yr       25-Yr       50-Yr       100-Yr      1-Yr
    (in)        (in)        (in)        (in)        (in)        (in)        (in)
--------------------------------------------------------------------------------
     3.5         4.5         5.0         6.0         7.0         7.5         2.7


Storm Data Source:              Rockland County, NY  (NRCS)
Rainfall Distribution Type:     Type III
Dimensionless Unit Hydrograph:  <standard>
```

```
RA Assoc.                     Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                          Rockland County, New York

                            Watershed Peak Table

 Sub-Area            Peak Flow by Rainfall Return Period
 or Reach       2-Yr      5-Yr      10-Yr     25-Yr     50-Yr    100-Yr      1-Yr
Identifier     (cfs)     (cfs)      (cfs)     (cfs)     (cfs)     (cfs)     (cfs)
----------------------------------------------------------------------------------
SUBAREAS
WS#1           39.06     54.88      62.85     78.70     94.47    102.35     26.68

Ws#2           12.64     17.95      20.62     25.95     31.28     33.97      8.50

WS#3           14.31     20.51      23.64     29.97     36.28     39.42      9.50

WS#4            0.95      1.63       1.99      2.75      3.54      3.94      0.48

WS#5            6.76     11.58      14.18     19.63     25.30     28.23      3.44

WS#6            5.45      9.19      11.18     15.36     19.71     21.93      2.84


REACHES
Pond#1         39.06     54.88      62.85     78.70     94.47    102.35     26.68
    Down       10.79     16.33      19.10     24.58     30.45     33.38      6.36

Reach#1        10.79     16.33      19.10     24.58     30.45     33.38      6.36
    Down       10.79     16.33      19.10     24.58     30.45     33.37      6.36

Reach#2        10.79     16.33      19.10     24.58     30.45     33.37      6.36
    Down       10.67     16.14      18.88     24.32     30.10     32.99      6.33

Pond#2         12.64     17.95      20.62     25.95     31.28     33.97      8.50
    Down        4.19      5.83       6.66      8.34     10.03     10.88      2.78

Reach#3         4.19      5.83       6.66      8.34     10.03     10.88      2.78
    Down        4.19      5.83       6.66      8.34     10.03     10.87      2.78

Pond#3         14.31     20.51      23.64     29.97     36.28     39.42      9.50
    Down        3.32      4.82       5.55      7.03      8.52      9.27      2.09

Reach#4         3.32      4.82       5.55      7.03      8.52      9.27      2.09
    Down        3.32      4.82       5.55      7.03      8.52      9.27      2.09

Reach#5         3.32      4.82       5.55      7.03      8.52      9.27      2.09
    Down        3.30      4.79       5.52      6.98      8.44      9.17      2.09

Reach#6         0.95      1.63       1.99      2.75      3.54      3.94      0.48
    Down        0.95      1.62       1.99      2.74      3.54      3.94      0.48

Reach#7         5.45      9.19      11.18     15.36     19.71     21.93      2.84
    Down        5.16      8.44      10.15     13.86     17.92     19.97      2.77


OUTLET         26.56     42.07      50.19     66.76     83.90     92.60     15.32
```

```
RA Assoc.                    Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                       Hydrograph Peak/Peak Time Table

 Sub-Area       Peak Flow and Peak Time (hr) by Rainfall Return Period
 or Reach        2-Yr      5-Yr     10-Yr     25-Yr     50-Yr    100-Yr      1-Yr
Identifier      (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)
            (hr)      (hr)      (hr)      (hr)      (hr)      (hr)      (hr)
---------------------------------------------------------------------------------
SUBAREAS
WS#1            39.06     54.88     62.85     78.70     94.47    102.35     26.68
           12.14     12.14     12.14     12.14     12.15     12.14     12.15

Ws#2            12.64     17.95     20.62     25.95     31.28     33.97      8.50
           12.16     12.16     12.16     12.15     12.16     12.15     12.16

WS#3            14.31     20.51     23.64     29.97     36.28     39.42      9.50
           12.17     12.17     12.18     12.18     12.17     12.17     12.18

WS#4             0.95      1.63      1.99      2.75      3.54      3.94      0.48
           12.12     12.12     12.12     12.12     12.11     12.11     12.13

WS#5             6.76     11.58     14.18     19.63     25.30     28.23      3.44
           12.39     12.36     12.36     12.35     12.34     12.34     12.42

WS#6             5.45      9.19     11.18     15.36     19.71     21.93      2.84
           12.22     12.21     12.22     12.21     12.20     12.20     12.23


REACHES
Pond#1          39.06     54.88     62.85     78.70     94.47    102.35     26.68
           12.14     12.14     12.14     12.14     12.15     12.14     12.15
    Down        10.79     16.33     19.10     24.58     30.45     33.38      6.36
           12.57     12.54     12.53     12.52     12.51     12.50     12.61

Reach#1         10.79     16.33     19.10     24.58     30.45     33.38      6.36
           12.57     12.54     12.53     12.52     12.51     12.50     12.61
    Down        10.79     16.33     19.10     24.58     30.45     33.37      6.36
           12.57     12.55     12.54     12.53     12.52     12.50     12.62

Reach#2         10.79     16.33     19.10     24.58     30.45     33.37      6.36
           12.57     12.55     12.54     12.53     12.52     12.50     12.62
    Down        10.67     16.14     18.88     24.32     30.10     32.99      6.33
           12.71     12.68     12.66     12.63     12.61     12.61     12.76

Pond#2          12.64     17.95     20.62     25.95     31.28     33.97      8.50
           12.16     12.16     12.16     12.15     12.16     12.15     12.16
    Down         4.19      5.83      6.66      8.34     10.03     10.88      2.78
           12.55     12.55     12.55     12.54     12.55     12.55     12.57

Reach#3          4.19      5.83      6.66      8.34     10.03     10.88      2.78
           12.55     12.55     12.55     12.54     12.55     12.55     12.57
    Down         4.19      5.83      6.66      8.34     10.03     10.87      2.78
           12.62     12.62     12.62     12.61     12.61     12.60     12.63

Pond#3          14.31     20.51     23.64     29.97     36.28     39.42      9.50
           12.17     12.17     12.18     12.18     12.17     12.17     12.18
    Down         3.32      4.82      5.55      7.03      8.52      9.27      2.09
           12.70     12.68     12.68     12.67     12.67     12.66     12.73

Reach#4          3.32      4.82      5.55      7.03      8.52      9.27      2.09



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RA Assoc.                   Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                  Hydrograph Peak/Peak Time Table (continued)

 Sub-Area       Peak Flow and Peak Time (hr) by Rainfall Return Period
 or Reach       2-Yr      5-Yr     10-Yr     25-Yr     50-Yr    100-Yr      1-Yr
Identifier     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)     (cfs)
            (hr)      (hr)      (hr)      (hr)      (hr)      (hr)      (hr)
----------------------------------------------------------------------------------
           12.70     12.68     12.68     12.67     12.67     12.66     12.73
    Down        3.32      4.82      5.55      7.03      8.52      9.27      2.09
           12.74     12.72     12.72     12.72     12.72     12.71     12.78

Reach#5         3.32      4.82      5.55      7.03      8.52      9.27      2.09
           12.74     12.72     12.72     12.72     12.72     12.71     12.78
    Down        3.30      4.79      5.52      6.98      8.44      9.17      2.09
           13.06     13.05     13.05     13.05     13.05     13.05     13.10

Reach#6         0.95      1.63      1.99      2.75      3.54      3.94      0.48
           12.12     12.12     12.12     12.12     12.11     12.11     12.13
    Down        0.95      1.62      1.99      2.74      3.54      3.94      0.48
           12.18     12.18     12.18     12.17     12.18     12.17     12.06

Reach#7         5.45      9.19     11.18     15.36     19.71     21.93      2.84
           12.22     12.21     12.22     12.21     12.20     12.20     12.23
    Down        5.16      8.44     10.15     13.86     17.92     19.97      2.77
           12.35     12.35     12.34     12.32     12.31     12.31     12.37


OUTLET         26.56     42.07     50.19     66.76     83.90     92.60     15.32
```

```
RA Assoc.                    Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                            Structure Output Table

Reach           Peak Flow (PF), Storage Volume (SV), Stage (STG)
 Identifier              by Rainfall Return Period
Structure
 Identifier      2-Yr      5-Yr     10-Yr     25-Yr     50-Yr   100-Yr      1-Yr
-----------------------------------------------------------------------------------
Reach: Pond#1
Weir : Pond#1
 0.8(ft)
  PF   (cfs)     10.79     16.33     19.10     24.58     30.45     33.38      6.36
  SV (ac ft)      1.43      1.98      2.26      2.80      3.34      3.60       .98
  STG   (ft)      2.71      3.60      4.05      4.93      5.59      5.91      2.00

Reach: Pond#2
Weir : Pond#2
 0.5(ft)
  PF   (cfs)      4.19      5.83      6.66      8.34     10.03     10.88      2.78
  SV (ac ft)       .41       .58       .68       .86      1.04      1.14       .27
  STG   (ft)      2.06      2.48      2.69      3.12      3.56      3.78      1.54

Reach: Pond#3
Weir : Pond#3
 0.5(ft)
  PF   (cfs)      3.32      4.82      5.55      7.03      8.52      9.27      2.09
  SV (ac ft)       .57       .83       .96      1.23      1.50      1.64       .37
  STG   (ft)      1.75      2.22      2.41      2.79      3.17      3.36      1.27
```

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RA Assoc.                    Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                              Reach Summary Table


               Receiving     Reach        Routing
  Reach          Reach       Length       Method
Identifier     Identifier     (ft)
-----------------------------------------------------------------------


  Pond#1         Reach#1                  STRUCTURE(Pond#1)
  Reach#1        Reach#2       265        CHANNEL
  Reach#2        Outlet        600        CHANNEL
  Pond#2         Reach#3                  STRUCTURE(Pond#2)
  Reach#3        Outlet        925        CHANNEL
  Pond#3         Reach#4                  STRUCTURE(Pond#3)
  Reach#4        Reach#5       1180       CHANNEL
  Reach#5        Outlet        1400       CHANNEL
  Reach#6        Outlet        925        CHANNEL
  Reach#7        Outlet        600        CHANNEL
```

```
                           Reach Channel Rating Details

   Reach          Reach         Reach          Friction       Bottom       Side
 Identifier       Length      Manning's         Slope          Width       Slope
                   (ft)           n             (ft/ft)         (ft)
--------------------------------------------------------------------------------


  Pond#1        (This reach is a structure: Pond#1)
  Reach#1         265          0.015           0.0226          1.5         2 :1
  Reach#2         600          0.035           0.001          30           2 :1
  Pond#2        (This reach is a structure: Pond#2)
  Reach#3         925          0.035           0.0145         30          10 :1
  Pond#3        (This reach is a structure: Pond#3)
  Reach#4         1180         0.025           0.0131         30           2 :1
  Reach#5         1400         0.035           0.001          30           2 :1
  Reach#6         925          0.035           0.0145         30          10 :1
  Reach#7         600          0.035           0.001          30           2 :1


   Reach                                      End           Top       Friction
 Identifier     Stage          Flow           Area         Width       Slope
                 (ft)          (cfs)         (sq ft)        (ft)       (ft/ft)
--------------------------------------------------------------------------------
  Pond#1        (This reach is a structure: Pond#1)

  Reach#1        0.0          0.000             0           1.5        0.0226
                 0.5          8.972           1.3           3.5
                 1.0         36.504           3.5           5.5
                 2.0        169.584            11           9.5
                 5.0       1539.240          57.5          21.5
                10.0       8922.449           215          41.5
                20.0      53984.196           830          81.5

  Reach#2        0.0          0.000             0            30        0.001
                 0.5         12.772          15.5            32
                 1.0         40.884            32            34
                 2.0        132.384            68            38
                 5.0        656.141           200            50
                10.0       2383.806           500            70
                20.0       9698.942          1400           110

  Pond#2        (This reach is a structure: Pond#2)

  Reach#3        0.0          0.000             0            30        0.0145
                 0.5         51.519          17.5            40
                 1.0        175.999            40            50
                 2.0        647.260           100            70
                 5.0       4315.163           400           130
                10.0      21028.203          1300           230
                20.0     113827.008          4600           430

  Pond#3        (This reach is a structure: Pond#3)

  Reach#4        0.0          0.000             0            30        0.0131
                 0.5         64.720          15.5            32
                 1.0        207.166            32            34
                 2.0        670.811            68            38
                 5.0       3324.765           200            50
                10.0      12079.101           500            70
                20.0      49145.986          1400           110

  Reach#5        0.0          0.000             0            30        0.001
                 0.5         12.772          15.5            32
```

```
RA Assoc.                    Miniceongo Park (1560)
          Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                            Rockland County, New York

                       Reach Channel Rating Details (continued)

   Reach       Reach       Reach        Friction      Bottom      Side
 Identifier    Length     Manning's       Slope        Width      Slope
                (ft)         n           (ft/ft)        (ft)
--------------------------------------------------------------------------------

               1.0       40.884          32           34
               2.0      132.384          68           38
               5.0      656.141         200           50
              10.0     2383.806         500           70
              20.0     9698.942        1400          110

  Reach#6      0.0        0.000           0           30       0.0145
               0.5       51.519        17.5           40
               1.0      175.999          40           50
               2.0      647.260         100           70
               5.0     4315.163         400          130
              10.0    21028.203        1300          230
              20.0   113827.008        4600          430

  Reach#7      0.0        0.000           0           30       0.001
               0.5       12.772        15.5           32
               1.0       40.884          32           34
               2.0      132.384          68           38
               5.0      656.141         200           50
              10.0     2383.806         500           70
              20.0     9698.942        1400          110
```

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RA Assoc.                     Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                          Rockland County, New York

                     Structure Description - User Entered

               Surface     Height     Surface
   Reach       Area @      Above      Area @        Pipe       Head on    Weir
 Identifier     Crest      Crest      Ht Above    Diameter      Pipe     Length
                (ac)        (ft)        (ac)        (in)        (ft)       (ft)
--------------------------------------------------------------------------------

  Pond#1
                0.44          6          0.75                               0.8


  Pond#2
               0.096          4         0.474                               0.5


  Pond#3
                .189          4          .781                               0.5
```

```
RA Assoc.                    Miniceongo Park (1560)
          Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                           Rockland County, New York

                     Structure Rating Details - Computed


   Reach                    Pool                Flows (cfs) @ Weir Length
 Idendifier   Stage        Storage      Length #1     Length #2     Length #3
              (ft)         (ac ft)        0.8ft          ft            ft
--------------------------------------------------------------------------------
Pond#1          0           0.00          0.000
              0.5           0.23          0.792
                1           0.47          2.240
                2           0.98          6.336
                5           2.85         25.044
               10           6.98         70.835
               20          19.13        200.352

   Reach                    Pool                Flows (cfs) @ Weir Length
 Idendifier   Stage        Storage      Length #1     Length #2     Length #3
              (ft)         (ac ft)        0.5ft          ft            ft
--------------------------------------------------------------------------------
Pond#2          0           0.00          0.000
              0.5           0.06          0.495
                1           0.14          1.400
                2           0.38          3.960
                5           1.66         15.652
               10           5.69         44.272
               20          20.82        125.220

   Reach                    Pool                Flows (cfs) @ Weir Length
 Idendifier   Stage        Storage      Length #1     Length #2     Length #3
              (ft)         (ac ft)        0.5ft          ft            ft
--------------------------------------------------------------------------------
Pond#3          0           0.00          0.000
              0.5           0.11          0.495
                1           0.26          1.400
                2           0.67          3.960
                5           2.80         15.652
               10           9.29         44.272
               20          33.38        125.220
```

WinTR-55 Output Hydrograph

Project: Miniceongo Park (1560)

Subarea: (Outlet) Storm: 1-Yr

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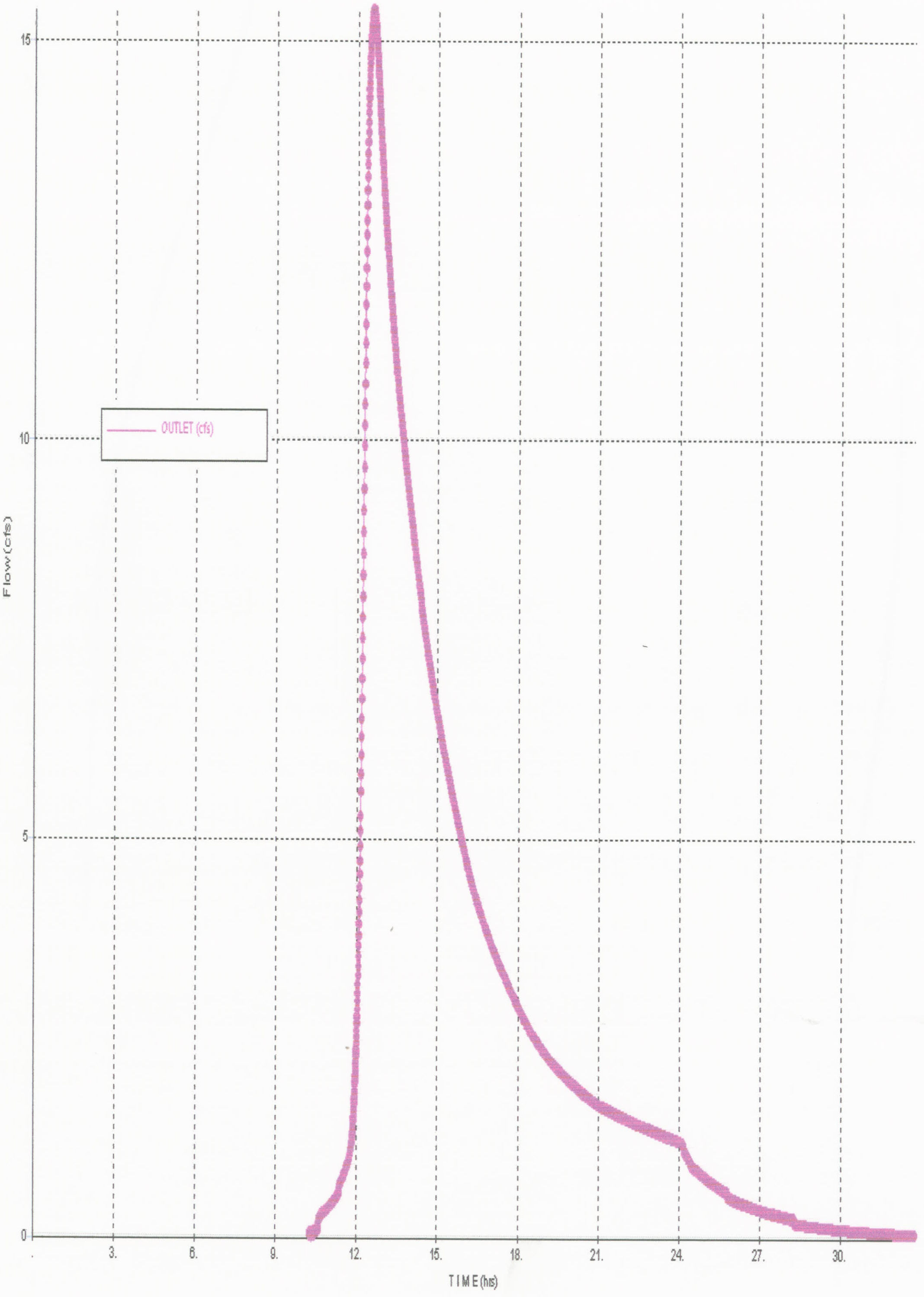
10/12/2005



WinTR-55 Output Hydrograph

10/12/2005

Project: Miniceongo Park (1560)

Subarea: (Outlet) Storm: 2-Yr

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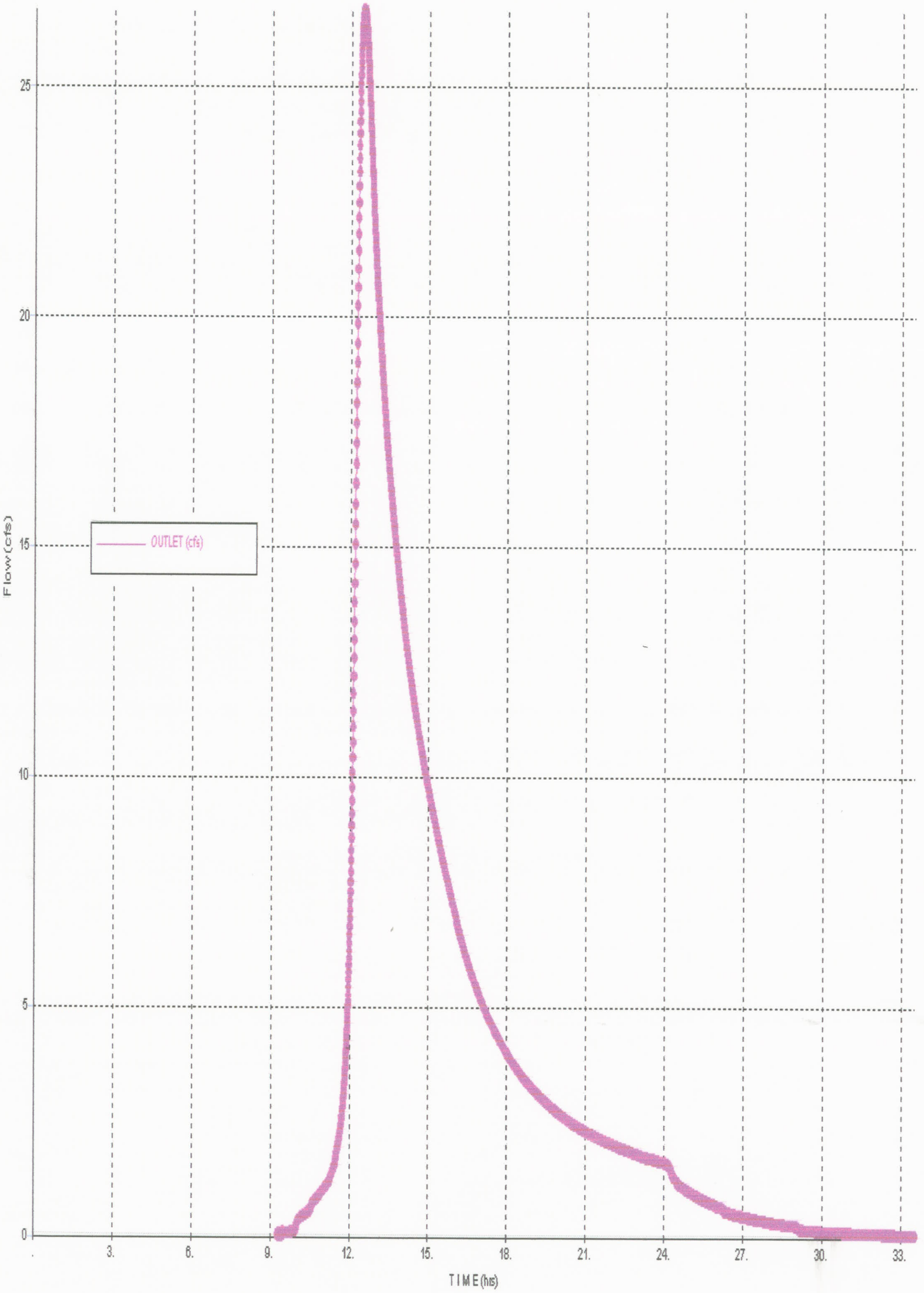

WinTR-55 Output Hydrograph

10/12/2005

Project: Miniceongo Park (1560)

Subarea: (Outlet) Storm: 5-Yr

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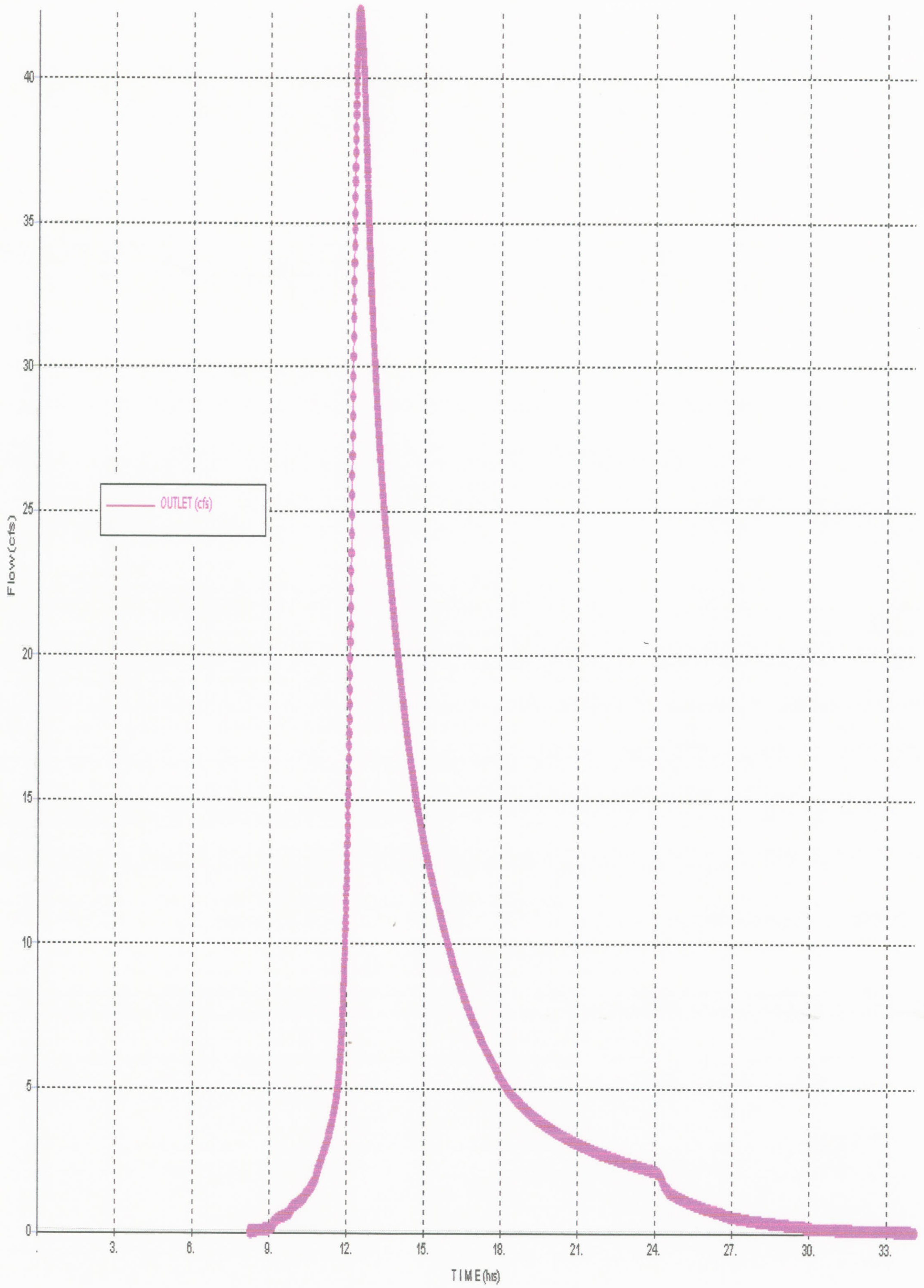

WinTR-55 Output Hydrograph

Project: Miniceongo Park (1560)

Subarea: (Outlet) Storm: 10-Yr

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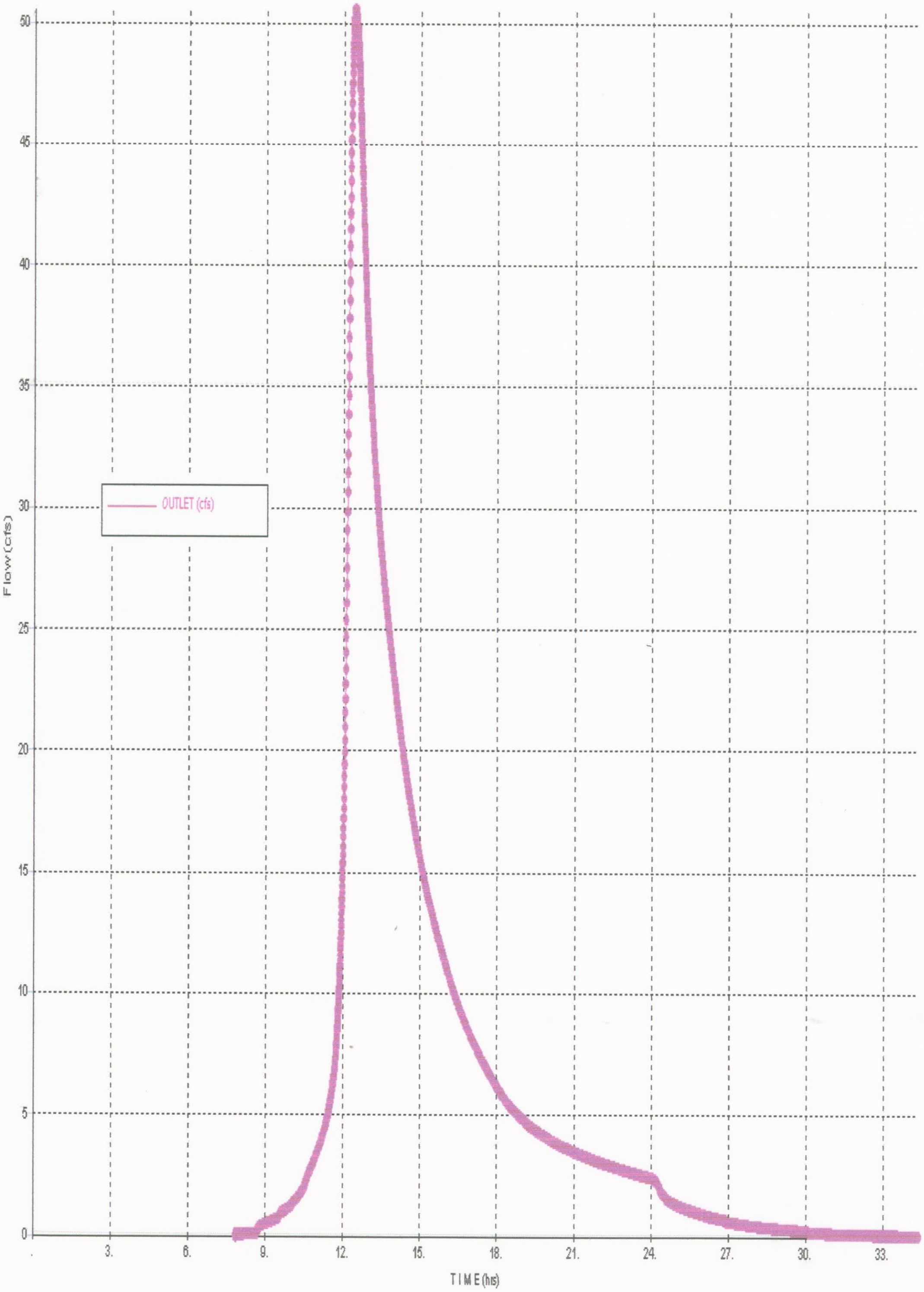
10/12/2005



WinTR-55 Output Hydrograph

Project: Miniceongo Park (1560)
Subarea: (Outlet) Storm: 25-Yr
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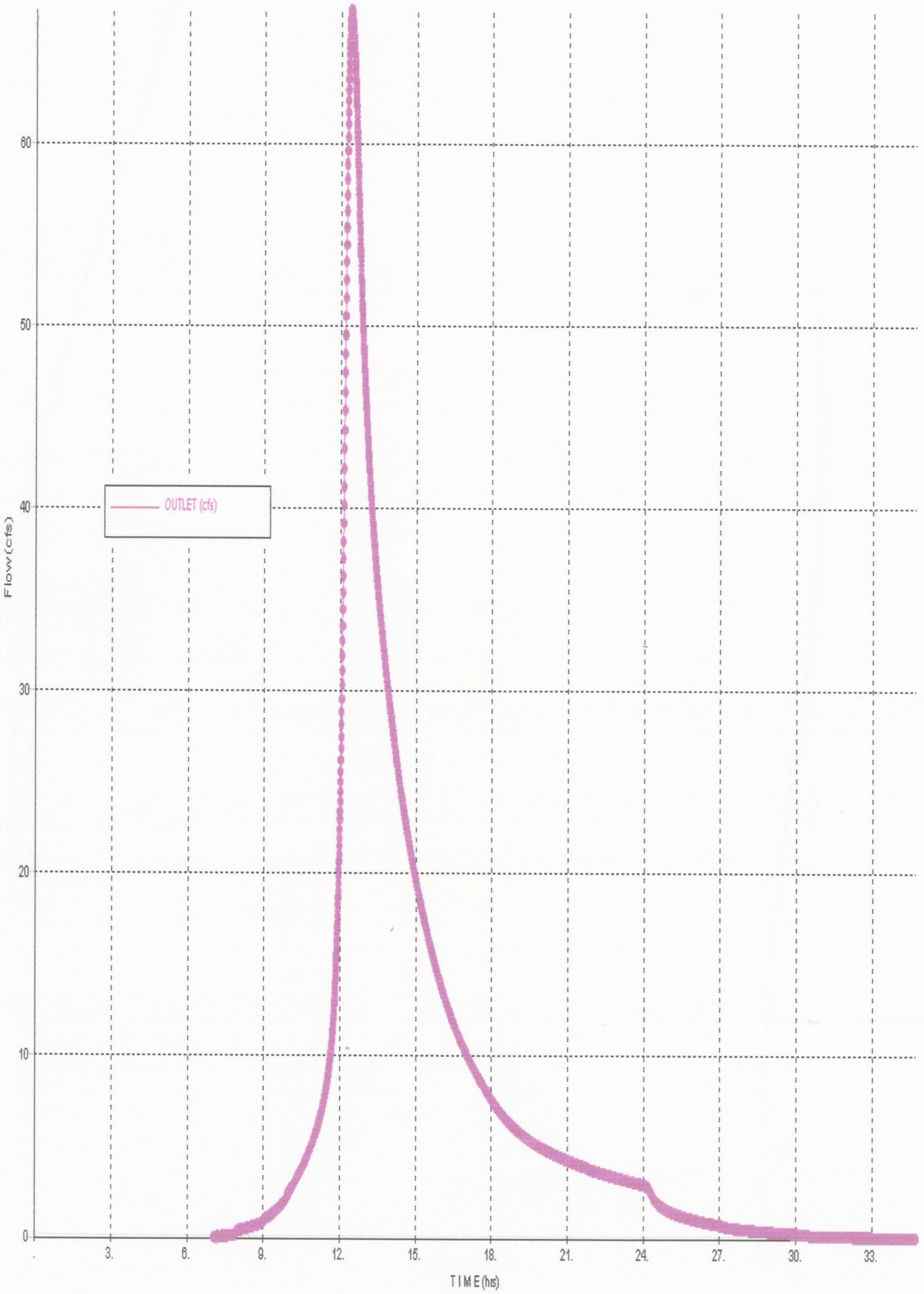
10/12/2005



WinTR-55 Output Hydrograph

Project: Miniceongo Park (1560)
Subarea: (Outlet) Storm: 50-Yr
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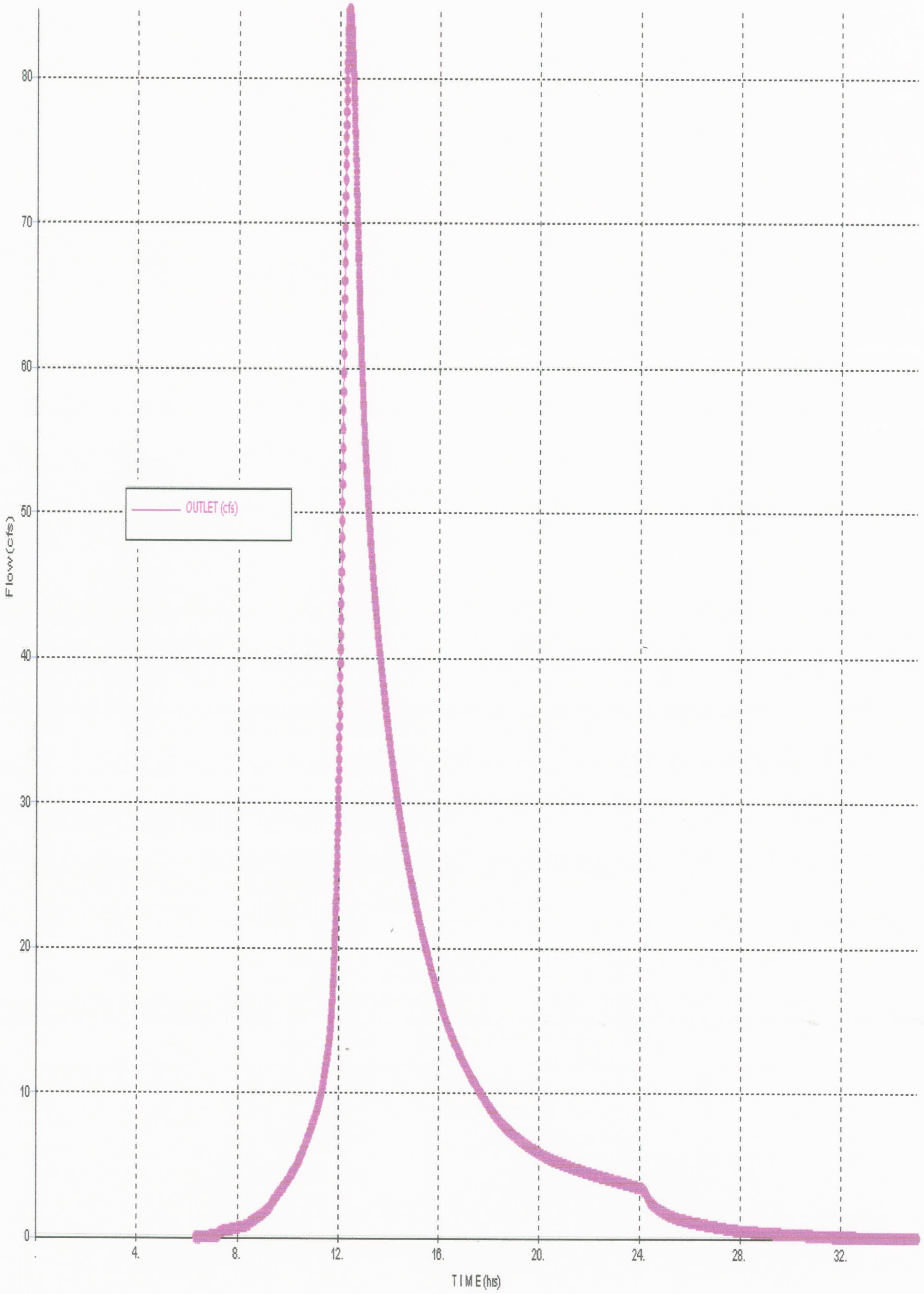
10/12/2005



Project: Miniceongo Park (1560)

Subarea: (Outlet) Storm: 100-Yr

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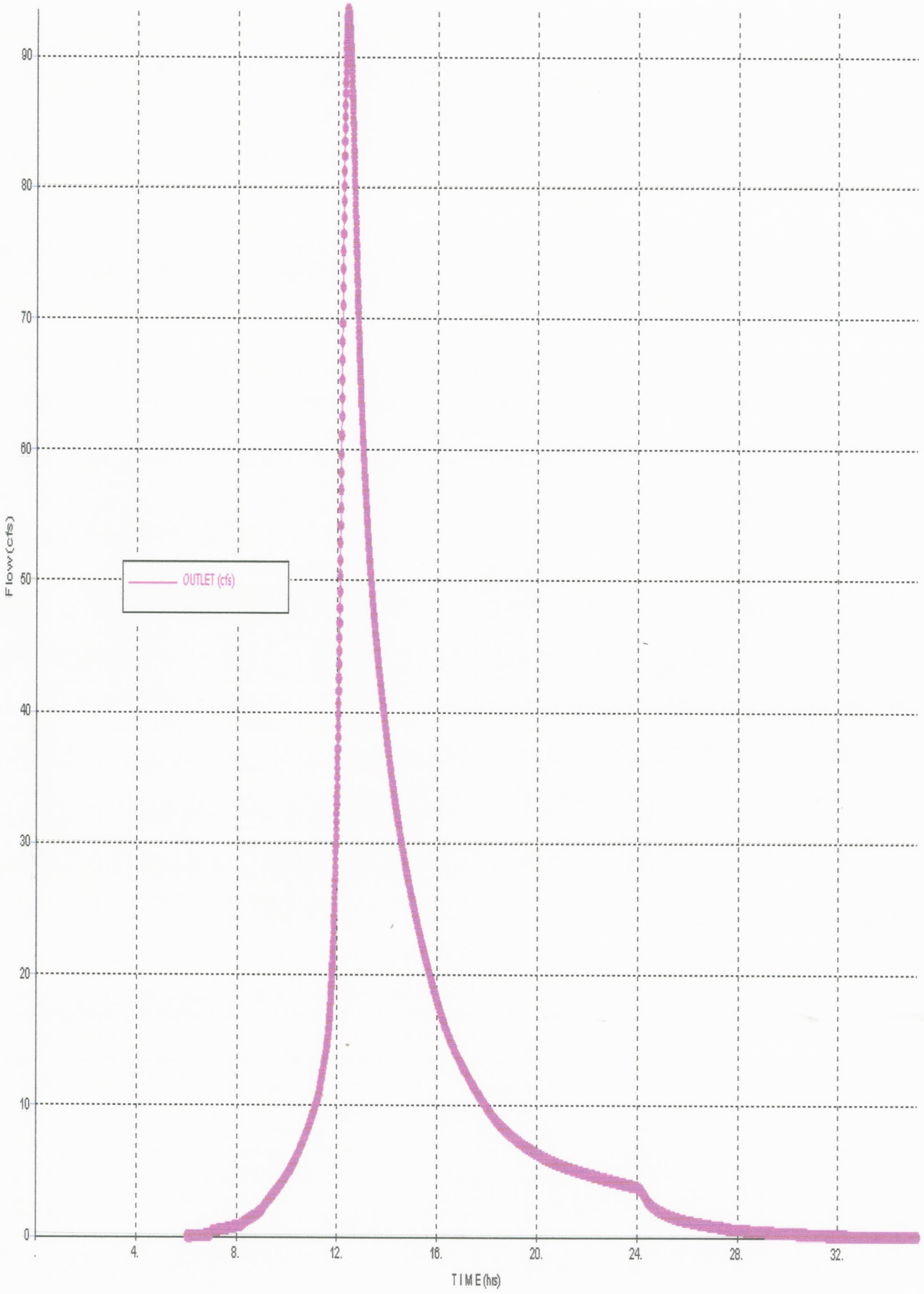

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RA Assoc.                    Miniceongo Park (1560)
           Developed Condition, 1, 2, 5, 10, 25, 50 & 100-yr Storms
                          Rockland County, New York

                             Reach Summary Table


               Receiving     Reach        Routing
  Reach          Reach       Length       Method
Identifier     Identifier     (ft)
----------------------------------------------------------------------

  Pond#1         Reach#1                  STRUCTURE(Pond#1)
  Reach#1        Reach#2       265        CHANNEL
  Reach#2        Outlet        600        CHANNEL
  Pond#2         Reach#3                  STRUCTURE(Pond#2)
  Reach#3        Outlet        925        CHANNEL
  Pond#3         Reach#4                  STRUCTURE(Pond#3)
  Reach#4        Reach#5       1180       CHANNEL
  Reach#5        Outlet        1400       CHANNEL
  Reach#6        Outlet        925        CHANNEL
  Reach#7        Outlet        600        CHANNEL
```

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINICEONGO PARK 1560
SHEET NO. ①
OF
CALCULATED BY
DATE 10/12/05
CHECKED BY
DATE
SCALE

WATER QUALITY

THE EXISTING GRADES WILL BE RAISED ACCORDING TO THE "F-1" PLAN. THREE SEDIMENT PONDS WILL BE CONSTRUCTED WHICH THEY RECIEVE BROWN WATER FROM THE DISTURBED AREA.

AS STATED PREVIOUSLY, THE PONDS ARE OVER EXCAVATED TO MAKE ROOM FOR SEDIMENTS GENERATED FROM NEWLY PLACED FILL AT THE SITE.

277 TOWNHOUSES, TWO COMMERCIAL LOTS, BUILDINGS & AMINITIES ARE PROPOSED AT THE SITE. THE IMPERVIOUS AREAS COVER 17.88 ACS. TOTAL LAWN AREAS ARE 17.60 ACS. THE SEDIMENT PONDS WILL BE RE-GRADED TO MEET THE REQUIRED SIZE OF THE POND NEEDED FOR SITE DEVELOPED CONDITION. THE PEAK FLOW AT THE POINT OF INTEREST WILL BE INCREASED DUE TO INCREASE OF IMPERVIOUS AREAS. FOR "ZERO NET INCREASE OF PEAK FLOW" @ THE P.O.I. THE TOTAL VOLUME OF

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINICEONGO PARK 1560
SHEET NO. 2 OF
CALCULATED BY DATE 10/12/05
CHECKED BY DATE
SCALE

STORAGE TO ACHEIVE ZERO NET INCREASE OF RUNOFF IS 6.38 AC-FT (POND #1 3.60 AC-FT + POND #2 1.14 AC-FT + POND #3 1.64 AC-FT).

ADDITIONAL VOLUME IS NECESSARY FOR "WATER QUALITY". THE RUNOFF FROM DEVELOPED AREAS MUST FLOW INTO A WATER QUALITY POND BEFORE BEING RELEASED TO STREAM.

THE FOLLOWING STUDY IS PREPARED ACCORDING TO "STORMWATER MANAGEMENT DESIGN MANUAL" DATED AUGUST 2003. THE STEP BY STEP METHOD (CHAPTER 8) WILL BE USED IN THIS REPORT.

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINICEONGO PARK 1560
SHEET NO. ③ OF
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SUMMARY OF HYDROLOGICAL DATA

AT THE POINT OF INTEREST (P.O.I.), TWO WATERSHEDS HAVE BEEN DELINEATED ON "EXISTING CONDITION" MAP. THE SAME AREA @ P.O.I., SIX WATERSHEDS HAVE BEEN DELINEATED ON THE "DEVELOPED CONDITION" MAP. TO ACHIEVE "ZERO NET INCREASE OF PEAK FLOW" @ P.O.I., THREE RETENTION PONDS BEEN PROPOSED. THEREFORE, THE VOLUME OF THREE WATERSHEDS HAVE TO BE REDUCED INORDER TO MEET THE ZERO NET INCREASE OF RUNOFF @ P.O.I.

100 - YEARSTORM

Q CFS	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	REMARK
Q_i	102.35	33.97	39.42	3.94	28.23	21.93	$\Sigma Q_i = 229.82$
Q_o	61.72	10.88	9.27	3.94	28.23	21.93	EXIST. 1 = 135.97 CFS
Q_o/Q_c	0.60	0.32	0.24	1	1	1	
VS/Vr	0.241	0.362	0.42				
Q_i (inch)	5.97 "	5.85	5.73	4.002			
Vr Ac-ft	9.51	3.24	3.85				
Vs	2.29	1.17	1.62				
ADD 15%	2.63	1.35	1.86				

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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WATERSHED #1

VOLUMES

1) WATER QUALITY VOLUME, WQ_v

* IMPERVIOUS COVER:

IMPERVIOUS AREA = 10.13 ACS

TOTAL AREA = 19.13 ACS

$$I = \frac{10.13}{19.13} = 53.04\%$$

* RUNOFF COEFICIENT R_v

$$R_v = 0.05 + (I)(0.009)$$

$$R_v = 0.05 + 53.04(0.009) = 0.53$$

$$\boxed{R_v = 0.53}$$

* WATER QUALITY VOLUME WQ_v

$$WQ_v = (0.9'')(R_v)(A)$$

$$WQ_v = (0.9'')(0.53)(19.13) \times \frac{1'}{12''} = 0.76 \text{ Ac-FT}$$

$$\boxed{WQ_V = 0.76 \text{ AC-FT}}$$

2) STREAM CHANNEL PROTECTION VOLUME C_{PV}

* INITIAL ABSTRACTION $I_a = \frac{200}{CN} - 2$

CN = 87 FROM TR-55

P = 1.3" 90% RAINFALL (SEE CHART 4.1 DEC)

$$I_a = \frac{200}{87} - 2 = 0.30$$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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* $I_a/P = \frac{0.30}{1.3} = 0.231$

* $T_c = 0.184$ HR FROM TR-55

* $q_u = 1306.78$ FROM TR-55

2-YR STORM

	WS #1	WS #2	WS #3	WS #4	WS #5	WS #6	REMARK
Q_i	39.06	12.64	14.31	0.95	6.76	5.45	$\Sigma Q = 79.17$ CFS
Q_o	10.47	4.19	3.32	0.95	6.76	5.45	$\Sigma Q_{EXIST.} = 31.14$
Q_o/Q_i	0.27 0.40	0.33 0.36	0.23 0.43	1	1	1	
Q_i	2.182"	2.095"	2.014"				
CFm	1,306.78	1,216.61	1,137.61				
Vr Ac-ft	3.48	1.16	1.35				
VS Ac-ft	1.39	0.42	0.58				
q_u	1306.78	1216.61	1137.61				

* T = 24 HRS

$q_u = 1307$ FIND $\frac{q_o}{q_i} \cong 0.005$ FROM CHART

$$V_s/V_r = 0.683 - 1.43\left(\frac{q_o}{q_i}\right) + 1.64\left(\frac{q_o}{q_i}\right)^2 - 0.804\left(\frac{q_o}{q_i}\right)^3$$

$V_s/V_r = 0.676$

$V_r = 1.479''$ FOR ONE-YR

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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$$V_s = \frac{1.479''}{12} \times 19.13 \times 0.676 = 1.59 \text{ AC-FT}$$

$$\boxed{C_{pv} = 1.59 \text{ AC-FT}}$$

* AVERAGE RELEASE RATE:

1.59 AC-FT TO BE RELEASED IN 24 HRS

$$\text{Rate} = \left(1.59 \times 43560 \; {}^{Ft^2}/_{Ac}\right) \div \left(24 \times 60 \times 60\right) = 0.8$$

$$\boxed{\text{Rate} = 0.8 \text{ CFS}}$$

3) OVER BANK FLOOD VOLUME Q_{P10}

10-YR STORM

	WS#1	WS#2	WS#3	WS#4	WS#5	WS#6	
Q_i	62.85	20.62	23.64	1.99	14.18	11.18	$\Sigma Q = 134.46$ CFS
Q_o	27.20	6.66	5.55	1.99	14.18	11.18	$Q_{EXIST} = 66.76$ CFS
$\frac{Q_o}{Q_i}$	0.43	0.32	0.23	1	1	1	
$\frac{V_s}{V_r}$	0.31	0.365	0.43				
Q_i	3.567	3.463	3.366				
V_r AC-Ft	5.69	1.92	2.26				
V_s	1.76	0.70	0.97				

JOB

SHEET NO. ⑦ OF

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WATERSHED #2

VOLUMES

1) WATER QUALITY VOLUME WQ_v

* IMPERVIOUS COVER = 3.42 ACS

TOTAL AREA = 6.65 ACS

$I = \frac{3.42}{6.65} = 51.43$

* RUNOFF COEFICIENT RV

$RV = 0.05 + (I)(0.009)$

$RV = 0.05 + 51.43 \times 0.009 = 0.51$

$\boxed{RV = 0.51}$

* WATER QUALITY VOLUME WQ_v

$WQ_v = (0.9'')\,R_v\,(A)$

$WQ_v = \frac{0.9}{12} \times 0.51 \times 6.65 = 0.26$ AC-FT

$\boxed{WQ_v = 0.26 \text{ AC-FT}}$

2) STREAM CHANNEL PROTECTION VOLUME C_{pv}

* INITIAL ABSTRACTION $I_a = \frac{200}{CN} - 2$

CN = 86 FROM TR-55

P = 1.3" 90% RAINFALL (SEE CHART 4.1 DEC)

JOB

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$Ia = \frac{200}{86} - 2 = 0.33$

* $Ia/p = \frac{0.33}{1.3} = 0.250$

* $T_C = 0.214$ HRS FROM TR-55

* $q_u = 1,216.6'$ SEE PAGE ⑤

$\frac{q_o}{q_i} = 0.0092$ FROM CHART B-1 DETENTION TIME

$$V_s/V_r = 0.683 - 1.43\left(\frac{q_o}{q_i}\right) + 1.64\left(\frac{q_o}{q_i}\right)^2 - 0.804\left(\frac{q_o}{q_i}\right)^3$$

$V_s/V_r = 0.670$

$V_r = 1.406''$ SEE TR-55

* $V_s = \frac{1.406''}{12} \times 6.65 \times 0.670 = 0.52$ AC-FT

$\boxed{C_{pv} = 0.52 \text{ AC-FT}}$

* AVERAGE RATE OF RELEASE:

0.52 AC-FT TO BE RELEASED IN 24 HRS

RATE $= (0.52 \times 43560 \text{ FT}^2/\text{AC}) \div (24 \times 3600) = 0.26$ CFS

$\boxed{\text{RATE} = 0.26 \text{ CFS}}$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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WS #3 - VOLUMES

1) WATER QUALITY VOLUME, WQV

* IMPERVIOUS AREA = 3.72 ACS

TOTAL AREA = 8.05 ACS

$$I = \frac{3.72}{8.05} = 46.21\%$$

* RUNOFF COEFICIENT RV

$$R_v = 0.05 + (I)(0.009)$$

$$RV = 0.05 + 46.21(0.009) = \boxed{0.47}$$

* WATER QUALITY VOLUME WQ_v

$$WQ_v = (0.9'')(R_v)(A)$$

$$WQ_v = (0.9'')(0.47)(8.05) \times \frac{1}{12} = 0.28 \text{ AC-FT}$$

$$\boxed{WQ_v = 0.28 \text{ AC-FT}}$$

2) STREAM CHANNEL PROTECTION VOLUME CPV

* INITIAL ABSTRACTION $Ia = \frac{200}{CN} - 2$

CN = 85 FROM TR-55

P = 1.3″ 90% RAINFALL (SEE CHART 4.1 DEC)

$$Ia = \frac{200}{85} - 2 = 0.35$$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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* $I_a/P = \frac{0.35}{1.3} = 0.269$

* $T_c = 0.238$ FROM TR-55

* $q_u = 1,137.61$ " "

$\frac{q_o}{q_i} = 0.0131$

$$V_s/V_r = 0.683 - 1.43\left(\frac{q_o}{q_i}\right) + 1.64\left(\frac{q_o}{q_i}\right)^2 - 0.804\left(\frac{q_o}{q_i}\right)^3$$

$V_s/V_r = 0.6643$

$V_r = 1.338''$ FOR ONE-YR STORM

$V_s = \frac{1.338}{12} \times 8.05 \times 0.6643 = 0.60$ AC-FT

$$\boxed{C_{pv} = 0.60 \text{ AC-FT}}$$

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POND DESIGN

WATERSHED #1 : POND #1

STEP 1. PRELIMINARY RUNOFF CONTROL VOLUMES

SYMBOL	CATEGORY	VOLUME REQ'D ac-ft	NOTES
WQ_v	WATER QUALITY	0.76	
C_{pv}	STREAM PROTECTION	1.39	AVERAGE ED = 0.8 CFS FOR 24 HRS
Q_p	PEAK CONTROL	1.76	10-YR STORM
Q_F	FLOOD CONTROL	2.29	100-YR STORM

STEP: 2: DRY POND

STEP 2A: DAM SAFETY

STEP 3: N/A

STEP 4: SIZE OF WET FOREBAY

10% x WQ_v OR. 0.1 x 0.76 = 0.076 AC-FT ≃ 1

STEP 5: PERMANENT POOL TO CONTAIN 50% OF WQ_v:

0.5 x (0.76) = 0.38 AC-FT INCLUDES 0.1 AC-FT PERMANENT POOL

SIZE: ED VOLUME TO CONTAIN 50% OF WQ_v

0.5 x 0.76 = 0.38 AC-FT

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STEP 6 : POND GEOMETRY

POND #1

ELEV MSL	AREA ft^2	AVERAGE ft^2	DEPTH ft	VOLUME ft^3	CUMMULATIVE $\Sigma V ft^3$: FOREBAYS	Ac-Ft	STORAGE ABOVE PERMANENT POOL
395.5	0				0	0	
		7,265	0.5				
396.0	14,530			3633	3876	0.089	.834
		16,917	2				
398.0	19,304			33,834	40,807	0.937	0.860
		22,437	2				
400.0	25,570			44,874	91,812	2.108	1.89
		28,825	2				
402.0	32,079			57,650	160,204	3.678	3.21

PERMANENT POOL IS 50% WQ_v :

0.5 x (0.76) = 0.38 AC-FT (INCLUDES FOREBAYS VOLUME 0.1 AC-FT)

ELEV.	FOREBAY #1 ft^2	FOREBAY #2 ft^2	FOREBAY #3	ΣA ft^2	DEPT.	ΔV ft^3	ΣV ft^3	ΣV Ac-Ft
395.5	0	0	0	0		0	0	
					0.5			
396.0	801	0	172	973		243	243	0.0056
					2			
398.0	1,516	157	451	2,124		3,097	3,340	0.0767
					2			
400.0	2,485	524	998	4007		6,131	9,471	0.2174
					2			
402.0	3776	1,022	1937	6735		10,742	20,213	0.464

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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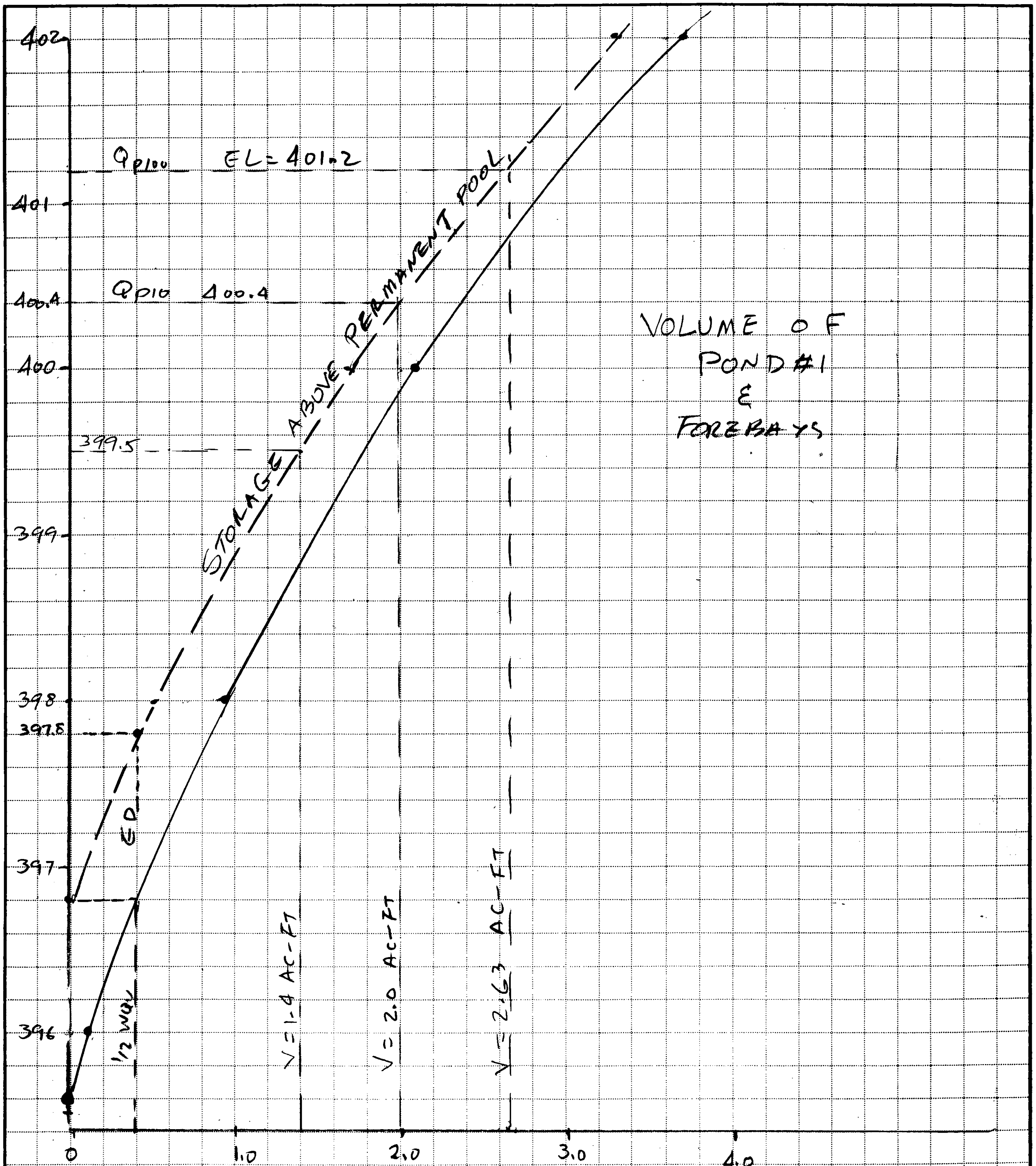

VOLUME OF
POND #1
&
FOREBAYS

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SET BASIC ELEVATIONS FOR POND STRUCTURES:

* THE POND BOTTOM SET AT 396.0 Ft.

* SET RISER INVERT @ EL = 395.5 FT FOR GRAVITY DRAIN

* SET BARREL OUTLET @ EL = 395.0

SET WATER SURFACE & OTHER ELEVATIONS:

* REQUIRED PERMANENT POOL VOLUME @ 50% OF WQV

OR $\frac{1}{2} \times 0.76 = 0.38$ AC - FT

SET PERMANENT POOL @ EL = 396.8 Ft

V = 0.4 AC - FT. OK

$$\boxed{\begin{array}{c}\text{PERMANENT POOL}\\ \text{EL} = 396.8 \text{ FT}\end{array}}$$

* FOREBAY VOLUME REQUIRED IS 0.1 AC-FT

* REQUIRED EXTENDED DETENTION VOLUME IS

$(WQ_V - ED) = 0.38$ AC-FT

THE VOLUME ABOVE PERMANENT POOL FOR V = 0.38 AC-FT IS 397.8

$$\boxed{\begin{array}{c}\text{EXTENDED DETENTION}\\ \text{EL} = 397.8\end{array}}$$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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COMPUTE THE REQUIRED WQ_v - ED ORIFICE DIA.

- AVERAGE ED RELEASE is 0.38 AC-FT x 43,560 / 3600 x 24

  $RATE_{ED} = 0.19$ CFS

- ORIFICE INVERT @ 396.8

- AVERAGE HEAD = (397.8 - 396.8) 1/2 = 0.5 FT

- $Q = CA(2gh)^{0.5}$

  SOLVE FOR DIA

  $C = 0.6$

  $0.19 = 0.6 A (2 \times 32.2 \times 0.5)^{0.5} = 3.40 A$

  A = 0.06 S.F. OR A = 8.04 in^2 OR $\boxed{D = 3.2''}$

  SAY D = 3.0"

  USE 4" PIPE & GATE
  DOWN TO 3.0"
  EQ.

$Q = CA(2gh)^{0.5} = 0.6 \times 0.0491 (2 \times 32.2)^{0.5} \times h^{0.5} = 0.19$

OR h = 0.65 FT

$WSEL = 396.8 + \frac{3''}{2} \times \frac{1}{12} + 0.65 = 397.58$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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STEP 7: COMPUTE ED ORIFICE SIZE
RELEASE RATE FOR CPV - ED
ESTABLISH CPV ELEVATION

SET THE CPV POOL ELEVATION

* REQUIRED CPV STORAGE IS 1.39 AC-FT

* FROM ELEV. VS STORAGE READ EL = 399.5 V = 1.4

$\boxed{\text{CPV WSEL} = 399.5 \text{ Ft}}$

SIZE CPV ORIFICE

* RELEASE RATE = 1.39 × 43560 ÷ (24 × 3600) = 0.70 CFS

* SET INVERT OF ORIFICE @ WSEL = 397.8

* DISCHARGE FROM 3" ORIFICE IS

$$h = \frac{1}{2}(399.5 - 397.93) = \underline{\underline{0.79}} \text{ FT}$$

$$A = \frac{1.5 \times 1.5 \times \pi}{144} = 0.0491 \text{ S-F}$$

$$Q = CA(2gh)^{0.5} = 0.6 \times 0.491(2 \times 32.2 \times 0.79)^{0.5}$$

$$Q_{3\text{" orifice}} = 0.21 \text{ CFS}$$

$Q = 0.7 - 0.21 = 0.49 \text{ CFS}$ $\quad h_{/2} = \frac{399.5 - 397.8}{2} = 0.85$

$$0.49 = 0.6 \times A (2 \times 32.2 \times 0.85)^{0.5}$$

$A = 0.11$ S.F. $\quad D = 0.37$ ft $\quad$ or $\quad D = 4.5"$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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* USE 6" DIA PIPE & GATE IT DOWN TO 4.5" EQ.

* NEW $h = 399.5 - (397.8 + 0.19) = 0.76$ Ft

CALC. NEW Q

$Q = 0.6 \times 0.11 (2 \times 32.2 \times 0.76)^{0.5} = 0.46$ CFS

TOTAL $Q = 0.21 + 0.46 = 0.67 \simeq 0.7$ OK

STEP 8:

Q_{P10} (10-YR STORM)

RELEASE RATE & WATER SURFACE ELE.

* $Q_{P10_{in}} = 62.85$ CFS DEVELOPED

* $Q_{P10_{out}} = 27.2$ CFS AFTER ROUTED THROUGH THE POND #1

* ESTIMATE OF STORAGE is V=1.76 AC-Ft ADD 15% FOR EQ. $V = 1.15 \times 1.76 = \underline{\underline{2.02}}$ AC-FT

* FROM STORAGE VS ELE. V=2.0 EL = 400.4

* Q FROM 3" ORIFICE is:

$h = \frac{1}{2}(400.4 - 396.93) = 1.74$ Ft

$Q = 0.6 \times 0.491 (2 \times 32.2 \times 1.74)^{0.5} = 0.31$ CFS

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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* Q FROM 4.5" ORIFICE IS:

$h = 1/2\,(400.4 - 397.99) = 1.21$ Ft

$Q = 0.6 \times 0.11\,(2 \times 32.2 \times 1.21)^{0.5} = 0.58$ CFS

* Q FOR SLOT DRAIN IS

$Q = 27.2 - (0.31 + 0.58) = 26.41$ SAY $\underline{\underline{26.4}}$

SET INV. @ 399.5

$h = 400.4 - 399.5 = 0.90$ Ft

$Q = CLH^{3/2} = 3.1 \times L \times (0.9)^{3/2}$

$L = 9.97$ Ft

USE $L = 8.5$ ft & CALC. H

$H = 0.96$ FT

CK ORIFICE EQ.

SEE PRINT OUT ON PAGE 18 A

Natural Resources Conservation Service
United States Department of Agriculture

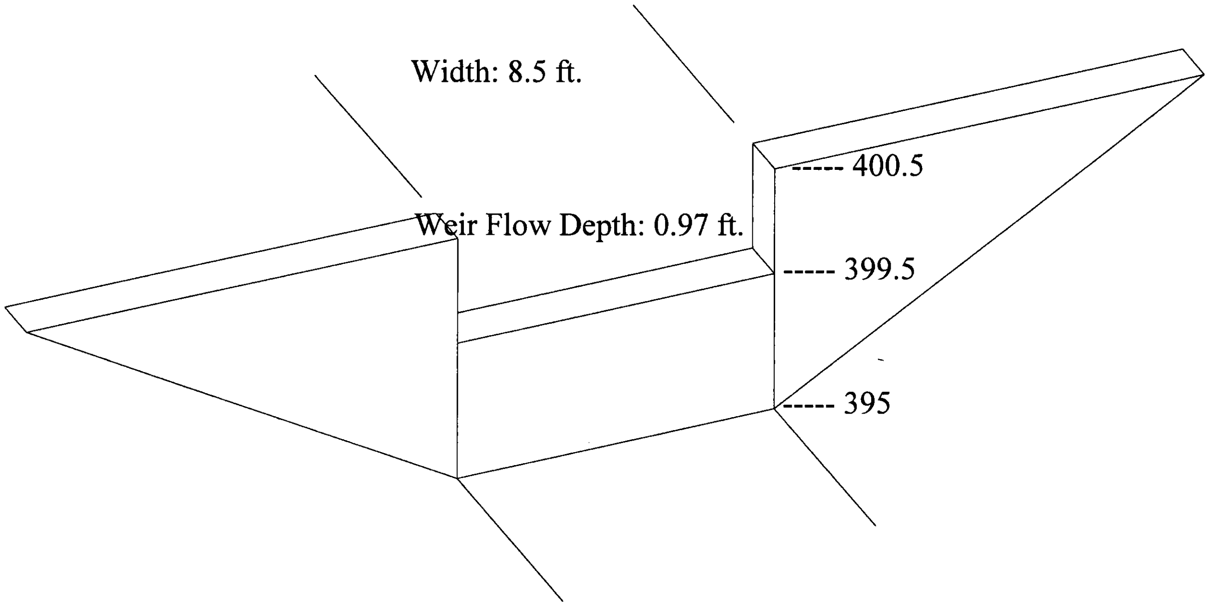
Straight Drop Structure

Participant: Miniceongo Park
Location: Route 202
County: County,

Designer: RA
Date: 10/18/2005

Checker: RA
Date: 10/18/05

Hydraulics Formula, Version 2.2.1



Width of inlet: 8.5 ft.
Depth of flow over weir: 0.97 ft.

Capacity: 26.4 cfs
Overfall: 4.5 ft.

Elevation of weir: 399.5
Elevation of floor: 395
Elevation of wingwall: 400.5

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STEP 9

SPILLWAY DESIGN

FLOOD RELEASE & WATER SURFACE EL.

* $Q_{P_{100}\,in} = 102.35$ CFS

$Q_{P_{100}\,out} = 61.72$ CFS

* STORAGE REQUIRED IS $V = 2.29$ AC-Ft

ADD 15% TO ACCOUNT FOR EO

x $V = 1.15 \times 2.29 = 2.63$ AC-FT

* FROM STORAGE VS EL. EL = 401.2 Ft

* Q FROM 3" ORIFICE IS

$h = \frac{1}{2}(401.2 - 396.93) = 2.14$ Ft

$Q = 0.6 \times 0.0491 \times (2 \times 32.2 \times 2.14)^{0.5} = 0.35$ CFS

x Q FROM 4.5" ORIFICE IS :

$h = \frac{1}{2}(401.2 - 397.99) = 1.61$ Ft

$Q = 0.6 \times 0.11 (2 \times 32.2 \times 1.61)^{0.5} = 0.67$ CFS

Q FROM 10 FT SLOT IS

$h = 401.2 - 399.5 = 1.7$ Ft

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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$Q = CLH^{3/2} = 3.1 \times 8.5 \times (1.7)^{3/2} = 58.41$

$TOTAL = 0.35 + 0.67 + 58.41 = 59.43 < 61.72$ CFS
out put
[illegible]

REVISE THE H FOR $Q = 60.70$

$H = 1.71$ ft $Q = 60.70$ O/C

$EL = 401.21$ OK

SEE PRINT OUT PAGE 21

Natural Resources Conservation Service
United States Department of Agriculture

Straight Drop Structure

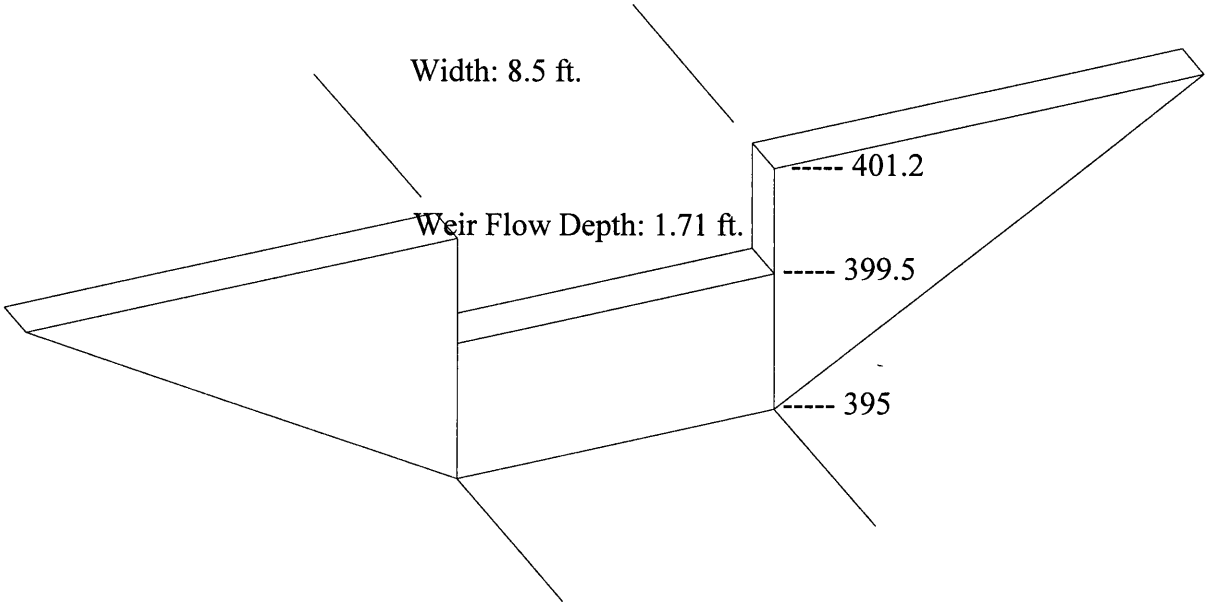
Page 21

Participant: Miniceongo Park
Location: Route 202
County: County,

Designer: RA
Date: 10/18/2005

Checker: RA
Date: 10/18/05

Hydraulics Formula, Version 2.2.1



Width of inlet: 8.5 ft.
Depth of flow over weir: 1.71 ft.

Capacity: 60.7 cfs
Overfall: 4.5 ft.

Elevation of weir: 399.5
Elevation of floor: 395
Elevation of wingwall: 401.2

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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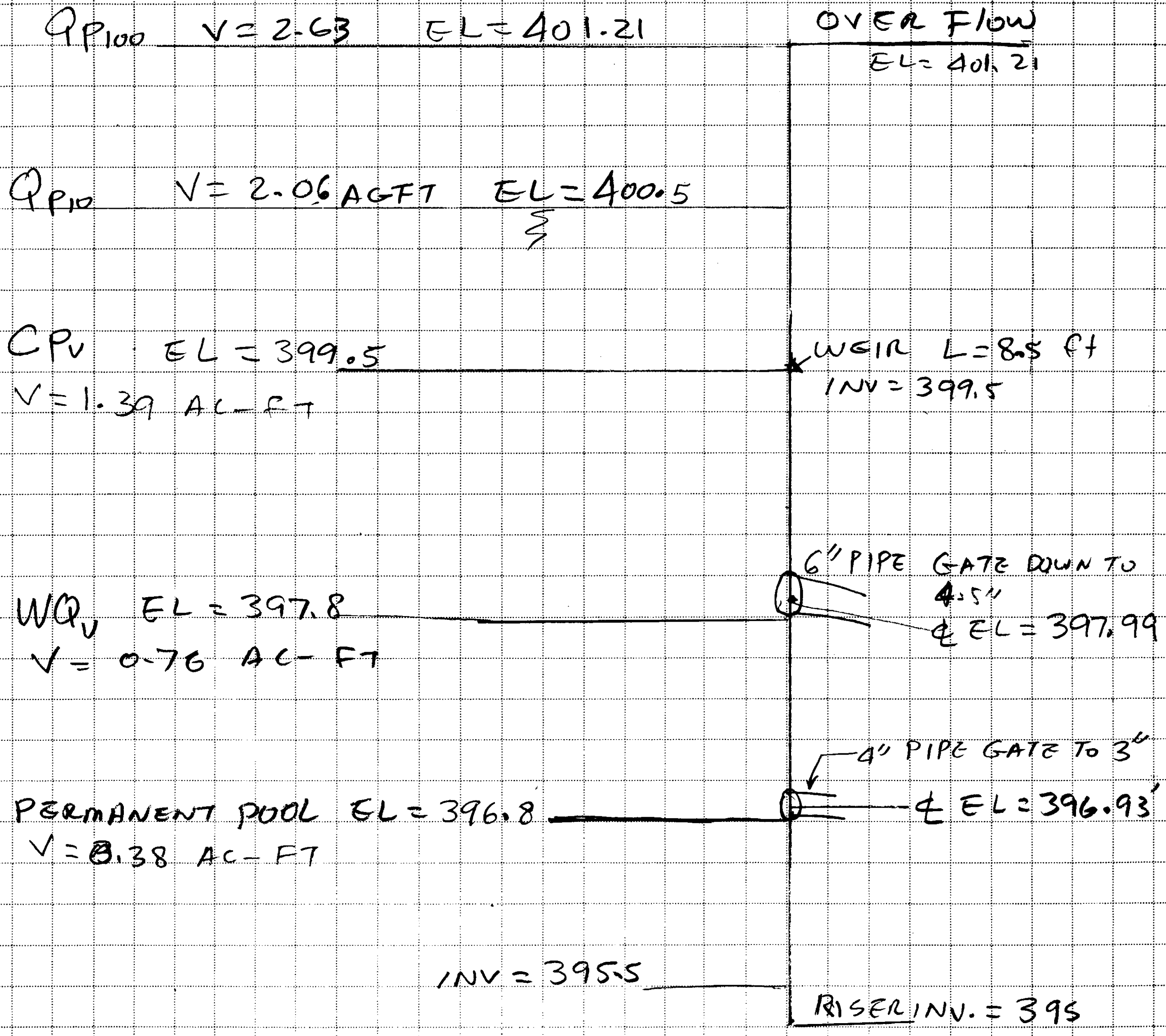
POND #1



Q_{P100} V = 2.63 EL = 401.21

OVER FLOW
EL = 401.21

Q_{P10} V = 2.06 AC FT EL = 400.5

CP_V EL = 399.5
V = 1.39 AC-FT

WEIR L = 8.5 ft
INV = 399.5

WQ_V EL = 397.8
V = 0.76 AC-FT

6" PIPE GATE DOWN TO 4.5"
℄ EL = 397.99

4" PIPE GATE TO 3"
℄ EL = 396.93'

PERMANENT POOL EL = 396.8
V = 0.38 AC-FT

INV = 395.5

RISER INV. = 395

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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POND #2

STEP #1 PRELIMINEARY RUNOFF CONTROL VOLUMES

SYMBOLES	CATEGORY	VOLUMES AC-FT	NOTES
WQv	WATER QUALITY	0.26	
Cpv	STREAM PROTECTION	0.42	
Q_P	PEAK CONTROL	0.70	10-YR STORM
Q_F	FLOOD CONTROL	1.17	100-YR STORM

STEPS #2, 2A & 3 N/A

STEP #4 SIZE OF WET FOREBAY

10% x WQv OR 0.1 x 0.26 = 0.026 ≈ 0.05 AC-FT

STEP #5: PERMANENT POOL TO CONTAIN 50% OF WQv:

0.5 (0.26) = 0.13 AC-FT INCLUDES 0.05 AC-FT

SIZE OF ED (EXTENDED DETENTION) VOLUME TO CONTAIN 50% OF WQv

0.5 x 0.26 = 0.13 AC-FT

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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STEP #6: POND GEOMETRY

POND #2

ELEVATION ft	AREA ft^2	AVERAGE ft^2	DEPTH ft	VOLUME ft^3	ΣV+2 FOREBAYES	V AC-FT
401.0	0			0	0	
		3,238	1			
402.0	6,476			3,238	3264	0.0749
		9,067	2			
404.0	11,658			18,134	21,765	0.500
		16,199	2			
406.0	20,740			32,398	55,449	1.273

FOREBAYES

ELEVATION	FOREBAY #1	FOREBAY #2	ΣA ft^2	DEPTH	ΔV	
401	0	0				
				1		
402	0	55	55		26	
				2		
404	120	312	432		367	
				2		
406	430	974	1,404		1286	

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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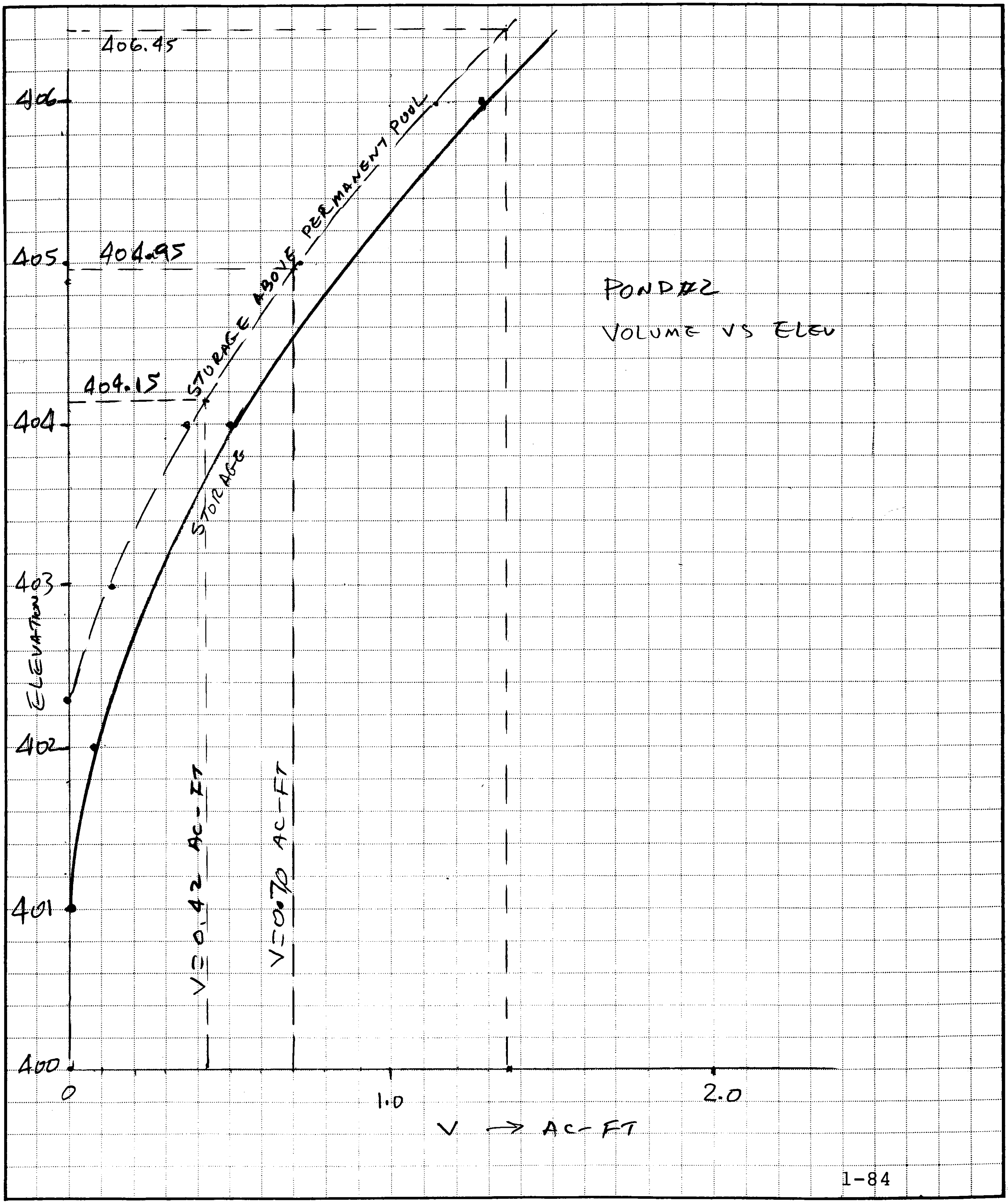

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Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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SET BASIC ELEVATION FOR POND STRUCTURES:

* POND BOTTOM SET @ 401.0 FT

* SET RISER INVERT @ EL = 401.0

* SET LEVEL SPREADER @ 401.0

SET WATER SURFACE & OTHER ELEVATIONS:

* REQUIRED PERMANENT POOL VOLUME @ 50% OF WQ_v

OR 1/2 × 0.26 = 0.13 AC-FT

SET PERMANENT POOL ELEVATION @ 402.15

PERMANENT POOL
EL = 402.15

* FOREBAY VOLUME IS 0.05 AC-FT

* REQUIRED EXTENDED DETENTION VOLUME IS

$(WQ_v - ED) = 0.13$ AC-FT

THE VOLUME ABOVE PERMANENT POOL FOR V=0.13 AC-FT IS 403.0

EXTENDED DETENTION
EL = 403.0

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COMPUTE THE REQUIRED WQ_v - ED' ORIFICE DIA.

* AVERAGE ED RELEASE IS:

$R = 0.13 \times 43560 \div (24 \times 3600) = 0.066$ CFS

* ORIFICE INVER @ 402.15

* AVERAGE HEAD $= \frac{1}{2}(403 - 402.15) = 0.425$ FT

* $Q = CA(2gh)^{0.5}$

$D = 2''$ $Q = 0.07$ CFS OK

USE 4" PIPE, THEN GATE IT DOWN TO 2" EQ.

* $WSEL = 402.15 + \frac{2'}{12} \times \frac{1}{2} + 0.85 = 403.08$ OK

STEP 7:

COMPUTE ED ORIFICE SIZE
RELEASE FOR CPV - ED
ESTABLISH C_{pv} ELEVATION

SET THE CPV POOL ELEVATION

* REQUIRED CPV STORAGE IS V = 0.42 AC-FT

* FROM ELEV. VS STORAGE → READ EL = 404.15

SIZE CPV ORIFICE

* RELEASE RATE $= 0.42 \times 43560 \div (24 \times 3600) = 0.21$ CFS

* SET INVERT OF ORIFICE @ EL = 403.0

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* DISCHAR FROM 2" ORIFICE IS

$h = 1/2(404.15 - 402.23) = 0.96$ FT

$Q = 0.10$ CFS

$Q = 0.21 - 0.10 = 0.11$ CFS

$h = 1/2(404.15\ 403.0) = 0.58$ FT

USE 4" PIPE & GATE IT DOWN TO 2.3" EQ.

$Q = 0.11$ CFS FOR $D = 2.3''$ & $h = 0.58$ AVERAGE

* $WSEL = 403.0 + \frac{2.3''}{12} \times \frac{1}{2} + 0.58 = \boxed{404.26 \text{ ok}}$

$\boxed{EL = 404.26}$

STEP 8:

$Q_{P_{10}}$ (10-YR STORM)

RELEASE RATE & WATER SURFACE EL.

* $Q_{P_{10}} = 20.62$ CFS INFLOW

$Q_{P_{10}} = 6.66$ CFS OUTFLOW

* ESTIMATE OF STORAGE IS $V = 0.70$ AC-FT

* FROM STORAGE VS VOLUME; $EL = 404.95$

* Q FROM 2" ORIFICE

$h = 1/2(404.95 - 402.23) = 1.36$ ft

$Q = 0.12$ CFS

Q FROM 2.3" ORIFICE

$h = 1/2\,(404.95 - 403.10) = 0.93$

$Q = 0.13$ CFS

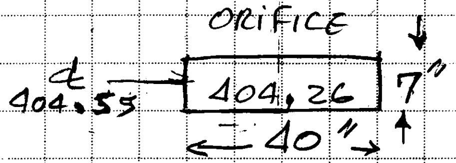
$Q = 6.66 - (0.12 + 0.13) = 6.41$ CFS

* DESIGN RECTANGULAR ORIFICE

$2h = 404.95 - 404.26 = 0.69$

A = 280 SQ. INCHES

$h = 404.95 - 404.55 = 0.40$



$Q = 5.92$ CFS < 6.41

USE $h = 0.47$ Ft $Q = 6.41$ CFS OK

WSEL $= 404.55 + 0.47 = 405.02$

$\boxed{\text{CPV 7 EL} = 405.02}$

STEP 9:

SPILLWAY DESIGN
FLOOD RELEASE & WATER SURFACE EL.

* $Q_{P_{100}} = 33.97$ CFS in Flow

$Q_{P_{100}} = 9.27$ CFS OUT Flow

* REQUIRED STORAGE = 1.17

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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* ADD 15% FOR ED V = 1.15 x 1.17 = 1.35 AC-FT

* FROM STORAGE VS ELEVATION → EL = 406.45

* Q FROM 2" ORIFICE IS:

$h = 1/2 (406.45 - 402.15) = 2.15$

$Q_{2''} = 0.15$ CFS

Q FROM 2.3" ORIFICE IS:

$h = 1/2 (406.45 - 403.10) = 1.68$ FT

$Q_{2.3''} = 0.18$ CFS

Q FROM RECT. ORIFICE A = 280 SQ. INCHES

$h = \frac{1}{2}(406.45 - 404.55) = 0.95$

$Q = 9.21$ CFS

$\Sigma Q = 0.15 + 0.18 + 9.21 = 9.54$ CFS

USE $h = 0.91$

$Q = 8.93$ CFS

$\Sigma Q = 0.15 + 0.18 + 8.93 = 9.26$ CFS OK

WSEL = 404.55 + 2 x 0.91 = 406.37

$\boxed{Q_{P_{100}} \quad EL = 406.37}$

OK

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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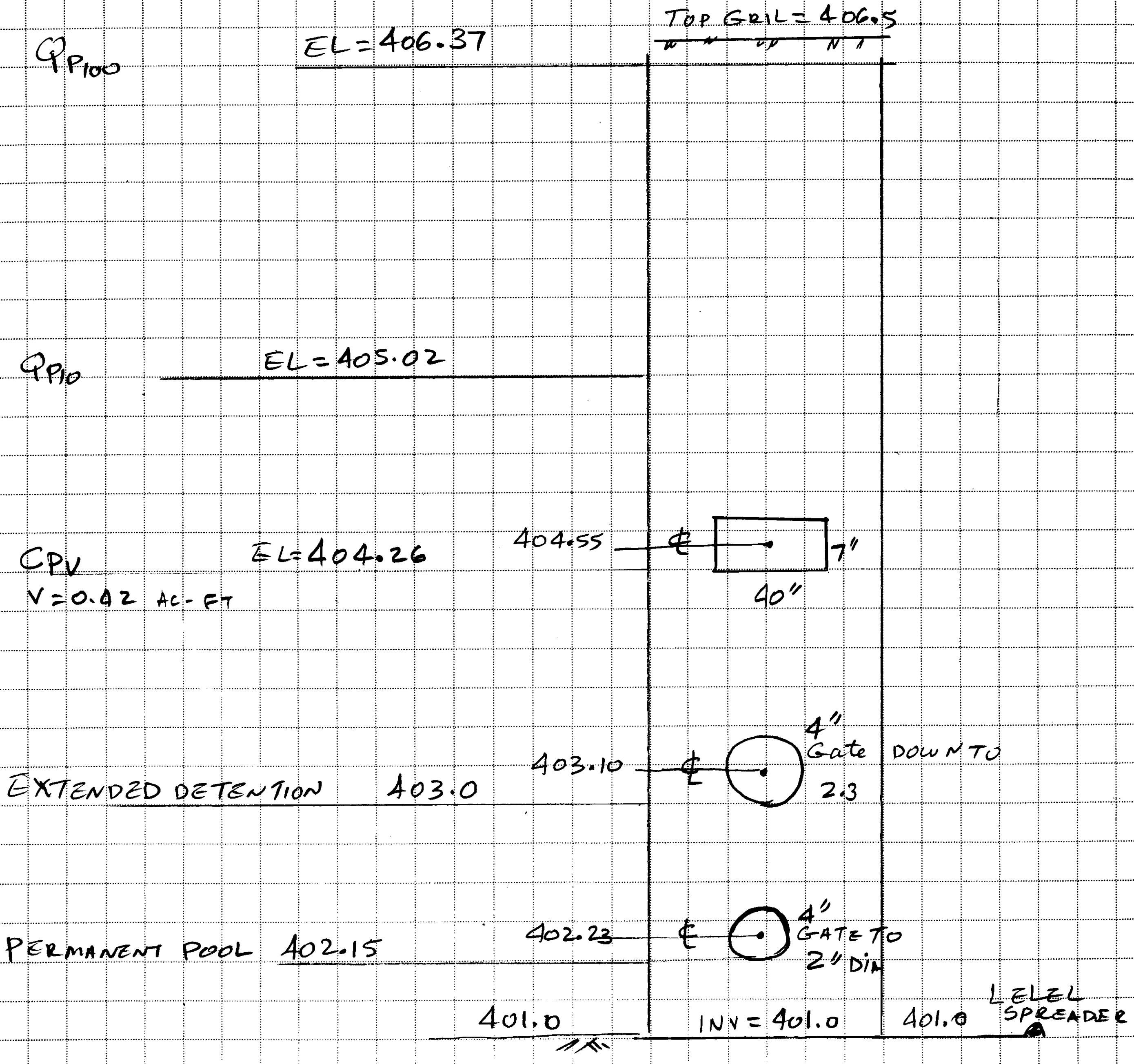

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POND #3

STEP #1 PRELIMINEARY RUNOFF CONTROL VOLUMES

SYMBOLS	CATEGORY	VOLUMES Ac-FT	NOTES
WQ_v	WATER QUALITY	0.28	
Cpv	STREAM PROTECTION	0.60	
Qp	PEAK CONTROL	0.97	10-YR STORM
Q_F	FLOOD CONTROL	1.62	100-YR STORM

STEPS # 2, 2A, & 3 N/A

STEP # 4: SIZE OF WET FOREBAY

10% x WQv OR $0.1 \times 0.28 = 0.028 \simeq 0.05$

STEP # 5: PERMANENT POOL TO CONTAIN 50% OF WQv.

$0.5(0.28) = 0.13$ AC-FT (INCLUDES 0.05 AC-FT)

SIZE OF E.D (EXTENDED DETENTION) VOLUME

$0.5 \times 0.28 = 0.14$ AC-FT

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STEP#6 POND GEOMETRY:

ELEV ft	AREA ft²	AVERAGE AREA	DEPTH	VOLUME Ft3	ΣV + 2 FORBAYS	TOTAL V	V AC-FT
405	0					0	
		4136	1				
406	8,272			4136	4,427	4,427	0.102
		10,822	2				
408	13,371			21644	22,963	27,390	0.629
		23,092	2				
410	32,812			46184	49,490	76,880	1.765
		37,484	1	37,404	43,374	120,254	2.76
411	42,156						

FORBAY

EL Ft	FOREBAY #1 Ft²	FORBAY #2 Ft²	ΣA	AVERAGE Ft²	DEPTH	VOLUME Ft³
405	0	0	0			0
				146	1	
406	34	257	291			291
				660	2	
408	279	749	1,028			1,319
				1,653	2	
410	676	1,602	2,278			3,306
				2664	1	
411	1250	1800	3050			5970

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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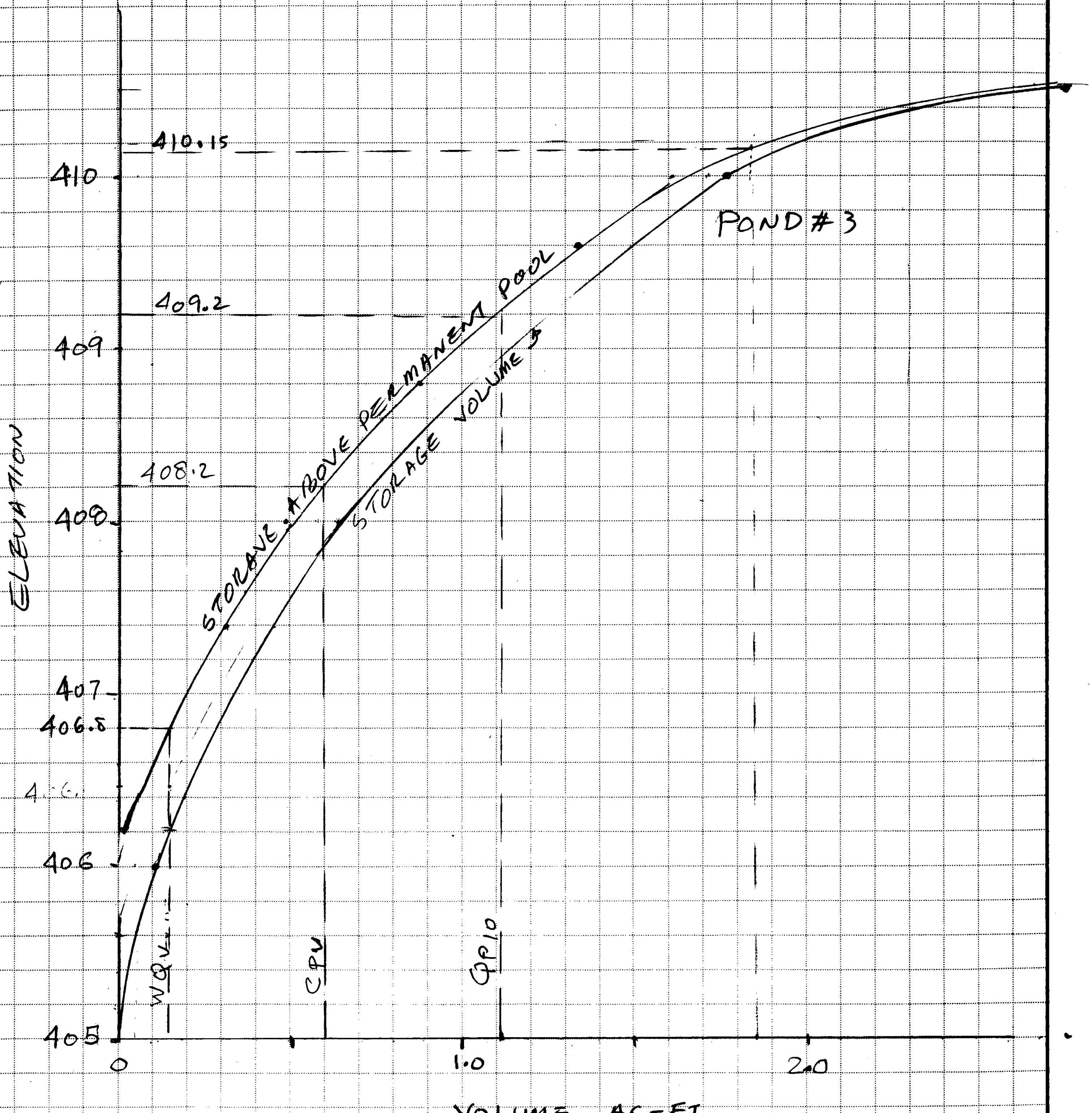

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Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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SET BASIC ELEVATION FOR POND STRUCTURES:

* POND BOTTOM SET @ EL = 405.6

* SET RIVER INVERT @ EL = 405.1

* SET BARREL OUTLET @ EL = 405.0

SET WATER SURFACE & OTHER ELEVATIONS:

* REQUIRED PERMANENT POOL VOLUME @ 50 % OF WQ_V

OR $1/2 \times 0.28 = 0.14$ AC-FT

SET PERMANENT POOL @ EL = 406.20 FT

PERMANENT POOL
EL = 406.20 FT

* FORBAY VOLUME REQUIRED IS 0.1 AC-FT

* REQUIRED EXTENDED DETENTION VOLUME IS:

$(WQ_v - ED) = 0.14$ AC-FT

THE VOLUME ABOVE PERMANENT POOL FOR V = 0.14 AC-FT

FROM EL. VS STORAGE EL = 406.8 Ft

EXTENDED DETENTION
EL = 406.8

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COMPUTE THE REQUIRED WQ_v - ED ORIFICE DIA.

* AVERAGE ED RELEASE IS:

$0.14 \times 43560 \div (24 \times 3600) = 0.07$ CFS

* ORIFICE INVERT SET @ EL = 406.2

$h = 1/2\,(406.8 - 406.2) = 0.3$ Ft

$Q = CA(2gh)^{0.5}$

$C = 0.6$, $h = 0.3$ Ft DIA = 2.2"

$Q = 0.07$ CFS

2.2"

USE 4" DIA, GATE DOWN TO 2.2"

USE 4" PIPE & GATE
DOWN TO 2.2" EQ

$h = 1/2\,(406.8 - 406.29) = 0.26$

$Q = 0.06$ REVISED h to 0.3

WSEL = $406.29 + 2 \times 0.3 = 406.89$ Ft

ED EL = 406.89

STEP 7: COMPUTE ED ORIFICE SIZE
RELEASE RATE FOR CP_V - ED
ESTABLISH CPV ELEVATION

SET THE CP_V POOL ELEVATION

- * REQUIRED CPV STORAGE IS V = 0.6 AC-FT
- * FROM EL. VS STORAGE → EL = 408.2

$\boxed{CPV\ WSEL = 408.2}$

SIZE ORIFICE FOR CPV

- * RELEASE RATE = 0.6 x 43560 ÷ (24 x 3600) = 0.30 CFS
- * SET INV. OF THE ORIFICE @ EL = 406.89
- * DISCHARGE FROM 2.2" DIA ORIFICE

h = 1/2 (408.2 - 406.29) = 0.96 FT

$Q_{2.2''}$ = 0.12 CFS

Q = 0.30 - 0.12 = 0.18 CFS

h = 1/2 (408.2 - 406.89) = 0.66 FT

DIA = 3" DIA

Q = 0.19 CFS

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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RE-CALC.

℄ OF ORIFICE IS $406.89 + \frac{3''}{12} \times \frac{1}{12} = \boxed{407.02}$

$h = 1/2 (408.2 - 407.02) = 0.59$

$Q = 0.18$ CFS OK

USE 4" PIPE
GATE DOWN TO
3" EQ.

STEP 8 $Q_{P_{10}}$ (10-YR STORM)

RELEASE RATE & WATER SURFACE

- $Q_{P_{10}} = 23.64$ CFS IN FLOW
- $Q_{P_{10}} = 5.55$ CFS OUT FLOW
- ESTIMATED OF STORAGE IS V = 0.97 AC-FT

ADD 15% FOR ED

$V = 1.15 \times 0.97 = 1.12$ AC-FT

- FROM EL. VS STORAGE READ EL = 409.2
- Q FROM 2.2"

$h = 1/2 (409.2 - 406.29) = 1.46$ ft $Q = 0.15$

Q FROM 3" ORIFICE

$h = 1/2 (409.2 - 407.02) = 1.09$ ft $Q = 0.25$

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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$Q_{3''} = 0.25$ CFS

$Q = 5.55-(0.15+0.15) = \underline{\underline{5.15}}$ CFS

✱ USE RECT. ORIFICE 40" × 6" HIGH

$h = \frac{1}{2}(409.2 - 408.2) = 0.5$ FT

$Q = 5.67$ CFS

RE-CAL

℄ OF ORIFICE IS $408.2 + 0.25 = 408.45$ FT

$h = 1/2\,(409.2 - 408.45) = 0.38$

$Q = 4.94$

USE 42" × 6" ORIFICE → $Q = 5.16$ CFS ok

$WSEL = 408.2 + \frac{3''}{12} + 0.38 \times 2 = 409.2$

$\boxed{WSEL = 409.2}$

STEP 9: SPILLWAY DESIGN
FLOOD RELEASE & WATER SURFACE EL.

✱ $Q_{P_{100}} = 39.42$ CFS INFLOW

$Q_{P_{100}} = 9.27$ CFS OUT FLOW

$V = 1.62$ AC-FT REQUIRES

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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* ADD 15% FOR ED

V = 1.15 × 1.62 = 1.86 AC-FT

* FROM STORAGE VS EL. READ EL = 410.15

* Q FROM 2.2" ORIFICE

$h = \frac{1}{2}(410.15 - 406.29) = 1.93$

Q = 0.18 CFS

Q FROM 3" ORIFICE IS:

$h = \frac{1}{2}(410.15 - 407.02) = 1.57$ FT

Q = 0.30 CFS

Q FROM 42" × 6" ORIFICE

$h = \frac{1}{2}(410.15 - 408.45) = 0.85$

Q = 7.76

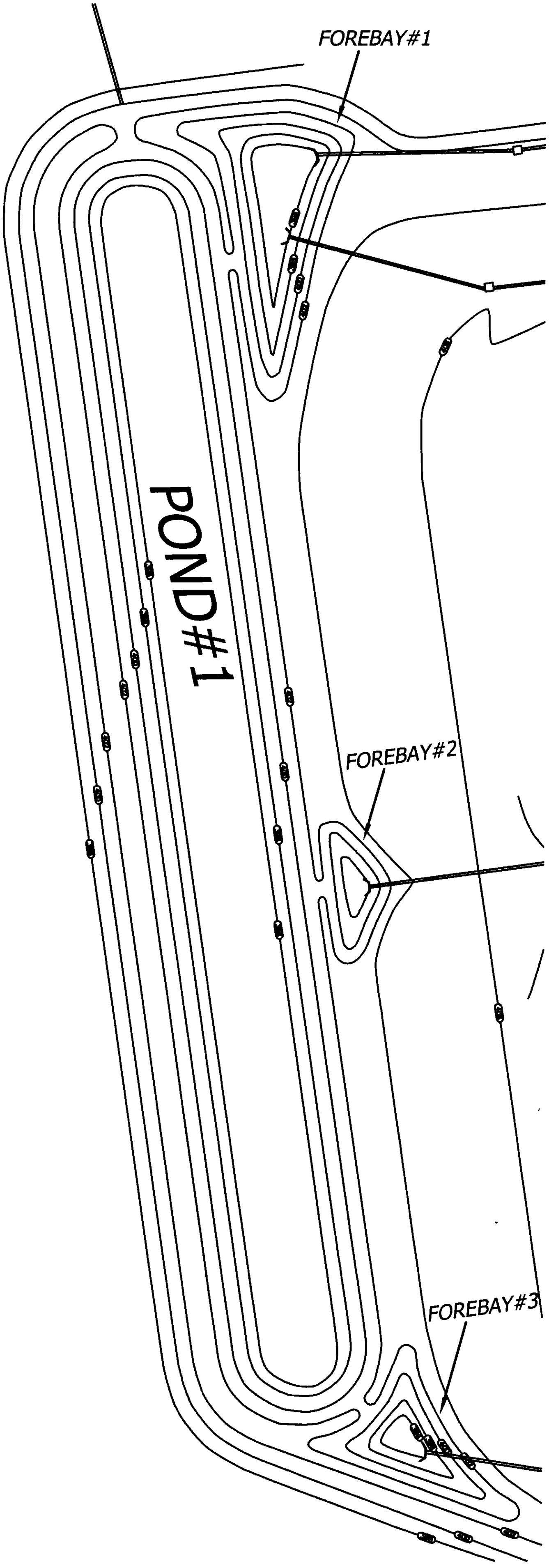
* $Q = 9.27 - (0.18 + 0.30 + 7.76) = 1.03$

SET ORIFICE @ EL = 409.2

D = 8.5"

$h = \frac{1}{2}\left((410.15 - (409.2 + \frac{8.5'}{12} \times \frac{1}{2}))\right) = 0.30$

Q = 1.04 CFS OK

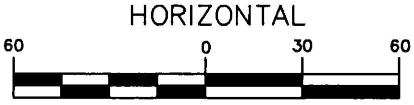


POND#1

ELEVATION (FT.)	AREA (SQ. FT.)
396	14,530
398	19,304
400	25,570
402	32,079

FOREBAY

ELEVATION (FT.)	FOREBAY#1	FOREBAY#2	FOREBAY#3
	AREA (SQ. FT.)	AREA (SQ. FT.)	AREA (SQ. FT.)
396	801	0	172
398	1,516	157	451
400	2,485	524	998
402	3,776	1,022	1,937

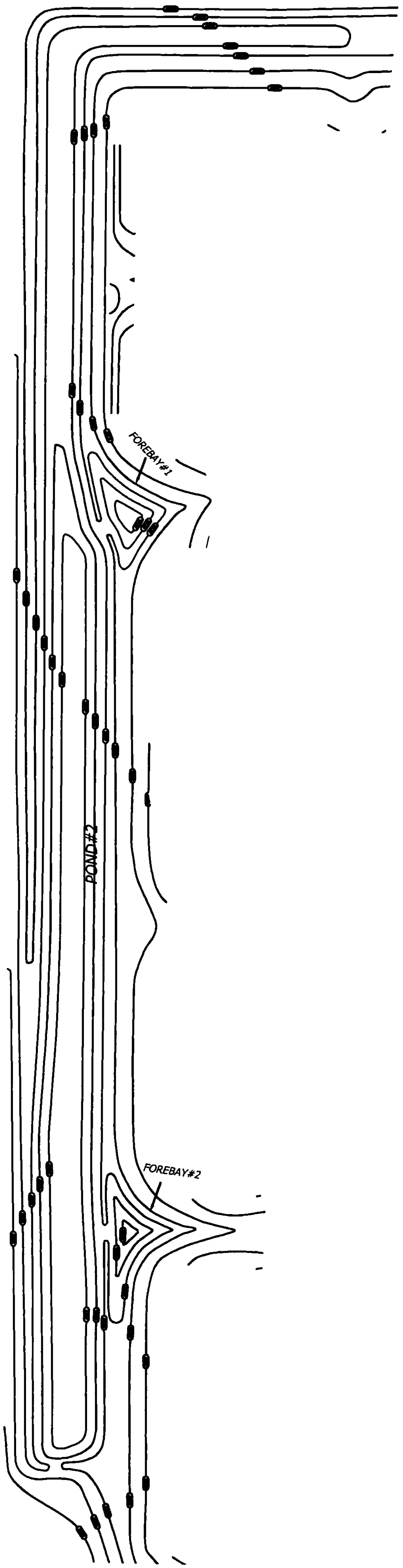


1 IN.= 60 FT.

REVISIONS

MINISCEONGO PARK
ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY, NEW YORK
POND#1
R A ASSOCIATES
CONSULTING ENGINEER

1560
OCTOBER 14, 2006
1"=60'
1/3



POND#2

ELEVATION (FT.)	AREA (SQ. FT.)
402	6,476
404	11,658
406	20,740

FOREBAY

ELEVATION (FT.)	FOREBAY#1	FOREBAY#2
	AREA (SQ. FT.)	AREA (SQ. FT.)
402	0	55
404	120	312
406	430	974
408	972	N/A

REVISIONS

MINISCEONGO PARK
ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY, NEW YORK
POND#2
R A ASSOCIATES
CONSULTING ENGINEER

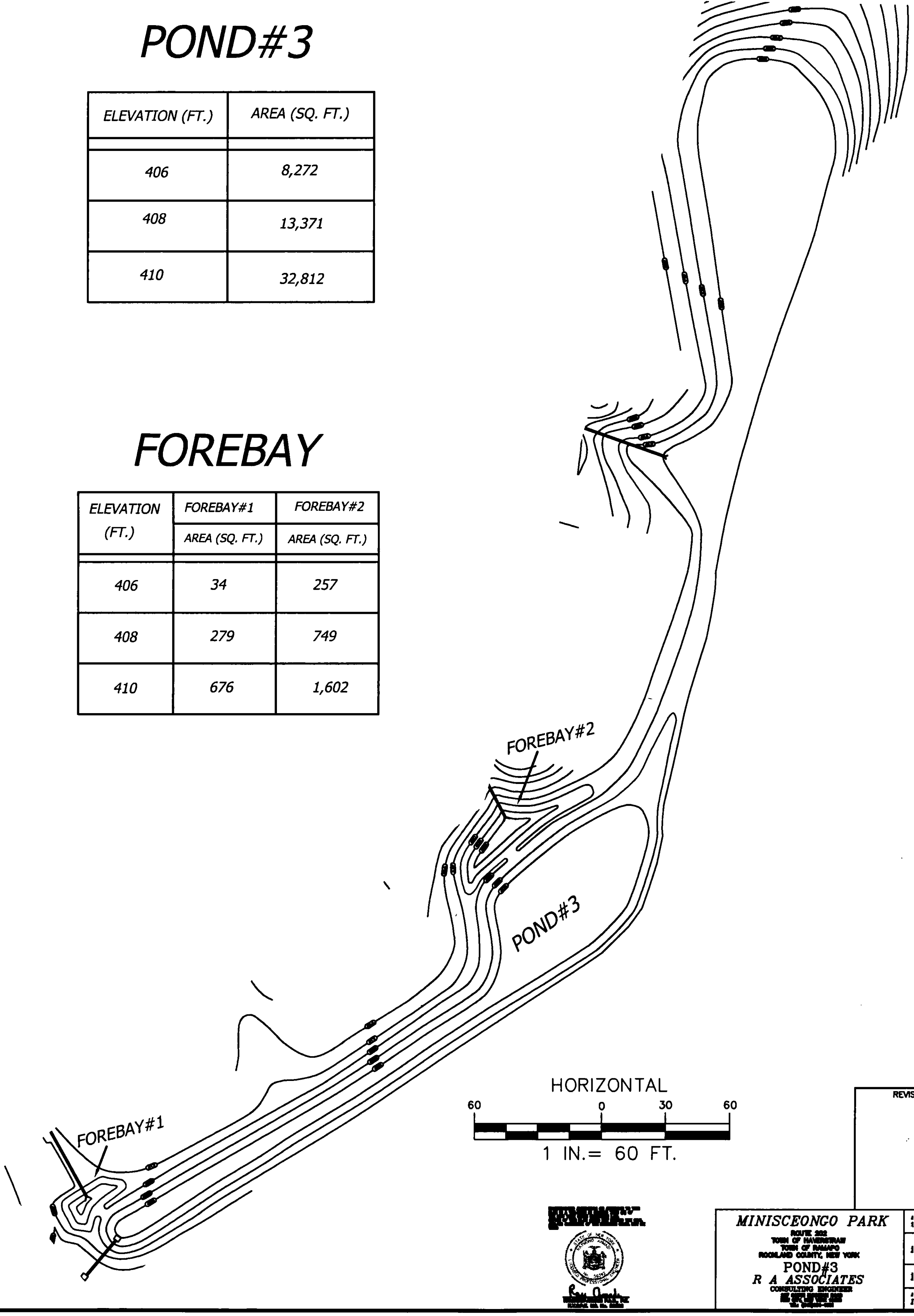
1560
OCTOBER 14, 2005
N.T.S
2/3

POND#3

ELEVATION (FT.)	AREA (SQ. FT.)
406	8,272
408	13,371
410	32,812

FOREBAY

ELEVATION (FT.)	FOREBAY#1	FOREBAY#2
	AREA (SQ. FT.)	AREA (SQ. FT.)
406	34	257
408	279	749
410	676	1,602



RAYMOND AMADI
No. 58587

REVISIONS

MINISCEONGO PARK
ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY, NEW YORK
POND#3
R A ASSOCIATES
CONSULTING ENGINEER

1560
OCTOBER 14, 2005
1"=60'
3/3

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

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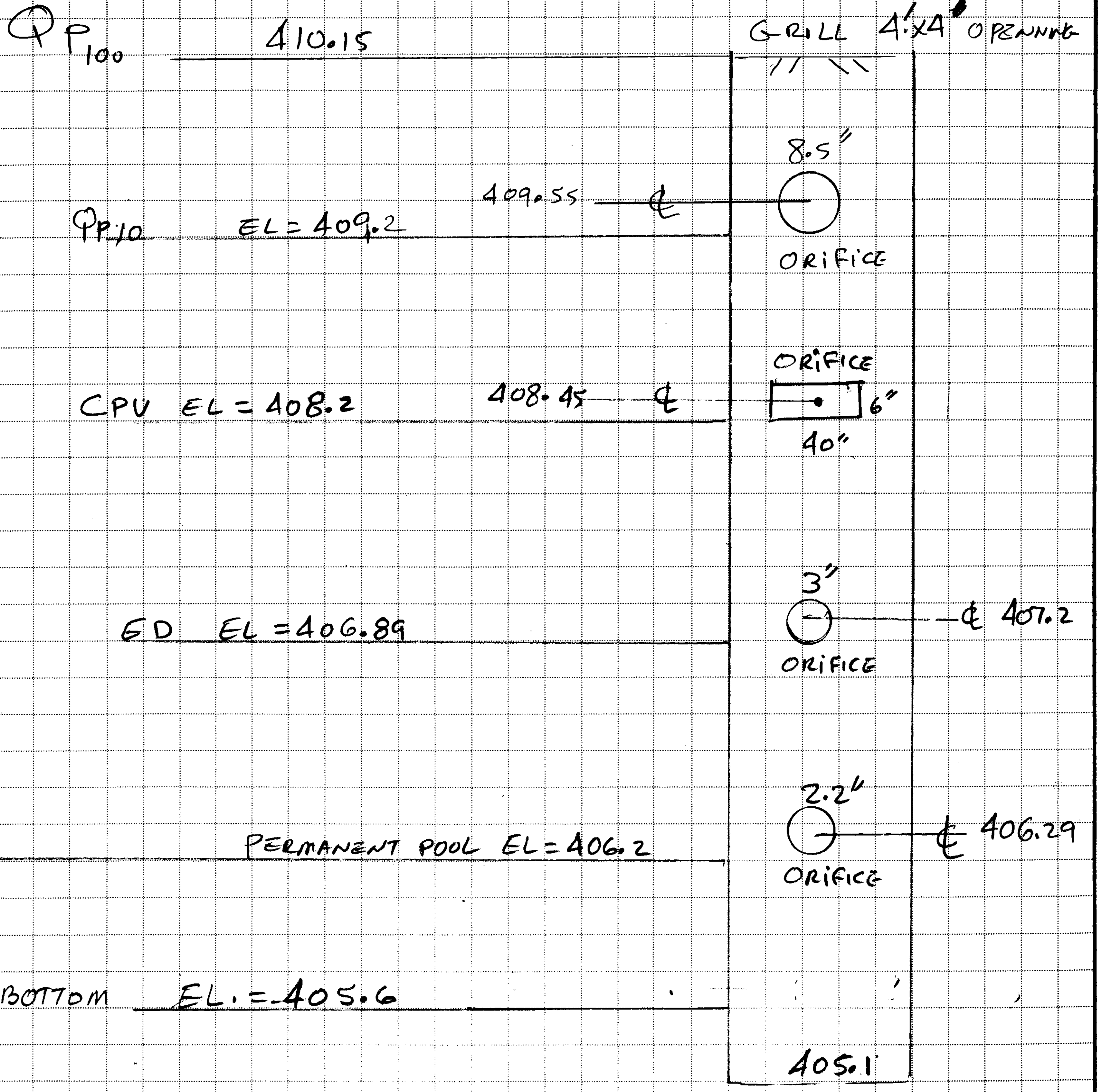
POND #3



MINISCEONGO PARK

N. Y. S. ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY
NEW YORK

SOIL EROSION & SEDIMENT CONTROL DURING CONTROL FILL

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
SEPTEMBER 13, 2005

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RA Associates

CONSULTING ENGINEERS / PLANNER

Ray Ahmadi, Ph.D., P.E.
227 South Mountain Road
New City, New York 10956
Tel.: (845) 634-1351
Fax/Ans. 634-1351
E-Mail: RAAssoc@optonline.net
RA-Engineers.com

September 13, 2005

Town of Haverstraw
Town Hall
One Rosman Rd.
Haverstraw, NY 10920

Att.: Mr. Joseph Caruso, P.E.
Village Engineer
Maser Consulting Engineering

Re: Minisceongo Park
Town of Haverstraw
Town of Ramapo
Rockland County, New York

Sub: Soil Erosion & Sediment control
During Control Fill

INTRODUCTION:

The Miniceongo Park Town Houses are proposed to be built at a location that it used to be sand and gravel pits in the past. The site is fairly flat. The proposed grading plan shows a minimum grade from north to south of the site. The north end of the

property is approximately forty feet lower than Quaker Road. At the south side of the property, the land is frequently flooded by the South Branch Miniceongo Creek.

The limit of the wetlands along the South Branch Miniceongo Creek has been delineated by Robert Torgensenon, L.S. AIA on November 9, 2001. The Soil Erosion / Water Quality Plan depicts the following features:

A) existing grades. The land slopes down from east (Quaker Road) to west (South Branch Miniceongo Creek). The drop is eleven feet in approximately 1,800 feet, which is less than 1% slope across the site (along Route 202).

B) limit of wetland as located on November 9, 2001.

C) limit of one hundred feet buffer zones with respect to the limit of wetland.

D) limit of one hundred-year flood elevation.

E) proposed contour lines during initial fill placement.

F) proposed limits of surcharged fill area.

G) silt fences around the disturbed areas.

H) the disturbed area is divided into three subareas. Each subarea will drain into a proposed silt pond.

I) the silt ponds are over excavated to store the silts eroded form the disturbed area during the fill placement and rough grading. After the fill placement, the ponds will be re-graded to in order to be used as permanent storm water management and water quality control during and after the construction.

New York Guidelines for Urban Erosion & Sediment Control, Fourth Edition-April 1997 has been in preparation of this report.

SITE LOCATION:

The site is a former sand and gravel pits located northwest corner of Haverstraw Road (Route 202) and Quaker Road in the Town of Haverstraw & Ramapo, New York.

The site is forty feet (40') lower than Quaker Road and approximately two feet above the 100-year flood elevation at the South Branch Miniceongo Creek. The site is fairly flat, less than 1% slope from Quaker Road to South Branch Miniceongo Creek.

FILL PLACEMENT:

The site must be fill in from zero to twelve feet from the west to east in order to be able to drain impervious areas to the ponds. The existing ground cover will be stripped and clean fill materials will be brought to the site. The sequence of fill replacement activities are shown on the attached map entitled “Miniceongo Park, Soil Erosion / Water Quality Plan” (F-1).

DISTURBED AREAS:

The clean fill materials will be brought to the site to lift up the existing grades to the proposed basements elevations. A portion of the site is reserved for stock pilling the material for future use. See attached Soil Erosion / Water Quality Plan (F-1) for details.

The total disturbed area will be 33.65 acres. There are three proposed sediment ponds which they are designed to receive the annual sediment yields from the disturbed areas. These temporary sediment ponds will be regarded after the construction of the development and install the proposed control devices according to the attached “Stormwater Management Design Report”.

The disturbed areas are divided into three subareas. The Dist.#1 has an area of 21.4 acres. The northwest area of this area will be surcharged as shown on F-1 plan. Down grade of the construction soils’ (fill material) stock pile will be a temporary trench connecting pond #2 to pond #1. Disturbed area No.2 (Dist.#2) located south of Bar Lab and it has an area of 6.40 acres. The runoff and sediment laden will flow into the proposed temporary pond #2 and then any over flow from the check dam flows into the temporary trench connected to pond #1. Disturbed area No. 3 (Dist.#3) is located west of PIP access Road with an area of 5.85 acres. The runoff and sediment laden will flow toward the proposed temporary sediment pond #3. Any over flow from the check dam flows through the down stream swale which it is connected to the pond #1.

Over flows from ponds Nos. 2 & 3 will flow slowly toward pond # 1 with velocity of less than one foot per second (FS). The pond are grossly over excavated (up 200% of required volumes). The water surface at the ponds must be risen to the elevation of the check dam’s weir in order to be released. There is no pipe except over flow weir at four to six feet above the bottom of the sediment basin. During the detention of the brown water in the ponds, the particles (sediment) in the brown water will be settled. As stated previously, the site is a former sand and gravel pits. Therefore, the storm water will be infiltrated to the ground through the pond’s side walls. It is assumed that the bottom of the pond will be silted soon after the first storm and there will be no infiltration through the bed of the ponds.

The particles in the water flowing with a velocity of less than 2 FPS are in settling stage. The pond #1 has approximately 6 ac-ft capacity which is more than double the capacity needed for the entire project. The temporary sediment ponds are two ft lower than the permanent ponds in order to have storage capacity for the sediment laden deposit from the disturbed areas.

SEDIMENT YIELDS:

Appendix "B" of New York Guidelines for Estimating Sediment Yields for Urban Construction Areas, dated April 1997 will be utilized to calculate sediment yields for the disturbed area.

The sediment yields for each disturbed areas have been calculated base on the above-mentioned guidelines. If the upstream pond Nos. 2 & 3 are breached, the sediment from the entire disturbed area (33.65 acres) will reach pond #1 which is six feet below the existing ground. The water surface must be raised at least 5.5 feet above the bed of pond #1 before any overflow releases from the proposed weir. The capacity of this basin more than double of the required brown runoff from the entire disturbed area. The design safety factor is more than two.

SUMMARY OF SEDIMENT YIELD DURING CONSTRUCTION & FILLING THE SITE

Disturbed Area ID	Area (Acre)	Sediment Yield (Acre-ft)	Provided Storage (± Acre-ft)	Remark
Dist.# 1	21.40	2.56	6.00	*
Dist.# 2	6.40	1.86	2.38	*
Dist.# 3	5.85	1.77	5.59	*
Total	33.65	2.91	6.00	*

* Temporary Sediment Pond is over excavated area by two feet.

HYDRAULIC / HYDROLOGY
OF
SEDIMENT YIELD
DURING
CONSTRUCTION & FILLING THE SITE

During the rough grading the site, the disturbed areas, the flush flooding will occur due to the loose bare soils imported filling the site. The ground cover of the disturbed areas have an important role in the hydrology the site.

The disturbed areas are divided into three sub areas. Each sub area drains into a temporary sediment pond. These ponds have a dual functions; a) to collect sediment, b) to attenuate the runoffs before reaching Miniceongo Creek.

HYDROLOGICAL SOIL GROUP:

The imported soils are assumed to have a CN number of 91 (CN=91). The higher the CN number, the higher the rate of runoff. The CN number of impervious areas such as roofs, driveway, etc. is 98 (maximum value of CN).

DRAINAGE STUDY:

We have prepared the attached Hydrological – Hydraulics analysis for the existing condition and disturbed areas. The existing site is located on two watersheds (WS#1 & WS#2). The total area of both watersheds is 50.87 acres. With the exception of the edge of property lines, the entire area is flat. The area used to be a sand pits, which the materials were excavated and used elsewhere.

The disturbed areas are located on three disturbed areas (Dist.#1, Dist.#2 and Dist.#3). The runoffs from each disturbed area will flow into a proposed temporary sediment pond. The purpose of the pond is to attenuate the flow and settle the sediment (water quality) before released to Minisceongo.

As the result of these activities, the runoff from the disturbed areas with a total area of equal to 33.65 acres will be increased due to the bare soil (no cover and the surface is smooth). For the comparison purposes, the runoff from the existing area must be proportioned to the same areas that they will be disturbed. . A detention pond is required to attenuate the peak runoffs during construction to existing condition.

The runoff for the existing condition is calculated in the attached section of this report. The peak flows must be multiplied by 0.66 (50.87 ac/33.65 ac=0.66) in order to obtain the peak runoff from portion of the site which it will be disturbed for filling the site.

A summary table of peak flows are attached for your reference

The volume of the proposed detention ponds are crossly over designed to protect Miniceongo Creek from receiving brown water from the site.

Preliminary calculations are attached for your reference.

Very truly yours,

Ray Ahmadi, Ph.D., P.E.

C:Hydrology TR-55\1560\Modified Report\Soil Erosion Report.wpd

SUMMARY OF PEAK FLOW OF DIFFERENT STORM FREQUENCIES DURING CONSTRUCTION AND FILLING THE SITE

Storm Frequency (Year)	Existing Condition (CFS) (1)	Developed Condition with Ponds (CFS) (2)	Change in Flow (CFS)	Remarks
1	10.18	12.32	+2.14	*
2	20.55	19.29	-1.26	*
10	44.06	33.67	-10.39	*
100	89.19	57.97	-31.22	*

(1) Flows are reduced for portion of disturbed areas
(2) Provided three ponds to attenuate the flows
* Required storage

MINISCEONGO PARK

N. Y. S. ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY
NEW YORK

TR-55 INPUT DATA FOR SOIL EROSION/ WATER QUALITY AND SEDIMENT YIELD DURING FILL PLACEMENT

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
SEPTEMBER 13, 2005

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINISCEONGO PARK (1560)
SHEET NO. ① OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE SOIL EROSION / WATER QUALITY

INTRODUCTION:

THE SITE IS A FORMER SAND PIT LOCATED AT NORTH-WEST CORNER OF HAVESTRAW RD (RTE 202) & QUAKER RD IN THE TOWN OF HAVESTRAW & RAMPO, NY.

THE SITE IS 40± LOWER THAN QUAKER, AND 2± ABOVE THE 100-YR FLOOD ELEVATION AT MINICEONGO CREEK. THE DISTANCE FROM QUAKER ROAD TO MINICEONGO CREEK IS 1800± & GRADE DROPS APPROXIMATELY 11± Ft (FROM 411± @ THE EAST OF THE SITE TO 400± @ THE BANK OF THE CREEK).

IN ORDER TO ACHEIVE THE PROSED GRADE PER GRADING PLAN AND BE ABLE TO DRAIN THE DEVELOPED AREA INTO THE PROPOSED PONDS, THE SITE MUST BE FILLED IN FROM "0" Ft TO 12 Ft.

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINICEONGO PARK (1560)
SHEET NO. ② OF
CALCULATED BY DATE 9/16/05
CHECKED BY DATE
SCALE SOIL EROSION/WATER QUALITY

DISTURBED AREA

THE FILL MATERIALS WILL BE BROUGHT FROM OUTSIDE TO BRING UP THE EXISTING GRADE UP TO THE PROPOSED BASEMENT ELEVATION. SEE ATTACHE SOIL EROSION/WATER QUALITY MAP (F-1).

THE TOTAL DISTURBED AREA WILL BE 33.65± ACS. THERE ARE THREE PROPOSED SEDIMENT PONDS WHICH THEY WILL BE RE-GRADED AFTER THE CONSTRUCTION OF THE SITE TO PERMENANT FLOOD CONTROL/WATER QUALITY PONDS. CALCULATIONS ARE COVERED IN THE "MINICEON PARK, STORMWATER MANAGEMENT REPORT"

THE SEDIMENT PONDS WILL BE TWO FT LOWER THAN THE PERMENANT POND TO HAVE ROOM FOR SEDIMENT LANDEN DEPOSIT.

THE DISTURBED AREAS WILL BE DIVIDED INTO THREE SUB-AREAS. THE DIST. #1 HAS AN AREA OF 21.40 ACS. THE NORTH-WEST OF THIS AREA WILL

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINICEONGO PARK (1560)
SHEET NO 3 OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE SOIL EROSION / WATER QUALITY

BE SURCHARGED AS SHOWN ON F-1 PLAN. DOWN GRADE OF THE SOIL STOCK PILE WILL BE A TEMPORARY SEDIMENT POND. THE BOTTOM OF THE POND'S ELEVATION IS @ 394. A DEAD STORAGE IS CREATED TO RECIEVE THE SEDIMENT LOADS FROM THIS DISTURBED AREA.

DIST. #2 LOCATED SOUTH OF BAR LAB & HAS AN AREA OF 6.40 ACS. THE RUN OFF & SEDIMENT LADEN WILL FLOW INTO THE PROPOSED TEMPORARY POND #2.

DIST. #3 IS LOCATED WEST OF PIP ACCESS ROAD WITH AN AREA OF 5.85 ACS. THE RUN OFF & SEDIMENT LADEN WILL FLOW TOWARD PROPOSED TEMPORARY POND #3.

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINICEONGO PARK (1560)
SHEET NO ④ OF
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DATE 9/6/05
CHECKED BY
DATE
SCALE SOIL EROSION / WATER QUALITY

SEDIMENT YIELDS

NY GUIDLINES FOR URBAN EROSION & SEDIMENT CONTROL, FOURTH PRINTING - APRIL 1997 WILL BE FOLLOWED IN THIS REPORT.

APPENDIX "B" GUIDELINES FOR ESTIMATING SEDIMENT YEILDS FOR URBAN CONSTRUCTION AREAS WILL BE UTILIZED TO CALCULATE SEDIMENT YEILDS FOR THE DISTURBED AREAS.

PER FIGURE B-1 "AVERAGE ANNUAL ISO-ERODENT VALUES", THE SITE IS LOCATED IN ROCKLAND COUNTY WITH ISO-ERODENT VALUE OF "200". FROM TABLE B-1 CORRECTION FACTOR USED IN EQUATION IS "1.34"

SEDIMENT YEILD EQUATION (APPENDIX B)

$$V=((C\times A/_{1320})\times(22000/A)^{0.715}$$

WHERE:

V = ACRE-FT, REQUIRED SEDIMENT STORAGE PER YEAR

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINICEONGO PARK (1560)
SHEET NO ⑤ OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE

A = UNCONTROLLED DRAINAGE AREA UNDER CONSTRUCTION EXPRESSED IN SQUARE miLES.

C = 150 - ERODENT CORRECTION FACTOR

DIST. #1

A = 21.40 ACS OR A = 0.03344 S.m.

C = 1.34

$$V = \left(\left(\frac{1.34 \times 0.03344}{1320} \right) \times \left(\frac{222,000}{003344} \right)^{0.715} \right)$$

$$\boxed{V = 2.56 \text{ AC-FT}}$$

THE PROPOSED TEMPORARY SEDIMENT POND #1 AT 4 FT. DEEP (BASIN IS 6 FT DEEP, FROM ElEV = 394 TO TOP EL = 400) HAS 6.16 AC-FT.

ElEV - VS - STORAGE
POND #1

EL.	A Ac-	ΔV AC-FT	ΣV AC-FT
393.8	0		
		0.046	
394	0.459		0.046
		1.27	
396	0.811		1.32
		2.04	
398	1.23		3.36
		2.80	
400	1.57		6.16

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINICEONGO PARK (1560)
SHEET NO. ⑥ OF
CALCULATED BY DATE 9/6/05
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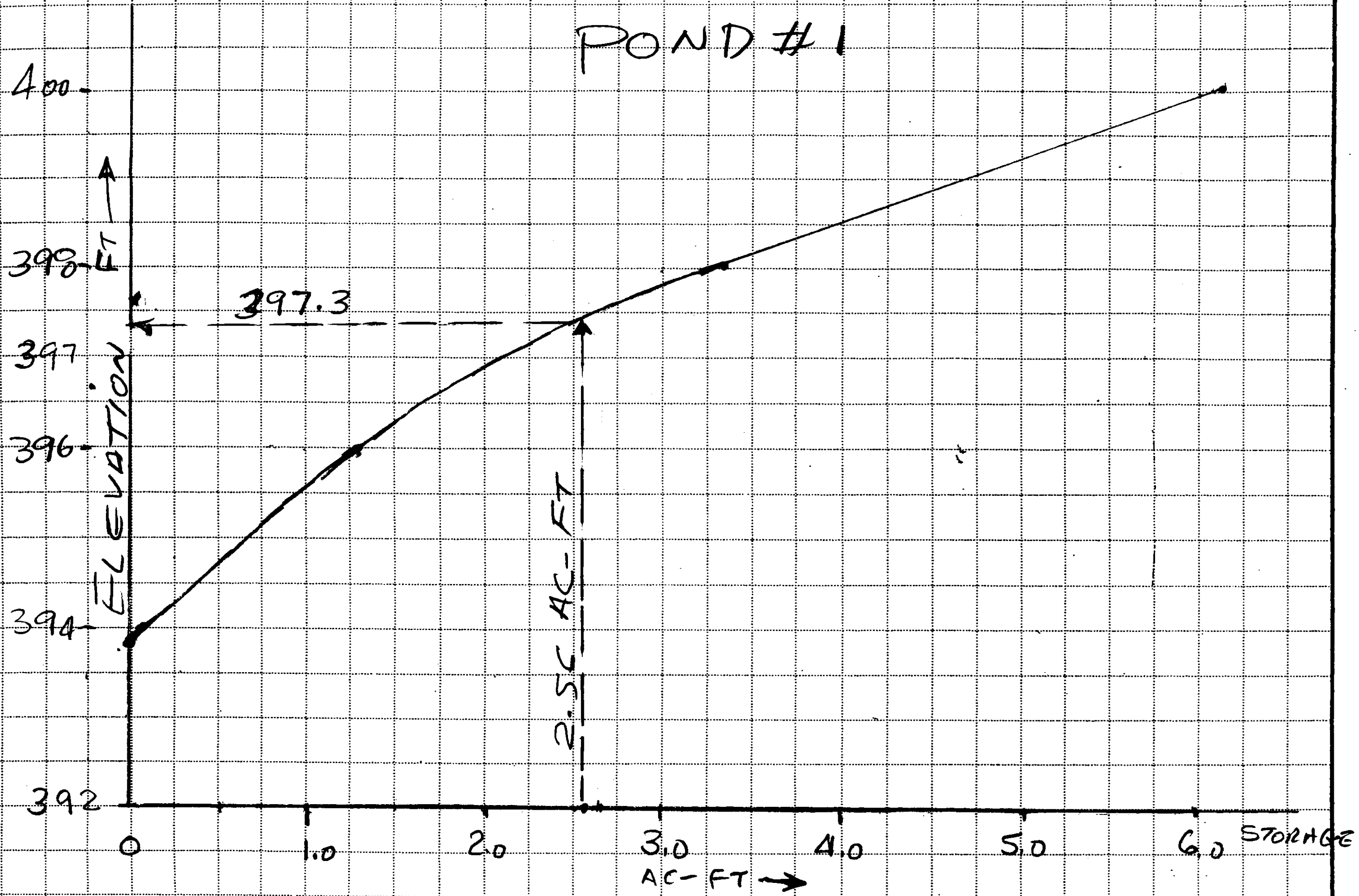
SCALE



ELEV. VS. STORAGE

ONE YEAR SEDIMENT DEPOSIT WILL FILL UP THE PROPOSED TEMPORARY POND #1 UP TO ELE. 397.3. THE STORAGE ABOVE THIS ELEVATION (V = 3 ± AC-FT) WILL BE USED FOR FLOODING, WATER QUALITY PORPOSES.

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINI CEONGO PARK (1560)
SHEET NO. ⑦ OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE

DIST. #2

A = 6.40 ACS OR A = 0.01 S.M.

C = 1.34

$$V = \left(\frac{C \times A}{1320}\right) \times \left(\frac{222{,}000}{A}\right)^{0.715}$$

$$V = \left(\frac{1.34 \times 10^{-2}}{1320}\right)\left(\frac{222{,}000}{10^{-2}}\right)^{0.715} = 1.82 \text{ AC-FT}$$

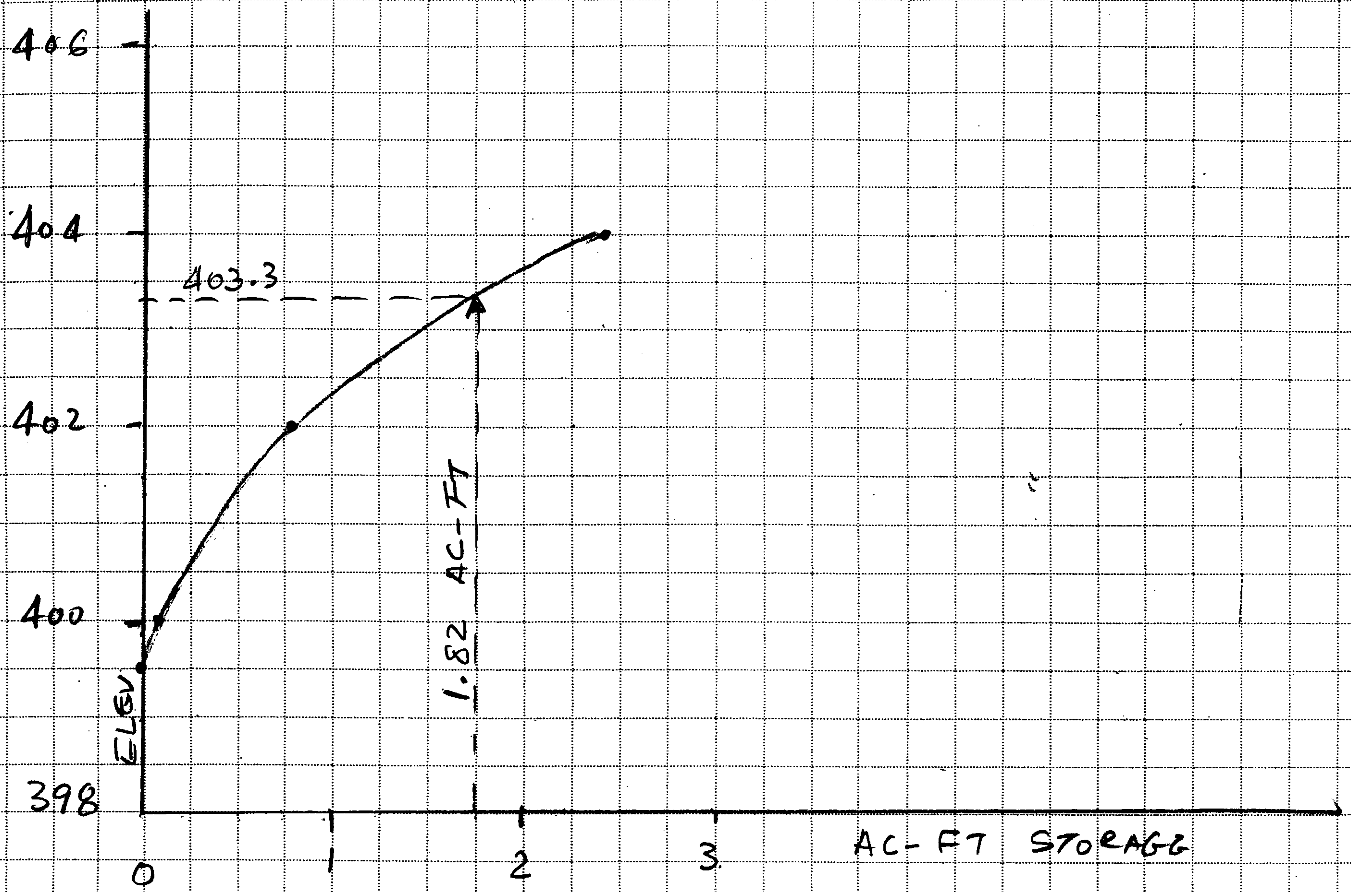
$$\boxed{V = 1.82 \text{ AC-FT}}$$

POND #2

ELEV VS. STORAGE

ELEV Ft	A Acs	ΔV AC-FT	ΣV AC-FT
399.5	0		
		0.07	
400.0	0.26		0.07
		0.78	
402.0	0.52		0.85
		1.53	
404.0	1.01		2.38

JOB MINICEONGO PARK (1560)
SHEET NO. ⑧ OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE



AFTER ONE YEAR OF SEDIMENT DEPOSIT FROM DISTURBED AREA #2, THE BOTTOM ELEVATION OF THE POND #2 WILL BE REACHED AT ELEVATION 403.3.

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINICEONGO PARK (1560)
SHEET NO. ⑨ OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE

DIST. #3

A = 5.85 Acs OR A = 0.00914 S. MI.

C = 1.34

$$V = \left(\frac{1.34 \times 0.00914}{1320}\right)\left(\frac{222,000}{0.00914}\right)^{0.715} = 1.77 \text{ AC-FT}$$

$$\boxed{V = 1.77 \text{ AC-FT}}$$

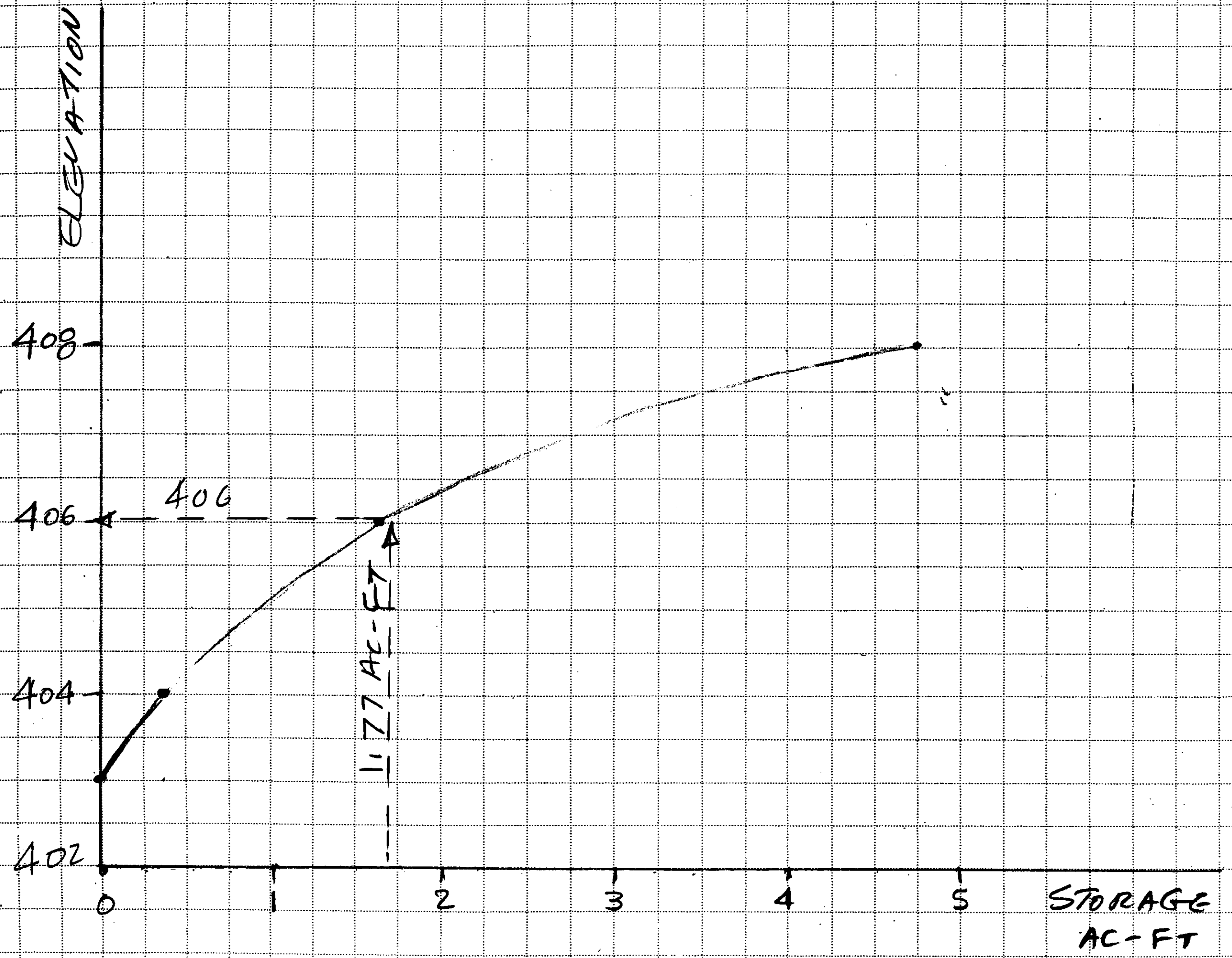
POND #3

ELEVATION VS. STORAGE

ELEV. FT	AREA ACS	ΔV AC-FT	ΣV AC-FT
403	0		0
		0.27	
404	0.53	→	0.27
		1.49	
406	0.96		1.76
		2.83	
408	1.87		4.59

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
914 634-1351
634-4106

JOB MINI CEONGO PARK (1560)
SHEET NO. 10 OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE



ONE YEAR SEDIMENT FROM DIST. #3 WILL FILL UP THE PROPOSED TEMPORARY POND #3 UP TO ELEVATION 404.

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINICEONGO PARK (1560)
SHEET NO. 11 A OF
CALCULATED BY DATE 9/19/05
CHECKED BY DATE
SCALE

ASSUME PONDS NO. 2 & 3 ARE FAILED. THE SEDIMENT YIELDS FROM ENTIRE DISTURBED AREA IS CALCULATED AS FOLLOW:

A = 33.65 ACS OR 0.05258

C = 1.34

$$V = \left(\frac{C \times A}{1320}\right) \times \left(\frac{222{,}000}{A}\right)^{0.715} = \left(\frac{1.34 \times 0.05258}{1320}\right)\left(\frac{222{,}000}{0.05258}\right)^{0.715}$$

V = 2.91 AC-FT

$$\boxed{V = 2.91 \text{ AC-FT}}$$

POND #1 @ ELEV = 400 HAS 6 AC-FT CAPACITY.

MINISCEONGO PARK

N. Y. S. ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY
NEW YORK

TR-55 INPUT DATA FOR HYDRAULIC / HYDROLOGY OF DISTURBED AREAS DURING CONSTRUCTION & FILLING THE SITE

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
SEPTEMBER 13, 2005

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINICEONGO PARK (1560)
SHEET NO. ⑪ OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE

HYDRAULIC / HYDROLOGY OF DISTURBED AREAS DURING CONSTRUCTION & FILLING THE SITE

APPROXIMATELY 33.65 ACS OF THE SITE WILL BE DISTURBED DURING ROUGH GRADING THE SITE. SEE F-1. THE DISTURBED AREAS ARE SUB-DIVIDED INTO THREE SEGMENTS. RUN OFF FROM EACH DISTURBED AREAS WILL FLOW INTO A PROPOSE TEMPORARY SEDIMENT POND. THE SEDIMENT PARTICLES: WILL HAVE SUFFICIENT TIME TO BE SETTLED BEFORE THE RELEASE OF THE RUN OFF TO MINICEONGO CRK.

JOB MINICEONGO PARK (1560)
SHEET NO. ⑫ OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE

DIST. #1

A = 21.40 ACS

CN = 91 PERVIOUS AREAS GRADED "C"

$L_1 = 100$ LF

$S = \frac{414-413}{100} = 0.01$ DISTURED AREA (Fill)

$L_2 = 475$ LF SHALLOW CONCENTRATED FILL

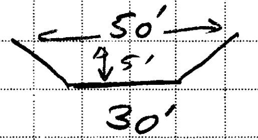
$S_2 = \frac{413-404}{475} = 0.0189$

$L_3 = 575$ LF SHALLOW CONC. FLOW

$S_3 = \frac{404-402}{575} = 0.0035$

$L_4 = 800 \pm$ LF STREAM FLOW TO P.O.I

$S_4 = 0.001$



A = 200 #

WP = 52.4 FT

n = 0.035 FT

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINICEONGO PARK

SHEET NO. (13) OF

CALCULATED BY DATE 9/6/05

CHECKED BY DATE

SCALE

DISTURBED AREA #2

A = 6.40 ACS

CN = 91 PERVIOUS AREA, GRADED "C"

L_1 = 100 LF OVER LAND

$$S_1 = \frac{414 - 413}{100} = 0.01$$

L_2 = 200 LF CONCENTRATED FLOW

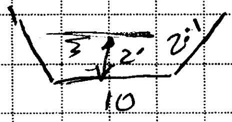
$$S_2 = \frac{413 - 408}{200} = 0.0250$$

L_3 = 70 LF SHALLOW CONCENTRATED FLOW

$$S_3 = \frac{408 - 402}{70} = 0.0857$$

L_4 = 1,050 LF CHNL NORTH-WEST OF THE SITE

$$S_4 = \frac{400 - 394}{1050} = 0.0057$$



B = 10'

D = 2'

A = 140 S.F.

P = 18.94 FT

n = 0.035

JOB MINICEONGO PARK
SHEET NO. ⑭ OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE

$L_5 = 800$ LF STREAM

$S_5 = 0.001$

$A = 200$ S.F.

$P = 52.4$ FT

$n = 0.035$

DIST. # 3

$A = 5.85$ ACS

$CN = 91$ PERVIOUS AREA NEWLY GRADED "C"

$L_1 = 100$ LF OVER LAND FLOW

$$S_1 = \frac{414-413}{100} = 0.01$$

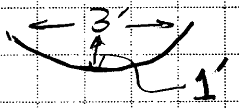
$L_2 = 550$ LF SHALLOW CONCENTRATED FLOW

$$S_2 = \frac{413-406}{550} = 0.0127$$

POND # 3 AFTER TO POND #1

$L_3 = 900$ LF SWALE (TEMPORARY)

$$S_3 = \frac{406-400}{900} = 0.0067$$



$A = \frac{2}{3} \times 3 \times 1 = 2$ S.F

$WP = 3$ FT

Ray Ahmadi, Ph.D. P.E.
Consulting Engineer
227 South Mountain Road
New City, New York 10956
634-1351

JOB MINICEONGO PARK
SHEET NO. 15 OF
CALCULATED BY DATE 9/6/05
CHECKED BY DATE
SCALE

n=0.035

L4=800 LF STREAM

S4=0.001

A = 200 S.F STREAM SECT.

WP = 52.4 FT

n = 0.035

MINISCEONGO PARK

N.Y.S. ROUTE 202
TOWN OF HAVERSTRAW
TOWN OF RAMAPO
ROCKLAND COUNTY
NEW YORK

TR-55 OUTPUT DATA AND HYDROGRAPHS FOR DISTURBED AREAS (1, 2, 10 & 100-YEAR STORMS)

BY

RA ASSOCIATE CONSULTING ENGINEERS
227 SOUTH MOUNTAIN ROAD
NEW CITY, NEW YORK
TEL / FAX (845)634-1351

DATE OF REPORT
SEPTEMBER 13, 2005

```
                    WinTR-55 Current Data Description

                        --- Identification Data ---

User:     RA Assoc.                              Date:       9/13/2005
Project:  Miniceongo Park                        Units:      English
SubTitle: Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                                                 Areal Units: Acres
State:    New York
County:   Rockland
Filename: P:\hydrology TR-55\1560\Dist#1.w55


                          --- Sub-Area Data ---

Name           Description             Reach        Area(ac)    RCN    Tc
-------------------------------------------------------------------------------
Dist. #1      Disturbed Area          Pond#1         21.4        91   .251
Dist.#2       Disturbed Area          Pond#2         6.4         91   0.1
Dist.#3       Disturbed Area          Pond#3         5.85        91   0.109

Total area: 33.65 (ac)


                          --- Storm Data  --

                  Rainfall Depth by Rainfall Return Period

   2-Yr        5-Yr        10-Yr       25-Yr       50-Yr       100-Yr      1-Yr
   (in)        (in)        (in)        (in)        (in)        (in)        (in)
--------------------------------------------------------------------------------
    3.5         4.5         5.0         6.0         7.0         7.5         2.7


Storm Data Source:              Rockland County, NY  (NRCS)
Rainfall Distribution Type:     Type III
Dimensionless Unit Hydrograph:  <standard>
```

```
RA Assoc.                        Miniceongo Park
               Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                              Rockland County, New York

                                   Storm Data

                     Rainfall Depth by Rainfall Return Period

   2-Yr         5-Yr         10-Yr        25-Yr        50-Yr        100-Yr       1-Yr
   (in)         (in)         (in)         (in)         (in)         (in)         (in)
--------------------------------------------------------------------------------
   3.5          4.5          5.0          6.0          7.0          7.5          2.7

Storm Data Source:              Rockland County, NY  (NRCS)
Rainfall Distribution Type:     Type III
Dimensionless Unit Hydrograph:  <standard>
```

```
RA Assoc.                   Miniceongo Park
            Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                         Rockland County, New York

                           Watershed Peak Table

 Sub-Area            Peak Flow by Rainfall Return Period
 or Reach        2-Yr      10-Yr     100-Yr      1-Yr
Identifier      (cfs)      (cfs)      (cfs)      (cfs)
---------------------------------------------------------------------------------
SUBAREAS
Dist. #1        46.29      70.97     111.61      33.08

Dist.#2         16.13      24.61      38.52      11.59

Dist.#3         14.66      22.37      35.04      10.53


REACHES
Pond#1          55.36      86.64     138.94      38.69
    Down        19.29      33.67      57.97      12.32

Pond#2          16.13      24.61      38.52      11.59
    Down         5.56       9.22      15.51       3.63

Pond#3          14.66      22.37      35.04      10.53
    Down         5.00       8.29      14.25       3.22


OUTLET          19.29      33.67      57.97      12.32
```

```
RA Assoc.                      Miniceongo Park
             Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                           Rockland County, New York

                       Hydrograph Peak/Peak Time Table

 Sub-Area       Peak Flow and Peak Time (hr) by Rainfall Return Period
 or Reach       2-Yr     10-Yr    100-Yr      1-Yr
Identifier     (cfs)     (cfs)     (cfs)     (cfs)
            (hr)      (hr)      (hr)      (hr)
---------------------------------------------------------------------------------

SUBAREAS
Dist. #1       46.29     70.97    111.61     33.08
           12.18     12.18     12.17     12.18

Dist.#2        16.13     24.61     38.52     11.59
           12.11     12.11     12.11     12.11

Dist.#3        14.66     22.37     35.04     10.53
           12.11     12.11     12.11     12.11


REACHES
Pond#1         55.36     86.64    138.94     38.69
           12.18     12.18     12.18     12.18
    Down       19.29     33.67     57.97     12.32
           12.71     12.65     12.61     12.78

Pond#2         16.13     24.61     38.52     11.59
           12.11     12.11     12.11     12.11
    Down        5.56      9.22     15.51      3.63
           12.40     12.36     12.34     12.44

Pond#3         14.66     22.37     35.04     10.53
           12.11     12.11     12.11     12.11
    Down        5.00      8.29     14.25      3.22
           12.42     12.38     12.35     12.45


OUTLET         19.29     33.67     57.97     12.32
```

```
RA Assoc.                      Miniceongo Park
            Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                          Rockland County, New York

                            Structure Output Table

Reach             Peak Flow (PF), Storage Volume (SV), Stage (STG)
 Identifier                by Rainfall Return Period
Structure
 Identifier        2-Yr      10-Yr    100-Yr      1-Yr
--------------------------------------------------------------------------------
Reach: Pond#1
Weir : Pond#1
 3(ft)
  PF   (cfs)       19.29      33.67     57.97     12.32
  SV (ac ft)        2.37       3.57      5.47      1.70
  STG   (ft)        1.71       2.42      3.46      1.26

Reach: Pond#2
Weir : Pond#2
 3(ft)
  PF   (cfs)        5.56       9.22     15.51      3.63
  SV (ac ft)         .46        .69      1.05       .33
  STG   (ft)         .74       1.05      1.46       .56

Reach: Pond#3
Weir : Pond#3
 3(ft)
  PF   (cfs)        5.00       8.29     14.25      3.22
  SV (ac ft)         .42        .63       .96       .31
  STG   (ft)         .69        .99      1.38       .52
```

```
RA Assoc.                       Miniceongo Park
             Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                           Rockland County, New York

                            Sub-Area Summary Table

 Sub-Area   Drainage     Time of     Curve  Receiving     Sub-Area
Identifier    Area    Concentration Number   Reach       Description
              (ac)        (hr)
--------------------------------------------------------------------------------
Dist. #1       21.40    0.251         91     Pond#1    Disturbed Area
Dist.#2         6.40    0.100         91     Pond#2    Disturbed Area
Dist.#3         5.85    0.109         91     Pond#3    Disturbed Area

Total Area:   33.65 (ac)
```

```
RA Assoc.                       Miniceongo Park
             Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                          Rockland County, New York

                             Reach Summary Table


                 Receiving      Reach       Routing
  Reach           Reach         Length      Method
Identifier      Identifier       (ft)
----------------------------------------------------------------------

  Pond#1          Outlet                    STRUCTURE(Pond#1)
  Pond#2          Pond#1                    STRUCTURE(Pond#2)
  Pond#3          Pond#1                    STRUCTURE(Pond#3)
```

```
RA Assoc.                      Miniceongo Park
             Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                           Rockland County, New York

                    Sub-Area Time of Concentration Details

 Sub-Area      Flow            Mannings's    End     Wetted                Travel
Identifier/   Length    Slope      n         Area    Perimeter   Velocity   Time
               (ft)    (ft/ft)              (sq ft)    (ft)      (ft/sec)   (hr)
--------------------------------------------------------------------------------
Dist. #1
  SHEET          100   0.0100     0.011                                    0.025
  SHALLOW        475   0.0189     0.050                                    0.059
  SHALLOW        575   0.0035     0.050                                    0.167

                                                 Time of Concentration      .251
                                                                        ========

Dist.#2
  SHEET          100   0.0100     0.011                                    0.025
  SHALLOW        200   0.0250     0.050                                    0.022
  SHALLOW         70   0.0857     0.050                                    0.004

                                                 Time of Concentration       0.1
                                                                        ========

Dist.#3
  SHEET          100   0.0100     0.011                                    0.025
  SHALLOW        550   0.0127     0.050                                    0.084

                                                 Time of Concentration     0.109
                                                                        ========
```

```
RA Assoc.                    Miniceongo Park
            Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                          Rockland County, New York

                 Sub-Area Land Use and Curve Number Details

 Sub-Area                                          Hydrologic  Sub-Area   Curve
Identifier           Land Use                         Soil       Area     Number
                                                      Group      (ac)
-------------------------------------------------------------------------------
Dist. #1  Newly graded area (pervious only)            C         21.4       91

          Total Area / Weighted Curve Number                     21.4       91
                                                                 ====       ==

Dist.#2   Newly graded area (pervious only)            C          6.4       91

          Total Area / Weighted Curve Number                      6.4       91
                                                                  ===       ==

Dist.#3   Newly graded area (pervious only)            C         5.85       91

          Total Area / Weighted Curve Number                     5.85       91
                                                                 ====       ==
```

```
RA Assoc.                    Miniceongo Park
              Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                           Rockland County, New York

                          Reach Channel Rating Details

   Reach        Reach        Reach          Friction       Bottom       Side
 Identifier     Length      Manning's         Slope         Width       Slope
                 (ft)          n             (ft/ft)         (ft)
-------------------------------------------------------------------------------

  Pond#1       (This reach is a structure: Pond#1)
  Pond#2       (This reach is a structure: Pond#2)
  Pond#3       (This reach is a structure: Pond#3)

   Reach                                     End          Top      Friction
 Identifier     Stage        Flow            Area        Width      Slope
                 (ft)        (cfs)         (sq ft)        (ft)     (ft/ft)
-------------------------------------------------------------------------------
  Pond#1       (This reach is a structure: Pond#1)

  Pond#2       (This reach is a structure: Pond#2)

  Pond#3       (This reach is a structure: Pond#3)
```

```
RA Assoc.                      Miniceongo Park
             Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                           Rockland County, New York

                     Structure Description - User Entered

               Surface     Height     Surface
   Reach       Area @      Above      Area @       Pipe      Head on   Weir
 Identifier     Crest      Crest      Ht Above    Diameter    Pipe    Length
               (ac)         (ft)      (ac)         (in)      (ft)      (ft)
--------------------------------------------------------------------------------

  Pond#1
                1.23           2       1.57                                 3


  Pond#2
                0.52           2       1.01                                 3


  Pond#3
                0.53           2       0.96                                 3
```

```
RA Assoc.                    Miniceongo Park
             Disturbed Areas (Fill), 1, 2, 5, 10 &100-year Storms
                       Rockland County, New York

                   Structure Rating Details - Computed

  Reach                   Pool                Flows (cfs) @ Weir Length
 Idendifier   Stage      Storage     Length #1      Length #2      Length #3
              (ft)       (ac ft)        3ft            ft             ft
--------------------------------------------------------------------------------
Pond#1          0          0.00         0.000
              0.5          0.64         2.970
                1          1.32         8.400
                2          2.80        23.759
                5          8.28        93.915
               10         20.80       265.631
               20         58.60       751.319

  Reach                   Pool                Flows (cfs) @ Weir Length
 Idendifier   Stage      Storage     Length #1      Length #2      Length #3
              (ft)       (ac ft)        3ft            ft             ft
--------------------------------------------------------------------------------
Pond#2          0          0.00         0.000
              0.5          0.29         2.970
                1          0.64         8.400
                2          1.53        23.759
                5          5.66        93.915
               10         17.45       265.631
               20         59.40       751.319

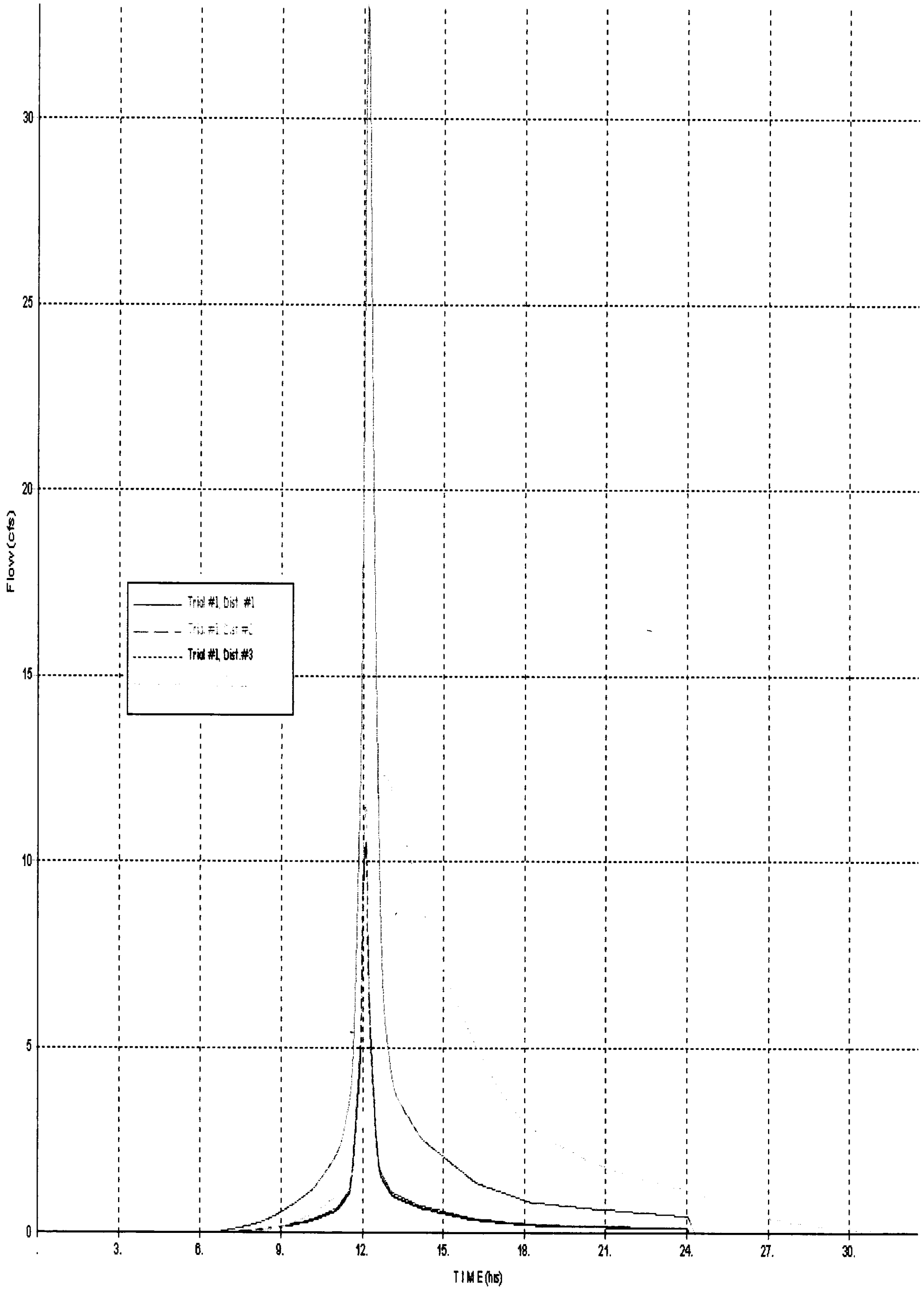
  Reach                   Pool                Flows (cfs) @ Weir Length
 Idendifier   Stage      Storage     Length #1      Length #2      Length #3
              (ft)       (ac ft)        3ft            ft             ft
--------------------------------------------------------------------------------
Pond#3          0          0.00         0.000
              0.5          0.29         2.970
                1          0.64         8.400
                2          1.49        23.759
                5          5.34        93.915
               10         16.05       265.631
               20         53.60       751.319
```

WinTR-55 Output Hydrograph

Project: Miniceongo Park

Subareas: (Dist. =1, Dist.=2, Dist.=3, Outlet) Storm: 1-Yr
P:\hydrology TR-55\d560\Dist#1.w55

9 13 2005

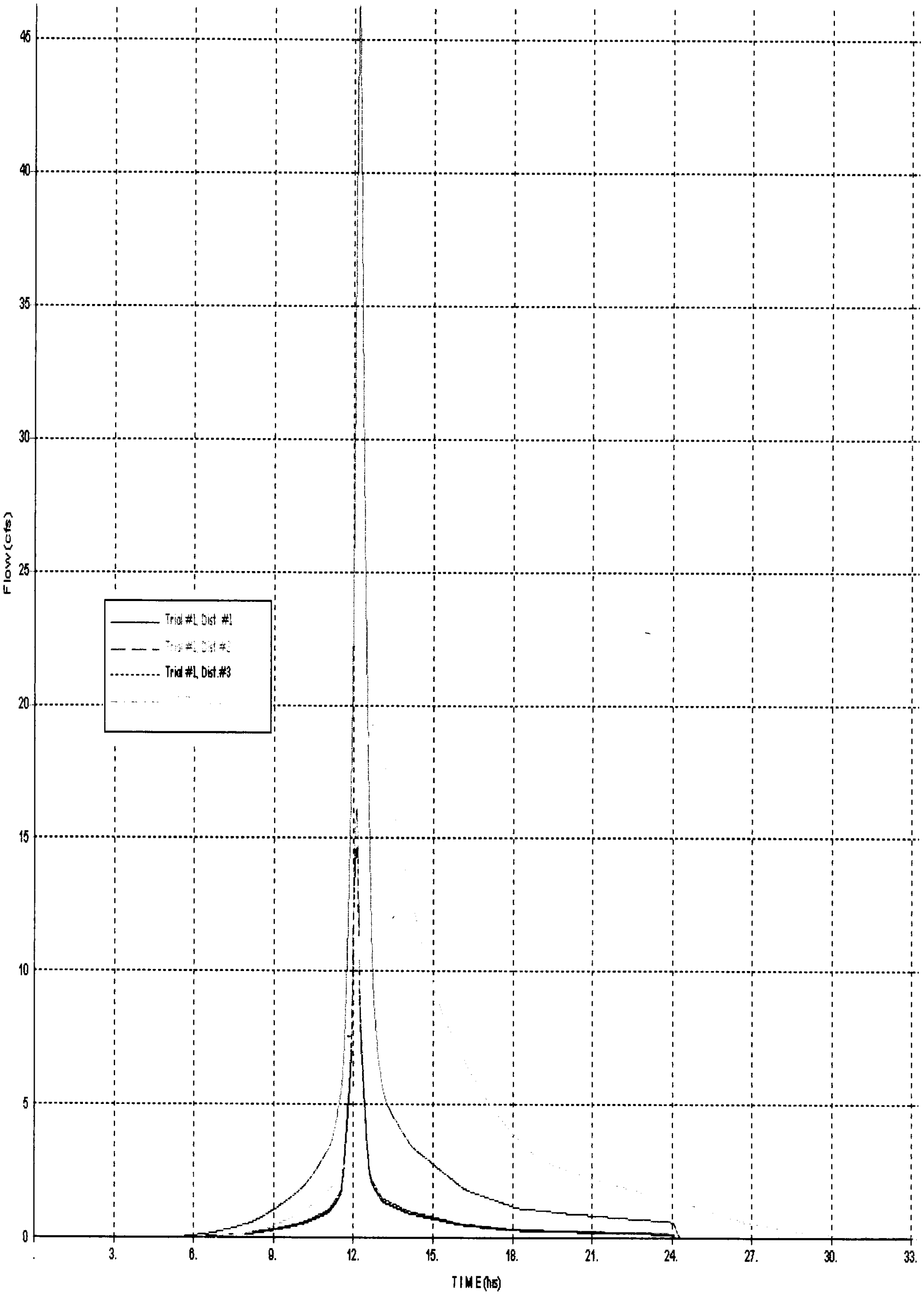


WinTR-55 Output Hydrograph

Project: Miniceongo Park

Subareas: (Dist. =1, Dist.=2, Dist.=3, Outlet) Storm: 2-Yr
P:\hydrology TR-55\1560\Dist#1.w55

9/13/2005

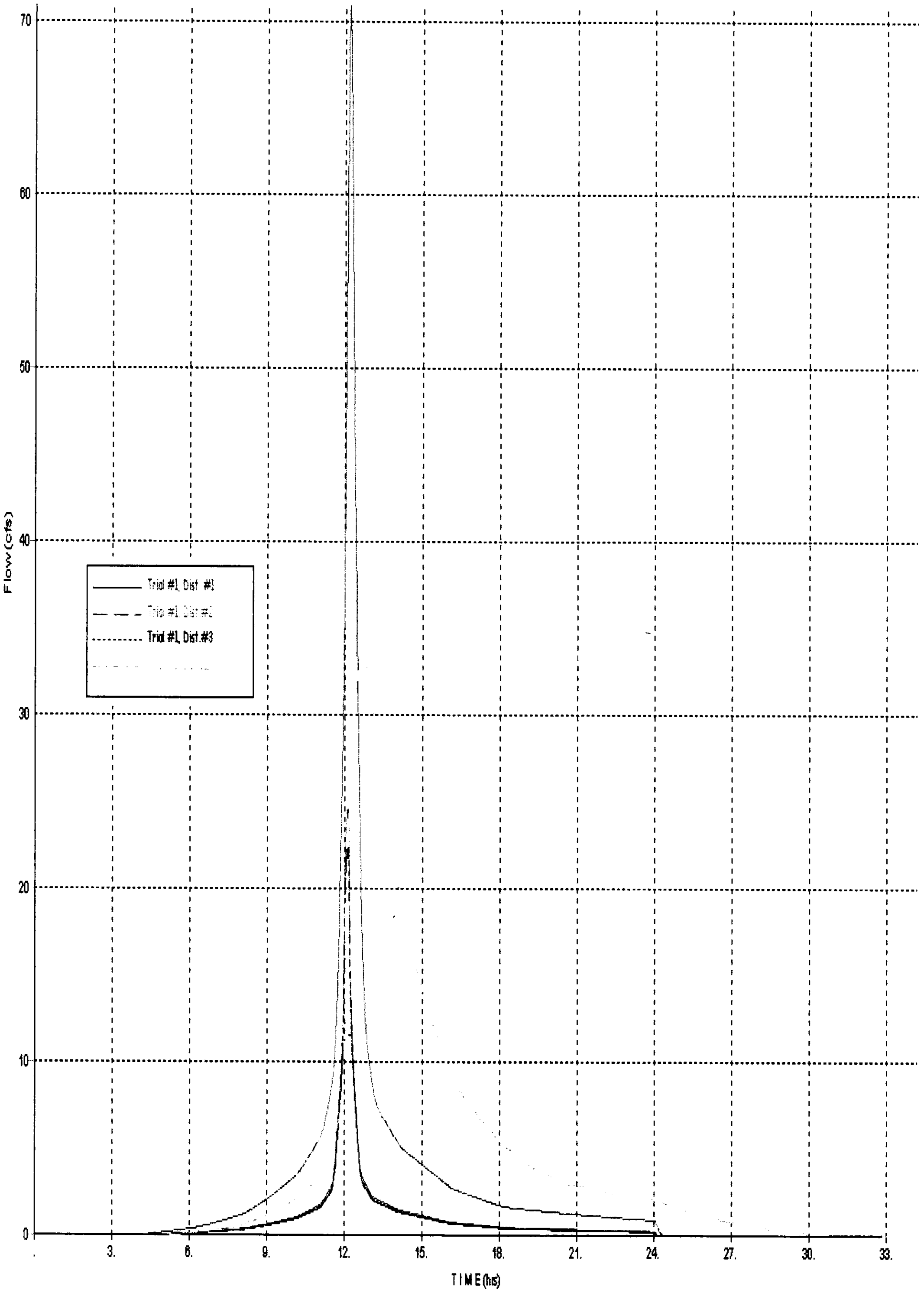


WinTR-55 Output Hydrograph

Project: Miniceongo Park

Subareas: (Dist. =1, Dist.=2, Dist.=3, Outlet) Storm: 10-Yr
P:\hydrology TR-55\1560\Dist#1.w55

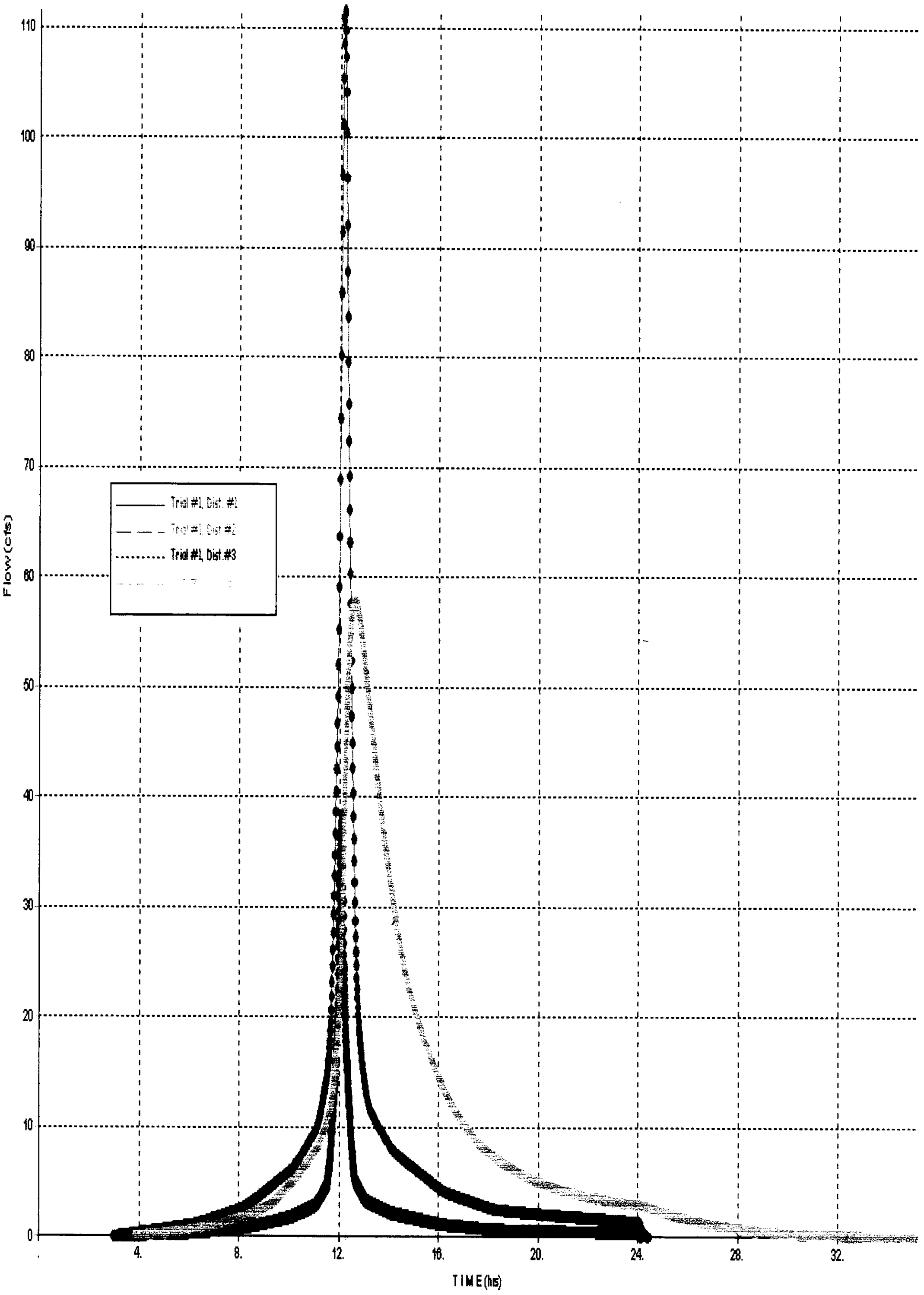
9/13/2005



WinTR-55 Output Hydrograph

Project: Miniceongo Park
Subareas: (Dist. =1, Dist.=2, Dist.=3, Outlet) Storm: 100-Yr
P:\hydrology TR-55\1560\Dist#1.w55

9/13/2005



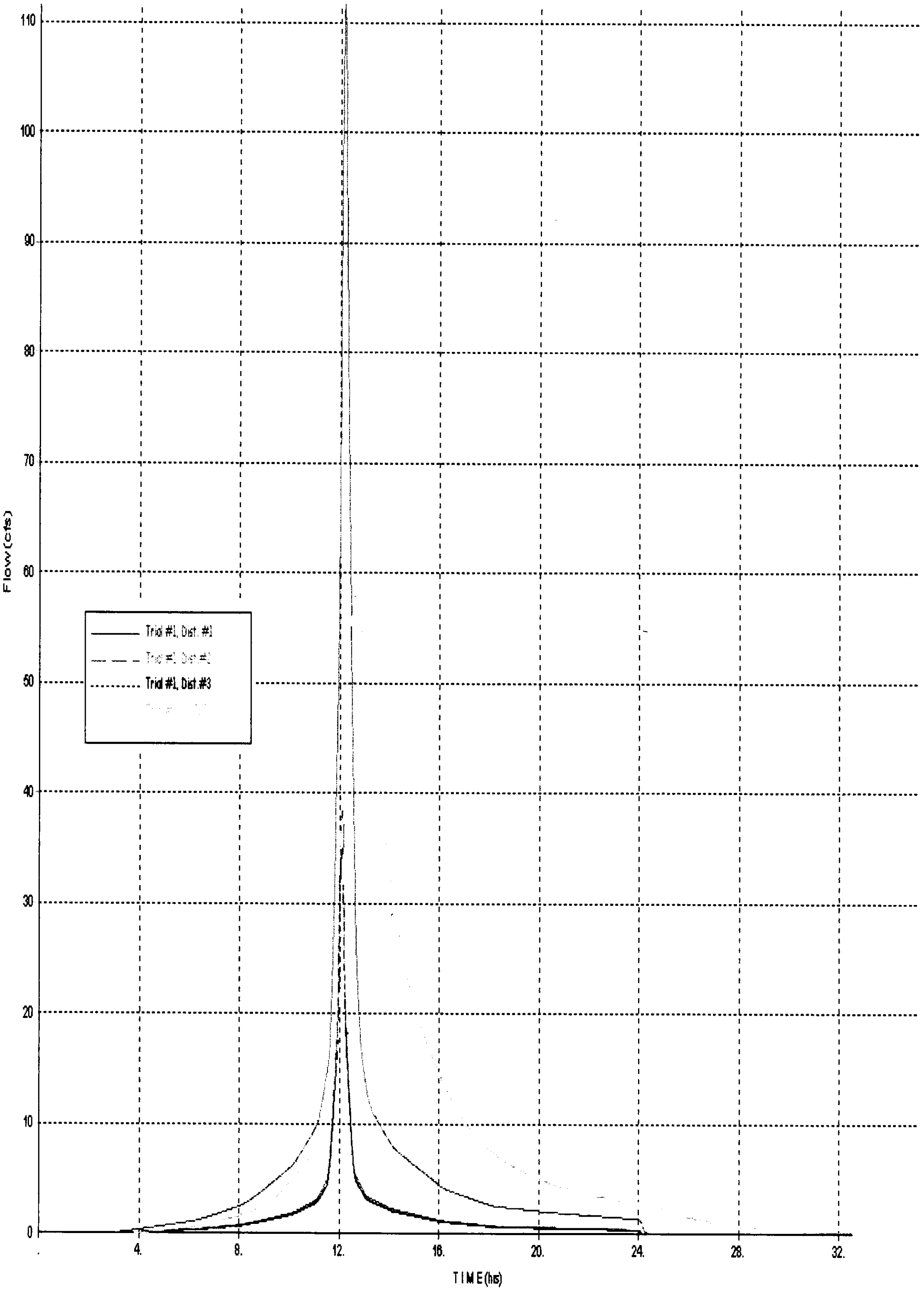
WinTR-55 Output Hydrograph

9 13 2005

Project: Miniceongo Park

Subareas: (Dist. =1, Dist.=2, Dist.=3, Outlet) Storm: 100-Yr

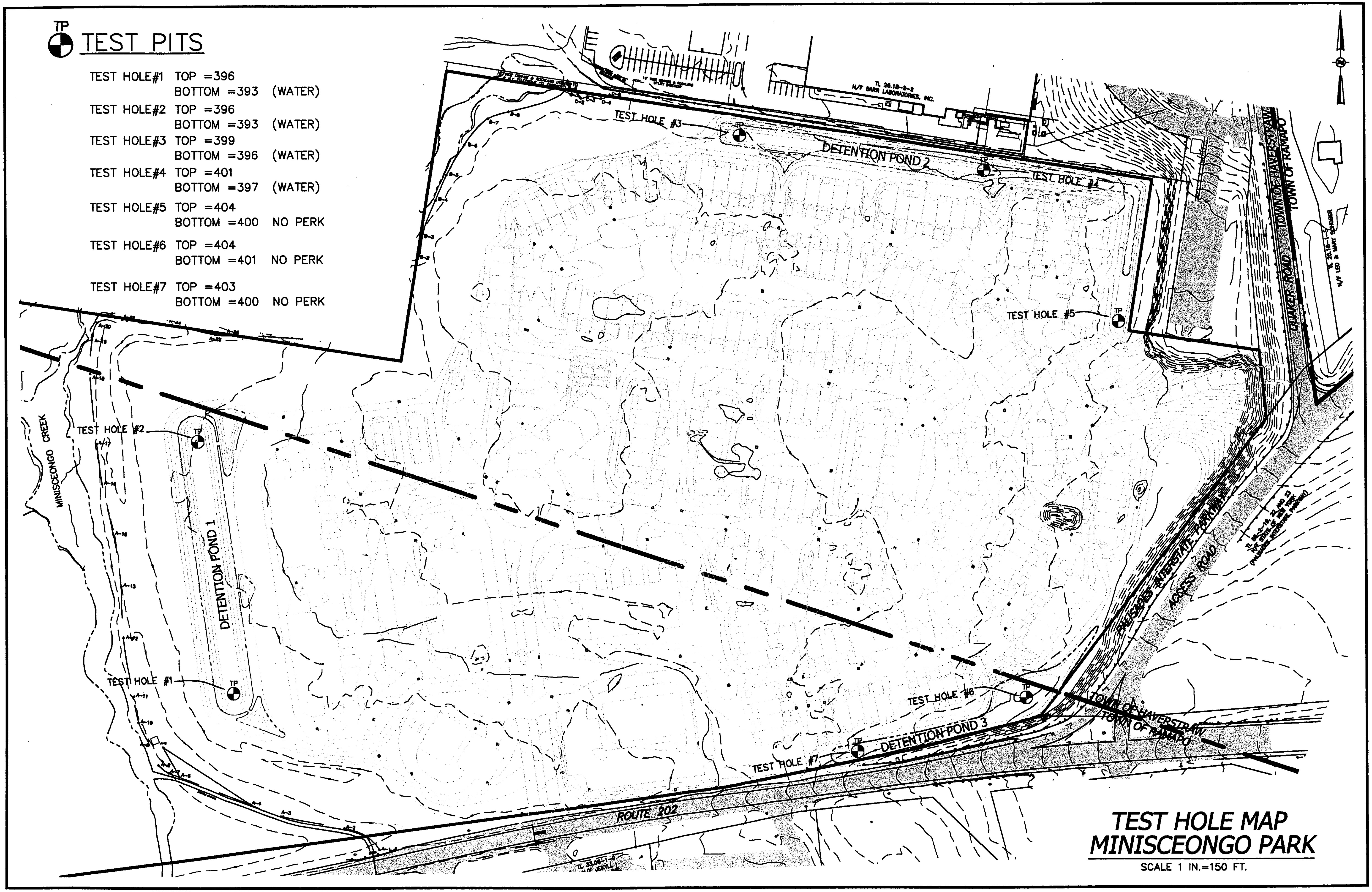
P:\hydrology TR-55\1560\Dist#1.w55



TEST PITS

TEST HOLE#1 TOP =396
BOTTOM =393 (WATER)
TEST HOLE#2 TOP =396
BOTTOM =393 (WATER)
TEST HOLE#3 TOP =399
BOTTOM =396 (WATER)
TEST HOLE#4 TOP =401
BOTTOM =397 (WATER)
TEST HOLE#5 TOP =404
BOTTOM =400 NO PERK
TEST HOLE#6 TOP =404
BOTTOM =401 NO PERK

TEST HOLE#7 TOP =403
BOTTOM =400 NO PERK



TEST HOLE MAP
MINISCEONGO PARK

SCALE 1 IN.=150 FT.

NY STATE POLLUTANT DISCHARGE ELIMINATION
SYSTEM FOR CONSTRUCTION ACTIVITIES

STORMWATER POLLUTION PREVENTION PLAN
For
MINISCENGO PARK

Route 202 and Palisades Interstate Parkway

Town of Haverstraw & Town of Ramapo
Rockland County, New York

Ray Ahmadi, Ph.D., P.E.
RA ASSOCIATES Consulting Engineers
227 South Mountain Road
New City, New York 10956
Phone/Fax: (845) 634-1351
e-mail: RAAssoc@optonline.net

March 31, 2006

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Figures

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Drawings

1.0 INTRODUCTION

1.1 NOTICE OF INTENT

Section 402 of the Clean Water Act requires permits for stormwater discharge from construction activities, that disturb one or more acres of land to obtain a permit. To implement this law, the New York State Department of Environmental Conservation (NYSDEC) issued the General Permit GP-02-01 for Stormwater Discharges from Construction Activities. The Notice of Intent (NOI) is the means to obtain coverage under this permit.

1.2 SWPPP GOALS AND OBJECTIVES

The goal of the Stormwater Pollution Prevention Plan (SWPPP) is to control runoff of pollutants from the project site during and after construction activities by complying with the NY State Pollutant Discharge Elimination System (SPDES) Stormwater Permit for construction activities and local rules and regulations. The SWPPP will implement 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; and
- Maintenance of stormwater controls during and after completion of construction.

The SWPPP will incorporate the proper selection, sizing and siting of the Stromwater Management Practices (SMPs) to protect water resources from stormwater impacts. The design of the proposed SMPs were determined using current engineering methodologies to provide appropriate sizing criteria to avoid overburdening stormwater conveyance structures. Erosion and Sediment Control (ESC), Water Quantity Control, and Water Quality Controls are inter-related components of the SWPPP.

The SWPPP is intended to be a "living" document. The document should be revised and updated by a qualified professional whenever site conditions dictate. Any proposed revisions shall undergo review by the owner or his designated representative prior to incorporation in the SWPPP and implementation at the site. Any proposed modifications shall be in accordance with the New York State Department of Environmental Conservation's technical standards.

2.0 SITE DESCRIPTION

2.1 Project Name & Location:

Minisceongo Park
U.S. Route 202
Town of Haverstraw & Ramapo
Rockland County, New York

Town of Haverstraw: Section 25.18, Block 2, Lots 3 and 4
Town of Ramapo: Section 33.06, Block 1, Lots 1 and 2

2.2 Owner/Operator Name & Address:

Davies Farm, LLC
475 Route 304, New City, NY 10956
Attention: Eric Bergstol
(845) 638-6565

2.3 General Contractor*:

____
(Company Name)

____
(Street Address)

____
(City, State, Zip Code)

____
(Phone Number)

*note – General Contractor shall be identified 30 days prior to commencement of work.

2.4 Description:

The development project consists of the construction of a mixed-use residential and commercial development on an approximately 53.3 acre site. This would consist of 279 multifamily and one-family attached townhouse dwellings. Of the total dwelling units, 164 dwelling units would be located in Haverstraw and 115 dwelling units would be located in Ramapo. The applicant proposes to construct only townhomes in Haverstraw while a mix of 96-multifamily and 19 townhome dwellings will be constructed in Ramapo.

Soil disturbing activities will include clearing and grubbing; installing a stabilized construction entrance; grading (cuts & fills); excavation for drainage, sanitary sewer, other utilities, and building foundations; construction of public and private roads and parking areas; and preparation for final planting and seeding.

2.5 Impervious Cover:

The existing project site consists of primarily vacant land with no impervious cover. The developed site includes approximately 33.5% impervious cover.

2.6 Site Area:

The existing project is approximately 53.3 acres, of which, approximately 35.6 acres will be disturbed by construction activities. The existing vegetative cover and habitat on the remaining 17.7 acres of the site would not be disturbed by the proposed project.

2.7 Location Map:

Figure 1: Site Location Map (source: USGS Quad Pomona 1983)

2.8 Sequence of Major Activities:

Phasing and schedule of construction is as follows (several phases will overlap):

Phase 1	Surcharge Fill	2 months for placement of surcharge material and 3 months for surcharge activity – (5 months total)
Phase 2	Fill and Compaction	6 months from completion of surcharge
Phase 3	Rough Grading	5 months

Phase 4	Building Construction	22 months
Phase 5	Final Grading, Landscaping	4 months

The proposed project will be completed within approximately 42 months from the beginning of surcharge fill activities. There would be an overlap between Phases 3, 4, and 5. Grading could be occurring in one portion of the site, while vertical building construction could be occurring elsewhere on the site.

During the surcharge phase, approximately 100,000-125,000 cubic yards of fill will be brought to the site. While during the site work phase, an additional 320,000-345,000 cubic yards of fill will be brought to the site.

The general order of activities will be as follows:

1. Install the stabilized construction entrance and track-out pad.
2. Perform limited clearing and grubbing activities in stages where total disturbance is not more than 5 acres at any point in time.
3. Prior to fill being brought to the site for the surcharge and fill compaction phase, erosion and sediment control measures including temporary silt fences, haybale barriers, drainage diversion swales, sediment traps, check dams and berms will be installed.
4. Dust control and debris track-out control measures will be implemented.
5. Disturbed area will be divided into three distinct subareas; each with a temporary silt/sedimentation trap that will be constructed by over-excavation in the locations of the future proposed stormwater ponds.
6. Perform surcharge fill operations in stages as shown on the Soil Erosion/Water Quality Plan During Fill Placement Phase plan.
7. Temporary soil covering measures including mulching, seeding and erosion control matting will be applied to stabilize surcharge fill and stockpile areas.
8. Following the surcharge and fill compaction phase program, grading activities and site work will commence which will be proceeded by a reinstallation, replacement and expansion of erosion and sediment control measures as per the erosion control plan for this project.
9. Immediately following installation of the sewer and drainage system, curb inlet protection measures including stone, haybales, fabric or excavated depressions will be established around inlets to filter sediments from runoff.
10. Construction of all roads and utilities shall proceed from downstream to upstream. Also, all major roads will be constructed prior to minor roads.
11. Perform grading for the buildings and driveways where an access road is already constructed. Construct driveways and buildings in stages.
12. As construction proceeds, all disturbed areas shall be paved, seeded, sodded, or planted as specified on the plans in a timely manner as noted in the "Timing of Controls/Measures" to prevent unnecessary erosion.
13. Remove any accumulated sediment and regrade permanent stormwater ponds to slopes and grades as per plan.
14. Once all disturbed areas have been properly stabilized, temporary control measures shall be removed.

3.0 CONTROLS

3.1 EROSION AND SEDIMENT CONTROLS STABILIZATION PRACTICES

3.1.1 Temporary Stabilization:

Topsoil, stockpiles, and soils that are exposed and left bare for a periods 14 days which are not being graded, not under active construction for 21 days or more, or not scheduled for permanent seeding within 21 days will be stabilized with temporary seed and mulch. All grass seed mixtures and application rates shall comply with Sediment and Erosion Control Plan.

Areas of the site which are to be paved, will be temporarily stabilized by applying stone sub-base until bituminous pavement can be applied.

3.1.2 Permanent Stabilization:

Disturbed portions of the site where construction activities permanently cease shall be stabilized with permanent seed no later than 14 days after the last construction activity. All grass seed mixtures and application rates shall comply with the Landscaping Plan.

3.2 STRUCTURAL PRACTICES

Proposed measures include silt fences, haybale filters, gravel sediment filters, rip-rap, temporary sediment traps, inlet protection, stabilized construction entrance, check dams and anti-tracking pads. Refer to Eosion Control Plan and Details sheet for the location and construction requirements of the proposed structural practices.

3.3 STORMWATER MANAGEMENT WATER QUALITY

Hydrologic and hydraulic analyses were conducted to address four distinct sizing criteria for storm water management practices. The four criteria are:

- Meeting pollutant removal goals,
- Reducing channel erosion,
- Preventing overbank flooding, and
- Helping to control extreme flood events.

Stormwater runoff entering the site will be directed through a combination of grading and pipe flow toward three separate wet extended detention ponds.

In New York State, a unified approach has been established for addressing these criteria. All runoff from developed portions of the site is conveyed into the permanent water quality ponds. The water quality ponds are designed in accordance with the 90% rule as specified by the New York State Department of Environmental Conservation Phase II stormwater regulations. This design is intended to capture and treat 90% of the average annual stormwater runoff volume (water quality volume) entering the site. The water quality volume is directly related to the amount of impervious surface created at a site. This volume of water contains the majority of contaminants and sediment from contributing roads, driveways, rooftops, and other portions of the site. While in these ponds, these contaminants will settle out to the bottom of the ponds and later be cleaned out from the bottom at the appropriate time. This water is then slowly discharged from the ponds after the storm runoff has been treated.

Channel protection will be achieved through the 24-hour extended detention of the post-developed one-year, 24-hour storm – meaning the volume of water from the one-year, 24-hour storm should be discharged from the site over a 24-hour period.

Overbank flooding is minimized by controlling the peak discharge from the 10-year storm to pre-development flow rates during the same storm event. Extreme floods are minimized by controlling the peak discharge from the 100-year storm to the pre-development flow rates during the same storm eent.

The Homeowners Association will provide long-term operation, maintenance and inspection of the wet extended detention ponds.

3.3.1 Name of Receiving Waters:

The site drains towards the west along the delineated wetland boundary and ultimately into the South Branch of the Minisceongo Creek.

3.4 PEAK FLOW ATTENUATION

For this site, three (3) stormwater quality/detention ponds are designed to attenuate potential increases in discharge and to provide adequate water quality and channel protection volumes as stipulated by the NYSDEC Stormwater Management Design Manual. The property has very gently sloping to nearly level topography, except along the easterly and northeasterly periphery of the site, which slopes up to Quaker Road and the Palisades Interstate Parkway ramp. As such, the site generally drains in one direction, from the east to the west. Flows eventually drain into Minisceongo Creek, which is located along the west end of the property.

3.5 RUNOFF CONVEYANCE SYSTEMS

Discharge outlet pipes for the site have been designed to convey the 100-year peak discharge.

3.6 OTHER CONTROLS

3.6.1 Waste Materials:

All waste materials will be collected and stored in securely lidded metal dumpsters rented from ______________________________, a solid waste management company located in Rockland County (name of carting company to be identified 30 days prior to commencement of work). The dumpsters will meet Town of Haverstraw, Town of Ramapo, Rock County, and New York State solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpsters. The dumpsters will be emptied as necessary, and the trash will be hauled off site to ______________________________(destination to be identified 30 days prior to commencement of work). No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and ___________________, the Job Supervisor, individual who is responsible for managing the day to day site operations, will be responsible for seeing that these procedures are followed (Job Supervisor shall be identified 30 days prior to commencement of work).

3.6.2 Hazardous waste:

All hazardous waste materials will be disposed of in the manner specified by local or state regulation or by the manufacturer. Site personnel will be instructed in these practices and _________________________, Job Supervisor, individual who is responsible for managing the day to day site operations, will be responsible for seeing that these procedures are followed (Job Supervisor shall be identified 30 days prior to commencement of work).

3.6.3 Sanitary Waste:

A licensed sanitary waste management contractor (sanitary waste management contractor to be identified 30 days prior to commencement of work) will collect all sanitary waste from the portable units.

3.6.4 Offsite Vehicle Tracking:

A stabilized construction entrance and gravel pad will be provided to wash, vacuum, sweep or spray-clean trucks over before leaving the site in order to prevent track-out of dirt, mud, debris and dust. Also, trucks will be covered with a tarp and at least 6 inches of freeboard clearance will be maintained to keep excessive dust from escaping the truck during hauling operations. Macadam surfaces shall be swept or vacuumed periodically as needed and at the end of each day during construction.

3.7 TIMING OF CONTROL MEASURES

As indicated in the Sequence of Major Activities, the stabilized construction entrance and other sediment and erosion control activities will be constructed prior to earthwork activities on any part of the site. Any soil areas that are exposed and left bare for a period of 14 days which are not being graded, not under active construction for 21 days or more, or not scheduled for permanent seeding within 21 days will be treated with temporary seed and mulch. Once construction activity ceases permanently in an area, that area will be stabilized with permanent seed and mulch. After the entire site is stabilized, accumulated sediments will be removed from the sediment and erosion control structures and the controls will be removed.

3.8 CERTIFICATION OF COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS

The stormwater pollution prevention plan reflects New York State Department of Environmental Conservation requirements for storm water management and erosion and sediment control, as established in Article 17, Titles 7, 8 and Article 70 of the Environmental Conservation Law. To ensure compliance, this plan was prepared in accordance with guidelines issued with the SPDES General Permit for Storm Water Discharges from Construction Activities that are Classified as "Associated with Construction Activity", published by the New York State Department of Environmental Conservation.

4.0 MAINTENANCE & INSPECTION PROCEDURES

4.1 SEDIMENT & EROSION CONTROL INSPECTION AND MAINTENANCE PRACTICES

The following are inspection and maintenance practices that will be used in coordination with the SWPPP Construction Log Book prepared for this project to maintain sediment and erosion controls:

- The Operator shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP, an required by the SPDES General Permit for Stormwater Discharges, have been adequately installed or implemented to ensure overall preparedness of the site for commencement of construction. Qualified professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, or someone working under the direction and supervision of a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist (person must have experience in the principles and practices of erosion and sediment control). The template for the initial inspection and assessment is included in Appendix A.
- All control measures will be inspected by a qualified professional at least once each week (7 days) and immediately following any storm event of 0.5 inches or greater.
- All measures will be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours of discovery.
- Built-up sediment will be removed from silt fences when it has reached one-third the height of the fence.
- Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.
- A maintenance inspection report will be filled out after each inspection and will become part of the SWPPP.
- __________________________, Job Supervisor, will select individuals who will be responsible for coordinating efforts with the qualified professional for regular inspections, maintenance and repair activities, and filling out the inspection and maintenance report forms. Inspection reports will summarize:
  1. Name of Inspector
  2. Qualifications of Inspector
  3. Date of Inspection
  4. Weather Conditions
  5. Areas inspected, including measurements
  6. Areas that have undergone temporary and permanent stabilization
  7. Indicate all disturbed areas that have not undergone active site work during the previous 14-day period

8. Observed condition of all erosion and sediment control practices
9. Inspect all sediment control practices and record approximate degree of sediment accumulation as a percentage of the sediment storage volume
10. Actions Taken to Correct Problems
11. Incorporate changes necessary to the SWPPP

The template for regular inspections is included in Appendix A.

- Personnel selected for inspection and maintenance responsibilities will receive training from the Job Supervisor and/or the qualified professional. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on site in good working order.
- The Operator shall ensure that a record of all inspection reports is maintained in the SWPPP Construction Log Book. The site log book shall be maintained on site and be made available to the permitting authorities upon request. Prior to the commencement of construction, the Operator shall certify in the site log book that the SWPPP was prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. The Operator shall retain copies of SWPPPs and any reports submitted in conjunction with this permit, and records of all data used to complete the NOI to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. The Operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis. The template for SWPPP Construction Log Book is included in Appendix A.
- Prior to filing of the Notice of Termination (NOT) or the end of permit term, the Operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. Final stabilization means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of 80% has been established, or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structure. The template for final inspections is included in Appendix A.
- When the site has been finally stabilized, the operator must submit a Notice of Termination form to terminate coverage under the SPDES GeneralPermit GP-02-01. The permittee must identify all of the permanent stormwater management structures that have been constructed. In addition, an manual describing the operation and maintenance practices that will be necessary for the structures to function as designed after the site is stabilized must be finalized and in-place. The permittee must also certify that the permanent structure have been constructed as described in the SWPPP.

5.0 NON-STORM WATER DISCHARGES

5.1 NON-STORMWATER DISCHARGES

It is expected that the following non-storm water discharges will occur from the site during the construction period:

- Water from water line flushing.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
- Uncontaminated groundwater (from natural springs)

6.0 INVENTORY FOR POLLUTION PREVENTION PLAN

6.1 MATERIAL SUBSTANCES

The materials or substances listed below are expected to be present on the site during construction:

Concrete
Detergents
Paints (enamels and latex)
Metal Studs
Roofing Materials
Tar and Paving Materials
Fertilizers
Petroleum Based Products
Cleaning Solvents
Wood
Masonry Block

7.0 SPILL CONTROL & PREVENTION

7.1 MATERIAL MANAGEMENT PRACTICES

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff:

7.1.1 Good Housekeeping:

The following good housekeeping practices will be followed on site during the construction project:

- An effort will be made to store only enough product required to do the job.
- All materials stored on site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Product will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The Job Supervisor will inspect daily to ensure proper use and disposal of materials on site.

7.1.2 Hazardous Products:

The following practices will be used to reduce the risks associated with hazardous materials:

- Products will be kept in original containers unless they are not resealable.
- Original labels and material safety data will be retained; they contain important product information.
- If surplus product must be disposed of, manufacturer's or local and State recommended methods for proper disposal will be followed.

7.2 PRODUCT SPECIFIC PRACTICES

The following product specific practices will be followed on site:

7.2.1 Petroleum Products:

All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any asphalt substances used on site will be applied according to the manufacturer's recommendations.

7.2.2 Fertilizers:

Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered shed. The content of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

7.2.3 Paints:

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm drainage system, but will be properly disposed of according to manufacturer's instructions or State and local regulations.

7.2.4 Concrete Trucks:

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site.

7.3 SPILL CONTROL PRACTICES

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanups:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage areas on site. Equipment and materials will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substances.
- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size of the spill. The Spill Control & Prevention Log form provided in Appendix C should be used for this purpose.
- The spill prevention plan will be adjusted to include measures to prevent a repetitive type of spill from re-occurring and how to clean up the spill if it does re-occur. A description of the spill, what caused it, and the cleanup measures will also be included.
- The Job Supervisor responsible for daily site operations, will be designated as the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup

training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of the responsible spill personnel will be posted in the material storage area and in the office trailer on site.

8.0 SUPPORTING PLANS & REPORTS

1. Site Plan Drawings prepared by Atzl, Scatassa & Zigler P.C.
2. Erosion Control Plans prepared by R.A. Associates Consulting Engineers
3. Soil Erosion/Water Quality Plan by R.A. Associates Consulting Engineers
4. Stormwater Management Report prepared by R.A. Associates Consulting Engineers
5. Soil Erosion & Sediment Control During Control Fill Report prepared by R.A. Associates Consulting Engineers
6. Fugitive Dust Control & Management Plan Report prepared by R.A. Associates Consulting Engineers

9.0 POLLUTION PREVENTION PLAN CERTIFICATION

9.1 OWNER/OPERATOR 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 all corresponding attachments 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 acknowledgement that I will receive as a result of submitting this NOI. 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 agree to comply with all the terms and conditions of the general permit for which this NOI is being submitted."

Signed: ______________________________ Date:__________________
(Owner/Operator)

____
(Printed Name & Title)

____

____

____
(Company Name, Address & Telephone Number)

10.0 CERTIFICATION BY CONTRACTORS

Made pursuant to the State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-02-01) for:

MINISCENGO PARK DEVELOPMENT, Route 202 and Palisades Interstate Parkway,
Town of Haverstraw & Town of Ramapo, Rockland County, New York

10.1 PRIME CONTRACTOR CERTIFICATION

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the stormwater pollution prevention plan for the construction site identified in this plan as a condition of authorization to discharge stormwater. I also understand that the 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."

Prime Contractor:

(Signature)	(Company)
(Name)	(Street Address)
(Title)	(City, State, Zip Code)
(Date)	(Phone Number)

10.2 SUB-CONTRACTOR CERTIFICATION

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the stormwater pollution prevention plan for the construction site identified in this plan as a condition of authorization to discharge stormwater. I also understand that the 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."

Sub-Contractor:

____
(Signature)

____
(Name)

____
(Title)

____
(Date)

____
(Company)

____
(Street Address)

____
(City, State, Zip Code)

____
(Phone Number)

Appendix A

SWPPP CONSTRUCTION SITE LOG BOOK

NY STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

SWPPP CONSTRUCTION SITE LOG BOOK

For

MINISCENGO PARK

Route 202 and Palisades Interstate Parkway

Town of Haverstraw & Town of Ramapo
Rockland County, New York

Table of Contents

Properly completing forms such as these which are also contained in Appendix D of the New York Standards and Specifications for Erosion and Sediment Control meet the inspection requirement of NYSDEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

1. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name **MINISCENGO PARK**

GP-02-01 Permit No. ________________ **Date of Authorization** ____________

Name of Operator ____

General Contractor ____

The Following Information To Be Read By All Persons Involved in The Construction of Stormwater Related Activities:

Site Assessment and Inspections –

a. The Operator agrees to have a qualified professiona[l1] conduct an assessment of the site prior to the commencement of construction and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. Following the commencement of construction, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

b. The Operator shall maintain a record of all inspection reports in this site log book. The site log book shall be maintained on site and be made available to the permitting authorities upon request. Prior to the commencement of construction,[2] the Operator shall certify in the site log book that the SWPPP was prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. The Operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

c. Prior to filing of the Notice of Termination or the end of permit term, the Operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.

[1] **"Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, or someone working under the direction and supervision of a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist (person must have experience in the principles and practices of erosion and sediment control).**

[2] **"Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.**

[3] **"Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.**

2. 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 persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal State and local erosion and sediment control requirements. 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:____
Name (please print):__________________________________
Title:____
Date:____
Address:____
Phone: ____
Email:____

3. PRE-CONSTRUCTION SITE ASSESSMENT FORM

______________________________ ______________________________

Inspector (print name) **Date of Inspection**

______________________________ ______________________________

Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the following forms is accurate and complete.

NOTE: Provide comments below as necessary

a. Notice of Intent, SWPPP, and Contractors' Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?______________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?______________
[ ] [ ] [ ] Have all contractors involved with implementing the erosion and sediment control portions of the SWPPP signed the contractor's certification?

b. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic systems absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, etc. have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

c. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.

d. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

e. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

4. CONSTRUCTION DURATION INSPECTIONS

These Inspection Forms will be filled out during the entire construction phase of the project.

______________________________ ______________________________

Inspector (print name) **Date of Inspection**

______________________________ ______________________________

Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Check one of the following:

☐ **Weekly Inspection or,**

☐ **Rain Event Inspection** (greater than 0.5 inches in 24 hour period)
Date of Rain Event __________**Amount of Rain** ________ **inches**

Stage of Construction (% complete) _________**%**

On a plan/sketch below that represents the project area, or on an attached site map:

1. Indicate the extent of all disturbed site areas and drainage pathways;
2. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
3. Indicate all areas of the site that have undergone temporary or permanent stabilization;
4. Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

SITE PLAN/SKETCH

General Housekeeping

Yes No NA

[ ] [ ] [ ] Is there an increase in turbidity that will cause a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

Temporary Stream Crossing

Yes No NA

[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] 20 feet minimum approach length, minimum 6 inch depth of rock, 18 inch maximum fill depth over pipes.
[ ] [ ] [ ] Installed diversion dike/swale through both approaches 50 feet (max) from top of bank.
[ ] [ ] [ ] Fill composed of clean shot rock or KTC Class III channel lining.
[ ] [ ] [ ] Rock clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Excavation Dewatering

Yes No NA

[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

Vegetative Filter Strips

Yes No NA

[ ] [ ] [ ] Vegetation is dense and there are no signs of erosion.
[ ] [ ] [ ] Width of filter strip is per the approved plan.
[ ] [ ] [ ] Ground slope of filter strip is between 1% and 5%.

Level Spreader

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

Interceptor Dikes and Swales

Yes No NA

[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Sediment Control

Yes No NA

[ ] [ ] [ ] Sediment control practices are located and installed correctly.
[ ] [ ] [ ] BMPs are maintained per specifications
[ ] [ ] [ ] Stockpiles are stabilized and contained.
[ ] [ ] [ ] De-watering operations prevent direct discharges to sensitive features.
[ ] [ ] [ ] Construction Schedule—Are clearing and grading operations divided into stages for large areas (i.e. greater than 2 acres), as opposed to mass grading? (NOTE: If staged, erosion control measures may also need to be staged.)

Adverse Impacts or Off-Site Degradation

Yes No NA

[ ] [ ] [ ] Work is within the limits of the approved plans, including clearing and blasting.
[ ] [ ] [ ] Adverse impacts – ponds, streams, wetlands and sinkholes are free of sediment from site.
[ ] [ ] [ ] Off-site degradation - sediment is kept out of roadways, adjacent property, storm sewers, or air (dust).

Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

Reinforced Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Installed steel posts, downstream side of flow, maximum 6 foot intervals with 6 x 6 inch 14 gage wire.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Sediment accumulation is ______% of design capacity.

Stone Check Dam

Yes No NA

[ ] [ ] [ ] Channel is without erosion (i.e., flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (i.e., rocks have not been displaced and no permanent pools behind the structure).
[ ] [ ] [ ] Sediment accumulation is ______% of design capacity.

Block and Gravel Drop Inlet Protection

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Sediment accumulation ______% of design capacity.

Filter Fabric (Drop) Inlet Protection

Yes No NA

[ ] [ ] [ ] Installed 2-inch x 4-inch wood frame and wood posts, with maximum 3-foot spacing.
[ ] [ ] [ ] Filter fabric buried a minimum of 8 inches and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Sediment accumulation is ______% of design capacity.

Excavated Drop Inlet Protection

Yes No NA

[ ] [ ] [ ] Excavated depth is a minimum 1-foot, but no more that 2-feet maximum.
[ ] [ ] [ ] Gravel supported by hardware cloth to allow drainage and restrict sediment movement.
[ ] [ ] [ ] Excavated side slopes should be 2:1.

Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
[ ] [ ] [ ] Sediment accumulation is ______% of design capacity.

Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Sediment accumulation is ______% of design capacity
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

MAINTENANCE SCHEDULES

Stabilization

Area	**Date since last disturbed**	**Date of next disturbance**	**Stabilized? (Yes/No)**	**Stabilized with**	**Condition**

MODIFICATIONS TO THE SWPPP

Modification & Reason:

5. MONITORING, REPORTING AND THREE MONTH STATUS REPORTS

A. The NYSDEC may, at its sole discretion, require monitoring of discharge(s) from the permitted construction activity after notifying the Operator in writing of the basis for such monitoring, the parameters and frequency at which monitoring shall occur and the associated reporting requirements, if any.

B. The Operator shall also prepare a written summary of its status with respect to compliance with this general permit at a minimum frequency of every three months during which coverage under this permit exists. The summary should address the status of achieving each component of the SWPPP. This summary shall be handled according to Permit requirements.

6. FINAL STABILZATION AND RETENTION OF RECORDS

A. Qualified Professional Certification -The Operator shall have the qualified professional perform a final site inspection prior to filing the Notice of Termination of the end of the permit term.

YES	NO	NA
☐	☐	☐ Final site drainage will prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.
☐	☐	☐ Conveyance systems are stabilized.
☐	☐	☐ Channels and streambanks are seeded at the outlet points.

"I hereby certify that the site has undergone final stabilization. Final Stabilization means that all soil disturbing activities have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures. Further, all temporary erosion and sediment controls (such as silt fence) not specified for permanent erosion control have been removed.

Name of Qualified Professional:____

Signature:____

B. Retention of Records - The Operator shall retain copies of SWPPPs and any reports submitted in conjunction with this permit, and records of all data used to complete the NOI to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. The Department, in its sole discretion, at any time upon written notification may extend this period.

C. Maintenance of SWPPP and any reports at the construction site - The Operator shall retain a copy of the SWPPP required by this permit at the construction site from the date of initiation of construction activities to the date of final stabilization.

D. Addresses - Except for the submittal of NOIs and NOTs, all written correspondence under this permit directed to NYSDEC, including the submittal of individual permit applications, shall be sent to the address of the appropriate Department Office.

1. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name ______________________________

GP-02-01 Permit No. ______________________________ **Date of Authorization** ____________

Name of Operator ______________________________

General Contractor ______________________________

The Following Information To Be Read By All Persons Involved in The Construction of Stormwater Related Activities:

Site Assessment and Inspections -

a. The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Following the commencement of construction, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

b. The Operator shall maintain a record of all inspection reports in this site log book. The site log book shall be maintained on site and be made available to the permitting authorities upon request. Prior to the commencement of construction,[2] the Operator shall certify in the site log book that the SWPPP, prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. The Operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

c. Prior to filing of the Notice of Termination or the end of permit term, the Operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.

[1] "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control). Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist.

[2] "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

[3] “Final stabilization” means that all soil-disturbing activities at the site have been completed and a uniform, perennial
vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as
the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent
structures.

2. OPERATOR.S 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 persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal State and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law. "

Name (please print)
Title
Date:
Address:
Phone:
Email:

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For Erosion and Sediment Control

3. PRE-CONSTRUCTION SITE ASSESSMENT FORM

____

____

Inspector (print name) **Date of Inspection**

____

____

Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the
following forms is accurate and complete.

NOTE: Provide comments below as necessary

a. Notice of Intent, SWPPP, and Contractors. Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?______________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____________
[ ] [ ] [ ] Have all contractors involved with implementing the erosion and sediment control portions of the SWPPP signed the contractor’s certification?

b. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?

[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic systems absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, etc. have been flagged for protection.

[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

c. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.

[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified
and protected.

[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.

d. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.

[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.

[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

e. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.

[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals

[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.

[ ] [ ] [ ] Sediment traps and barriers are installed.

4. CONSTRUCTION DURATION INSPECTIONS

These Inspection Forms will be filled out during the entire construction phase of the project.

____

____

Inspector (print name) **Date of Inspection**

____

____

Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate
and complete.

Check one of the following:

.Weekly Inspection or, **. Rain Event Inspection** (greater than 0.5 inches in 24 hour period)

Date of Rain Event _____Amount of Rain ___ inches

Stage of Construction (% complete) ____**%**

On a plan/sketch below that represents the project area, or on an attached site map:

1.Indicate the extent of all disturbed site areas and drainage pathways;

2.Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

3.Indicate all areas of the site that have undergone temporary or permanent stabilization;

4.Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

SITE PLAN/SKETCH

General Housekeeping

Yes No NA

[ ] [ ] [ ] Is there an increase in turbidity that will cause a substantial visible contrast to natural conditions?

[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?

[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?

[ ] [ ] [ ] Is construction impacting the adjacent property?

[ ] [ ] [ ] Is dust adequately controlled?

Temporary Stream Crossing

Yes No NA

[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.

[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.

[ ] [ ] [ ] 20 feet minimum approach length, minimum 6 inch depth of rock, 18 inch maximum fill depth over pipes.

[ ] [ ] [ ] Installed diversion dike/swale through both approaches 50 feet (max) from top of bank.

[ ] [ ] [ ] Fill composed of clean shot rock or KTC Class III channel lining.

[ ] [ ] [ ] Rock clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Excavation Dewatering

Yes No NA

[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.

[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.

[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.

[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

Vegetative Filter Strips

Yes No NA

[ ] [ ] [ ] Vegetation is dense and there are no signs of erosion.

[ ] [ ] [ ] Width of filter strip is per the approved plan.
[ ] [ ] [ ] Ground slope of filter strip is between 1% and 5%.

Level Spreader

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

Interceptor Dikes and Swales

Yes No NA

[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

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For Erosion and Sediment Control

Sediment Control

Yes No NA

[ ] [ ] [ ] Sediment control practices are located and installed correctly.
[ ] [ ] [ ] BMPs are maintained per specifications
[ ] [ ] [ ] Stockpiles are stabilized and contained.
[ ] [ ] [ ] De-watering operations prevent direct discharges to sensitive features.
[ ] [ ] [ ] Construction Schedule—Are clearing and grading operations divided into stages for large areas (i.e. greater than 2 acres), as opposed to mass grading? (NOTE: If staged, erosion control measures may also need to be staged.)

Adverse Impacts or Off-Site Degradation

Yes No NA

[ ] [ ] [ ] Work is within the limits of the approved plans, including clearing and blasting.
[ ] [ ] [ ] Adverse impacts – ponds, streams, wetlands and sinkholes are free of sediment from site.
[ ] [ ] [ ] Off-site degradation - sediment is kept out of roadways, adjacent property, storm sewers, or air (dust).

Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

Reinforced Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Installed steel posts, downstream side of flow, maximum 6 foot intervals with 6 x 6 inch 14 gage wire.
[ ] [ ] [ ] Fabric buried 6 inches minimum.

[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Sediment accumulation is ___% of design capacity.

Stone Check Dam

Yes No NA

[ ] [ ] [ ] Channel is without erosion (i.e., flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (i.e., rocks have not been displaced and no permanent pools behind the structure).
[ ] [ ] [ ] Sediment accumulation is ___% of design capacity.

Block and Gravel Drop Inlet Protection

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Sediment accumulation ___% of design capacity.

Filter Fabric (Drop) Inlet Protection

Yes No NA

[ ] [ ] [ ] Installed 2-inch x 4-inch wood frame and wood posts, with maximum 3-foot spacing.
[ ] [ ] [ ] Filter fabric buried a minimum of 8 inches and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Sediment accumulation is ___% of design capacity.

Excavated Drop Inlet Protection

Yes No NA

[ ] [ ] [ ] Excavated depth is a minimum 1-foot, but no more that 2-feet maximum.
[ ] [ ] [ ] Gravel supported by hardware cloth to allow drainage and restrict sediment movement.
[ ] [ ] [ ] Excavated side slopes should be 2:1.

Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
[ ] [ ] [ ] Sediment accumulation is ___% of design capacity.

Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Sediment accumulation is ___% of design capacity
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

MAINTENANCE SCHEDULES

Stabilization

Area	Date since last disturbed	Date of next disturbance	Stabilized? (Yes/No)	Stabilized with	Condition

MODIFICATIONS TO THE SWPPP

Modification & Reason:

5. MONITORING, REPORTING AND THREE MONTH STATUS REPORTS

A. The NYSDEC may, at its sole discretion, require monitoring of discharge(s) from the permitted construction activity after notifying the Operator in writing of the basis for such monitoring, the parameters and frequency at which monitoring shall occur and the associated reporting requirements, if any.

B. The Operator shall also prepare a written summary of its status with respect to compliance with this general permit at a minimum frequency of every three months during which coverage under this permit exists. The summary should address the status of achieving each component of the SWPPP . This summary shall be handled according to Permit requirements.

6. FINAL STABILZATION AND RETENTION OF RECORDS

A. Qualified Professional Certification -The Operator shall have the qualified professional perform a final site inspection prior to filing the Notice of Termination of the end of the permit term.

YES NO NA
[ ] [ ] [ ] Final site drainage will prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.
[ ] [ ] [ ] Conveyance systems are stabilized.
[ ] [ ] [ ] Channels and streambanks are seeded at the outlet points.

"I hereby certify that the site has undergone final stabilization. Final Stabilization means that all soil disturbing activities have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures. Further, all temporary erosion and sediment controls (such as silt fence) not specified for permanent erosion control have been removed.

Name of Qualified Professional:____
Signature:____

B Retention of Records - The Operator shall retain copies of SWPPPs and any reports submitted in conjunction with this permit, and records of all data used to complete the NOI to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

C. Maintenance of SWPPP and any reports at the construction site - The Operator shall retain a copy of the SWPPP required by this permit at the construction site from the date of initiation of construction activities to the date of final stabilization.

D. Addresses - Except for the submittal of NOIs and NOTs, all written correspondence under this permit directed to NYSDEC, including the submittal of individual permit applications, shall be sent to the address of the appropriate Department Office.

Appendix B

STORMWATER POND CONSTRUCTION INSPECTION CHECKLIST FORM

MINISCEONGO PARK
STORMWATER POND #1, #2, and #3
CONSTRUCTION INSECTION CHECKLIST FORM

Project: Minisceongo Park Development
Location: Town of Haverstraw & Town of Ramapo, Rockland County, NY

Site Status: ______________________________

Date of Inspection: ______________________________

Time of Inspection: ______________________________

Weather Conditions
(including recent rainfall): ______________________________

Inspector's Name: ______________________________

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction/Materials and Equipment		
Pre-construction meeting		
Pipe and appurtenances on-site prior to construction and dimensions checked		
1. Material (including protective coating, if specified)		
2. Diameter		
3. Dimensions of metal riser or pre-cast concrete outlet structure		
4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans		
5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope		
6. Number and dimensions of prefabricated anti-seep collars		
7. Watertight connectors and gaskets		
8. Outlet drain valve		
Project benchmark near pond site		
Equipment for temporary de-watering		
2. Subgrade Preparation		
Area beneath embankment stripped of all Vegetation, topsoil, and organic matter		
3. Pipe Spillway Installation		
Method of installation detailed on plans		
A. Bed preparation		
Installation trench excavated with specified side slopes		

Minisceongo Park Stormwater Pond #1, #2, and #3
Construction Inspection Checklist Form

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
Stable, uniform, dry subgrade of relatively impervious material (If subgrade is wet, contractor shall have defined steps before proceeding with installation)		
Invert at proper elevation and grade		
B. Pipe placement		
Metal / plastic pipe		
1. Watertight connectors and gaskets properly installed		
2. Anti-seep collars properly spaced and having watertight connections to pipe		
3. Backfill placed and tamped by hand under "haunches" of pipe		
4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2 feet cover over pipe is reached		
3. Pipe Spillway Installation		
Concrete pipe		
1. Pipe set on blocks or concrete slab for pouring of low cradle		
2. Pipe installed with rubber gasket joints with no spalling in gasket interface area		
3. Excavation for lower half of anti-seep collar(s) with reinforcing steel set		
4. Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant		
5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix		
6. Upper half of anti-seep collar(s) formed with reinforcing steel set		
7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
8. Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary.		
C. Backfilling		
Fill placed in maximum 8 inch lifts		
Backfill taken minimum 2 feet above top of anti-seep collar elevation before traversing with heavy equipment		
4. Riser / Outlet Structure Installation		
Riser located within embankment		
A. Metal riser		
Riser base excavated or formed on stable subgrade to design dimensions		
Set on blocks to design elevations and plumbed		
Reinforcing bars placed at right angles and projecting into sides of riser		

Minisceongo Park Stormwater Pond #1, #2, and #3
Construction Inspection Checklist Form

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
Concrete poured so as to fill inside of riser to invert of barrel		
B. Pre-cast concrete structure		
Dry and stable subgrade		
Riser base set to design elevation		
If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely		
Watertight and structurally sound collar or Gasket joint where structure connects to pipe spillway		
C. Poured concrete structure		
Footing excavated or formed on stable Subgrade, to design dimensions with reinforcing steel set		
Structure formed to design dimensions, with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
Forms stripped & inspected for "honeycomb" prior to backfilling; parge if necessary		
5. Embankment Construction		
Fill material		
Compaction		
Embankment		
1. Fill placed in specified lifts and compacted with appropriate equipment		
2. Constructed to design cross-section, side slopes and top width		
3. Constructed to design elevation plus allowance for settlement		
6. Impounded Area Construction		
Excavated / graded to design contours and side slopes		
Inlet pipes have adequate outfall protection		
Forebay(s)		
Pond benches		
7. Earth Emergency Spillway Construction		
Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc.		
Excavated to proper cross-section, side slopes and bottom width		
Entrance channel, crest, and exit channel Constructed to design grades and elevations		
8. Outlet Protection		
A. End section		
Securely in place and properly backfilled		
B. Endwall		
Footing excavated or formed on stable Subgrade, to design dimensions and reinforcing steel set, if specified		

Minisceongo Park Stormwater Pond #1, #2, and #3
Construction Inspection Checklist Form

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
Endwall formed to design dimensions with Reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary)		
Forms stripped and structure inspected for "honeycomb" prior to backfilling; parge if necessary		
C. Riprap apron / channel		
Apron / channel excavated to design cross-Section with proper transition to existing ground		
Filter fabric in place		
Stone sized as per plan and uniformly place at the thickness specified		
9. Vegetative Stabilization		
Approved seed mixture or sod		
Proper surface preparation and required soil Amendments		
Excelsior mat or other stabilization, as per plan		
10. Miscellaneous		
Drain for ponds having a permanent pool		
Trash rack / anti-vortex device secured to outlet structure		
Trash protection for low flow pipes, orifices, etc.		
Fencing (when required)		
Access road		
Set aside for clean-out maintenance		
11. Stormwater Wetlands		
Adequate water balance		
Variety of depth zones present		
Approved pondscaping plan in place reinforcement budget for additional plantings		
Plants and materials ordered 6 months prior to construction		
Construction planned to allow for adequate planting and establishment of plant community (April-June planting window)		
Wetland buffer area preserved to maximum extent possible		

Comments:

Minisceongo Park Stormwater Pond #1, #2, and #3
Construction Inspection Checklist Form

Actions to be Taken:

Appendix C

SPILL CONTROL & PREVENTION LOG

SPILL CONTROL & PREVENTION LOG
SWPPP for MINISCEONGO PARK
Town of Haverstraw & Town of Ramapo
Rockland County, New York

Date of Spill	Material Spilled	Spill Location	Cause	Cleanup	Agency Reported (Toxic/Hazardous)	Reoccurance Prevention Measure

Full-scale Plans for the SWPPP accompany the DEIS.