PATTERSON CROSSING RETAIL CENTER

DRAFT ENVIRONMENTAL IMPACT STATEMENT

VOLUME II

NYS ROUTE 311 at INTERSTATE 84 EXIT 18

Towns of Patterson and Kent, Putnam County, New York

Project Sponsor: Patterson Crossing Realty, LLC
1699 Route 6, Suite 1
Carmel, NY 10512
Contact: Paul A. Camarda
Tel. (845) 228-1400

Lead Agency: Town of Patterson Planning Board
P.O. Box 470
1142 Route 311
Patterson, NY 12563
Contact: Richard Williams Sr., Town Planner
Tel. (845) 878-6500

Prepared By: TIM MILLER ASSOCIATES, Inc.
10 North Street
Cold Spring, New York 10516
Contact: Tim Miller, AICP
Tel. (845) 265-4400

Project Engineer: Insite Engineering,
Surveying & Landscape Architecture, P.C.
3 Garrett Place
Carmel, NY 10512
Contact: Jefferey Contelmo, P.E.
Tel. (845) 225-9690

Lead Agency Acceptance Date: __________

Public Hearing Date: __________

Deadline for Receipt of Public Comments: __________

July 27, 2006

Project Consultants

for

Patterson Crossing Retail Center DEIS

<u>Environmental Planner</u>
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<u>Hydrogeology Consultant</u>
SSEC, Inc.
4 Deer Trail
Cornwall, New York 12518
Contact: Sergio Smiriglio
Tel. (845) 534-3816
Fax. (845) 534-3314

<u>Cultural Resources Consultant</u>
Columbia Heritage, Ltd.
56 North Plank Road, Suite 287
Newburgh, NY 12550
Contact: Steve Oberon
Tel. (888) 294-4815
Fax. (845) 565-9504

<u>Air Quality Consultant</u>
RTP Environmental Associates, Inc.
400 Post Ave.
Westbury, NY 11590
Contact: Ken Skipka
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<u>Geotechnical Consultant</u>
GEODESIGN INCORPORATED
984 Southford Road
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Tel. (203) 758-8836
Fax. (203) 758-8842

Lighting Consultant

Holophane
One Half Crossbar Road
Hastings-On-Hudson, NY 10706
Contact: Andrew Gross
Tel: (914) 693-7427
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PATTERSON CROSSING RETAIL CENTER
Draft Environmental Impact Statement

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Volume II

Appendices

List of Drawings

Appendix A

SEQRA DOCUMENTATION

New York State
Department of Environmental Conservation
Commissioner's Determination
of
Lead Agency Under Article 8
of the
Environmental Conservation Law

PROJECT: Proposed Patterson Crossing Retail Center located in the Towns of Patterson and Kent, Putnam County

DISPUTING AGENCIES: Town of Patterson Planning Board and the Town of Kent Planning Board.

This decision to designate the Town of Patterson Planning Board as lead agency for the conduct of the environmental review under the State Environmental Quality Review Act (SEQRA) is made pursuant to Article 8 of the Environmental Conservation Law (ECL) and 6 NYCRR Part 617. This decision is based on my finding that the Town of Patterson Planning Board has the broadest governmental powers for the investigation of the impacts of the proposed action through its site plan review and erosion control permit authority over the majority of the potentially affected property.

The proposed project is the application by the Hudson Valley Realty Corporation (Corporation) to construct a 439,500 square foot "retail center" with 2,079 parking spaces on a 90.46 acre parcel located along the border between and containing acreage in both the Town of Patterson and the Town of Kent, Putnam County. All of the six proposed new buildings, nearly all of the parking lots (97% of proposed spaces), and the secondary access road would be constructed within the significantly larger section of the property (74.1 acres, or ~82%) which lies in the Town of Patterson. The primary access road and a corner of one of 5 parking pads would be located in the smaller section of the property (16.3 acres, or ~ 18%) lying in the Town of Kent.

The entire parcel abuts the western right-of way of Interstate Route 84 (I-84), and the proposed project would be constructed between I-84 and existing residential developments. A drainage divide splits the site, with flows going north and west into a direct tributary of Lake Carmel as well as east and south into the drainage system leading to the Great Swamp and East Branch of the Croton River. Most of the project site contains moderate to steep slopes and is forested, so site development would require substantial clearing and grading. On-site water supply and wastewater treatment systems will be required for the development as proposed.

While a number of local and state agencies have jurisdictions governing the project, only the Planning Boards of the Town of Patterson and the Town of Kent are contesting for lead agency. The Town of Patterson Planning Board (Patterson Board) jurisdictions are site development plan review plus an erosion control permit, and the Town of Kent Planning Board (Kent Board) jurisdictions are site development plan review plus erosion control, wetlands and sign permits.

The Patterson Board's jurisdictions apply to all activities on the portion of the property within the Town of Patterson, which includes the majority of the land clearing and new construction. The combination of site plan review and erosion control permits provides the Patterson Board with the authority to impose significant changes or conditions on the majority of the project's components, should those changes or conditions be identified as necessary to avoid or mitigate identified impacts.

Only a small portion of the project acreage is located within the Town of Kent; however, the project components proposed for that small area trigger multiple jurisdictions of the Kent Board. The main entrance and much of the primary access road from Route 311 are proposed to be within the Town of Kent, including a large sign at the base of the access road, near its intersection with Route 311. The access road itself would traverse 400 to 500 feet of relatively steep slopes, the lower roughly three-fourths of that length in the Town of Kent. Also within the Town of Kent portion of the site, segments of the access road plus a small corner of the parking area for buildings A, B and C are near a small stream. Altogether, the Kent Board has four bases for jurisdiction over those parts of the project within the Town of Kent: site plan review over only those elements of the proposed development in Kent plus local erosion control, wetlands and sign permits for specific areas or components. These jurisdictions would give the Kent Board authority to impose conditions, if necessary, to avoid or mitigate potential impacts associated with those project components within Kent.

In resolving a lead agency dispute, I am guided by the three criteria listed in order of importance in paragraph 6 NYCRR Part 617.6(b)(5)(v). These are:

(1) whether the anticipated impacts of the action being considered are primarily of statewide, regional or local significance (i.e., if such impacts are of primarily local significance, all other considerations being equal, the local agency involved will be lead agency);
(2) which agency has the broadest governmental powers for investigation of the impacts of the proposed action; and
(3) which agency has the greatest capability for providing the most thorough environmental assessment of the proposed action.

The first criterion relates to whether the anticipated impacts are primarily of statewide, regional or local significance. At present, the majority of the onsite physical construction is proposed to occur within the Town of Patterson, the existing residences actually adjoining the site are within the Town of Patterson, and the secondary access is proposed to be provided via streets within the Town of Patterson; thus, many impacts of construction and operation will be borne by the Town of Patterson or its residents. However, construction of the primary access road as proposed plus any offsite construction necessary to upgrade Route 311 or other portions of the existing road network, and subsequent use of those roads, will impact lands and residents of the Town of Kent. Since the impacts are primarily local in nature and both municipalities will likely be impacted, I must proceed to the next criterion in order to resolve this dispute.

The next criterion addresses the breadth of jurisdiction. Consideration of this criterion reveals a clear distinction between the disputing agencies. The Town of Patterson must issue a site development plan approval in order for the project to be constructed. Since the majority of the project site and proposed components are located in the Town of Patterson, this review will address most of the major concerns including the siting and construction of all of the proposed structures, nearly all of the proposed parking, and the internal roadways. Under its site development plan approval, the Town of Patterson Planning Board will have the authority to impose substantive conditions on the size and location of structures, parking, internal roads, and associated drainage management facilities to avoid or minimize the impacts that are identified during the environmental review.

In contrast, the Town of Kent's jurisdiction is limited to those project elements actually located within Kent: construction of the access road and, potentially, upgrading of the road network needed to accommodate the increase in traffic resulting from the project. The ability of the Town of Kent to impose substantive conditions and mitigation would also be limited to those components within the Town of Kent. Therefore, I find that the jurisdiction of the Patterson Board provides broader authority to review and provide mitigation for the anticipated impacts from this proposal.

The third criterion relates to the capacity of an agency to provide for a thorough environmental assessment. Both parties to this dispute possess the necessary staff or the ability to obtain the assistance of consultants to undertake an adequate environmental review for the proposed action. Given that weighing the second criterion has indicated a clear preference for the Patterson Board, however, consideration of the third criterion is not necessary for me to reach a decision.

I conclude, based on the facts presented, that the Town of Patterson Planning Board should be lead agency for the conduct of the environmental review for the proposed Patterson Crossing Retail Center due to the local nature of the impacts and the broad scope of authority afforded to the Patterson Board under its site development plan review and erosion control permit processes. I note, however, that the environmental review of the proposed project must address all potential impacts, including those which may primarily affect lands and residents of the Town of Kent.

This decision in no way limits the jurisdiction or responsibility of the Kent Board. I urge the Town of Kent to actively contribute to the environmental review which the Patterson Board will direct. Further, I remind the Patterson Board that the environmental record which it will develop needs to address potential impacts identified by the Kent Board so that the common environmental record will satisfy both the Patterson Board and the Kent Board's needs for an environmental record on which to base approvals needed for all project components.

Dated: 12/13/04
Albany, New York

Erin M. Crotty, Commissioner

Distribution of Copies

Disputing Agencies/Applicant:

Richard Williams, Planner, Town of Patterson
Arthur Singer, Chair, Town of Kent Planning Board
Hudson Valley Realty Corporation, attn: Paul Camarda

New York State Department of Environmental Conservation, Region 3:

Marc Moran, Regional Director
Margaret Duke, Regional Permit Administrator

New York State Department of Environmental Conservation, Albany:

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New York State Health Department
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COPY

TOWN OF PATTERSON
PLANNING & ZONING OFFICE

April 15, 2005

RE: Patterson Crossing Retail Center
Town of Patterson, Putnam County

Dear Involved Agency:

Please find enclosed the final scoping document for the Patterson Crossing Retail Center.

The scoping document has been prepared for an application received by the Town of Patterson Planning Board for the construction of a 439,500 square foot retail center by Hudson Valley Realty Corp. entitled the Patterson Crossing Retail Center. The 94.94 acre parcel is located within the Town of Patterson (79.54 acre) and the Town of Kent (15.4 acres), Putnam County, NY. The subject parcels are currently identified on the Town of Patterson Tax Maps as parcels 33.-2-23, 22.-3-1 and 34.-2-3. The parcel located in the Town of Kent is identified on the Town of Kent Tax Maps as 22.-2-48.

Please feel free to contact my Office if you have any questions.

Sincerely yours,

Richard Williams Sr.
TOWN PLANNER

FINAL

SCOPE FOR A

DRAFT ENVIRONMENTAL IMPACT STATEMENT

(DEIS)

THE PATTERSON CROSSING

INTERSTATE 84 AND NYS ROUTE 311

TOWNS OF PATTERSON AND KENT

PUTNAM COUNTY, NY

Adopted: April 14, 2005

Lead Agency and Contact Person:

Planning Board
Town of Patterson
1142 Route 311
P.O. Box 470
Patterson, NY 12563

Chairman Herb Schech

Contact: Richard Williams Sr., Planner

PROJECT DESCRIPTION

SEQRA Classification of Action: Type 1

Description of Proposed Action

The Town of Patterson Planning Board has received an application for site plan approval from the Hudson Valley Realty Corp. to construct a "retail center" entitled "Patterson Crossing" on 90.46± acres of undeveloped land. The Project proposes 439,500 s.f. of retail space (including the garden center), with parking for 2,079 cars. Access will be from NYS Route 311, approximately 1,000 feet west of the I-84 intersection. Water to the site will be supplied from groundwater wells with an anticipated daily usage of 15,675 gallons per day. The Project Sponsor is evaluating various options to address wastewater disposal. An application has been submitted to the NYC Department of Environmental Protection for inclusion in the Pilot Offset Program which would allow the construction of a wastewater treatment plant. A series of stormwater basins will be used as the primary method of managing post-development stormwater runoff. A stormwater pollution prevention plan will be developed meeting the Town of Patterson, Town of Kent, NYS Department of Environmental Conservation and NYC Department of Environmental Protection requirements. The Project Sponsor is also proposing to complete remedial repairs to an eroding stream channel on the site which conveys runoff from the residentially-developed areas west of the site to a tributary of the Middle Branch Croton River.

Site Location

The project is located on the south side of New York State Route 311, approximately 1,000 feet west of the of the intersection of Interstate 84. The project site lies in the Town of Patterson and the Town of Kent, Putnam County. Three parcels are located in the Town of Patterson and have a combined area of 74.1± acres. An additional 16.3 ± acres of the project site, which abuts Route 311 and from which access is derived, is located in the Town of Kent. The project is located in the East Branch Croton Reservoir, and Middle Branch Croton Reservoir watersheds.

Potentially Significant Adverse Impacts

A. The proposed action will require the physical alteration of approximately 60 acres and the permanent conversion of 32.4 acres of site into impervious surface. This disturbance may have an adverse impact on surface water quality and quantity through increased erosion, loss of vegetation, changes in hydrology and increased pollution from the creation of large areas of impervious surfaces.

B. The proposed action may substantially increase the quantity of traffic on the area's roads.

C. The creation of large areas of impervious surface may restrict groundwater recharge and affect available ground water resources.

D. The proposed action may adversely affect human and community resources through increased noise, increased demand for fire or police services, and increased light pollution.

GENERAL GUIDELINES

1. The Environmental Impact Statement ("EIS") should be written in the third person, i.e., the terms "we" and "our" should not be used. The Applicant's conclusions and opinions should be identified as those of "the Applicant" or "the Developer".

   The "draft" EIS should include a discussion of each item identified in this Scoping Document. Existing conditions, where appropriate future conditions without the project (*i.e. "no action alternative"*), and future conditions with the project as presently planned should all be discussed within each sub-category (e.g. soils, surface water, traffic, etc.) rather than as separate sections. For each identified adverse impact, also discuss any mitigation that is needed to minimize, to the maximum extent practical, any identified adverse impacts.

2. Narrative discussions should be accompanied by appropriate tables, charts, graphs, maps and diagrams whenever possible. If a particular subject matter can be most effectively described in graphic format, the narrative discussion should merely summarize and highlight the information presented graphically. All plans and maps showing the site should include adjacent properties (if appropriate), neighboring uses and structures, roads, and water bodies.

3. Information should be presented in a manner which can be readily understood by the public. Where technical terms are used, they should include an explanation of their meaning.

3. The entire document should be checked carefully to ensure consistency with respect to the information presented in various sections.

4. The level of detail provided should be sufficient to ensure that the EIS will be adequate to support the SEQR findings of <u>all involved agencies</u> and should include any pending rules and regulations which may impact the project.

5. Any assumptions incorporated into the assessment of an impact should be clearly identified. In such cases, the "worst case" scenario analysis should also be identified and discussed.

PROJECT SCOPE

COVER SHEET

A. Identify whether it is a "Draft" or "Final" Environmental Impact Statement

B. The name of the project.

C. The location of the project.

D. The name and address of the project sponsor, and the name and contact information of the contact person representing the Applicant.

E. The name and address of the primary preparer(s) of the EIS, and the name and telephone number of a contact person representing the preparer.

F. The name and address of the Lead Agency (Town of Patterson Planning Board) for the project and the name and telephone number of the person to be contacted for further information.

G. The date of acceptance of the DEIS or FEIS.

H. Date of Public Hearing and deadline for written comments on the DEIS

I. List of Consultants involved with the project including: names, addresses, FAX numbers and project responsibilities of all consultants involved with the project.

TABLE OF CONTENTS

A. All headings which appear in the text should be presented in the Table of Contents along with the appropriate page numbers. In addition, the Table of Contents should include a list of figures, a list of tables, a list of appendix items, and a list of additional EIS volumes, if any.

I. SUMMARY

A. Brief description of the Proposed Action including public need and benefits, including social and economic considerations.

B. List of Involved and Interested Agencies and required approvals/permits.

C. A brief listing of the anticipated adverse impacts and proposed mitigation measures for each impact category discussed in the DEIS. The presentation should be simple and concise.

D. A brief description of the alternatives considered in the DEIS. A table should be presented which assesses and compares each alternative relative to the various adverse impacts identified.

E. Alternatives considered

F. A listing of matters to be decided which are not included in "B" above.

II. PROJECT DESCRIPTION

A. LOCATION

1. Background and history

2. Describe the geographic boundaries of the proposed project site.

   a. Provide the tax map designation of Site in both Patterson and Kent.
   b. Describe the road network surrounding the site, and means of access to the site.
   c. Include a location map.

3. Objectives of the Project Sponsor

   a. Describe range of market area and type of retail center (neighborhood, regional, etc.)

B. REGIONAL SETTING

1. Describe the existing land use and zoning in both Patterson and Kent

   a. Describe existing land use of project site.

   b. Discuss how the proposed use of the site relates to the Town of Patterson Comprehensive Plan and the Town of Kent Comprehensive Plan that include project site and surrounding area

   c. Describe zoning of site and surrounding area.

2. Provide a description of the land use surrounding the site.

C. DESIGN AND LAYOUT

1. Structures

   a. Gross area
   b. Layout of buildings
   c. Building use
   d. Site Plans and building elevations
   e. Drainage Plans
   f. Utilities Layout

2. Parking

   a. Number of parking spaces and layout

3. Description of access to the site.

   a. Primary access
   b. Pedestrian access
   c. Emergency access
   d. Access through adjoining residential neighborhoods

4. Landscaping Plan

   a. Quantity, location and type of proposed landscaping
   b. Setbacks and Buffer treatments

5. Water supply

   a. Well location
   b. Anticipated use requirements

6. Sewage disposal system

   a. Location
   b. Anticipated sewage flows

7. Site Lighting

   a. Type of lighting proposed.
   b. Proposed lighting levels

8. Site coverage.

   a. Proposed impervious surface area (roofs, parking lots, roads)
   b. Amount of land to be cleared with description of cover type, i.e. woodland, farmland, etc.
   c. Amount of open space to remain under control of project sponsor.
   d. Proposed conservation areas and disposition.

D. CONSTRUCTION AND OPERATION

1. Construction

   a. Total construction period anticipated
   b. Schedule of construction (sequencing)
   c. Phasing
   d. Winter operations
   e. Construction traffic.
   f. Dust Suppression
   g. Erosion and sediment control
   h. Blasting operations

2. Operation

   a. Equipment and materials storage and/or staging areas.
   b. Schedule of operation (hours, shifts, holidays)
   c. Anticipated number of employees
   d. Deliveries, means, methods and times of.
   e. Lighting and Security

III. ECONOMIC AND SOCIAL BENEFITS

A. Benefits of the proposed action

1. Economic

   a. Discuss the existing cost of services and tax revenue generated by the site for:

      1. Town of Patterson
      2. Town of Kent

3. Putnam County
4. Carmel Central Schools

b. Discuss the expected, or anticipated cost of services and tax revenue generated by completed project for:

1. Town of Patterson
2. Town of Kent
3. Putnam County
4. Carmel Central Schools

2. Environment

3. Social

a. Need for retail

4. Employment

a. Describe existing employment conditions in the area
b. Employment opportunities during construction
c. Employment opportunities post-construction, including (type and salary levels)

IV. ENVIRONMENTAL SETTING, ANTICIPATED IMPACTS, AND PROPOSED MITIGATION MEASURES

A. GEOLOGY

1. Existing Conditions

a. Composition and thickness of bedrock material

1. Depth to, and nature of, subsurface bedrock formations.
2. Location and extent of any surficial bedrock.

2. Future "No Build" Conditions

a. Describe future conditions without project.

3. Future Conditions with Project.

a. Describe area and depth of bedrock removal required, if any.
b. Describe final disposition of any excavated bedrock.
c. Blasting

1. Identify and discuss state and local requirements regulating blasting.
2. Identify volume of rock requiring blasting.

4. Mitigation Measures

a. Discuss blasting plans and controls.
b. If blasting is required, schedule and warning system to be approved by Town(s)

B. SOILS

1. Existing conditions

a. Soil types based on USDA NRDC soil classifications (include map)

1. Location
2. Characteristics, hydrologic soil group designation, and engineering properties including the Erosion "K" factor.
3. Suitability of their intended use.
4. Depth to water table.

2. Future "No Build" Conditions.

a. Describe future conditions without project.

3. Future conditions with project.

a. Quantitative estimate of cut and fill to site.

1. Provide data on anticipated cut and fill volumes from site
2. Provide a preliminary grading plan showing existing and proposed grading on the site.
3. Discuss impact if cuts and fills are not balanced.

4. Mitigation Measures

a. Design adequate soil erosion and sediment control devices to protect slope areas and surface waters, including retention/detention areas.

b. Site phasing
c. Use of retaining walls to reduce embankment regrading when possible.

C. TOPOGRAPHY

1. Existing Conditions

a. Description of topography at project site

1. Slopes
a. 0-8%
b. 9-15%
c. 15-25%
d. 25% or greater

2. Prominent or unique features
3. Description of topography of surrounding area

2. Future "No Build" Conditions.

a. Describe future conditions without project.

3. Future Conditions with project.

a. Describe changes to site topography
b. Compare pre-development and post-development topography.
c. Discuss the potential for slope instability

4. Mitigation Measures

a. Avoidance of construction on steep slopes.
b. Construction where unsuitable material encountered.

D. GROUNDWATER

1. Existing Conditions

a. Location and description of aquifer and recharge areas

1. Depth to water table
2. Fracture Trace Analysis
3. Define area contributing to recharge of the site.

b. Identification of present uses and level of use of groundwater

1. Location of existing wells

a. Discuss number of wells and water usage within area contributing to recharge of the site, and at a minimum those wells within 2,000 feet of proposed wellhead
b. Public/private water supply
c. Industrial uses

2. Well test protocol

a. Conduct simultaneous 72-hour continuous pump test at the estimated maximum daily demand for the proposed wells for Patterson Crossing. Prior to conducting the test a plan shall be prepared describing the test parameters and submitted to the Putnam County Health Department and Patterson Planning Board, as lead agency. The test parameters shall include monitoring of one or more of the adjacent residential wells.
b. Near the end of the test, samples will be collected from each well for analysis of the water-quality parameters to be determined by Putnam County Health Department and the Patterson Planning Board as lead agency.

2. Future Conditions without project.

3. Future Conditions with project.

a. Describe loss of recharge area based on hydrogeologic study which includes calculations of pre- and post-construction changes in groundwater recharge.
b. Identify effect on neighboring wells from well-yield test.
c. Discuss potential impacts to groundwater resources from construction, including blasting.

4. Mitigation Measures

a. Maintain permeable areas on the site
b. Contingency plans for accidental spills

c. Potential scheme for mitigating impacts to area wells such as long term monitoring.

E. SURFACE WATER

1. Existing Conditions

a. Describe existing drainage areas
   1. Middle Branch Watershed
   2. East Branch Watershed
   3. Identify discharge points of existing drainage

b. Describe current quantity of stormwater runoff for the 90th percentile, 1, 2, 10, 25 and 100 year 24 hour storm events.

c. Describe current quality of stormwater relative to the following pollutants:

   1. Total phosphorus
   2. Total nitrogen
   3. Biological oxygen demand
   4. Suspended solids

d. Describe runoff from existing residential area entering onto site.

2. Future "No Build" Conditions

a. Describe future conditions without project.

3. Future Conditions with project.

a. Describe the post-development quantity of stormwater runoff for the 90th percentile, 1, 2, 10, 25 and 100 year 24 hour storm events.

b. Describe the post-development quality of stormwater runoff relative to the following pollutants:
   1. Total Phosphorus
   2. Total nitrogen
   3. Biological oxygen demand
   4. Suspended solids

c. Describe the quantity and quality of stormwater runoff during construction.

d. Potential for sedimentation and erosion

e. Assess the potential thermal impacts to downstream fish habitat in the Middle Branch River.
f. Potential for failure of detention ponds.
g. Discuss the use of de-icing materials on the quality of surface runoff.
h. Increase in nutrients associated with parking areas such as petroleum, antifreeze and refuse.
i. Future monitoring of basins and stormwater discharged from site.
j. Conduct a detailed geomorphic assessment in accordance with the New York State Stormwater Management Design Manual Appendix J for any drainage basin with 50 acres of developed area with an impervious cover greater than 25%.
k. Discuss the potential for stormwater basins being used by mosquitos for breeding, including any design or control measures to inhibit mosquito breeding.
l. Discuss any of-site road improvements and stormwater practices.

4. Mitigation measures

a. Include a conceptual Stormwater Pollution Prevention Plan that meets the Town's, City's and State's regulatory requirements. The conceptual plan should include sequence of construction, sediment and erosion control measures, and description of BMP's, with a goal of zero-net increase in runoff rate and zero-net increase from pollutants such as phosphorus and suspended solids from the pre-development condition for each individual sub-watershed basin.
b. Design parking lot to reduce stormwater runoff to the maximum extent practicable.
c. Describe proposed use of stormwater runoff from roof surfaces for irrigation use onsite and for Garden Center.
d. Provide treatment of stormwater generated from adjoining residential areas
e. Stabilize existing streambank erosion problem.
f. Employ the use of soil erosion control techniques during construction and operation to avoid siltation, including:

    1. Implementation of a soil erosion control plan based on the latest New York State technical guidance for controlling erosion and sedimentation.
    2. Phasing of construction.
    3. Construction Sequence
    4. Maintenance requirements during construction
    5. Post construction maintenance requirements
    6. Responsible parties for implementation and maintenance of

erosion control measures and stormwater facilities during construction and post-construction.

g. Discuss the use of Low Impact Development Techniques (LID) including pervious pavement.

F. WETLANDS, STREAMS AND WATER BODIES

1. Existing Conditions

a. Identify United States Army Corps of Engineers (USACE), State and local jurisdictional wetland areas and buffers within or contiguous to the project site.

1. Acreage
2. Vegetative Cover
3. Functional value
4. Classification or level of importance
5. Description of wetland types
6. Wildlife habitat

b. Identify State, local or NYC Department of Environmental Protection streams on the site, or any streams that may be discharged to.

1. Seasonal variation
2. Size
3. Discuss the existing condition of the steam channel and identify any areas of streambank erosion.
4. Benefits provided (wildlife, recreation, etc.)
5. NYS DEC Classification
   a. No. H-31-P44-23-P59-6

c. Identification of flood plains, discussion of potential for flooding

d. Discuss the existing condition of Lake Carmel.

2. Future "No Build" Conditions.

a. Describe Future conditions without project.

3. Future Conditions with project.

a. Disturbance to Town regulated wetlands in connection with storm water discharge into the Middle Branch Croton River
b. Potential alteration of natural hydrology of wetlands on the site
c. Impacts to wildlife
d. Identify any changes to existing streams on the site.
e. Discuss the effect that the proposed action will have on the water quality of Lake Carmel.

2. Mitigation measures

G. VEGETATION AND WILDLIFE

1. Existing Conditions

a. Description of vegetative cover presently on the proposed project site.
b. Description of wildlife currently inhabiting the proposed project site.
c. Identification of any endangered or threatened vegetation or wildlife existing on the site.

1. Contact NYS DEC Wildlife Resource Center to identify the presence of any rare, threatened, or endangered species or concern that may be known to inhabit the site.
2. Qualified personnel to perform field survey.

2. Future "No Build" Conditions

a. Describe future conditions without project.

3. Future Conditions with project.

a. Discuss potential for loss of wildlife habitat.
b. Discuss potential impact to rare or endangered species.

4. Mitigation Measures

a. Dedication of restricted open space
b. Remove minimum amounts of forest cover
c. Leave clusters of trees wherever possible
d. Leave vegetative buffers along stream banks
e. Landscape with native vegetation that provides high quality wildlife habitat.

H. TRANSPORTATION

1. Existing conditions

   a. Description of size, capacity, geometry and condition of services.

      1. Roads (I84, Rt.311, Rt.52, Fair Street)
      2. Traffic control
      3. Local Accident data
      4. Route 311 causeway at Lake Carmel
      5. Route 311 between Ludingtonville Road and Cushman Road

   b. List of intersections to be studied (A discussion of the methodology used should be included).

      1. NYS Route 311 and Route 52
      2. NYS Route 311 and Terry Hill Road/North Terry Hill Road
      3. NYS Route 311 and Longfellow Drive
      4. NYS Route 311 and Ludington Court
      5. NYS Route 311 and I-84 eastbound, including ramps
      6. NYS Route 311 and I-84 westbound, including ramps
      7. NYS Route 311 and Ludingtonville Road (CR-43)
      8. NYS Route 311 and Fair Street(C.R.60)
      9. NYS Route 311 and NYS Route 164
      10. NYS Route 311 and Site Access (Build-Condition only)
      11. Horsepond Road (south) and Route 52
      12. Barrett Hill Road and Route 52
      13. Terry Hill and Fair Street

   c. Description of current level of services

      1. Discuss occurrence of peak hour traffic patterns for retail activities
      2. PM and Saturday peak hour traffic flows
      3. Vehicle mix
      4. Source of existing traffic

   d. Public Transportation

      1. Description of current availability of service
      2. Description of present level of use.

2. Describe future conditions without project.

3. Future Conditions (Based on a Project completion in *2010*)

   a. PM and Saturday peak hour traffic flows.
   b. Analysis of increase in traffic as a result of project, including site access, road conditions, sight distance, queue lengths, storage capacity and character.
   c. Potential impact from truck traffic on roads and intersections.
   d. Increased traffic related to project construction.
   e. Analysis of internal traffic circulation.
   f. Discuss the potential increase in traffic from vehicles using North Terry Hill/Putnam Drive as a short cut.

4. Mitigation Measures

   a. Discuss road improvements (as needed)

      1. Types of improvements (e.g., traffic control at intersections, road widening, intersection improvements, drainage improvements, surface improvements, etc.)
      2. Responsibility for improvements
      3. Methods of funding as appropriate.

I. NOISE

1. Existing conditions

   a. Existing noise levels from proposed project site.
   b. Analyze three receptor locations as follows:
      1. In general area of northeast terminus of Greenwood Court.
      2. At property line abutting residential properties along Concord Road.
      3. At property line abutting residential properties along Vernon Drive.

2. Future "No Build" Conditions

   a. Describe future conditions without project.

3. Future Conditions

   a. Discuss noise levels during construction including hours of operation.

b. Discuss noise levels post-construction including hours of operation and deliveries. The discussion should include the anticipated increase in noise on adjacent residential areas, especially during evening/sleep hours and anticipated use of exterior loudspeakers.

4. Mitigation measures

a. Schedule construction during "normal business" hours to minimize noise impacts during sensitive times such as early morning and late night.
b. Assure adherence to construction noise standards.
c. Sound barriers for adjacent residential areas

1. Describe various types of sound barriers such as vegetative buffers and fences and their ability to reduce noise.
2. Use of building location to serve as sound barrier.

d. Locating loading dock areas away from adjacent residential areas.

J. UTILITIES

1. Wastewater Disposal

a. Future Conditions

1. Discuss proposed method of providing wastewater treatment.
2. If a wastewater treatment plant with surface discharge is proposed, identify receiving water body and discuss ability of water body to assimilate effluent.
3. Discuss alternative method of providing for wastewater treatment meeting current regulatory requirements.
4. Identify any water quality impacts associated with wastewater disposal.

b. Mitigation Measures

1. Discuss NYC Department of Environmental Protection Pilot Phosphorous Offset Program and proposed methods to provide offsets.

2. Electric and Gas

a. Existing Conditions

1. Identify provider and available service in the area

b. Future Conditions

1. Discuss demand created for electric, fuel oil and/or gas

c. Mitigation

1. Incorporate energy savings measures into facility design
2. Install utility services underground.
3. Discuss use of energy saving technologies such as geo-thermal heating and cooling.

3. Solid Waste Disposal

a. Existing Conditions

1. Identify method of solid waste disposal in area of site

b. Future Conditions

1. Identify level of wastes to be generated.
2. Discuss the potential impacts from the location of compactors and/or refuse storage areas on the surrounding area.
3. Discuss the potential increase in rodent or scavenger populations.

c. Mitigation Measures

1. Ensure proper disposal techniques for solid waste.
2. Identify methods that will be used to maximize recycling.
3. Discuss means that will be used to control litter and maintain parking area in a clean condition.
4. Identify methods that will be used to control rodents and other scavengers such as use of containers with lids.

K. COMMUNITY SERVICES AND FACILITIES

1. Police Protection (State, County and local) and Security

a. Existing conditions

1. Review existing police protection capabilities in Patterson and Kent, including response time and human resources.

b. Future Conditions

1. Security and traffic
2. Discuss traditional police or security demands from other comparable projects operated by the applicant or prospective retail stores to operate at this site.
3. Emergency Access
4. Pedestrian trespass or "shortcutting" through private property
5. Identify and increase in costs to Town(s) or County.

c. Mitigation measures

1. Internal security system and surveillance cameras.

2. Evaluate effectiveness of fencing and/or landscape buffers to prevent "shortcutting" through private property, and other non-intrusive security measures to protect the adjacent residential homes.

3. Security provisions for emergency road.

2. Fire Protection

a. Existing Conditions

1. Review existing fire fighting capabilities in Patterson and Kent, including response time and human resources.
2. Identify primary response provider.

b. Future Conditions

1. On-site fire protection measures
2. Emergency response
3. Include an assessment of equipment type by responding agency and an assessment of whether the available equipment (i.e. ladder truck/ pumper truck) would be adequate for the height and size of the buildings proposed.
4. Assess the water supply needs to fight a worst-case fire event.
5. Identify and increase in costs to Town(s) or County.

c. Mitigation Measures

1. Discuss fire protection measures that will be incorporated into site design
2. Assure adequate water and vehicular access for fire fighting
3. Discuss any mutual aid agreement between the Patterson and Kent Fire Departments that may impact the Project.

3. Health care facilities and emergency services (hospitals and ambulance)

a. Existing conditions

1. Identify existing facilities and service in terms of location and response time

b. Possible Impacts

1. Employee or customer illness or injury

c. Mitigation Measures

1. Protocols for responding to on-site accidents
2. Provisions (if any) for air lifting trauma patients from site.

L. SOCIOECONOMIC

1. Identify the characteristics of existing community retail centers for Patterson and Lake Carmel.

a. Identification of the types of commercial establishments that are likely or unlikely to draw from the community retail centers.

b. Project how the proposed project may affect the community retail centers.

1. Increased economic growth of supporting businesses in the area, such as gas stations, restaurants and office supply businesses.
2. Describe likely economic effect or synergy with businesses in identified community retail centers.

c. Mitigation Measures

1. Discuss mitigation needed, if any to address increase in cost of services provided by municipalities.
2. Identify any tax incentives which may reasonably be anticipated will be applied to the project.

2. Retail Opportunities

a. Discuss the existing regional shopping opportunities.
b. Discuss disposable income and local spending habits.
c. Discuss the existing travel patterns, vehicle miles traveled and energy consumption.

M. CULTURAL RESOURCES

1. Historic and archeological resources

a. Existing Conditions

1. Location and description of historical areas or structures listed on State or National Register or designated by the community, or included on a Statewide Inventory
2. Identify areas of site and/or adjoining site that have potential significant archaeological value, including results of a Phase IA cultural resource inventory

b. Possible Impacts

c. Mitigation Measures

2. Visual Resources.

a. Existing Conditions

1. Description of the physical character of the community.
2. Prepare a viewshed analysis.
3. Description of natural areas of significant scenic value, if any exist in the immediate area
4. Identification of structures of significant architectural design

b. Future Conditions

1. Visual impact to views from nearby roads and highways visible to the project site.
2. Visual impact to views from residential areas.
3. Signage
4. Site Lighting

   a. Discuss how site lighting during nighttime hours will effect the surrounding area, especially the nearby residences.
   b. Discuss impacts from different types of lighting (Metal Halide, low pressure sodium and high pressure sodium)
   c. Include a photogrammetric map depicting the light levels at the property lines of the project and extending for a distance of 200 feet.

c. Mitigation measures

1. Visibility of site from NYS Route 311 due to topography.
2. Viewshed will be limited to I-84 due to setback requirements, landscaping, and design of facility
3. Minimize visual impact through thoughtful and innovative design of signs to consider height, size, and design.
4. Minimize visual impact through thoughtful and innovative design of lighting to consider height, size, intensity, glare, and hours of lighting operation.
5. Minimize visual impact of proposed buildings through thoughtful design and use of earthtone colors and natural materials for buildings.
6. Design landscaping to be visually pleasing
7. If on-site water supply is required, tanks will be stored underground
8. Fencing

N. CUMULATIVE IMPACTS

1. Possible Impacts

a. Discuss the cumulative impacts of the proposed project, based on a design year of 2010, along with other projects of significant size which have applications pending before the Planning Board(s) of the Town of Patterson, Kent, Southeast and Carmel which have received at least a conceptual review, or have received approvals and construction has yet to be completed. Projects of significant size include residential subdivisions or site plans of forty-nine or more units and commercial projects of 40,000,or more, square feet. Evaluated projects should include Hillcrest Commons and Chestnut Petroleum.

O. AIR QUALITY

1. Existing Conditions

a. Description of existing ambient air quality levels based on closest SCAMS/NAMS station.

b. National and State Air Quality Standards - The air quality existing condition and impact effort will include first level screening of traffic data for potentially impacted locations within the study area. The study area is defined as an area extending 500 feet from the north, east and west property line and 1,000 feet from the west property line and along NYS Route 311. The screening effort will be followed by computer modeling analyses for a minimum of three sites to determine the magnitude of the action's impact. Final modeling will include CAL3QHC and MOBILE5B analyses for Carbon Monoxide (CO). Emission models, modified per the current NYSDEC guidance (if any). All modeling will conform to NYSDOT's Environmental Procedures Manual.

2. Future "No Build" Conditions

a. Mobile Source Analysis
b. Stationary Source Analysis
c. Consistency with New York State Air Quality Implementation Plan.

3. Possible Impacts - This analysis will include the proposed build scenario and is limited to one set of traffic data (existing conditions, no action and one full build scenario).

a. Mobile Source Analysis
b. Stationary Source Analysis
c. Consistency with the New York State Air Quality Implementation Plan.

3. Mitigation Measures

a. Truck idle time will be limited to 5 minutes or less
b. Dust control measures will be employed during site construction.

V ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED IF THE PROJECT IS IMPLEMENTED.

VI ALTERNATIVES

A. No Action

1. Impacts of no action

a. Effects on public need
b. Effects on private developers' need
c. Beneficial or adverse environmental impacts

B. Alternative Scale or Magnitude

1. Alternate site plan layout

a. Building Orientation
b. Minimize parking area with multi-story parking facilities, and including below ground parking.

2. Alternate project size

a. Describe and evaluate a retail center of approximately 350,000 sq. ft.

C. Alternative Use

1. Consider an alternative use for property which complies with existing zoning (light industrial).

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Identify those natural and human resources listed in Section II that will be consumed, converted, or made unavailable for future use.

VIII. GROWTH INDUCING ASPECTS

This section describes the potential growth aspects the proposed project might have. Listed below are examples of areas of concern that are typically affected by the growth induced by a project.

A. POPULATION

1. Increases in business and resident population due to creation or relocation of business.
2. Increases in resident population due to the creation of jobs to be filled by people outside the Putnam County region.

B. SUPPORT FACILITIES

1. Business created to serve the new facility

2. Service industries created to supply the new facility

C. DEVELOPMENT POTENTIAL

1. Introduction or improvement of infrastructure (roads, waste disposal, sewers, water)
2. Creation of further growth potential by construction of improved infrastructure

IX EFFECTS ON THE USE AND CONSERVATION OF ENERGY RESOURCES

Identify the energy sources to be used, anticipated levels of consumption and ways to reduce energy consumption.

X APPENDICES

The following is a list of materials typically used in support of the EIS. This list will include supporting studies required as part of the DEIS.

A. List of underlying studies, reports, and information considered or relied on in preparing the statement. The DEIS should include any pertinent excerpts of those studies to facilitate review of the DEIS.

B. A copy of the Positive Determination and final Scoping Document.

C. List of all federal, state, regional, or local agencies, organizations, consultants, and private persons consulted in preparing the statement.

D. Relevant correspondence regarding the project and issues discussed in the DEIS.

E. Technical exhibits and studies, including traffic impact study, stormwater management, water supply, wastewater treatment, economic feasibility study, etc.

PART 1 - PROJECT INFORMATION
Prepared by Project Sponsor

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire form, Parts A through E. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete Parts 2 and 3.
It is expected that completion of the full EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

NAME OF ACTION **Patterson Crossing Retail Center**		
LOCATION OF ACTION (Include Street Address, Municipality and County) **NYS Route 311, Town of Patterson and Kent, Putnam County**		
NAME OF APPLICANT/SPONSOR **Patterson Crossing Realty, LLC**	BUSINESS TELEPHONE **845-224-1400**	
ADDRESS **1699 Route 6, Suite 1**		
CITY/PO **Carmel**	STATE **NY**	ZIP CODE **10512**
NAME OF OWNER (if different) **Cushman Montgomery**	BUSINESS TELEPHONE **850-385-0070**	
ADDRESS **C/O Charles Gardner Esq. / 300 Thomas Wood Drive**		
CITY/PO **Tallahasee**	STATE **Florida**	ZIP CODE
DESCRIPTION OF ACTION **Site Plan approval for development of a Retail Center, parking and stormwater management facilities. See attachment A**		

Please Complete Each Question - Indicate N.A. if not applicable

A. Site Description

Physical setting of overall project, both developed and undeveloped areas.

1. Present land use: ☐ Urban ☐ Industrial ☐ Commercial ☐ Residential (suburban) ☐ Rural (non-farm) ■ Forest ☐ Agriculture ■ Other **Existing Telecommunication building at southern part of the site**

2. Total acreage of project area: **90.5** acres.

APPROXIMATE ACREAGE	PRESENTLY	AFTER COMPLETION
Meadow or Bushland (Non-agricultural)	**2.0** acres	**2.0** acres
Forested	**87.7** acres	**28.2** acres
Agricultural (Includes orchards, cropland, pastures, etc.)	**0** acres	**0** acres
Wetland (Freshwater or tidal as per Articles 24, 25 or ECL	**0.2** acres	**0.2** acres
Water Surface Area	**0.1** acres	**0.1** acres
Unvegetated (Rock, earth or fill)	**0** acres	**0** acres
Roads, buildings and other paved surfaces	**0.5** acres	**34.2** acres
Other (Indicate type) **Landscape and stormwater management facilities**	**0** acres	**25.8** acres

3. What is predominant soil type(s) on project site? **PnB, PnC, PnD, WdB and CsD**
   a. Soil drainage: ■ Well Drained **83** % of site ☐ Moderately well drained ______ % of site
   ■ Poorly Drained **17** % of site
   b. If any agricultural land is involved, how many acres of soil are classified within soil group 1 through 4 of the NYS Land Classification System? **NA** acres. (See 1 NYCRR 370O.

4. Are there bedrock outcroppings on project site? ■ Yes ☐ No
   a. What is the depth to bedrock? **0-37** (in feet)

5. Approximate percentage of proposed site with slopes: ■ 0-10% **54.5** % ☐ 10-15% **20.6** % ■ 15% or greater **24.8** %

6. Is project substantially contiguous to, or contain a building, site, or district, listed on the State or National Registers of Historic Places? ☐ Yes ■ No

7. Is project substantially contiguous to a site listed on the Register of National Natural Landmarks? ☐ Yes ■ No

8. What is the depth of the water table? **1.5 to >6** (in feet)

9. Is site located over a primary, principal, or sole source aquifer? ☐ Yes ■ No

10. Do hunting, fishing or shell fishing opportunities presently exist in the project area? ☐ Yes ■ No

11. Does project site contain any species of plant or animal life that is identified as threatened or endangered? **TBD**

☐ Yes ■ No According to **Site Visits- to be confirmed by NYS Office of Environmental Conservation Information Services**

Identify each species ________

12. Are there any unique or unusual land forms on the project site? (i.e., cliffs, dunes, other geological formations.)

☐ Yes ■ No Describe ________

13. Is the project site presently used by the community or neighborhood as an open space or recreational area?

☐ Yes ■ No If yes, explain ________

14. Does the present site include scenic views known to be important to the community?

■ Yes ☐ No **From adjoining residential lots**

15. Streams within or contiguous to project area: **Middle Branch Croton River**

a. Name of Stream and name of River to which it is tributary

Middle Branch Croton River is tributary to the Lake Carmel.

16. Lakes, ponds, wetland areas within or contiguous to project area:

a. Name **NA** b. Size (In acres) ________

17. Is the site served by existing public utilities? ■ Yes ☐ No

a) If Yes, does sufficient capacity exist to allow connection? ■ Yes ☐ No

b) If Yes, will improvements be necessary to allow connection? ■ Yes ☐ No

18. Is the site located in an agricultural district certified pursuant to Agriculture and Markets law, Article 25-AA, Section 303 and 304? ☐ Yes ■ No

19. Is the site located in or substantially contiguous to a Critical Environmental Area designated pursuant to Article 8 of the ECL, and 6 NYCRR 617? ☐ Yes ■ No

20. Has the site ever been used for the disposal of solid or hazardous wastes? ☐ Yes ■ No

B. Project Description

1. Physical dimensions and scale of project (fill in dimensions as appropriate)

a. Total contiguous acreage owned or controlled by project sponsor **90.5** acres.

b. Project acreage to be developed: **60.5** acres initially; **60.5** acres ultimately.

c. Project acreage to remain undeveloped **30.0** Acres (see narrative Attachment A).

d. Length of project, in miles: **NA** (if appropriate)

e. If the project is an expansion, indicate percent of expansion proposed? **NA** %

f. Number of off-street parking spaces existing **0** Proposed **2079 Spaces** .

g. Maximum vehicular trips generated per hour **+1200** (Upon completion of project)? PM Peak Hour

h. If residential: Number and type of housing units:

	One Family	Two Family	Multiple Family	Condominium
Initially				
Ultimately				

i. Dimensions (in feet) of largest proposed structure **<35** height; **360** width; **445** length.

j. Linear feet of frontage along a public thoroughfare project will occupy is? **5100** ft.

2. How much natural material (i.e. rock, earth, etc.) will be removed from the site? **0** tons/cubic yards?

3. Will disturbed areas be reclaimed? ■ Yes ☐ No ☐ N/A
   a. If yes, for what intended purpose is the site being reclaimed? **Proposed building, Landscaping and Stormwater facilities**
   b. Will topsoil be stockpiled for reclamation? ■ Yes ☐ No
   c. Will upper subsoil be stockpiled for reclamation? ■ Yes ☐ No

4. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site? **59.5** acres.

5. Will any mature forest (over 100 years old) or other locally important vegetation be removed by this project?
   ☐ Yes ■ No

6. If single-phase project: Anticipated period of construction? **24** Months, (including demolition).

7. If multi-phased:
   a. Total number of phases anticipated? ______ (number).
   b. Anticipated date of commencement phase 1 ______ Month ______ Year, (including demolition)
   c. Approximate completion date of final phase ______ Month ______ Year.
   d. Is phase 1 functionally dependent on subsequent phases? ☐ Yes ☐ No

8. Will blasting occur during construction? ■ Yes ☐ No

9. Number of jobs generated during construction? **307** After project is complete **1028**

10. Number of jobs eliminated by this project? **0**

11. Will project require relocation of any projects or facilities?? ☐ Yes ■ No
    If yes, explain ______

12. Is surface liquid waste disposal involved? ■ Yes ☐ No **TBD- both options to be investigated**
    a. If yes, indicate type of waste (sewage, industrial, etc.) and amount. **Sewage- 15,675 gpd**
    b. Name of water body into which effluent will be discharged. ______

13. Is subsurface liquid waste disposal involved? ☐ Yes ■ No **TBD- both options to be investigated**

14. Will surface area of an existing water body increase or decrease by proposal? ☐ Yes ■ No
    Explain ______

15. Is project or any portion of project located in 100-year flood plain? ☐ Yes ■ No

16. Will the project generate solid waste? ■ Yes ☐ No
    a. If yes, what is the amount per month **32** Tons
    b. If yes, will an existing solid waste facility be used? ■ Yes ☐ No
    c. If yes, give name **RESCO** ;Location **Peekskill, NY**
    d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? ■ Yes ☐ No
    e. If yes, explain **Recyclables**

17. Will the project involve the disposal of solid waste? ☐ Yes ■ No
    a. If yes, what is the anticipated rate of disposal? ______ Tons/month.
    b. If yes, what is the anticipated site life? ______ Years.

18. Will project use herbicides or pesticides? ☐ Yes ■ No

19. Will project routinely produce odors (more than one hour per day?) ☐ Yes ■ No

20. Will project produce operating noise exceeding the local ambient noise levels? ☐ Yes ■ No

21. Will project result in an increase in energy use? ■ Yes ☐ No
    If yes, indicate type(s) **Electricity and gas**

22. If water supply is from wells, indicate pumping capacity **TBD** Gallons/minute.

23. Total anticipated water usage per day **15,675** gallons/day.

24. Does project involve Local, State or Federal funding? ☐ Yes ■ No
    If yes, explain ______

25. Approvals Required:

			Type	Submittal Date
City, Town, Village Board	■ Yes	☐ No	Possible Town Board for Transp. Corp.	
City, Town, Village Planning Board	■ Yes	☐ No	Site Plan, Special Use Permit,), Steep Slope, Wetland, Signs Permit, Site Plan,	
City, Town Zoning Board	■ Yes	☐ No	Fence Variance (Patterson/Kent)	
City, County Health Department	■ Yes	☐ No	Water supply, Sewage disposal	
Other Local Agencies	☐ Yes	■ No		
Other Regional Agencies	■ Yes	☐ No	NYC DEP SPPP, Sewer approval, County Highway	
State Agencies	■ Yes	☐ No	NYS DEC SPDES NYS DOT Highway Work Permit (Access road connection and offsite traffic improvements, if any)	
Federal Agencies	■ Yes	☐ No	Possible Army Corps of Engineers	

C. Zoning and Planning Information

1. Does proposed action involve a planning or zoning decision? ■ Yes ☐ No

If yes, indicate decision required:

☐ Zoning amendment ■ zoning variance ■ special use permit ☐ subdivision ■ site plan

☐ new /revision of master plan ☐ resource management plan ☐ other ______

2. What is the zoning classification(s) of the site? **Industrial, Residential (R-4), Commercial**

3. What is the maximum potential development of the site if developed as permitted by the present zoning?

4 single-family residences and 880,00 square feet retail and Industrial buildings

4. What is the proposed zoning of the site? **NA**

5. What is the maximum potential development of the site if developed as permitted by the proposed zoning?

NA

6. Is the proposed action consistent with the recommended uses in adopted local land use plans? ■ Yes ☐ No

7. What are the predominant land use(s) and zoning classifications within a ¼ mile radius of proposed action?

Residential, Commercial and Industrial

8. Is the proposed action compatible with adjoining/surrounding land uses within a ¼ mile? ■ Yes ☐ No

9. If the proposed action is the subdivision of land, how many lots are proposed? **NA**

a. What is the minimum lot size proposed? ______

10. Will proposed action require any authorization(s) for the formation of sewer or water districts? ☐ Yes ☐ No **TBD**

11. Will the proposed action create a demand for any community provided services (recreation, education, police, and fire protection)? ■ Yes ☐ No

12. Will the proposed action result in the generation of traffic significantly above present levels? ■ Yes ☐ No

a. If yes, is the existing road network adequate to handle the additional traffic? ☐ Yes ☐ No **TBD**

D. Informational Details

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with your proposal, please discuss such impacts and measures, which you propose to mitigate or avoid them.

E. Verification

I certify that the information provided above is true to the best of my knowledge.

Applicant/Sponsor Name **Patterson Crossing Realty, LLC** Date 6/30/04

Signature [signature] Title Planner for applicant

Full Environmental Assessment Form
Attachment A
PROJECT DESCRIPTION
Patterson Crossing

INTRODUCTION

The applicant proposes a proposed Retail Center on approximately 90.5 acres of undeveloped land of which 16.3 acres is zoned commercial in the Town of Kent and 74.1 acres is zoned residential and industrial in the Town of Patterson (see attached figures). This development project is called "Patterson Crossing". Most of the proposed development activity is within the Industrial zone of the Town of Patterson.

Site Location

The regional setting and site location are shown in the accompanying location map. The project site is located on New York State Route 311 near exit 18 of Interstate 84 in the Town of Patterson and Kent, Putnam County, New York. The municipal boundary bisects the site and all road frontage is within the Town of Kent

Description of the Project

The applicant is proposing a shopping center consisting of higher end retailers as listed in the table below. Total gross leasable area of these commercial uses is anticipated to be approximately 411,300 square feet in addition to 28,200 square feet of garden center. A reduced copy of the site plan is attached.

Table 1
Intensity of Use and Parking Requirements

Building	Square Foot	Parking Spaces
Cafe	3,000	,15
Restaurant	7,000	35
Retail	8,000	40
Bed, Bath and Beyond	24,800	124
Retail	15,400	77
Best Buy	30,000	150
Clothing or Sporting goods	51,200	256
Lowe's, Garden Center	135,200, 28,200	676*
Costco*	136,700	684
Total	411,300	2057

*Garden Center not included in parking calculation
fuel station at Costco for members only.

Access will be taken via a driveway connecting the site to Route 311. No buildings are proposed within the Kent portion of the site, although some accessory parking facilities are. No buildings are proposed within the residentially zoned portion of the Town of Patterson.

The proposed retail buildings have been sited on the far east side of the site and will be buffered from the interstate by a dense canopy of trees. The land abutting residential neighborhoods will be fenced and treated with landscaped buffers.

A preliminary stormwater management plan is proposed in accordance with New York City stormwater management requirements.

The site is served by electric and gas. Water and sewer service will provided by onsite facilities.

Of the 90.5 total acreage of the project site, approximately 30 acres will be conserved, 33.2 acres will consist of roads, buildings and other paved surfaces, and 25.8 acres will consist of landscaping and storm water management facilities.

Approvals Required

This proposed action will require approvals from the following agencies:

- Town of Patterson Board of Appeals, Special Use Permit, possible fence variance
- Town of Patterson Planning Board: Site Plan
- Town of Kent Planning Board: Steep Slope, Wetland, and Sign permit, Site Plan,
- Town of Kent Zoning Board: possible fence variance
- Putnam County Health Department: Water supply, sewage treatment facility
- New York City Dept of Environmental Protection: Stormwater Protection Plan and sewage treatment facility
- New York State Department of Environmental Conservation: SPDES permit
- NYSDOT Highway work permit

New York State Thruway Authority

New York Division
4 Executive Boulevard
Suffern, NY 10901

www.thruway.state.ny.us

John T. Brizzell, P.E.
Deputy Executive
Director

Ramesh Mehta, PE
Division Director
Phone (845) 918-2500
Fax (845) 918-2594

March 14, 2006

Mr. Herb Schech, Chairman
Mr. Richard Williams Sr., Planner
Patterson Planning Board
Town of Patterson
1142 Route 311
Patterson, NY 12563

RE: The Patterson Crossing
I-84 MP 61.85 EB @ NYS Rt. 311

Dear Mssrs. Schech and Williams:

The Thruway Authority has obtained the Towns' Scope for a Draft Environmental Impact Statement for the above subject proposed project. We have no objections to the Town being Lead Agency and offer the following concerns the Authority, as an involved agency, will have with this project:

1) Traffic - A Traffic Impact Study will be needed in order to analyze the operation of the road system, including the I-84 Interchange 18 area. Capacity and queuing analyses will need to include the interchange ramps.

2) Drainage - You will find attached the Thruway Authority's criteria for Hydraulic Design of New Facilities and Developments Utilizing Thruway (I-84) Drainage.

3) Signing - Any signing adjacent to I-84 must meet the Thruway's regulations for commercial signs adjacent to the I-84 property. Attached is a copy of the regulations. Please contact our Traffic Management (518-471-4453) office for any questions you may have.

4) Lighting - The Authority's design practice for non-lighted areas of the highway requires that site lighting from new developments must not increase the foot-candle magnitude more than one tenth (0.1) foot-candle above the existing foot-candle magnitude at the outside edge of the outside travel lane of our roadway.

5) Fencing - A 6-ft. chain link fence needs to exist between the facility and the I-84 mainline.

Thank you for the opportunity to provide comments. Please forward two copies of any subsequent material to myself at the above address. Should you have any questions, please call me at 845-918-2510.

Very truly yours,

Darrin J. Scalzo

Darrin J. Scalzo
Division Permit Coordinator

DJS:an
Attachments

cc: R. Mehta

HYDRAULIC DESIGN OF
NEW FACILITIES AND DEVELOPMENTS
IMPACTING THRUWAY DRAINAGE

All projects that will alter stormwater runoff to New York State Thruway Authority lands shall be designed so that no increase in peak flows will occur. The criteria for this shall be the peak flows for 10, 25, and 50-year storms. Hydrologic and/or hydraulic computations shall be modeled using a method that is applicable to the size of the watershed involved. (Examples being the Rational Method, SCS TR-55 or TR-20 HEC-1, Dodson, Haestead).

In addition, any project down stream of Authority lands must not impede existing flows from the Thruway and be designed in such a manner as to accommodate the Thruway flows without flooding the project area.

To obtain Thruway approval the following materials are required:

1. Location map clearly showing project site, along with drainage basin schematic. All drainage basins must be clearly labeled.

2. Contoured site/drainage plans for pre and post-development including: flow direction arrows, Thruway structures affected, types of pipes, culverts or ditches, (with all pertinent dimensions, N-values, slopes and invert elevations).

3. Hydraulic computations and hydrographs for pre and post-development conditions for above storms. Standard backup data required includes but is not limited to: typical detention basin cross-section, emergency spillway configuration, maximum water surface elevations/volumes for each storm and outlet details (type of pipe, N-values, inverts, length, slope, inlet/outlet treatment and velocities).

   Note that detention basins/structures should be designed to contain the 100-year storm without overtopping.

4. A detailed narrative and summary sheet, specific to the impact on the Authority, is required. This narrative must include a discussion of pre and post-development flows and exactly how these post-development flows will be held to pre-development levels. (This narrative must refer to specific pages in the drainage study.)

5. A statement signed by a licensed engineer, certifying that post-development peak flows will be at or below pre-development levels and there will be no detrimental effect on the Authority.

Thruway approval does not relieve the developer from meeting all local, county, state and federal regulations governing erosion/sediment control and all other water quality standards that may apply.

3/2005

NEW YORK STATE THRUWAY AUTHORITY
BUREAU OF TRAFFIC ENGINEERING

GENERAL GUIDELINES PERTAINING TO ADVERTISING DEVICES

I. These guidelines supplement section 361-a of the Public Authorities Law and Part 105 of the Rules and Regulations of the Thruway Authority.

II. All advertising devices subject to a permit should be evaluated with respect to the following guidelines:

A. Normally, a limit of one sign for an individual property owner or individual business facing each direction of traffic.

B. Allowance of an additional entrance sign for a motel, gas station, shopping center, etc. when necessary to identify such entrance from the local highway.

1. The legend on an entrance sign should be limited to no more than four lines or twelve words of copy, including the name of the business.
2. A list of the individual businesses is not allowed on the shopping center entrance sign.

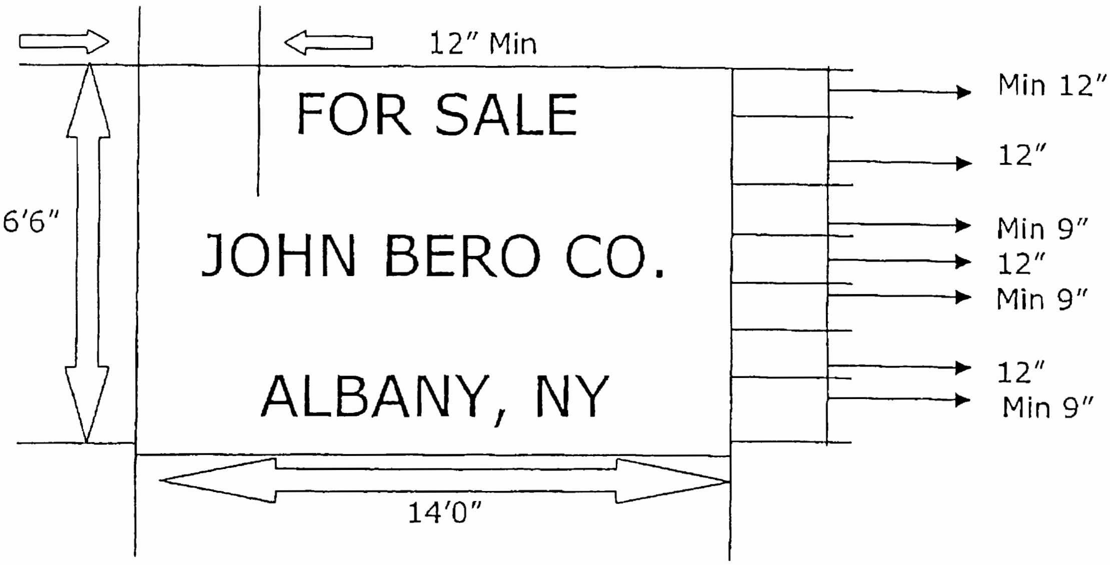
C. A street address or telephone number is not permitted.

D. A sign should usually consist of two colors, one for the legend and a contrasting color for the background. If it will not cause unreasonable distraction, a symbol, logo or additional colors may be allowed.

E. Outdoor advertising signs, displays and devices which include the steady illumination of sign faces, panels or slats that rotate or change to different messages in a fixed position, commonly known and referred to as changeable or multiple message signs, provided the change of one sign face to another is not more frequent than once every six seconds and the actual change process is accomplished in three seconds or less.

F. The sign and legend should be large enough to be seen and read within a reasonable and appropriate time. It should not be so large as to cause an unreasonable distraction or violate the natural scenic beauty or aesthetic features at its location In general:

1. The sign should not exceed 200 square feet in area nor 30 feet in any one dimension. The top of a sign should not be more than 40 feet above the Thruway road surface adjacent to its location. A sign on a building will be considered in relation to the size of the building.
2. A typical layout for a sign with 12 inch capital letters is shown below:



The width of the sign can be approximated by multiplying the number of letters and spaces, including edges spaces, by the height of the letter, in inches. The interline spacing should not be less and ¾ of the average of the heights of the capital or uppercase letters in adjacent lines of letters. The spacing to the top and bottom borders should be equal to the average of the letter height of the adjacent lines of letters. The lateral spacing to the vertical borders shall be essentially the same as the height of the largest letters.

III. Some advertising devices may be excluded from a need for a permit.
  A. An advertising device visible from a main roadway of the Thruway system may be excluded from a need for a permit when such device is:
    1. Deemed incidental and not otherwise in non-conference with section 361-a of the Public Authorities Law or Part 105 of the Thruway's Rules and Regulations.
    2. Among a multitude of devices oriented toward local highways and not causing an unreasonable distraction to Thruway travelers.
  B. An advertising device visible from an interchange roadway but not visible from a main roadway of the Thruway system may be excluded from permit requirement when such device is:
    1. Deemed incidental and not otherwise in non-conformance with section 361-a of the Public Authorities Law or Part 105 of the Thruway's Rules and Regulations.
    2. Among a multitude of devices oriented toward local highways and not causing an unreasonable distraction to Thruway travelers.

TAP-620

SECTION 361-A, PUBLIC AUTHORITIES LAW

(Chapter 593, Laws of 1952, effective April 10, 1952, as amended by Chapter 316, Laws of 1961, effective April 6, 1961)

§361-a. Restriction and regulation of advertising devices

1. Except as otherwise provided in this section, the erection or maintenance of any advertising device located within six hundred sixty feet of the nearest edge of the right-of-way of the Thruway without a written permit therefore granted by the Authority pursuant to this section is prohibited.
2. The term "advertising device" as used in this section shall include any billboard, sign, notice, poster, display or other device intended to attract or which does attract the attention of operators of motor vehicles on the Thruway, and shall where so determined by the Authority, include a structure erected or used in connection with the display of any such device and all lighting or other attachments used in conjunction therewith.
3. The Authority may from time to time adopt, modify, amend or repeal regulations governing the issuance of permits or renewals thereof for the erection and maintenance of advertising devices. Such regulations shall be designed to effectuate the general purposes of this article and the specific objectives and standards hereinafter set forth:
   a) To provide for maximum visibility along the Thruway system and connecting roads or highways;
   b) To prevent unreasonable distraction of operators of motor vehicles;
   c) To prevent confusion with regard to traffic lights, signs or signals or otherwise interfere with the effectiveness of traffic regulations;
   d) To preserve and enhance the natural scenic beauty or the aesthetic features of the Thruway system and adjacent areas;
   e) To promote maximum safety, comfort and well-being of the users of the Thruway.

4. To effectuate the purposes of this section, the Authority may limit the application of any regulation adopted; hereunder to exclude or include, in whole or in part.
   a) Specified areas of the Thruway system based upon use, population density, nature of the surrounding community, special conditions prevailing therein, or such other factors as

may make differentiation or separate classification or regulation necessary, proper or desirable;
b) Particular types of classes of advertising devices based upon size, design, lighting or such other factors as may make differentiation or separate classification or regulation necessary, proper or desirable;
c) The erection or maintenance of advertising devices on particular sections or portions.

5. Application for permits or renewals thereof shall be on forms prescribed by the Authority and shall contain such information as the Authority may require. A fee of ten dollars with respect to each advertising device shall be paid to the Authority with each initial application subject to a refund of one-half of this amount if the permit is not issued. Each permit shall be valid for a period not in excess of one year and may be renewed from time to time for such periods within thirty days of the expiration date thereof upon payment to the Authority of a fee of five dollars.
6. The permit or renewal thereof shall be revocable at any time on thirty days notice to the permittee in the event of a violation of the requirements of this section or any regulation lawfully adopted hereunder. Any advertising device erected or maintained after September first, nineteen hundred fifty-two in violation of this section of any regulation adopted hereunder is hereby declared to be, and is, a public nuisance and such device may be without notice be abated and removed by any officer or employee of the Authority, or upon request of the Authority, by any peace officer.
7. The Authority by regulation may exclude from the coverage of this section advertising devices which it finds do not interfere with safety on the Thruway system or contravene any of the other standards set forth in this section, including but not limited to:
   a) Advertising devices which are to be erected or maintained on property for the purpose of setting forth or indicating
      1. The name and address of the owner, lessee or occupant of such property, or
      2. The name or type of business or profession conducted on such property, or
      3. Information required or authorized by law to be posted or displayed thereon.
   b) Advertising devices which are not visible from any traveled portion of the Thruway system;
   c) Advertising devices indicating the sale or leasing of the property upon which they are placed;
   d) Directional or other official signs and signals erected or maintained by the state or other public agency having jurisdiction.

8. Nothing in this section shall apply with respect to any property which is owned or leased by the State of New York or any agency thereof or with respect to which the State of New York or any agency thereof has or shall have a valid easement or covenant with the owner thereof concerning the restriction, removal or prohibition of advertising devices.
9. Nothing in this section shall be construed to abrogate or affect the provisions of any municipal ordinance, regulation or resolution which are more restrictive concerning advertising devices than the provisions of this section or of the regulations adopted hereunder.
10. Pending the assumption of jurisdiction over any section or connection of the Thruway system by the Authority, the superintendent shall have all powers and duties with respect thereto conferred upon the Authority by this section.

Part 105. ADVERTISING DEVICES

105.1 Statutory Reference

The erection or maintenance of any advertising device, located within 660 feet of the nearest edge of the right-of-way of the Thruway is prohibited pursuant to section 361-a of the Public Authorities Law.

105.2 Definitions

For the purposes of this Part, the following definitions shall apply:

A. Advertising device shall include any billboard, sign, notice, poster, display or other device intended to attract or which does attract the attention of operators of motor vehicles on the Thruway, and shall include a structure erected or used in connection with the display of any such device and all lighting or other attachments used in conjunction therewith.
B. Off-premises device shall include an advertising device displaying a message pertaining to a business or service not conducted or provided on the property on which the device is located.

105.3 Prohibited advertising devices

A. The following are prohibited:

1. Advertising devices which advertise activities that are illegal under Federal, State or municipal laws or regulation;
2. Obsolete advertising devices;
3. Advertising devices not securely affixed in place;
4. Advertising devices which purport to be or are imitations of or resemble or are likely to be construed as official traffic control devices or railroad signs or signals, or which attempted to direct or regulate the movement of traffic, or which hide from view or interfere with the effectiveness of any official traffic control device or any railroad sign or signal;
5. Advertising devices which prevent the driver of a vehicle from having a clear and unobstructed view;
6. Advertising devices which contain, include or are illuminated by any flashing, intermittent or moving light or lights;
7. Advertising devices which permit beams or rays of light to be directed at any portion of the Thruway system, or

which cause glare and tend to interfere with any driver's operation of a vehicle on the Thruway system;

8. Advertising devices which move or have any animated or moving parts;
9. Advertising devices on trees, rocks or other natural features;
10. Advertising devices which, based on established policy or in the judgment of the Thruway Authority, constitute a traffic hazard; and
11. Off-premises devices, except that the following off-premises devices may be permitted under this Part: devices located in areas within 660 feet of the nearest edge of the right-of-way which are zoned industrial or commercial under authority of State law and which lie within the boundaries of cities having a population greater than 250,000, provided that no off-premises advertising device shall be permitted to be maintained within 660 feel of the nearest edge of the Niagara section right-of-way within the city of Buffalo north to Elm Street.

B. Whenever an off-premises advertising device prohibited under subdivision (a) of this section, but lawful under prior law, is located in areas within 660 feet of the nearest edge of the right-of-way of Interstates 84 or 287, and construction of same at its present location commenced with respect to Interstate 85 on or before September 1, 1992 and with respect to Interstate 287 on or before April 1, 1991, the same may continue to be maintained, subject to permitting under the Part, for a reasonable period not to exceed the longer of two years from commencement of construction or the period which the owner of the advertising device can demonstrate is necessary to avoid substantial financial loss. In determining what constitutes substantial financial loss, the Authority may consider such factors as initial capital investment, investment realization at the time of the permit application, life expectancy of the investment, the existence or non-existence of a lease obligation, and existence of a contingency clause permitting termination of the lease. Failure to apply for a permit under this Part shall constitute presumptive evidence that immediate removal of the off-premises advertising device will cause no substantial economic loss.

105.4 Exclusions

A. Excluded from these regulations are:

1. Advertising devices which are not visible from any traveled portion of the Thruway system;
2. Advertising devices for which the attraction is deemed incidental by the Thruway Authority;
3. Directional or other official signs and signals erected or maintained by the State or other public agency having jurisdiction; and
4. Information required or authorized by law to be posted or displayed thereon.

105.5 Permits

Application for a permit or renewal thereof for each separate advertising device shall be on forms adopted by the Thruway Authority and shall contain such information as the Thruway Authority may require.

105.6 Restrictions as to Thruway lands

Notwithstanding the purpose for which it may be erected or the persons to whom it may be visible, no advertising device shall be erected or maintained on lands under the jurisdiction of the Thruway Authority except devices by the Thruway Authority or with the consent of the Thruway Authority.

Appendix B

CORRESPONDENCE

Appendix B - List of Contacts

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program - Letter Follows.

New York State Department of Environmental Conservation, Region 3
Ron Pierce - Telephone Conversation on 5/09/05.

New York State Office of Parks, Recreation and Historic Preservation - Letter Follows.

New York State Department of Transportation
Angela Aiello - Letter Follows.

New York City Department of Environmental Protection - Letter Follows.

Putnam County Office of the Sheriff
Chief Donald B. Smith - Letter Follows.

Putnam County Bureau of Emergency Services
Adam Stiebling, Deputy Commissioner - Telephone Conversation on 2/22/05.

Putnam County Department of Health
Michael Budzinski, P.E., Director of Engineering - Letter Follows.

Town of Kent Police Department
Chief Donald L. Smith - Letter Follows.

Patterson Fire Dept. No. 1, Inc.
Chief Frank Smith - Telephone Conversation on 2/20/04.

Patterson Fire Dept. No. 1, Inc.
Brian M. Burdick, President - Letter Follows.

Connecticut Test Borings, LLC
Chris D'Angelis - Soil Borings - See Appendix D.

04031

J6 - A6

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
ELEANOR ROOSEVELT STATE OFFICE BUILDING
4 BURNETT BOULEVARD
POUGHKEEPSIE, N.Y. 12603-2594

ROBERT A. DENNISON III, P.E.
REGIONAL DIRECTOR

JOSEPH H. BOARDMAN
COMMISSIONER

June 15, 2005

James Garofalo
Tim Miller Associates, Inc.
10 North Street
Cold Spring, NY 10516

RE: Freedom of Information Law Request FR8-05-000048
Accident Data
Fair Street, T/ Patterson
Your File No. 04031

Dear Mr. Garofalo:

This correspondence is in reference to your May 24, 2005 Freedom of Information Law (FOIL) request and will acknowledge receipt of your check in the amount of $50.00.

Transmitted herewith is the information you requested.

Thank you for your interest in our operations.

Sincerely,

A. K. Aiello

Angela K. Aiello
Administrative Services Director

AKA:jjr

Attachment

SHERLITA AMLER, MD, MS, FAAP
Commissioner of Health

LORETTA MOLINARI, RN, MSN
Associate Commissioner of Health

ROBERT J. BONDI
County Executive

DEPARTMENT OF HEALTH
1 Geneva Road, Brewster, New York 10509

January 18, 2005

Tim Miller Associates Inc.
Mr. Jon Dahlgren
10 North Street
Cold Spring, New York 10516

Re: Well Testing Plan for Patterson Crossing
Town of Patterson

Dear Mr. Dahlgren:

This Department has received and reviewed the revised well testing program for the above referenced project. The revised well testing plan has been determined to be acceptable to this Department.

Kindly advise this office if there are any questions.

Respectfully,

Michael J. Budzinski, PE
Director of Engineering

MJB:cw
Cc: P. Camarda

Environmental Health (845) 278-6130 Fax (845) 278-7921
Nursing Services (845) 278-6558 **WIC** (845) 278-6678 Fax (845) 278-6085
Early Intervention/Preschool (845) 278-6014 Fax (845) 278-6648

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

January 17, 2005

COPY

Andrew Mavian
Tim Miller Associates, Inc
10 North St
Cold Spring, NY 10516

Dear Mr. Mavian:

In response to your recent request, we have reviewed the New York Natural Heritage Program databases with respect to an Environmental Assessment for the proposed Patterson Crossing Retail Center, site as indicated on the map you provided, located on Rte 311, Town of Patterson and Kent, Putnam County.

We have no records of <u>known</u> occurrences of rare or state-listed animals or plants, significant natural communities, or other significant habitats, on or in the immediate vicinity of your site.

The absence of data does not necessarily mean that rare or state-listed species, natural communities or other significant habitats do not exist on or adjacent to the proposed site. Rather, our files currently do not contain any information which indicates their presence. For most sites, comprehensive field surveys have not been conducted. For these reasons, we cannot provide a definitive statement on the presence or absence of rare or state-listed species, or of significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

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

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Data bases. Your project may require additional review or permits; for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

Sincerely,
Betty Ketcham
Betty A. Ketcham, Information Services
New York Natural Heritage Program

Enc.
cc: Reg. 3, Wildlife Mgr.

DIVISION OF ENVIRONMENTAL PERMITS REGIONAL OFFICES

January 2004

REGION	COUNTIES	REGIONAL PERMIT ADMINISTRATORS
1	Nassau & Suffolk	John Pavacic NYS-DEC BLDG. 40 SUNY at Stony Brook Stony Brook, NY 11790-2356 Telephone: (631) 444-0365
2	New York City (Boroughs of Manhattan, Brooklyn, Bronx, Queens, & Staten Island	John Cryan NYS-DEC One Hunters Point Plaza 47-40 21st Street Long Island City, NY 11101-5407 Telephone: (718) 482-4997
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster & Westchester	Margaret Duke NYS-DEC 21 South Putt Corners Road New Paltz, NY 12561-1696 Telephone: (845) 256-3054
4	Albany, Columbia, Greene, Montgomery, Rensselaer & Schenectady	William Clarke NYS-DEC 1150 North Wescott Road Schenectady, NY 12306-2014 Telephone: (518) 357-2069
4 (sub-office)	Delaware, Otsego & Schoharie	Kent Sanders NYS-DEC Route 10 HCR#1, Box 3A Stamford, NY 12167-9503 Telephone: (607) 652-7741
5	Clinton, Essex, Franklin & Hamilton	Thomas Hall NYS-DEC Route 86, PO Box 296 Ray Brook, NY 12977-0296 Telephone: (518) 897-1234
5 (sub-office)	Fulton, Saratoga, Warren & Washington	Thomas Hall NYS-DEC County Route 40 PO Box 220 Warrensburg, NY 12885-0220 Telephone: (518) 623-1281
6	Jefferson, Lewis & St. Lawrence	Brian Fenlon NYS-DEC State Office Building 317 Washington Street Watertown, NY 13601-3787 Telephone: (315) 785-2245
6 (sub-office)	Herkimer & Oneida	J. Joseph Homburger* NYS-DEC State Office Building 207 Genesee Street Utica, NY 13501-2885 Telephone: (315) 793-2555

7	Cayuga, Madison, Onondaga & Oswego	John Feltman NYS-DEC 615 Erie Blvd. West (Env.Permits Room 206) Syracuse, NY 13204-2400 Telephone: (315) 426-7438
7 (sub-office)	Broome, Chenango, Cortland, Tioga & Thompkins	Michael Barylski* NYS-DEC 1285 Fisher Avenue Cortland, NY 13045-1090 Telephone: (607) 753-3095
8	Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne & Yates	Peter Lent NYS-DEC 6274 East Avon Lima Road Avon, NY 14414-9519 Telephone: (716) 226-2466
9	Erie, Niagara & Wyoming	Steve Doleski NYS-DEC 270 Michigan Avenue Buffalo, NY 14203-2999 Telephone: (716) 851-7165
9 (sub-office)	Allegany, Cattaraugus, Chautauqua	Ken Taft* NYS-DEC 182 East Union, Suite 3 Allegany, NY 14706-1328 Telephone: (716) 372-0645

* Deputy Regional Permit Administrator

31 - 46

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

DONALD B. SMITH
Brigadier General, U.S. Army (Ret.)
SHERIFF
(845) 225 - 3000

PETER H. CONVERY
UNDERSHERIFF
(845) 225 - 1460

October 22, 2004

Ms. Janell Herring
Senior Planner
Tim Miller Associates, Inc.
10 North Street
Cold Spring, NY 10516

Re: Proposed Patterson Crossing, Towns of Patterson and Kent

Dear Ms. Herring:

This is in response to your letter, dated October 6, 2004, regarding the proposed Patterson Crossing in the Towns of Patterson and Kent. In your letter, you requested information on the ability of the Sheriff's Department to provide police protection services to this project. I hope the information listed below is of use in your Environmental Impact Study

- The Putnam County Sheriff's Department, along with the New York State Police, provides primary police services to the Town of Patterson.

- The Town of Kent Police Department provides primary police services within the Town of Kent.

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

- The Putnam County Sheriff's Department service ratio is one deputy sheriff per 1200 persons.

- The Kent Police station is located approximately 1.5 miles from the proposed site on Route 52 in the Town of Kent.

- The Putnam County Sheriff's Department headquarters is located approximately 4 miles from the proposed site at 3 County Center, Carmel, NY.

- The Putnam County Sheriff's Department has a total of 83 sworn officers.

- The Putnam County Sheriff's Department responds to approximately 32,000 – 33,000 calls for service per year.

- We do not anticipate a significant impact to the Putnam County Sheriff's Department in providing police protection specifically attributed to the proposed Patterson Crossing project. However, with Putnam County being one of the fastest growing counties in New York State, the collective impact of many new developments on law enforcement would most certainly require more law enforcement resources in future years.

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

Sincerely,

Donald B. Smith
Sheriff

DBS/lal

POLICE DEPARTMENT
Town of Kent
770 ROUTE 52, CARMEL, NEW YORK 10512

JH - file

Address All Communications
To Chief of Police
Donald L. Smith, Jr.

Emergency - (845) 225 - 4600
Office - (845) 225 - 5646
Fax - (845) 225 - 7659

October 14, 2004

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

Dear Ms. Herring:

This letter is in response to your letter dated October 6, 2004 regarding the impact the proposed Patterson Crossing Retail Center project would have on my department as well as responses to the statistical data you have requested.

The Town of Kent Police Department is comprised of 26 full time employees, 21 sworn and 5 civilian. The department responds to approximately 10,000 calls a year. At any given shift there are a minimum of (2) two officers on patrol and a typical emergency response time is less than (3) minutes. The ratio of police officers to population served is roughly 1.4 : 1000. The construction of our new police facility is scheduled to be complete in Fall of this year. The station will be located on Route 52 approximately 1 ½ miles from the proposed project. There are no immediate plans nor do we anticipate in the near future an increase in manpower.

Although most of the project will be located in the Town of Patterson, there are some serious concerns I have that may potentially impact my department. The first concern is the amount of traffic this project will generate. According to the map, it appears the proposed entrance will be located in the Town of Kent and therefor all of the project's traffic will pass through our town at one point or another increasing the possibility of traffic crashes, not only at the project site, but also around the ancillary intersections along Route 311 and along Route 52. The traffic along these highways is already congested and any further increase without roadway redesign would cause, in my opinion, severe impact.

As far as other types of law enforcement response not associated directly to traffic, it would be difficult to determine at this time the impact this project would have on my department.

If I can be of further assistance to you, please do not hesitate to contact me.

Sincerely,

Donald L. Smith Jr.
Chief of Police

B. - File - P Camarda
MN
J. Contelmo
04031

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

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

June 29, 2004

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

Re: <u>SEQRA</u>
Patterson Crossing Retail Center
I-84 and NY 311
Kent/Patterson, Putnam County
04PR03000

Dear Mr. Nainwal:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP) concerning your project's potential impact/effect upon historic and/or prehistoric cultural resources. Our staff has reviewed the documentation that you provided on your project. Preliminary comments and/or requests for additional information are noted on separate enclosures accompanying this letter. A determination of impact/effect will be provided only after ALL documentation requirements noted on any enclosures have been met. Any questions concerning our preliminary comments and/or requests for additional information should be directed to the appropriate staff person identified on each enclosure.

In cases where a state agency is involved in this undertaking, it is appropriate for that agency to determine whether consultation should take place with OPRHP under Section 14.09 of the New York State Parks, Recreation and Historic Preservation Law. In addition, if there is any federal agency involvement, Advisory Council on Historic Preservation's regulations, "Protection of Historic and Cultural Properties" 36 CFR 800 requires that agency to initiate Section 106 consultation with the State Historic Preservation Officer (SHPO).

When responding, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Ruth L. Pierpont

Ruth L. Pierpont
Director

RLP:bsa

BUILDINGS/STRUCTURES/DISTRICTS EVALUATION COMMENTS

PROJECT NUMBER 04PR03000

(Patterson Crossing Retail Center/I-84 and NY 311/T/KENT /T/PATTERSON)

- [x] Based upon a review of the information submitted and the scope of the project described, the NYS Office of Parks, Recreation and Historic Preservation has no concerns regarding historic buildings/structures/ districts within your project area.

- [ ] The following State/National Registers of Historic Places listed/eligible property/district is located within or adjacent to your project area. However, given the scope of the project, the NYS Office of Parks, Recreation and Historic Preservation has no concerns regarding historic buildings/structures/districts within your project area.

* Archaeology comments will be provided in a separate attachment.

If you have any questions concerning this information, please call Peter Shaver at 518-237-8643. ext 3264

PLEASE BE SURE TO REFER TO THE PROJECT NUMBER NOTED ABOVE WHEN RESPONDING TO THIS REQUEST

ARCHEOLOGY COMMENTS
04PR03000

Based on reported resources, there is an archeological site in or adjacent to your project area. Therefore the Office of Parks, Recreation and Historic Preservation (OPRHP) recommends that a Phase 1 archeological survey is warranted for all portions of the project to involve ground disturbance, unless substantial prior ground disturbance can be documented. If you consider the project area to be disturbed, documentation of the disturbance will need to be reviewed by OPRHP. Examples of disturbance include mining activities and multiple episodes of building construction and demolition.

A Phase 1 survey is designed to determine the presence or absence of archeological sites or other cultural resources in the project's area of potential effect. The Phase 1 survey is divided into two progressive units of study including a Phase 1A sensitivity assessment and initial project area field inspection, and a Phase 1B subsurface testing program for the project area. The OPRHP can provide standards for conducting cultural resource investigations upon request. Cultural resource surveys and survey reports that meet these standards will be accepted and approved by the OPRHP.

Our office does not conduct cultural resources surveys. A 36 CFR 61 qualified archeologist should be retained to conduct the Phase 1 survey. Many archeological consulting firms advertise their availability in the yellow pages. The services of qualified archeologists can also be obtained by contacting local, regional, or statewide professional archeological organizations. Phase 1 surveys can be expected to vary in cost per mile of right-of-way or by the number of acres impacted. We encourage you to contact a number of consulting firms and compare examples of each firm's work to obtain the best product.

Documentation of ground disturbance should include a description of the disturbance with confirming evidence. Confirmation can include current photographs and/or older photographs of the project area which illustrate the disturbance (approximately keyed to a project area map), past maps or site plans that accurately record previous disturbances, or current soil borings that verify past disruptions to the land. Agricultural activity is not considered to be substantial ground disturbance and many sites have been identified in previously cultivated land.

Please also be aware that a Section 233 permit from the New York State Education Department (SED) may be necessary before any archeological survey activities are conducted on State-owned land.If any portion of the project includes the lands of New York State you should contact the SED before initiating survey activities.The SED contact is Christina B. Rieth and she can be reached at (518) 402-5975. Section 233 permits are not required for projects on private lands.

If you have any questions concerning archeology, please contact Michael Schifferli at 518-237-8643. ext 3281

PATTERSON FIRE DEPT. NO. 1, INC.

Box 334
Patterson, New York 12563
845-878-6047
www.pattersonfiredept.com

September 30, 2005

Mr. Paul Camarda & Mr. Mathew Bondi

Please be advised that the Patterson Vol. Fire Dept is the responsible Fire Dept to provide the Fire and Emergency Medical Services for the Patterson Crossing project on Route 311 in the Town of Patterson.

The Patterson Fire Dept. is a dedicated Volunteer Fire Dept. ready willing and able to provide the necessary protection for all areas within our fire district.

As we have discussed in the past, the Patterson Crossing Project will be constructed under the guidance of the New York State Building and Fire Codes with the required fire separations and fire protection systems in place. The Patterson Fire Department, Officers and it's Members support this project.

Thank you

Paul P. Piazza

Chief Patterson Fire Dept.

Brian M. Burdick

President, Patterson F.D.

The City of New York
Department of Environmental Protection
71 Smith Avenue
Kingston, New York
12401

Tel (845) 340-7532
Fax (845) 340-7504

Emily Lloyd
Commissioner

Tel (718) 595-6565
Fax (718) 595-3557

Bureau of Water Supply

Michael A. Principe, Ph.D.
Deputy Commissioner

Tel (914) 742-2001
Fax (914) 741-0348

April 20, 2005

TO: Charles Cutietta-Olson, Director, WQIA

FROM: Kelly Seelbach, Upstate DWQC Data Coordinator

SUBJECT: Requested Data

****

Request Number: O05-11

Requested By: Andrew Mavian
Tim Miller Associates, Inc.
10 North Street
Cold Spring, NY 10516

Data Requested: An Excel file of conductivity, total phosphorus, total nitrogen, D.O., chloride, pH, and turbidity from EBCR4 and MIDBR8, 1998 – 2001 and a printout of the maximum, minimum, and mean values of each analyte for each site.

Date Needed By: April 22, 2005

Date Request Received: April 5, 2005

Date Request Completed: April 20, 2005

Reason for Request: For description of baseline conditions for DEIS of proposed "Patterson Crossing" retail development at Route 311 and I-84 interchange.

Enclosed please find a diskette containing the information requested by Mr. Mavian. Also included are a contents procedure for the dataset, the printout, a laboratory methods table, a comments table, data entry code sheets, and a key to sampling locations. The data have been exported from SAS to an Excel spreadsheet. All data have been checked and corrected. If there are any questions regarding the information he will need to speak with David Robinson, Director, Kensico Laboratory, 19 West Lake Drive, Valhalla, NY 10595, 914-287-7156 or the East of Hudson District hydrologist.

This request contains 18 pages and 1 Excel file.

Enc.
KCS:kcs
xc: D. Smith (w/o enc.)
A. Bader (w/o enc.)
D. Robinson (w/o enc.)
D. Borchert (w/o enc.)
L. Emery (w/o enc.)
J. Mayfield (w/o enc.)
A. Mavian (w/o enc.)
file

Appendix C
RETAIL MARKET DATA
(CLARITAS DATA)

Business-Facts: Retail SIC Summary Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**
Project Code: 1492188-1 **Site: 01**

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

SIC Code	Business Description	Total Establishments	Total Employees	Sales (in Millions)	Establishments 20+ Employees
RET	All Retailing	66	405	41.5	2
52	Building Materials, Garden Supply and Mobile Homes	6	57	7.7	1
521	Lumber and Other Building Materials	3	48	6.1	1
523	Paint, Glass and Wallpaper	1	2	.4	0
525	Hardware Stores	1	2	.3	0
526	Retail Nurseries and Garden	1	5	.9	0
527	Mobile Home Dealers	0	0	.0	0
53	General Merchandise Stores	1	10	.8	0
531	Department Stores	0	0	.0	0
54	Food Stores	3	19	3.1	0
541	Grocery Stores	2	18	3.0	0
542	Meat and Fish Markets	0	0	.0	0
543	Fruit and Vegetable Markets	0	0	.0	0
544	Candy, Nut and Confection Store	0	0	.0	0
545	Dairy Products Stores	0	0	.0	0
546	Retail Bakeries	1	1	.1	0
549	Miscellaneous Food Stores	0	0	.0	0
55	Automobile Dealers and Gas Service Stations	4	8	1.5	0
551	New and Used Car Dealers	0	0	.0	0
552	Used Car Dealers	1	1	.2	0
553	Auto and Home Supply Stores	1	1	.2	0
554	Gasoline Service Stations	2	6	1.1	0
555	Boat Dealers	0	0	.0	0
556	Recreational Vehicle Dealer	0	0	.0	0
557	Motorcycle Dealers	0	0	.0	0
559	Automotive Dealers, NEC	0	0	.0	0
56	Apparel and Accessory Stores	1	2	.1	0
561	Mens and Boys Clothing Stores	0	0	.0	0
562	Womens Clothing Stores	0	0	.0	0
563	Womens Accessory and Specialty Stores	1	2	.1	0
564	Childrens and Infants Wear	0	0	.0	0
565	Family Clothing Stores	0	0	.0	0
566	Shoe Stores	0	0	.0	0
569	Miscellaneous Apparel and Accessory Stores	0	0	.0	0
57	Home Furniture,Furnishings and Equipment	11	53	11.3	0
571	Home Furniture and Furnishing	3	22	3.9	0
5712	Furniture and Kitchen Design Stores	0	0	.0	0

Business-Facts: Retail SIC Summary Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**
Project Code: 1492188-1 **Site: 01**

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

SIC Code	Business Description	Total Establishments	Total Employees	Sales (in Millions)	Establishments 20+ Employees
5713	Floor Covering Stores	1	18	3.6	0
5719	Miscellaneous Home Furnishing Stores	2	4	.3	0
572	Household Appliance Stores	1	1	.2	0
573	Radio, TV and Computer Store	7	30	7.2	0
5731	Radio, TV, Electronic Stores	1	3	.5	0
5734	Computer Hardware and Software Stores	4	20	5.6	0
5735	Music, Video CD's and Tape Stores	2	7	1.1	0
58	Eating and Drinking Places	20	180	8.8	1
5812	Eating Places	20	180	8.8	1
5813	Drinking Places	0	0	.0	0
59	Miscellaneous Retail	20	76	8.2	0
591	Drug Stores and Proprietary	1	11	1.4	0
592	Liquor Stores	4	12	1.0	0
593	Used Merchandise Stores	2	2	.2	0
5932A	Antique Stores	1	1	.1	0
594	Miscellaneous Shopping Goods Stores	6	25	1.3	0
5941	Sporting Goods, Bicycle and Gun Stores	4	22	1.1	0
5942	Book Stores	0	0	.0	0
5943	Stationery Stores	0	0	.0	0
5944	Jewelry Stores	0	0	.0	0
5945	Hobby, Toy and Game Shops	0	0	.0	0
5946	Camera and Photography Supply Stores	0	0	.0	0
5947	Gift, Novelty and Souvenir Shops	2	3	.2	0
5948	Luggage and Leather Goods Stores	0	0	.0	0
5949	Sewing, Needlework and Craft Stores	0	0	.0	0
596	NonStore Retailers	0	0	.0	0
5961	Catalog and Mail Order Houses	0	0	.0	0
598	Fuel and Ice Dealers	0	0	.0	0
599	Retail Stores, NEC	7	26	4.3	0
5992	Florists	1	3	.2	0
5993	Tobacco Stores and Stands	0	0	.0	0
5994	News Dealers and Newsstands	0	0	.0	0
5995	Optical Goods Stores	0	0	.0	0
5999	Miscellaneous Retail Stores NEC	6	23	4.1	0
5999M	Pet Shops	0	0	.0	0

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

SIC Code	Business Description	Total Establishments	Total Employees	Sales (in Millions)	Establishments 20+ Employees
RET	All Retailing	1,004	9,033	1,203.1	89
52	Building Materials, Garden Supply and Mobile Homes	82	1,304	182.8	13
521	Lumber and Other Building Materials	29	863	110.2	10
523	Paint, Glass and Wallpaper	13	43	7.8	0
525	Hardware Stores	8	196	25.8	1
526	Retail Nurseries and Garden	31	186	33.0	2
527	Mobile Home Dealers	1	16	6.0	0
53	General Merchandise Stores	16	279	27.3	3
531	Department Stores	6	201	22.4	2
54	Food Stores	85	1,271	208.7	12
541	Grocery Stores	40	995	173.7	9
542	Meat and Fish Markets	8	75	12.0	2
543	Fruit and Vegetable Markets	7	22	4.4	0
544	Candy, Nut and Confection Store	0	0	.0	0
545	Dairy Products Stores	0	0	.0	0
546	Retail Bakeries	12	93	3.2	1
549	Miscellaneous Food Stores	18	86	15.4	0
55	Automobile Dealers and Gas Service Stations	113	868	256.9	11
551	New and Used Car Dealers	13	425	171.7	11
552	Used Car Dealers	14	27	6.4	0
553	Auto and Home Supply Stores	27	161	28.7	0
554	Gasoline Service Stations	49	205	37.3	0
555	Boat Dealers	3	6	1.8	0
556	Recreational Vehicle Dealer	4	25	7.1	0
557	Motorcycle Dealers	2	18	3.6	0
559	Automotive Dealers, NEC	1	1	.3	0
56	Apparel and Accessory Stores	20	131	8.5	2
561	Mens and Boys Clothing Stores	2	9	1.3	0
562	Womens Clothing Stores	6	45	2.4	1
563	Womens Accessory and Specialty Stores	2	4	.2	0
564	Childrens and Infants Wear	0	0	.0	0
565	Family Clothing Stores	1	4	.2	0
566	Shoe Stores	3	11	1.4	0
569	Miscellaneous Apparel and Accessory Stores	6	58	3.0	1
57	Home Furniture,Furnishings and Equipment	141	1,143	215.6	7
571	Home Furniture and Furnishing	59	631	94.5	4
5712	Furniture and Kitchen Design Stores	22	464	74.2	4

Business-Facts: Retail SIC Summary Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**
Project Code: 1492188-1 **Site: 01**

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

SIC Code	Business Description	Total Establishments	Total Employees	Sales (in Millions)	Establishments 20+ Employees
5713	Floor Covering Stores	14	63	12.6	0
5719	Miscellaneous Home Furnishing Stores	19	95	7.2	0
572	Household Appliance Stores	15	52	9.4	0
573	Radio, TV and Computer Store	67	460	111.7	3
5731	Radio, TV, Electronic Stores	17	67	10.5	1
5734	Computer Hardware and Software Stores	32	329	91.0	2
5735	Music, Video CD's and Tape Stores	12	50	7.8	0
58	Eating and Drinking Places	263	2,557	128.2	30
5812	Eating Places	255	2,484	125.2	29
5813	Drinking Places	8	73	3.0	1
59	Miscellaneous Retail	284	1,480	175.1	11
591	Drug Stores and Proprietary	25	275	34.9	0
592	Liquor Stores	26	79	6.4	0
593	Used Merchandise Stores	24	155	10.5	3
5932A	Antique Stores	12	15	1.2	0
594	Miscellaneous Shopping Goods Stores	93	358	28.3	3
5941	Sporting Goods, Bicycle and Gun Stores	20	83	4.6	1
5942	Book Stores	6	16	.9	0
5943	Stationery Stores	8	57	10.2	1
5944	Jewelry Stores	9	59	3.2	1
5945	Hobby, Toy and Game Shops	5	10	.7	0
5946	Camera and Photography Supply Stores	0	0	.0	0
5947	Gift, Novelty and Souvenir Shops	39	118	7.8	0
5948	Luggage and Leather Goods Stores	0	0	.0	0
5949	Sewing, Needlework and Craft Stores	6	15	.9	0
596	NonStore Retailers	16	160	24.0	3
5961	Catalog and Mail Order Houses	3	29	5.8	1
598	Fuel and Ice Dealers	2	6	1.2	0
599	Retail Stores, NEC	98	447	69.8	2
5992	Florists	18	53	3.2	0
5993	Tobacco Stores and Stands	2	6	.4	0
5994	News Dealers and Newsstands	0	0	.0	0
5995	Optical Goods Stores	6	55	6.9	1
5999	Miscellaneous Retail Stores NEC	72	333	59.3	1
5999M	Pet Shops	13	75	13.3	1

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

SIC Code	Business Description	Total Establishments	Total Employees	Sales (in Millions)	Establishments 20+ Employees
RET	All Retailing	6,309	63,686	8,407.0	657
52	Building Materials, Garden Supply and Mobile Homes	424	6,724	938.8	67
521	Lumber and Other Building Materials	154	4,082	520.7	50
523	Paint, Glass and Wallpaper	95	444	79.2	2
525	Hardware Stores	45	1,237	166.5	7
526	Retail Nurseries and Garden	128	944	166.0	8
527	Mobile Home Dealers	2	17	6.4	0
53	General Merchandise Stores	119	5,301	578.9	48
531	Department Stores	67	4,999	555.6	47
54	Food Stores	501	7,366	1,180.7	56
541	Grocery Stores	246	5,924	1,005.8	47
542	Meat and Fish Markets	32	269	43.0	3
543	Fruit and Vegetable Markets	27	94	18.8	0
544	Candy, Nut and Confection Store	14	54	2.9	0
545	Dairy Products Stores	13	92	8.2	0
546	Retail Bakeries	78	451	16.5	4
549	Miscellaneous Food Stores	91	482	85.5	2
55	Automobile Dealers and Gas Service Stations	625	7,447	2,408.8	121
551	New and Used Car Dealers	128	4,620	1,866.2	105
552	Used Car Dealers	95	249	58.8	0
553	Auto and Home Supply Stores	141	1,250	217.4	10
554	Gasoline Service Stations	208	985	177.5	2
555	Boat Dealers	21	137	41.1	2
556	Recreational Vehicle Dealer	11	56	15.9	0
557	Motorcycle Dealers	14	115	23.0	2
559	Automotive Dealers, NEC	7	35	8.9	0
56	Apparel and Accessory Stores	346	2,761	204.1	25
561	Mens and Boys Clothing Stores	21	274	36.9	4
562	Womens Clothing Stores	103	742	44.8	4
563	Womens Accessory and Specialty Stores	21	193	10.3	3
564	Childrens and Infants Wear	21	230	12.0	2
565	Family Clothing Stores	55	560	29.7	6
566	Shoe Stores	52	334	42.5	1
569	Miscellaneous Apparel and Accessory Stores	73	428	27.9	5
57	Home Furniture,Furnishings and Equipment	819	5,727	1,048.7	35
571	Home Furniture and Furnishing	378	2,823	392.5	20
5712	Furniture and Kitchen Design Stores	168	1,568	251.0	12

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

SIC Code	Business Description	Total Establishments	Total Employees	Sales (in Millions)	Establishments 20+ Employees
5713	Floor Covering Stores	74	380	76.0	0
5719	Miscellaneous Home Furnishing Stores	111	811	61.7	8
572	Household Appliance Stores	81	361	64.2	3
573	Radio, TV and Computer Store	360	2,543	592.0	12
5731	Radio, TV, Electronic Stores	67	392	60.6	4
5734	Computer Hardware and Software Stores	193	1,690	459.5	5
5735	Music, Video CD's and Tape Stores	62	338	52.3	2
58	Eating and Drinking Places	1,572	17,708	883.1	215
5812	Eating Places	1,516	17,391	869.0	211
5813	Drinking Places	56	317	14.1	4
59	Miscellaneous Retail	1,903	10,652	1,163.9	90
591	Drug Stores and Proprietary	125	1,708	219.4	20
592	Liquor Stores	145	465	37.8	1
593	Used Merchandise Stores	210	706	47.6	5
5932A	Antique Stores	142	227	15.3	0
594	Miscellaneous Shopping Goods Stores	735	4,002	299.1	38
5941	Sporting Goods, Bicycle and Gun Stores	141	768	41.0	7
5942	Book Stores	57	428	22.5	5
5943	Stationery Stores	39	389	70.6	9
5944	Jewelry Stores	111	427	24.5	2
5945	Hobby, Toy and Game Shops	91	660	44.2	8
5946	Camera and Photography Supply Stores	7	48	9.5	0
5947	Gift, Novelty and Souvenir Shops	252	1,085	73.5	5
5948	Luggage and Leather Goods Stores	6	27	1.4	0
5949	Sewing, Needlework and Craft Stores	31	170	11.9	2
596	NonStore Retailers	61	552	89.0	7
5961	Catalog and Mail Order Houses	9	199	39.8	4
598	Fuel and Ice Dealers	7	27	6.2	0
599	Retail Stores, NEC	620	3,192	464.8	19
5992	Florists	119	544	30.8	1
5993	Tobacco Stores and Stands	31	73	4.6	0
5994	News Dealers and Newsstands	4	32	1.7	0
5995	Optical Goods Stores	43	274	24.9	4
5999	Miscellaneous Retail Stores NEC	423	2,269	402.8	14
5999M	Pet Shops	55	364	64.5	5

Prepared from Claritas Business-Facts which includes data from infoUSA.

Appendix: Area Listing

Area Name:

Type: Radius | Reporting Detail: Aggregate | Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY

Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 3.00

Area Name:

Type: Radius | Reporting Detail: Aggregate | Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY

Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 10.00

Area Name:

Type: Radius | Reporting Detail: Aggregate | Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY

Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 20.00

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

Annual Expenditures	Aggregate (in 000's) 2004	Aggregate (in 000's) 2009	Per Capita 2004	Per Capita 2009	Average Household 2004	Average Household 2009	Market Index to USA 2004	Market Index to USA 2009
Apparel:								
Total Apparel	32,876	40,484	2,045	2,387	5,830	6,735	1.46	1.46
Women's Apparel	9,377	11,716	583	691	1,663	1,949	1.45	1.44
Men's Apparel	6,166	7,414	383	437	1,093	1,233	1.42	1.42
Girl's Apparel	1,794	2,286	112	135	318	380	1.30	1.31
Boy's Apparel	1,726	2,164	107	128	306	360	1.31	1.31
Infant's Apparel	690	812	43	48	122	135	1.20	1.21
Footwear (excl. Infants)	3,534	4,229	220	249	627	703	1.35	1.35
Other Apparel Prods/Services	9,589	11,862	596	699	1,701	1,973	1.65	1.64
Entertainment:								
Sports and Recreation	10,180	13,803	633	814	1,805	2,296	1.44	1.45
TV, Radio and Sound Equipment	13,482	17,327	838	1,022	2,391	2,883	1.38	1.38
Reading Materials	3,878	4,975	241	293	688	828	1.41	1.40
Travel	11,678	14,350	726	846	2,071	2,387	1.60	1.58
Photographic Equipment	1,313	1,437	82	85	233	239	1.62	1.59
Food at Home:								
Total Food at Home	36,329	41,094	2,259	2,423	6,442	6,837	1.23	1.22
Cereal Products	2,021	2,213	126	130	358	368	1.25	1.24
Bakery Products	4,170	4,471	259	264	740	744	1.32	1.31
Fish and Seafood	904	1,057	56	62	160	176	1.44	1.42
Meats (All)	7,699	8,855	479	522	1,365	1,473	1.24	1.24
Dairy Products	3,870	4,253	241	251	686	708	1.28	1.27
Fresh Milk and Cream	955	1,026	59	61	169	171	1.17	1.16
Eggs	396	492	25	29	70	82	1.13	1.12
Other Dairy Products	2,519	2,735	157	161	447	455	1.36	1.34
Fruits and Vegetables	4,592	5,227	286	308	814	870	1.28	1.27
Juices	1,224	1,345	76	79	217	224	1.41	1.40
Sugar and Other Sweets	2,242	2,574	139	152	398	428	1.20	1.20
Fats and Oils	312	368	19	22	55	61	1.18	1.17
Nonalcoholic Beverages	3,316	3,442	206	203	588	573	1.14	1.13
Prepared Foods	5,979	7,288	372	430	1,060	1,212	1.12	1.11

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

	Aggregate (in 000's)		Per Capita		Average Household		Market Index to USA	
Annual Expenditures	**2004**	**2009**	**2004**	**2009**	**2004**	**2009**	**2004**	**2009**
Health Care:								
Total Health Care	21,343	32,809	1,327	1,934	3,785	5,458	1.07	1.04
Medical Services	10,608	13,775	660	812	1,881	2,292	1.31	1.32
Prescription Drugs	9,719	17,617	604	1,039	1,724	2,931	.88	.88
Medical Supplies	1,016	1,417	63	84	180	236	1.26	1.26
Household Equipment:								
Total Household Textiles	4,371	5,481	272	323	775	912	1.46	1.47
Domestic Textiles	1,721	2,246	107	132	305	374	1.37	1.38
Window and Furniture Covers	2,650	3,234	165	191	470	538	1.52	1.55
Total Furniture	6,609	7,762	411	458	1,172	1,291	1.51	1.52
Bedroom Furniture	1,790	2,102	111	124	317	350	1.46	1.47
Living/Dining Room Furniture	3,068	3,471	191	205	544	577	1.54	1.56
Other Furniture	1,752	2,189	109	129	311	364	1.50	1.52
Major Appliances	2,336	2,489	145	147	414	414	1.36	1.36
Small Appliance/Houseware	4,568	5,339	284	315	810	888	1.36	1.38
Misc Household Equipment	3,989	5,139	248	303	707	855	1.38	1.36
Misc Personal Items:								
Personal Care Products and Services	6,530	8,684	406	512	1,158	1,445	1.29	1.29
Personal Expenses and Services	10,208	12,702	635	749	1,810	2,113	1.36	1.38
Smoking Prods/Supplies	5,380	6,350	335	374	954	1,056	1.18	1.17
Miscellaneous Items:								
Total Education	10,496	13,898	653	819	1,861	2,312	1.60	1.61
Room and Board	803	877	50	52	142	146	1.83	1.82
Tuition/School Supplies	9,693	13,021	603	768	1,719	2,166	1.58	1.60
Pet Expenses	3,171	4,147	197	244	562	690	1.28	1.28
Day Care	2,507	3,457	156	204	445	575	1.40	1.39
Contributions (All)	13,234	16,662	823	982	2,347	2,772	1.34	1.35

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

	Aggregate (in 000's)		Per Capita		Average Household		Market Index to USA	
Annual Expenditures	**2004**	**2009**	**2004**	**2009**	**2004**	**2009**	**2004**	**2009**
Other Misc. Expenses:								
Housekeeping Supplies	2,203	2,839	137	167	391	472	1.25	1.24
Total Food away from Home	35,706	43,266	2,221	2,551	6,332	7,198	1.39	1.37
Breakfast and Brunch	2,313	3,172	144	187	410	528	1.24	1.23
Dinner	12,382	14,196	770	837	2,196	2,362	1.50	1.48
Lunch	8,843	11,420	550	673	1,568	1,900	1.28	1.27
Snacks and Non Alcoholic Beverage	2,814	3,858	175	227	499	642	1.26	1.25
Catered Affairs	893	1,012	56	60	158	168	1.64	1.60
Food and Nonalcoholic Bevgs on Trips	8,462	9,607	526	566	1,501	1,598	1.44	1.43
Total Alcoholic Beverages	9,036	10,433	562	615	1,602	1,736	1.32	1.31
Alcoholic Beverages at Home	5,902	6,958	367	410	1,047	1,158	1.25	1.25
Alcoholic Beverages away from Home	3,134	3,475	195	205	556	578	1.47	1.46
Shelter and Related Expenses:								
Household Services	4,229	6,137	263	362	750	1,021	1.48	1.48
Household Repairs	9,830	11,266	611	664	1,743	1,874	1.53	1.50
Total Housing Expenses	6,687	7,152	416	422	1,186	1,190	1.47	1.40
Fuels and Utilities	2,276	2,008	142	118	404	334	2.67	2.43
Telephone Service	4,411	5,144	274	303	782	856	1.19	1.20
Transportation Expenses:								
Total Transportation Expenses	50,884	66,348	3,164	3,912	9,024	11,038	1.33	1.32
New Autos/Trucks/Vans	24,138	27,840	1,501	1,641	4,280	4,631	1.50	1.49
Used Vehicles	13,920	19,760	866	1,165	2,468	3,287	1.14	1.15
Boats and Outboard Motor, Etc	2,270	2,552	141	150	402	424	1.48	1.58
Towing Charges	39	52	2	3	7	9	1.20	1.24
Gasoline	8,964	14,104	557	832	1,590	2,346	1.23	1.22
Diesel Fuel	90	97	6	6	16	16	1.34	1.29
Rented Vehicles	1,465	1,944	91	115	260	323	1.48	1.49
Automotive Maintenace/Repair/Other	12,490	14,490	777	854	2,215	2,411	1.37	1.38
Total Specified Consumer Expenditures	335,542	420,320	20,867	24,782	59,504	69,925	1.35	1.34

Consumer Spending Patterns Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**
Project Code: 1492188-1 **Site: 01**

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

Annual Expenditures	Aggregate (in 000's) 2004	Aggregate (in 000's) 2009	Per Capita 2004	Per Capita 2009	Average Household 2004	Average Household 2009	Market Index to USA 2004	Market Index to USA 2009
Apparel:								
Total Apparel	312,018	385,472	2,201	2,568	6,371	7,374	1.59	1.60
Women's Apparel	88,715	111,499	626	743	1,811	2,133	1.57	1.58
Men's Apparel	57,843	69,907	408	466	1,181	1,337	1.54	1.54
Girl's Apparel	16,616	21,298	117	142	339	407	1.38	1.40
Boy's Apparel	15,548	19,625	110	131	317	375	1.36	1.37
Infant's Apparel	6,587	7,765	46	52	134	149	1.32	1.33
Footwear (excl. Infants)	32,786	39,515	231	263	669	756	1.44	1.45
Other Apparel Prods/Services	93,923	115,862	663	772	1,918	2,216	1.86	1.85
Entertainment:								
Sports and Recreation	99,718	135,574	703	903	2,036	2,593	1.62	1.64
TV, Radio and Sound Equipment	127,391	163,804	899	1,091	2,601	3,133	1.50	1.50
Reading Materials	36,979	47,528	261	317	755	909	1.55	1.54
Travel	114,823	141,070	810	940	2,344	2,699	1.81	1.79
Photographic Equipment	12,508	13,710	88	91	255	262	1.77	1.75
Food at Home:								
Total Food at Home	321,981	365,652	2,271	2,436	6,574	6,995	1.26	1.25
Cereal Products	17,806	19,569	126	130	364	374	1.27	1.26
Bakery Products	37,223	40,094	263	267	760	767	1.36	1.35
Fish and Seafood	8,072	9,468	57	63	165	181	1.48	1.46
Meats (All)	67,805	78,196	478	521	1,384	1,496	1.26	1.26
Dairy Products	34,138	37,648	241	251	697	720	1.30	1.29
Fresh Milk and Cream	8,402	9,062	59	60	172	173	1.18	1.18
Eggs	3,473	4,323	25	29	71	83	1.14	1.14
Other Dairy Products	22,263	24,264	157	162	455	464	1.38	1.37
Fruits and Vegetables	41,268	47,140	291	314	843	902	1.33	1.32
Juices	10,901	12,007	77	80	223	230	1.44	1.44
Sugar and Other Sweets	20,138	23,306	142	155	411	446	1.24	1.25
Fats and Oils	2,742	3,253	19	22	56	62	1.20	1.19
Nonalcoholic Beverages	29,011	30,239	205	201	592	578	1.14	1.14
Prepared Foods	52,877	64,734	373	431	1,080	1,238	1.14	1.13

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

Annual Expenditures	Aggregate (in 000's) 2004	Aggregate (in 000's) 2009	Per Capita 2004	Per Capita 2009	Average Household 2004	Average Household 2009	Market Index to USA 2004	Market Index to USA 2009
Health Care:								
Total Health Care	206,940	318,312	1,460	2,120	4,225	6,089	1.20	1.16
Medical Services	103,085	133,917	727	892	2,105	2,562	1.47	1.48
Prescription Drugs	94,160	170,807	664	1,138	1,923	3,267	.99	.99
Medical Supplies	9,695	13,587	68	91	198	260	1.38	1.39
Household Equipment:								
Total Household Textiles	43,121	54,055	304	360	880	1,034	1.66	1.67
Domestic Textiles	16,273	21,288	115	142	332	407	1.49	1.50
Window and Furniture Covers	26,848	32,767	189	218	548	627	1.78	1.81
Total Furniture	66,018	77,444	466	516	1,348	1,481	1.74	1.74
Bedroom Furniture	17,452	20,517	123	137	356	392	1.64	1.65
Living/Dining Room Furniture	31,202	35,243	220	235	637	674	1.80	1.82
Other Furniture	17,365	21,684	122	144	355	415	1.72	1.73
Major Appliances	21,775	23,209	154	155	445	444	1.46	1.46
Small Appliance/Houseware	44,812	52,342	316	349	915	1,001	1.54	1.55
Misc Household Equipment	37,620	48,677	265	324	768	931	1.50	1.49
Misc Personal Items:								
Personal Care Products and Services	59,952	79,905	423	532	1,224	1,529	1.37	1.37
Personal Expenses and Services	103,184	128,559	728	856	2,107	2,459	1.58	1.61
Smoking Prods/Supplies	43,560	51,428	307	343	889	984	1.10	1.09
Miscellaneous Items:								
Total Education	101,651	134,993	717	899	2,075	2,582	1.78	1.80
Room and Board	7,511	8,182	53	55	153	157	1.97	1.95
Tuition/School Supplies	94,139	126,811	664	845	1,922	2,426	1.77	1.79
Pet Expenses	29,913	39,306	211	262	611	752	1.39	1.39
Day Care	24,605	33,852	174	226	502	648	1.58	1.56
Contributions (All)	132,011	166,300	931	1,108	2,695	3,181	1.53	1.55

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

Annual Expenditures	Aggregate (in 000's) 2004	2009	Per Capita 2004	2009	Average Household 2004	2009	Market Index to USA 2004	2009
Other Misc. Expenses:								
Housekeeping Supplies	19,680	25,444	139	169	402	487	1.29	1.28
Total Food away from Home	325,781	395,688	2,298	2,636	6,652	7,569	1.46	1.44
Breakfast and Brunch	20,545	28,214	145	188	419	540	1.26	1.26
Dinner	113,491	130,657	801	870	2,317	2,499	1.58	1.57
Lunch	79,754	103,348	563	688	1,628	1,977	1.33	1.32
Snacks and Non Alcoholic Beverage	24,738	34,053	175	227	505	651	1.27	1.27
Catered Affairs	8,193	9,296	58	62	167	178	1.73	1.69
Food and Nonalcoholic Bevgs on Trips	79,059	90,121	558	600	1,614	1,724	1.55	1.54
Total Alcoholic Beverages	82,878	95,839	585	638	1,692	1,833	1.39	1.39
Alcoholic Beverages at Home	53,649	63,246	378	421	1,095	1,210	1.31	1.31
Alcoholic Beverages away from Home	29,229	32,593	206	217	597	623	1.58	1.57
Shelter and Related Expenses:								
Household Services	40,896	59,206	288	394	835	1,133	1.65	1.65
Household Repairs	94,384	108,425	666	722	1,927	2,074	1.69	1.66
Total Housing Expenses	60,626	65,207	428	434	1,238	1,247	1.53	1.46
Fuels and Utilities	20,331	17,980	143	120	415	344	2.74	2.50
Telephone Service	40,295	47,227	284	315	823	903	1.25	1.26
Transportation Expenses:								
Total Transportation Expenses	472,099	615,008	3,330	4,097	9,639	11,765	1.42	1.40
New Autos/Trucks/Vans	230,908	266,582	1,629	1,776	4,715	5,100	1.65	1.65
Used Vehicles	124,701	178,434	880	1,189	2,546	3,413	1.17	1.20
Boats and Outboard Motor, Etc	21,447	24,252	151	162	438	464	1.60	1.73
Towing Charges	327	437	2	3	7	8	1.17	1.20
Gasoline	79,528	125,393	561	835	1,624	2,399	1.25	1.25
Diesel Fuel	760	817	5	5	16	16	1.30	1.25
Rented Vehicles	14,428	19,095	102	127	295	365	1.68	1.68
Automotive Maintenace/Repair/Other	114,966	133,796	811	891	2,347	2,559	1.45	1.46
Total Specified Consumer Expenditures	3,151,890	3,959,807	22,235	26,379	64,354	75,748	1.46	1.45

Consumer Spending Patterns Report

Prepared For: Tim Miller Assoc. **Order #:** 963277662
Project Code: 1492188-1 **Site:** 01

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

Annual Expenditures	Aggregate (in 000's) 2004	Aggregate (in 000's) 2009	Per Capita 2004	Per Capita 2009	Average Household 2004	Average Household 2009	Market Index to USA 2004	Market Index to USA 2009
Apparel:								
Total Apparel	1,501,012	1,820,477	2,119	2,448	6,039	6,945	1.51	1.51
Women's Apparel	422,642	521,939	597	702	1,701	1,991	1.48	1.48
Men's Apparel	277,063	328,828	391	442	1,115	1,254	1.45	1.45
Girl's Apparel	81,999	103,233	116	139	330	394	1.34	1.35
Boy's Apparel	76,883	95,647	109	129	309	365	1.32	1.33
Infant's Apparel	32,767	38,011	46	51	132	145	1.29	1.30
Footwear (excl. Infants)	157,853	187,206	223	252	635	714	1.37	1.37
Other Apparel Prods/Services	451,805	545,614	638	734	1,818	2,081	1.76	1.73
Entertainment:								
Sports and Recreation	473,544	630,497	668	848	1,905	2,405	1.52	1.52
TV, Radio and Sound Equipment	611,273	772,538	863	1,039	2,459	2,947	1.42	1.41
Reading Materials	177,523	224,334	251	302	714	856	1.46	1.45
Travel	543,814	654,701	768	880	2,188	2,498	1.69	1.66
Photographic Equipment	58,902	63,509	83	85	237	242	1.65	1.61
Food at Home:								
Total Food at Home	1,576,357	1,772,512	2,225	2,384	6,342	6,762	1.21	1.21
Cereal Products	88,133	96,109	124	129	355	367	1.24	1.23
Bakery Products	181,029	192,901	256	259	728	736	1.30	1.29
Fish and Seafood	39,111	45,386	55	61	157	173	1.41	1.40
Meats (All)	337,323	385,882	476	519	1,357	1,472	1.24	1.24
Dairy Products	166,191	181,546	235	244	669	693	1.25	1.24
Fresh Milk and Cream	41,195	43,994	58	59	166	168	1.14	1.14
Eggs	17,601	21,755	25	29	71	83	1.14	1.14
Other Dairy Products	107,395	115,797	152	156	432	442	1.32	1.31
Fruits and Vegetables	202,618	228,988	286	308	815	874	1.28	1.28
Juices	53,772	58,612	76	79	216	224	1.40	1.40
Sugar and Other Sweets	97,658	111,611	138	150	393	426	1.19	1.19
Fats and Oils	13,426	15,775	19	21	54	60	1.16	1.15
Nonalcoholic Beverages	141,344	145,875	200	196	569	556	1.10	1.10
Prepared Foods	255,754	309,828	361	417	1,029	1,182	1.08	1.08

Consumer Spending Patterns Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**
Project Code: 1492188-1 **Site: 01**

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

Annual Expenditures	Aggregate (in 000's) 2004	Aggregate (in 000's) 2009	Per Capita 2004	Per Capita 2009	Average Household 2004	Average Household 2009	Market Index to USA 2004	Market Index to USA 2009
Health Care:								
Total Health Care	1,000,423	1,517,441	1,412	2,041	4,025	5,789	1.14	1.11
Medical Services	496,153	632,486	700	851	1,996	2,413	1.39	1.39
Prescription Drugs	457,910	820,983	646	1,104	1,842	3,132	.95	.95
Medical Supplies	46,360	63,972	65	86	187	244	1.30	1.31
Household Equipment:								
Total Household Textiles	203,597	249,856	287	336	819	953	1.54	1.54
Domestic Textiles	77,355	99,403	109	134	311	379	1.40	1.40
Window and Furniture Covers	126,242	150,453	178	202	508	574	1.65	1.65
Total Furniture	311,174	357,291	439	481	1,252	1,363	1.61	1.61
Bedroom Furniture	82,675	95,320	117	128	333	364	1.53	1.53
Living/Dining Room Furniture	146,868	162,100	207	218	591	618	1.67	1.67
Other Furniture	81,630	99,872	115	134	328	381	1.59	1.59
Major Appliances	100,498	105,704	142	142	404	403	1.33	1.32
Small Appliance/Houseware	209,609	240,554	296	324	843	918	1.42	1.42
Misc Household Equipment	173,680	222,070	245	299	699	847	1.36	1.35
Misc Personal Items:								
Personal Care Products and Services	290,899	381,964	411	514	1,170	1,457	1.31	1.31
Personal Expenses and Services	495,709	602,799	700	811	1,994	2,300	1.49	1.50
Smoking Prods/Supplies	213,236	248,653	301	334	858	949	1.06	1.05
Miscellaneous Items:								
Total Education	476,164	617,104	672	830	1,916	2,354	1.64	1.64
Room and Board	33,449	35,634	47	48	135	136	1.73	1.69
Tuition/School Supplies	442,716	581,470	625	782	1,781	2,218	1.64	1.64
Pet Expenses	137,922	179,229	195	241	555	684	1.27	1.27
Day Care	118,433	160,132	167	215	477	611	1.50	1.47
Contributions (All)	639,430	788,054	903	1,060	2,573	3,006	1.46	1.47

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

Annual Expenditures	Aggregate (in 000's) 2004	Aggregate (in 000's) 2009	Per Capita 2004	Per Capita 2009	Average Household 2004	Average Household 2009	Market Index to USA 2004	Market Index to USA 2009
Other Misc. Expenses:								
Housekeeping Supplies	95,232	121,727	134	164	383	464	1.23	1.22
Total Food away from Home	1,559,464	1,867,531	2,201	2,512	6,275	7,124	1.38	1.36
Breakfast and Brunch	99,941	135,523	141	182	402	517	1.21	1.20
Dinner	539,063	611,153	761	822	2,169	2,331	1.48	1.46
Lunch	386,816	494,340	546	665	1,556	1,886	1.27	1.26
Snacks and Non Alcoholic Beverage	120,048	163,015	169	219	483	622	1.21	1.21
Catered Affairs	38,116	42,750	54	57	153	163	1.59	1.55
Food and Nonalcoholic Bevgs on Trips	375,480	420,750	530	566	1,511	1,605	1.45	1.44
Total Alcoholic Beverages	398,500	453,502	562	610	1,603	1,730	1.32	1.31
Alcoholic Beverages at Home	259,458	301,360	366	405	1,044	1,150	1.25	1.24
Alcoholic Beverages away from Home	139,042	152,141	196	205	559	580	1.48	1.46
Shelter and Related Expenses:								
Household Services	200,269	283,793	283	382	806	1,083	1.59	1.57
Household Repairs	420,987	478,167	594	643	1,694	1,824	1.48	1.46
Total Housing Expenses	297,232	314,464	420	423	1,196	1,200	1.48	1.41
Fuels and Utilities	99,392	86,273	140	116	400	329	2.64	2.40
Telephone Service	197,839	228,192	279	307	796	871	1.21	1.22
Transportation Expenses:								
Total Transportation Expenses	2,220,848	2,846,748	3,135	3,829	8,936	10,860	1.32	1.29
New Autos/Trucks/Vans	1,094,537	1,244,147	1,545	1,673	4,404	4,746	1.54	1.53
Used Vehicles	573,073	806,566	809	1,085	2,306	3,077	1.06	1.08
Boats and Outboard Motor, Etc	99,269	108,948	140	147	399	416	1.46	1.55
Towing Charges	1,613	2,104	2	3	6	8	1.13	1.16
Gasoline	379,197	591,021	535	795	1,526	2,255	1.18	1.17
Diesel Fuel	3,544	3,820	5	5	14	15	1.20	1.16
Rented Vehicles	69,616	90,142	98	121	280	344	1.60	1.58
Automotive Maintenace/Repair/Other	541,585	620,237	764	834	2,179	2,366	1.35	1.35
Total Specified Consumer Expenditures	15,047,319	18,595,589	21,239	25,009	60,543	70,938	1.37	1.36

Claritas' Consumer Spending Patterns Report is derived from the Consumer Buying Power (CBP) database using information from the U.S. Bureau of Labor Statistics (BLS) Consumer Expenditure Survey (CEX).

The Annual Aggregate (in 000's) is used to obtain the Annual Per Capitas and the Average Household data by dividing the aggregate by the corresponding total household population and total households, respectively. The Market Index value is the ratio of the Annual Average Household Expenditure (AAHE) for the geography that this report is being produced, as compared to the "AAHE" for the U.S.A.

Current Year Estimates and Five Year Projections are produced by Claritas, Inc.

Appendix: Area Listing

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 3.00

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 10.00

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 20.00

Pop-Facts: Demographic Snapshot Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**
Project Code: 1492188-1 **Site: 01**

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
Population						
2009 Projection	16,961		150,114		743,565	
2004 Estimate	16,080		141,755		708,488	
2000 Census	15,331		134,970		679,676	
1990 Census	14,200		118,397		616,791	
Growth 2004-2009	5.48%		5.90%		4.95%	
Growth 2000-2004	4.89%		5.03%		4.24%	
Growth 1990-2000	7.96%		14.00%		10.20%	
2004 Est. Population by Single Race Classification	16,080		141,755		708,488	
White Alone	14,798	92.03	129,857	91.61	597,338	84.31
Black or African American Alone	379	2.36	3,679	2.60	44,263	6.25
American Indian and Alaska Native Alone	30	0.19	195	0.14	1,574	0.22
Asian Alone	206	1.28	3,037	2.14	22,567	3.19
Native Hawaiian and Other Pacific Islander Alone	3	0.02	57	0.04	236	0.03
Some Other Race Alone	431	2.68	2,859	2.02	27,274	3.85
Two or More Races	233	1.45	2,071	1.46	15,234	2.15
2004 Est. Population Hispanic or Latino by Origin*	16,080		141,755		708,488	
Not Hispanic or Latino	14,674	91.26	131,117	92.50	634,855	89.61
Hispanic or Latino:	1,406	8.74	10,637	7.50	73,633	10.39
Mexican	139	9.89	1,147	10.78	10,407	14.13
Puerto Rican	615	43.74	3,768	35.42	24,673	33.51
Cuban	56	3.98	450	4.23	1,978	2.69
All Other Hispanic or Latino	596	42.39	5,272	49.56	36,575	49.67
2004 Est. Hispanic or Latino by Single Race Class.	1,406		10,637		73,633	
White Alone	884	62.87	6,903	64.90	39,757	53.99
Black or African American Alone	13	0.92	186	1.75	2,703	3.67
American Indian and Alaska Native Alone	0	0.00	69	0.65	545	0.74
Asian Alone	12	0.85	29	0.27	218	0.30
Native Hawaiian and Other Pacific Islander Alone	1	0.07	30	0.28	82	0.11
Some Other Race Alone	405	28.81	2,653	24.94	25,118	34.11
Two or More Races	92	6.54	767	7.21	5,211	7.08

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Pop. Asian Alone Race by Category*	206		3,037		22,567	
Chinese, except Taiwanese	64	31.07	826	27.20	5,693	25.23
Filipino	33	16.02	336	11.06	2,092	9.27
Japanese	14	6.80	135	4.45	787	3.49
Asian Indian	54	26.21	941	30.98	7,514	33.30
Korean	17	8.25	274	9.02	1,967	8.72
Vietnamese	3	1.46	104	3.42	1,013	4.49
Cambodian	0	0.00	101	3.33	1,153	5.11
Hmong	0	0.00	0	0.00	0	0.00
Laotian	0	0.00	49	1.61	305	1.35
Thai	7	3.40	30	0.99	199	0.88
Other Asian	11	5.34	190	6.26	1,506	6.67
Two or more Asian categories	4	1.94	49	1.61	337	1.49
2004 Est. Population by Ancestry	16,080		141,755		708,488	
Pop, Arab	25	0.16	725	0.51	3,262	0.46
Pop, Czech	89	0.55	651	0.46	3,242	0.46
Pop, Danish	58	0.36	394	0.28	1,505	0.21
Pop, Dutch	85	0.53	966	0.68	5,461	0.77
Pop, English	600	3.73	6,332	4.47	37,108	5.24
Pop, French (except Basque)	159	0.99	1,346	0.95	8,503	1.20
Pop, French Canadian	117	0.73	810	0.57	5,391	0.76
Pop, German	1,202	7.48	12,906	9.10	58,958	8.32
Pop, Greek	60	0.37	983	0.69	4,276	0.60
Pop, Hungarian	59	0.37	892	0.63	5,158	0.73
Pop, Irish	3,408	21.19	25,213	17.79	104,330	14.73
Pop, Italian	4,150	25.81	35,192	24.83	140,896	19.89
Pop, Lithuanian	25	0.16	328	0.23	1,720	0.24
Pop, United States or American	644	4.00	5,348	3.77	26,986	3.81
Pop, Norwedian	124	0.77	972	0.69	4,116	0.58
Pop, Polish	413	2.57	4,390	3.10	21,416	3.02
Pop, Portuguese	65	0.40	974	0.69	6,589	0.93
Pop, Russian	204	1.27	2,180	1.54	12,494	1.76
Pop, Scottish	155	0.96	1,315	0.93	7,912	1.12
Pop, Scotch-Irish	80	0.50	1,267	0.89	6,104	0.86
Pop, Slovak	39	0.24	516	0.36	2,363	0.33
Pop, Subsaharan African	5	0.03	205	0.14	1,656	0.23
Pop, Swedish	218	1.36	1,251	0.88	6,081	0.86
Pop, Swiss	23	0.14	313	0.22	1,475	0.21
Pop, Ukrainian	18	0.11	366	0.26	2,573	0.36
Pop, Welsh	60	0.37	275	0.19	1,719	0.24
Pop, West Indian (exc Hisp groups)	104	0.65	596	0.42	5,629	0.79

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles *Radius*	*%*	0.00 - 10.00 Miles *Radius*	*%*	0.00 - 20.00 Miles *Radius*	*%*
2004 Est. Population by Ancestry						
Pop, Other ancestries	1,579	9.82	17,053	12.03	132,986	18.77
Pop, Ancestry Unclassified	2,309	14.36	17,994	12.69	88,578	12.50
2004 Est. Pop Age 5+ by Language Spoken At Home	15,080		132,765		661,603	
Speak Only English at Home	13,441	89.13	115,797	87.22	551,500	83.36
Speak Asian/Pacific Islander Language at Home	103	0.68	1,332	1.00	9,655	1.46
Speak IndoEuropean Language at Home	752	4.99	8,504	6.41	48,196	7.28
Speak Spanish at Home	734	4.87	6,420	4.84	48,482	7.33
Speak Other Language at Home	50	0.33	711	0.54	3,771	0.57
2004 Est. Population by Sex	16,080		141,755		708,488	
Male	7,987	49.67	69,735	49.19	350,562	49.48
Female	8,093	50.33	72,020	50.81	357,926	50.52
Male/Female Ratio	0.99		0.97		0.98	
2004 Est. Population by Age	16,080		141,755		708,488	
Age 0 - 4	1,000	6.22	8,990	6.34	46,884	6.62
Age 5 - 9	1,206	7.50	10,188	7.19	52,293	7.38
Age 10 - 14	1,268	7.89	10,716	7.56	54,120	7.64
Age 15 - 17	696	4.33	6,291	4.44	30,859	4.36
Age 18 - 20	490	3.05	4,308	3.04	25,681	3.62
Age 21 - 24	673	4.19	5,637	3.98	30,867	4.36
Age 25 - 34	1,995	12.41	15,448	10.90	80,377	11.34
Age 35 - 44	3,010	18.72	26,140	18.44	125,892	17.77
Age 45 - 49	1,372	8.53	12,364	8.72	58,547	8.26
Age 50 - 54	1,198	7.45	10,757	7.59	51,458	7.26
Age 55 - 59	974	6.06	8,904	6.28	42,688	6.03
Age 60 - 64	705	4.38	6,504	4.59	30,469	4.30
Age 65 - 74	815	5.07	8,504	6.00	41,904	5.91
Age 75 - 84	470	2.92	5,121	3.61	26,354	3.72
Age 85 and over	210	1.31	1,884	1.33	10,095	1.42
Age 16 and over	12,378	76.98	109,764	77.43	544,944	76.92
Age 18 and over	11,910	74.07	105,570	74.47	524,332	74.01
Age 21 and over	11,420	71.02	101,263	71.44	498,651	70.38
Age 65 and over	1,495	9.30	15,509	10.94	78,353	11.06
2004 Est. Median Age	37.37		38.56		37.63	
2004 Est. Average Age	36.46		37.44		36.91	

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Male Population by Age	7,987		69,735		350,562	
Age 0 - 4	516	6.46	4,620	6.63	23,930	6.83
Age 5 - 9	630	7.89	5,254	7.53	26,724	7.62
Age 10 - 14	654	8.19	5,488	7.87	27,735	7.91
Age 15 - 17	368	4.61	3,247	4.66	15,898	4.54
Age 18 - 20	248	3.11	2,332	3.34	13,910	3.97
Age 21 - 24	367	4.59	3,003	4.31	16,665	4.75
Age 25 - 34	988	12.37	7,577	10.87	39,975	11.40
Age 35 - 44	1,483	18.57	12,628	18.11	61,933	17.67
Age 45 - 49	671	8.40	6,030	8.65	29,063	8.29
Age 50 - 54	566	7.09	5,240	7.51	25,398	7.24
Age 55 - 59	485	6.07	4,354	6.24	20,952	5.98
Age 60 - 64	359	4.49	3,231	4.63	15,038	4.29
Age 65 - 74	374	4.68	3,955	5.67	19,685	5.62
Age 75 - 84	208	2.60	2,176	3.12	10,639	3.03
Age 85 and over	70	0.88	601	0.86	3,015	0.86
2004 Est. Median Age, Male	36.50		37.65		36.69	
2004 Est. Average Age, Male	35.54		36.43		35.84	
2004 Est. Female Population by Age	8,093		72,020		357,926	
Age 0 - 4	484	5.98	4,370	6.07	22,954	6.41
Age 5 - 9	575	7.10	4,934	6.85	25,568	7.14
Age 10 - 14	614	7.59	5,228	7.26	26,385	7.37
Age 15 - 17	328	4.05	3,043	4.23	14,960	4.18
Age 18 - 20	243	3.00	1,976	2.74	11,771	3.29
Age 21 - 24	305	3.77	2,634	3.66	14,202	3.97
Age 25 - 34	1,007	12.44	7,871	10.93	40,402	11.29
Age 35 - 44	1,527	18.87	13,512	18.76	63,958	17.87
Age 45 - 49	701	8.66	6,333	8.79	29,484	8.24
Age 50 - 54	631	7.80	5,517	7.66	26,059	7.28
Age 55 - 59	489	6.04	4,551	6.32	21,736	6.07
Age 60 - 64	346	4.28	3,273	4.54	15,431	4.31
Age 65 - 74	441	5.45	4,549	6.32	22,219	6.21
Age 75 - 84	262	3.24	2,945	4.09	15,716	4.39
Age 85 and over	140	1.73	1,283	1.78	7,079	1.98
2004 Est. Median Age, Female	38.21		39.41		38.55	
2004 Est. Average Age, Female	37.37		38.42		37.97	

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Population Age 15+ by Marital Status*	12,607		111,861		555,191	
Total, Never Married	3,114	24.70	25,243	22.57	137,555	24.78
Married, Spouse present	7,358	58.36	68,670	61.39	320,197	57.67
Married, Spouse absent	575	4.56	4,754	4.25	26,913	4.85
Widowed	635	5.04	6,157	5.50	31,886	5.74
Divorced	925	7.34	7,037	6.29	38,640	6.96
Males, Never Married	1,769	14.03	14,038	12.55	75,644	13.62
Previously Married	562	4.46	4,507	4.03	26,136	4.71
Females, Never Married	1,345	10.67	11,205	10.02	61,912	11.15
Previously Married	1,292	10.25	10,319	9.22	54,250	9.77
2004 Est. Pop. Age 25+ by Educational Attainment*	10,747		95,626		467,783	
Less than 9th grade	302	2.81	2,982	3.12	22,077	4.72
Some High School, no diploma	950	8.84	6,203	6.49	39,445	8.43
High School Graduate (or GED)	3,142	29.24	25,848	27.03	119,173	25.48
Some College, no degree	2,330	21.68	19,436	20.33	84,980	18.17
Associate Degree	903	8.40	6,914	7.23	33,142	7.08
Bachelor's Degree	1,906	17.74	19,924	20.84	97,047	20.75
Master's Degree	842	7.83	10,618	11.10	51,916	11.10
Professional School Degree	310	2.88	2,584	2.70	13,652	2.92
Doctorate Degree	63	0.59	1,118	1.17	6,350	1.36
Households						
2009 Projection	6,011		52,276		262,137	
2004 Estimate	5,639		48,977		248,539	
2000 Census	5,333		46,339		237,360	
1990 Census	4,729		38,933		211,402	
Growth 2004-2009	6.60%		6.74%		5.47%	
Growth 2000-2004	5.74%		5.69%		4.71%	
Growth 1990-2000	12.77%		19.02%		12.28%	
2004 Est. Households by Household Type*	5,639		48,977		248,539	
Family Households	4,272	75.76	37,593	76.76	182,634	73.48
Nonfamily Households	1,367	24.24	11,384	23.24	65,905	26.52
2004 Est. Group Quarters Population*	350		4,315		23,292	
2004 Households by Ethnicity, Hispanic/Latino	369	6.54	2,541	5.19	18,423	7.41

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Households by Household Income	5,639		48,977		248,539	
Income Less than $15,000	374	6.63	2,445	4.99	17,697	7.12
Income $15,000 - $24,999	264	4.68	2,161	4.41	14,917	6.00
Income $25,000 - $34,999	319	5.66	3,044	6.22	18,989	7.64
Income $35,000 - $49,999	614	10.89	4,764	9.73	27,036	10.88
Income $50,000 - $74,999	1,207	21.40	9,182	18.75	45,050	18.13
Income $75,000 - $99,999	995	17.64	8,402	17.15	38,363	15.44
Income $100,000 - $149,999	1,198	21.24	10,217	20.86	43,626	17.55
Income $150,000 - $249,999	560	9.93	6,775	13.83	29,256	11.77
Income $250,000 - $499,999	91	1.61	1,547	3.16	8,799	3.54
Income $500,000 and more	16	0.28	440	0.90	4,806	1.93
2004 Est. Average Household Income	$88,758		$102,578		$101,005	
2004 Est. Median Household Income	$76,042		$83,607		$75,379	
2004 Est. Per Capita Income	$31,516		$35,818		$35,810	
2004 Est. Household Type, Presence Own Children*	5,639		48,977		248,539	
Single Male Householder	469	8.32	3,839	7.84	22,348	8.99
Single Female Householder	596	10.57	5,399	11.02	30,597	12.31
Married-Couple Family, own children	1,761	31.23	16,283	33.25	77,061	31.01
Married-Couple Family, no own children	1,773	31.44	16,197	33.07	74,824	30.11
Male Householder, own children	79	1.40	574	1.17	3,595	1.45
Male Householder, no own children	109	1.93	866	1.77	4,638	1.87
Female Householder, own children	314	5.57	1,793	3.66	12,240	4.92
Female Householder, no own children	237	4.20	1,880	3.84	10,276	4.13
Nonfamily, Male Householder	188	3.33	1,328	2.71	7,682	3.09
Nonfamily, Female Householder	114	2.02	819	1.67	5,278	2.12
2004 Est. Households by Household Size*	5,639		48,977		248,539	
1-person household	1,065	18.89	9,237	18.86	52,944	21.30
2-person household	1,742	30.89	15,443	31.53	76,626	30.83
3-person household	1,094	19.40	8,892	18.16	44,219	17.79
4-person household	1,087	19.28	9,252	18.89	44,379	17.86
5-person household	444	7.87	4,214	8.60	20,083	8.08
6-person household	144	2.55	1,381	2.82	6,819	2.74
7 or more person household	63	1.12	558	1.14	3,468	1.40
2004 Est. Average Household Size*	2.79		2.81		2.76	

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Households by Presence of People*	5,639		48,977		248,539	
Households with 1 or more People Age 18 or under:						
Married-Couple Family	1,834	32.52	16,797	34.30	79,621	32.04
Other Family, Male Householder	94	1.67	692	1.41	4,273	1.72
Other Family, Female Householder	366	6.49	2,126	4.34	14,123	5.68
Nonfamily, Male Householder	15	0.27	100	0.20	531	0.21
Nonfamily, Female Householder	3	0.05	20	0.04	137	0.06
Households no People Age 18 or under:						
Married-Couple Family	1,700	30.15	15,684	32.02	72,264	29.08
Other Family, Male Householder	94	1.67	748	1.53	3,961	1.59
Other Family, Female Householder	185	3.28	1,547	3.16	8,393	3.38
Nonfamily, Male Householder	642	11.38	5,066	10.34	29,499	11.87
Nonfamily, Female Householder	706	12.52	6,198	12.65	35,738	14.38
2004 Est. Households by Number of Vehicles*	5,639		48,977		248,539	
No Vehicles	207	3.67	1,683	3.44	15,639	6.29
1 Vehicle	1,474	26.14	11,787	24.07	66,938	26.93
2 Vehicles	2,372	42.06	22,730	46.41	112,200	45.14
3 Vehicles	1,095	19.42	9,164	18.71	38,656	15.55
4 Vehicles	364	6.46	2,634	5.38	10,851	4.37
5 or more Vehicles	128	2.27	980	2.00	4,254	1.71
2004 Est. Average Number of Vehicles*	2.08		2.07		1.92	
Family Households						
2009 Projection	4,519		39,760		190,986	
2004 Estimate	4,272		37,593		182,634	
2000 Census	4,065		35,827		175,611	
1990 Census	3,859		31,301		160,892	
Growth 2004-2009	5.78%		5.76%		4.57%	
Growth 2000-2004	5.09%		4.93%		4.00%	
Growth 1990-2000	5.34%		14.46%		9.15%	

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Family Households by Household Income	4,272		37,593		182,634	
Income Less than $15,000	176	4.12	769	2.05	6,016	3.29
Income $15,000 - $24,999	147	3.44	960	2.55	6,518	3.57
Income $25,000 - $34,999	195	4.56	1,536	4.09	9,514	5.21
Income $35,000 - $49,999	344	8.05	2,952	7.85	16,275	8.91
Income $50,000 - $74,999	885	20.72	6,831	18.17	33,628	18.41
Income $75,000 - $99,999	823	19.26	7,079	18.83	31,799	17.41
Income $100,000 - $149,999	1,078	25.23	9,536	25.37	40,061	21.94
Income $150,000 - $249,999	533	12.48	6,156	16.38	26,421	14.47
Income $250,000 - $499,999	80	1.87	1,393	3.71	7,984	4.37
Income $500,000 and more	12	0.28	383	1.02	4,419	2.42
2004 Est. Average Family Household Income	$98,379		$114,748		$116,855	
2004 Est. Median Family Household Income	$86,833		$95,304		$90,226	
2004 Est. Families by Poverty Status*	4,272		37,593		182,634	
Income At or Above Poverty Level:						
Married-Couple Family, own children	1,870	43.77	16,763	44.59	78,969	43.24
Married-Couple Family, no own children	1,562	36.56	15,257	40.58	70,016	38.34
Male Householder, own children	35	0.82	596	1.59	3,780	2.07
Male Householder, no own children	117	2.74	659	1.75	3,549	1.94
Female Householder, own children	278	6.51	1,773	4.72	10,747	5.88
Female Householder, no own children	189	4.42	1,560	4.15	8,130	4.45
Income Below Poverty Level:						
Married-Couple Family, own children	41	0.96	258	0.69	1,901	1.04
Married-Couple Family, no own children	62	1.45	202	0.54	999	0.55
Male Householder, own children	31	0.73	145	0.39	656	0.36
Male Householder, no own children	5	0.12	39	0.10	248	0.14
Female Householder, own children	82	1.92	293	0.78	3,280	1.80
Female Householder, no own children	2	0.05	47	0.13	360	0.20
2004 Est. Pop Age 16+ by Employment Status*	12,378		109,764		544,944	
In Armed Forces	0	0.00	19	0.02	4,592	0.84
Civilian - Employed	8,454	68.30	71,823	65.43	350,455	64.31
Civilian - Unemployed	274	2.21	2,393	2.18	12,943	2.38
Not in Labor Force	3,650	29.49	35,529	32.37	176,954	32.47

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Civ Employed Pop 16+ Class of Worker*	8,454		71,823		350,455	
For-Profit Private Workers	5,542	65.55	49,274	68.60	243,423	69.46
Non-Profit Private Workers	857	10.14	6,160	8.58	29,418	8.39
Local Government Workers	1,100	13.01	8,100	11.28	31,643	9.03
State Government Workers	351	4.15	2,318	3.23	13,309	3.80
Federal Government Workers	135	1.60	1,035	1.44	7,190	2.05
Self-Emp Workers	454	5.37	4,767	6.64	24,638	7.03
Unpaid Family Workers	14	0.17	168	0.23	833	0.24
2004 Est. Civ Employed Pop 16+ by Occupation*	8,454		71,823		350,455	
Management, Business, and Financial Operations	1,257	14.87	12,727	17.72	60,711	17.32
Professional and Related Occupations	1,955	23.13	17,757	24.72	87,952	25.10
Service	1,351	15.98	8,846	12.32	46,156	13.17
Sales and Office	2,271	26.86	19,088	26.58	89,207	25.45
Farming, Fishing, and Forestry	14	0.17	171	0.24	627	0.18
Construction, Extraction and Maintainance	950	11.24	7,843	10.92	33,600	9.59
Production, Transportation and Material Moving	655	7.75	5,392	7.51	32,202	9.19
2004 Est. Pop 16+ by Occupation Classification*	8,454		71,823		350,455	
Blue Collar	1,605	18.99	13,234	18.43	65,802	18.78
White Collar	5,476	64.77	49,491	68.91	237,472	67.76
Service and Farm	1,372	16.23	9,098	12.67	47,181	13.46
2004 Est. Workers Age 16+, Transportation To Work*	8,320		70,726		347,525	
Drove Alone	6,655	79.99	56,859	80.39	267,655	77.02
Car Pooled	701	8.43	5,898	8.34	32,843	9.45
Public Transportation	570	6.85	3,978	5.62	21,143	6.08
Walked	101	1.21	927	1.31	10,056	2.89
Motorcycle	0	0.00	22	0.03	134	0.04
Bicycle	10	0.12	88	0.12	615	0.18
Other Means	35	0.42	204	0.29	1,594	0.46
Worked at Home	247	2.97	2,750	3.89	13,485	3.88
2004 Est. Workers Age 16+ by Travel Time to Work*	8,072		67,976		334,040	
Less than 15 Minutes	1,287	15.94	12,376	18.21	83,726	25.06
15 - 29 Minutes	1,922	23.81	18,166	26.72	94,278	28.22
30 - 44 Minutes	1,510	18.71	13,833	20.35	64,159	19.21
45 - 59 Minutes	1,560	19.33	10,435	15.35	36,826	11.02
60 or more Minutes	1,793	22.21	13,166	19.37	55,050	16.48
2004 Est. Average Travel Time to Work in Minutes*	41.95		38.94		34.72	

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
2004 Est. Tenure of Occupied Housing Units*	5,639		48,977		248,539	
Owner Occupied	4,597	81.52	41,448	84.63	186,681	75.11
Renter Occupied	1,042	18.48	7,529	15.37	61,858	24.89
2004 Occ Housing Units, Avg Length of Residence	15		15		15	
2004 Est. All Owner-Occupied Housing Values	4,597		41,448		186,681	
Value Less than $20,000	1	0.02	66	0.16	517	0.28
Value $20,000 - $39,999	7	0.15	160	0.39	1,169	0.63
Value $40,000 - $59,999	13	0.28	119	0.29	1,353	0.72
Value $60,000 - $79,999	12	0.26	62	0.15	1,315	0.70
Value $80,000 - $99,999	28	0.61	128	0.31	2,080	1.11
Value $100,000 - $149,999	420	9.14	2,087	5.04	13,450	7.20
Value $150,000 - $199,999	1,287	28.00	5,744	13.86	28,137	15.07
Value $200,000 - $299,999	2,038	44.33	15,840	38.22	63,817	34.19
Value $300,000 - $399,999	560	12.18	10,257	24.75	35,103	18.80
Value $400,000 - $499,999	132	2.87	3,558	8.58	14,904	7.98
Value $500,000 - $749,999	67	1.46	2,307	5.57	13,430	7.19
Value $750,000 - $999,999	29	0.63	788	1.90	6,920	3.71
Value $1,000,000 or more	4	0.09	334	0.81	4,486	2.40
2004 Est. Median All Owner-Occupied Housing Value	$226,067		$278,022		$271,014	
2004 Est. Housing Units by Units in Structure*	5,923		51,931		262,503	
1 Unit Attached	578	9.76	4,697	9.04	17,561	6.69
1 Unit Detached	4,603	77.71	40,474	77.94	178,979	68.18
2 Units	249	4.20	2,022	3.89	16,710	6.37
3 to 19 Units	378	6.38	3,423	6.59	34,266	13.05
20 to 49 Units	91	1.54	597	1.15	4,437	1.69
50 or More Units	5	0.08	258	0.50	6,520	2.48
Mobile Home or Trailer	20	0.34	446	0.86	3,931	1.50
Boat, RV, Van, etc.	0	0.00	15	0.03	100	0.04

Pop-Facts: Demographic Snapshot Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**
Project Code: 1492188-1 **Site: 01**

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles *Radius*	*%*	0.00 - 10.00 Miles *Radius*	*%*	0.00 - 20.00 Miles *Radius*	*%*
2004 Est. Housing Units by Year Structure Built*	5,923		51,931		262,503	
Housing Unit Built 1999 to present	513	8.66	4,492	8.65	18,379	7.00
Housing Unit Built 1995 to 1998	245	4.14	2,530	4.87	10,839	4.13
Housing Unit Built 1990 to 1994	197	3.33	2,663	5.13	11,752	4.48
Housing Unit Built 1980 to 1989	836	14.11	8,447	16.27	37,018	14.10
Housing Unit Built 1970 to 1979	718	12.12	8,457	16.29	41,604	15.85
Housing Unit Built 1960 to 1969	1,032	17.42	8,928	17.19	44,891	17.10
Housing Unit Built 1950 to 1959	1,072	18.10	6,801	13.10	36,163	13.78
Housing Unit Built 1940 to 1949	628	10.60	3,691	7.11	16,934	6.45
Housing Unit Built 1939 or Earlier	684	11.55	5,923	11.41	44,922	17.11
2004 Est. Median Year Structure Built*	1966		1971		1967	

*In contrast to Claritas Demographic Estimates, "smoothed" data items are Census 2000 tables made consistent with current year estimated and 5 year projected base counts.

Appendix: Area Listing

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 3.00

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 10.00

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 20.00

Executive Summary Report

Prepared For: Tim Miller Assoc. **Order #: 963277662**

Project Code: 1492188-1 **Site: 01**

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

- The population in this area is estimated to change from 15,331 to 16,080, resulting in a growth of 4.9% between 2000 and the current year. Over the next five years, the population is projected to grow by 5.5%.

  The population in the United States is estimated to change from 281,421,906 to 292,936,668, resulting in a growth of 4.1% between 2000 and the current year. Over the next five years, the population is projected to grow by 4.8%.

- The current year median age for this population is 37.4, while the average age is 36.5. Five years from now, the median age is projected to be 38.1.

  The current year median age for the United States is 36.0, while the average age is 36.9. Five years from now, the median age is projected to be 36.7.

- Of this area's current year estimated population:
  92.0% are White Alone, 2.4% are Black or African Am. Alone, 0.2% are Am. Indian and Alaska Nat. Alone, 1.3% are Asian Alone, 0.0% are Nat. Hawaiian and Other Pacific Isl. Alone, 2.7% are Some Other Race, and 1.4% are Two or More Races.

  For the entire United States:
  73.8% are White Alone, 12.4% are Black or African Am. Alone, 0.9% are Am. Indian and Alaska Nat. Alone, 4.0% are Asian Alone, 0.2% are Nat. Hawaiian and Other Pacific Isl. Alone, 6.1% are Some Other Race, and 2.7% are Two or More Races.

- This area's current estimated Hispanic or Latino population is 8.7%, while the United States current estimated Hispanic or Latino population is 14.0%.

- The number of households in this area is estimated to change from 5,333 to 5,639, resulting in an increase of 5.7% between 2000 and the current year. Over the next five years, the number of households is projected to increase by 6.6%.

  The number of households in the United States is estimated to change from 105,480,101 to 109,949,228, resulting in an increase of 4.2% between 2000 and the current year. Over the next five years, the number is projected to increase by 5.0%.

- The average household income is estimated to be $88,758 for the current year, while the average household income for the United States is estimated to be $63,301 for the same time frame.

  The average household income in this area is projected to increase 13.7% over the next five years, from $88,758 to $100,937. The United States is projected to have a 13.3% increase in average household income.

- The current year estimated per capita income for this area is $31,516, compared to an estimate of $24,092 for the United States as a whole.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

- For this area, 52.6% of the population is estimated to be employed and age 16 and over for the current year. The employment status of this labor force is as follows:

  0.0% are in the Armed Forces, 68.3% are employed civilians, 2.2% are unemployed civilians, and 29.5% are not in the labor force.

  For the United States, 46.6% of the population is estimated to be employed and age 16 and over for the current year. The employment status of this labor force is as follows:

  0.5% are in the Armed Forces, 59.9% are employed civilians, 3.6% are unemployed civilians, and 35.9% are not in the labor force.

- For this area, 52.6% of the population is estimated to be employed and age 16 and over for the current year. The occupational classifications are as follows:

  19.0% have occupation type blue collar, 64.8% are white collar, and 16.2% are Service & farm workers.

  For the United States, 46.6% of the population is estimated to be employed and age 16 and over for the current year. The occupational classifications are as follows:

  24.0% have occupation type blue collar, 60.0% are white collar, and 16.1% are Service & farm workers.

- For the civilian employed population age 16 and over in this area, it is estimated that they are employed in the following occupational categories:

  14.9% are in "Management, Business, and Financial Operations", 23.1% are in "Professional and Related Occupations", 16.0% are in "Service", and 26.9% are in "Sales and Office".

  0.2% are in "Farming, Fishing, and Forestry", 11.2% are in "Construction, Extraction, and Maintenance", and 7.7% are in "Production, Transportation, and Material Moving".

  For the civilian employed population age 16 and over in the United States, it is estimated that they are employed in the following occupational categories:

  13.6% are in "Management, Business, and Financial Operations", 20.2% are in "Professional and Related Occupations", 14.8% are in "Service", and 26.7% are in "Sales and Office".

  0.7% are in "Farming, Fishing, and Forestry", 9.5% are in "Construction, Extraction, and Maintenance", and 14.5% are in "Production, Transportation, and Material Moving".

- Currently, it is estimated that 11.3% of the population age 25 and over in this area had earned a Master's, Professional, or Doctorate Degree and 17.7% had earned a Bachelor's Degree.

  In comparison, for the United States, it is estimated that for the population over age 25, 8.9% had earned a Master's, Professional, or Doctorate Degree, while 15.7% had earned a Bachelor's Degree.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-3.00 Miles, Total

- Most of the dwellings in this area (81.5%) are estimated to be Owner-Occupied for the current year. For the entire country the majority of the housing units are Owner-Occupied (66.5%).

- The majority of dwellings in this area are estimated to be structures of 1 Unit Detached (77.7%) for the current year. In the United States, the majority of dwellings are estimated to be structures of 1 Unit Detached (60.4%) for the same year.

- The majority of housing units in this area (18.1%) are estimated to have been Housing Unit Built 1950 to 1959 for the current year.

  Most of the housing units in the United States (17.4%) are estimated to have been Housing Unit Built 1970 to 1979 for the current year.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

- The population in this area is estimated to change from 134,970 to 141,755, resulting in a growth of 5.0% between 2000 and the current year. Over the next five years, the population is projected to grow by 5.9%.

  The population in the United States is estimated to change from 281,421,906 to 292,936,668, resulting in a growth of 4.1% between 2000 and the current year. Over the next five years, the population is projected to grow by 4.8%.

- The current year median age for this population is 38.6, while the average age is 37.4. Five years from now, the median age is projected to be 39.3.

  The current year median age for the United States is 36.0, while the average age is 36.9. Five years from now, the median age is projected to be 36.7.

- Of this area's current year estimated population:
  91.6% are White Alone, 2.6% are Black or African Am. Alone, 0.1% are Am. Indian and Alaska Nat. Alone, 2.1% are Asian Alone, 0.0% are Nat. Hawaiian and Other Pacific Isl. Alone, 2.0% are Some Other Race, and 1.5% are Two or More Races.

  For the entire United States:
  73.8% are White Alone, 12.4% are Black or African Am. Alone, 0.9% are Am. Indian and Alaska Nat. Alone, 4.0% are Asian Alone, 0.2% are Nat. Hawaiian and Other Pacific Isl. Alone, 6.1% are Some Other Race, and 2.7% are Two or More Races.

- This area's current estimated Hispanic or Latino population is 7.5%, while the United States current estimated Hispanic or Latino population is 14.0%.

- The number of households in this area is estimated to change from 46,339 to 48,977, resulting in an increase of 5.7% between 2000 and the current year. Over the next five years, the number of households is projected to increase by 6.7%.

  The number of households in the United States is estimated to change from 105,480,101 to 109,949,228, resulting in an increase of 4.2% between 2000 and the current year. Over the next five years, the number is projected to increase by 5.0%.

- The average household income is estimated to be $102,578 for the current year, while the average household income for the United States is estimated to be $63,301 for the same time frame.

  The average household income in this area is projected to increase 15.8% over the next five years, from $102,578 to $118,749. The United States is projected to have a 13.3% increase in average household income.

- The current year estimated per capita income for this area is $35,818, compared to an estimate of $24,092 for the United States as a whole.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

- For this area, 50.7% of the population is estimated to be employed and age 16 and over for the current year. The employment status of this labor force is as follows:

  0.0% are in the Armed Forces, 65.4% are employed civilians, 2.2% are unemployed civilians, and 32.4% are not in the labor force.

  For the United States, 46.6% of the population is estimated to be employed and age 16 and over for the current year. The employment status of this labor force is as follows:

  0.5% are in the Armed Forces, 59.9% are employed civilians, 3.6% are unemployed civilians, and 35.9% are not in the labor force.

- For this area, 50.7% of the population is estimated to be employed and age 16 and over for the current year. The occupational classifications are as follows:

  18.4% have occupation type blue collar, 68.9% are white collar, and 12.7% are Service & farm workers.

  For the United States, 46.6% of the population is estimated to be employed and age 16 and over for the current year. The occupational classifications are as follows:

  24.0% have occupation type blue collar, 60.0% are white collar, and 16.1% are Service & farm workers.

- For the civilian employed population age 16 and over in this area, it is estimated that they are employed in the following occupational categories:

  17.7% are in "Management, Business, and Financial Operations", 24.7% are in "Professional and Related Occupations", 12.3% are in "Service", and 26.6% are in "Sales and Office".

  0.2% are in "Farming, Fishing, and Forestry", 10.9% are in "Construction, Extraction, and Maintenance", and 7.5% are in "Production, Transportation, and Material Moving".

  For the civilian employed population age 16 and over in the United States, it is estimated that they are employed in the following occupational categories:

  13.6% are in "Management, Business, and Financial Operations", 20.2% are in "Professional and Related Occupations", 14.8% are in "Service", and 26.7% are in "Sales and Office".

  0.7% are in "Farming, Fishing, and Forestry", 9.5% are in "Construction, Extraction, and Maintenance", and 14.5% are in "Production, Transportation, and Material Moving".

- Currently, it is estimated that 15.0% of the population age 25 and over in this area had earned a Master's, Professional, or Doctorate Degree and 20.8% had earned a Bachelor's Degree.

  In comparison, for the United States, it is estimated that for the population over age 25, 8.9% had earned a Master's, Professional, or Doctorate Degree, while 15.7% had earned a Bachelor's Degree.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-10.00 Miles, Total

- Most of the dwellings in this area (84.6%) are estimated to be Owner-Occupied for the current year. For the entire country the majority of the housing units are Owner-Occupied (66.5%).

- The majority of dwellings in this area are estimated to be structures of 1 Unit Detached (77.9%) for the current year. In the United States, the majority of dwellings are estimated to be structures of 1 Unit Detached (60.4%) for the same year.

- The majority of housing units in this area (17.2%) are estimated to have been Housing Unit Built 1960 to 1969 for the current year.

  Most of the housing units in the United States (17.4%) are estimated to have been Housing Unit Built 1970 to 1979 for the current year.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

- The population in this area is estimated to change from 679,676 to 708,488, resulting in a growth of 4.2% between 2000 and the current year. Over the next five years, the population is projected to grow by 5.0%.

  The population in the United States is estimated to change from 281,421,906 to 292,936,668, resulting in a growth of 4.1% between 2000 and the current year. Over the next five years, the population is projected to grow by 4.8%.

- The current year median age for this population is 37.6, while the average age is 36.9. Five years from now, the median age is projected to be 38.4.

  The current year median age for the United States is 36.0, while the average age is 36.9. Five years from now, the median age is projected to be 36.7.

- Of this area's current year estimated population:
  84.3% are White Alone, 6.2% are Black or African Am. Alone, 0.2% are Am. Indian and Alaska Nat. Alone, 3.2% are Asian Alone, 0.0% are Nat. Hawaiian and Other Pacific Isl. Alone, 3.8% are Some Other Race, and 2.2% are Two or More Races.

  For the entire United States:
  73.8% are White Alone, 12.4% are Black or African Am. Alone, 0.9% are Am. Indian and Alaska Nat. Alone, 4.0% are Asian Alone, 0.2% are Nat. Hawaiian and Other Pacific Isl. Alone, 6.1% are Some Other Race, and 2.7% are Two or More Races.

- This area's current estimated Hispanic or Latino population is 10.4%, while the United States current estimated Hispanic or Latino population is 14.0%.

- The number of households in this area is estimated to change from 237,360 to 248,539, resulting in an increase of 4.7% between 2000 and the current year. Over the next five years, the number of households is projected to increase by 5.5%.

  The number of households in the United States is estimated to change from 105,480,101 to 109,949,228, resulting in an increase of 4.2% between 2000 and the current year. Over the next five years, the number is projected to increase by 5.0%.

- The average household income is estimated to be $101,005 for the current year, while the average household income for the United States is estimated to be $63,301 for the same time frame.

  The average household income in this area is projected to increase 14.4% over the next five years, from $101,005 to $115,568. The United States is projected to have a 13.3% increase in average household income.

- The current year estimated per capita income for this area is $35,810, compared to an estimate of $24,092 for the United States as a whole.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

- For this area, 49.5% of the population is estimated to be employed and age 16 and over for the current year. The employment status of this labor force is as follows:

  0.8% are in the Armed Forces, 64.3% are employed civilians, 2.4% are unemployed civilians, and 32.5% are not in the labor force.

  For the United States, 46.6% of the population is estimated to be employed and age 16 and over for the current year. The employment status of this labor force is as follows:

  0.5% are in the Armed Forces, 59.9% are employed civilians, 3.6% are unemployed civilians, and 35.9% are not in the labor force.

- For this area, 49.5% of the population is estimated to be employed and age 16 and over for the current year. The occupational classifications are as follows:

  18.8% have occupation type blue collar, 67.8% are white collar, and 13.5% are Service & farm workers.

  For the United States, 46.6% of the population is estimated to be employed and age 16 and over for the current year. The occupational classifications are as follows:

  24.0% have occupation type blue collar, 60.0% are white collar, and 16.1% are Service & farm workers.

- For the civilian employed population age 16 and over in this area, it is estimated that they are employed in the following occupational categories:

  17.3% are in "Management, Business, and Financial Operations", 25.1% are in "Professional and Related Occupations", 13.2% are in "Service", and 25.5% are in "Sales and Office".

  0.2% are in "Farming, Fishing, and Forestry", 9.6% are in "Construction, Extraction, and Maintenance", and 9.2% are in "Production, Transportation, and Material Moving".

  For the civilian employed population age 16 and over in the United States, it is estimated that they are employed in the following occupational categories:

  13.6% are in "Management, Business, and Financial Operations", 20.2% are in "Professional and Related Occupations", 14.8% are in "Service", and 26.7% are in "Sales and Office".

  0.7% are in "Farming, Fishing, and Forestry", 9.5% are in "Construction, Extraction, and Maintenance", and 14.5% are in "Production, Transportation, and Material Moving".

- Currently, it is estimated that 15.4% of the population age 25 and over in this area had earned a Master's, Professional, or Doctorate Degree and 20.7% had earned a Bachelor's Degree.

  In comparison, for the United States, it is estimated that for the population over age 25, 8.9% had earned a Master's, Professional, or Doctorate Degree, while 15.7% had earned a Bachelor's Degree.

WOODSTOCK RD. & CONCORD RD. CARMEL, NY, 0.00-20.00 Miles, Total

- Most of the dwellings in this area (75.1%) are estimated to be Owner-Occupied for the current year. For the entire country the majority of the housing units are Owner-Occupied (66.5%).

- The majority of dwellings in this area are estimated to be structures of 1 Unit Detached (68.2%) for the current year. In the United States, the majority of dwellings are estimated to be structures of 1 Unit Detached (60.4%) for the same year.

- The majority of housing units in this area (17.1%) are estimated to have been Housing Unit Built 1939 or Earlier for the current year.

  Most of the housing units in the United States (17.4%) are estimated to have been Housing Unit Built 1970 to 1979 for the current year.

Appendix: Area Listing

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 3.00

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 10.00

Area Name:

Type: Radius Reporting Detail: Aggregate Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 20.00

Retail Trade Potential Report

Prepared For: Tim Miller Assoc. **Order #:** 963277662
Project Code: 1492188-1 **Site:** 01

Trade Area: WOODSTOCK RD. & CONCORD RD. CARMEL, NY, Total

Description	0.00 - 3.00 Miles Radius	%	0.00 - 10.00 Miles Radius	%	0.00 - 20.00 Miles Radius	%
Total Retail Sales	$134,960,372		$1,611,079,767		$9,533,497,032	
Apparel and Accessory Stores	$811,420	0.60	$61,647,043	3.83	$498,121,621	5.22
Automotive Dealers	$40,126,383	29.73	$382,825,909	23.76	$2,017,793,414	21.17
Automotive and Home Supply Stores	$2,884,093	2.14	$21,851,723	1.36	$98,203,322	1.03
Drug and Proprietary Stores	$6,654,597	4.93	$74,127,658	4.60	$439,330,361	4.61
Eating and Drinking Places	$8,958,867	6.64	$122,867,755	7.63	$782,603,322	8.21
Food Stores	$23,750,760	17.60	$259,957,109	16.14	$1,526,382,904	16.01
Furniture and Home Furnishings Stores	$4,173,529	3.09	$43,228,382	2.68	$234,596,742	2.46
Home Appliance, Radio, and T.V. Stores	$3,845,659	2.85	$40,046,383	2.49	$215,979,602	2.27
Gasoline Service Stations	$12,394,314	9.18	$105,524,109	6.55	$516,242,839	5.42
General Merchandise	$9,328,977	6.91	$158,680,948	9.85	$1,031,056,812	10.82
Department Stores (Including Leased Depts.)	$6,068,699	4.50	$102,474,096	6.36	$671,563,914	7.04
Hardware, Lumber and Garden Stores	$8,915,044	6.61	$98,465,852	6.11	$579,669,049	6.08

Appendix: Area Listing

Area Name:

Type: Radius | Reporting Detail: Aggregate | Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY

Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 3.00

Area Name:

Type: Radius | Reporting Detail: Aggregate | Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY

Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 10.00

Area Name:

Type: Radius | Reporting Detail: Aggregate | Reporting Level: Block Group

Radius Definition:

WOODSTOCK RD. & CONCORD RD. CARMEL, NY

Center Point: 41.468280 -73.650450
Circle/Band: 0.00 - 20.00

Area Map Report

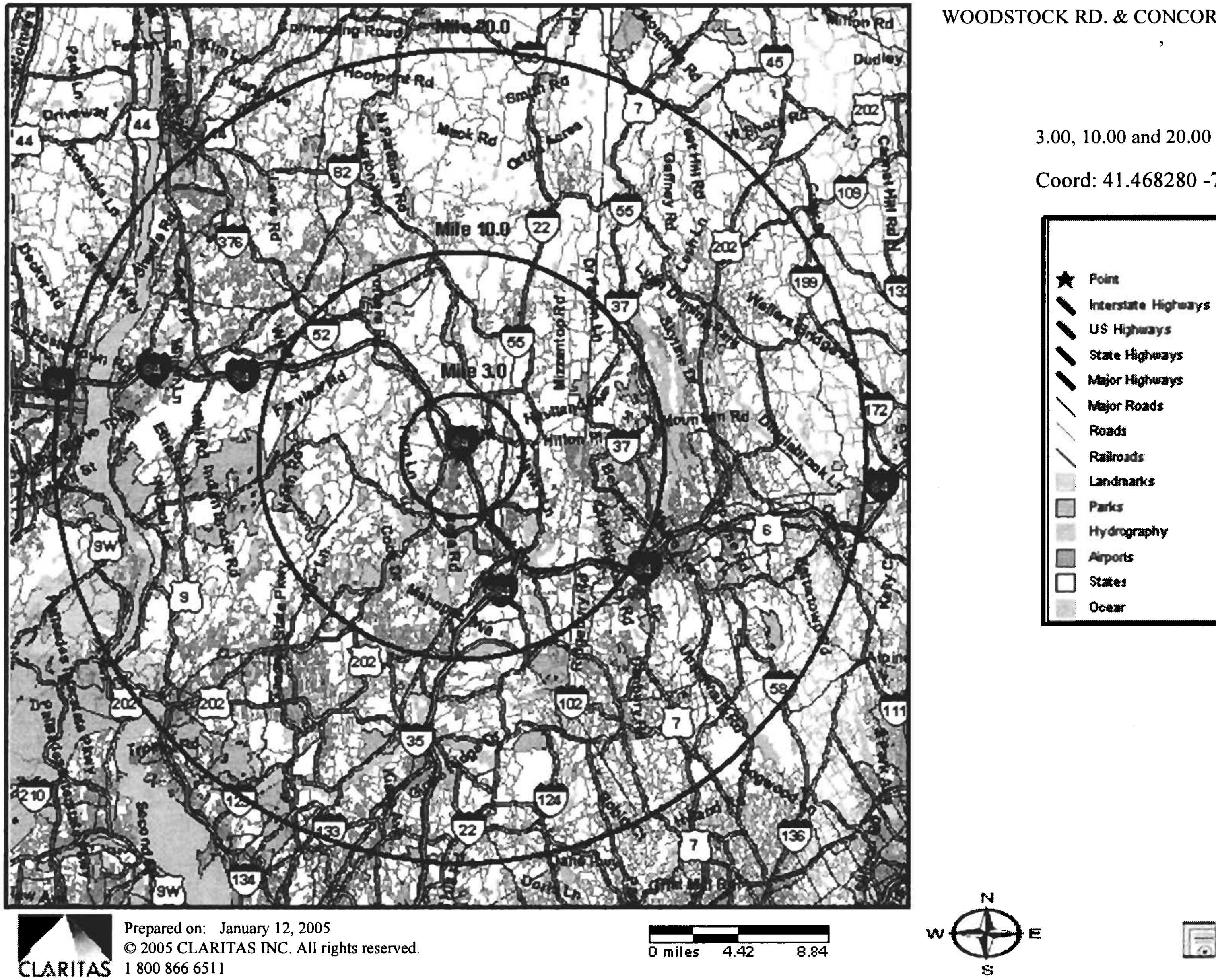
Prepared For: Tim Miller Assoc.
Project Code: 1492188-1

Order #: 963277662
Site: 01

WOODSTOCK RD. & CONCORD RD. CARMEL, NY

3.00, 10.00 and 20.00 Mile Radii

Coord: 41.468280 -73.650450



Prepared on: January 12, 2005

1 800 866 6511

CLARITAS

SITEREPORTS

Understanding Your Claritas Report

Claritas is the nation's most comprehensive source of updated marketing information about American consumers and businesses. Your Claritas data is based on a number of sources, including the Claritas Demographic Update, our annual release of current-year estimates and five-year projections of U.S. Census data. This Update relies on the decennial census for an accurate starting point and a variety of sources indicating change following the census.

Consumer Expenditure data is drawn from Consumer Buying Power, our database of estimated expenditures based on the Bureau of Labor Statistics' Consumer Expenditure Survey.

Business data comes from Business-Facts, Claritas' database of over 12 million business and professional records. Claritas' partner, infoUSA, collects Business-Facts data.

PRIZM NE is Claritas' premier segmentation system. PRIZM NE was created by a proprietary method developed by Claritas statisticians called Multivariate Divisive Partitioning (MDP). MDP borrows and extends a tree partitioning method that creates the segments based on demographics that matter most to households' behaviors.

Resources

Claritas provides a number of resources to help you understand your reports and data. They are available online at www.claritas.com/resources.

Resources include:

- A comprehensive glossary of the terms used in your reports
- Claritas Demographic Update methodology
- Consumer Buying Power methodology
- Business-Facts methodology
- PRIZM NE methodology summary
- White papers concerning our data and methodology

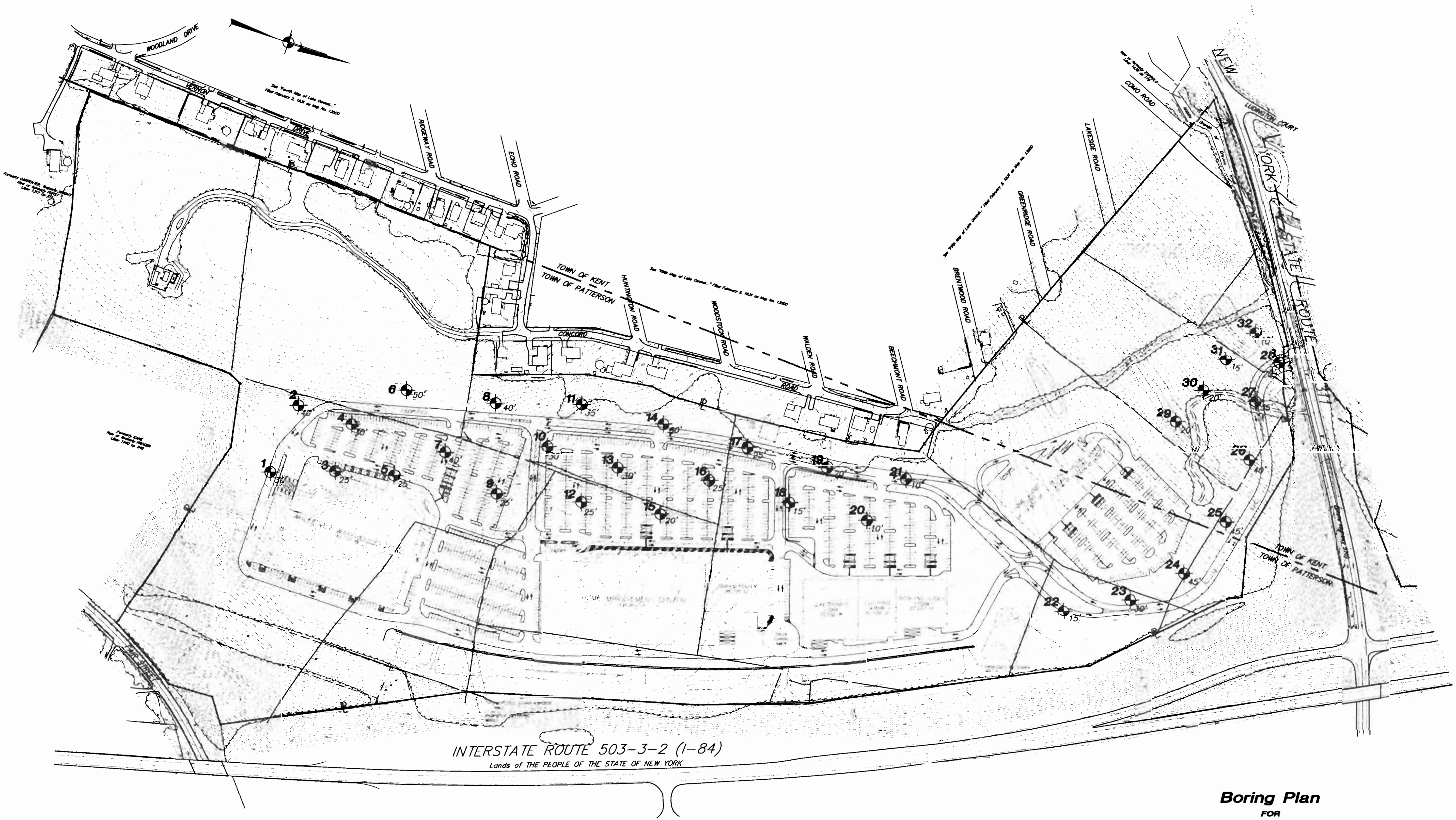
For More Information

Contact Claritas at:

- Sales, 800-234-5973
- Support, 800-866-6511

Appendix D

BORING LOGS AND
BORING LOCATIONS



GRAPHIC SCALE

(IN FEET)
1 inch = 100 ft.

Boring Plan
FOR
PATTERSON CROSSING
RETAIL CENTER

Towns of Patterson & Kent
Putnam County, New York

December 9, 2003
Revised: May 3, 2005
Revised: October 10, 2005

Prepared by:
INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place• Carmel, New York 10512
Phone (845) 225-9690 • Fax (845) 225-9717
www.insite-eng.com

01124.100
01124–boring.dwg

Soil Sampling Log

DATE STARTED	3/29/2004
DATE FINISHED	3/29/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/29/2004
TIME	0 Hours
DEPTH	Dry
SAMPLER Dia. (Type/O.D /I D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

Connecticut Test Borings, LLC
P.O. Box 69 - Seymour, CT 06483
GEOTECHNICAL & ENVIRONMENTAL DRILLING
(203) 888-3857
FAX (203) 888-0655

ESPECIALLY COMPILED FOR
Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

SHEET	1 OF 1
PROJECT No	C04116
LOCATION	Rt. 311 Patterson, NY
OFFSET	
GROUND ELEVATION	
HOLE No	B-2
CASING	SSA 5"
SAMPLER	
CORE BARREL	

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
										DARK BROWN SILTY SAND, ROOTS				
										OLIVE BROWN SILTY SAND, GRAVEL				
	-5								6'					
										WEATHERED ROCK				
									7'6"	REFUSAL				
	-10													
	-15									OFFSET 10' SOUTH ENCOUNTERED REFUSAL AT 6'6"				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE: C04116

Soil Sampling Log

DATE STARTED	3/29/2004	SHEET	1 OF 1
DATE FINISHED	3/29/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/29/2004	HOLE No.	B-4
TIME	0 Hours	CASING	SSA 5"
DEPTH	6'-6"	SAMPLER	
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS / DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
								6"	DARK BROWN SILTY SAND, ROOTS				
									BROWN OLIVE SILTY SAND, GRAVEL				
-5									"SAME" W/ COBBLESTONES				
-10								10'	GREY SILTY SAND, GRAVEL, MIXED W/ WEATHERED ROCK				
-15									GREY SILTY SAND & WEATHERED ROCK				
-20													
-25								27'	REFUSAL				
-30													
-35													
-40													
-45													
-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS		COHESIVE SOILS	
0 - 4	VERY LOOSE	0 - 2	VERY SOFT
4 - 10	LOOSE	2 - 4	SOFT
10-30	MEDIUM	4 - 8	MEDIUM
30-50	DENSE	8-15	STIFF
50+	VERY DENSE	15-30	VERY STIFF
		30+	HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/29/2004	SHEET	1 OF 1
DATE FINISHED	3/29/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/29/2004	HOLE No.	B-5
TIME	0 Hours	CASING	SSA 5"
DEPTH	Dry	SAMPLER	
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO.	PEN	REC.	BORE / WELL (NOT TO SCALE)
									4"	DARK BROWN SILTY SAND. ROOTS				
										BROWN SILTY SAND, GRAVEL				
									4'	WEATHERED ROCK				
	-5								5'6"	REFUSAL				
	-10													
	-15									OFFSET 6' SOUTH AND ENCOUNTERED REFUSAL AT 5'				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/29/2004	SHEET	1 OF 1
DATE FINISHED	3/29/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/29/2004	HOLE No.	B-6
TIME	0 Hours	CASING	SSA 5"
DEPTH	4'-0"	SAMPLER	
SAMPLER Dia (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co., LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
										DARK BROWN SILTY SAND, ROOTS				
										BROWN OLIVE SILTY SAND, GRAVEL, COBBLESTONES FRAGMENTS OF WEATHERED ROCK				
	-5													
									9'					
	-10									WEATHERED ROCK MIXED W/ SOIL				
	-15								15'					
										REFUSAL				
										OFFSET 10' NORTH ENCOUNTERED REFUSAL AT 8'				
										OFFSET 10' NORTH ENCOUNTERED REFUSAL AT 5'				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE C04116

Soil Sampling Log

DATE STARTED	3/29/2004
DATE FINISHED	3/29/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/29/2004
TIME	0 Hours
DEPTH	Dry
SAMPLER Dia (Type/O.D./I.D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

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P.O. Box 69 - Seymour, CT 06483
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(203) 888-3857
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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co., LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

SHEET	1 OF 1
PROJECT No	C04116
LOCATION	Rt. 311 Patterson, NY
OFFSET	
GROUND ELEVATION	
HOLE No.	B-7
CASING	SSA 5"
SAMPLER	
CORE BARREL	

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									10"	DARK BROWN SILTY SAND, ROOTS				
									1'6"	RUST ORANGE SILTY SAND, GRAVEL				
										REFUSAL				
	-5													
	-10													
	-15									OFFSET 5' SOUTH AND ENCOUNTERED REFUSAL AT 1'6"				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/29/2004	SHEET	1 OF 1
DATE FINISHED	3/29/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/29/2004	HOLE No.	B-8
TIME	0 Hours	CASING	SSA 5"
DEPTH	Dry	SAMPLER	
SAMPLER Dia (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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(203) 888-3857
FAX (203) 888-0655

ESPECIALLY COMPILED FOR
Patterson Crossing Development Co., LLC
1699 Rt. 6, Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									8"	DARK BROWN SILTY SAND, ROOTS				
										BROWN SILTY SAND, GRAVEL, COBBLESTONES FRAGMENTS OF ROCK				
	-5													
									8'					
	-10									REFUSAL				
	-15													
										OFFSET 3' NORTH ENCOUNTERED REFUSAL AT 1'				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER	A.W.
HELPER	J.C.
SOILS ENGINEER	
DRILLING INSPECTOR	

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/29/2004
DATE FINISHED	3/29/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/29/2004
TIME	0 Hours
DEPTH	15'-0"
SAMPLER Dia (Type/O.D./I.D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co., LLC
1699 Rt. 6, Suite 1
Carmel, NY 10512

SHEET	1 OF 1
PROJECT No	C04116
LOCATION	Rt. 311 Patterson, NY
OFFSET	
GROUND ELEVATION	
HOLE No.	B-10
CASING	SSA 5"
SAMPLER	
CORE BARREL	

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									1'6"	DARK BROWN SILTY SAND				
										OLIVE BROWN SILTY SAND, GRAVEL, COBBLESTONES FRAGMENTS OF WEATHERED ROCK				
	-5													
	-10													
	-15								15'	OLIVE GREY SILTY SAND MIXED W/ WEATHERED ROCK				
									18'	REFUSAL				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
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SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE: C04116

Soil Sampling Log

DATE STARTED	3/29/2004	SHEET	1 OF 1
DATE FINISHED	3/29/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/29/2004	HOLE No.	B-11
TIME	0 Hours	CASING	SSA 5"
DEPTH	7'-0"	SAMPLER	
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

Connecticut Test Borings, LLC

P.O. Box 69 - Seymour, CT 06483

GEOTECHNICAL & ENVIRONMENTAL DRILLING

(203) 888-3857

FAX (203) 888-0655

ESPECIALLY COMPILED FOR

Patterson Crossing Development Co., LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									4"	DARK BROWN SILTY SAND, ROOTS				
										BROWN OLIVE SILTY SAND				
	-5									"SAME" W/ GRAVEL, COBBLESTONES, FRAGMENTS OF ROCK				
	-10													
									12'	BROWN OLIVE SILTY SAND MIXED W/ WEATHERED ROCK				
	-15													
									18'	REFUSAL				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/29/2004	**Connecticut Test Borings, LLC**	SHEET	1 OF 1
DATE FINISHED	3/29/2004	P.O. Box 69 - Seymour, CT 06483	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	GEOTECHNICAL & ENVIRONMENTAL DRILLING	LOCATION	Rt. 311
HAMMER FALL	30"	(203) 888-3857		Patterson, NY
GROUND WATER OBSERVATION		FAX: (203) 888-0655	OFFSET	
DATE	3/29/2004	**ESPECIALLY COMPILED FOR**	GROUND ELEVATION	
TIME	0 Hours	Patterson Crossing Development Co., LLC	HOLE No.	B-13
DEPTH	Dry	1699 Rt. 6 , Suite 1	CASING	SSA 5"
SAMPLER Dia (Type/O.D./I.D.)	SS 2" / 1-3/8"	Carmel, NY 10512	SAMPLER	
TYPE OF RIG	CME 55 - Track		CORE BARREL	

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
										DARK BROWN SILTY SAND, ROOTS				
										BROWN SILTY SAND & WEATHERED ROCK				
										OLIVE BROWN SILTY SAND & WEATHERED ROCK				
	-5													
										BROWN SILTY SAND & WEATHERED ROCK				
	-10													
									13'	REFUSAL				
	-15													
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR

SAMPLE TYPE	COHESIONLESS SOILS	COHESIVE SOILS
C = CORED	0 - 4 VERY LOOSE	0 - 2 VERY SOFT
W = WASHED	4 - 10 LOOSE	2 - 4 SOFT
SS = SPLIT SPOON	10-30 MEDIUM	4 - 8 MEDIUM
UP = UNDISTURBED PISTON	30-50 DENSE	8 15 STIFF
TP = TEST PIT	50+ VERY DENSE	15-30 VERY STIFF
UT = UNDISTURBED THINWALL		30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE C04116

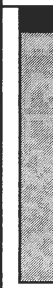
Soil Sampling Log

DATE STARTED	3/29/2004	SHEET	1 OF 1
DATE FINISHED	3/29/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/29/2004	HOLE No	B-14
TIME	0 Hours	CASING	SSA 5"
DEPTH	Dry	SAMPLER	
SAMPLER Dia (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

Connecticut Test Borings, LLC
P.O. Box 69 - Seymour, CT 06483
GEOTECHNICAL & ENVIRONMENTAL DRILLING
(203) 888-3857
FAX: (203) 888-0655

ESPECIALLY COMPILED FOR
Patterson Crossing Development Co., LLC
1699 Rt. 6, Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC	BORE / WELL (NOT TO SCALE)
									1'	DARK BROWN SILTY SAND, ROOTS				
									2'	BROWN SILTY SAND, ROOTS				
										OLIVE BROWN SILTY SAND & WEATHERED ROCK				
	-5									BROWN SILTY SAND & WEATHERED ROCK				
	-10								11'					
										REFUSAL				
	-15													
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													



Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE: C04116

Soil Sampling Log

DATE STARTED 3/29/2004	**Connecticut Test Borings, LLC**	SHEET	1 OF 1
DATE FINISHED 3/29/2004	P.O. Box 69 - Seymour, CT 06483	PROJECT No	C04116
WEIGHT OF HAMMER 140 Lbs.	GEOTECHNICAL & ENVIRONMENTAL DRILLING	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL 30"	(203) 888-3857 FAX (203) 888-0655	OFFSET	
GROUND WATER OBSERVATION	ESPECIALLY COMPILED FOR	GROUND ELEVATION	
DATE 3/29/2004	Patterson Crossing Development Co., LLC	HOLE No	B-15
TIME 0 Hours	1699 Rt. 6 , Suite 1	CASING	SSA 5"
DEPTH 16'-0"	Carmel, NY 10512	SAMPLER	
SAMPLER Dia (Type/O.D /I D) SS 2" / 1-3/8"		CORE BARREL	
TYPE OF RIG CME 55 - Track			

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									8"	DARK BROWN SILTY SAND, ROOTS				
										BROWN OLIVE SILTY SAND, GRAVEL, FRAGMENTS OF WEATHERED ROCK				
	-5									BROWN SILTY SAND & WEATHERED ROCK				
	-10									BROWN SILTY SAND & WEATHERED ROCK				
	-15								17'	REFUSAL				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER.
DRILLING INSPECTOR

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE C04116

Soil Sampling Log

DATE STARTED	3/29/2004	SHEET	1 OF 1
DATE FINISHED	3/29/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	30'-North
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/29/2004	HOLE No.	B-16
TIME	0 Hours	CASING	SSA 5"
DEPTH	Dry	SAMPLER	
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC	BORE / WELL (NOT TO SCALE)
									1'	DARK BROWN SILTY SAND, ROOTS				
									2'6"	BROWN SILTY SAND, GRAVEL				
										REFUSAL				
	-5													
	-10													
	-15													
										OFFSET 8' EAST ENCOUNTERED REFUSAL AT 2'				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER A.W.
HELPER J.C.
SOILS ENGINEER
DRILLING INSPECTOR

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	1 OF 1
DATE FINISHED	3/30/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/30/2004	HOLE No.	B-17
TIME	0 Hours	CASING	SSA 5"
DEPTH	10'-0"	SAMPLER	
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO.	PEN	REC.	BORE / WELL (NOT TO SCALE)
										DARK BROWN SILTY SAND, ROOTS				
										BROWN OLIVE SILTY SAND				
	-5													
	-10													
										OLIVE BROWN SILTY SAND, COBBLESTONES				
	-15													
									19'	REFUSAL				
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004
DATE FINISHED	3/30/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/30/2004
TIME	0 Hours
DEPTH	6'-0"
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

SHEET	1 OF 1
PROJECT No	C04116
LOCATION	Rt. 311 Patterson, NY
OFFSET	
GROUND ELEVATION	
HOLE No.	B-18
CASING	SSA 5"
SAMPLER	
CORE BARREL	

CASING BLOWS DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC	BORE / WELL (NOT TO SCALE)
									DARK BROWN SILTY SAND, ROOTS				
									OLIVE BROWN SILTY SAND, GRAVEL				
-5													
									"SAME" WITH COBBLESTONES				
-10													
-15								15'					
									BOTTOM OF BORING				
-20													
-25													
-30													
-35													
-40													
-45													
-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004	*Connecticut Test Borings, LLC*	SHEET	1 OF 1
DATE FINISHED	3/30/2004	P.O. Box 69 - Seymour, CT 06483	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	GEOTECHNICAL & ENVIRONMENTAL DRILLING	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	(203) 888-3857 FAX (203) 888-0655	OFFSET	20' East
GROUND WATER OBSERVATION		ESPECIALLY COMPILED FOR	GROUND ELEVATION	
DATE	3/30/2004	Patterson Crossing Development Co.,LLC	HOLE No	B-19
TIME	0 Hours	1699 Rt. 6 , Suite 1	CASING	SSA 5"
DEPTH	6'-0"	Carmel, NY 10512	SAMPLER	
SAMPLER Dia. (Type/O D./I.D.)	SS 2" / 1-3/8"		CORE BARREL	
TYPE OF RIG	CME 55 - Track			

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO.	PEN	REC.	BORE / WELL (NOT TO SCALE)
									10'	DARK BROWN SILTY SAND. ROOTS				
										BROWN SILTY SAND				
										OLIVE SILTY SAND, LITTLE GRAVEL, COBBLESTONES (TILL)				
	-5													
									8'	REFUSAL				
	-10													
	-15													
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/30/2004	**Connecticut Test Borings, LLC**	SHEET	1 OF 1
DATE FINISHED	3/30/2004	P.O. Box 69 - Seymour, CT 06483	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	GEOTECHNICAL & ENVIRONMENTAL DRILLING	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	(203) 888-3857 FAX (203) 888-0655	OFFSET	
GROUND WATER OBSERVATION		**ESPECIALLY COMPILED FOR**	GROUND ELEVATION	
DATE	3/30/2004	Patterson Crossing Development Co.,LLC	HOLE No.	B-20
TIME	0 Hours	1699 Rt. 6 , Suite 1	CASING	SSA 5"
DEPTH	Dry	Carmel, NY 10512	SAMPLER	
SAMPLER Dia. (Type/O.D /I D.)	SS 2" / 1-3/8"		CORE BARREL	
TYPE OF RIG	CME 55 - Track			

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									8"	DARK BROWN SILTY SAND				
									2'6"	BROWN SILTY SAND				
										OLIVE BROWN SILTY SAND, GRAVEL, COBBLESTONES (TILL)				
	-5													
	-10								10'	BOTTOM OF BORING				
	-15													
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER: A.W.
SOILS ENGINEER
DRILLING INSPECTOR

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	1 OF 1
DATE FINISHED	3/30/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/30/2004	HOLE No.	B-21
TIME	0 Hours	CASING	SSA 5"
DEPTH	9'-0"	SAMPLER	
SAMPLER Dia (Type/O.D /I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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ESPECIALLY COMPILED FOR
Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									6"	DARK BROWN SILTY SAND, ROOTS				
										BROWN OLIVE SILTY SAND				
	-5													
										"SAME" W/ GRAVEL, COBBLESTONES				
	-10								10'					
										BOTTOM OF BORING				
	-15													
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	1 OF 1
DATE FINISHED	3/30/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	

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GROUND WATER OBSERVATION

DATE	3/30/2004	GROUND ELEVATION	
TIME	0 Hours	HOLE No	B-22
DEPTH	8'-0"	CASING	SSA 5"
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	SAMPLER	
TYPE OF RIG	CME 55 - Track	CORE BARREL	

ESPECIALLY COMPILED FOR
Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
								6"	DARK BROWN SILTY SAND, ROOTS				
								1'6"	BROWN SILTY SAND				
									OLIVE BROWN SILTY SAND, GRAVEL, COBBLESTONES (TILL)				
-5													
									"SAME"				
-10													
-15								15'	BOTTOM OF BORING				
-20													
-25													
-30													
-35													
-40													
-45													
-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	1 OF 1
DATE FINISHED	3/30/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/30/2004	HOLE No.	B-23
TIME	0 Hours	CASING	SSA 5"
DEPTH	12'-0"	SAMPLER	
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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Patterson Crossing Development Co.,LLC
1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
										DARK BROWN SILTY SAND, ROOTS				
									2'6"	ORANGE BROWN SILTY SAND, ROOTS				
										BROWN SILTY SAND, COBBLESTONES (TILL)				
	-5													
	-10									OLIVE SILT, SAND, GRAVEL, COBBLESTONES (TILL)				
	-15													
	-20													
	-25									OLIVE GREY SILTY SAND, GRAVEL, COBBLESTONES (TILL)				
	-30								30'	BOTTOM OF BORING				
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	1 OF 1
DATE FINISHED	3/30/2004	PROJECT No.	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/30/2004	HOLE No	B-24
TIME	0 Hours	CASING	SSA 5"
DEPTH	20'-0"	SAMPLER	
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

Connecticut Test Borings, LLC
P.O. Box 69 - Seymour, CT 06483
GEOTECHNICAL & ENVIRONMENTAL DRILLING
(203) 888-3857
FAX: (203) 888-0655

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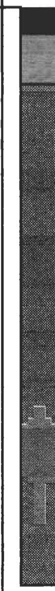
Carmel, NY 10512

DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO	PEN	REC.
									DARK BROWN SILTY SAND, ROOTS			
								3'	BROWN SILTY SAND			
-5									OLIVE SILTY SAND, LITTLE GRAVEL, COBBLESTONES (TILL)			
-10												
-15												
-20								22'				
-25									REFUSAL			
-30												
-35												
-40												
-45												
-50												

BORE / WELL (NOT TO SCALE)



Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER: A.W.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	1 OF 1
DATE FINISHED	3/30/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/30/2004	HOLE No.	B-25
TIME	0 Hours	CASING	SSA 5"
DEPTH	26'-0"	SAMPLER	
SAMPLER Dia (Type/O.D /I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO.	PEN	REC.	BORE / WELL (NOT TO SCALE)
										DARK BROWN SILTY SAND, ROOTS				
										BROWN SILTY SAND				
	-5								5'					
										OLIVE SILTY SAND, LITTLE GRAVEL, COBBLESTONES (TILL)				
	-10													
	-15													
										OLIVE GREY SILTY SAND, GRAVEL, COBBLESTONES (TILL)				
	-20													
	-25													
	-30													
	-35													
									37'	REFUSAL				
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004
DATE FINISHED	3/30/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/30/2004
TIME	0 Hours
DEPTH	18'-0"
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

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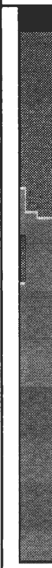
1699 Rt. 6 , Suite 1
Carmel, NY 10512

SHEET	1 OF 1
PROJECT No.	C04116
LOCATION	Rt. 311 Patterson, NY
OFFSET	
GROUND ELEVATION	
HOLE No.	B-26
CASING	SSA 5"
SAMPLER	
CORE BARREL	

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
									8"	DARK BROWN SILTY SAND, ROOTS				
										BROWN SILTY SAND W/ LG. COBBLESTONES (TILL)				
	-5									BROWN OLIVE SILTY SAND, LITTLE GRAVEL, COBBLESTONES (TILL)				
	-10													
	-15													
	-20								21'	REFUSAL				
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/31/2004
DATE FINISHED	3/31/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/31/2004
TIME	0 Hours
DEPTH	20'-0"
SAMPLER Dia (Type/O.D /I D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

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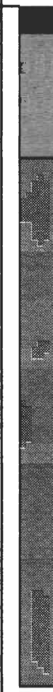
Carmel, NY 10512

SHEET	1 OF 1	
PROJECT No	C04116	
LOCATION	Rt. 311 Patterson, NY	
OFFSET		
GROUND ELEVATION		
HOLE No.	B-27	
CASING	SSA	5"
SAMPLER		
CORE BARREL		

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC	BORE / WELL (NOT TO SCALE)
									4"	DARK BROWN SILTY SAND, ROOTS				
										LT. BROWN SILTY SAND				
										OLIVE BROWN SILTY SAND				
	-5													
										LARGE GRAVEL, COBBLESTONES (TILL)				
	-10													
	-15													
										COLOR CHANGE TO LT. GREY OLIVE				
	-20													
	-25													
									27'	REFUSAL				
	-30													
	-35													
	-40													
	-45													
	-50													



Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER: C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	OF
DATE FINISHED	3/30/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	
GROUND WATER OBSERVATION		GROUND ELEVATION	
DATE	3/30/2004	HOLE No	B-28
TIME	0 Hours	CASING	SSA 5"
DEPTH	Dry	SAMPLER	
SAMPLER Dia. (Type/O D./I.D.)	SS 2" / 1-3/8"	CORE BARREL	
TYPE OF RIG	CME 55 - Track		

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1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO.	PEN	REC	BORE / WELL (NOT TO SCALE)
									4"	DARK BROWN SILTY SAND, ROOTS				
									1'	BROWN SILTY SAND				
										OLIVE BROWN SILTY SAND & GRAVEL COBBLESTONES				
	-5													
									6'6"	REFUSAL				
	-10													
										OFFSET ATTEMPT MADE W/ REFUSAL AT 4'				
	-15													
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

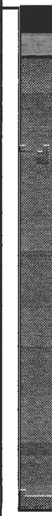
COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/31/2004	**Connecticut Test Borings, LLC**	SHEET	1 OF 1
DATE FINISHED	3/31/2004	P.O. Box 69 - Seymour, CT 06483	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	GEOTECHNICAL & ENVIRONMENTAL DRILLING	LOCATION	Rt. 311
HAMMER FALL	30"	(203) 888-3857		Patterson, NY
GROUND WATER OBSERVATION		FAX (203) 888-0655	OFFSET	
DATE	3/31/2004	**ESPECIALLY COMPILED FOR**	GROUND ELEVATION	
TIME	0 Hours	Patterson Crossing Development Co.,LLC	HOLE No	B-29
DEPTH	18'-0"	1699 Rt. 6 , Suite 1	CASING	SSA 5"
SAMPLER Dia (Type/O.D /I.D.)	SS 2" / 1-3/8"	Carmel, NY 10512	SAMPLER	
TYPE OF RIG	CME 55 - Track		CORE BARREL	

CASING BLOWS / DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
								6"	DARK BROWN SILTY SAND, ROOTS				
								1'	GREY SILTY SAND, ROOTS				
									BROWN SILTY SAND & GRAVEL (TILL)				
-5									OLIVE BROWN SILTY SAND, LITTLE GRAVEL COBBLESTONES (TILL)				
-10													
-15													
-20								20'	BOTTOM OF BORING				
-25													
-30													
-35													
-40													
-45													
-50													



Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER A.W.
SOILS ENGINEER
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/31/2004
DATE FINISHED	3/31/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/31/2004
TIME	0 Hours
DEPTH	Dry
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

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1699 Rt. 6 , Suite 1
Carmel, NY 10512

SHEET	1 OF 1
PROJECT No	C04116
LOCATION	Rt. 311 Patterson, NY
OFFSET	
GROUND ELEVATION	
HOLE No	B-30
CASING	SSA 5"
SAMPLER	
CORE BARREL	

CASING BLOWS	DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO.	PEN	REC.	BORE / WELL (NOT TO SCALE)
									5"	DARK BROWN SILTY SAND, ROOTS				
										BROWN OLIVE SILTY SAND				
										"SAME" W/ GRAVEL, COBBLESTONES				
	-5								5'6"					
										REFUSAL				
	-10													
										OFFSET ATTEMPT -2' WEST ENCOUNTERED REFUSAL AT 4'6"				
										2ND OFFSET ATTEMPT-5' WEST ENCOUNTERED REFUSAL AT 5'				
	-15													
	-20													
	-25													
	-30													
	-35													
	-40													
	-45													
	-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
HELPER: A.W.
SOILS ENGINEER:
DRILLING INSPECTOR
NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8-15 STIFF
15-30 VERY STIFF
30+ HARD

FILE: C04116

Soil Sampling Log

DATE STARTED	3/30/2004	SHEET	1 OF 1
DATE FINISHED	3/30/2004	PROJECT No	C04116
WEIGHT OF HAMMER	140 Lbs.	LOCATION	Rt. 311 Patterson, NY
HAMMER FALL	30"	OFFSET	

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GROUND WATER OBSERVATION

DATE	3/30/2004	GROUND ELEVATION	
TIME	0 Hours	HOLE No.	B-31
DEPTH	11'-0"	CASING	SSA 5"
SAMPLER Dia. (Type/O.D /I D.)	SS 2" / 1-3/8"	SAMPLER	
TYPE OF RIG	CME 55 - Track	CORE BARREL	

ESPECIALLY COMPILED FOR
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1699 Rt. 6 , Suite 1
Carmel, NY 10512

CASINGS / BLOWS / DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS / REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
								10"	DARK BROWN SILTY SAND, ROOTS				
									BROWN SILTY SAND				
								1'6"	OLIVE BROWN SILTY SAND (TILL)				
-5													
-10									OLIVE SILTY SAND, COBBLESTONES (TILL)				
								13'	REFUSAL				
-15													
-20													
-25													
-30													
-35													
-40													
-45													
-50													

Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.
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NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS
0 - 4 VERY LOOSE
4 - 10 LOOSE
10-30 MEDIUM
30-50 DENSE
50+ VERY DENSE

COHESIVE SOILS
0 - 2 VERY SOFT
2 - 4 SOFT
4 - 8 MEDIUM
8 15 STIFF
15-30 VERY STIFF
30+ HARD

FILE C04116

Soil Sampling Log

DATE STARTED	3/30/2004
DATE FINISHED	3/30/2004
WEIGHT OF HAMMER	140 Lbs.
HAMMER FALL	30"
GROUND WATER OBSERVATION	
DATE	3/30/2004
TIME	0 Hours
DEPTH	Dry
SAMPLER Dia. (Type/O.D./I.D.)	SS 2" / 1-3/8"
TYPE OF RIG	CME 55 - Track

Connecticut Test Borings, LLC

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ESPECIALLY COMPILED FOR

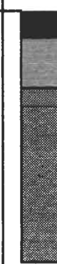
Patterson Crossing Development Co.,LLC

1699 Rt. 6 , Suite 1

Carmel, NY 10512

SHEET	1 OF 1
PROJECT No	C04116
LOCATION	Rt. 311 Patterson, NY
OFFSET	
GROUND ELEVATION	
HOLE No	B-32
CASING	SSA 5"
SAMPLER	
CORE BARREL	

CASING BLOWS DEPTH	SAMPLE DEPTH (FEET)	SAMP TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS REMARKS	SAMPLE NO	PEN	REC.	BORE / WELL (NOT TO SCALE)
								8"	DARK BROWN SILTY SAND, ROOTS				
									BROWN SILTY SAND				
								2'6"	OLIVE BROWN SILTY SAND & GRAVEL (TILL)				
-5													
-10								10'	BOTTOM OF BORING				
-15													
-20													
-25													
-30													
-35													
-40													
-45													
-50													



Proportions used: trace = 0-10%, little = 10-20%, some = 20-35%, and = 35-50%

DRILLER C.D.

HELPER A.W.

SOILS ENGINEER

DRILLING INSPECTOR

NOT RESPONSIBLE FOR SAMPLE STORAGE AFTER 30 DAYS

SAMPLE TYPE
C = CORED
W = WASHED
SS = SPLIT SPOON
UP = UNDISTURBED PISTON
TP = TEST PIT
UT = UNDISTURBED THINWALL

COHESIONLESS SOILS	
0 - 4	VERY LOOSE
4 - 10	LOOSE
10-30	MEDIUM
30-50	DENSE
50+	VERY DENSE

COHESIVE SOILS	
0 - 2	VERY SOFT
2 - 4	SOFT
4 - 8	MEDIUM
8 15	STIFF
15-30	VERY STIFF
30+	HARD

FILE C04116

Appendix E

HYDROGEOLOGY INVESTIGATION
(MOUNDING ANALYSIS)

Hydrogeology Investigation (Mounding analysis)

Patterson Crossing
South Disposal Area
Patterson and Kent, New York

Prepared for:

Mr. Paul Camarda
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File No. 664-01.1
August 2005

GEODESIGN
INCORPORATED

GEOTECHNICAL ENGINEERS AND ENVIRONMENTAL CONSULTANTS

d/b/a Geo**Design**, Inc. P.C.

August 30, 2005
File No. 664-01

Mr. Paul Camarda
Hudson Valley Realty
1699 Route 6, Suite 1
Carmel, NY 10512

Re: Hydrogeology Investigation (Mounding Analysis)
Patterson Crossing –South Area Subsurface Disposal System
Patterson and Kent, New York

Dear Paul:

The attached report presents the findings and conclusions of the hydrogeology investigation for the South Disposal Area of the proposed Patterson Crossing development off of Route 311 in the towns of Patterson and Kent, New York.

The investigation included the exploration, testing and analysis of the aquifer at the site under existing conditions. It also makes predictions regarding groundwater mounding under flows that will result from the proposed on-site subsurface disposal and treatment system.

Our work was completed as outlined in our March 11th, 2005 Workplan, which was submitted to the New York City Department of Environmental Protection (NYC DEP).

Very Truly Yours,

Geo**Design**, Inc.

Original Signed

Jeffrey Buckley, P.E. (CT)
Project Engineer

Original Signed

Ulrich La Fosse, P.E. (NY, CT & MA)
Sr. Principal

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Appendices

1.0 INTRODUCTION

This report presents the results of the hydrogeology investigation for the proposed South Disposal Area at the proposed Patterson Crossing retail development, located off of Route 311 in the towns of Patterson and Kent, New York. Our work was performed in accordance with our workplan, dated March 11th, 2005 and submitted to the New York City Department of Environmental Protection (NYC DEP).

1.10 Background

The site Locus is shown on Figure 1, included in Appendix 1. The proposed South Disposal Area (South Area) is shown on Figure 2. The project civil engineer (Insite Engineering, Surveying and Landscape Architecture, P.C.) preliminarily explored this site in 2001. Insite Engineering also provided us with the base map for our exploration location plan.

In August 2004, GeoDesign planned, monitored and logged test pits in this area. These explorations were not witnessed by either NYC DEP or Putnam County Department of Health personnel. Data from these test pits is not included in this report. However, the 2004 test pit data was used to plan explorations performed during this study.

Soil encountered in the 2004 test pits consisted of about six inches of organic topsoil, overlying about 1.5 to 2 feet of fine silty sand subsoil, over dense to very dense glacial till deposits comprised of a heterogeneous mixture of sand, silt, gravel, cobbles and boulders.

In November 2004, three preliminary test borings and observation wells (termed GD-S-1 through GD-S-3) were drilled/installed at the proposed South Area. NYC DEP representatives witnessed these explorations. Locations of these wells are depicted on Figure 2.

Surficial materials encountered in the test borings were similar to conditions encountered in the August 2004 test pits. The 2004 test borings were advanced through the surficial soil to bedrock, which was encountered at depths ranging from 16 to 47 feet.

1.20 Present Study

Following the 2004 preliminary investigations, GeoDesign was retained to further study the site to collect field data and perform a hydrogeological investigation and mounding analysis. GeoDesign planned an exploration program consisting of ten additional test borings / monitoring well locations. In collaboration with Insite Engineering, we also planned ten deep test holes (test pits) and a percolation test adjacent to each test pit.

These explorations, along with the November 2004 test borings, were used to develop parameters for the hydrogeologic assessment (rainfall influence and mounding analysis), and numerical modeling - including preparation of a three dimensional mathematical model.

The field data collected from the test borings and observation wells were used in setting up our groundwater model and mounding analysis. Relevant data from these field investigations and subsequent laboratory testing is included in this report. Test pit data and soil percolation data was used by Insite Engineering in their design of the actual subsurface disposal system, and not used in the groundwater mounding analysis. This data is not included in this report as it will be included in Insite's work product.

2.0 SITE DESCRIPTION

The site is a wooded and undeveloped area (with the exception of the cell tower). It is bordered to the east by Interstate I-84 and to the north by Route 311. Private residential neighborhoods border the site to the west and south. The site is partially located in both the towns of Patterson and Kent, New York. The majority of the site acreage is located in Patterson, except for the northwest corner, adjacent to Route 311. The South Area in located entirely within the Town of Patterson.

The site has steep topography along the north and east perimeter, and the local high point in this locale is situated near the southwest corner of the site, near the cell phone tower. The tower is intended to remain in use on the property following the propose development. An unpaved road provides access to the cell tower from Concord Road. At the southwest corner of the site, grading drops to the west towards Lake Carmel and to the east towards Interstate I-84. Within the area of the proposed South Area depicted on Figure 2, a relatively flat area exists east of the existing access road.

Commercial development is planned for the site. The locations of the retail stores are downgradient, to the east and northeast of the proposed South Area. The wastewater from the proposed development will be pumped to the South Area and will be dosed by gravity into the proposed leaching field areas. The approximate outline of the proposed septic leaching fields is shown on Figure 2. A total sewage flow rate equal to 11,000 gpd is proposed, over a total surface area of approximately 280,000 square feet (140,000 square foot checkerboard pattern primary area and 140,000 square foot secondary area).

3.0 SUBSURFACE EXPLORATIONS and FIELD TESTING

The subsurface exploration, sampling, and field program performed for this study to supplement the exploration data described in Section 1.10 included test borings, observation wells, in-situ permeability tests (falling head tests).

3.10 Test Borings

GeoDesign personnel staked boring locations in the field by taping from existing site features. Insite Engineering later surveyed observation wells for location and elevation. Between April 25 and May 9, 2005 test borings were drilled at twelve locations depicted on Figure 2. Borings explored between these dates are termed S-4 through S-13, S-9A and S-13A, and logs are included in Appendix 2. Borings were monitored and logged by a Geo**Design** representative.

Borings were advanced using either 4.25-inch hollow stem augers, or 4-inch diameter flush-joint casing. Split spoon samples (24-inch long by 2-inch outside diameter) of unconsolidated materials were obtained at about five-foot intervals down to the bedrock level to allow retrieval of soils for visual classification and laboratory testing. Samples were kept in screw-top sealed glass jars. Where bedrock was encountered, a five-foot long rock core sample was taken to confirm the presence of bedrock (as differentiated from boulders) at refusal depth. Coring was performed using NX (2-1/8 diameter) diamond coring bits. In areas where shallow bedrock was encountered, a second core sample was obtained to provide additional bedrock data and allow measuring groundwater levels within the bedrock.

3.20 Observation Wells

Each boring was terminated with a 2-inch diameter PVC groundwater observation well. Each well was installed with a ten foot long screened section placed at a depth below the groundwater surface, as encountered during drilling. If groundwater was not encountered, the screened interval was placed at the bottom of the boring. The well risers were sealed with a two-foot thick bentonite seal to minimize infiltration of surface water. Locking caps and padlocks were fitted to the top of each well riser for protection. Each of the wells that had water was developed by bailing three times its volume of the water until sediment free water was produced. Well installation details are included on the boring logs in Appendix 2.

3.30 In-situ Permeability Tests

In-situ permeability (hydraulic conductivity) tests were made at eight boring locations prior to well installation. Table 6 lists wells in which each in-situ permeability test was performed, and provides a summary of the test results. The permeability of the unconsolidated deposits above the bedrock surface was estimated by means of falling head tests, also known as slug tests. Falling head tests were made by measuring the rate of water drop within watertight casings above a peastone-filled wick. Specific test results are included in Appendix 3.

Wicks of precise geometry were formed by extracting the 4-inch casing a measured height and simultaneously filling the resulting cavity with peastone. The watertight casing was then filled with water and the rate of drop of water was recorded vs. time. The rate of water drop was measured by means of a stopwatch and an electric water level meter.

Estimated permeabilities range from about 0.008 feet per day in boring S-11 to 0.2 feet per day in boring S-13. The average permeability was 0.06 feet per day. Based on the geometries of the wicks, these values are primarily horizontal permeabilities. The falling head tests were typically performed in the glacial till soil. However, recovered samples and SPT "N" values indicate that the gradation and the density of the unconsolidated material are highly variable at the site, thus impacting the soil's ability to transport water.

3.40 Groundwater Levels

Levels of groundwater were recorded in the observations wells by measuring the depth of water using an electric water level meter. Measurements were made during and immediately following drilling. Since water was used to wash out the casing and at some borings to core bedrock, these measurements (shown on the boring logs) do not reflect stabilized readings. Stabilized groundwater level readings were measured on several occasions in May and June 2005. This data is included in Table 1 and has also been plotted, as shown on Table 2.

4.0 SITE GEOLOGY

4.10 Geologic Setting

Large-scale published surficial geologic mapping, (Lower Hudson Sheet, Compiled and edited by Donald H. Cadwell, 1989) classifies the entire site as being overlain by Till with a notation that where the till is underlain by Gneiss it "tends to be sandy".

4.20 Geologic Materials

The generalized stratigraphy based on materials encountered in the borings is as follows:

Topsoil	- 12 to 24 inches thick mixture of forest litter and organic topsoil/subsoil
Glacial Till	- Underlies the Topsoil and subsoil - Dense to very dense mixture of sand, silt and gravel with cobbles and boulders - Extends to top of Bedrock surface
Bedrock	- Depth to bedrock ranges from approximately 14 to 49 feet below grade. - Moderately hard, slightly weathered gray Gneiss, trace quartz - Recovery ranges from 27 to 95% - Rock Quality Designation ranges from 12 to 77% - Maximum depth of rock coring below rock surface was ten feet.

A detailed summary of bedrock data is shown on Table 9.

5.0 LABORATORY TESTING PROGRAM

We performed laboratory gradation analyses on ten soil samples recovered in the borings. The gradation analyses were used to confirm visual classifications made in the field. Also, gradation results were used to approximate the coefficient of permeability using the Kozeny-Carman Method. Gradation test results and a summary of the Kozeny-Carman permeability data is attached as Appendix 4.

Estimated permeabilities determined using this method are generally within one order of magnitude of those determined from field testing.

6.0 SITE HYDROGEOLOGY

The objectives of this section are to evaluate the groundwater regime of the proposed South Area and surrounding downgradient region, and to analyze groundwater behavior (levels, flow patterns, flow direction, and flow velocities) under existing and projected conditions. This section describes the extents and characteristics of the aquifer. Section 7.0 presents and discusses the computer flow model that describes the physical behavior of the hydrogeologic system.

6.10 Aquifer and Aquifer Boundaries

The Glacial Till and upper portions of the underlying Gneiss Bedrock form the aquifer at the site. The South Area is a regional topographical high point, with grading decreasing to the west towards Lake Carmel, and to the east towards off-site wetlands/marsh areas adjacent to Interstate I-84. A surface drainage divide exists in the northwest corner of the South Area, near wells S-9 and S-13. Approximate pre-development groundwater contours are depicted on Figure 3. This plan is based on groundwater data measured in May 2005. The approximate location of the groundwater divide is depicted on Figure 3 as a dashed line.

6.20 Aquifer Characteristics

The most important aquifer characteristics that affect steady-state groundwater flow direction and elevations are permeability and saturated thickness. Together these yield transmissivity. Permeability (hydraulic conductivity) is a measure of the ease with which water will move (flow) through a unit volume of the aquifer at a given flow gradient. The transmissivity is the product of the aquifer thickness and the permeability. Transmissivity was estimated by two methods: 1) using the estimated permeability from falling head testing discussed in Section 3.30 together with the aquifer thickness (from the borings) as a starting point to set up a groundwater model, and 2) adjusting the permeability values to calibrate the model to observed water levels using estimated groundwater recharge (base flow) values. The groundwater model and its calibration are presented in Section 7.0

6.30 Groundwater Sources and Discharge

Since the proposed South Area is a regional high point, the only source of groundwater at the site is precipitation that recharges into the ground. Precipitation historically averages about 40 inches per year in this locale, and was about 50 inches per year in the twelve months preceding the study period. The majority of this precipitation is lost to surficial runoff and evapotranspiration.

Discharge from the aquifer occurs along the previously described downgradient boundaries in the form of flow to the off-site wetlands and Lake Carmel.

In the post-development condition, we have adjusted the groundwater recharge based on proposed changes to the site. These include increasing flows by recharging 11,000 gpd over the approximate 280,000 square feet of effective recharge area. Post-development conditions also include decreasing recharge flows by decreasing recharge due to paving site access roads, parking lots, and the construction of buildings.

Details concerning each of these groundwater sources and discharges are provided in the following sections.

6.40 Precipitation, Estimated, and Published Base Flow Data

Precipitation and base flow data for this locale was researched to provide input into the groundwater model and supplement the data measured on-site.

Long term (historical) and recent precipitation data was obtained from National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources from nearby observation stations to compare precipitation during to the testing period to historical mean data. Long period historical data was obtained from the Poughkeepsie, NY observation station. This data, which includes monthly precipitation from 1896 to 2005, is included in Table 3. More recent precipitation data from the airports at Danbury, CT, White Plains, NY and Poughkeepsie, NY, is included in Table No. 4A and the attached graph (Table 4B) from January 2003 to June 2005.

A rain gauge was installed adjacent to the fenced cell phone tower on May 1, 2005. This gauge recorded hourly rainfall data to compare site-specific rainfall with published data from the nearby weather stations. The rain gauge data has been included on Tables 4A and 4B for the months of May and June 2005. Additionally, Table 5A compares the precipitation recorded at the onsite rain gauge to the historical data at Station KPOU in Poughkeepsie. Table 5B depicts daily rainfall events from May 1, 2005 to July 6, 2005.

Specifics on the distances from these stations to the site, precipitation data for Carmel, NY obtained from published sources, and a summary of representative precipitation data applicable to the site are included in Table No. 7.

The basis for groundwater recharge at the site is provided on Tables No. 8A and 8B. As indicated on Table No. 8A, the published average groundwater recharge (groundwater runoff) for nearby watersheds with unconsolidated till deposits is about 8.27 inches per year or 0.69 inches per month. Taking into account seasonal variations in recharge (due to variations in precipitation, snow cover, temperature, and evapotranspiration), as shown on Table No. 3, 4A and 4B, we selected an annualized steady-state groundwater recharge rate (base flow) of 15 inches per year or 1.22 inches per month during the period May and June 2005. We also estimated a post-development groundwater recharge rate applicable to portions of the site post-development (e.g. after paving, etc.). This rate is 7.5 inches per year as summarized on Table No. 8B.

Year to year variations in groundwater recharge (base flow) for nearby watersheds obtained in a published report prepared by the USGS were also reviewed for comparison. Specifically we reviewed data presented in the USGS report titled "Stream, Base Flow, and Ground-Water Recharge in the Housatonic River basin, Western Massachusetts and Parts of Eastern New York and Northwestern Connecticut". This data indicates that the ratio of maximum base flow to mean base flow (max/mean) for eleven stream-flow gauging stations ranges from 1.4 to 1.6 year to year over a 30 to 60 year record period. In our evaluation (Table No. 8A) we used a factor of 1.5 for the maximum to mean base flow season to season based on seasonal fluctuations in precipitation.

Selected USGS references are included in Appendix 9.

7.0 HYDROGEOLOGICAL ANALYSIS (GROUNDWATER MODEL)

The purpose of the following analysis was to develop a model of the general groundwater flow patterns at the site, and more particularly in the vicinity of the proposed subsurface disposal system. A three-dimensional groundwater flow computer model was developed for the purpose of predicting flow pattern with a reasonable degree of reliability. This section describes the model, outlines the limitations of its predictive capabilities, describes the model calibration, describes the flow conditions which were simulated, and presents conclusions.

7.10 Model Description

The direction and rate of groundwater movement can be described by the use of mathematical equations. These can be solved using a numerical (computer) model. The selected model was developed by The Scientific Software Group and is called Groundwater Vistas, version 2.61. This model is the MODFLOW finite-difference numerical model originally published by the USGS (McDonald and Harbaugh, 1984 and 1988), with computer interface enhancements. Due to the very steep grades at the site and the resulting large cell-to-cell changes in ground surface elevation across the model, the simulation was performed using the "confined" layer option. In addition, a steady-state simulation was performed so that variations in water levels over time were not modeled and the aquifer's storage coefficient did not need to be taken into consideration.

The development of the model proceeded in the following general sequence. The model limits are defined on Figure 5-1 (Appendix 5). A rectangular grid was superimposed over the study area. One hundred foot square cells (grids) were used for the entire site except in the areas where no groundwater data was available. Grid spacing was gradually increased to 400 feet at the edge of the model. The grid is depicted on Figure 5-1. Each square or rectangle on the grid represents one cell of the model. Data can be varied for each cell as described below.

Despite varying topography (ground surface), a constant top elevation was used throughout the model. This elevation (El. 900 feet) was chosen as being several feet higher than the highest ground surface elevation in the entire model area (near the middle of the South Area). This practice is common in groundwater modeling in situations where large areas are modeled.

The aquifer was modeled in three-dimensions using one layer, which was used to model flow through both the soil and the bedrock. Based on bedrock conditions (type and quality) where it was cored, a ten foot thickness was added to the thickness of the unconsolidated deposits to simulate groundwater flow in the upper portion of the bedrock. The bottom elevation at the center of each grid is shown on Figure 5-2. These elevations are graded following the color spectrum from orange (high elevations) to blue (lower elevations). These bottom elevations are also depicted on Figures. 5-3 and 5-4, which consist of representative cross-sections north-south and west-east across the site, respectively.

Constant head boundary conditions were modeled in five areas. These locations were inferred based on features observed on USGS surficial mapping for the area. Some of these features are visible on the Locus Plan (Figure 1). By definition, the groundwater levels in these cells do change, regardless of changing parameters within the rest of the model. On the west edge of the model, Lake Carmel is modeled with a constant head of Elev. 619. Off-site wetlands to the east of Interstate I-84 were modeled at a constant head of Elev. 740. At the southeast corner of the model, a constant head of Elev. 660 was used. Another small mapped wetlands area north of the site was modeled as a constant head at Elev. 650. The existing Interstate I-84 is bordered with swales to collect surface water and control groundwater levels. These swales were simulated in the model with the use of constant head boundaries set at a depth of ten feet. Figure 5-1 depicts constant head cells as a blue shade.

All model units are stated in feet and days. Thus, distances, elevations, and depths are in feet; permeabilities (hydraulic conductivities) are in ft/day; recharge flow rates are ft^3/day; velocities are in ft/day.

The hydraulic characteristics of the aquifer were entered at each cell. The soil vertical permeabilities were entered as one-tenth of the horizontal, representing anisotropy (K_h/K_v) of 10. The final (calibrated) horizontal soil horizontal permeabilities are shown on Figure 5-5.

The groundwater recharge was entered in each cell at 0.00334589 ft/day or 15 inches/year as discussed in Section 6.4.

7.20 Model Results, Calibration and Limitations

The groundwater model and results are provided in Appendices 7 and 8, respectively. The model was then calibrated by comparing the simulated results to known groundwater levels and flow patterns. Based on the results of the simulation, the hydraulic parameters were adjusted until the simulation accurately reflected known groundwater level conditions as measured in the observation wells. This process was repeated until a satisfactory match was achieved.

The groundwater elevations that result from the model run for the existing conditions (following model calibration) are included in Figure 5-6.

Specifically, the model was calibrated to existing conditions using "targets", or locations where groundwater levels are known, e.g. at observation wells. The targets represent the minimum depth to groundwater that was measured between May and June 2005, or the highest groundwater observed during this time period. The results of the final calibration are summarized on Table No. 10, and also in Figure 5-7 (Appendix 5). As shown on the table, modeled groundwater elevations "match" actual measured elevations within plus or minus 1 foot. This calibration is deemed to be acceptable in consideration of observed groundwater level variations in the wells within a few days of the date when peak levels were recorded.

It must be recognized that the calibration is limited to locations where existing water level data is available (e.g. where wells were installed and water was present). For example, since groundwater was not observed in well S-6, the calibration of the model at this location is not as precise as elsewhere within the South Area. Where groundwater data was unavailable, the model results were reviewed and permeabilities were adjusted by using values similar to those measured in the field for similar soil types. In this manner, the permeability matrix was adjusted to achieve groundwater contours that more approximately parallel ground surface elevation contours than those that resulted in the initial model runs.

We also note that the northwest corner of the South Area is hydrogeologically complex, in part due to the proximity to oddly shaped surface and groundwater divides. The groundwater surface elevations do not mimic ground surface elevations in this area (e.g. depth to water is highly variable). Hydraulic gradients are also highly variable in this area. For these reasons, despite the good match at the targets, the modeled groundwater elevations for the pre-construction condition include a peak between observation wells S-12 and S-9A that does not reflect actual conditions.

7.30 Post-Construction Changes to Aquifer Geometry

The model grid, soil/bedrock strata geometries, and constant head boundaries were unchanged for the post development model. Therefore the information presented in Figures 5-1 through 5-4 is applicable to the simulated (proposed) condition.

However, in the post-construction model, several new targets were used to compare groundwater levels near the proposed emergency access drive cut. Instead of representing groundwater levels, these targets represent the proposed ground surface elevations (following construction of the emergency access drive). In our model, these values range from El. 840 to 860, and can be seen on Figure 6-1. These targets were used to assess the possibility of groundwater breakout to the east and downgradient of the proposed disposal area.

7.40 Post-Construction Changes to Aquifer Transmissivity

Increasing the groundwater recharge in the area of the proposed leaching fields will increase the groundwater flow in and near these areas and downgradient of these areas. In turn, this increased flow will result in an increased saturated flow thickness in the soil stratum and a corresponding increased recharge flow will result in increased transmissivity of the aquifer. This was accounted for by increasing the permeability of the soil stratum near to and downgradient of the proposed leaching fields by thirty percent of their originally calibrated (pre-construction) values. The methodology used to estimate this increase is detailed on Table 11. The resulting soil permeabilities for the post-construction model are listed on Table 12.

7.50 Simulated Flow Patterns

The post-construction groundwater recharge, which includes the proposed leaching field flows and the reduced recharge in newly built-upon areas (as described in Section 6), are shown on Figure 6-1. On this Figure, the blue area remains constant, simulating only recharge due to precipitation. The red area is a reduced recharge area, simulating the paved/constructed condition. The remaining area is the South Area, where the 11,000 gpd flow is introduced to the ground. The basis for the recharge rates included on this figure is included in Table No. 8B. At the west side of the area, where the depth to groundwater is generally higher, a lower flow (9,000 gpd) was used. At the east side of the area, where groundwater is deeper, a higher flow (13,000 gpd) was used. A flow rate of 11,000 gpd was used in the middle of the area. Since each sub-area is similarly sized, this results in an average modeled recharge rate of 11,000 gpd for the South Area overall.

The predicted post-construction groundwater contour elevations are depicted on Figure 6-2. These predicted groundwater levels are representative of conditions which will exist once the property improvements have been made, the proposed maximum steady-state subsurface discharge system flow of 11,000 gpd has been reached, and a steady precipitation-induced groundwater recharge (base flow) rate of 15 inches per year condition exists.

As noted in Section 7.20, a groundwater peak occurs between observation wells S-12 and S-9A in the model of existing conditions (pre-development model). This peak also exists in the post-development model in the same location. However, comparison of the pre-development and post-development models reveals no significant changes in groundwater elevations at this location. Therefore, the simulation at this location is not representative and does not predict flooding or breakout.

The predicted rise (mounding) of the groundwater levels under this simulation is represented by Figure 6-4. This figure depicts the predicted riser in groundwater from the calibrated results shown on Figure 5-7. The sign convention of the model output is such that a negative number actually represents a rise in the groundwater level. (For example, a value of –10 indicates a 10-foot rise in groundwater due to the 11,000 gpd recharge.)

In summary, except at three localized areas, the predicted maximum height of the groundwater mound is sufficiently below the ground surface such that breakout is not expected, nor is flooding of the disposal system anticipated. (e.g. depth to groundwater is greater than two and three feet beyond and within the proposed disposal area, respectively.) As shown on Figure 6-4, three target locations predict a groundwater rise, which would flood the bottom of the disposal system if not addressed. At each of these locations, we recommend adding a thickness of two feet of sand and gravel fill to raise the bottom of leaching system, and/or adding two feet of common fill beyond the proposed leaching areas. This will maintain the post-development groundwater levels below the leaching trenches and prevent breakout.

7.60 Simulated Groundwater Flow Velocities

The average rate at which groundwater moves between two points, its flow velocity, can be determined by the following equation:

$v = (k^* i) / n$ where,

v = velocity of groundwater flow, (FT/DAY)
k = soil permeability, (FT/DAY)
i = hydraulic gradient = $\Delta H/\Delta L$ (FT/FT)
n = soil porosity, dimensionless, conservatively taken as .30 for soils such as those encountered on site.

A porosity of 0.3 was entered into the model, and the predicted average groundwater flow velocities are depicted on Figure 6-3. As shown on this figure velocities range from about 0.03 to almost 0.06 feet per day in the area between the edge of the proposed leaching fields and the downgradient property line to the west. This property line is considered the most critical area in this model due to the presence of domestic water supply wells on the neighboring parcels. Predicted velocities range from 0.02 to 0.14 feet per day.

7.70 Estimated Effluent Travel Time

The average travel time that it will take the septic effluent to travel from the closest disposal area to the nearest property line can be expressed as follows:

t = d/v where,

t = travel time, (DAYS)
v = velocity (FT/DAY)
d = distance to point of concern, (FT)

The minimum distance between the nearest proposed leaching trench and the property line is approximately 175 feet. Conservatively neglecting the time for the effluent to reach the groundwater surface and considering the shortest horizontal travel distance and the highest predicted groundwater velocity, we estimate a minimum travel time of approximately 1,250 days (175 feet / 0.14 feet/day), or about three years.

8.0 CONCLUSIONS

The site of the proposed Patterson Crossing development on Route 311 in Patterson and Kent, New York has been the subject of a hydrogeological investigation for the purpose of predicting the groundwater flow conditions under proposed subsurface disposal of sewage at the South Area, generated from the proposed commercial development.

Based on the results of the field investigations, review of precipitation data, review of published USGS geological and groundwater data for this locale, hydrogeological analyses including the preparation of a three-dimensional computer model, we have been able to make reasonable predictions (simulations) of the groundwater flow conditions at the site. These predictions were made after the groundwater model was first calibrated to known groundwater flow patterns at the site. Following calibration, a simulation was performed using a proposed 11,000 gpd sewage flow rate in the area of the proposed subsurface disposal system shown on Figure 2 (Appendix 1). We also considered the effect of the site development on the groundwater recharge and on the aquifer properties.

Based on the results of this simulation, we conclude that, aside from localized areas, the minimum predicted depth to the groundwater mound is approximately two and three feet beyond and within the proposed disposal area, respectively. Thus, the simulation does not predict breakout of the leachate above the ground surface or flooding of the leaching trenches. However, as noted in Section 7.50 within the areas depicted on Figure 6-4, we recommend that 1) within the proposed disposal area, the vertical separation from the bottom of the fields to the groundwater be increased by adding a minimum thickness of two feet of sand-gravel fill, and 2) beyond the proposed disposal area, a minimum of two feet of common fill be placed to raise site grades and prevent breakout.

Also based on the simulation, we estimate a minimum travel time of approximately three years for the leachate to reach the nearest property line, located approximately 175 feet west of the nearest proposed leaching trench. This travel time is sufficient to provide adequate treatment of the septic effluent.

9.0 LIMITATIONS

This report is subject to the limitations included in Appendix 10.

Tables and Graphs

Table 1

Groundwater and Well Data - South Area

Patterson Crossing

Patterson and Kent, New York

												May/June Data Only						
Well No.	Ref. Elev.	G.S. Elev.	Stickup	Well Depth Below GS	5/3/2005 Elev.	5/4/2005 Elev.	5/5/2005 Elev.	5/9/2005 Elev.	6/1/2005 Elev.	6/14/2005 Elev.	6/27/2005 Elev.	Max Elev.	Min. Elev.	Mean Elev.	Range between Min and Max	DTW from max	8/15/2005 Elev.
S-1	891.26	889.21	2.05	48	865.86	865.76	865.46	865.76	863.46	863.36	863.06	**865.9**	**863.1**	**864.7**	**2.8**	**23**	866.06
S-2	899.00	896.51	2.49	43	872.80	872.80	872.60	872.50	870.90	870.50	869.80	**872.8**	**869.8**	**871.7**	**3.0**	**24**	873.00
S-3	869.59	867.01	2.58	26	845.19	845.19	845.29	843.19	843.19	842.29	842.09	**845.3**	**842.1**	**843.8**	**3.2**	**22**	841.64
S-4	861.03	858.88	2.15	22	843.33	843.23	843.53	843.13	839.33	839.33	Dry	**843.5**	**839.3**	**842.0**	**4.2**	**15**	Dry
S-5	864.69	862.75	1.94	28	846.49	846.29	846.49	846.29	843.99	843.99	Dry	**846.5**	**844.0**	**845.6**	**2.5**	**16**	Dry
S-6	863.42	861.25	2.17	17	Dry	Dry	Dry	Dry	Dry	Dry	Dry				**0.0**	**23**	Dry
S-7	884.93	882.11	2.82	23	873.13	872.93	873.23	872.83	868.43	867.43	866.73	**873.2**	**866.7**	**870.7**	**6.5**	**9**	866.41
S-8	895.70	893.47	2.23	35	869.40	869.40	869.10	868.90	866.90	866.40	865.60	**869.4**	**865.6**	**868.0**	**3.8**	**24**	866.00
S-9	896.73	894.74	1.99	33	892.93	892.53	892.83	892.43	891.53	890.13	889.53	**892.9**	**889.5**	**891.7**	**3.4**	**2**	887.53
S-9A	897.10	894.50	2.60	15					882.20	881.30	881.10	**882.2**	**881.1**	**881.5**	**1.1**	**12**	888.20
S-10	888.58	886.00	2.58	25	865.88	866.08	872.48	875.18	874.18	874.38	873.98	**875.2**	**865.9**	**871.7**	**9.3**	**11**	870.82
S-11	889.69	886.99	2.70	49	869.49	869.29	876.49	876.79	869.09	868.09	867.99	**876.8**	**868.0**	**871.0**	**8.8**	**10**	875.19
S-12	894.61	892.33	2.28	39	872.41	872.11	872.01	875.51	888.51	887.61	886.91	**888.5**	**872.0**	**879.3**	**16.5**	**4**	871.36
S-13	890.53	888.16	2.37	31	886.53	886.33	886.33	885.93	885.23	884.03	883.53	**886.5**	**883.5**	**885.4**	**3.0**	**4**	881.18
S-13A	890.50	888.00	2.50	15					884.20	883.30	882.60	**884.2**	**882.6**	**883.4**	**1.6**	**4**	881.55

Notes:

1) Ref Elev. = Reference Elevation marked on top of PVC well stickup inside casing.

2) DTW = Depth to Water Below Ground Surface

3) GS = Ground Surface

4) Elev. = Groundwater Surface Elevation

5) All data is stated in feet.

6) Well locations located by GeoDesign by taping from existing site features. Well elevations surveyed by Insite Engineering.

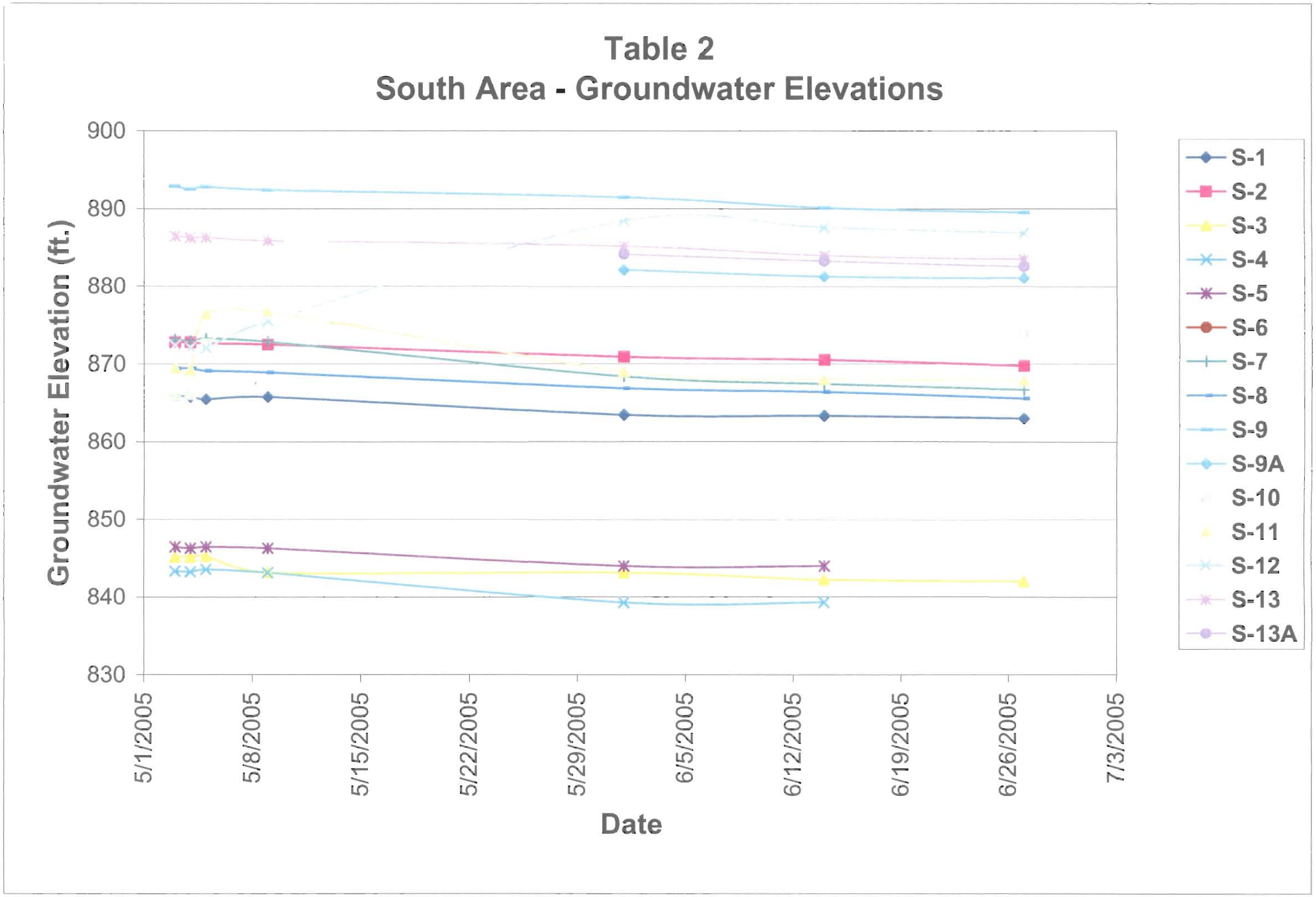


Table 2
South Area - Groundwater Elevations
Groundwater Elevation (ft.)
900
890
880
870
860
850
840
830
5/1/2005
5/8/2005
5/15/2005
5/22/2005
5/29/2005
6/5/2005
6/12/2005
6/19/2005
6/26/2005
7/3/2005
Date
S-1
S-2
S-3
S-4
S-5
S-6
S-7
S-8
S-9
S-9A
S-10
S-11
S-12
S-13
S-13A

Table 3

Historical Precipitation at Station KPOU
Poughkeepsie, NY

Precip. (in)	Month												
	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
1835	-	-	-	-	-	-	-	-	-	-	-	-	-
1836	-	-	-	-	-	-	-	-	-	-	-	-	-
1837	-	-	-	-	-	-	-	-	-	-	-	-	-
1838	-	-	-	-	-	-	-	-	-	-	-	-	-
1839	-	-	-	-	-	-	-	-	-	-	-	-	-
1840	-	-	-	-	-	-	-	-	-	-	-	-	-
1841	-	-	-	-	-	-	-	-	-	-	-	-	-
1842	-	-	-	-	-	-	-	-	-	-	-	-	-
1843	-	-	-	-	-	-	-	-	-	-	-	-	-
1844	-	-	-	-	-	-	-	-	-	-	-	-	-
1845	-	-	-	-	-	-	-	-	-	-	-	-	-
1846	-	-	-	-	-	-	-	-	-	-	-	-	-
1847	-	-	-	-	-	-	-	-	-	-	-	-	-
1848	-	-	-	-	-	-	-	-	-	-	-	-	-
1849	-	-	-	-	-	-	-	-	-	-	-	-	-
1850	-	-	-	-	-	-	-	-	-	-	-	-	-
1851	-	-	-	-	-	-	-	-	-	-	-	-	-
1852	-	-	-	-	-	-	-	-	-	-	-	-	-
1853	-	-	-	-	-	-	-	-	-	-	-	-	-
1854	-	-	-	-	-	-	-	-	-	-	-	-	-
1855	-	-	-	-	-	-	-	-	-	-	-	-	-
1856	-	-	-	-	-	-	-	-	-	-	-	-	-
1857	-	-	-	-	-	-	-	-	-	-	-	-	-
1858	-	-	-	-	-	-	-	-	-	-	-	-	-
1859	-	-	-	-	-	-	-	-	-	-	-	-	-
1860	-	-	-	-	-	-	-	-	-	-	-	-	-
1861	-	-	-	-	-	-	-	-	-	-	-	-	-
1862	-	-	-	-	-	-	-	-	-	-	-	-	-
1863	-	-	-	-	-	-	-	-	-	-	-	-	-
1864	-	-	-	-	-	-	-	-	-	-	-	-	-
1865	-	-	-	-	-	-	-	-	-	-	-	-	-
1866	-	-	-	-	-	-	-	-	-	-	-	-	-
1867	-	-	-	-	-	-	-	-	-	-	-	-	-
1868	-	-	-	-	-	-	-	-	-	-	-	-	-
1869	-	-	-	-	-	-	-	-	-	-	-	-	-
1870	-	-	-	-	-	-	-	-	-	-	-	-	-
1871	-	-	-	-	-	-	-	-	-	-	-	-	-
1872	-	-	-	-	-	-	-	-	-	-	-	-	-
1873	-	-	-	-	-	-	-	-	-	-	-	-	-
1874	-	-	-	-	-	-	-	-	-	-	-	-	-
1875	-	-	-	-	-	-	-	-	-	-	-	-	-
1876	-	-	-	-	-	-	-	-	-	-	-	-	-
1877	-	-	-	-	-	-	-	-	-	-	-	-	-
1878	-	-	-	-	-	-	-	-	-	-	-	-	-
1879	-	-	-	-	-	-	-	-	-	-	-	-	-
1880	-	-	-	-	-	-	-	-	-	-	-	-	-
1881	-	-	-	-	-	-	-	-	-	-	-	-	-
1882	-	-	-	-	-	-	-	-	-	-	-	-	-
1883	-	-	-	-	-	-	-	-	-	-	-	-	-
1884	-	-	-	-	-	-	-	-	-	-	-	-	-
1885	-	-	-	-	-	-	-	-	-	-	-	-	-
1886	-	-	-	-	-	-	-	-	-	-	-	-	-
1887	-	-	-	-	-	-	-	-	-	-	-	-	-
1888	-	-	-	-	-	-	-	-	-	-	-	-	-
1889	-	-	-	-	-	-	-	-	-	-	-	-	-
1890	-	-	-	-	-	-	-	-	-	-	-	-	-
1891	-	-	-	-	-	-	-	-	-	-	-	-	-
1892	-	1.00	2.30	-	-	-	5.86	-	-	-	-	-	-
1893	2.17	6.24	-	-	-	-	-	-	-	-	-	-	-
1894	-	-	-	-	-	-	-	1.37	-	-	-	-	-
1895	-	-	-	-	-	-	-	-	1.16	3.45	3.70	3.03	-
1896	1.05	5.49	6.12	0.87	3.28	3.57	3.96	2.92	4.30	2.31	2.98	1.37	38.22
1897	2.11	2.22	2.74	2.41	5.42	2.77	15.71	3.75	1.62	1.06	4.46	4.39	48.66
1898	3.54	3.46	2.23	3.35	6.38	0.95	3.87	8.77	3.35	5.08	3.16	2.68	46.82

Table 3

Historical Precipitation at Station KPOU
Poughkeepsie, NY

Precip. (in)	Month												
	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
1899	2.70	4.00	5.32	1.69	1.75	4.57	5.84	0.86	6.51	1.26	1.78	1.79	38.07
1900	2.82	5.33	3.36	1.81	4.20	2.17	4.28	3.14	2.78	2.80	3.86	2.07	38.62
1901	1.57	0.70	4.88	8.26	6.43	1.23	6.47	7.20	3.59	2.28	1.66	6.16	50.43
1902	2.38	4.13	4.12	3.28	2.33	4.55	7.57	2.34	6.21	5.56	0.99	5.37	48.83
1903	3.09	4.40	3.88	2.61	0.74	10.90	3.26	7.96	2.29	6.17	1.53	2.73	49.56
1904	2.51	2.35	2.91	3.34	2.29	2.65	4.48	6.00	4.20	2.74	1.34	1.84	36.65
1905	3.27	1.35	2.75	2.28	0.79	4.10	4.30	4.46	4.79	2.16	1.74	2.73	34.72
1906	2.56	2.05	3.72	4.82	3.71	2.84	6.36	3.10	2.26	3.56	1.43	4.21	40.62
1907	3.19	2.39	2.08	2.15	3.50	3.42	2.53	2.04	6.11	4.95	4.35	4.39	41.10
1908	2.38	5.13	2.15	2.11	5.93	1.43	4.48	3.81	0.78	1.99	0.63	2.43	33.25
1909	3.00	4.79	2.66	5.41	2.25	2.15	2.96	5.46	3.60	0.90	1.31	3.66	38.15
1910	4.93	2.86	1.03	4.77	2.77	4.38	2.10	4.11	2.04	1.39	3.43	2.05	35.86
1911	2.20	2.61	2.99	2.80	1.88	5.43	2.82	6.46	2.44	5.67	2.67	3.01	40.98
1912	1.24	1.91	5.87	3.55	3.72	1.54	3.00	3.66	2.96	2.86	2.25	4.12	36.68
1913	3.13	2.29	4.68	4.52	2.50	1.02	1.64	3.62	3.13	6.46	2.18	2.47	37.64
1914	3.57	2.03	3.77	3.24	2.65	2.80	4.63	2.01	0.24	2.52	2.48	4.10	34.04
1915	4.79	4.75	0.42	1.75	2.10	2.79	6.10	7.30	2.32	2.57	1.08	5.73	41.70
1916	0.98	3.34	2.66	2.71	2.62	4.87	6.50	1.99	2.49	1.04	2.65	4.09	35.94
1917	2.79	1.67	3.04	1.71	2.66	3.60	2.55	1.67	0.95	4.61	1.05	2.77	29.07
1918	3.33	2.19	1.39	4.10	3.52	3.44	4.69	3.36	3.42	1.23	2.31	3.82	36.80
1919	2.70	2.96	4.46	2.66	3.99	2.03	7.17	4.40	4.21	3.17	4.01	2.55	44.31
1920	2.19	4.33	3.04	3.83	1.93	5.21	4.26	4.04	5.75	1.87	3.04	4.32	43.81
1921	2.10	2.95	2.76	4.94	2.07	3.38	4.33	2.81	2.60	1.05	3.72	2.04	34.75
1922	1.12	2.35	3.54	2.40	4.64	6.49	5.68	3.47	2.02	1.88	0.97	3.20	37.76
1923	4.22	1.87	2.43	2.98	2.33	3.32	3.07	1.82	2.87	3.87	3.90	3.44	36.12
1924	3.60	2.46	0.90	5.35	4.60	1.79	1.94	2.34	4.38	0.44	2.12	1.66	31.58
1925	3.75	2.61	3.30	1.74	2.57	4.13	7.10	1.76	2.97	3.52	3.39	2.43	39.27
1926	1.82	3.91	1.77	2.47	1.50	2.34	3.62	4.66	2.71	3.78	3.08	2.54	34.20
1927	2.17	2.51	1.40	2.20	5.15	2.80	4.08	6.59	2.89	5.57	7.14	4.34	46.84
1928	2.05	3.86	2.11	4.52	2.32	7.06	7.92	8.27	2.64	0.75	2.26	1.09	44.85
1929	3.18	3.14	2.14	6.55	3.25	1.82	2.67	3.02	2.73	3.61	2.43	3.69	38.23
1930	2.13	1.80	2.28	2.07	3.04	4.22	2.72	3.48	2.22	1.20	3.65	2.57	31.38
1931	1.39	1.77	2.60	3.07	4.93	5.91	6.55	3.73	1.46	1.82	1.31	2.44	36.98
1932	3.00	1.83	3.24	1.79	3.09	3.01	4.24	4.34	1.65	5.60	7.27	1.76	40.82
1933	1.31	2.56	4.04	4.52	2.09	2.70	2.31	9.25	5.48	2.10	0.99	2.23	39.58
1934	2.36	2.14	2.74	3.93	4.31	3.62	5.44	2.75	8.14	2.20	4.25	2.22	44.10
1935	3.32	2.45	1.84	3.08	1.79	3.45	3.56	1.29	2.92	2.35	4.83	1.09	31.97
1936	3.94	2.86	4.99	3.38	2.48	3.38	4.34	6.99	3.13	3.19	1.71	4.66	45.05
1937	6.42	1.86	2.73	4.51	4.08	6.38	2.95	3.91	3.11	2.96	2.92	2.32	44.15
1938	2.95	1.55	1.61	2.06	4.39	5.95	7.08	5.97	9.85	1.83	2.24	2.51	47.99
1939	2.26	3.78	2.75	4.28	1.18	2.48	2.70	2.04	2.24	4.27	1.32	1.22	30.52
1940	0.98	2.01	3.66	4.69	5.58	3.33	4.45	3.13	2.64	2.00	4.35	2.88	39.70
1941	2.17	2.22	0.95	0.78	1.64	4.80	5.01	2.39	0.87	1.78	1.92	2.64	27 17
1942	2.76	1.81	4.98	0.87	2.79	2.68	4.03	4.37	3.40	3.87	4.54	4.59	40.69
1943	2.67	1.56	2.58	3.14	5.51	4.46	6.47	1.10	1.73	6.67	3.70	0.51	40.10
1944	0.98	1.33	4.22	3.28	1.79	5.08	3.50	0.61	4.87	1.45	4.88	2.98	34.97
1945	4.06	3.50	1.89	4.77	7.49	5.82	10.77	5.73	5.60	2.40	4.41	3.81	60.25
1946	1.14	2.62	1.58	1.50	4.61	2.93	5.97	2.95	3.68	1.42	0.76	2.12	31.28
1947	2.53	1.84	2.39	4.30	5.06	4.32	4.36	3.24	2.85	2.43	6.09	3.18	42.59
1948	3.06	1.92	3.12	4.57	4.41	4.34	2.10	2.35	0.78	1.99	3.85	7.40	39.89
1949	4.69	2.48	1.19	2.37	4.60	0.99	3.19	4.26	2.54	2.34	1.90	4.03	34.58
1950	3.79	3.01	2.80	2.42	4.34	4.02	4.12	3.68	2.29	1.24	5.69	3.09	40.49
1951	3.30	3.28	5.07	2.89	3.78	3.52	3.53	5.87	3.17	3.62	5.26	3.50	46.79
1952	4.01	1.69	3.28	7.41	5.33	4.96	4.32	5.87	4.73	0.85	2.35	3.69	48.49
1953	4.09	2.23	6.63	5.58	5.22	3.15	2.52	2.19	2.33	4.31	1.86	4.64	44.75
1954	1.52	1.88	3.07	2.97	4.57	1.57	2.09	5.18	5.48	1.45	6.77	3.27	39.82
1955	0.79	2.85	4.38	3.62	1.75	2.37	0.82	12.71	2.59	10.40	4.42	0.54	47.24
1956	1.84	3.63	3.71	4.41	2.78	1.68	4.36	1.72	6.30	2.49	1.72	4.25	38.89
1957	1.80	1.15	2.13	4.60	2.94	1.19	2.23	1.66	2.29	3.11	3.05	5.71	31.86
1958	4.32	2.54	3.60	6.01	3.85	1.82	2.92	2.20	3.95	5.04	3.73	0.62	40.60
1959	2.92	2.56	2.43	3.01	1.83	3.58	3.98	3.56	0.72	6.81	3.26	2.93	37.59
1960	2.34	2.81	1.71	3.13	3.51	4.75	5.65	2.28	6.08	2.21	1.76	1.63	37.86
1961	2.35	3.47	3.08	4.78	4.10	3.14	2.96	1.99	2.52	1.54	4.12	2.69	36.74
1962	3.03	5.20	1.11	2.94	1.36	2.82	1.43	3.85	1.91	2.59	2.33	2.99	31.56

Table 3

Historical Precipitation at Station KPOU
Poughkeepsie, NY

Precip. (in)	Month												
	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
1963	2.69	2.18	2.57	1.04	1.36	4.32	4.16	1.81	3.12	0.36	5.36	2.22	31.19
1964	2.12	1.79	2.26	3.41	0.94	2.98	1.99	2.35	1.30	0.89	1.67	2.82	24.52
1965	2.24	2.24	1.13	2.40	1.05	1.54	2.91	4.38	2.66	2.92	2.16	2.08	27.71
1966	1.89	2.21	1.99	2.20	3.13	1.04	0.96	0.87	6.86	4.49	3.14	2.23	31.01
1967	1.23	1.52	4.44	3.44	2.91	7.23	5.32	5.76	1.48	2.92	2.54	4.16	42.95
1968	1.20	0.72	3.86	2.37	6.50	5.57	0.72	2.05	3.83	2.16	3.88	3.87	36.73
1969	1.45	1.85	2.51	4.21	3.27	4.16	5.06	3.60	3.25	1.56	6.41	4.15	41.48
1970	0.43	2.97	2.01	3.82	2.96	2.96	1.89	4.03	3.31	2.93	3.96	3.10	34.37
1971	1.68	3.58	1.99	2.62	5.03	1.47	5.22	10.92	3.98	3.51	3.41	2.70	46.11
1972	2.23	3.53	3.22	4.75	7.74	7.99	4.13	2.14	1.93	3.68	8.11	5.33	54.78
1973	2.81	1.82	3.83	6.50	6.17	4.89	2.43	1.24	2.71	1.61	1.76	8.65	44.42
1974	4.20	1.12	3.86	3.94	4.46	4.65	4.25	3.82	5.20	2.55	2.82	3.08	43.95
1975	3.51	3.11	3.99	1.88	3.14	3.99	13.63	3.15	7.19	4.31	4.35	2.98	55.23
1976	3.67	2.76	1.79	2.28	3.36	2.67	5.10	7.27	3.90	6.78	0.67	2.09	42.34
1977	1.27	3.33	6.11	4.17	2.59	3.38	1.43	3.24	5.95	4.72	5.25	4.45	45.89
1978	7.09	1.13	3.38	1.08	7.08	3.29	2.83	4.14	2.76	1.97	1.70	3.38	39.83
1979	6.65	3.09	2.05	3.95	5.82	1.62	2.10	4.32	5.71	4.02	3.50	1.85	44.68
1980	0.64	0.92	4.55	5.18	1.86	3.62	2.79	2.50	1.83	3.15	3.07	0.57	30.68
1981	0.77	5.42	0.15	4.01	4.82	3.81	3.79	0.64	2.81	4.12	1.28	3.61	35.23
1982	3.76	3.15	2.78	3.63	2.97	8.39	3.58	3.86	2.14	1.60	3.00	0.93	39.79
1983	3.72	2.23	7.39	8.51	6.84	4.03	1.28	4.00	2.36	3.57	4.91	6.60	55.44
1984	1.33	3.37	3.70	5.14	11.49	1.58	5.53	1.90	0.84	2.20	2.04	2.65	41.77
1985	1.00	2.04	2.58	1.71	4.19	3.34	4.66	4.68	5.31	1.72	6.11	2.23	39.57
1986	3.48	3.52	2.96	1.68	2.10	5.87	9.00	2.84	0.46	2.51	5.23	3.28	42.93
1987	3.65	0.32	3.12	6.47	2.22	2.35	4.51	3.79	6.59	4.70	1.27	1.50	40.49
1988	2.11	2.97	1.61	1.36	4.51	0.30	8.49	4.54	1.93	1.50	7.10	0.88	37.30
1989	1.72	2.29	3.00	2.78	11.81	7.21	1.63	3.63	6.71	6.54	1.86	1.01	50.19
1990	4.10	3.49	3.25	3.05	6.04	3.28	3.30	7.91	1.19	5.85	2.70	5.00	49.16
1991	1.50	1.63	3.82	3.58	5.05	2.21	2.72	4.92	4.81	4.07	3.70	3.03	41.04
1992	1.70	1.92	3.08	3.12	2.83	3.34	7.18	2.81	1.98	1.31	4.60	4.16	38.03
1993	2.28	2.70	5.69	5.17	1.07	2.71	1.32	1.95	6.05	3.82	3.46	3.62	39.84
1994	3.69	2.86	5.25	3.06	3.63	5.62	5.12	5.97	3.03	1.23	3.56	2.67	45.69
1995	4.49	2.52	2.53	3.76	3.51	2.34	11.27	1.80	3.30	9.98	5.40	2.62	53.52
1996	7.41	2.21	3.26	6.56	3.71	4.06	11.62	1.39	5.94	7.48	2.58	7.09	63.31
1997	2.68	1.47	4.11	4.86	5.15	2.24	4.29	4.52	2.70	1.83	6.01	3.50	43.36
1998	3.72	2.54	4.17	4.26	6.33	10.79	2.23	2.67	3.78	3.74	1.39	1.06	46.68
1999	6.16	2.53	5.36	1.57	3.38	1.50	2.11	4.22	6.94	3.47	2.40	2.08	41.72
2000	2.95	3.31	4.58	4.90	8.10	7.02	4.23	5.28	3.70	1.77	2.63	4.27	52.74
2001	2.18	2.25	6.37	0.11	2.69	4.64	2.85	3.24	4.76	0.79	0.85	2.08	32.81
2002	1.03	0.87	2.39	3.96	4.51	4.12	3.84	4.05	2.74	5.63	5.18	2.91	41.23
2003	2.58	2.56	3.08	1.47	3.78	4.47	2.44	4.31	9.22	4.34	4.31	3.98	46.54
2004	1.95	1.86	1.87	2.92	2.27	1.74	4.94	6.23	8.14	1.8	2.93	3.48	40.13
2005	4.79	1.58	3.88	3.78	1.95	4.70							20.68

1896 to 2005													
Mean	2.76	2.60	3.15	3.46	3.75	3.68	4.34	3.89	3.54	3.12	3.20	3.12	**40.43**
Min.	0.43	0.32	0.15	0.11	0.74	0.30	0.72	0.61	0.24	0.36	0.63	0.51	24.52
Max.	7.41	5.49	7.39	8.51	11.81	10.90	15.71	12.71	9.85	10.40	8.11	8.65	63.31
Median	2.63	2.47	3.02	3.28	3.44	3.38	4.08	3.63	2.97	2.57	3.00	2.93	40.00

Notes:

1. All data from Station KPOU (Poughkeepsie) except for select dates from 1995 through 2001 where data at this station was unavailable. Data from these dates collected from West Point. NY Station or Danbury, CT Station.

Table 4A

Monthly Precipitation since January 2003

Month	Poughkeepsie, NY (KPOU)	Danbury, CT (KDXR)	White Plains, NY (KHPN)	Onsite Rain Gauge	Average
Jan-03	2.58	2.60	2.07		2.42
Feb-03	2.56	2.74	1.15		2.15
Mar-03	3.08	3.86	3.90		3.61
Apr-03	1.47	2.42	2.84		2.24
May-03	3.78	4.33	4.44		4.18
Jun-03	4.47	8.87	7.98		7.11
Jul-03	2.44	4.07	1.78		2.76
Aug-03	4.31	6.83	4.57		5.24
Sep-03	9.22	7.99	7.25		8.15
Oct-03	4.34	5.03	4.35		4.57
Nov-03	4.31	4.11	4.14		4.19
Dec-03	3.98	6.19	5.45		5.21
Jan-04	1.95	1.57	1.83		1.78
Feb-04	1.86	2.21	2.62		2.23
Mar-04	1.87	3.33	3.87		3.02
Apr-04	2.92	5.31	5.31		4.51
May-04	2.27	3.11	3.92		3.10
Jun-04	1.74	2.46	3.19		2.46
Jul-04	4.94	4.75	7.04		5.58
Aug-04	6.23	2.5	3.46		4.06
Sep-04	8.14	8.1	11.5		9.25
Oct-04	1.8	2.23	1.34		1.79
Nov-04	2.93	3.87	3.86		3.55
Dec-04	3.48	4.13	3.15		3.59
Jan-05	4.79	3.98	3.89		4.22
Feb-05	1.58	2.32	2.94		2.28
Mar-05	3.88	3.35	3.59		3.61
Apr-05	3.78	5.14	4.93		4.62
May-05	1.95	2.01	1.32	**2.54**	**1.76**
Jun-05	4.7	2.75	3.81	**5.22**	**3.75**
2003 Annual Total	46.54	59.04	49.92		51.83
2004 Annual Total	40.13	43.57	51.09		44.93
May 2004 - May 2005	**47.51**	**47.95**	**54.13**		**49.86**
(12 months preceeding					
date of gw model)					

Table 4B
Monthly Precipitation Since Jan. 2003

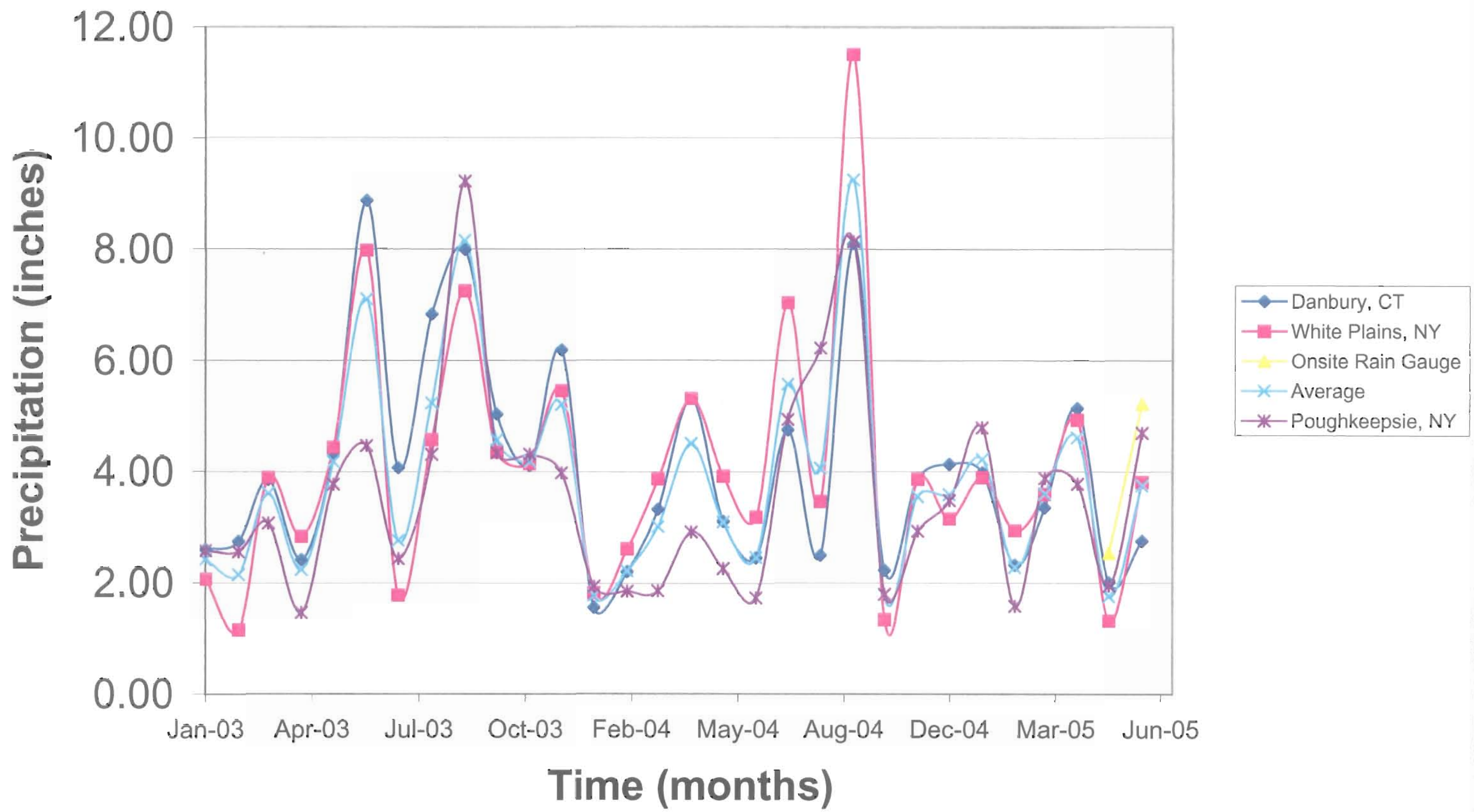


Table 5A - Monthly Precipitation Data and Comparision to Onsite Rain Gauge

Patterson Crossing
Patterson and Kent, New York

Historical Precipitation (at Station KPOU) **Period from 1896 to 2005** (All data in inches)				
	Max.	Min.	Median	Mean
May	11.81	0.74	3.44	3.75
June	10.9	0.3	3.38	3.68

Onsite Rain Gauge location *		
	Measured Rainfall (inches)	Deviation from KPOU Historical Mean (inches)
May	2.54	-1.21
June	**5.22**	**1.54**

* Rain gauge located on fence at Cell Phone tower on south side of site

Table 5B
Daily Rainfall (from onsite rain gauge)
Patterson Crossing
Patterson and Kent, New York

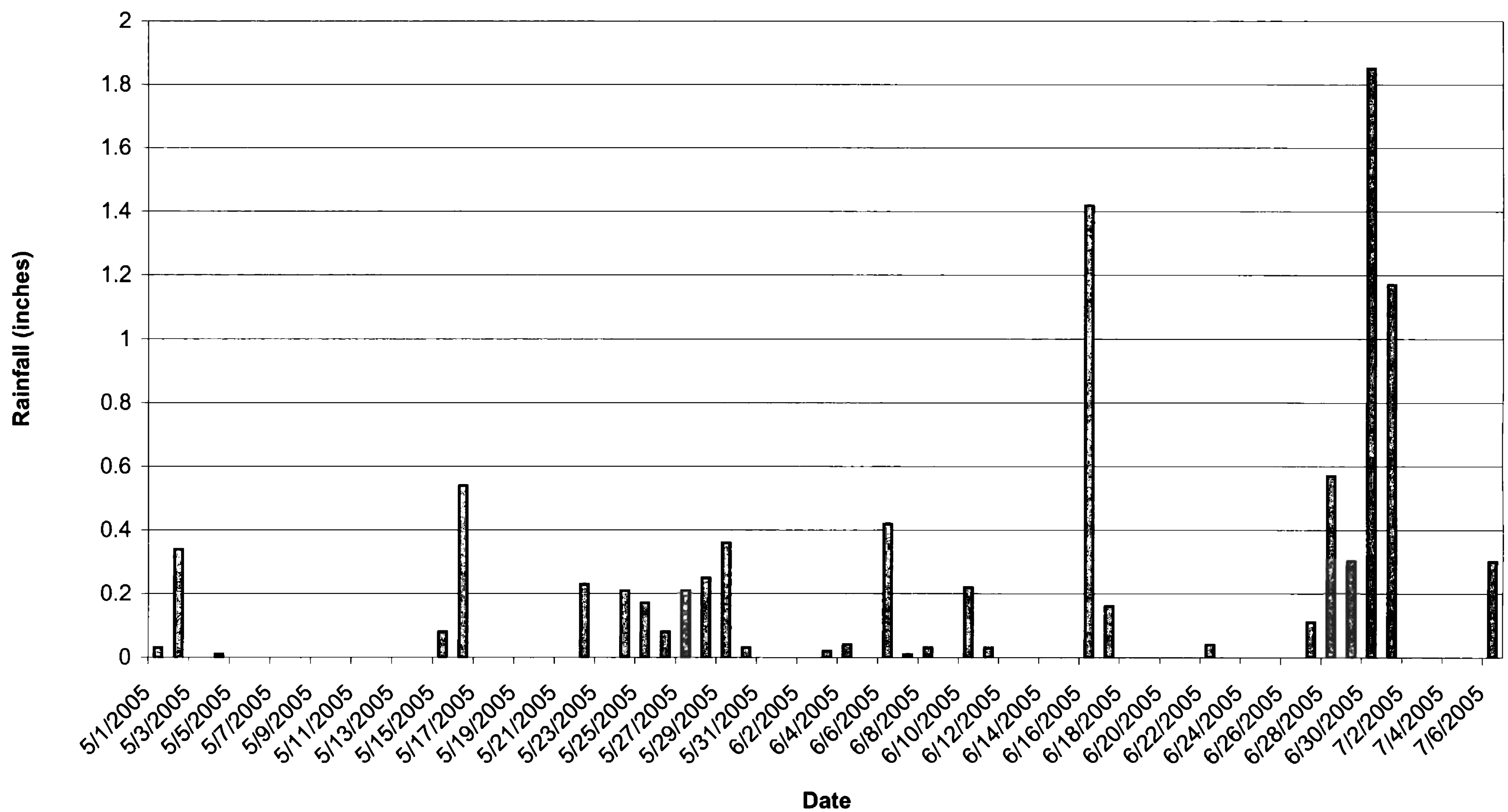


Table 6
Summary of Soil Permeability - South Area

Patterson Crossing
Patterson and Kent, New York

Falling Head Test Data			
Area	**Well No.**	**Permeability (cm/sec)**	**Permeability (ft/day)**
South Area	S-1	6.87E-06	1.95E-02
	S-2	6.76E-06	1.92E-02
	S-8	6.37E-06	1.80E-02
	S-9	3.85E-05	1.09E-01
	S-10	1.82E-05	5.16E-02
	S-11	2.80E-06	7.93E-03
	S-12	1.63E-05	4.63E-02
	S-13	8.71E-05	2.47E-01

South Area:	Minimum	2.80E-06	7.93E-03	(S-11)
	Maximum	8.71E-05	2.47E-01	(S-13)
	Average	2.29E-05	6.48E-02	

Table 7 - Basis for Rainfall Selection

Nearest Airport Data	**Location Relative to Site**	**NOAA Observation Station**
Danbury CT	10 miles southeast	DXR
Poughkeepsie NY	21 miles northwest	POU
White Plains, NY	35 miles south-southwest	HPN

Rainfall Data for each of these three stations and average of all three stations are plotted on Table 5B from January 2003 to June 2005.
A rain gauge installed at the site by GeoDesign obtained readings beginning on May 1, 2005. These readings are included on the chart.

Cumulative (total) Precipitation for the 12 month period preceeding the start of the field work was as follows: (See Table 4A for details)

Danbury, CT	47.95 inches
Poughkeepsie, NY	47.51 inches
White Plains, NY	54.13 inches
Average	49.86 inches

Long term Historical Annual Rainfall Record at Poughkeepsie, NY (See Table 3 for details)

Between 1896 and 2005:

Mean	40.43 inches
Min.	24.52 inches
Max.	63.31 inches
Median	40.00 inches

Precipitation Data at Carmel, NY obtained from:

USGS Bulletin GW-37- "The Ground Water Resources of Putman County, NY, 1957"

Normal (mean) annual precipitation at Carmel is 47.40 inches

Table 8A - Basis for Pre-development Groundwater Recharge

The precipitation for the 12 month period through the end of June 2005 at Poughkeepsie (KPOU) was 47.51 inches. (See Table 7)
This value compares favorably to the historical mean annual precipitation at Carmel (47.40 inches).

The long term historical mean annual rainfall at KPOU was 40.43 inches. (See Table 7)

Precipitation at the onsite rain gauge was higher than the KPOU historical mean. (See Table 5A)

Adjusting the past 12 months of rainfall at KPOU to the Poughkeepsie historical mean, and applying that number to the historical Carmel data yields: (47.51/40.43) * 47.40 = **56 inches**

This precipitation data, together with the site geology, topography, and vegetation was used to estimate a design infiltrated flow for the undeveloped (pre-development) condition.

Estimated Values for Computation of Groundwater Runoff*				
Area of Till and Bedrock In Basin (mi^2)	GW Runoff (Mgal/d)	GW Runoff (in/yr)	Basin No.	Basin Name
0.84	0.33	8.25	7A	Croton River North
0.93	0.36	8.13	7B	Croton River North
1.10	0.42	8.02	7C	Croton River North
0.61	0.24	8.26	7D	Croton River North
1.35	0.54	8.40	10A	Green Briar Brook
1.72	0.71	8.67	15A	Plum Brook
1.22	0.50	8.61	15B	Plum Brook
1.38	0.56	8.52	15C	Plum Brook
0.35	0.13	7.80	17A	Titicus River
2.35	0.91	8.13	17B	Titicus River
2.02	0.79	8.21	17C	Titicus River
	Avg.	8.27	inches/year	

* - Selected Average Annual Recharge Values from Table 12 of reference "Computation of Bedrock-Aquifer Recharge in Northern Westchester County, New York, and Chemical Quality of Water from Selected Bedrock Wells." USGS Water Resources Investigations Report 92-4157 (selected pages attached as Appendix 9)

Basins selected in the above table are located approximately five to six miles due south of the subject site.

Using an average recharge (GW runoff) of 8.27 inches/year,
and adjusting to account for 56 inches of precipitation during previous 12 months at Carmel
versus 47.40 inches of precipitation from historical mean at Carmel yields the following annual runoff:

(8.27 inches/yr.) * (56/47.4) = 9.77 inches/year

On a per month basis this yields: 9.77/12= 0.814 inches/month

The wet/snowy winter/spring weather that preceded the test period (See above data and Tables 4B and 5A) was assumed to have a 50% higher recharge value than the above average monthly value.

Therefore, adjust to 0.814 * 1.5 = 1.22 inches/month

Annualized this yields = 1.22* 12 = 15 inches/year

For the groundwater model, the recharge value will be: **0.00334589 ft/day**

Assumes approximate steady state is reached following this recharge rate over the three to four months preceeding the observed groundwater levels

Table 8B - Basis for Post-development Groundwater Recharge - South Area

The areas of the site in which runoff characteristics will be significantly changed as a result of the construction were considered in the model as follows:

Subsurface Treatment System (SSTS)

South Area:

Effective septic recharge area for model equals 140,000 ft^2 multiplied by 2 (checkerboard reserve) = 280,000 ft^2
(As per Insite Engineering, based on analysis of soil percolation test results)

Post-development recharge for a given design flow rate

	SOUTH AREA			
Sewage Flow Rate	***9,000***	***11,000***	***13,000***	gallons per day
	1203.21	1470.59	1737.97	ft^3 per day
Unit Flow Rate	0.004297	0.005252	0.006207	ft/day
Pre-Construction Base Flow	0.00334589	0.00334589	0.00334589	ft/day
Total Recharge				
Post Development	**0.0076**	**0.0086**	**0.0096**	**ft/day**

Construction / Paved Areas

The following estimated reduced design recharge rates (inches/year) were used in paved / developed areas, where buildings, parking lots, access roads, or other developments are planned.

Pre-development Infiltration (in/yr)	*Reduction Factor*	*Post-development Infiltration* (in/yr)	**(ft/day)**
15	0.50	7.5	**0.001712**

Table 9
Summary of Depth to Bedrock

Hole No.	Ground Surface Elevation (ft.)	Depth to Top of Bedrock (ft.)	Bedrock Elevation (ft.)	RQD 0-5' run (%)	RQD 5'-10' run (%)	Notes
S-1	889.21	47	842.21			Not cored, roller bit refusal
S-2	896.51	43.5	853.01			
S-3	867.01	16	851.01	77	12	
S-4	858.88	18	840.88	45		
S-5	862.75	18	844.75	38	55	
S-6	861.25	15	846.25	82		
S-7	882.11	14	868.11	60	77	
S-8	893.47	30	863.47	72		
S-9	894.74	33	861.74			Not cored, roller bit refusal
S-9A	894.50	Not encountered				Exploration ended above top of bedrock
S-10	886.00	26.5	859.50			Bedrock core lost in borehole. No RQD value recorded.
S-11	886.99	49	837.99			Not cored, roller bit refusal
S-12	892.33	34.5	857.83	52		
S-13	888.16	41	847.16			Not cored, roller bit refusal
S-13A	888.00	Not encountered				Exploration ended above top of bedrock

Table 10 - Existing Conditions Model Calibration Results

Patterson Crossing
Patterson and Kent, NY

Well No./ Target	Measured Groundwater Elevation (ft.)	Simulated Groundwater Elevation (ft.)	Difference in Elevation (ft.) (residual)
S-1	866	867	-1
S-2	873	874	-1
S-3	845	846	-1
S-4	844	844	0
S-5	846	847	-1
S-6	840	840	0
S-7	873	872	1
S-8	869	869	0
S-9A	882	881	1
S-10	875	875	0
S-11	877	877	0
S-12	889	889	0
S-13	886	886	0

Notes:
1) Targets S-9 and S-13A were not used in the calibration due to each target's proximity to nearby wells that were used in the model for calibration purposes.

2) All above data has been rounded to the nearest foot.

3) "Residual" refers to the difference in the modeled groundwater table from the field measured groundwater level at each well location. The sign convention is as follows:
- Negative residual is a result of the groundwater model being higher than the field value
- Positive residual occurs when the field value higher than the groundwater model value

Table 11

Increased Transmissivity Due to Increased Aquifer Saturated Thickness (for use in Post-Development Groundwater Model)

Patterson Crossing

Patterson and Kent, New York

South Area		
Well No.	**Depth to Water (ft.)**	**Thickness of Cell in Model**
S-1	23.75	60
S-2	23.91	60
S-3	21.72	80
S-4	15.35	70
S-5	16.26	70
S-6	23.00	70
S-7	8.88	60
S-8	24.37	60
S-9	10.00	65
S-10	13.52	60
S-11	10.50	60
S-12	20.32	60
S-13	1.83	70

16.4		avg. depth to water
	64.6	avg. total thickness
	47.0	avg. saturated thickness (cell thickness minus avg depth to water)
13.4		assumed avg. allowable water rise (depth to water minus assumed depth to bottom of discharge trench)
	1.3	**estimated increase in T at South Area (increasing K by the same proportion without changing thickness)**

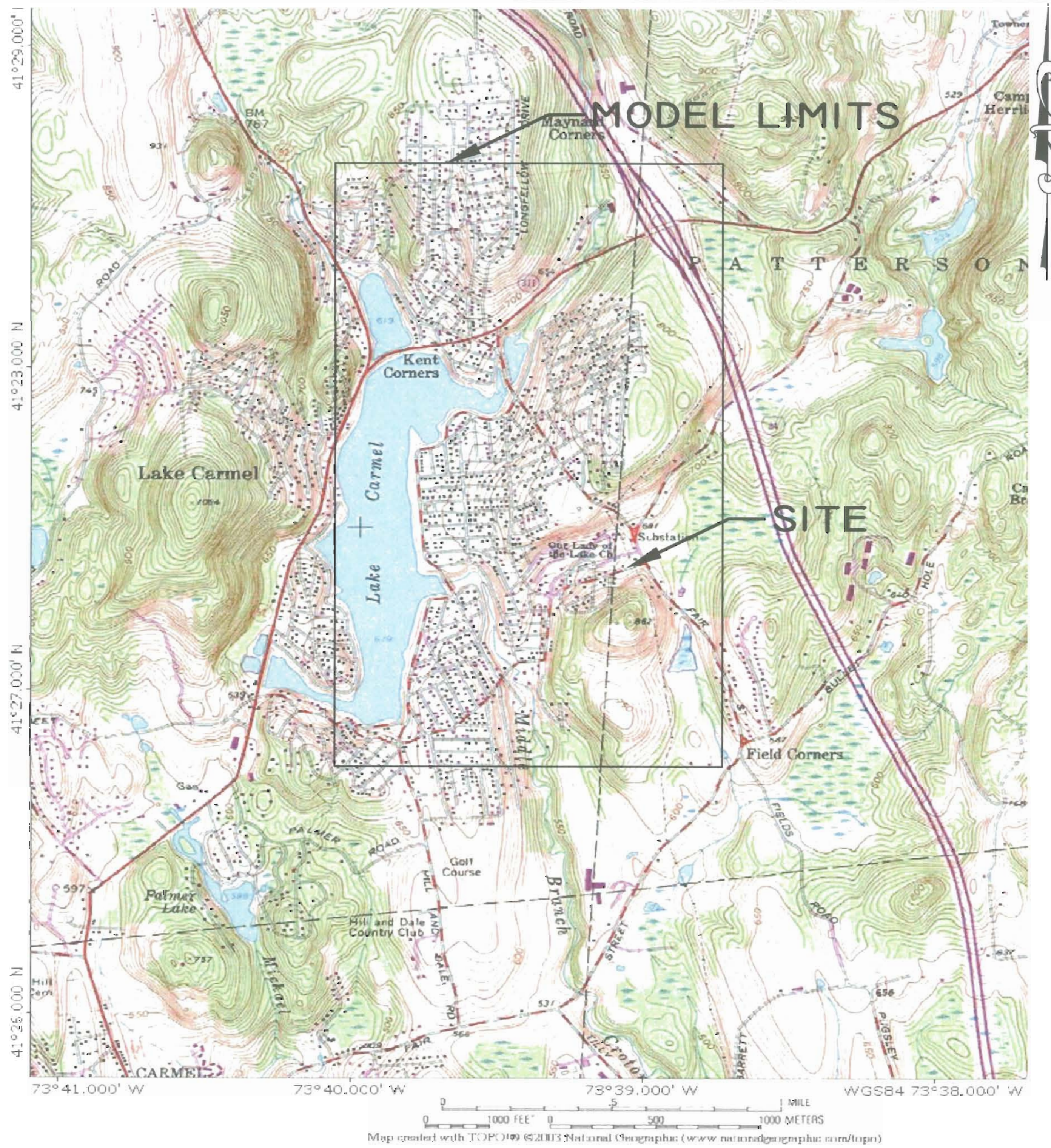
Table 12

Post Model Increase in Hydraulic Conductivity to Account for Increased Saturated Thickness

K multiplier
1.3

Zone No.	K Pre		K Post		Area used
	Kh	Kz	Kh	Kz	
1	0.01	0.001	0.013	0.0013	South Area
2	0.0185	0.00185	0.02405	0.002405	South Area
3	0.01955	0.001955	0.025415	0.002542	South Area
4	0.025	0.0025	0.0325	0.00325	South Area
5	0.0245	0.00245	0.03185	0.003185	South Area
6	0.0285	0.00285	0.03705	0.003705	South Area
7	0.055	0.0055	0.0715	0.00715	South Area
8	0.0635	0.00635	0.08255	0.008255	South Area
9	0.16	0.016	0.208	0.0208	South Area
10	0.1275	0.01275	0.1275	0.01275	Entire Model outside of proposed SSTS
11	0.145	0.0145	0.1885	0.01885	South Area
12	0.155	0.0155	0.2015	0.02015	South Area
13	0.165	0.0165	0.2145	0.02145	South Area
14	0.175	0.0175	0.2275	0.02275	South Area
15	0.195	0.0195	0.2535	0.02535	South Area
16	0.25	0.025	0.325	0.0325	South Area
17	0.225	0.0225	0.2925	0.02925	South Area
18	0.2555	0.02555	0.33215	0.033215	South Area
19	0.3055	0.03055	0.39715	0.039715	South Area
20	0.3555	0.03555	0.46215	0.046215	South Area
21	0.55	0.055	0.715	0.0715	South Area
22	0.68	0.068	0.884	0.0884	South Area
23	0.7355	0.07355	0.95615	0.095615	South Area
43	0.01	0.001	0.01	0.001	South Area - no multiplier on Pre Zone 1
44	0.0245	0.00245	0.0245	0.00245	South Area - no multiplier on Pre Zone 5
45	0.0285	0.00285	0.0285	0.00285	South Area - no multiplier on Pre Zone 6
46	0.055	0.0055	0.055	0.0055	South Area - no multiplier on Pre Zone 7
47	0.0635	0.00635	0.0635	0.00635	South Area - no multiplier on Pre Zone 8
48	0.195	0.0195	0.195	0.0195	South Area - no multiplier on Pre Zone 15
49	0.2555	0.02555	0.2555	0.02555	South Area - no multiplier on Pre Zone 18
50	0.3055	0.03055	0.3055	0.03055	South Area - no multiplier on Pre Zone 19
51	0.3555	0.03555	0.3555	0.03555	South Area - no multiplier on Pre Zone 20
52	0.68	0.068	0.68	0.068	South Area - no multiplier on Pre Zone 22

Appendix 1 – Figures



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REVIEWED BY: JGB

NEW YORK

QUADRANGLE LOCATION

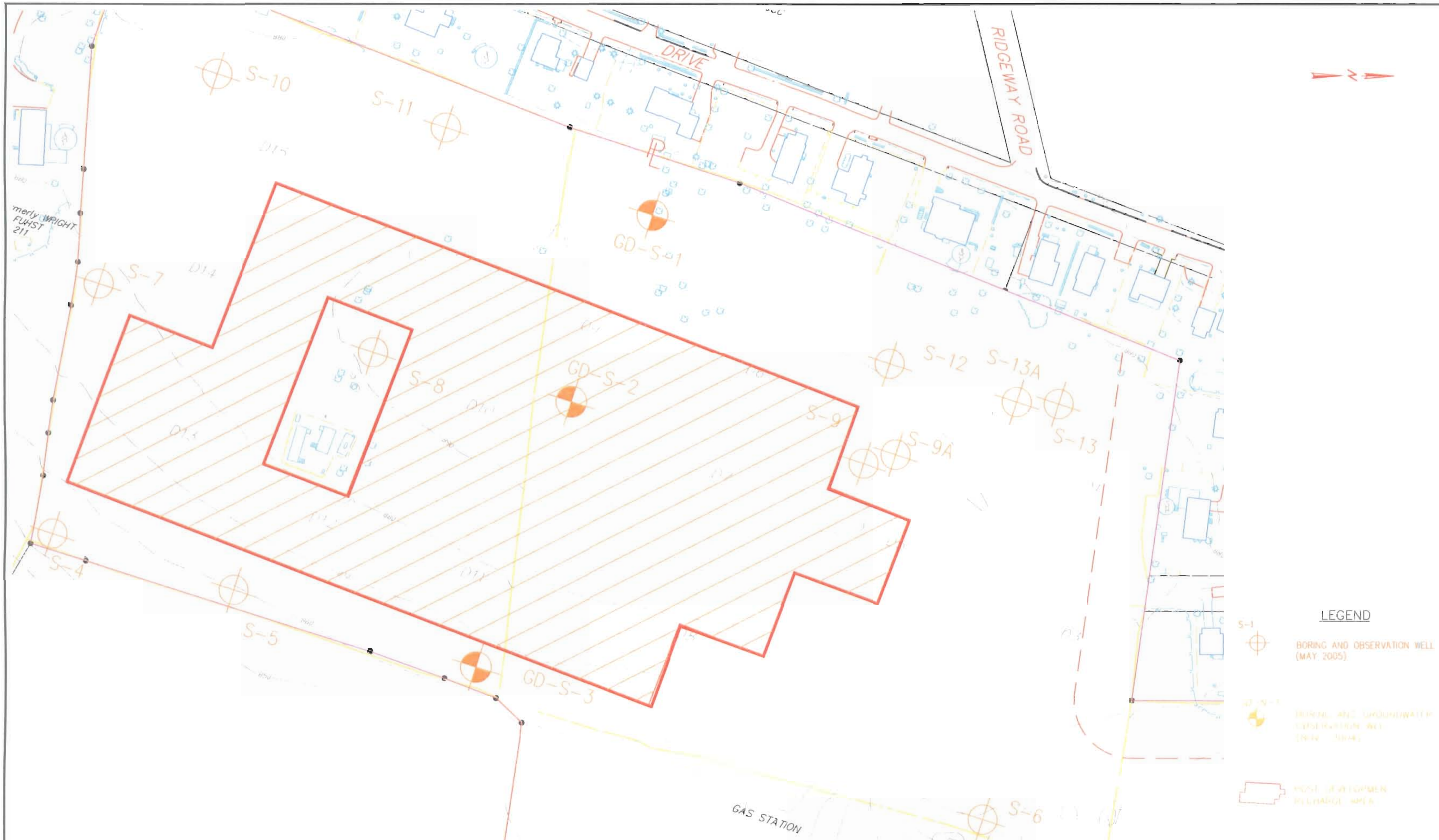
SCALE IN FEET

0 1000 2000 4000

AREA PLAN
PATTERSON CROSSING
PATTERSON & KENT, NEW YORK

REFERENCE:
U.S.G.S. 7.5 MINUTE QUADRANGLE:LAKE CARMEL, NY
Figure was created using TOPO! 2003 software

PROJECT NO. 664-01
DATE 8-11-05
FIGURE NO. 1



DESIGNED BY ULF					
DRAWN BY SMC / JGB					
CHECKED BY JGB					
APPROVED BY ULF	NO.	DATE	DRWN	CHKD	APPVD
	REVISIONS				

NOTES

1.) BASE MAP PROVIDED BY INSITE ENGINEERING IN DIGITAL FORMAT.
2.) EXPLORATION LOCATIONS BASED ON SURVEY DATA PROVIDED TO US BY INSITE ENGINEERING.
3.) SEE REPORT FOR LIMITATIONS AND FURTHER INFORMATION.

SCALE IN FEET

1" = 100'

0' 50' 100' 200'

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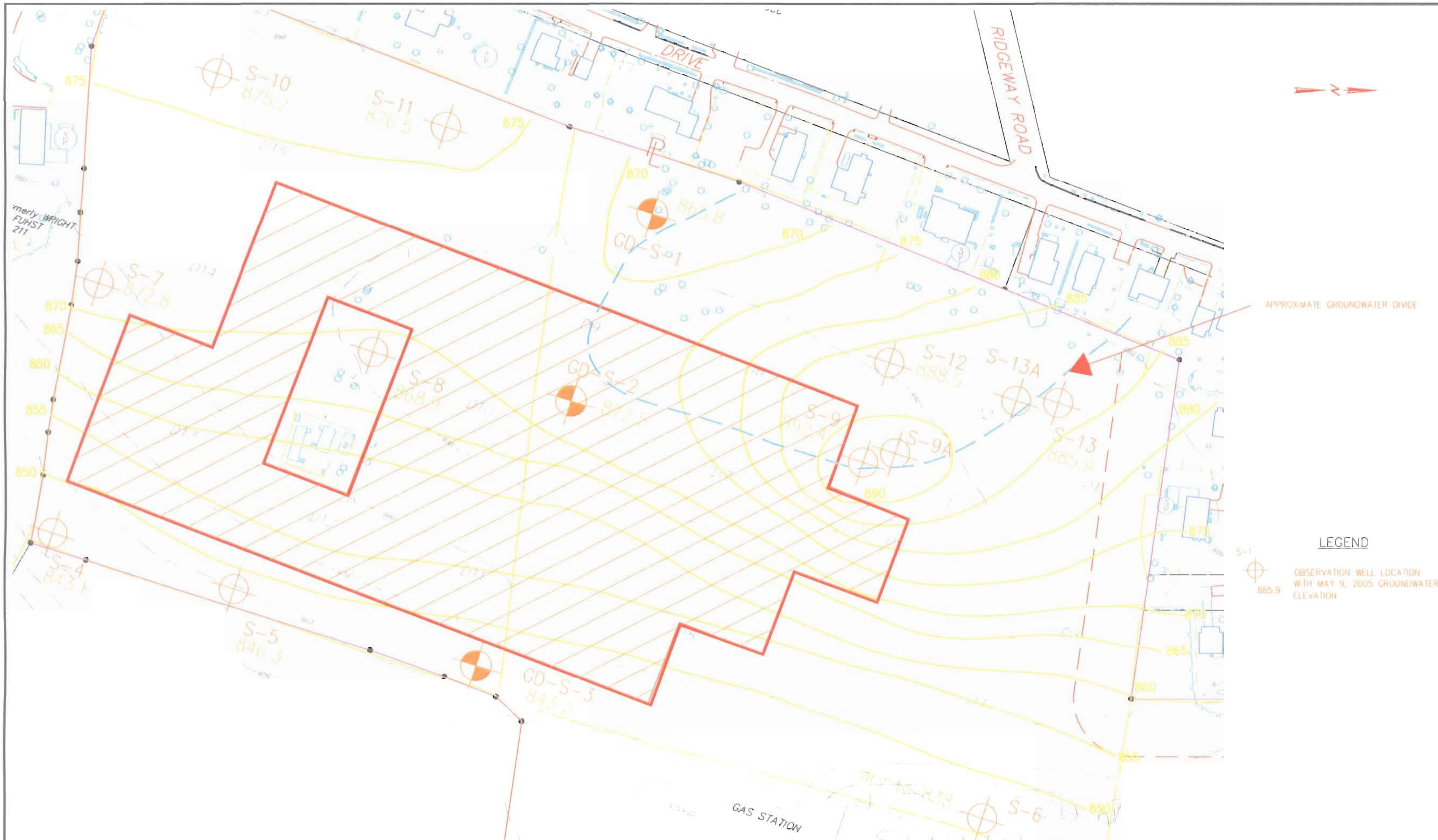
EXPLORATION LOCATION PLAN

SOUTH AREA

PATTERSON CROSSING
PATTERSON AND KENT, NEW YORK

FILE NO.	664 01
SCALE 1" = 100'	DATE 08/10/05
FIGURE NO.	2



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SCALE IN FEET
1" = 100'
0' 50' 100' 200'

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GEOTECHNICAL ENGINEERS · ENVIRONMENTAL CONSULTANTS
984 SOUTHFORD ROAD · MIDDLEBURY CONNECTICUT 06762
TELEPHONE: (203)758-8836 FACSIMILE: (203)758-8842

EXISTING CONDITIONS
GROUNDWATER CONTOUR PLAN
SOUTH AREA

PATTERSON CROSSING
PATTERSON AND KENT, NEW YORK

FILE NO 664 01
SCALE 1" = 100'
DATE 08/10/05
FIGURE NO 3

Appendix 2 – Test Boring Logs

GEODESIGN INCORPORATED

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-1
Page No.: 1 of 2
File No.: 664-01
Checked By: ULF

Boring Company: General Borings Inc
Foreman: Rick Posa
GeoDesign Rep.: Jeff Buckley
Date Started: November 4, 2004 Date Finished: November 5, 2004
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 889.21
Station: Offset: ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev (ft)	Notes
▼	11/8/04	24.0	865.2	
▼	11/18/04	24.5	864.7	
▼	5/9/05	23.5	865.7	
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
													Topsoil/ Subsoil	
1.5													Glacial Till 887.7	
5														
10		1	SS	24	20	10.0	12	17	17	19				Dense, brown fine to coarse SAND and SILT, trace fine Gravel
15														
20		2	SS	24	18	20.0	12	17	20	37				Dense, brown fine to coarse SAND and SILT, trace fine Gravel
25														
30														

Remarks: Thickness of topsoil and subsoil approximated by observing auger cuttings and drilling difficulty.
Borehole exploration began using hollow stem augers. Once the desired depth for the falling head test was reached, the augers were removed from the bore hole, and 3-inch flush joint casing was inserted. The casing was used for the falling head test, and was then advanced to the end of exploration.
Falling head test performed in bore hole with a two foot long wick from 28 to 30 feet.

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube, V = Vane, WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: S-1

GEODESIGN INCORPORATED

Geotechnical Engineers and Environmental Consultants
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Telephone: 203-758-8836 Fax: 203-758-8842

BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-1
Page No.: 2 of 2
File No.: 664-01
Checked By: ULF

Boring Company	General Borings Inc
Foreman	Rick Posa
GeoDesign Rep.	Jeff Buckley
Date Started:	November 4, 2004
Date Finished	November 5, 2004
N Coordinate	
E Coordinate:	
Ground Surface Elevation (feet)	889.21
Station:	
Offset:	ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type	Diedrich D-47	
Hammer Type	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev. (ft)	Notes
▼	11/8/04	24.0	865.2	
▼	11/18/04	24.5	864.7	
▼	5/9/05	23.5	865.7	
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System Burmister
		3	SS	24	18	30.0	16	20	24	29			Glacial Till *(Continued)*		Dense, brown SILT, some fine to medium Sand
35															
40															
45															
													47.0 Bottom of Exploration at 47.0 ft 842.2		
50															
55															
60															

Remarks

Roller bit refusal at a depth of 47 feet. (Inferred top of bedrock.)
At a depth of 48 feet, a 2-inch diameter PVC observation well was installed with a 10 foot slotted screen and 40 feet of riser (including a 2 foot stickup.)

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations. A = Auger; C = Core, D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used Trace = 1-10%, Little = 10-20%, Some = 20-35%; And = 35-50%

Boring No.: S-1

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-2
Page No.: 1 of 2
File No.: 664-01
Checked By: ULF

Boring Company: General Borings Inc
Foreman: Rick Posa
GeoDesign Rep. Jeff Buckley
Date Started: November 3, 2004 Date Finished: November 4, 2004
N Coordinate: E Coordinate:
Ground Surface Elevation (feet): 896.51
Station: Offset: ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D	3.25 in.	1.38 in.
Hammer Wt	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type	Diedrich D-47	
Hammer Type	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev (ft)	Notes
▼	11/8/04	24.4	872.1	
▼	11/18/04	24.7	871.8	
▼	5/9/05	24.3	872.3	
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Sample Description Classification System Burmister
													Topsoil/ Subsoil	
													2.0 Glacial Till 894.5	
5														
10		1	SS	24	18	10.0	6	12	14	17				Medium dense, brown fine to coarse SAND and SILT, trace fine Gravel
15		2	SS	24	24	15.0	20	17	14	14				Dense, brown fine to coarse SAND and SILT, trace fine Gravel
20		3	SS	24	20	20.0	14	18	17	20				Dense, brown fine to coarse SAND and SILT, trace fine Gravel
25		4	SS	24	12	25.0	16	20	23	25			▼	Dense, brown fine to coarse SAND, some Silt, little fine to coarse Gravel
30														

Remarks

Thickness of topsoil and subsoil approximated by observing auger cuttings and drilling difficulty.
Borehole exploration began using hollow stem augers. Once the desired depth for the falling head test was reached, the augers were removed from the bore hole, and 3-inch flush joint casing was inserted. The casing was used for the falling head test, and was then advanced to the end of exploration.

Notes
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring, NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core, D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube, V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: S-2

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: **S-2**
Page No.: 2 of 2
File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc
Foreman	Rick Posa
GeoDesign Rep.	Jeff Buckley
Date Started:	November 3, 2004
Date Finished	November 4, 2004
N. Coordinate	
E. Coordinate	
Ground Surface Elevation (feet):	896.51
Station:	
Offset:	ft

	Casing:	Sampler
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in
Hammer Wt.	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
11/8/04	24.4	872.1	
11/18/04	24.7	871.8	
5/9/05	24.3	872.3	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation(feet))	Sample Description (Classification System: Burmister)
													Glacial Till *(Continued)*	
35														
40		5	SS	12	9	40.0	22	100						Very dense, gray fine to medium SAND and SILT, trace fine Gravel
													43.5	
		C-1	C	60	44	43.5					4		Bedrock 853.0	Poor Quality, Moderately Hard, Moderately Weathered, white/gray, GNEISS
45											3			
											5			
											6			
											6		48.5	
													Bottom 848.0 of Exploration at 48.5 ft	
50														
55														
60														

Remarks

Falling head test performed in bore hole with a two foot long wick from 33 to 35 feet.
Roller bit refusal at a depth of 43.5 feet. Bedrock cored from 43.5 to 48.5 feet.
A 2-inch diameter PVC observation well was installed to a depth of 43 feet. The observation well consisted of 10 feet of slotted screen, with 35.5 feet of riser (including a 2.25 foot stickup.)

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring, NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube, V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%, And = 35-50%

Boring No.: **S-2**

GEODESIGN INCORPORATED
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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-3
Page No.: 1 of 1
File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc				
Foreman:	Rick Posa				
GeoDesign Rep.:	Jeff Buckley				
Date Started	November 2, 2004	Date Finished:	November 3, 2004		
N. Coordinate:		E. Coordinate:			
Ground Surface Elevation (feet)	867.01				
Station:		Offset:	ft		

	Casing	Sampler
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall	NA	30 in.
Rig Type:	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev. (ft)	Notes
▼	11/8/04	23.3	843.7	
▼	11/18/04	23.0	844.0	
▼	5/9/05	23.7	843.3	
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Sample Description Classification System: Burmister
		1	SS	24	18	0.0	1	1	2	2			Topsoil/ Subsoil	Very loose, brown fine to coarse SAND and SILT, trace (-) fine Gravel, trace (-) Roots
													2.0	
													Glacial Till 865.0	
5														
		2	SS	24	20	5.0	9	15	18	22				Dense, brown fine to coarse SAND and SILT, trace fine Gravel
10														
		3	SS	24	18	10.0	7	10	9	7				Medium dense, brown fine to coarse SAND, some Silt, trace fine Gravel
15														
		4	SS	5	5	15.0	5	50/0"					16.0	Very dense, brown fine to coarse SAND, some Silt, trace (-) fine Gravel, (moist)
		C-1	C	60	57	16.0	[REC= 95%; RQD= 77%]				3		Bedrock 851.0	Good Quality, Moderately Hard, Slightly Weathered, white/gray, GNEISS
											4			
											4			
20											4			
											6			
		C-2	C	60	16	21.0	[REC= 27%; RQD= 12%]				6			Very Poor Quality, Moderately Hard, Slightly Weathered, white/gray, GNEISS
											7			
											3			
25											3			
											5		26.0	
													Bottom 841.0 of Exploration at 26.0 ft	
30														

Remarks: Thickness of topsoil and subsoil approximated by observing auger cuttings and drilling difficulty. Split spoon refusal at 15'5"; hollow stem auger refusal at 16 ft. Drill water lost in borehole (not recirculating) during rock coring at a depth 20 feet (4 feet into bedrock). Sand seam collapsed and filled core hole after removal of core barrel. Sand recovered in core barrel during core run C-2. Borehole exploration began using hollow stem augers; once bedrock was reached, 3" diameter casing was used to seal off the rock socket to prevent sand seam collapse.
2-inch diameter PVC observation well installed at 26 feet with 10 feet of slotted screen and 20 feet of riser (including a 2.7 foot stickup.)

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube, V = Vane, WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%, And = 35-50%

Boring No.: S-3

BORING LOG

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Geotechnical Engineers and Environmental Consultants
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Project Name: Patterson Crossing Hydrogeological Investigation, Patterson and Kent, New York

Boring No.: S-4
Page No.: 1 of 1
File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc
Foreman:	Erik Delpriore
GeoDesign Rep.:	Jeff Buckley
Date Started:	April 25, 2005
Date Finished:	April 25, 2005
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	858.98
Station:	
Offset:	ft

	Casing	Sampler
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall	NA	30 in.
Rig Type:	Diedrich D-50	
Hammer Type	Safety	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
5/9/05	15.8	843.1	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0-6	Blows 6-12	Blows 12-18	Blows 18-24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
0		1	SS	24	19	0.0	2	2	3	4			Topsoil; 1.0 Glacial Till 857.9	Loose, dark brown fine to medium SAND and SILT, trace (-) Roots
5		2	SS	24	20	5.0	6	11	18	25				Medium dense, brown fine to coarse SAND, little Silt, little fine Gravel
10		3	SS	24	15	10.0	7	11	19	13				Dense, brown fine to coarse SAND and SILT, trace coarse Gravel
15		4	SS	5	1	15.0	100/5"							Very dense, white coarse GRAVEL/COBBLE fragments
18		C-1	C	60	39	18.0	[REC= 65%; RQD= 45%]				4		18.0 Bedrock 840.9	Poor Quality, gray, GNEISS
20											4			
											5			
											4			
											4		23.0 Bottom 835.9 of Exploration at 23.0 ft	
25														
30														

Remarks: Auger refusal at a depth of 18 feet. Bedrock cored 18 to 23 feet.
Observation well installed to a depth of 22 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 12 to 22 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; D = Driven, G = Grab, PS = Piston Sample. SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube, V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%, Some = 20-35%; And = 35-50%

Boring No.: S-4

GEODESIGN INCORPORATED
Geotechnical Engineers and Environmental Consultants
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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-5
Page No.: 1 of 1
File No.: 664-01
Checked By: ULF

Boring Company	General Borings Inc				
Foreman	Erik Delpriore				
GeoDesign Rep.	Jeff Buckley				
Date Started:	April 25, 2005	Date Finished:	April 26, 2005		
N Coordinate		E. Coordinate			
Ground Surface Elevation (feet):	862.85				
Station:		Offset:	ft		

	Casing:	Sampler:
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type	Diedrich D-50	
Hammer Type:	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05	16.6	846.2	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation (feet)	Sample Description (Classification System: Burmister)
		1	SS	24	20	0.0	1	1	2	3			Topsoil; 1.0 Glacial Till 861.8	Very loose, brown fine to medium SAND, some Silt, trace (-) Roots
5		2	SS	24	17	5.0	3	4	7	16				Medium dense, brown fine to medium SAND, some Silt
10		3	SS	24	18	10.0	11	10	8	13				Medium dense, brown SILT and fine to coarse SAND, little fine to coarse Gravel
15		4	SS	24	12	15.0	23	37	18	17				Very dense, brown SILT and fine to coarse SAND, little fine to coarse Gravel
		C-1	C	60	50	18.0	[REC= 83%; RQD= 38%]				5		18.0 Bedrock 844.8	Poor Quality, gray, GNEISS
20											6			
											5			
											5			
											5			
		C-2	C	60	50	23.0	[REC= 83%; RQD= 55%]				4			Fair Quality, gray, GNEISS
25											5			
											6			
											5			
											5		28.0	
30													Bottom 834.8 of Exploration at 28.0 ft	

Remarks: Auger refusal at a depth of 18 feet. Bedrock cored 18 to 28 feet.
Observation well installed to a depth of 28 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 18 to 28 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring, NR = Not Recorded.
3) Abbreviations: A = Auger, C = Core; D = Driven, G = Grab; PS = Piston Sample; SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%, Some = 20-35%; And = 35-50%

Boring No.: S-5

GEODESIGN INCORPORATED
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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-6
Page No.: 1 of 1
File No.: 664-01
Checked By: ULF

Boring Company	General Borings Inc
Foreman	Erik Delpriore
GeoDesign Rep.:	Jeff Buckley
Date Started	April 29, 2005
Date Finished:	May 2, 2005
N. Coordinate:	
E. Coordinate	
Ground Surface Elevation (feet):	861.35
Station	
Offset:	ft

	Casing	Sampler
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall	NA	30 in.
Rig Type	Diedrich D-50	
Hammer Type	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05			Dry to 17 ft.

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System Burmister)
		1	SS	24	23	0.0	1	1	3	4			Topsoil; 1.0 Glacial Till 860.3	Loose, dark brown fine to medium SAND and SILT, trace Roots
5		2	SS	24	19	5.0	11	13	18	23				Dense, brown fine to coarse SAND and SILT, little fine to coarse Gravel
10		3	SS	1	0	10.0	100/1"							Very dense, no recovery
15		C-1	C	60	55	15.0	[REC= 92%; RQD= 82%]				4		15.0 Bedrock 846.3	Good quality, gray, GNEISS
											5			
											5			
											5			
											5			
20													20.0 Bottom 841.3 of Exploration at 20.0 ft	
25														
30														

Remarks

Auger refusal at a depth of 15 feet. Bedrock cored 15 to 20 feet.
Observation well installed to a depth of 17 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 7 to 17 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; D = Driven, G = Grab; PS = Piston Sample; SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube, V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used Trace = 1-10%, Little = 10-20%; Some = 20-35%, And = 35-50%

Boring No.: S-6

GEODESIGN INCORPORATED
Geotechnical Engineers and Environmental Consultants
984 Southford Road
Middlebury, Connecticut 06762
Telephone: 203-758-8836 Fax: 203-758-8842

BORING LOG

Project Name: Patterson Crossing Hydrogeological Investigation Patterson and Kent, New York

Boring No.: S-7
Page No.: 1 of 1
File No.: 664-01
Checked By: ULF

Boring Company	General Borings Inc		
Foreman	Rick Posa		
GeoDesign Rep.	Jeff Buckley		
Date Started	April 25, 2005	Date Finished	April 26, 2005
N. Coordinate		E. Coordinate	
Ground Surface Elevation (feet):	882.11		
Station		Offset	ft

	Casing	Sampler
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall	NA	30 in.
Rig Type	Diedrich D-47	
Hammer Type	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev (ft)	Notes
▼	5/9/05	9.4	872.7	
▼				
▼				
▼				

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Sample Description (Classification System: Burmister)
		1	SS	24	6	0.0	1	2	2	2			Topsoil	Loose, brown fine to medium SAND and SILT, trace Roots
													2.0 Glacial Till 880.1	
5		2	SS	24	18	5.0	9	10	10	13				Medium dense, brown fine to medium SAND, some Silt, trace fine Gravel
10		3	SS	5	5	10.0	100/5"							Very dense, brown fine to medium SAND, some Silt, trace fine Gravel (fractured cobble/boulder fragments in tip)
													14.0 Bedrock 868.1	
15		C-1	C	60	50	14.0	[REC= 83%; RQD= 60%]				14			Gray/white GNEISS with Quartz
											15			
											13			
											14			
											14			
20		C-2	C	60	55	19.0	[REC= 92%; RQD= 77%]				12			Gray/white GNEISS with Quartz
											13			
											15			
											15			
											18			
25													24.0 Bottom 858.1 of Exploration at 24.0 ft	
30														

Remarks: Auger refusal at a depth of 14 feet. Bedrock cored 14 to 24 feet.
Observation well installed to a depth of 23 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 13 to 23 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)

Notes: 1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; D = Driven, G = Grab; PS = Piston Sample: SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube; V = Vane, WOR/H = Weight of Rod/Hammer
4) Proportions Used. Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Boring No.: S-7

GEODESIGN INCORPORATED

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.:	S-8
Page No.:	1 of 1
File No.:	664-01
Checked By:	ULF

Boring Company	General Borings Inc		
Foreman:	Erik Delpriore		
GeoDesign Rep.:	Jeff Buckley		
Date Started:	April 26, 2005	Date Finished:	April 27, 2005
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	893.57		
Station:		Offset:	ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	Diedrich D-50	
Hammer Type:	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev (ft)	Notes
▼	5/9/05	24.7	868.8	
▼				
▼				
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation(feet))	Symbol	Sample Description (Classification System: Burmister)
		1	SS	24	14	0.0	1	1	1	3			1.0 Topsoil		Very loose, dark brown SILT and fine SAND, trace (-) Roots
													Glacial Till 892.5		
5															
		2	SS	24	19	5.0	4	7	7	13					Medium dense, olive brown CLAYEY SILT and fine to coarse SAND, trace fine Gravel
10															
		3	SS	24	17	10.0	22	30	35	29					Very dense, olive brown SILT and fine to medium SAND, little fine to coarse Gravel
15															
		4	SS	24	19	15.0	44	43	31	35					Very dense, olive brown fine to medium SAND and SILT, trace fine Gravel
20															
		5	SS	24	18	20.0	14	20	22	27					Dense, gray/brown fine to medium SAND, some Silt, little fine to coarse Gravel
25													25.0 ▼		
		C-1	C	30	15	25.0					4		Boulder 868.5		Cored through Boulder
											4				
											2/0.5'		27.5		
													Glacial Till 866.0		
30													30.0		
		C-2	C	60	51	30.0	[REC= 85%; RQD= 72%]				4		Bedrock 863.5		Gray GNEISS
											5				
											5				
											5				
35											4		35.0		
													Bottom 858.5 of Exploration at 35.0 ft		

Remarks:
Occasional cobbles inferred throughout the glacial till strata, based on observed difficulty in auger advancement.
Auger refusal at a depth of 30 feet. Bedrock cored 30 to 35 feet.
Observation well installed to a depth of 34.5 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 24.5 to 34.5 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)
Falling head test performed in test boring, with a wick from 23.5 to 27 feet below grade.

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made AC = After coring; NR = Not Recorded
3) Abbreviations: A = Auger; C = Core; D = Driven, G = Grab, PS = Piston Sample; SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube; V = Vane, WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%; And = 35-50%

Boring No.: **S-8**

GEODESIGN INCORPORATED
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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-9

File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc				
Foreman:	Erik Delpriore				
GeoDesign Rep.	Jeff Buckley				
Date Started	April 26, 2005	Date Finished:	April 29, 2005		
N Coordinate:		E. Coordinate:			
Ground Surface Elevation (feet):	894.74				
Station:		Offset:	ft		

	Casing	Sampler
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall	NA	30 in.
Rig Type	Diedrich D-50	
Hammer Type	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev. (ft)	Notes
▼	5/9/05	2.2	892.5	
▼				
▼				
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
		1	SS	24	20	0.0	1	1	1	2			Topsoil; 1.0 Glacial Till 893.7; ▼	Very loose, dark brown fine to medium SAND and SILT, trace Roots/Leaves
5		2	SS	24	15	5.0	10	12	13	17				Medium dense, brown CLAYEY SILT and fine to coarse SAND
10		3	SS	24	14	10.0	10	10	15	18				Medium dense, brown SILT and fine to coarse SAND, trace fine Gravel
15		4	SS	24	11	15.0	13	21	35	40				Very dense, brown fine to medium SAND and SILT, little fine Gravel
20		5	SS	24	16	20.0	18	25	29	34				Very dense, brown SILT and fine to medium SAND, trace fine Gravel
25		6	SS	24	21	25.0	20	21	34	50				Very dense, brown fine to medium SAND and SILT, trace fine Gravel
30														

Remarks

Auger refusal at a depth of 33 feet on inferred top of bedrock.
Observation well installed to a depth of 33 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 23 to 33 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)
Falling head test performed in bore hole with a three foot long wick from 17 to 20 feet.

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger, C = Core; D = Driven; G = Grab, PS = Piston Sample, SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: S-9

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-9

File No.: 664-01
Checked By: ULF

Boring Company: General Borings Inc
Foreman: Erik Delpriore
GeoDesign Rep: Jeff Buckley
Date Started: April 26, 2005 Date Finished: April 29, 2005
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 894.74
Station: Offset: ft

	Casing	Sampler
Type	H.S.A.	SS
I.D	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall	NA	30 in.
Rig Type.	Diedrich D-50	
Hammer Type:	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05	2.2	892.5	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System Burmister
		7	SS	24	17	30.0	24	29	36	53			Glacial Till *(Continued)* 33.0		Very dense, brown fine SAND and SILT, little fine Gravel
35													Bottom 861.7 of Exploration at 33.0 ft		
40															
45															
50															
55															
60															

Remarks

Notes: 1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made AC = After coring, NR = Not Recorded
3) Abbreviations: A = Auger, C = Core; D = Driven, G = Grab. PS = Piston Sample; SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%; Some = 20-35%, And = 35-50%

Boring No.: S-9

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-9A
Page No.: 1 of 1
File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc
Foreman:	Rick Posa
GeoDesign Rep.:	Jeff Buckley
Date Started:	May 9, 2005
Date Finished:	May 9, 2005
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	894.5
Station	
Offset:	ft

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05			Dry to 15 ft.

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation(feet))	Sample Description (Classification System: Burmister)
													Topsoil	
													1.0 Glacial Till 893.5	
5														
10														
15													15.0 Bottom 879.5 of Exploration at 15.0 ft	
20														
25														
30														

Remarks: Samples not taken in boring. Augers advanced to a depth of 15 feet, where an observation well was installed. Soil lithology inferred from observed auger cuttings.
Observation well installed to a depth of 15 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 5 to 15 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)

Notes
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded
3) Abbreviations: A = Auger, C = Core, D = Driven; G = Grab; PS = Piston Sample, SS = Split Spoon. SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%, Some = 20-35%; And = 35-50%

Boring No.: S-9A

BORING LOG

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Project Name: Patterson Crossing Hydrogeological Investigation Patterson and Kent, New York

Boring No.: S-10
Page No.: 1 of 2
File No.: 664-01
Checked By: ULF

Boring Company: General Borings Inc
Foreman: Rick Posa
GeoDesign Rep.: Jeff Buckley
Date Started: April 26, 2005 Date Finished: April 27, 2005
N Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 886.0
Station: Offset: ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type	Diedrich D-47	
Hammer Type	Safety	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
5/9/05	10.9	875.1	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0-6	Blows 6-12	Blows 12-18	Blows 18-24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System Burmister)
		1	SS	24	8	0.0	1	1	2	4			Topsoil	Very loose, dark brown fine to medium SAND, some Silt, trace Roots
													2.0 Glacial Till 884.0	
5		2	SS	24	18	5.0	4	4	7	9				Medium dense, olive brown fine to medium SAND and SILT
10		3	SS	24	10	10.0	5	7	10	10				Medium dense, olive brown fine to medium SAND and SILT
15		4	SS	24	21	15.0	9	14	17	19				Dense, olive brown SILT and fine to coarse SAND, trace fine Gravel
													17.5 Boulder 868.5	
													19.0 Glacial Till 867.0	
20		5	SS	24	15	20.0	11	14	18	21				Dense, olive brown fine to medium SAND, some Silt, trace fine Gravel
25		6	SS	15	12	25.0	9	58	100/3"					Very dense, olive brown fine to medium SAND and SILT, trace fine Gravel
		C-1	C	60		26.5					5		26.5 Bedrock 859.5	GNEISS? (see remarks below)
											5			
30											5			

Remarks

Auger refusal at a depth of 26.5 feet. Bedrock cored from 26.5 feet to 31.5 feet. During removal of core barrel from hole, rock sample fell from core barrel and was lost in borehole. As a result, bedrock could not be classified.
An observation well was installed to a depth of 25 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 15 to 25 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)
Falling head test performed in bore hole with a two foot long wick from 16 to 18 feet.

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger, C = Core, D = Driven; G = Grab, PS = Piston Sample, SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube, V = Vane, WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%; And = 35-50%

Boring No.: S-10

GEODESIGN INCORPORATED

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-10
Page No.: 2 of 2
File No.: 664-01
Checked By: ULF

Boring Company	General Borings Inc		
Foreman	Rick Posa		
GeoDesign Rep.	Jeff Buckley		
Date Started:	April 26, 2005	Date Finished:	April 27, 2005
N Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	886.0		
Station:		Offset:	ft

	Casing:	Sampler:
Type	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05	10.9	875.1	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation(feet))	Symbol	Sample Description (Classification System: Burmister)
											5		Bedrock *(Continued)*		
											5		31.5		
													Bottom 854.5 of Exploration at 31.5 ft		
35															
40															
45															
50															
55															
60															

Remarks

Notes: 1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made AC = After coring; NR = Not Recorded
3) Abbreviations: A = Auger; C = Core, D = Driven; G = Grab, PS = Piston Sample, SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: S-10

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-11
Page No.: 1 of 2
File No.: 664-01
Checked By: ULF

Boring Company	General Borings Inc		
Foreman	Rick Posa		
GeoDesign Rep.	Jeff Buckley		
Date Started:	April 27, 2005	Date Finished:	April 28, 2005
N Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	886.99		
Station:		Offset:	ft

	Casing	Sampler
Type	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall	NA	30 in.
Rig Type	Diedrich D-47	
Hammer Type	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05	10.2	876.8	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
		1	SS	24	9	0.0	1	1	2	2			Topsoil; 1.0 Glacial Till 886.0	Very loose, dark brown fine to medium SAND and SILT, trace (-) Roots
5		2	SS	24	15	5.0	4	6	8	12				Medium dense, fine to medium SAND, some Silt, trace fine Gravel
10		3	SS	24	20	10.0	7	11	17	21				Medium dense, brown SILT and fine to coarse SAND, trace fine Gravel
15		4	SS	0	0	15.0	100/0"							No recovery (inferred boulder/cobble)
20		5	SS	9	9	20.0	16	100/3"						Very dense, brown SILT and fine to medium SAND, trace fine Gravel
25		6	SS	24	18	25.0	9	12	16	17				Medium dense, brown SILT and fine to medium SAND, trace fine Gravel
30														

Remarks

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made AC = After coring; NR = Not Recorded.
3) Abbreviations. A = Auger; C = Core; D = Driven, G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon. ST = Shelby Tube, V = Vane, WOR/H = Weight of Rod/Hammer
4) Proportions Used Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: S-11

GEODESIGN INCORPORATED
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Middlebury, Connecticut 06762
Telephone: 203-758-8836 Fax: 203-758-8842

BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc
Foreman	Rick Posa
GeoDesign Rep.	Jeff Buckley
Date Started:	April 27, 2005
Date Finished:	April 28, 2005
N. Coordinate	
E. Coordinate:	
Ground Surface Elevation (feet):	886.99
Station	
Offset:	ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall.	NA	30 in.
Rig Type:	Diedrich D-47	
Hammer Type	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev. (ft)	Notes
▼	5/9/05	10.2	876.8	
▼				
▼				
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Sample Description (Classification System: Burmister)
		7	SS	24	24	30.0	8	10	13	17			Glacial Till *(Continued)*	Medium dense, brown SILT and fine to medium SAND, trace fine Gravel
35														
		8	SS	24	15	35.0	20	24	25	29				Dense, brown fine to medium SAND and SILT, trace fine Gravel
40														
		9	SS	9	4	40.0	28	100/3"						Very dense, brown fine to medium SAND and SILT, trace fine Gravel
45														
		10	SS	24	24	45.0	10	14	19	21				Dense, brown fine to medium SAND and SILT, trace fine Gravel
													49.0	
50													Bottom 838.0 of Exploration at 49.0 ft	
55														
60														

Remarks

Auger refusal at a depth of 49 feet. (Inferred top of bedrock)
Observation well installed to a depth of 49 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 39 to 49 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)
Falling head test performed in bore hole with a wick from 18 to 20 feet.

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded
3) Abbreviations. A = Auger; C = Core, D = Driven, G = Grab; PS = Piston Sample; SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used Trace = 1-10%, Little = 10-20%; Some = 20-35%, And = 35-50%

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-12

File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc
Foreman:	Erik Delpriore
GeoDesign Rep.:	Jeff Buckley
Date Started:	April 27, 2005
Date Finished:	April 28, 2005
N Coordinate:	
E Coordinate:	
Ground Surface Elevation (feet):	892.33
Station:	
Offset:	ft

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	Diedrich D-50	
Hammer Type:	Safety	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
5/9/05	16.9	875.4	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0-6	Blows 6-12	Blows 12-18	Blows 18-24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
		1	SS	24	24	0.0	2	2	4	7			Topsoil; 1.0 Glacial Till 891.3	Loose, brown fine to medium SAND and SILT, trace Roots
5		2	SS	24	18	5.0	9	20	29	45				Dense, brown fine to coarse SAND, some Silt, trace fine Gravel
10		3	SS	17	14	10.0	13	17	100/5"					Very dense, brown fine to coarse SAND, some Silt, trace fine Gravel
15		4	SS	1	0	15.0	100/1"						15.0 Boulder/ Cobble 877.3; 17.5 Glacial Till 874.8	No recovery
20		5	SS	24	6	20.0	27	31	35	40				Very dense, brown fine to medium SAND and SILT, trace fine Gravel
25		6	SS	24	20	25.0	20	23	35	36				Very dense, brown SILT and fine to coarse SAND, trace fine Gravel
30														

Remarks

Notes: 1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made AC = After coring; NR = Not Recorded.
3) Abbreviations. A = Auger; C = Core; D = Driven, G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube, V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used Trace = 1-10%, Little = 10-20%; Some = 20-35%, And = 35-50%

Boring No.: S-12

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: **S-12**

File No.: 664-01
Checked By: ULF

Boring Company	General Borings Inc				
Foreman	Erik Delpriore				
GeoDesign Rep.:	Jeff Buckley				
Date Started:	April 27, 2005	Date Finished:	April 28, 2005		
N. Coordinate		E. Coordinate:			
Ground Surface Elevation (feet):	892.33				
Station:		Offset:	ft		

	Casing	Sampler
Type:	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type	Diedrich D-50	
Hammer Type	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05	16.9	875.4	

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min/ft)	Moisture Content (%)	Strata Description (Depth & Elevation(feet))	Sample Description (Classification System: Burmister)
		7	SS	24	18	30.0	24	24	32	41			Glacial Till *(Continued)*	Very dense, brown SILT and fine to medium SAND, trace fine Gravel
													34.5	
35		C-1	C	60	56	34.5	[REC= 93%; RQD= 52%]				4		Bedrock 857.8	Fair Quality, gray, GNEISS
											4			
											4			
											4			
											4		39.5	
40													Bottom 852.8 of Exploration at 39.5 ft	
45														
50														
55														
60														

Remarks

Auger refusal at a depth of 34.5 feet. Bedrock cored from 34.5 to 39.5 feet.
Observation well installed to a depth of 39 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 29 to 39 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)
Falling head test performed in bore hole with a wick from 23 to 25 feet.

Notes
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations. A = Auger, C = Core, D = Driven; G = Grab; PS = Piston Sample, SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%; And = 35-50%

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-13
Page No.: 1 of 2
File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc
Foreman:	Rick Posa
GeoDesign Rep.:	Jeff Buckley
Date Started:	April 28, 2005
Date Finished:	April 29, 2005
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	888.26
Station:	Offset: ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev (ft)	Notes
▼	5/9/05	2.2	886.0	
▼				
▼				
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0-6	6-12	12-18	18-24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Sample Description Classification System Burmister
		1	SS	24	10	0.0	1	1	2	1			Topsoil; 1.0 Glacial Till 887.2	Very loose, dark brown fine SAND and SILT, trace Roots
5		2	SS	24	12	5.0	6	11	14	19				Medium dense, brown fine to medium SAND, some Silt, trace fine Gravel
10		3	SS	24	18	10.0	15	17	17	19				Dense, brown fine to medium SAND and SILT, little fine to coarse Gravel
15		4	SS	24	24	15.0	9	14	19	21				Dense, brown fine to medium SAND and SILT, trace fine Gravel
20		5	SS	24	12	20.0	3	9	11	12				Medium dense, gray/brown fine to medium SAND and SILT, trace fine Gravel
25		6	SS	24	24	25.0	6	10	12	13				Medium dense, gray/brown SILT and fine to coarse SAND, trace coarse Gravel
30														

Remarks

Notes
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; D = Driven; G = Grab, PS = Piston Sample; SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon, ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%, And = 35-50%

Boring No.: S-13

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-13
Page No.: 2 of 2
File No.: 664-01
Checked By: ULF

Boring Company: General Borings Inc
Foreman: Rick Posa
GeoDesign Rep.: Jeff Buckley
Date Started: April 28, 2005 Date Finished: April 29, 2005
N. Coordinate: E Coordinate:
Ground Surface Elevation (feet): 888.26
Station: Offset: ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.	NA	140 lbs
Hammer Fall.	NA	30 in.
Rig Type:	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

	Date	Depth (ft)	Elev. (ft)	Notes
▼	5/9/05	2.2	886.0	
▼				
▼				
▼				

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min/ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
		7	SS	24	24	30.0	16	27	38	41			Glacial Till *(Continued)*	Very dense, gray/brown SILT and fine SAND, little fine Gravel
													33.0 Boulder 855.2	
35														
													36.0 Glacial Till 852.2	
40														
													41.0 Bottom of Exploration at 41.0 ft 847.2	
45														
50														
55														
60														

Remarks

Initial auger refusal at a depth of 33 feet. Cored through a boulder from 33 to 36 feet. Roller bit advanced through a boulder to refusal at a depth of 41 feet (inferred top of bedrock).
Observation well installed to a depth of 31 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 21 to 31 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)
Falling head test performed in borehole, with a wick from 23 to 25 feet below grade.

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded
3) Abbreviations: A = Auger; C = Core, D = Driven, G = Grab, PS = Piston Sample; SS = Split Spoon, SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube, V = Vane, WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Boring No.: S-13

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BORING LOG

Project Name

Patterson Crossing
Hydrogeological Investigation
Patterson and Kent, New York

Boring No.: S-13A
Page No.: 1 of 1
File No.: 664-01
Checked By: ULF

Boring Company:	General Borings Inc		
Foreman:	Rick Posa		
GeoDesign Rep	Jeff Buckley		
Date Started:	May 9, 2005	Date Finished:	May 9, 2005
N Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	888.0		
Station:		Offset:	ft

	Casing	Sampler
Type:	H.S.A.	SS
I.D.	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	Diedrich D-47	
Hammer Type:	Safety	

Groundwater Observations

Date	Depth (ft)	Elev (ft)	Notes
5/9/05			Dry to 15 ft.

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description (Depth & Elevation (feet))	Symbol	Sample Description (Classification System: Burmister)
													Topsoil		
													1.0 Glacial Till 887.0		
5															
10															
15													15.0 Bottom 873.0 of Exploration at 15.0 ft		
20															
25															
30															

Remarks: Samples not taken in boring. Augers advanced to a depth of 15 feet, where an observation well was installed. Soil lithology inferred from observed auger cuttings.
Observation well installed to a depth of 15 feet below grade. (2-inch diameter PVC pipe, with a 10 foot long 0.01 inch slotted screen from 5 to 15 feet, with solid riser above. Filter sand placed around screen, and bentonite seal placed both above filter sand and 12 to 18 inches below ground surface.)

Notes:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring, NR = Not Recorded.
3) Abbreviations: A = Auger, C = Core; D = Driven, G = Grab, PS = Piston Sample, SS = Split Spoon; SSL = 3.5 Inch ID Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used. Trace = 1-10%, Little = 10-20%, Some = 20-35%, And = 35-50%

Boring No.: S-13A

Appendix 3 – Falling Head Test Data

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-1	**Driller:**	R. Posa
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	11/5/2004	**Weather:**	Cloudy, 40's

Ground surface El.:	883.0	(ft.)	Depth to Top of Wick:	28.0	(ft.)	Length of Wick (L):	2.0	(ft.)
Top of Casing El.:	885.0	(ft.)	Depth to Bottom of Wick:	30.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	855.0	(ft.)						
			Depth to Groundwater:	24.0		ln(L/R):	2.61844	
			Groundwater Elevation:	859.0		R^2/2L:	0.06380	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	312.0					
20	20	6.00		306.0	0.0194	**1.62E-04**	**6.87E-06**	**1.95E-02**

Notes:
1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured during drilling.

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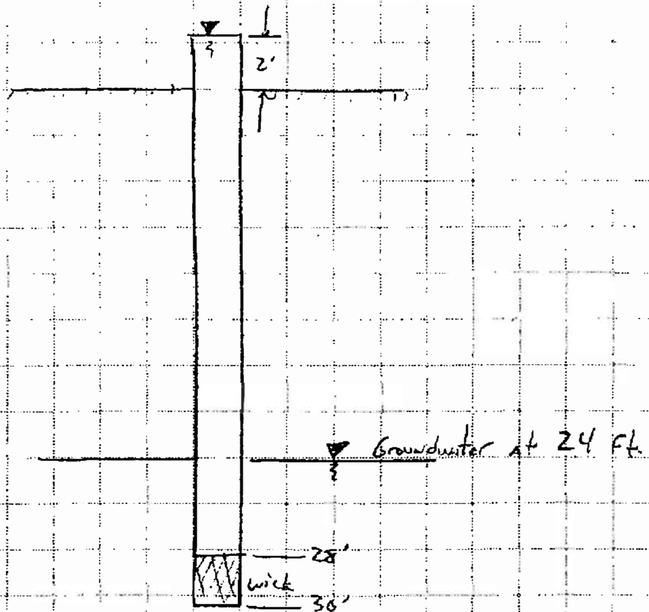
JOB Patterson Crossing 664-01
SHEET NO. ______ OF ______
CALCULATED BY JGB DATE ______
CHECKED BY ______ DATE ______
SCALE Falling Head Test

Falling Head Tests - South Area

GD-5-1



Casing ID = 3"
OD = 3.5" (wick diameter)

$$k = \left(\frac{R^2}{2L}\right)\left(\ln\left(\frac{L}{R}\right)\right)\left(\frac{\ln(h_1/h_2)}{(t_2-t_1)}\right)$$

R = wick radius = $\frac{3.5}{2}$ = 1.75"
L = wick length = 2' = 24"
h_1 = 26' × 12 = 312"
h_2 = (26' - 0.5') × 12 = 306"
t_1 = 0
t_2 = 20 min.

$k = 1.62 \times 10^{-4}$ in/min.
$= 6.86 \times 10^{-6}$ cm/sec
$= 1.94 \times 10^{-2}$ ft/day

Time	Measured Drop
0 min	0
7 min	3 in
14 min	5 in.
20 min.	6 in.

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-2	**Driller:**	R. Posa
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	11/4/2004	**Weather:**	Cloudy, 40's

Ground surface El.:	893.0	(ft.)	Depth to Top of Wick:	33.0	(ft.)	Length of Wick (L):	2.0	(ft.)
Top of Casing El.:	895.0	(ft.)	Depth to Bottom of Wick:	35.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	860.0	(ft.)						
			Depth to Groundwater:	24.4		ln(L/R):	2.61844	
			Groundwater Elevation:	868.6		R^2/2L:	0.06380	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	316.8					
20	20	6.00		310.8	0.0191	**1.60E-04**	**6.76E-06**	**1.92E-02**

Notes:
1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured during drilling.

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JOB Patterson Crossing 664-01

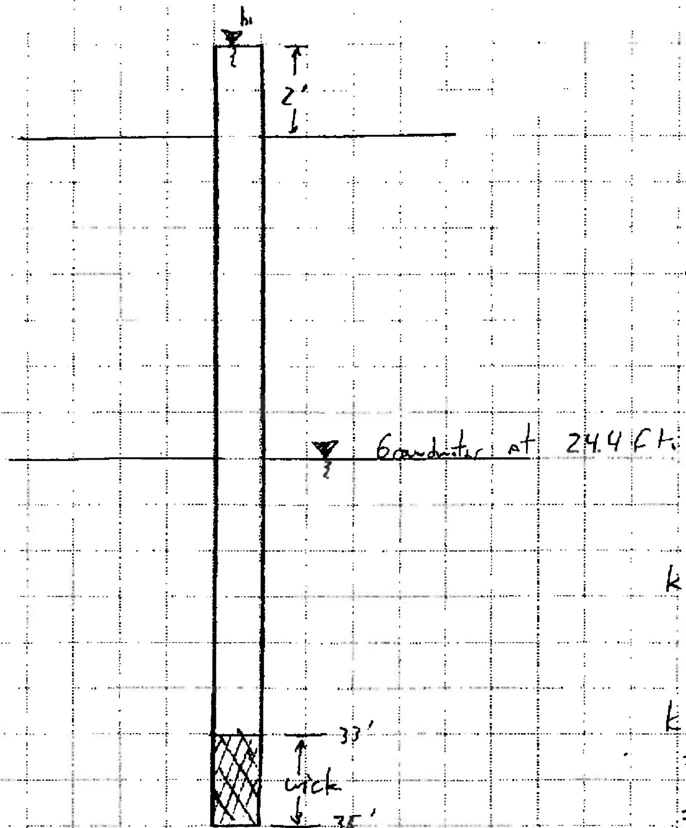
SHEET NO. ____ OF ____

CALCULATED BY JGB DATE ____

CHECKED BY ____ DATE ____

SCALE Falling Head Test

GD-5-2



Casing I.D. = 3"
O.D. = 3.5"

$R = 1.75"$
$L = 2' = 24"$
$h_1 = 26.4 \times 12 = 316.8"$
$h_2 = 25.9 \times 12 = 310.8"$
$t_1 = 0$
$t_2 = 20$ min.

$$k = \left(\frac{R^2}{2L}\right) \times \ln\left(\frac{L}{R}\right) \times \left(\frac{\ln\left(h_1/h_2\right)}{(t_2 - t_1)}\right)$$

$k = 1.60 \times 10^{-4}$ in/min
$= 6.76 \times 10^{-6}$ cm/sec.
$= 1.92 \times 10^{-2}$ ft/day

Time	Measured Drop
0	0
3	1 in.
5	2 in.
7	3 in.
10.5	4 in.
14	4.5 in.
20	6 in.

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-8	**Driller:**	E. Delpriore
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	4/27/2005	**Weather:**	Clear, 60's

Ground surface El.:	891.0	(ft.)	Depth to Top of Wick:	23.5	(ft.)	Length of Wick (L):	3.5	(ft.)
Top of Casing El.:	893.0	(ft.)	Depth to Bottom of Wick:	27.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	867.5	(ft.)						
			Depth to Groundwater:	24.7		ln(L/R):	3.17805	
			Groundwater Elevation:	866.3		R^2/2L:	0.03646	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	320.4					
60	60	24.00		296.4	0.0779	**1.50E-04**	**6.37E-06**	**1.80E-02**

Notes:
1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured in observation well after drilling was completed.

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JOB Patterson Crossing 664-01

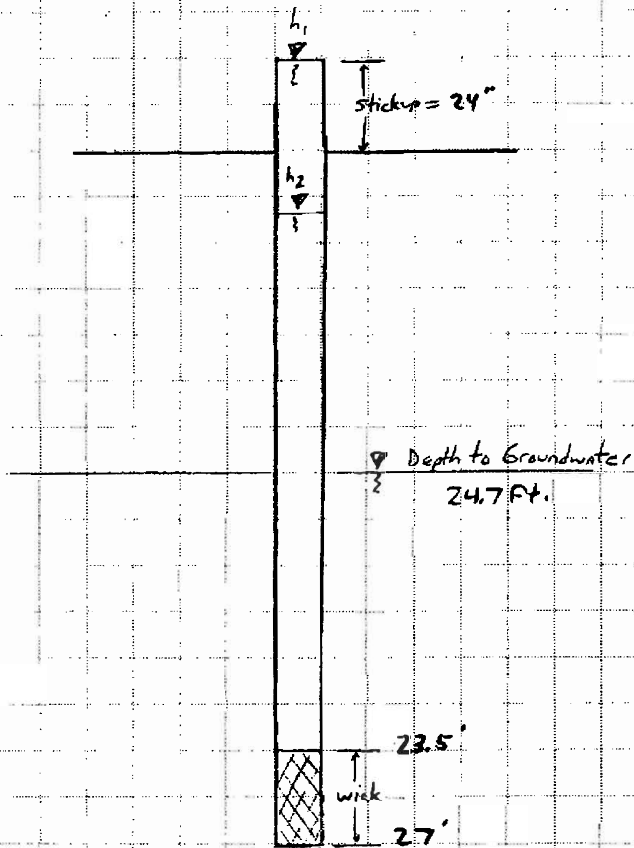
SHEET NO. ______ OF ______

CALCULATED BY JGB DATE 5/12/05

CHECKED BY ______ DATE ______

SCALE ______

Falling Head Test S-8 (4/27/05)



Casing I.D. = 3.25"
Casing O.D. = 3.50"

$R = 1.75"$
$L = 42"$
$h_1 = 320.4"$
$h_2 = 296.4"$
$t_1 = 0$
$t_2 = 60$ min.

Elapsed Time	Measured Drop
0	0
1 min	9"
3 min	12.5"
21 min	20"
30 min	21"
60 min	24"

$$k = \left(\frac{R^2}{2L}\right) \times \ln\left(\frac{L}{R}\right) \times \left(\frac{\ln(h_1/h_2)}{(t_2 - t_1)}\right)$$

$= 1.50 \times 10^{-4}$ in/min
$= 6.37 \times 10^{-6}$ cm/sec.
$= 1.80 \times 10^{-2}$ ft/day.

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-9	**Driller:**	E. Delpriore
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	4/29/2005	**Weather:**	Clear, 60's

Ground surface El.:	892.0	(ft.)	Depth to Top of Wick:	17.0	(ft.)	Length of Wick (L):	3.0	(ft.)
Top of Casing El.:	895.0	(ft.)	Depth to Bottom of Wick:	20.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	875.0	(ft.)						
			Depth to Groundwater:	2.2		ln(L/R):	3.02390	
			Groundwater Elevation:	889.8		R^2/2L:	0.04253	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	62.4					
45	45	17.00		45.4	0.3181	**9.09E-04**	**3.85E-05**	**1.09E-01**

Notes:

1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured in observation well after drilling was completed.

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984 SOUTHFORD ROAD • MIDDLEBURY, CT 06762
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JOB Patterson Crossing 664-01

SHEET NO. ______ OF ______

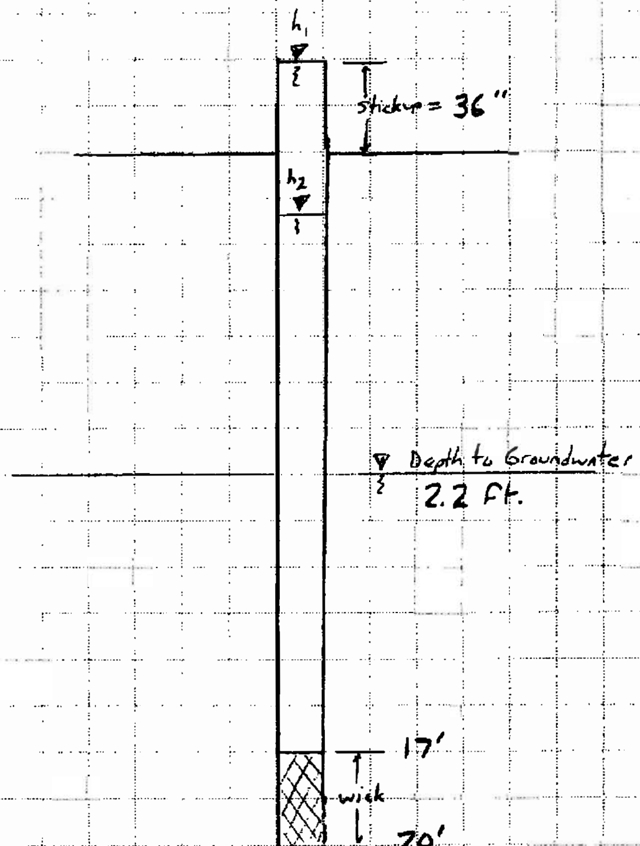
CALCULATED BY JGB DATE 5/12/05

CHECKED BY ______ DATE ______

SCALE ______

Falling Head Test

S-9



Casing I.D. = 3.25"
Casing O.D. = 3.50"

$R = 1.75"$
$L = 36"$
$h_1 = 62.4"$
$h_2 = 45.4$
$t_1 = 0$
$t_2 = 45 \text{ min}$

Elapsed Time	Measured Drop
0	0
2 min.	2"
45 min.	17"

$$k = \left(\frac{R^2}{2L}\right) \times \ln\left(\frac{L}{R}\right) \times \left(\frac{\ln\left(h_1/h_2\right)}{(t_2 - t_1)}\right)$$

$= 9.09 \times 10^{-4}$ in/min
$= 3.85 \times 10^{-5}$ cm/sec.
$= 1.09 \times 10^{-1}$ ft/day.

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-10	**Driller:**	R. Posa
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	4/27/2005	**Weather:**	Clear, 60's

Ground surface El.:	881.0	(ft.)	Depth to Top of Wick:	16.0	(ft.)	Length of Wick (L):	2.0	(ft.)
Top of Casing El.:	883.5	(ft.)	Depth to Bottom of Wick:	18.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	865.0	(ft.)						
			Depth to Groundwater:	10.9		ln(L/R):	2.61844	
			Groundwater Elevation:	870.1		R^2/2L:	0.06380	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	160.8					
60	60	23.00		137.8	0.1544	**4.30E-04**	**1.82E-05**	**5.16E-02**

Notes:

1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured in observation well after drilling was completed.

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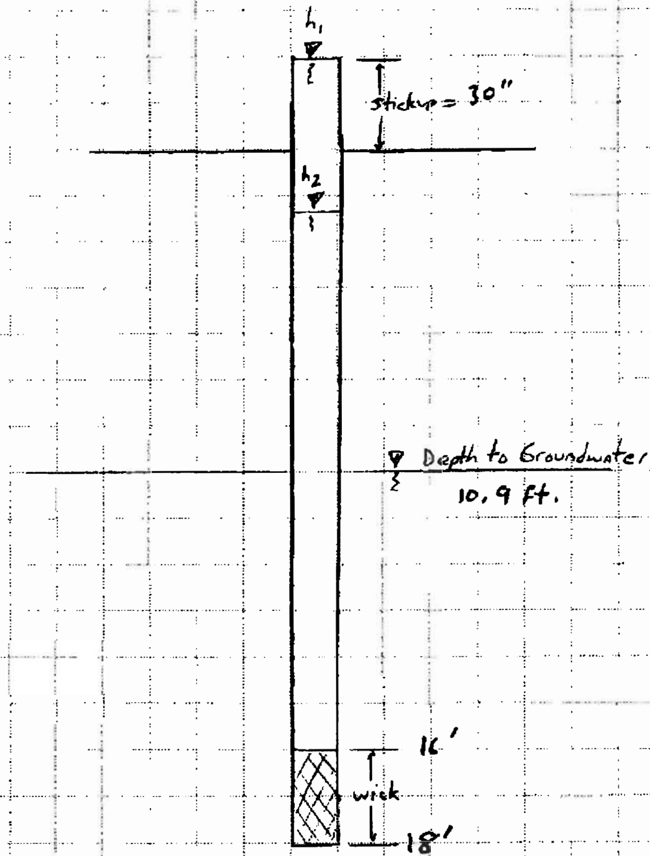
JOB Patterson Crossing 664-01
SHEET NO. ____ OF ____
CALCULATED BY JGB DATE 5/12/05
CHECKED BY ____ DATE ____
SCALE ____

Falling Head Test S-10 (4/27/05)



Casing I.D. = 3.25"
Casing O.D. = 3.50"

R = 1.75"
L = 24"
h_1 = 160.8"
h_2 = 137.8"
t_1 = 0
t_2 = 60 min

Elapsed Time	Measured Drop
0	0
5 min	12"
15 min	14"
20 min	16"
30 min	19"
60 min	23"

$$k = \left(\frac{R^2}{2L}\right) \times \ln\left(\frac{L}{R}\right) \times \left(\frac{\ln\left(h_1/h_2\right)}{(t_2 - t_1)}\right)$$

$= 4.30 \times 10^{-4}$ in/min
$= 1.82 \times 10^{-5}$ cm/sec
$= 5.16 \times 10^{-2}$ ft/day.

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-11	**Driller:**	R. Posa
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	4/27/2005	**Weather:**	Clear, 60's

Ground surface El.:	882.0	(ft.)	Depth to Top of Wick:	18.0	(ft.)	Length of Wick (L):	2.0	(ft.)
Top of Casing El.:	882.5	(ft.)	Depth to Bottom of Wick:	20.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	864.0	(ft.)						
			Depth to Groundwater:	10.2		ln(L/R):	2.61844	
			Groundwater Elevation:	871.8		R^2/2L:	0.06380	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	128.4					
80	80	4.00		124.4	0.0316	**6.61E-05**	**2.80E-06**	**7.93E-03**

Notes:

1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured in observation well after drilling was completed.

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JOB Patterson Crossing 664-01

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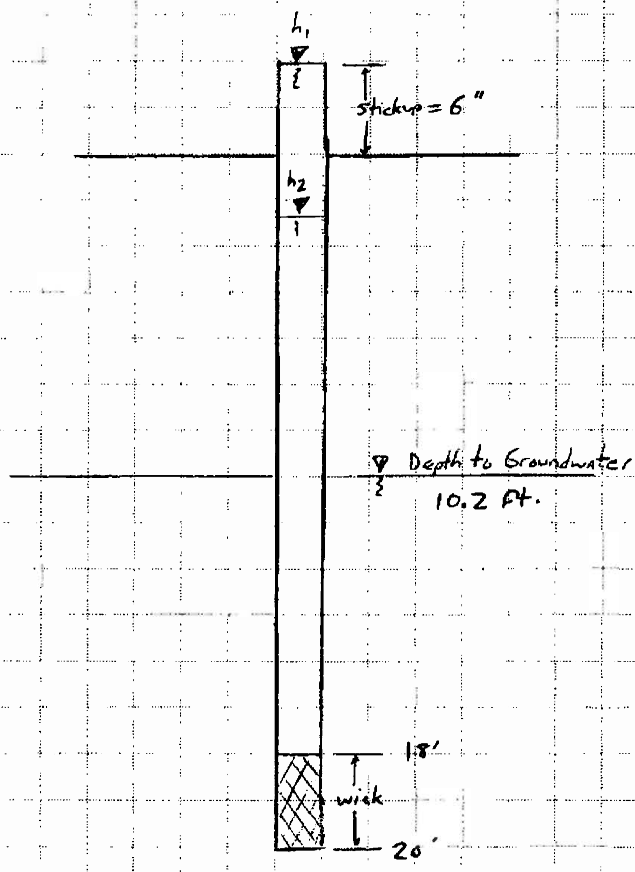
CALCULATED BY JGB DATE 5/12/05

CHECKED BY ______ DATE ______

SCALE ______

Falling Head Test S-11 (4/28/05)



Casing I.D. = 3.25"
Casing O.D. = 3.50"

$R = 1.75"$
$L = 24"$
$h_1 = 128.4$
$h_2 = 124.4$
$t_1 = 0$
$t_2 = 80$ min.

Elapsed Time	Measured Drop
0	0
5 min	1"
80 min	4"

$$k = \left(\frac{R^2}{2L}\right) \times \ln\left(\frac{L}{R}\right) \times \left(\frac{\ln\left(h_1/h_2\right)}{(t_2 - t_1)}\right)$$

$= 6.61 \times 10^{-5}$ in/min
$= 2.80 \times 10^{-6}$ cm/sec.
$= 7.93 \times 10^{-3}$ ft/day.

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-12	**Driller:**	E. Delpriore
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	4/28/2005	**Weather:**	Clear, 60's

Ground surface El.:	882.0	(ft.)	Depth to Top of Wick:	23.0	(ft.)	Length of Wick (L):	2.0	(ft.)
Top of Casing El.:	884.0	(ft.)	Depth to Bottom of Wick:	25.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	859.0	(ft.)						
			Depth to Groundwater:	16.9		ln(L/R):	2.61844	
			Groundwater Elevation:	865.1		R^2/2L:	0.06380	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	226.8					
40	40	20.00		206.8	0.0923	**3.86E-04**	**1.63E-05**	**4.63E-02**

Notes:
1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured in observation well after drilling was completed.

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JOB Patterson Crossing 664-01

SHEET NO. ______ OF ______

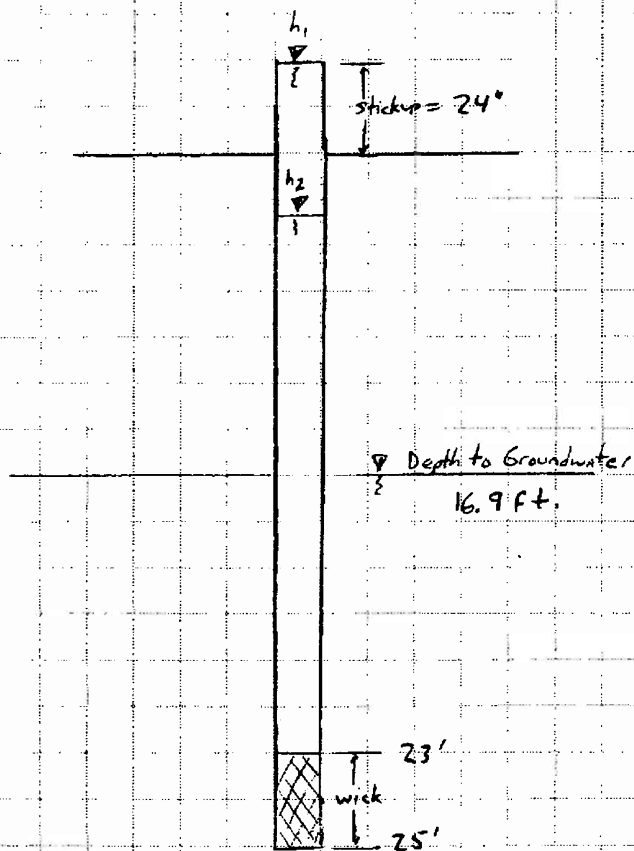
CALCULATED BY JGB DATE 5/12/05

CHECKED BY ______ DATE ______

SCALE ______

Falling Head Test

S-12 (4/28/05)



Casing I.D. = 3.25"

Casing O.D. = 3.50"

$R = 1.75"$

$L = 24"$

$h_1 = 226.8"$

$h_2 = 206.8"$

$t_1 = 0$

$t_2 = 40$ min

Elapsed Time	Measured Drop
0	0
1 min	5"
5 min	11"
10 min	13"
17 min	16"
40 min	20"

$$k = \left(\frac{R^2}{2L}\right) \times \ln\left(\frac{L}{R}\right) \times \left(\frac{\ln(h_1/h_2)}{(t_2 - t_1)}\right)$$

$= 3.86 \times 10^{-4}$ in/min

$= 1.63 \times 10^{-5}$ cm/sec.

$= 4.63 \times 10^{-2}$ ft/day.

Patterson Crossing

Patterson and Kent, New York

Calculation of Soil Permeability from Falling Head Test Data

Well No.:	S-13	**Driller:**	R. Posa
Test Type:	Falling Head	**Engineer:**	J. Buckley
Date:	4/29/2005	**Weather:**	Clear, 60's

Ground surface El.:	884.0	(ft.)	Depth to Top of Wick:	23.0	(ft.)	Length of Wick (L):	2.0	(ft.)
Top of Casing El.:	886.0	(ft.)	Depth to Bottom of Wick:	25.0	(ft.)	Radium of Wick (R):	0.15	(ft.)
Top of Wick El.:	861.0	(ft.)						
			Depth to Groundwater:	2.2		ln(L/R):	2.61844	
			Groundwater Elevation:	881.8		R^2/2L:	0.06380	(in.)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	k (in/min)	k (cm/sec)	k (ft/day)
0	0	0.00	50.4					
20	20	11.00		39.4	0.2462	**2.06E-03**	**8.71E-05**	**2.47E-01**

Notes:

1. Ground surface elevations were interpolated from existing contours, and are approximate.
2. Groundwater levels were measured in observation well after drilling was completed.

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JOB Patterson Crossing 664-01

SHEET NO. ____ OF ____

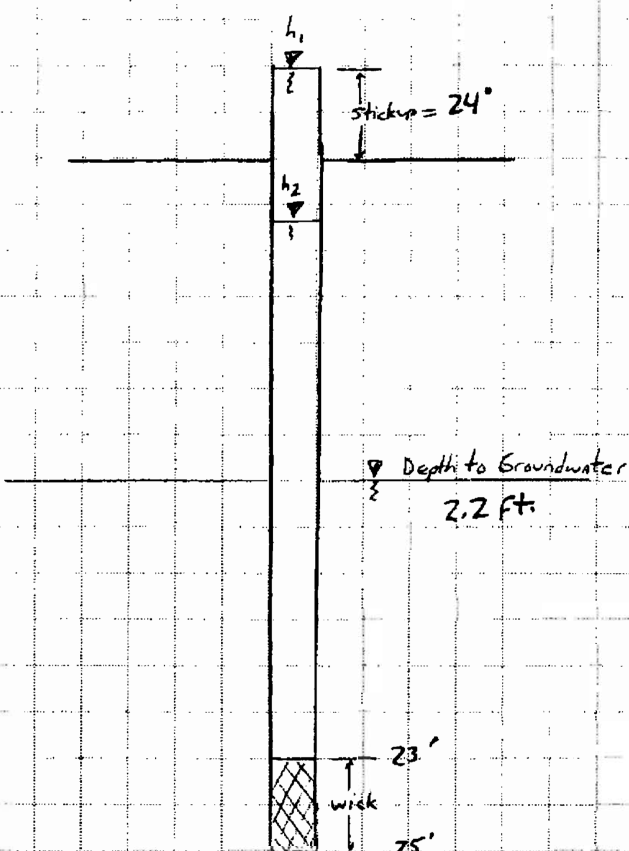
CALCULATED BY JGB DATE 5/12/05

CHECKED BY ____ DATE ____

SCALE ____

Falling Head Test

S-13 (4/29/05)



Casing I.D. = 3.25"
Casing O.D. = 3.50"

$R = 1.75''$
$L = 24''$
$h_1 = 50.4$
$h_2 = 39.4$
$t_1 = 0$
$t_2 = 20$ min.

Elapsed Time	Measured Drop
0	0
20 min	11"

$$k = \left(\frac{R^2}{2L}\right) \times \ln\left(\frac{L}{R}\right) \times \left(\frac{\ln\left(h_1/h_2\right)}{(t_2 - t_1)}\right)$$

$= 2.06 \times 10^{-3}$ in/min
$= 8.71 \times 10^{-5}$ cm/sec
$= 2.47 \times 10^{-1}$ ft/day.

Appendix 4 – Laboratory Gradation Test Results and Kozeny-Carman Analyses Summary

Kozeny - Carman Analyses
to Estimate Coefficient of Permability

Patterson Crossing
Patterson and Kent, New York

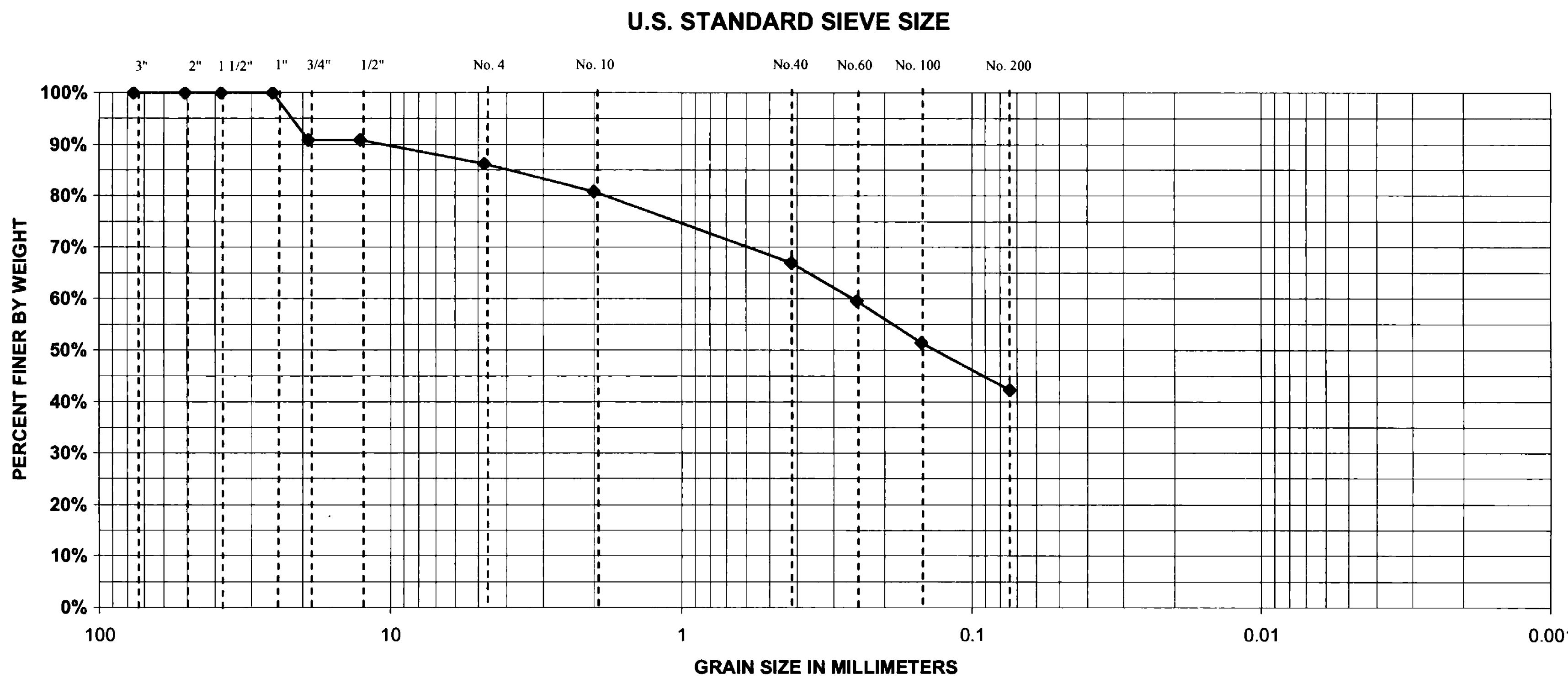
Area	Test Boring No.	Sample No.	Sample Depth (ft.)	D_{10} (mm)	SPT "N-value (blows / ft)	Descriptive Density	Relative Density (%)	in-situ void ratio e	in-situ porosity n	Coefficient of Permability k (cm/sec)	Coefficient of Permability k (ft/day)
South Area	S-4	S-3	10'-12'	0.008	30	Dense	65	0.395	0.28	1.33E-05	3.77E-02
	S-5	S-4	15'-17'	0.0025	55	Very dense	90	0.220	0.18	2.56E-07	7.27E-04
	S-6	S-2	5'-'7'	0.006	31	Dense	65	0.395	0.28	7.48E-06	2.12E-02
	S-8	S-3	10'-12'	0.005	65	Very dense	95	0.185	0.16	6.28E-07	1.78E-03
	S-9	S-2	5'-7'	0.0022	25	Medium dense	60	0.430	0.30	1.26E-06	3.59E-03
	S-9	S-3	10'-12'	0.0046	25	Medium dense	60	0.430	0.30	5.53E-06	1.57E-02
	S-10	S-4	15'-17'	0.003	31	Dense	65	0.395	0.28	1.87E-06	5.30E-03
	S-11	S-3	10'-12'	0.002	28	Medium dense	63	0.409	0.29	9.13E-07	2.59E-03
	S-12	S-6	25'-27'	0.0018	58	Very dense	85	0.255	0.20	2.01E-07	5.70E-04
	S-13	S-6	25'-27'	0.002	22	Medium dense	40	0.570	0.36	2.22E-06	6.29E-03

SPT (bl/ ft)	Descriptive Density	Relative Density (%)
0 to 4	Very loose	0 to 15
4 to 10	Loose	15 to 35
10 to 30	Medium Dense	35 to 65
30 to 50	Dense	65 to 85
50 +	Very dense	85 to 100

e_{min}	e_{max}
0.15	0.85

South Area	Minimum:	2.01E-07	5.70E-04
	Maximum:	1.33E-05	3.77E-02
	Average:	3.36.E-06	9.54.E-03

References:
1.) Lambe & Whitman p 30 and p 287 and attached Kozeny-Carman Discussion



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION TEST

Patterson Crossing

BORING NO.	S-4
SAMPLE NO.	S-3
DEPTH	10'-12'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
11 of 20	Test Boring Split Spoon Sample	Fine to coarse SAND and SILT, little fine to coarse Gravel

GeoDesign Inc.
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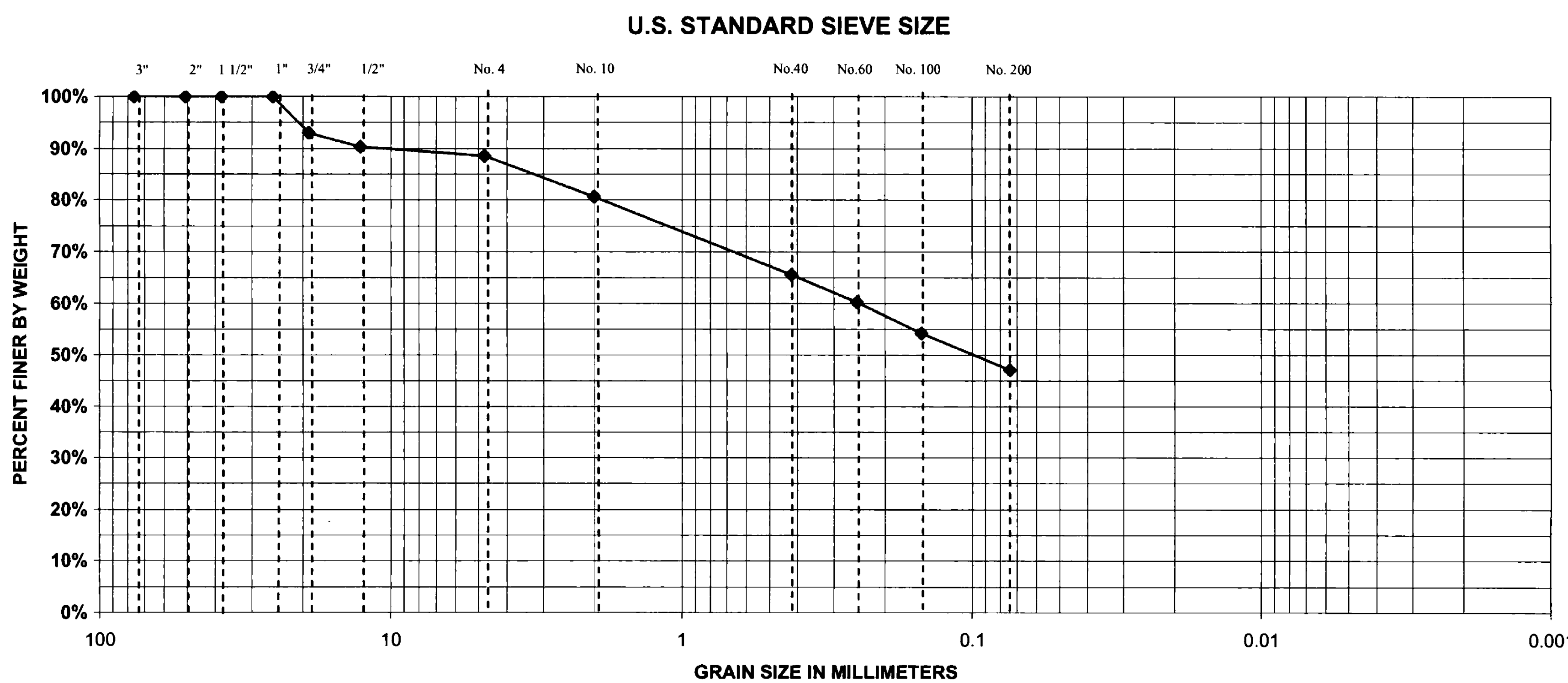
(203) 758 8836 (voice)
(203) 758 8842 (fax)
www.geodesign.net



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION TEST

Patterson Crossing

BORING NO.	S-5
SAMPLE NO.	S-4
DEPTH	15'-17'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
12 of 20	Test Boring Split Spoon Sample	SILT and fine to coarse SAND, little fine to coarse Gravel

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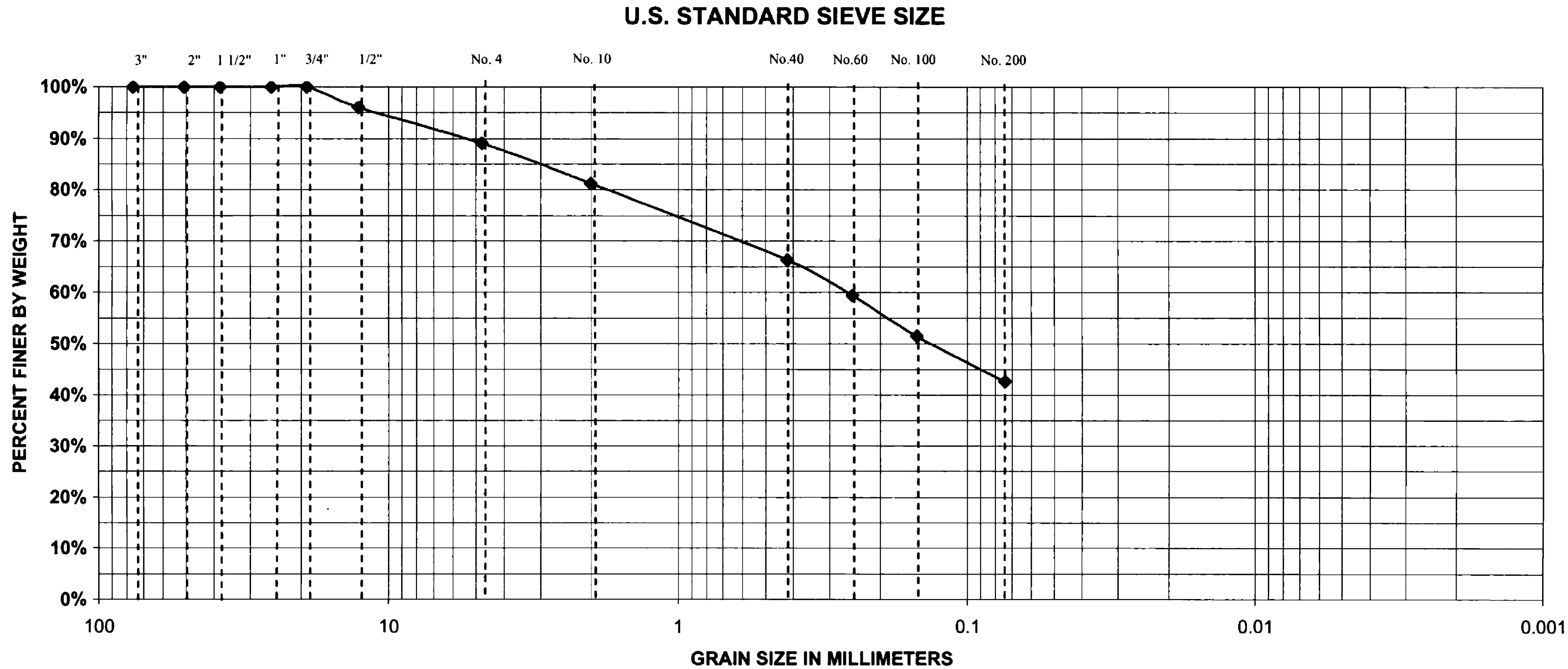

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION TEST

Patterson Crossing

BORING NO.	S-6
SAMPLE NO.	S-2
DEPTH	5'-7'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
13 of 20	Test Boring Split Spoon Sample	Fine to coarse SAND and SILT, little fine Gravel

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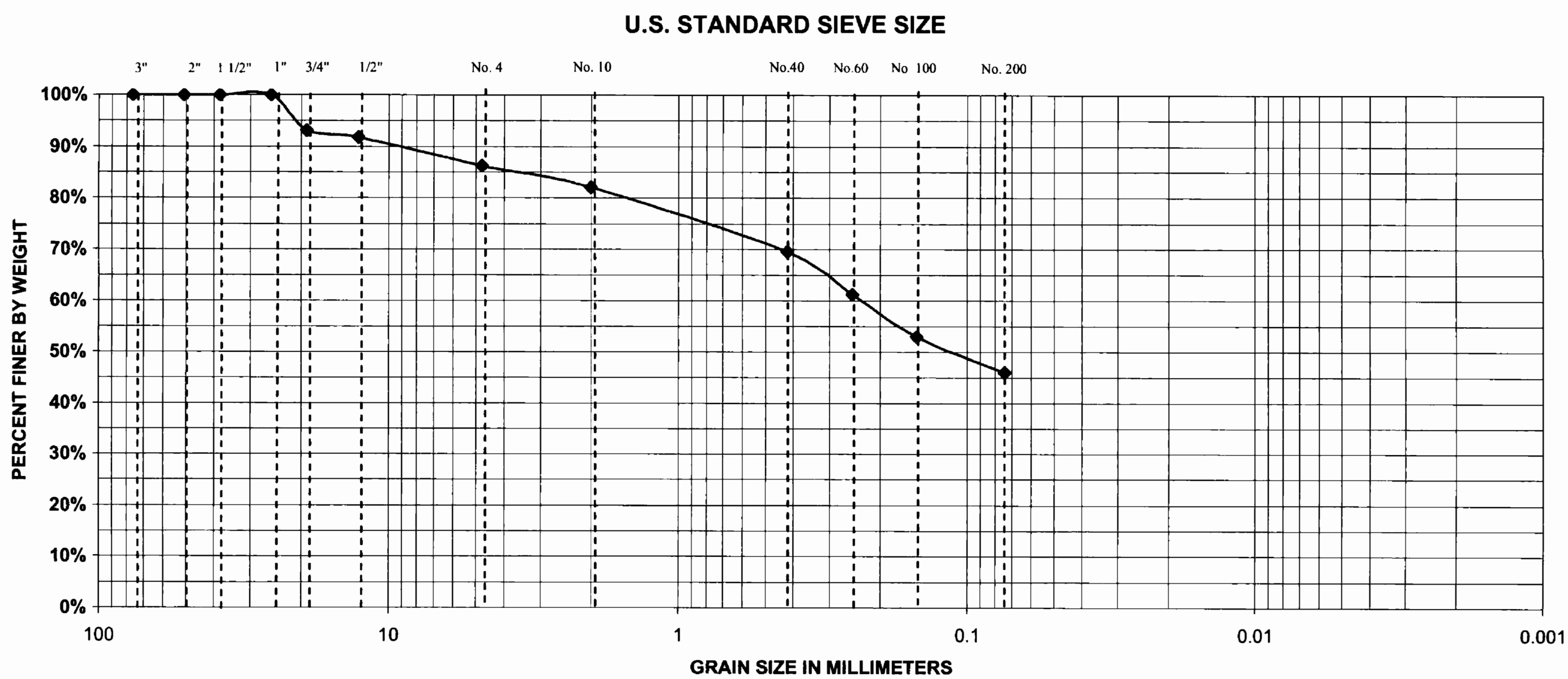

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION TEST

Patterson Crossing

BORING NO.	S-8
SAMPLE NO.	S-3
DEPTH	10'-12'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
14 of 20	Test Boring Split Spoon Sample	SILT and fine to medium SAND, little fine to coarse Gravel

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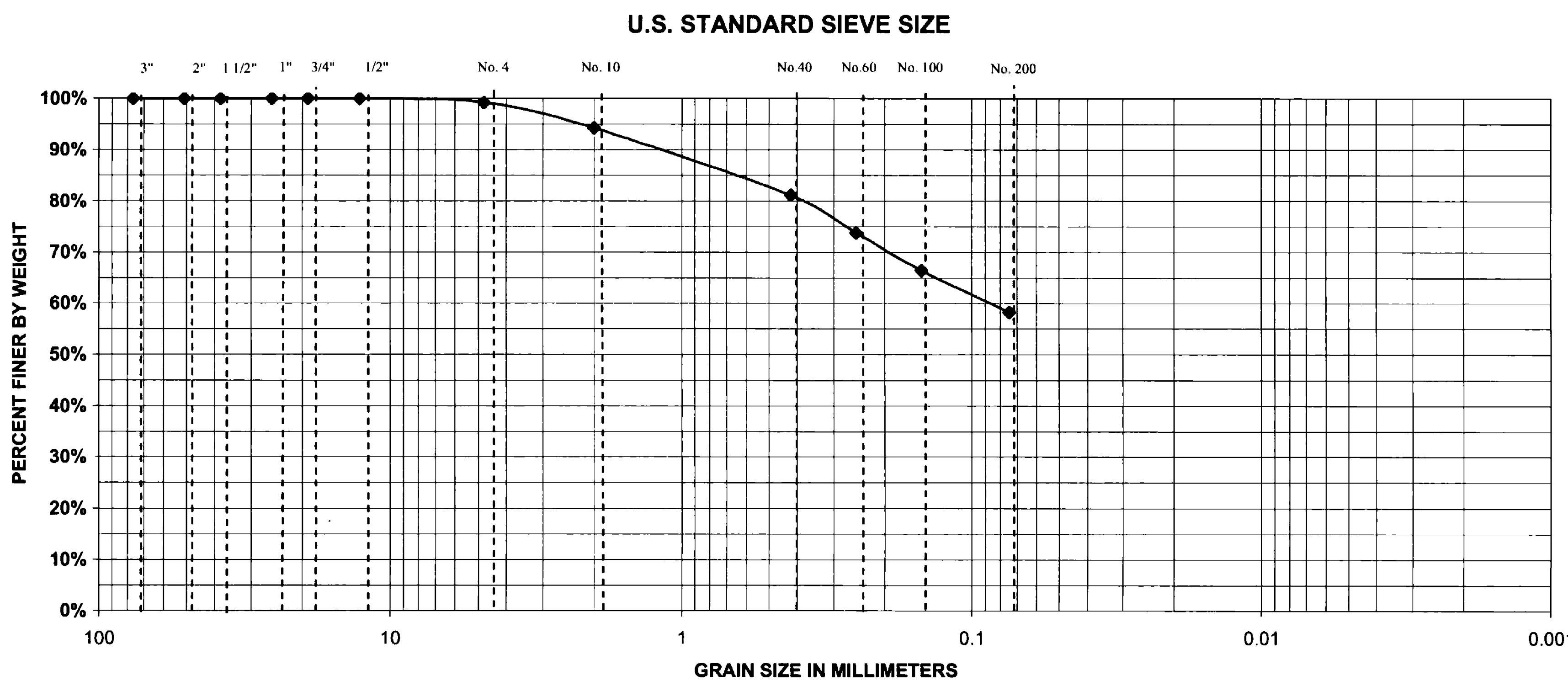

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION TEST

Patterson Crossing

BORING NO.	S-9
SAMPLE NO.	S-2
DEPTH	5'-7'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
15 of 20	Test Boring Split Spoon Sample	SILT and fine to coarse SAND

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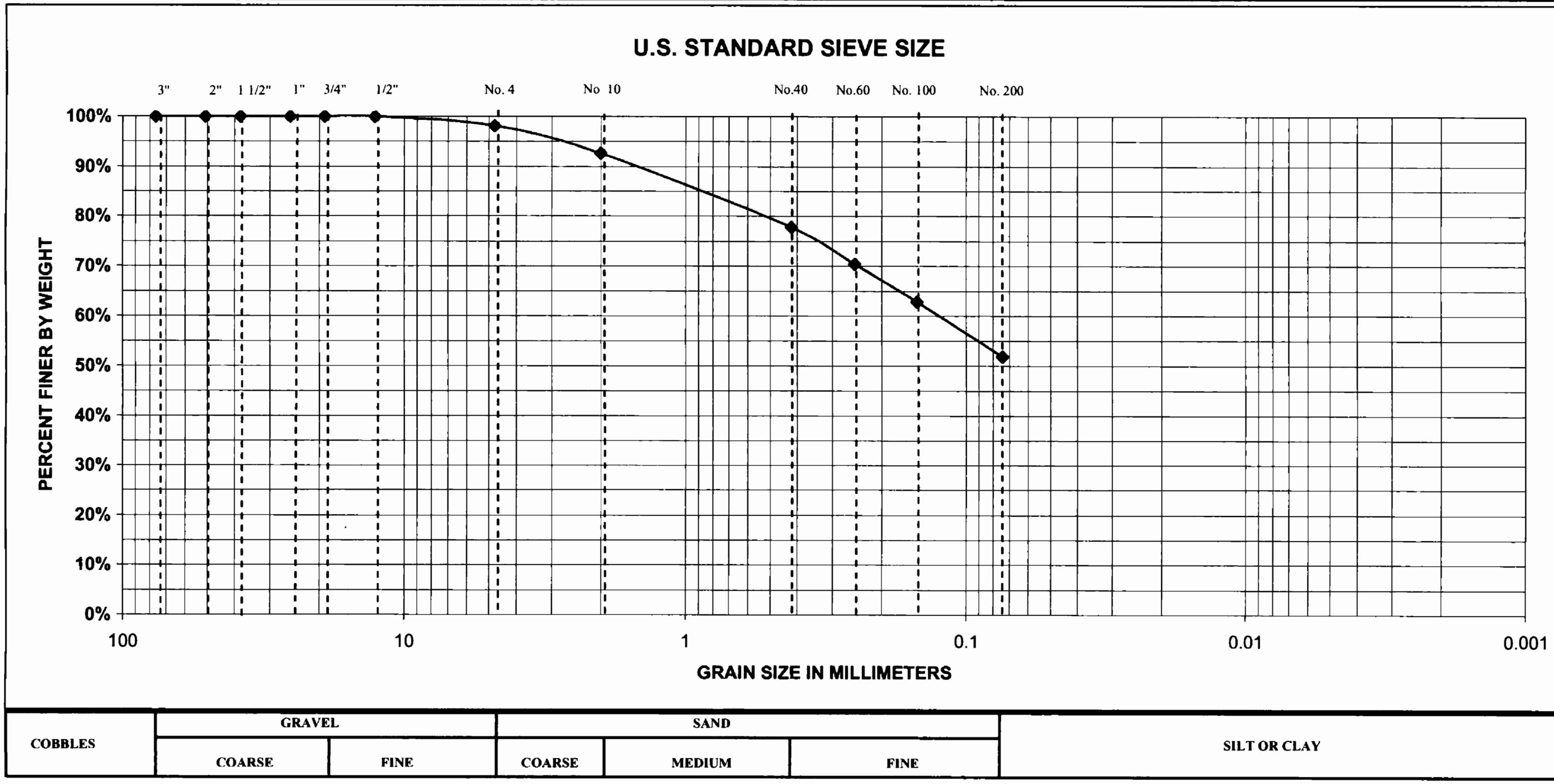

GRADATION TEST

Patterson Crossing

BORING NO.	S-9
SAMPLE NO.	S-3
DEPTH	10'-12'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
16 of 20	Test Boring Split Spoon Sample	SILT and fine to coarse SAND, trace fine Gravel

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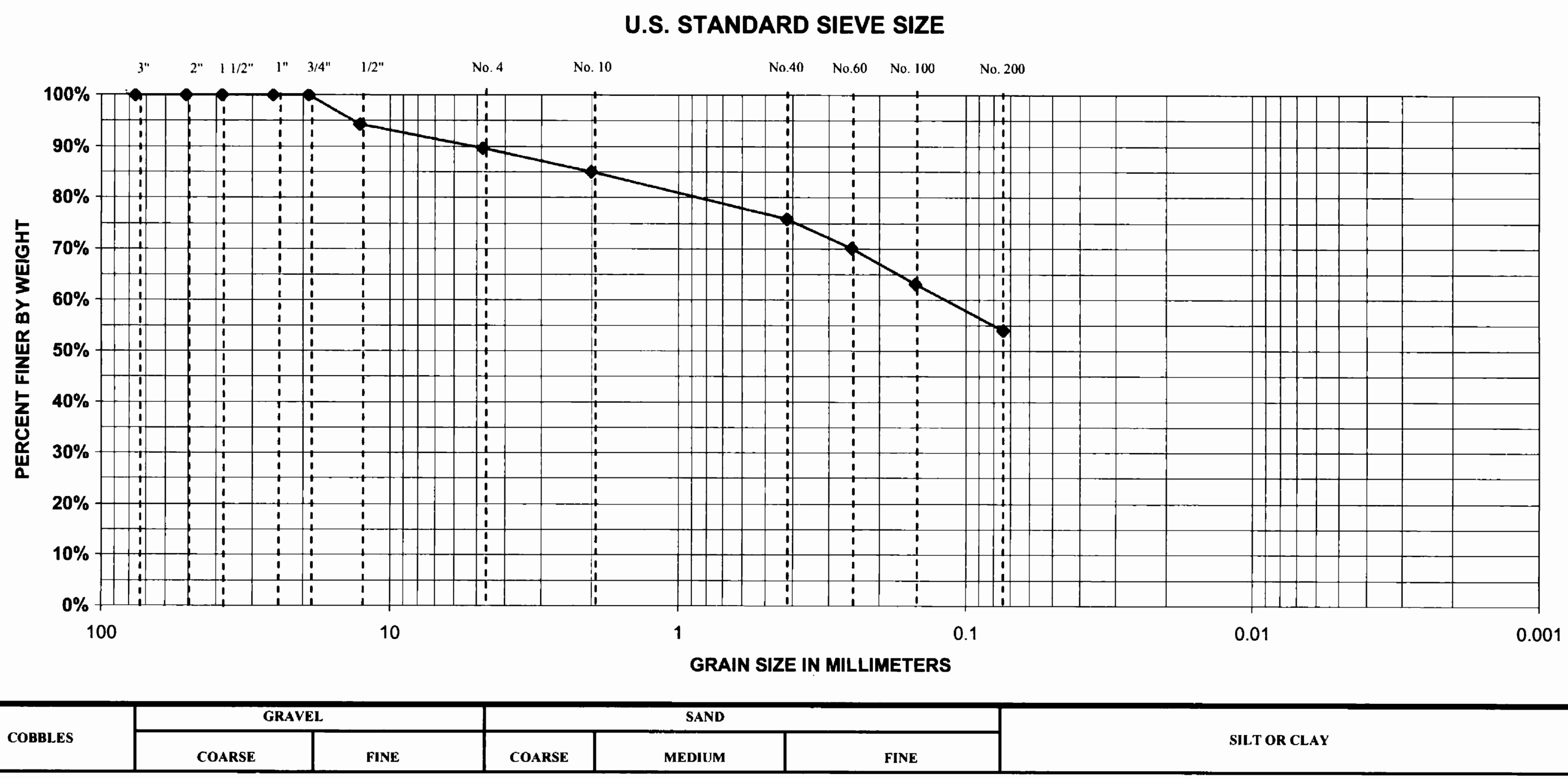

GRADATION TEST

Patterson Crossing

BORING NO.	S-10
SAMPLE NO.	S-4
DEPTH	15'-17'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
17 of 20	Test Boring Split Spoon Sample	SILT and fine to coarse SAND, trace fine Gravel

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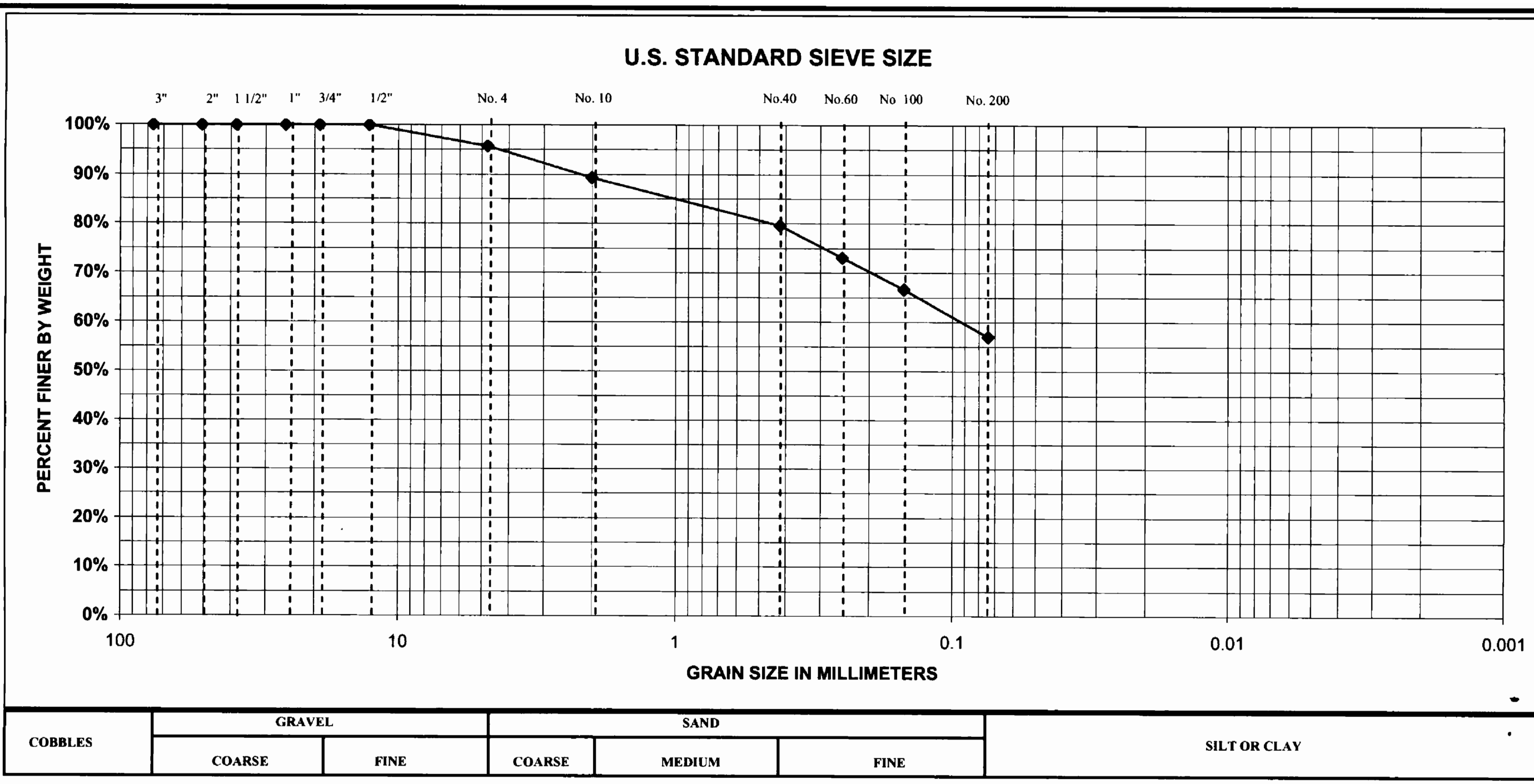

GRADATION TEST

Patterson Crossing

BORING NO.	S-11
SAMPLE NO.	S-3
DEPTH	10'-12'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
18 of 20	Test Boring Split Spoon Sample	SILT and fine to coarse SAND, trace fine Gravel

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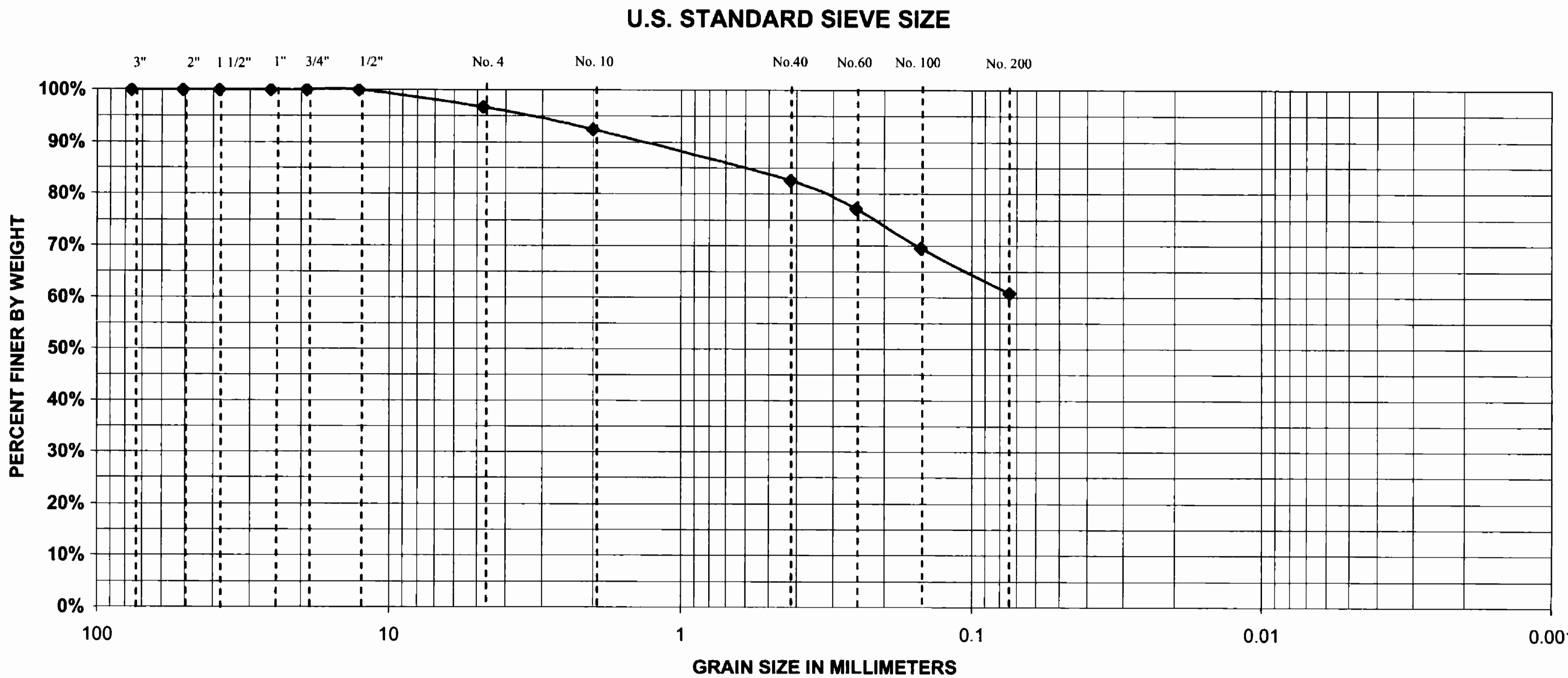

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRADATION TEST

Patterson Crossing

BORING NO.	S-12
SAMPLE NO.	S-6
DEPTH	25'-27'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
19 of 20	Test Boring Split Spoon Sample	SILT and fine to coarse SAND, trace fine Gravel

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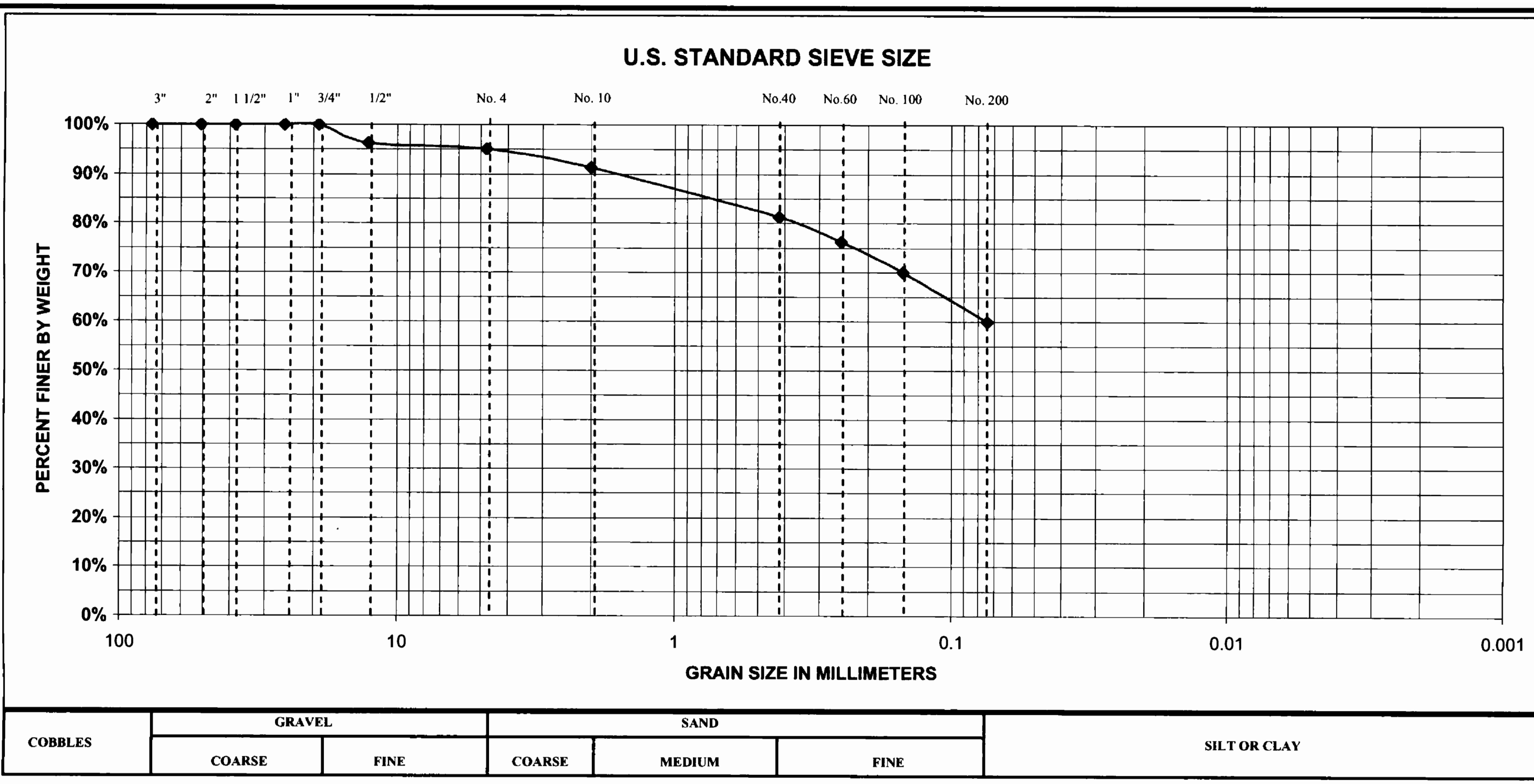

GRADATION TEST

Patterson Crossing

BORING NO.	S-13
SAMPLE NO.	S-6
DEPTH	25'-27'
TECH.	JGB
REVIEWER	ULF
DATE	5/13/2005
FILE NO.	664-01

BURMISTER SOIL CLASSIFICATION SYSTEM

TEST NO.	MATERIAL SOURCE	DESCRIPTION
20 of 20	Test Boring Split Spoon Sample	SILT and fine to coarse SAND, trace coarse Gravel

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Appendix 5 – Groundwater Model Results - Existing Conditions

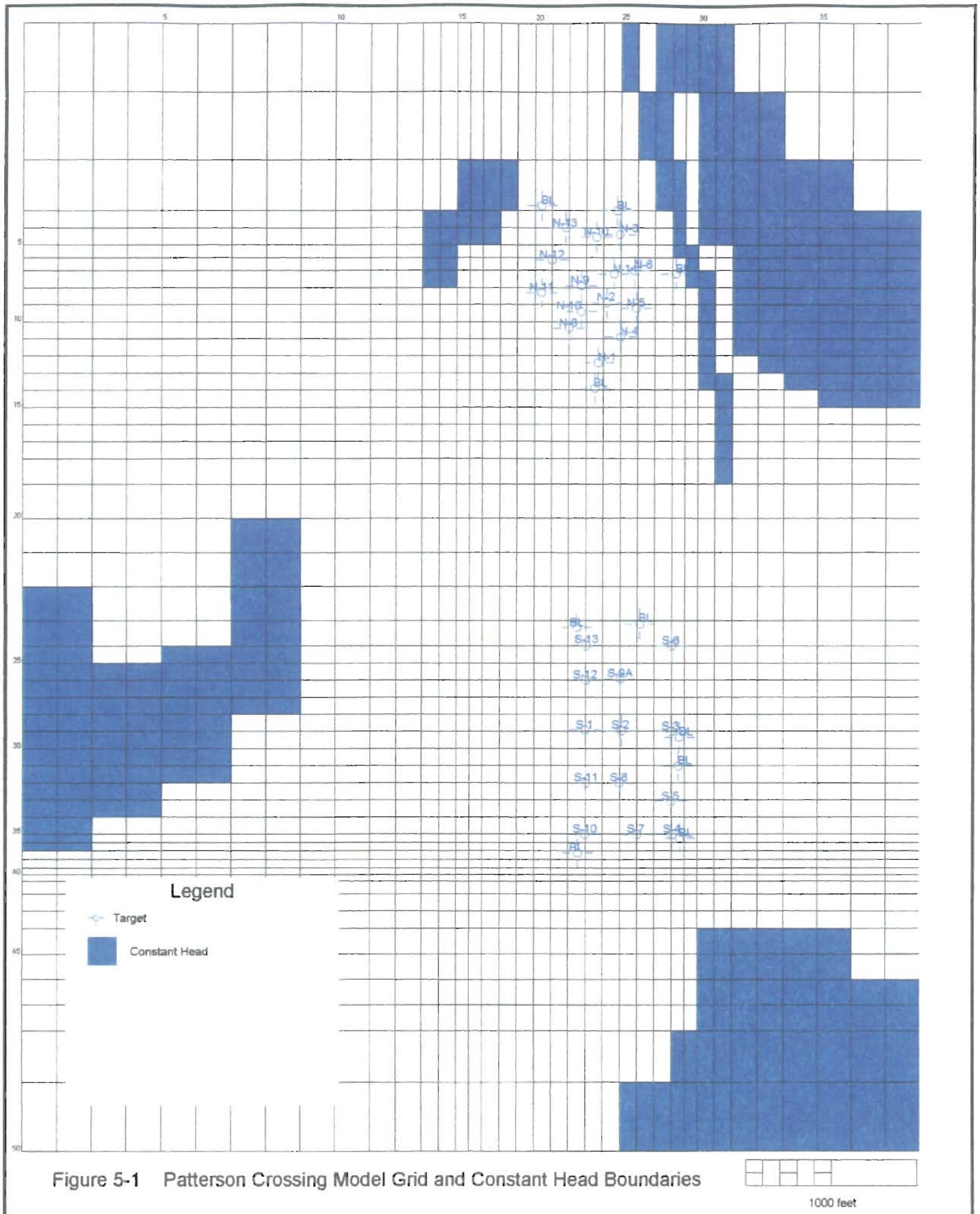


Figure 5-1 Patterson Crossing Model Grid and Constant Head Boundaries

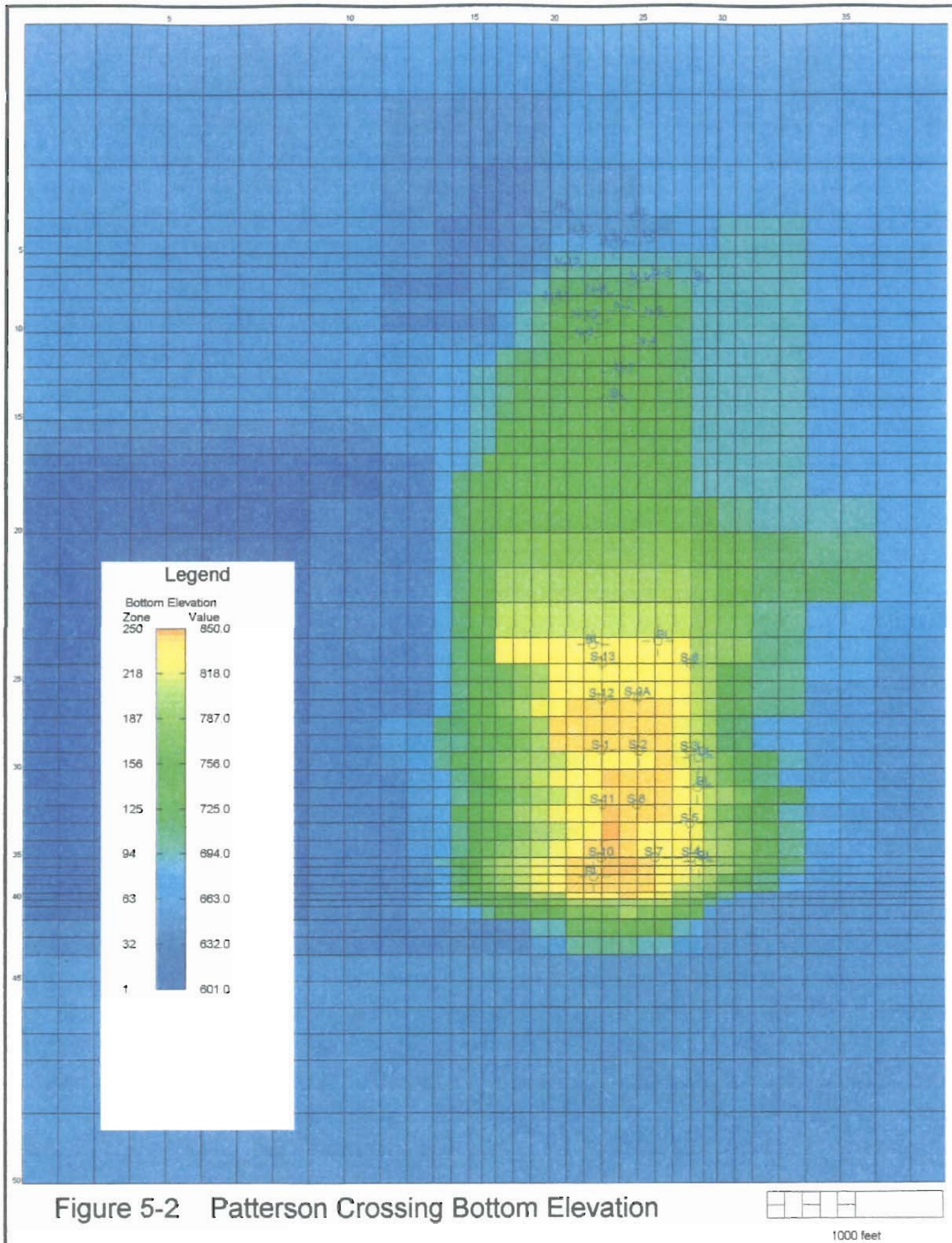


Figure 5-2 Patterson Crossing Bottom Elevation

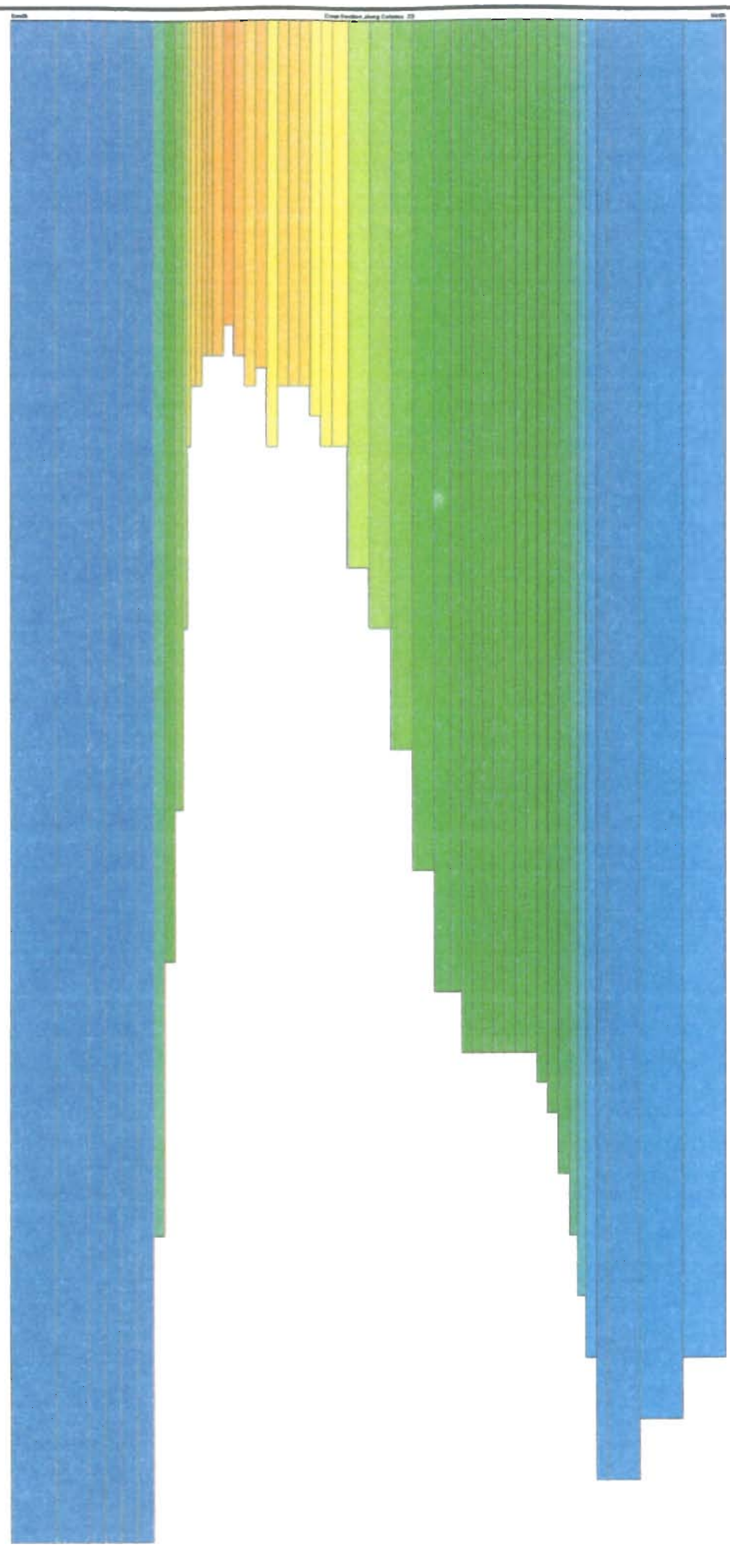


Figure 5-3   Cross Section at Column 23

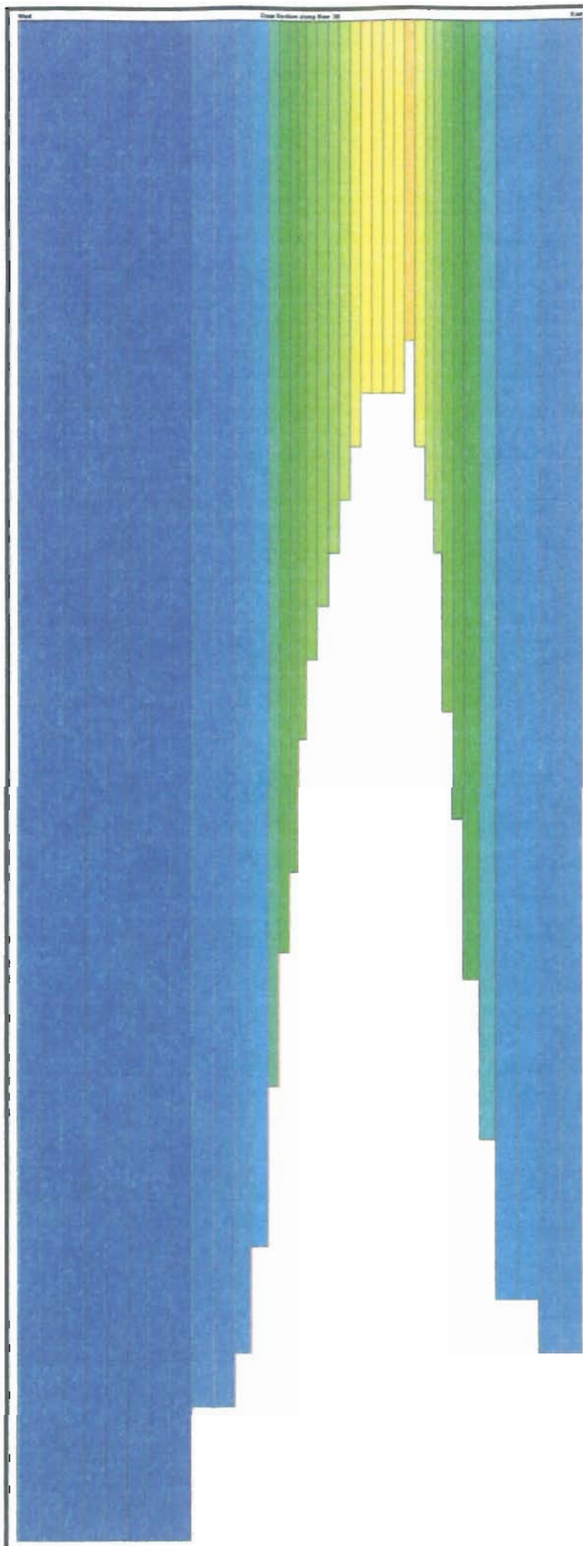


Figure 5-4   Cross Section at Row 30

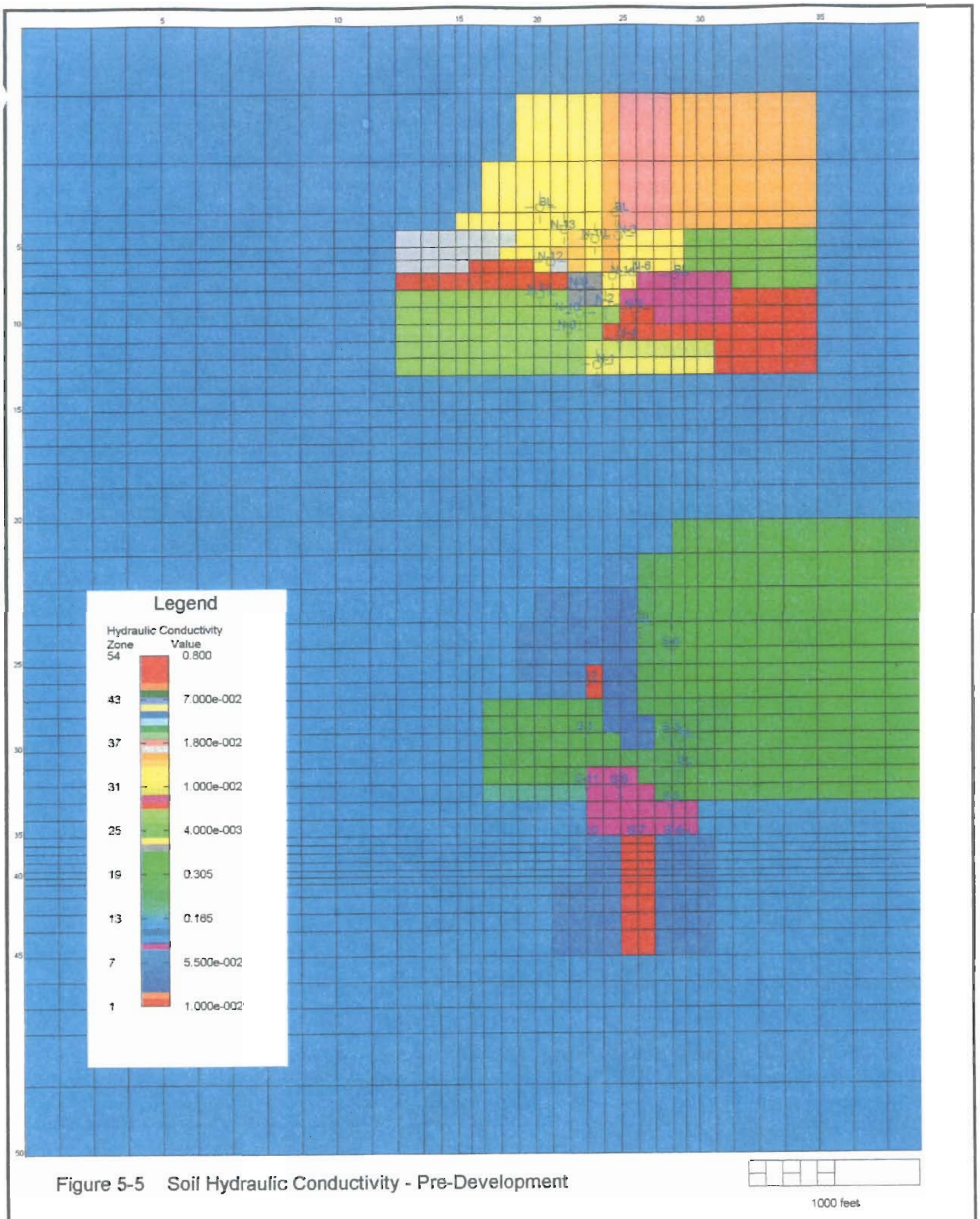


Figure 5-5 Soil Hydraulic Conductivity - Pre-Development

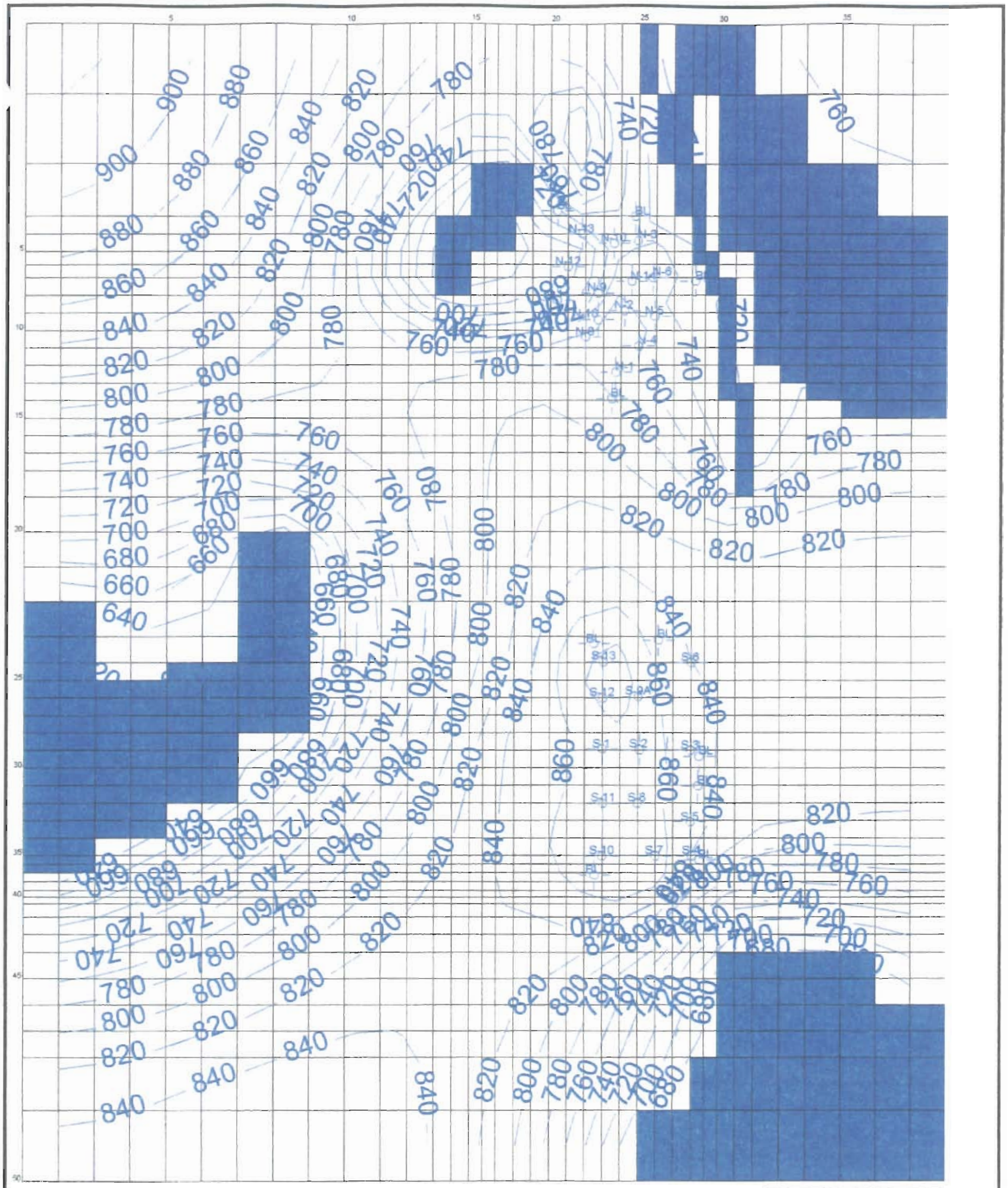


Figure 5-6 Groundwater Elevations - May/June 2005

1000 feet

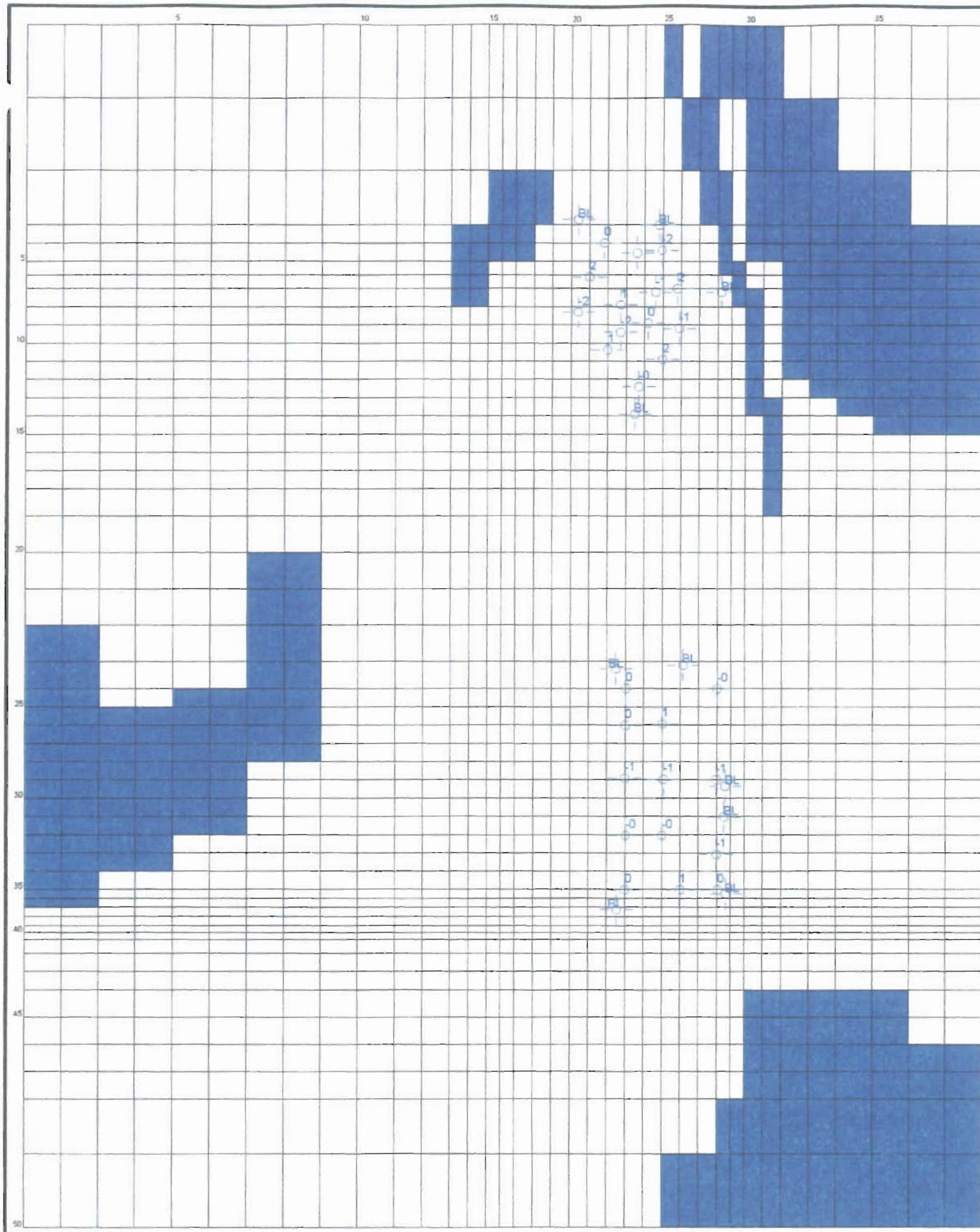


Figure 5-7 Existing Conditions - Model Calibration Residuals

1000 feet

Appendix 6 – Groundwater Model Results - Proposed Conditions

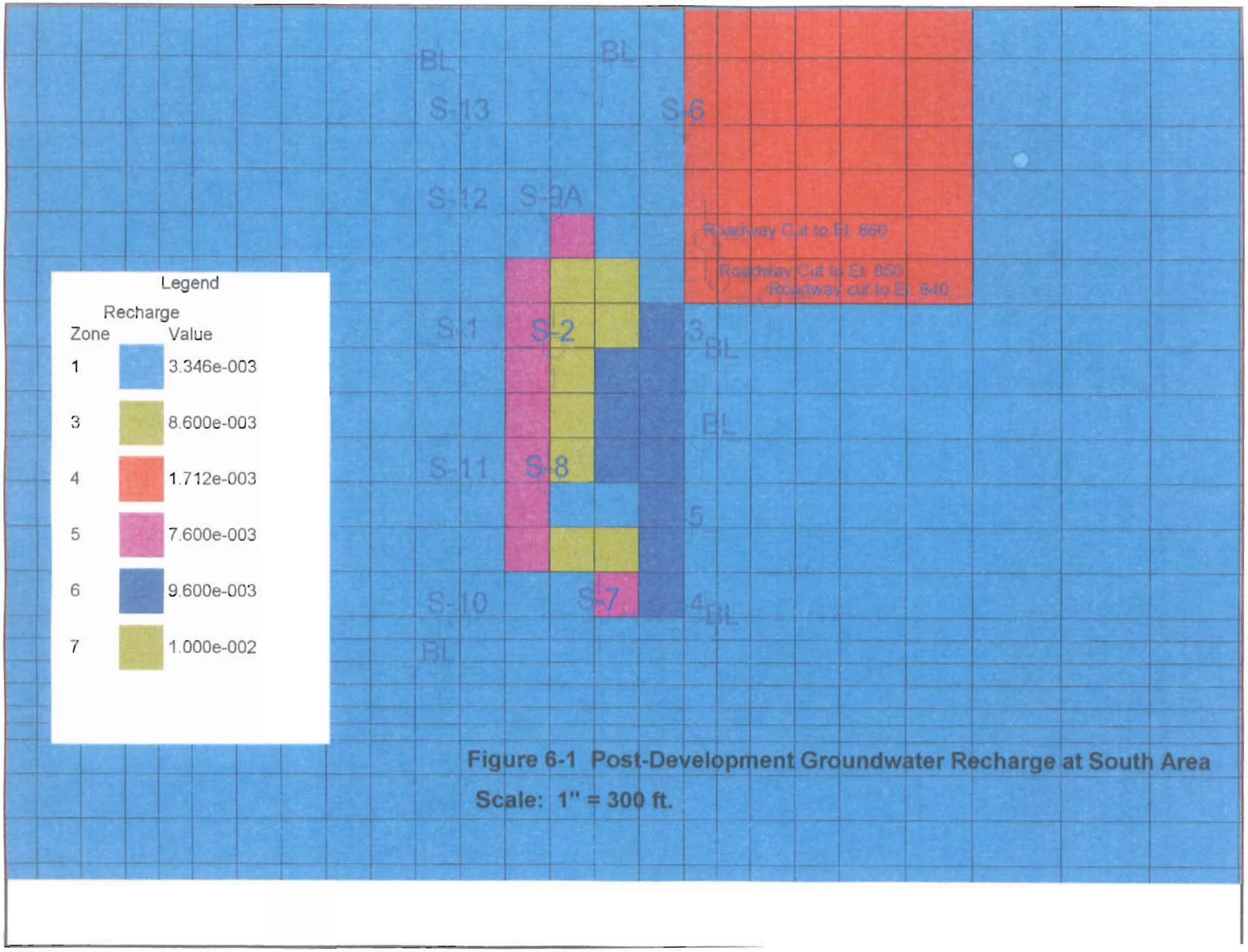


Figure 6-1 Post-Development Groundwater Recharge at South Area

Scale: 1" = 300 ft.

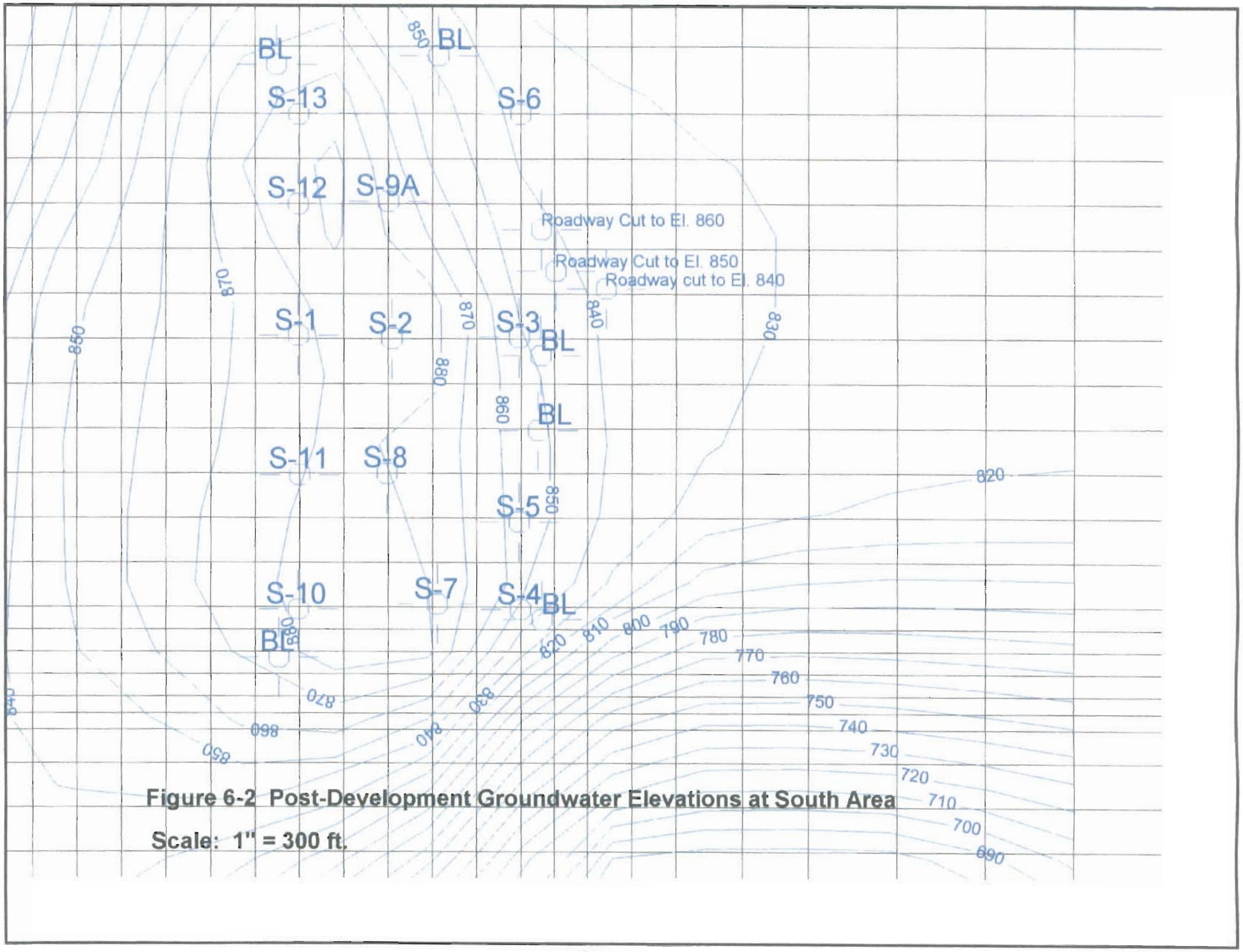


Figure 6-2 Post-Development Groundwater Elevations at South Area

Scale: 1" = 300 ft.

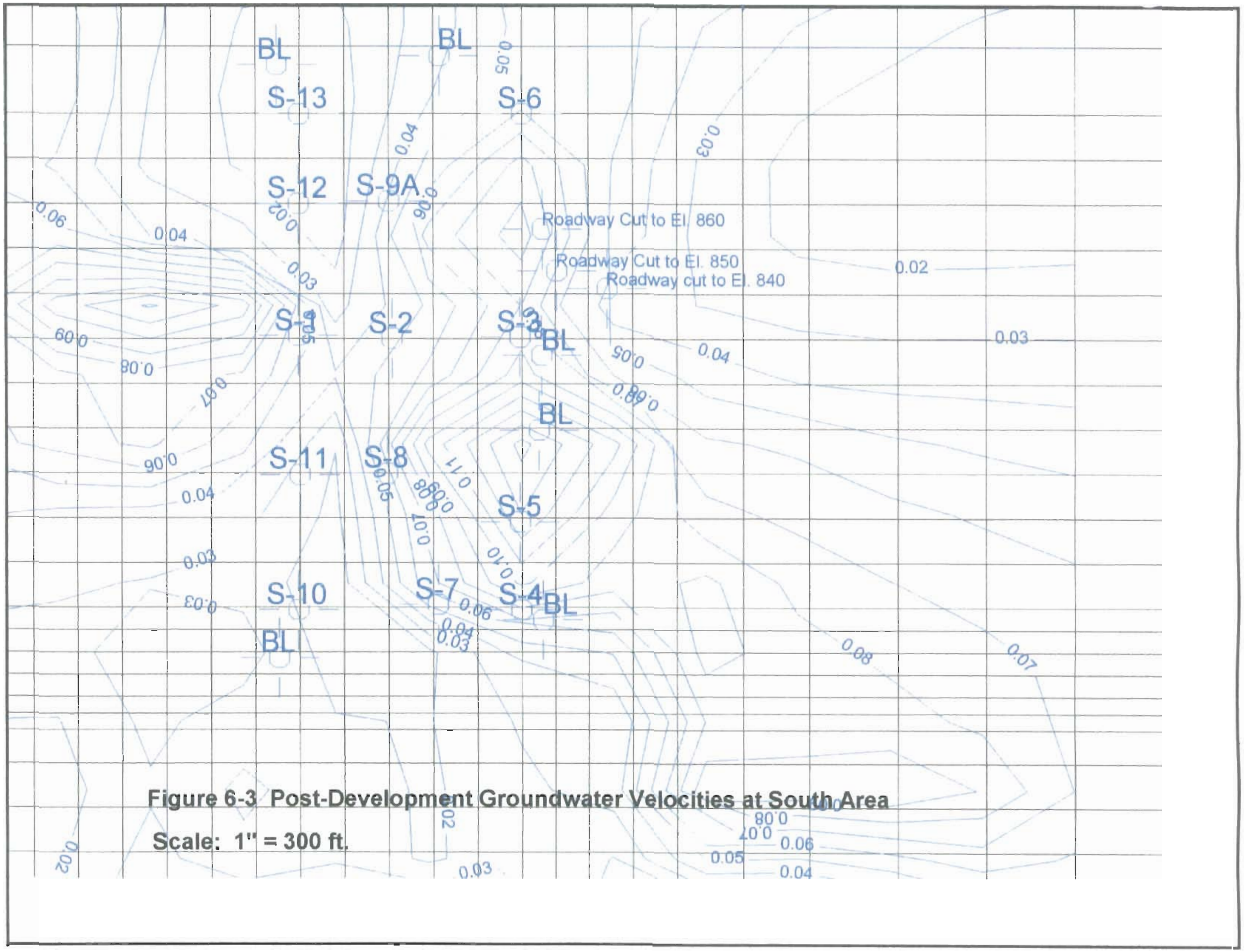


Figure 6-3 Post-Development Groundwater Velocities at South Area

Scale: 1" = 300 ft.

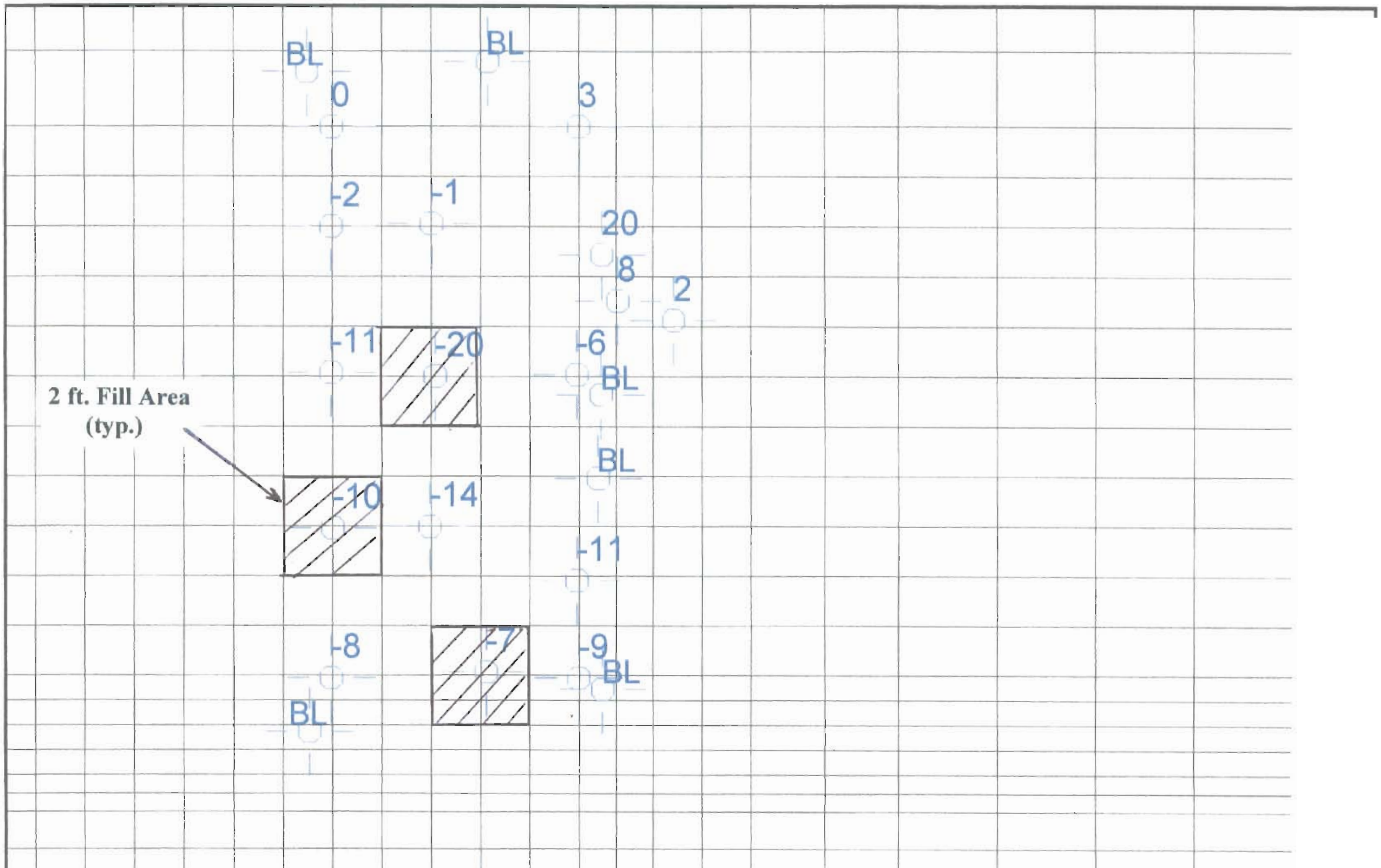


Figure 6-4 Post-Development Groundwater Residuals at South Area

Scale: 1" = 300 ft.

Appendix 7 – Groundwater Model Results Digital Format

Appendix 8 – MODFLOW Output

```
1                    U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-
WATER MODEL
0MODFLOW Data Set Created by Groundwater Vistas
    1 LAYERS        50 ROWS        37 COLUMNS
    1 STRESS PERIOD(S) IN SIMULATION
 MODEL TIME UNIT IS DAYS
0I/O UNITS:
 ELEMENT OF IUNIT:  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
         I/O UNIT: 11  0  0  0  0  0  0 18 19  0  0 22  0  0  0  0  0  0  0  0
0  0  0  0  0  0  0  0  0  0
0BAS1 -- BASIC MODEL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT  1
 ARRAYS RHS AND BUFF WILL SHARE MEMORY.
 START HEAD WILL BE SAVED
      16741 ELEMENTS IN X ARRAY ARE USED BY BAS
      16741 ELEMENTS OF X ARRAY USED OUT OF     28247
0BCF3 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 3, 7/9/92 INPUT READ FROM UNIT 11
 STEADY-STATE SIMULATION
 CELL-BY-CELL FLOWS WILL BE RECORDED ON UNIT 50
 HEAD AT CELLS THAT CONVERT TO DRY=   999.00
 WETTING CAPABILITY IS NOT ACTIVE
      LAYER  AQUIFER TYPE    INTERBLOCK T
      ------------------------------------
        1          0          0-HARMONIC
       1850 ELEMENTS IN X ARRAY ARE USED BY BCF
      18591 ELEMENTS OF X ARRAY USED OUT OF     28247
0RCH1 -- RECHARGE PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 18
 OPTION 1 -- RECHARGE TO TOP LAYER
       1850 ELEMENTS OF X ARRAY USED FOR RECHARGE
      20441 ELEMENTS OF X ARRAY USED OUT OF     28247
0SIP1 -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT
READ FROM UNIT 19
 MAXIMUM OF   100 ITERATIONS ALLOWED FOR CLOSURE
     5 ITERATION PARAMETERS
       7805 ELEMENTS IN X ARRAY ARE USED BY SIP
      28246 ELEMENTS OF X ARRAY USED OUT OF     28247
1MODFLOW Data Set Created by Groundwater Vistas
0


                                        BOUNDARY ARRAY FOR LAYER  1 WILL BE READ
ON UNIT  1 USING FORMAT: (25I3)
                              --------------------------------------------------
----------------------------------------------
0AQUIFER HEAD WILL BE SET TO  999.00     AT ALL NO-FLOW NODES (IBOUND=0).
0


                                          INITIAL HEAD FOR LAYER  1 WILL BE READ
ON UNIT  1 USING FORMAT: (10e12.4)
                              --------------------------------------------------
----------------------------------------------
0HEAD PRINT FORMAT IS FORMAT NUMBER   0    DRAWDOWN PRINT FORMAT IS FORMAT
NUMBER   0
0HEADS WILL BE SAVED ON UNIT 30    DRAWDOWNS WILL BE SAVED ON UNIT 31
0OUTPUT CONTROL IS SPECIFIED EVERY TIME STEP
```

```
0                                                      COLUMN TO ROW ANISOTROPY =
1.000000     FOR LAYER  1
0


                                                    DELR WILL BE READ ON UNIT 11
USING FORMAT: (10E12.4)
                              --------------------------------------------------
-----------------------------

   200.00       200.00       200.00       200.00       200.00       200.00
200.00       200.00       200.00       200.00
   150.00       150.00       100.00       100.00       75.000       75.000
100.00       100.00       100.00       100.00
   100.00       100.00       100.00       100.00       100.00       100.00
100.00       75.000       75.000       100.00
   100.00       150.00       150.00       200.00       200.00       200.00
200.00
0


                                                    DELC WILL BE READ ON UNIT 11
USING FORMAT: (10E12.4)
                              --------------------------------------------------
-----------------------------

   400.00       400.00       300.00       100.00       100.00       75.000
75.000       100.00       100.00       100.00
   100.00       100.00       100.00       100.00       100.00       100.00
100.00       100.00       150.00       200.00
   200.00       200.00       200.00       150.00       100.00       100.00
100.00       100.00       100.00       100.00
   100.00       100.00       100.00       100.00       100.00       50.000
50.000       50.000       50.000       37.500
   37.500       75.000       100.00       100.00       150.00       150.00
150.00       150.00       300.00       400.00
0


                                  TRANSMIS. ALONG ROWS FOR LAYER  1 WILL BE READ
ON UNIT 11 USING FORMAT: (10e12.4)
                              --------------------------------------------------
----------------------------------------------
0


                                                           SOLUTION BY THE
STRONGLY IMPLICIT PROCEDURE
                                                           ----------------------
--------------------
0                                                 MAXIMUM ITERATIONS ALLOWED FOR
CLOSURE =       100
                                                                  ACCELERATION
PARAMETER =      1.0000
                                                      HEAD CHANGE CRITERION FOR
CLOSURE =     0.10000E-02
```

```
                                                      SIP HEAD CHANGE PRINTOUT
INTERVAL =        5
0                                                     CALCULATE ITERATION
PARAMETERS FROM MODEL CALCULATED WSEED
1                                                    STRESS PERIOD NO.   1,
LENGTH =   3650000.
                                                     ----------------------------
------------------

                                                     NUMBER OF TIME STEPS =     1

                                                      MULTIPLIER FOR DELT =
1.200

                                                   INITIAL TIME STEP SIZE =
3650000.
0                                                                    RECHARGE =
0.3345900E-02
0AVERAGE SEED = 0.00063818
 MINIMUM SEED = 0.00000748
0
    5 ITERATION PARAMETERS CALCULATED FROM AVERAGE SEED:

            0.0000000E+00  0.8410590E+00  0.9747378E+00  0.9959848E+00
0.9993618E+00
0
    56 ITERATIONS FOR TIME STEP   1 IN STRESS PERIOD   1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 -------------------------------------------------------------------------------
----------------------------------------------------
   -236.4     (  1, 25,  3)  -129.5     (  1,  5, 24)  -146.1     (  1,  8, 21)
-164.6     (  1, 38,  8)  -190.5     (  1, 15, 17)
   -28.49     (  1,  1, 11)   38.25     (  1, 10, 10)   46.82     (  1, 14, 16)
158.5     (  1, 12, 11)   55.43     (  1, 45, 21)
   -13.95     (  1, 11, 12)  -12.62     (  1,  2,  2)  -31.04     (  1,  1,  1)
-33.26     (  1, 46, 18)  -21.38     (  1, 15,  9)
    2.776     (  1, 20,  9)   3.559     (  1, 19, 10)   4.941     (  1, 17, 13)
12.01     (  1, 13, 12)  -3.992     (  1, 33, 19)
   -1.010     (  1, 11, 12) -0.8869     (  1, 27, 14)  -2.239     (  1,  1,  1)
2.657     (  1, 44, 15)  -1.357     (  1, 16,  9)
  -0.2440     (  1, 28, 25)  0.2464     (  1, 22, 18)  0.4330     (  1, 24, 17)
0.8428     (  1, 17, 14)  0.4676     (  1, 35, 15)
  -0.1401     (  1, 40, 26)  0.1042     (  1, 30, 11) -0.1487     (  1,  1,  1)
-0.2839     (  1, 45, 20)  0.1372     (  1, 50, 14)
   0.2056E-01 (  1, 38, 26) -0.1634E-01 (  1, 25, 16) -0.3696E-01 (  1, 36,  9)
0.3231E-01 (  1, 16, 19) -0.6674E-01 (  1, 36, 16)
   0.1107E-01 (  1, 50, 18) -0.1143E-01 (  1, 27, 13)  0.1401E-01 (  1, 48, 14)
0.4344E-01 (  1, 46, 17) -0.1733E-01 (  1, 50, 13)
  -0.2815E-02 (  1, 27, 24) -0.2244E-02 (  1, 41, 23)  0.4593E-02 (  1, 26, 15)
0.4017E-02 (  1, 27, 20)  0.6804E-02 (  1, 36, 15)
  -0.1167E-02 (  1, 50, 18)  0.1312E-02 (  1, 29, 12) -0.1485E-02 (  1, 32, 21)
-0.4146E-02 (  1, 45, 18)  0.1789E-02 (  1, 50, 13)
   0.2640E-03 (  1, 27, 24)
0
```

```
0HEAD/DRAWDOWN PRINTOUT FLAG = 1     TOTAL BUDGET PRINTOUT FLAG = 1     CELL-BY-
CELL FLOW TERM FLAG = 1
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
   HEAD    DRAWDOWN  HEAD  DRAWDOWN
 PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------
     0         0       1       1
 "   CONSTANT HEAD" BUDGET VALUES WILL BE SAVED ON UNIT 50 AT END OF TIME STEP
1, STRESS PERIOD   1
 "FLOW RIGHT FACE " BUDGET VALUES WILL BE SAVED ON UNIT 50 AT END OF TIME STEP
1, STRESS PERIOD   1
 "FLOW FRONT FACE " BUDGET VALUES WILL BE SAVED ON UNIT 50 AT END OF TIME STEP
1, STRESS PERIOD   1
0HEAD WILL BE SAVED ON UNIT 30 AT END OF TIME STEP  1, STRESS PERIOD   1
0DRAWDOWN WILL BE SAVED ON UNIT 31 AT END OF TIME STEP  1, STRESS PERIOD   1
0


                              VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME
STEP  1 IN STRESS PERIOD   1
                              ---------------------------------------------------
---------------------------
0                   CUMULATIVE VOLUMES      L**3
RATES FOR THIS TIME STEP      L**3/T
                    ------------------
------------------------

                          IN:
IN:
                          ---
---
                            STORAGE =        0.00000
STORAGE =        0.00000
                      CONSTANT HEAD =   0.11038E+11
CONSTANT HEAD =    3024.1
                           RECHARGE =   0.34578E+12
RECHARGE =    94733.
0                          TOTAL IN =   0.35681E+12
TOTAL IN =    97757.
0                        OUT:
OUT:
                         ----
----
                            STORAGE =        0.00000
STORAGE =        0.00000
                      CONSTANT HEAD =   0.35681E+12
CONSTANT HEAD =    97757.
                           RECHARGE =        0.00000
RECHARGE =        0.00000
0                         TOTAL OUT =   0.35681E+12
TOTAL OUT =    97757.
0                          IN - OUT =   0.55706E+06
IN - OUT =   0.14844
0               PERCENT DISCREPANCY =                0.00
PERCENT DISCREPANCY =                0.00
```

```
0


        TIME SUMMARY AT END OF TIME STEP  1 IN STRESS PERIOD   1
                                    SECONDS        MINUTES        HOURS
DAYS           YEARS
                                ---------------------------------------------------
----------------------
      TIME STEP LENGTH       0.315360E+12   0.525600E+10   0.876000E+08
0.365000E+07    9993.16
    STRESS PERIOD TIME       0.315360E+12   0.525600E+10   0.876000E+08
0.365000E+07    9993.16
 TOTAL SIMULATION TIME       0.315360E+12   0.525600E+10   0.876000E+08
0.365000E+07    9993.16
1
```

```
1                    U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-
WATER MODEL
0MODFLOW Data Set Created by Groundwater Vistas
    1 LAYERS        50 ROWS        37 COLUMNS
    1 STRESS PERIOD(S) IN SIMULATION
 MODEL TIME UNIT IS DAYS
0I/O UNITS:
 ELEMENT OF IUNIT:  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
         I/O UNIT: 11  0  0  0  0  0  0 18 19  0  0 22  0  0  0  0  0  0  0  0
0  0  0  0  0  0  0  0  0  0
0BAS1 -- BASIC MODEL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT  1
 ARRAYS RHS AND BUFF WILL SHARE MEMORY.
 START HEAD WILL BE SAVED
      16741 ELEMENTS IN X ARRAY ARE USED BY BAS
      16741 ELEMENTS OF X ARRAY USED OUT OF     28247
0BCF3 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 3, 7/9/92 INPUT READ FROM UNIT 11
 STEADY-STATE SIMULATION
 CELL-BY-CELL FLOWS WILL BE RECORDED ON UNIT 50
 HEAD AT CELLS THAT CONVERT TO DRY=   999.00
 WETTING CAPABILITY IS NOT ACTIVE
      LAYER  AQUIFER TYPE    INTERBLOCK T
      ------------------------------------
         1         0         0-HARMONIC
       1850 ELEMENTS IN X ARRAY ARE USED BY BCF
      18591 ELEMENTS OF X ARRAY USED OUT OF     28247
0RCH1 -- RECHARGE PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 18
 OPTION 1 -- RECHARGE TO TOP LAYER
       1850 ELEMENTS OF X ARRAY USED FOR RECHARGE
      20441 ELEMENTS OF X ARRAY USED OUT OF     28247
0SIP1 -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT
READ FROM UNIT 19
 MAXIMUM OF   100 ITERATIONS ALLOWED FOR CLOSURE
     5 ITERATION PARAMETERS
       7805 ELEMENTS IN X ARRAY ARE USED BY SIP
      28246 ELEMENTS OF X ARRAY USED OUT OF     28247
1MODFLOW Data Set Created by Groundwater Vistas
0


                                        BOUNDARY ARRAY FOR LAYER  1 WILL BE READ
ON UNIT  1 USING FORMAT: (25I3)
                              --------------------------------------------------
----------------------------------------------
0AQUIFER HEAD WILL BE SET TO  999.00     AT ALL NO-FLOW NODES (IBOUND=0).
0


                                          INITIAL HEAD FOR LAYER  1 WILL BE READ
ON UNIT  1 USING FORMAT: (10e12.4)
                              --------------------------------------------------
----------------------------------------------
0HEAD PRINT FORMAT IS FORMAT NUMBER   0    DRAWDOWN PRINT FORMAT IS FORMAT
NUMBER   0
0HEADS WILL BE SAVED ON UNIT 30    DRAWDOWNS WILL BE SAVED ON UNIT 31
0OUTPUT CONTROL IS SPECIFIED EVERY TIME STEP
```

```
0                                                   COLUMN TO ROW ANISOTROPY =
1.000000     FOR LAYER  1
0


                                                 DELR WILL BE READ ON UNIT 11
USING FORMAT: (10E12.4)                ---------------------------------------------------
----------------------------

   200.00      200.00      200.00      200.00      200.00      200.00
200.00      200.00      200.00      200.00
   150.00      150.00      100.00      100.00      75.000      75.000
100.00      100.00      100.00      100.00
   100.00      100.00      100.00      100.00      100.00      100.00
100.00      75.000      75.000      100.00
   100.00      150.00      150.00      200.00      200.00      200.00
200.00
0


                                                 DELC WILL BE READ ON UNIT 11
USING FORMAT: (10E12.4)                ---------------------------------------------------
----------------------------

   400.00      400.00      300.00      100.00      100.00      75.000
75.000      100.00      100.00      100.00
   100.00      100.00      100.00      100.00      100.00      100.00
100.00      100.00      150.00      200.00
   200.00      200.00      200.00      150.00      100.00      100.00
100.00      100.00      100.00      100.00
   100.00      100.00      100.00      100.00      100.00      50.000
50.000      50.000      50.000      37.500
   37.500      75.000      100.00      100.00      150.00      150.00
150.00      150.00      300.00      400.00
0


                                  TRANSMIS. ALONG ROWS FOR LAYER  1 WILL BE READ
ON UNIT 11 USING FORMAT: (10e12.4)
                                       ---------------------------------------------------
---------------------------------------------
0


                                                        SOLUTION BY THE
STRONGLY IMPLICIT PROCEDURE
                                                        ----------------------
--------------------
0                                              MAXIMUM ITERATIONS ALLOWED FOR
CLOSURE =       100
                                                              ACCELERATION
PARAMETER =      1.0000
                                                   HEAD CHANGE CRITERION FOR
CLOSURE =     0.10000E-02
```

```
                                                                SIP HEAD CHANGE PRINTOUT
INTERVAL =          5
0                                                               CALCULATE ITERATION
PARAMETERS FROM MODEL CALCULATED WSEED
1                                                              STRESS PERIOD NO.    1,
LENGTH =    3650000.
                                                               ---------------------------
-----------------

                                                               NUMBER OF TIME STEPS =      1

                                                                MULTIPLIER FOR DELT =
1.200

                                                             INITIAL TIME STEP SIZE =
3650000.
0


                                                        RECHARGE WILL BE READ ON UNIT 18
USING FORMAT: (10e12.4)                          ---------------------------------------------
--------------------------------
0AVERAGE SEED = 0.00063868
 MINIMUM SEED = 0.00000748
0
    5 ITERATION PARAMETERS CALCULATED FROM AVERAGE SEED:

            0.0000000E+00  0.8410278E+00  0.9747279E+00  0.9959824E+00
0.9993613E+00
0
    56 ITERATIONS FOR TIME STEP   1 IN STRESS PERIOD   1
0MAXIMUM HEAD CHANGE FOR EACH ITERATION:
0 HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
HEAD CHANGE LAYER,ROW,COL HEAD CHANGE LAYER,ROW,COL
 ---------------------------------------------------------------------------------
-----------------------------------------------------
   -236.4     (  1, 25,  3)  -123.5     (  1,  5, 24)  -143.7     (  1,  8, 21)
-162.2     (  1, 38,  8)  -189.6     (  1, 12, 11)
   -28.65     (  1,  1, 11)   38.27     (  1, 10, 10)   46.87     (  1, 15, 15)
160.0     (  1, 12, 11)   57.82     (  1, 44, 21)
   -13.89     (  1, 11, 12)  -12.74     (  1,  2,  2)  -31.39     (  1,  1,  1)
-37.64     (  1, 46, 18)  -22.46     (  1, 15,  9)
    3.000     (  1, 20,  9)   3.820     (  1, 19, 10)   5.191     (  1, 17, 13)
12.78     (  1, 13, 12)  -4.107     (  1, 11, 10)
   -1.073     (  1, 11, 12)  -1.041     (  1, 27, 13)  -2.413     (  1,  1,  1)
2.566     (  1, 44, 15)  -1.607     (  1, 16,  9)
   0.2715     (  1, 23, 20)  0.2947     (  1, 22, 18)  0.5320     (  1, 24, 17)
1.070     (  1, 14, 12)  0.6421     (  1, 36, 15)
  -0.1792     (  1, 41, 26)  0.1395     (  1, 30, 11) -0.1973     (  1,  1,  1)
-0.3886     (  1, 45, 19)  0.1842     (  1, 50, 13)
   0.2865E-01 (  1, 38, 26) -0.1985E-01 (  1, 25, 15) -0.4879E-01 (  1, 39,  8)
0.4053E-01 (  1, 15, 17) -0.8326E-01 (  1, 37, 15)
   0.1130E-01 (  1, 50, 11) -0.1652E-01 (  1, 27, 13)  0.1740E-01 (  1, 48, 14)
0.5497E-01 (  1, 46, 16) -0.2306E-01 (  1, 50, 12)
  -0.3619E-02 (  1, 27, 24)  0.2997E-02 (  1, 25, 15)  0.6904E-02 (  1, 26, 14)
0.6318E-02 (  1, 27, 19)  0.1001E-01 (  1, 36, 15)
```

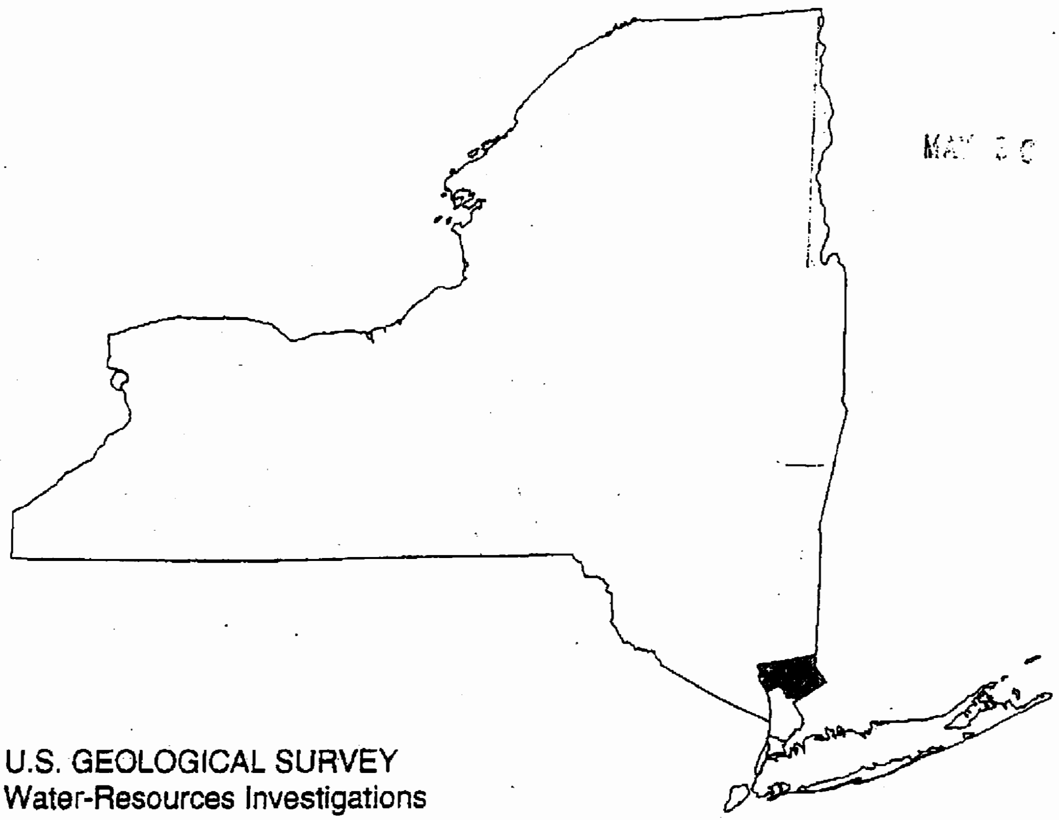
```
  -0.1602E-02 (  1, 41, 26)  0.2141E-02 (  1, 30, 11) -0.2148E-02 (  1, 32, 20)
-0.6140E-02 (  1, 46, 16)  0.2763E-02 (  1, 50, 12)
  -0.4216E-03 (  1, 24, 18)
0
0HEAD/DRAWDOWN PRINTOUT FLAG = 1     TOTAL BUDGET PRINTOUT FLAG = 1     CELL-BY-
CELL FLOW TERM FLAG = 1
0OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:
   HEAD    DRAWDOWN  HEAD  DRAWDOWN
 PRINTOUT  PRINTOUT  SAVE    SAVE
 ----------------------------------
     0        0       1       1
 "   CONSTANT HEAD" BUDGET VALUES WILL BE SAVED ON UNIT 50 AT END OF TIME STEP
1, STRESS PERIOD   1
 "FLOW RIGHT FACE " BUDGET VALUES WILL BE SAVED ON UNIT 50 AT END OF TIME STEP
1, STRESS PERIOD   1
 "FLOW FRONT FACE " BUDGET VALUES WILL BE SAVED ON UNIT 50 AT END OF TIME STEP
1, STRESS PERIOD   1
0HEAD WILL BE SAVED ON UNIT 30 AT END OF TIME STEP  1, STRESS PERIOD   1
0DRAWDOWN WILL BE SAVED ON UNIT 31 AT END OF TIME STEP  1, STRESS PERIOD    1
0


                              VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME
STEP  1 IN STRESS PERIOD   1
                              --------------------------------------------------
---------------------------
0                   CUMULATIVE VOLUMES      L**3
RATES FOR THIS TIME STEP      L**3/T
                    ------------------
------------------------


                          IN:
IN:
                          ---
---
                            STORAGE =        0.00000
STORAGE =        0.00000
                      CONSTANT HEAD =    0.11227E+11
CONSTANT HEAD =     3076.0
                           RECHARGE =    0.34308E+12
RECHARGE =    93995.
0                          TOTAL IN =    0.35431E+12
TOTAL IN =    97071.
0                        OUT:
OUT:
                         ----
----
                            STORAGE =        0.00000
STORAGE =        0.00000
                      CONSTANT HEAD =    0.35431E+12
CONSTANT HEAD =     97071.
                           RECHARGE =        0.00000
RECHARGE =        0.00000
0                         TOTAL OUT =    0.35431E+12
TOTAL OUT =    97071.
0                          IN - OUT =   -0.26214E+06
IN - OUT =  -0.70313E-01
```

```
0                PERCENT DISCREPANCY =                0.00
PERCENT DISCREPANCY =                0.00



0


          TIME SUMMARY AT END OF TIME STEP  1 IN STRESS PERIOD   1
                               SECONDS        MINUTES         HOURS
DAYS           YEARS
                           ---------------------------------------------------------
----------------------
      TIME STEP LENGTH       0.315360E+12   0.525600E+10   0.876000E+08
0.365000E+07    9993.16
    STRESS PERIOD TIME       0.315360E+12   0.525600E+10   0.876000E+08
0.365000E+07    9993.16
 TOTAL SIMULATION TIME       0.315360E+12   0.525600E+10   0.876000E+08
0.365000E+07    9993.16
1
```

Appendix 9 – USGS References used to Estimate Base Flow (Groundwater Recharge

WOLCOTT (10)

Computation of Bedrock-Aquifer Recharge in Northern Westchester County, New York, and Chemical Quality of Water from Selected Bedrock Wells



U.S. GEOLOGICAL SURVEY
Water-Resources Investigations
Report 92-4157

Prepared in cooperation with the
WESTCHESTER COUNTY WATER AUTHORITY

Table 12.—Estimated values and associated data for computation of ground-water runoff for selected basins in northern Westchester County.

[Location of basins shown in fig. 13A-13[illegible]; mi², square miles; in/yr, inches per year; Mgal/d, million gallons per day.]

Basin name and identification number	Total area (mi²)	Stratified-drift area (mi²)	Till and bedrock area (mi²)	Annual runoff (in/yr)	Ground-water runoff from till and bedrock (Mgal/d)
*1A	1.79	0.06	1.73	24.5	0.71
*1B	1.04	.07	.97	25.0	.40
*1C	.85	.05	.80	25.0	.35
*1D	.43	.02	.41	24.3	.16
Broad Brook					
2A	2.17	1.14	1.03	27.0	.45
2B	1.51	.39	1.12	28.8	.58
2C	1.48	.32	1.16	28.5	.56
Cross River					
3A	3.16	.70	2.46	26.2	[illegible]
3B	2.71	.78	1.93	25.9	.84
3C	1.28	.19	1.09	20.6	.40
3D	2.06	.07	1.99	20.6	[illegible]
3E	2.18	.45	1.73	27.4	.71
3F	1.40	[illegible]	1.40	21.4	.84
Cross River east					
4A	1.30	[illegible]	1.34	27.5	.67
4B	1.00	.09	.91	27.6	.42
4C	1.72	.35	1.51	28.0	.70
4D	1.78	.06	1.62	25.3	.71
Cross River west					
5A	1.18	.47	[illegible]	26.6	[illegible]
Croton River east					
6A	1.00	.12	[illegible]	[illegible]	.34
6B	2.00	.02	1.77	[illegible]	[illegible]
6C	1.36	.16	1.21	[illegible]	.44
6D	[illegible]	[illegible]	2.00	[illegible]	[illegible]
6E	1.48	.51	.97	[illegible]	[illegible]
6F	[illegible]	[illegible]	1.93	[illegible]	[illegible]
Croton River north					
7A	0.87	0.02	0.84	[illegible]	[illegible]
7B	1.55	.25	.80	[illegible]	[illegible]
7C	1.35	.29	1.19	[illegible]	.42
7D	.75	.14	.61	[illegible]	.34
7E	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7F	2.20	.42	1.84	[illegible]	.54
7G	1.04	.18	[illegible]	[illegible]	[illegible]
Croton River south					
8A	[illegible]	.00	[illegible]	[illegible]	[illegible]
8B	[illegible]	.05	[illegible]	[illegible]	.51
8C	[illegible]	.00	[illegible]	[illegible]	[illegible]
8D	[illegible]	[illegible]	2.05	27.2	1.00
8E	1.05	.15	[illegible]	[illegible]	[illegible]
8F	1.46	.72	.74	[illegible]	.33
8G	1.30	.18	1.11	[illegible]	.48
8H	2.05	.40	1.24	[illegible]	.71

*Some or all of basin is in the active region of the ground-water flow model.

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Table [illegible].—Estimated values and associated data for computation of ground-water runoff for selected basins in northern Westchester County (continued).

Basin name and identification number	Total area (mi^2)	Stratified-drift area (mi^2)	Till and bedrock area (mi^2)	Annual runoff (in/yr)	Ground-water runoff from till and bedrock (Mgal/d)
Croton River west					
9A	[illegible]	.42	[illegible]	[illegible]	1.46
9B	[illegible]	[illegible]	[illegible]	[illegible]	.43
9C	2.18	[illegible]	[illegible]	[illegible]	[illegible]
9D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9E	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9F	[illegible]	.19	[illegible]	27.2	[illegible]
9G	[illegible]	.42	[illegible]	27.3	[illegible]
9H	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9I	1.34	[illegible]	[illegible]	[illegible]	[illegible]
9J	[illegible]	.11	[illegible]	[illegible]	[illegible]
Cross River Basin					
10A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10B	[illegible]	[illegible]	1.10	22.7	.43
Kisco River					
11A	[illegible]	0.40	[illegible]	[illegible]	[illegible]
11B	[illegible]	.41	[illegible]	[illegible]	[illegible]
11C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11D	[illegible]	.44	[illegible]	[illegible]	[illegible]
11E	1.04	[illegible]	[illegible]	[illegible]	.40
11F	[illegible]	[illegible]	1.40	[illegible]	[illegible]
11G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11H	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11I	[illegible]	[illegible]	1.47	[illegible]	[illegible]
11J	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11K	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11L	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Muscoot River					
12A	[illegible]	.27	[illegible]	[illegible]	[illegible]
12B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
*12C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Muscoot River south					
*13A	[illegible]	.31	1.47	[illegible]	[illegible]
[illegible] Lake					
14A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					
15A	[illegible]	[illegible]	[illegible]	[illegible]	.71
*15B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
*15D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
*15E	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Stone Hill River					
16A	[illegible]	.41	[illegible]	[illegible]	[illegible]
16B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16D	[illegible]	.77	[illegible]	[illegible]	[illegible]
16E	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16H	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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Table 12.—Estimated values and associated data for computation of ground-water runoff for selected basins in northern Westchester County (continued).

Basin name and identification number	Total area (mi²)	Stratified-drift area (mi²)	Till and bedrock area (mi²)	Annual runoff (in/yr)	Ground-water runoff from till and bedrock (Mgal/d)
*Titicus River					
17A	0.45	0.16	0.85	23.1	0.13
17B	3.10	.30	2.80	22.3	.81
17C	2.04	.05	2.00	22.7	.30
17D	2.88	.27	2.56	24.0	.81
17E	2.60	.42	2.18	25.5	.88
17F	1.00	.06	.93	25.4	.29
17G	1.68	.14	1.54	25.0	.54
17H	1.72	.25	1.49	24.6	.41
17I	2.32	.09	2.20	25.4	.85
Waccabuc River basin					
18A	.65	.04	.61	26.2	.27
18B	2.59	.14	2.46	30.5	1.06
18C	2.02	.28	1.75	27.0	.70
18D	1.41	.01	1.40	27.5	.34
18E	.90	.09	.81	28.1	.30
18F	2.34	.70	2.26	28.0	1.45
Silvermine River basin					
19A	.50	.06	.46	26.8	.25
19B	.79	.04	.75	28.5	.25
19C	1.05	.01	1.04	27.5	.75
19D	1.36	.04	1.32	26.7	.51
Rippowam River basin					
20A	2.08	.07	2.01	26.5	.98
20B	1.53	.02	1.51	27.2	.60
Mill River basin					
21A	1.44	.27	1.17	27.0	.54
21B	1.60	.09	1.51	27.0	.55
21C	.49	.06	.42	26.8	.20
21D	.37	.10	[illegible]	26.0	.25
21E	1.88	.14	1.76	27.0	.82
21F	1.07	.01	1.06	27.5	.46
21G	.65	.01	.64	27.2	.30
21H	1.06	.11	.95	27.8	.44
Mianus River					
22A	2.85	0.57	2.28	28.5	1.12
22B	2.30	.30	1.80	28.0	.80
22C	2.04	1.27	1.77	28.2	.63
22D	2.06	.44	1.58	28.6	.64
22E	.85	.01	.84	27.4	.30
22F	1.19	.20	1.18	27.2	.43
22G	2.12	.11	2.00	26.8	.88
22H	1.00	.08	1.06	26.5	.48
22I	1.28	.18	1.07	28.2	.46
22J	1.68	.18	1.50	28.5	.78

*Some or all of basin is in the active region of the ground-water flow model.

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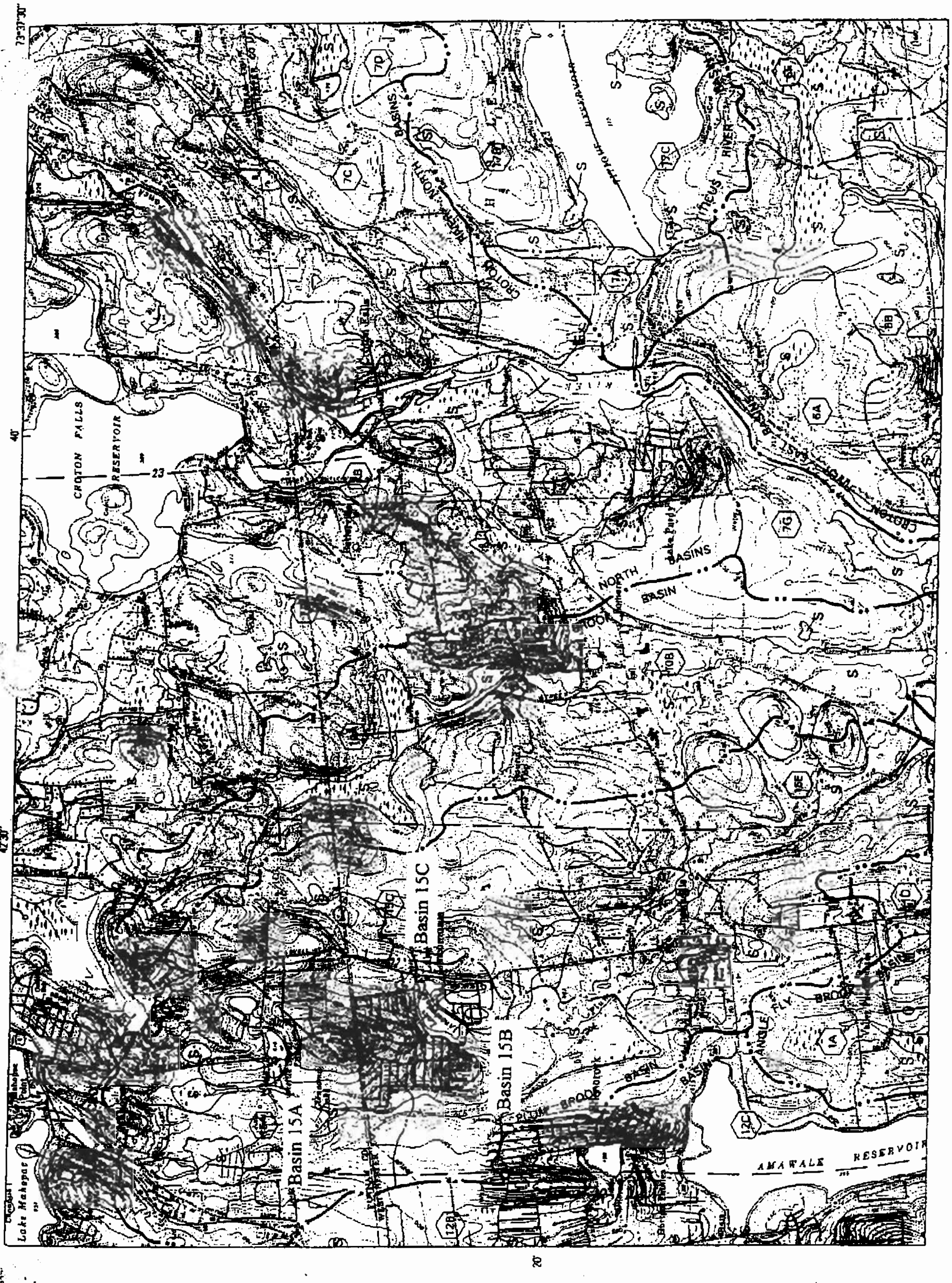


CROTON FALLS RESERVOIR
AMAWALK RESERVOIR
Basin 15A
Basin 15B
Basin 15C
NORTH BASIN
Lake Mahopac

Streamflow, Base Flow, and Ground-Water Recharge in the Housatonic River Basin, Western Massachusetts and Parts of Eastern New York and Northwestern Connecticut

By Gardner C. Bent

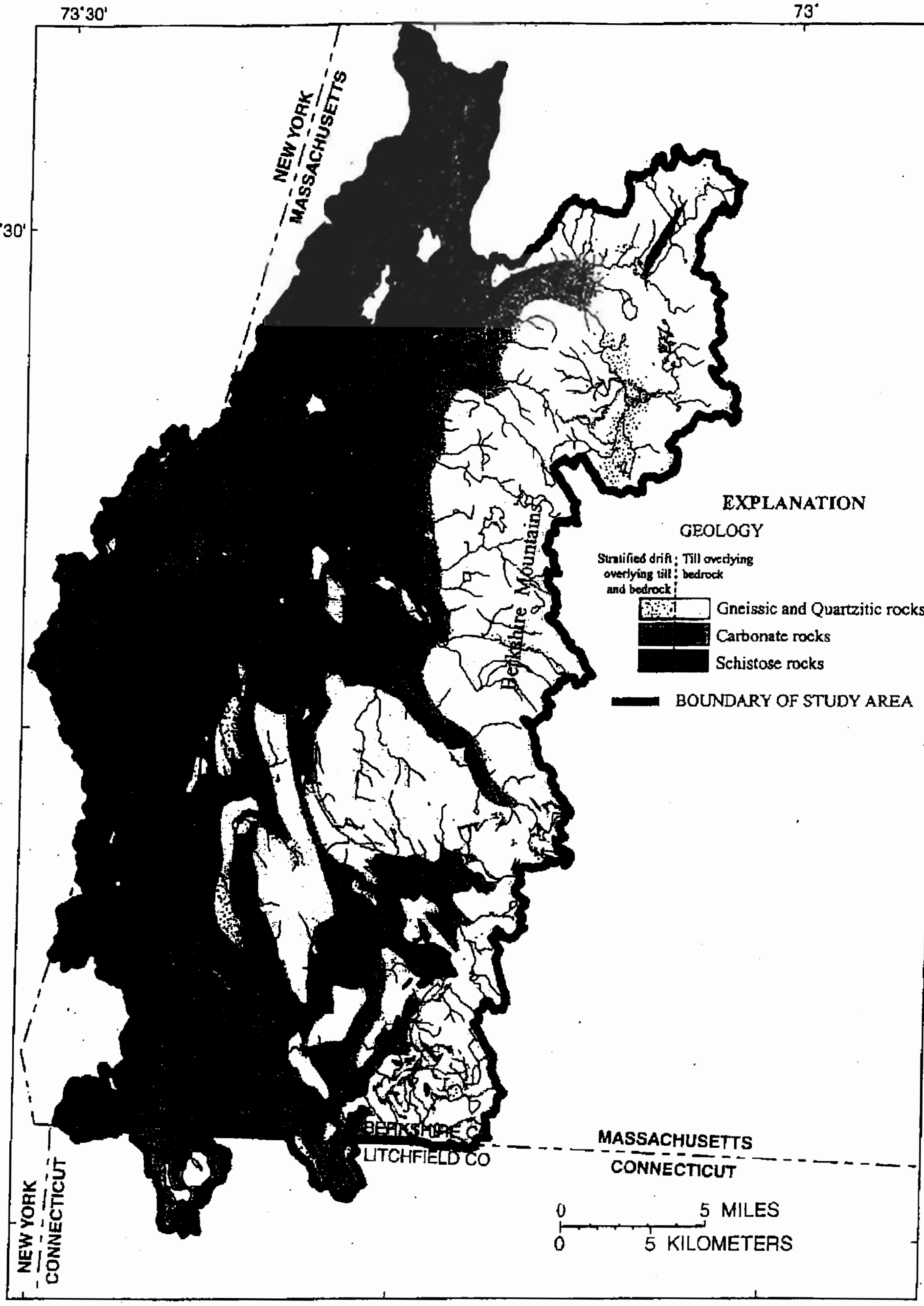
Abstract

This report presents the results of a study of streamflow, base flow, and ground-water recharge in the Housatonic River Basin in western Massachusetts, eastern New York, and northwestern Connecticut. Detailed hydrologic information is needed for efficient management and optimal use of surface-water and ground-water sources and for development of future public-water supplies in the study area.

Streamflows for selected flow durations from 1 to 99 percent and the August median streamflows were estimated for 11 long-term streamflow-gaging stations in and near the study area. Estimates of streamflow and associated standard errors were determined for selected flow durations from 50 to 99 percent and the August median streamflows for 21 low-flow partial-record stations and for selected flow durations from 1 to 99 percent and the August median streamflows for two partial-record stations and seven short-term discontinued streamflow-gaging stations. Median streamflows per square mile for the 10-, 50-, and 90-percent flow durations and the August median streamflows were 3.90, 1.01, 0.185, and 0.248 cubic feet per second per square mile. Streamflows per square mile at selected flow-duration discharges between 1 and 99 percent at the 41 stations were related to basin characteristics to explain differences in streamflow characteristics. Basin characteristics included basin elevations, extent of stratified-drift deposits, land use, aspect, and underlying bedrock geology types. Most streamflow differences were positively correlated to basin elevation differences, most likely because precipitation increases with elevation, and to stratified-drift deposits, which allow more precipitation to recharge the ground water and to discharge later than do till and bedrock deposits.

Mean base flow was computed from continuous records of daily mean discharge at 11 long-term streamflow-gaging stations in and near the study area. Mean annual base flow ranged from 13.4 to 24.5 inches per year. Minimum annual base flow ranged from 45 to 72 percent of mean annual rates at the 11 long-term stations, and the ratio of base flow to streamflow (base-flow index) ranged from 0.55 to 0.80. Base-flow durations between 1 and 99 percent were calculated from streamflow records at the 11 long-term streamflow-gaging stations. Base flow accounted for 45.5 to 85.0 percent of total annual streamflow at the 1- and 99-percent flow durations.

Ground-water-recharge rates were computed from continuous records of daily mean discharge at 11 long-term streamflow-gaging stations in and near the study area. Mean annual ground-water-recharge rates ranged from 17.5 to 22.4 inches per year at 10 of the 11 long-term stations. Mean annual ground-water-recharge rates ranged from 2 to 7 inches per year higher than base flow. Minimum annual ground-water-recharge rates ranged from 48 to 72 percent of mean annual ground-water-recharge rates. Mean annual potential ground-water recharge was estimated from monthly climatological data collected at six climatological stations in and near the study area. Mean potential ground-water recharge ranged from about 17.9 to 28.9 inches per year, with a median value of 22.6 inches per year.



Base from U.S. Geological Survey Digital Line Graphs, 1:100,000, 1989 Universal Transverse Mercator Projection, zone 18

Figure 2. Distribution of underlying bedrock types and stratified-drift and till deposits in the Housatonic River Basin, western Massachusetts and parts of eastern New York and northwestern Connecticut. (Compiled from Stone and others, 1985; Robinson and others, 1999.)

Table 14. Estimates of minimum, maximum, and mean annual streamflow and base flow, and base-flow indexes derived from the computer programs HYSEP and PART at long-term continuous and discontinued streamflow-gaging stations in and near the Housatonic River Basin, western Massachusetts and parts of eastern New York and northwestern Connecticut

[A water year is the 12-month period beginning October 1 and ending September 30. It is designated by the calendar year in which it ends. HYSEP (Sloto and Crouse, 1996); PART (Rutledge, 1998). USGS station No.: Locations shown in figure 3 and described in table 3. Base-flow index is mean annual base flow divided by mean annual streamflow. Streamflow and base flow are in inches per year. No., number; USGS, U.S. Geological Survey; --, not applicable]

USGS station No.	Period of record computed (water years)	Number of water years	Water year	Minimum	Water year	Maximum	Mean	Standard deviation	Base-flow index
Annual streamflow									
01180800	1964–77	14	1965	14.4	1972	44.5	30.8	8.21	--
01181000	1936–95	60	1965	10.6	1972	42.9	27.4	7.46	--
01187300	1939–55, 1957–95	56	1965	11.0	1955	43.8	27.1	7.86	--
01197000	1937–95	59	1965	10.0	1945	36.6	24.9	6.42	--
01197300	1964–74	11	1965	10.6	1973	45.6	31.0	8.99	--
01197500	1914–95	82	1965	10.1	1928	46.4	25.2	6.30	--
01198000	1952–71, 1995	21	1965	8.17	1952	31.4	21.0	5.64	--
01198500	1950–71	22	1965	7.62	1956	37.9	22.8	7.87	--
01199050	1962–95	34	1965	7.31	1976	34.0	22.2	6.49	--
01331400	1964–74	11	1965	12.8	1972	41.7	26.9	8.44	--
01333000	1950–95	46	1965	10.1	1975	40.1	26.0	6.33	--
Annual base flow derived by using HYSEP computer program (local minimum algorithm)									
01180800	1964–77	14	1965	10.0	1972	26.5	18.3	4.41	0.59
01181000	1936–95	60	1965	7.14	1972	24.5	15.3	3.57	.56
01187300	1939–55, 1957–95	56	1965	6.82	1945	22.8	14.9	3.88	.55
01197000	1937–95	59	1965	7.18	1972	21.4	15.0	3.39	.60
01197300	1964–74	11	1965	6.08	1972	30.6	21.4	6.55	.69
01197500	1914–95	82	1965	5.94	1928	27.2	15.5	4.03	.61
01198000	1952–71, 1995	21	1965	6.03	1952	21.0	14.2	3.45	.68
01198500	1950–71	22	1965	4.56	1956	20.0	13.4	3.89	.59
01199050	1962–95	34	1965	5.79	1976	25.3	15.9	4.45	.72
01331400	1964–74	11	1965	8.20	1972	25.2	16.2	4.79	.60
01333000	1950–95	46	1965	7.21	1952	23.8	16.8	3.51	.64
Annual base flow derived by using PART computer program									
01180800	1964–77	14	1965	11.1	1972	28.9	20.2	4.72	0.66
01181000	1936–95	60	1965	8.27	1978	24.6	16.9	3.88	.62
01187300	1939–55, 1957–95	56	1965	7.73	1978	23.1	15.9	3.84	.59
01197000	1937–95	59	1965	7.96	1945	23.8	16.5	3.76	.66
01197300	1964–74	11	1965	7.08	1972	33.4	24.5	7.25	.79
01197500	1914–95	82	1965	7.36	1928	32.0	17.6	4.68	.70
01198000	1952–71, 1995	21	1965	6.99	1952	24.6	16.7	4.05	.80
01198500	1950–71	22	1965	5.55	1956	23.2	15.2	4.36	.67
01199050	1962–95	34	1965	6.24	1976	23.4	17.4	4.77	.79
01331400	1964–74	11	1965	9.33	1972	24.7	17.6	4.68	.65
01333000	1950–95	46	1965	8.30	1975	29.0	19.6	4.27	.75

Appendix 10 – Limitations

LIMITATIONS

Explorations

1. The analyses and conclusions submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may become evident with further investigation. If such variations appear, it will be necessary to reevaluate the conclusions of this report.

2. The stratification lines on the logs and soil profile described in the text are intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.

3. Water level readings have been made in the drill holes and observation wells at times and under conditions stated on the logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater and flow rates may occur due to variations in rainfall, temperature and other factors occurring since the time measurements were made.

Analyses

4. A groundwater flow model of the study area was developed during this study. Efforts have been made to check the program in general and its output for the simulations performed to-date, and in our opinion, the results have been reasonable. However, it is recognized that models developed using different programs and/or different assumptions could produce different flow patterns. It should also be noted that fluctuations in the flow patterns variations will occur due to changes in rate and sequence of applications of sewage flows, seasonal precipitation and other climactic fluctuations, as well as other factors.

Review

5. In the event that any changes in the nature, design or location of the proposed subsurface disposal systems or other proposed site development features affecting groundwater recharge are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by Geo**Design**, Inc. It is recommended that this firm be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

Uses of Report

6. This report has been prepared for the exclusive use of Paul Camarda and Hudson Valley Realty for specific application to the proposed subsurface disposal system at the proposed Patterson Crossing development, in Patterson and Kent, New York in accordance with generally accepted hydrogeologic practices. No other warranty, express or implied, is made.