TOWN OF PHILIPSTOWN CONSERVATION BOARD
TOW HALL 238 MAIN STREET, COLD SPRING, NY
TUESDAY JUNE 12, 2012 AT 7:30 PM

MEETING AGENDA

1.) GARRISON GULF CLUB TM#60.-1-59.2 WL-12-216
2015 ROUTE 9
STREAM BANK REPAIR

2.) SCANGA, NICK AND JULIE TM# 27.20-1-26 WL-12-217
7 CROSS CREEK RD
CONSTRUCTION OF BRIDGE

3.) FREED, BRIDGET TM# 89.-1-29 WL-12-215
365 SOUTH MOUNTAIN PASS
CONSTRUCTION OF 15X15 BARN

4.) MILES, SUZANNE TM# 61.-3-60 WL-12-218
98 PHILIPSBROOK RD
CULVERT REPLACEMENT

5.) DONNELY, DANIEL& SHIELA TM# 60.-2-65 WL-12-
94 FRAZIER RD
CLEARING SHRUB AND SMALL TREE GROWTH NEAR ADJACENT STREAM

* ITEMS MAY NOT BE TAKEN IN ORDER AS LISTED

GARRISON Gulf Club
(THE GARRISON)
WL-12-216

DATE	
5-24-12	Received Application / Plans STAMPED & DATED 5-22-12
	prepared By MICHAEL P. CARR /
5-24-12	500.00 Application FEE PAID
	500.00 Escrow FEE PAID
5-24-12	INSPECTOR VERIFIED OK TO PLACE ON THE AGENDA FOR 6/12/12

RECEIVED
MAY 24 2012
TOWN OF PHILIPSTOWN
CONSERVATION BOARD

TAL

TOWN OF PHILIPSTOWN
PUTNAM COUNTY, NEW YORK

238 Main Street
Cold Spring, NY, 10516
(845) 265-5202

APPLICATION FOR WETLANDS PERMIT

Note to Applicant:
Submit the completed application to the appropriate permitting authority. The application for Wetlands Permit should be submitted simultaneously with any related application (e.g., subdivision approval, site plan approval, Special Use Permit, etc.), being made to the permitting authority.

(Office Use Only)

received
5/24/12 DK

Application # WL-12-216

Received by: _____

Date 5-24-12

Fee 500.00 App
500.00 Escrow

Permitting Authority

_____ Z.B.A.

_____ Planning Board

_____ Wetlands Inspector

Pursuant to Chapter 93 of the Code of the Town of Philipstown, entitled "Freshwater Wetlands and Watercourse Law of the Town of Philipstown" (Wetlands Law), the undersigned hereby applies for a Wetlands Permit to conduct a regulated activity in a controlled area.

1. **Owner:** Name: GARRISON GOLF CLUB - THE GARRISON

   Address: PO BOX 348, 2015 ROUTE 9 GARRISON NY

   Telephone: 845 424 4747

2. **Agent:** Name: MICHAEL P. CARR, P.E.
   (*Applicant must be owner of the land. The Application may be managed an authorized agent of such person.*)

3/ **Name of Agent**

If Corporation, give names of officers:

_____ _____

Mailing Address: PO BOX 160 COLD SPRING NY 10516

Telephone: 845 265 4152

3. **Location of Proposed Activity:**
   2015 ROUTE 9 GARRISON NY

   Tax Map No.: 60.-1-59.2

   Acreage of Controlled Area Affected: 21

4. **Type of Activity: (See list of regulated activities)**

   STREAM BANK REPAIR

5. Other permit(s) required and agency or agencies responsible for granting such permits such as but not limited to P.C.B.O.H, N.Y.D.E.C, Army Core of Engineers, EPA, DOT, Building Dept. Planning Board, and Z.B.A.

6. Each copy of this application shall be accompanied by:

a. A detailed description of the proposed activity and a comparison of the activity to the criteria for approval specified in §93-8 of the Wetlands Law. (See below)

b. A completed short form environmental assessment form.

c. A map prepared by a licensed surveyor landscape architect or engineer showing:

1. The controlled area(s) wetland buffer zone 100 feet from the edge of any wetlands, lakes, ponds or streams on the site;

2. Any wetland or watercourse therein and the location thereof;

3. The location, extent, and nature of the proposed activity.

D. The names of claimants of water rights in the wetland or watercourse of whom the applicant has record notice and the names and addresses of all owners of record of properties abutting and directly across from the proposed activity as shown on the latest tax record.

(Note: Any map, plat or plan showing the above information that is required to be submitted for any other permit or approval in connection with the regulated activity, and that is acceptable to the Permitting Authority, may be used.)

Date: 5/22/2012

Signature of Applicant:

MICHAEL P. CARR, P.E.
Consulting Engineer

2700 Route 9, PO Box 160
Cold Spring, New York 10516
Phone: (845) 265-4152
Fax: (845) 265-4154
email: mcarr@carr-eng.com

Date: May 22, 2012

Wetlands Advisory Board
David J. Klotzle
Wetlands Inspector, Philipstown, NY
238 Main Street
Cold Spring, NY 10516

Reference: Request for stream bank repair permit for the 7th fairway at the Garrison Golf Club, located at 2015 Route 9, Garrison, NY 10516

Written Outline of Proposed Activity

The Garrison Golf Club wishes to obtain a Wetlands Permit to Repair the eroded banks of the intermittent stream which runs along the west side of the 7th fairway of the Garrison Golf Club. The applicant also wishes to repair banks and displaced damaged check dams at the south end of the fairway. The repair process will proceed as follows:

1. The process will proceed as indicated on the attached plans, and as outlined below:
2. Verify stream levels are at seasonal low.
3. Install silt fencing as required in plan.
4. Install boulder bank protection along eroded sections of bank as shown in detail and backfill with accumulated piles of run of bank left from August 28th storm.
5. Re-align concrete check dams at south end of fairway, and repair banks to direct water over check dams
6. Topsoil, seed, and hay mulch all disturbed areas.

Should you require any additional information, or have any questions, feel free to contact me at the above listed number.

Regards,

Michael P. Carr, P.E.

PHOTO 1 SHOWING ERODED BANK ALONG 7TH FAIRWAY
(note: 3' gap between fairway and stream was 11' wide before storm)

PHOTO 2 SHOWING CONCRETE CHECK DAMS NO LONGER FUNCTIONING

Response to Criteria for Approval 93-8: The Garrison

1. The activity will not have a substantial adverse effect upon the natural function and benefits of wetland or watercourse as set forth in 93-2B.
   Response: Affirmative, Bank repair will not adversely affect the wetlands or watercourse. Upon completion, conditions should be returned to storm conditions.
2. The activity will not substantially change the natural channel of a watercourse or substantially inhibit the dynamics of a watercourse system.
   Response: Affirmative, Bank repair will not adversely affect the natural channel of the watercourse. The channel and flow will be maintained during and after the work.
3. The activity will not result in the degrading or pollution of waters.
   Response: Affirmative, The watercourse will be protected during the bank repair with wire backed silt fencing.
4. The activity will not increase the potential for flooding.
   Response: Affirmative, The bank repair will not alter flow conditions, and will not increase potential for flooding.
5. Sufficient provision has been made for control of pollution, erosion, siltation and sedimentation during and after conduct of the activity.
   Response: Affirmative, The stream will be protected from pollution, erosion, and siltation during and after construction by using wire backed silt fencing. Excavation operations will be prohibited during periods of precipitation.
6. No practicable alternative location is available on the subject parcel.
   Response: Affirmative
7. No additional technical improvements or safeguards can reasonably be added to the plan or activity which would minimize the impact on a controlled area.
   Response: Affirmative
8. The activity will alleviate or remove a hazard to the public health.
   Response: Affirmative, bank repair will maintain the stream's volume and contribute to the stream's ability to regulate flow downstream.

The Garrison – **60.-1-59.2**
2015 US 9
Garrison, NY 10524

Adjoining Properties:
John Savva, Helen Savva – **60.-1-58**
PO Box 1093
Peekskill, NY 10566

Kenneth B. Parkin, Robin Faltz – **60.-1-59.11**
88 Snake Hill Rd
Garrison, NY 10524

Arnold Moss, Nancy Abraham – **60.-2-62**
232 East 62nd St
NY, New York 10021

Garrison Land Dev Corp – **60.-2-64**
Attn: Voelp
8 John Walsh Blvd Ste 411
Peekskill, NY 10566

Friars Of The Atonement- **60.-2-71.1, 60.-2-71.2, 60.-2-71.3**
Attn: Facilities Management
PO Box 300
Garrison, NY 10524

Allen E. Harris, Diane M. Harris – **60.-2-76**
27 Coleman Rd
Garrison, NY 10524

Kimberly Perrone – **60.-2-77, 60.-2-80**
24 Mynderse St
Saugerties, NY 12477

Carl Rankel – **60.-2-81**
1994 Albany Post Rd
Garrison, NY 10524

Louis Lombardo, Ruth Lombardo - **60.-2-83**
1988 US 9
Garrison, NY 10524

County Line Equities LLC – **60.-2-84**
35 Rodeo Dr
Lagrangeville, NY 12540

PROJECT ID NUMBER

617.20
APPENDIX C
STATE ENVIRONMENTAL QUALITY REVIEW

SEQR

SHORT ENVIRONMENTAL ASSESSMENT FORM

for UNLISTED ACTIONS Only

PART 1 - PROJECT INFORMATION (To be completed by Applicant or Project Sponsor)

1. APPLICANT / SPONSOR
GARRISON GOLF CLUB

2. PROJECT NAME
STREAM BANK REPAIR

3. PROJECT LOCATION:
Municipality GARRISON NY TOWN OF PHILIPSTOWN
County PUTNAM

4. PRECISE LOCATION: Street Addess and Road Intersections, Prominent landmarks etc - or provide map
2015 ROUTE 9, GARRISON NY, 7TH FAIRWAY ADJACENT TO SNAKE HILL ROAD

5. IS PROPOSED ACTION: ☐ New ☐ Expansion ☒ Modification / alteration

6. DESCRIBE PROJECT BRIEFLY:

Applicant wishes to repair intermittent stream banks running along 7th fairway of the Garrison Golf Club, and armor banks with stone to prevent further erosion. Banks to also be repaired around the existing two concrete check dams at south end of fairway as required.

7. AMOUNT OF LAND AFFECTED:
Initially < 1 acres Ultimately < 1 acres

8. WILL PROPOSED ACTION COMPLY WITH EXISTING ZONING OR OTHER RESTRICTIONS?
☒ Yes ☐ No If no, describe briefly:

9. WHAT IS PRESENT LAND USE IN VICINITY OF PROJECT? (Choose as many as apply.)
☒ Residential ☐ Industrial ☐ Commercial ☐ Agriculture ☐ Park / Forest / Open Space ☒ Other (describe)

GOLF COURSE

10. DOES ACTION INVOLVE A PERMIT APPROVAL, OR FUNDING, NOW OR ULTIMATELY FROM ANY OTHER GOVERNMENTAL AGENCY (Federal, State or Local)
☐ Yes ☒ No If yes, list agency name and permit / approval:

11. DOES ANY ASPECT OF THE ACTION HAVE A CURRENTLY VALID PERMIT OR APPROVAL?
☐ Yes ☒ No If yes, list agency name and permit / approval:

12. AS A RESULT OF PROPOSED ACTION WILL EXISTING PERMIT / APPROVAL REQUIRE MODIFICATION?
☐ Yes ☐ No

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE

Applicant / Sponsor Name MICHAEL P. CARN Date: 5/22/2012

Signature MC

If the action is a Costal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment

MICHAEL P. CARR, P.E.
Consulting Engineer

2700 Route 9, PO Box 160
Cold Spring, New York 10516
Phone: (845) 265-4152
Fax: (845) 265-4154
email: mcarr@carr-eng.com

Date: August 4, 2011

Wetlands Advisory Board
David J. Klotzle
Wetlands Inspector, Philipstown, NY
238 Main Street
Cold Spring, NY 10516

Reference: Letter of Authorization for Michael P. Carr, P.E. to act as Agent for Request for improvements for the Garrison Golf Club, located at 2015 Route 9, Garrison, NY 10516

This is to inform you that Mr. Michael P. Carr, P.E. is authorized by the Garrison Golf Club to act on our behalf in obtaining a Wetlands Permit and DEC permit for stream improvements.

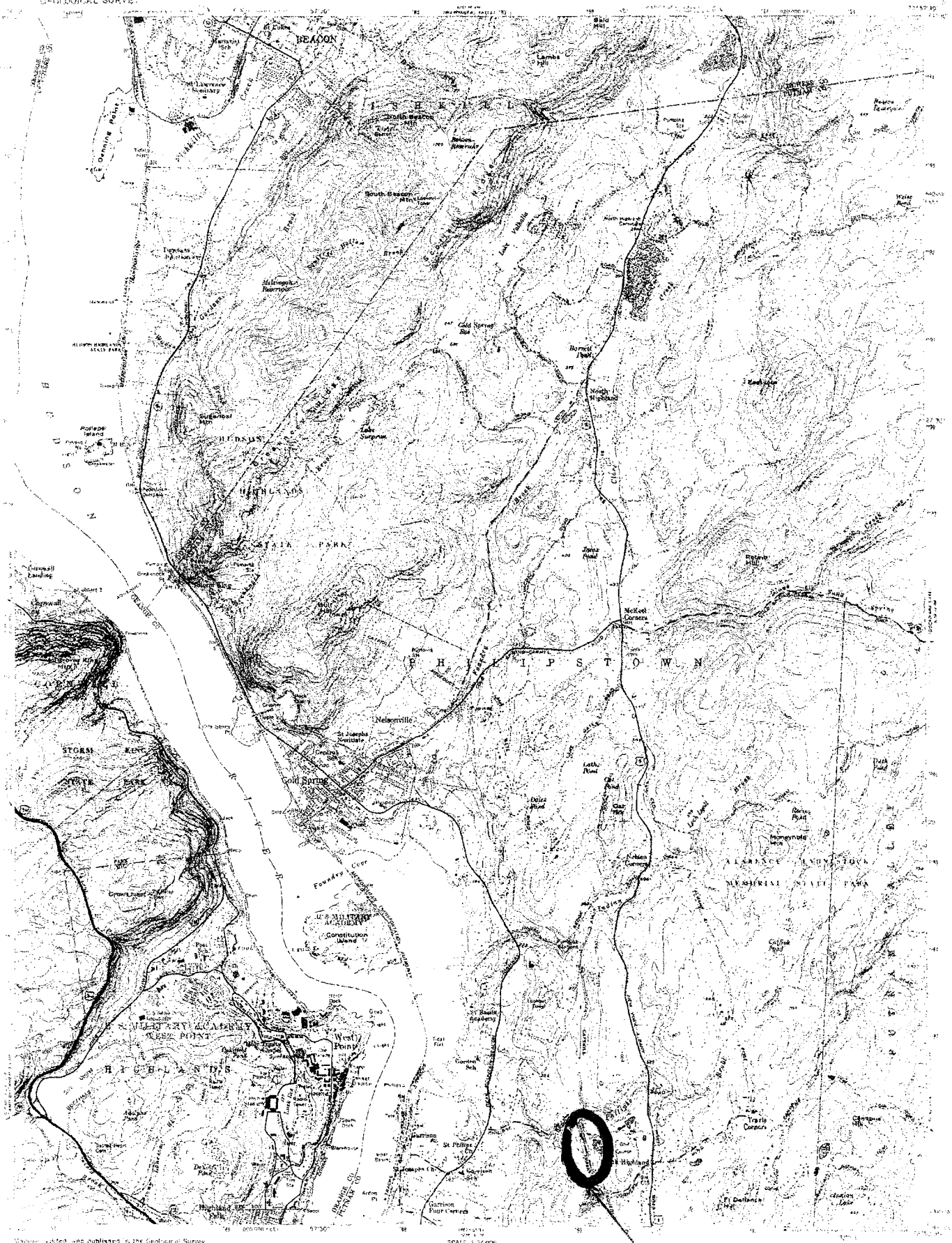
Very truly yours,

Marti Ajello
Assistant General Manager

DONNA CALLO - NOTARY PUBLIC
NYS # 01GA6024891
QUALIFIED IN DUTCHESS COUNTY
COMMISSION EXPIRES: 5/17/14

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

WEST POINT QUADRANGLE
NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHIC)



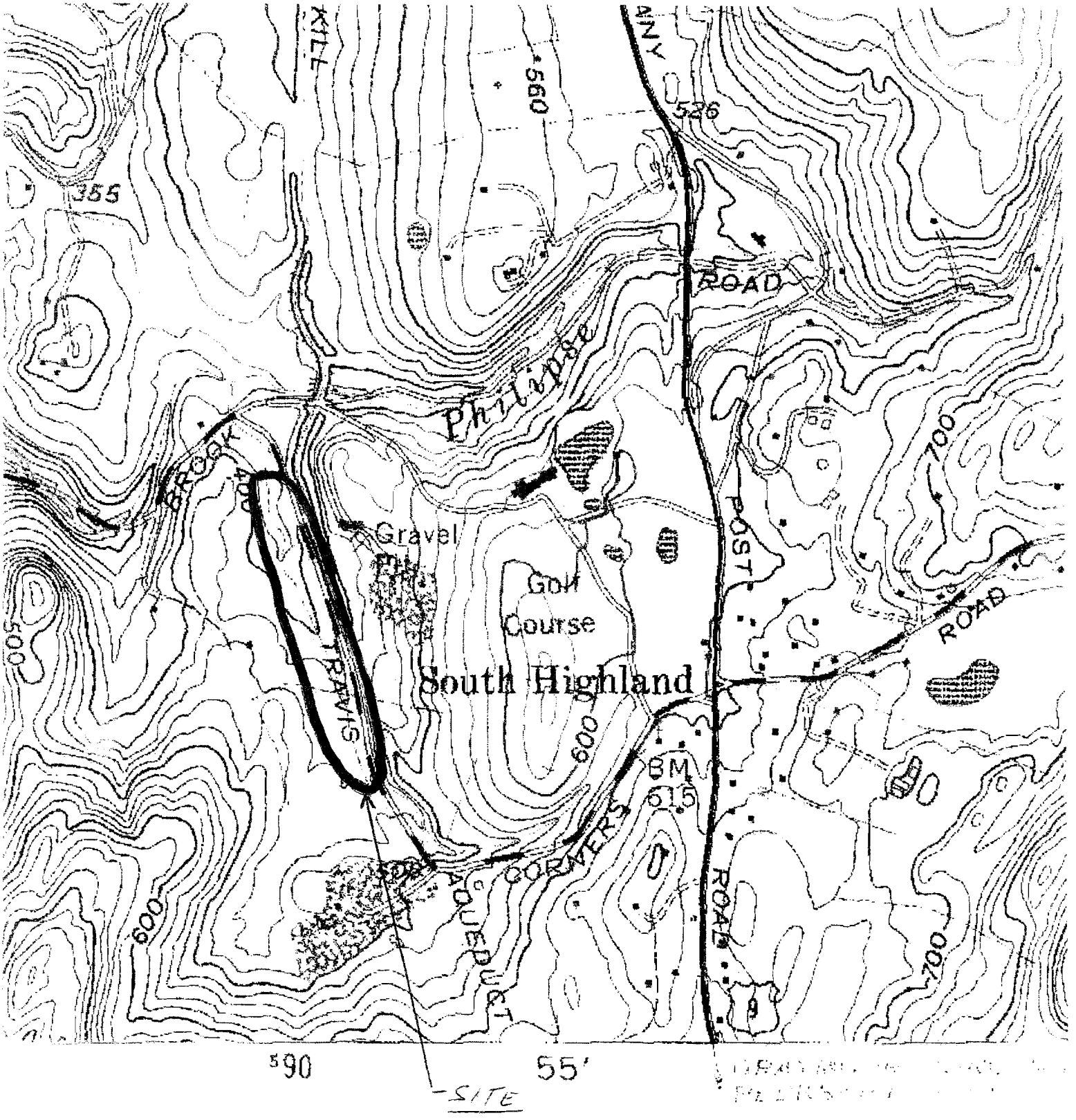
Topographic edition published by the Geological Survey

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225 OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WEST POINT, N.Y.


KILL
ANY
560
526
355
ROAD
Philipse
BROOK
Gravel
Pit
Golf
Course
South Highland
POST
ROAD
700
500
TRAVIS
600
BM
615
CORNERS
AQUEDUCT
ROAD
600
700
590
55'
SITE
1 MILE
6000
7000 FEET

TOWN OF PHILIPSTOWN
PUTNAM COUNTY, NEW YORK

238 Main Street
Cold Spring, NY, 10516
(845) 265-5202

RECEIVED
MAY 24 2012
TOWN OF PHILIPSTOWN
CONSERVATION BOARD

APPLICATION FOR WETLANDS PERMIT

Note to Applicant:
Submit the completed application to the appropriate permitting authority. The application for Wetlands Permit should be submitted simultaneously with any related application (e.g., subdivision approval, site plan approval, Special Use Permit, etc.), being made to the permitting authority.

(Office Use Only)

Application # WL-12-217

Received by: _____

Date 5-24-12

Fee 500 ck #785 Escrow
500 ck #786 Permit

Permitting Authority

received 5/29/12 - DJ

_____ Z.B.A.

_____ Planning Board

_____ Wetlands Inspector

Pursuant to Chapter 93 of the Code of the Town of Philipstown, entitled "Freshwater Wetlands and Watercourse Law of the Town of Philipstown" (Wetlands Law), the undersigned hereby applies for a Wetlands Permit to conduct a regulated activity in a controlled area.

1. **Owner:** Name: NICK & JULIE SCANGA

   Address: 77 INNSBRUCK BLVD, HOPEWELL JCT NY 12533

   Telephone: (845) 803-0176

2. **Agent:** Name: MICHAEL P. CARR, P.E.
   (*Applicant must be owner of the land. The Application may be managed by an authorized agent of such person possessing a notarized letter of consent from the owner.*)

3/ **Name of Agent** MICHAEL P. CARR

If Corporation, give names of officers:

_____ _____

_____ _____

Mailing Address: PO BOX 160, COLD SPRING NY 10516

Telephone: (845) 265-4152

3. **Location of Proposed Activity:**
   CROSS CREEK ROAD, TOWN OF PHILIPSTOWN

   Tax Map No.: _____

   Acreage of Controlled Area Affected: .13 ACRES

4. **Type of Activity: (See list of regulated activities)**

   C - CONSTRUCTION OF BRIDGE

5. Other permit(s) required and agency or agencies responsible for granting such permits such as but not limited to P.C.B.O.H, N.Y.D.E.C, Army Core of Engineers, EPA, DOT, Building Dept. Planning Board, and Z.B.A.

NYS DEC

6. Each copy of this application shall be accompanied by:

a. A detailed description of the proposed activity and a comparison of the activity to the criteria for approval specified in §93-8 of the Wetlands Law. (See below)

b. A completed short form environmental assessment form.

c. A map prepared by a licensed surveyor landscape architect or engineer showing:

1. The controlled area(s) wetland buffer zone 100 feet from the edge of any wetlands, lakes, ponds or streams on the site;

2. Any wetland or watercourse therein and the location thereof;

3. The location, extent, and nature of the proposed activity.

D. The names of claimants of water rights in the wetland or watercourse of whom the applicant has record notice and the names and addresses of all owners of record of properties abutting and directly across from the proposed activity as shown on the latest tax record.

(Note: Any map, plat or plan showing the above information that is required to be submitted for any other permit or approval in connection with the regulated activity, and that is acceptable to the Permitting Authority, may be used.)

Date: 5/17/12

Signature of Applicant:

MICHAEL P. CARR, P.E.
Consulting Engineer

2700 Route 9, PO Box 160
Cold Spring, New York 10516
Phone: (845) 265-4152
Fax: (845) 265-4154
email: mcarr@carr-eng.com

Date: May 16, 2012

Wetlands Advisory Board
David J. Klotzle
Wetlands Inspector, Philipstown, NY
238 Main Street
Cold Spring, NY 10516

Reference: Request for permit for bridge replacement over Clove Creek, on Cross Creek Road, located off Rt 9, 200' south of Carlson Court, Cold Spring, NY 10516, on lands of Giuliana Salvi-Scanga, tax map # 27.20-1-26

Written Outline of Proposed Activity

Ms. Scanga wishes to obtain a Wetlands Permit to Replace the washed away bridge which allows Cross Creek Road to cross from the west side of Clove Creek, to the east side. This bridge was washed away during the storm of August 28th 2011.

1. The process will proceed as indicated on the attached plans, and as outlined below:
2. Verify stream levels are at seasonal low.
3. Install silt fencing and protective barriers as outlined in plan.
4. Install cofferdam(s) as outlined in plan.
5. Remove existing debris vegetation, stumps, and abutment, preventing rock and concrete material from falling into the stream.
6. Verify stream flow stays within channel and out of cofferdam area.
7. Dig footing excavation to depth and profile as shown on plan.
8. Form and pour footing as noted on plan.
9. Form and pour abutments as noted on plan.
10. Install steel structure as noted on plan.
11. Install wood deck as noted on plan.
12. Install railings as noted on plan.
13. Backfill abutments, and armor abutments as shown on plan.
14. Topsoil, seed, and hay mulch all disturbed areas as shown on plan.

Should you require any additional information, or have any questions, feel free to contact me at the above listed number.

Regards,

Michael P. Carr, P.E.

PHOTO 1 SHOWING WEST SHORE OF CLOVE CREEK AT PREVIOUS BRIDGE SITE VIEWED FROM EAST SHORE

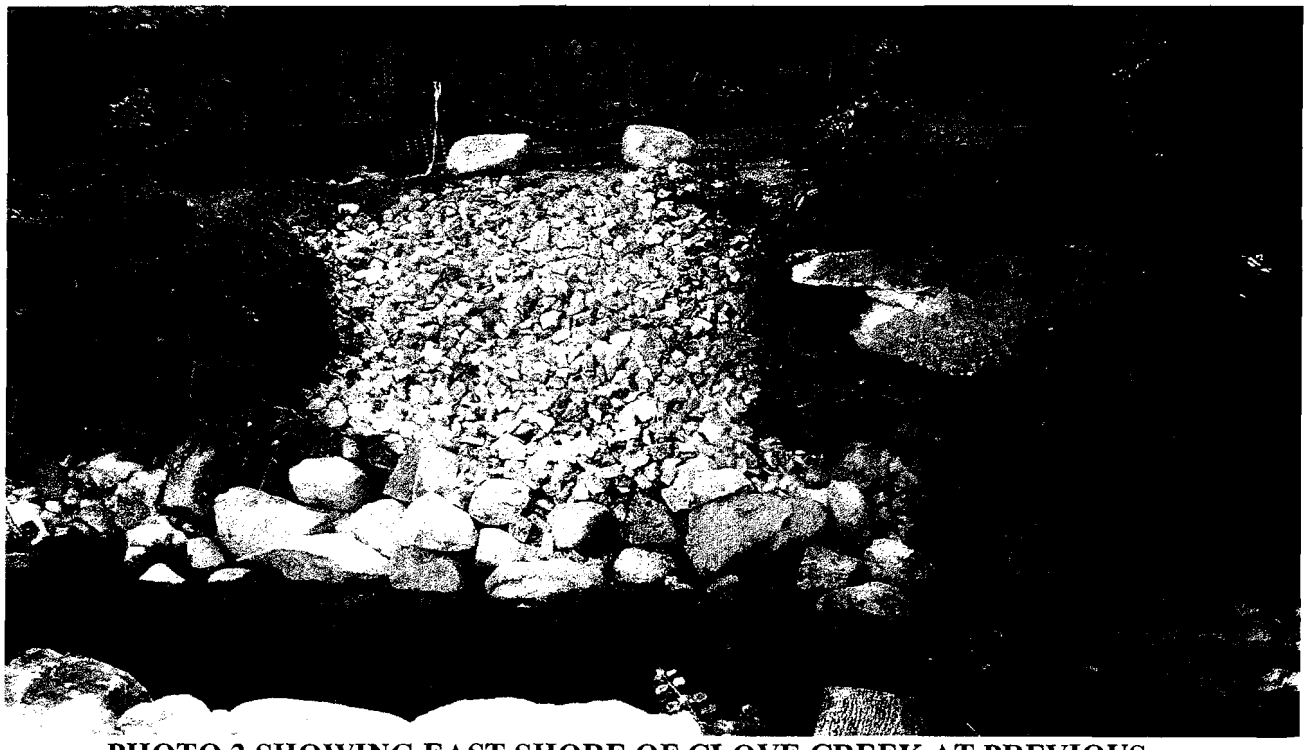


PHOTO 2 SHOWING EAST SHORE OF CLOVE CREEK AT PREVIOUS BRIDGE SITE VIEWED FROM WEST SHORE

Response to Criteria for Approval 93-8: The New Bridge:

1. The activity will not have a substantial adverse effect upon the natural function and benefits of wetland or watercourse as set forth in 93-2B.
   Response: Affirmative, bridge replacement and bank repair will not adversely affect the wetlands or watercourse (Clove Creek). Upon completion, conditions should be returned to storm conditions.
2. The activity will not substantially change the natural channel of a watercourse or substantially inhibit the dynamics of a watercourse system.
   Response: Affirmative, bridge replacement and bank repair will not adversely affect the natural channel of the watercourse (Clove Creek). The channel and flow will be maintained during and after the work.
3. The activity will not result in the degrading or pollution of waters.
   Response: Affirmative, The watercourse will be protected during the bridge replacement and bank repair with wire backed silt fencing.
4. The activity will not increase the potential for flooding.
   Response: Affirmative, The bridge replacement and bank repair will not alter flow conditions, and will not increase potential for flooding.
5. Sufficient provision has been made for control of pollution, erosion, siltation and sedimentation during and after conduct of the activity.
   Response: Affirmative, The stream will be protected from pollution, erosion, and siltation during and after construction by using coffer dams and wire backed silt fencing. Excavation operations will be prohibited during periods of precipitation.
6. No practicable alternative location is available on the subject parcel.
   Response: Affirmative
7. No additional technical improvements or safeguards can reasonably be added to the plan or activity which would minimize the impact on a controlled area.
   Response: Affirmative
8. The activity will alleviate or remove a hazard to the public health.
   Response: Affirmative, bridge replacement and bank repair will maintain the stream's volume and contribute to the stream's ability to regulate flow downstream.

List of Adjoiners to tax map # 27.20-1-26

27.20-1-24
Singh Bachiter
Singh Jagdeep
21 Torchia Road
Cold Spring, NY 10516

27.20-1-25
Vuksta Peter J II
Vuksta Janine M
11 Cross Creek Road, Apt 1
Cold Spring, NY 10516

27.20-1-27
Singh Bachiter
Singh Jagdeep
21 Torchia Road
Cold Spring, NY 10516

27.20-1-28
Reichard Kevin
3012 Route 9
Cold Spring, NY 10516

27.20-1-29
Reichard Kevin
3008 Route 9
Cold Spring, NY 10516

MICHAEL P. CARR, P.E.
Consulting Engineer

2700 Route 9, PO Box 160
Cold Spring, New York 10516
Phone: (845) 265-4152
Fax: (845) 265-4154
email: mcarr@carr-eng.com

Date: May 16,2012

Wetlands Advisory Board
David J. Klotzle
Wetlands Inspector, Philipstown, NY
238 Main Street
Cold Spring, NY 10516

Reference: Letter of Authorization for Michael P. Carr, P.E. to act as Agent for Application for Wetlands Permit for new bridge to be constructed over Clove Creek on Cross Creek Road, Town of Philipstown

This is to inform you that Mr. Michael P. Carr, P.E. is authorized by Giuliana Salvi Scanga to act on my behalf in obtaining a Wetlands Permit and DEC permit (if required) for the bridge and stream improvements.

Very truly yours,

Giuliana Salvi Scanga
Owner

CHRISTINA M. MCCOY
NO. 01MC6211031
Notary Public, State of New York
My Commission Expires 9/8/2013

PROJECT ID NUMBER

617.20
APPENDIX C
STATE ENVIRONMENTAL QUALITY REVIEW

SEQR

SHORT ENVIRONMENTAL ASSESSMENT FORM

for UNLISTED ACTIONS Only

PART 1 - PROJECT INFORMATION (To be completed by Applicant or Project Sponsor)

1. APPLICANT / SPONSOR
NICK SCANGA

2. PROJECT NAME
REPLACEMENT BRIDGE OVER CLOVE CREEK

3. PROJECT LOCATION:
Municipality COLD SPRING PHILIPSTOWN
County PUTNAM

4. PRECISE LOCATION: Street Addess and Road Intersections, Prominent landmarks etc - or provide map
CROSS CREEK ROAD, COLD SPRING NY 10516

5. IS PROPOSED ACTION: [X] New [ ] Expansion [ ] Modification / alteration

6. DESCRIBE PROJECT BRIEFLY:
APPLICANT WISHES TO REPLACE BRIDGE SERVING CROSS CREEK ROAD WHICH CROSSES OVER CLOVE CREEK.
BRIDGE WAS WASHED AWAY DURING AUGUST 27TH 2011 STORM

7. AMOUNT OF LAND AFFECTED:
Initially .13 acres Ultimately .13 acres

8. WILL PROPOSED ACTION COMPLY WITH EXISTING ZONING OR OTHER RESTRICTIONS?
[X] Yes [ ] No If no, describe briefly:

9. WHAT IS PRESENT LAND USE IN VICINITY OF PROJECT? (Choose as many as apply.)
[X] Residential [X] Industrial [X] Commercial [ ] Agriculture [ ] Park / Forest / Open Space [ ] Other (describe)

10. DOES ACTION INVOLVE A PERMIT APPROVAL, OR FUNDING, NOW OR ULTIMATELY FROM ANY OTHER GOVERNMENTAL AGENCY (Federal, State or Local)
[X] Yes [ ] No If yes, list agency name and permit / approval:
PHILIPSTOWN C.A.C., NYS DEC

11. DOES ANY ASPECT OF THE ACTION HAVE A CURRENTLY VALID PERMIT OR APPROVAL?
[X] Yes [ ] No If yes, list agency name and permit / approval:
NYS DEC

12. AS A RESULT OF PROPOSED ACTION WILL EXISTING PERMIT / APPROVAL REQUIRE MODIFICATION?
[ ] Yes [X] No

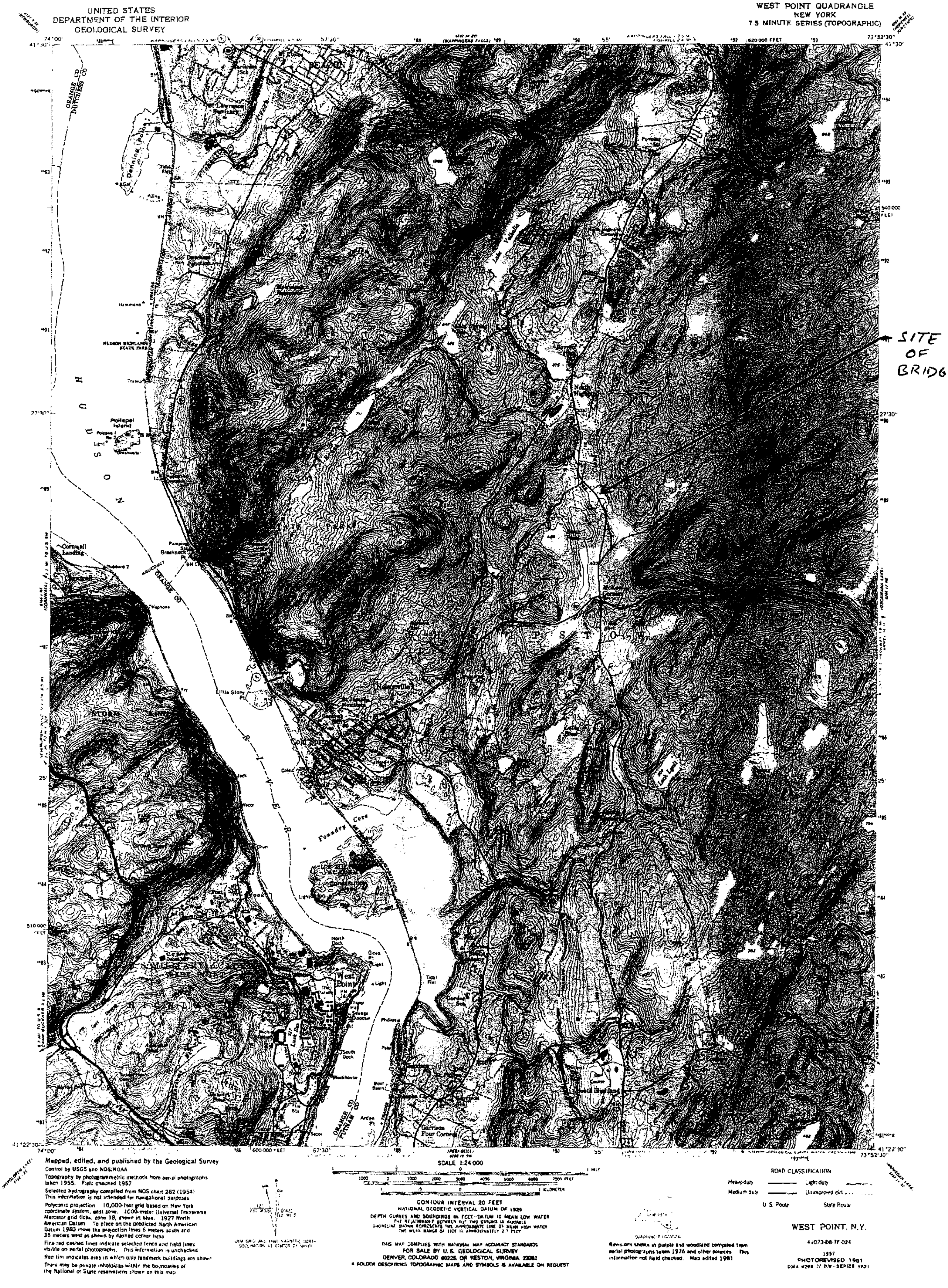
I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE

Applicant / Sponsor Name

Date: 5/17/12

Signature

If the action is a Costal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WEST POINT QUADRANGLE
NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHIC)
SITE OF BRIDGE
HUDSON
RIVER
Pollepel Island
Cornwall Landing
Breakneck
Little Stony Pt
Cold Spring
Nelsonville
Foundry Cove
West Point
North Dock
South Dock
Tidal Flat
Garrison Four Corners
ORANGE CO
DUTCHESS CO
PUTNAM CO
Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs taken 1955. Field checked 1957
Selected hydrography compiled from NOS chart 282 (1954)
This information is not intended for navigational purposes
Polyconic projection. 10,000-foot grid based on New York coordinate system, east zone. 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue. 1927 North American Datum. To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 35 meters west as shown by dashed corner ticks
Fine red dashed lines indicate selected fence and field lines visible on aerial photographs. This information is unchecked
Red tint indicates area in which only landmark buildings are shown
There may be private inholdings within the boundaries of the National or State reservations shown on this map
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
U. S. Route
State Route
Revisions shown in purple and woodland compiled from aerial photographs taken 1976 and other sources. This information not field checked. Map edited 1981
WEST POINT, N.Y.
1957
PHOTOREVISED 1981

BRIGITTE FREED

WL-12-215

DATE

5-21-12 RECEIVED APPLICATION / SURVEY / 500.00 APP FEE
500.00 ESCROW FEE

5-24-12 INSPECTOR VERIFIED OK TO PLACE ON 6-12-12 AGENDA

TOWN OF PHILIPSTOWN
PUTNAM COUNTY, NEW YORK

238 Main Street
Cold Spring, NY, 10516
(845) 265-5202

APPLICATION FOR WETLANDS PERMIT

Note to Applicant:
Submit the completed application to the appropriate permitting authority. The application for Wetlands Permit should be submitted simultaneously with any related application (e.g., subdivision approval, site plan approval, Special Use Permit, etc.), being made to the permitting authority.

RECEIVED
MAY 22 2012
TOWN OF PHILIPSTOWN
CONSERVATION BOARD

(Office Use Only)

Application # WL 12-215

Received by: DCL

Date 5-21-12

Fee ck. 3012 500 Escrow
ck 3104 500 W/L Permit

Permitting Authority

_____ Z.B.A

_____ Planning Board

_____ Wetlands Inspector

Pursuant to Chapter 93 of the Code of the Town of Philipstown, entitled "Freshwater Wetlands and Watercourse Law of the Town of Philipstown" (Wetlands Law), the undersigned hereby applies for a Wetlands Permit to conduct a regulated activity in a controlled area.

1. Owner: Name: BRIGITTE FREED

Address: 365 SOUTH MOUNTAIN PASS, GARRISON, NY 10524

Telephone: 845-424-3889

2. Agent: Name: _____
(Applicant must be owner of the land. The Application may be managed an authorized agent of such person.)

3/ **Name of Agent**

If Corporation, give names of officers:

_____ _____

_____ _____

Mailing Address: _____

Telephone: _____

3. Location of Proposed Activity:

Tax Map No.: 89-1-29

Acreage of Controlled Area Affected: 15'X15' BLDG.

4. Type of Activity: (See list of regulated activities)

BUILDING A 15'X15' BARN

5. Other permit(s) required and agency or agencies responsible for granting such permits such as but not limited to P.C.B.O.H. N.Y.D.E.C. Army Core of Engineers, EPA, DOT, Building Dept. Planning Board, and Z.B.A.

6. Each copy of this application shall be accompanied by.

a. A detailed description of the proposed activity and a comparison of the activity to the criteria for approval specified in §93-8 of the Wetlands Law. (See below)

b. A completed short form environmental assessment form.

c. A map prepared by a licensed surveyor landscape architect or engineer showing.

1. The controlled area(s) wetland buffer zone 100 feet from the edge of any wetlands lakes, ponds or streams on the site;

2. Any wetland or watercourse therein and the location thereof;

3. The location, extent, and nature of the proposed activity.

D. The names of claimants of water rights in the wetland or watercourse of whom the applicant has record notice and the names and addresses of all owners of record of properties abutting and directly across from the proposed activity as shown on the latest tax record.

(Note: Any map, plat or plan showing the above information that is required to be submitted for any other permit or approval in connection with the regulated activity, and that is acceptable to the Permitting Authority, may be used.)

Date: 5-17-2012

Signature of Applicant:

Brigitte Feid

617.20

Appendix C
State Environmental Quality Review
SHORT ENVIRONMENTAL ASSESSMENT FORM
For UNLISTED ACTIONS Only

PART I - PROJECT INFORMATION (To be completed by Applicant or Project Sponsor)

1. APPLICANT/SPONSOR
BRIGITTE FREED

2. PROJECT NAME

3. PROJECT LOCATION:
Municipality PHILIPSTOWN County PUTNAM

4. PRECISE LOCATION (Street address and road intersections, prominent landmarks, etc., or provide map)
365 SOUTH MOUNTAIN PASS, GARRISON, N.Y. 10524

5. PROPOSED ACTION IS:
☒ New ☐ Expansion ☐ Modification/alteration

6. DESCRIBE PROJECT BRIEFLY:
15' X 15' BARN

7. AMOUNT OF LAND AFFECTED:
Initially 15' X 15' acres Ultimately 225 ☒' ~~acres~~

8. WILL PROPOSED ACTION COMPLY WITH EXISTING ZONING OR OTHER EXISTING LAND USE RESTRICTIONS?
☐ Yes ☐ No If No, describe briefly

9. WHAT IS PRESENT LAND USE IN VICINITY OF PROJECT?
☒ Residential ☐ Industrial ☐ Commercial ☐ Agriculture ☐ Park/Forest/Open Space ☐ Other
Describe:

10. DOES ACTION INVOLVE A PERMIT APPROVAL, OR FUNDING, NOW OR ULTIMATELY FROM ANY OTHER GOVERNMENTAL AGENCY (FEDERAL, STATE OR LOCAL)?
☐ Yes ☒ No If Yes, list agency(s) name and permit/approvals:

11. DOES ANY ASPECT OF THE ACTION HAVE A CURRENTLY VALID PERMIT OR APPROVAL?
☐ Yes ☒ No If Yes, list agency(s) name and permit/approvals:

12. AS A RESULT OF PROPOSED ACTION WILL EXISTING PERMIT/APPROVAL REQUIRE MODIFICATION?
☐ Yes ☒ No

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE
Applicant/sponsor name: BRIGITTE FREED Date: 5-17-2012
Signature: Brigitte Freed

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment

Reset

PART II - IMPACT ASSESSMENT (To be completed by Lead Agency)

A. DOES ACTION EXCEED ANY TYPE I THRESHOLD IN 6 NYCRR, PART 617.4? If yes, coordinate the review process and use the FULL EAF.
☐ Yes ☐ No

B. WILL ACTION RECEIVE COORDINATED REVIEW AS PROVIDED FOR UNLISTED ACTIONS IN 6 NYCRR, PART 617.6? If No, a negative declaration may be superseded by another involved agency.
☐ Yes ☐ No

C. COULD ACTION RESULT IN **ANY** ADVERSE EFFECTS ASSOCIATED WITH THE FOLLOWING: (Answers may be handwritten, if legible)

C1. Existing air quality, surface or groundwater quality or quantity, noise levels, existing traffic pattern, solid waste production or disposal, potential for erosion, drainage or flooding problems? Explain briefly:

C2. Aesthetic, agricultural, archaeological, historic, or other natural or cultural resources; or community or neighborhood character? Explain briefly:

C3. Vegetation or fauna, fish, shellfish or wildlife species, significant habitats, or threatened or endangered species? Explain briefly:

C4. A community's existing plans or goals as officially adopted, or a change in use or intensity of use of land or other natural resources? Explain briefly:

C5. Growth, subsequent development, or related activities likely to be induced by the proposed action? Explain briefly:

C6. Long term, short term, cumulative, or other effects not identified in C1-C5? Explain briefly:

C7. Other impacts (including changes in use of either quantity or type of energy)? Explain briefly:

D. WILL THE PROJECT HAVE AN IMPACT ON THE ENVIRONMENTAL CHARACTERISTICS THAT CAUSED THE ESTABLISHMENT OF A CRITICAL ENVIRONMENTAL AREA (CEA)?
☐ Yes ☒ No If Yes, explain briefly:

E. IS THERE, OR IS THERE LIKELY TO BE, CONTROVERSY RELATED TO POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS?
☐ Yes ☒ No If Yes, explain briefly:

PART III - DETERMINATION OF SIGNIFICANCE (To be completed by Agency)

INSTRUCTIONS: For each adverse effect identified above, determine whether it is substantial, large, important or otherwise significant. Each effect should be assessed in connection with its (a) setting (i.e. urban or rural); (b) probability of occurring; (c) duration; (d) irreversibility; (e) geographic scope; and (f) magnitude. If necessary, add attachments or reference supporting materials. Ensure that explanations contain sufficient detail to show that all relevant adverse impacts have been identified and adequately addressed. If question D of Part II was checked yes, the determination of significance must evaluate the potential impact of the proposed action on the environmental characteristics of the CEA.

☐ Check this box if you have identified one or more potentially large or significant adverse impacts which **MAY** occur. Then proceed directly to the FULL EAF and/or prepare a positive declaration.

☐ Check this box if you have determined, based on the information and analysis above and any supporting documentation, that the proposed action **WILL NOT** result in any significant adverse environmental impacts **AND** provide, on attachments as necessary, the reasons supporting this determination.

Name of Lead Agency	Date
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Signature of Responsible Officer in Lead Agency	Signature of Preparer (If different from responsible officer)

Reset

TOWN OF PHILIPSTOWN
PUTNAM COUNTY, NEW YORK

238 Main Street
Cold Spring, NY, 10516
(845) 265-5202

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CONSERVATION BOARD

APPLICATION FOR WETLANDS PERMIT

Note to Applicant:
Submit the completed application to the appropriate permitting authority. The application for Wetlands Permit should be submitted simultaneously with any related application (e.g., subdivision approval, site plan approval, Special Use Permit, etc.), being made to the permitting authority.

(Office Use Only)

Application # WL-12-218

Received by: _____

Date _____

Fee 500.00 permit
500.00 Escrow

Permitting Authority

_____ Z.B.A.

_____ Planning Board

_____ Wetlands Inspector

Pursuant to Chapter 93 of the Code of the Town of Philipstown, entitled "Freshwater Wetlands and Watercourse Law of the Town of Philipstown" (Wetlands Law), the undersigned hereby applies for a Wetlands Permit to conduct a regulated activity in a controlled area.

1. Owner: Name: SUZANNE MILES

Address: 18 COLEMAN ROAD

Telephone: _____

2. Agent: Name: WADE SILKWORTH
(Applicant must be owner of the land. The Application may be managed by an authorized agent of such person possessing a notarized letter of consent from the owner.)

3/ **Name of Agent**

If Corporation, give names of officers:

_____ _____

Mailing Address: 6 MAPLE ROAD, POUGHKEEPSIE, NY 12601

Telephone: _____

3. Location of Proposed Activity:
98 PHILIPSEBROOK RD, GARRISON, NY 10524

Tax Map No.: 61-3-60

Acreage of Controlled Area Affected: 0.10 ACRES OF DISTURBANCE

4. Type of Activity: (See list of regulated activities)

CULVERT REPLACEMENT

5. Other permit(s) required and agency or agencies responsible for granting such permits such as but not limited to P.C.B.O.H, N.Y.D.E.C, Army Core of Engineers, EPA, DOT, Building Dept. Planning Board, and Z.B.A.

NYSDEC STREAM DISTURBANCE PERMIT

6. Each copy of this application shall be accompanied by:

a. A detailed description of the proposed activity and a comparison of the activity to the criteria for approval specified in §93-8 of the Wetlands Law. (See below)

b. A completed short form environmental assessment form.

c. A map prepared by a licensed surveyor landscape architect or engineer showing:

1. The controlled area(s) wetland buffer zone 100 feet from the edge of any wetlands, lakes, ponds or streams on the site;

2. Any wetland or watercourse therein and the location thereof;

3. The location, extent, and nature of the proposed activity.

D. The names of claimants of water rights in the wetland or watercourse of whom the applicant has record notice and the names and addresses of all owners of record of properties abutting and directly across from the proposed activity as shown on the latest tax record.

(Note: Any map, plat or plan showing the above information that is required to be submitted for any other permit or approval in connection with the regulated activity, and that is acceptable to the Permitting Authority, may be used.)

Date: 5/25/2012

Signature of Applicant:

Silkworth Engineering

Wade Silkworth, P.E.

6 Maple Road
Poughkeepsie, NY 12601
Phone: (845) 489-3329
Fax: (845) 849-3451
silkworthengineering@gmail.com
www.silkworthengineering.com

May 25, 2012

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CONSERVATION BOARD

Ashley Wilson
Regional Permit Adminsitrator
NYSDEC, Region 3
21 South Putt Corners Road
New Paltz, NY 12561
(3 hard copies by mail)

David Klotzle
Wetland Inspector
Philipstown Town Hall
238 Main St
Cold Spring, NY 10516
(Hand delivered 9 hard copies and CD by mail)

CC: Suzanne Miles, Applicant (1 copy hand delivered)

RE: **Stream Crossing Repair**
98 Philipsebrook Rd
Tax ID# 61-3-60

Dear Ms. Wilson and Mr. Klotzle:

Please find enclosed herewith the noted number of application packages for the above referenced project. Each package includes the following:

- NYSDEC Joint Application Form
- Town Wetland Permit Application
- Location Map
- Site photographs
- Project Plans
- Engineering Report
- EAF – part 1

The proposed project is for the replacement of the culvert on the private driveway that crosses the Philipse Brook and provides access to the home at 98 Philipsebrook Rd. The existing culvert and headwalls have sustained significant damage from large storms over the past couple years. In March of 2011 an Emergency Authorization was provided by the NYSDEC to conduct immediate repairs for a short term solution to protect life, safety and property. Pursuant to this authorization, a new 48" HDPE culvert was installed through the existing opening.

Since that time, additional large storms with high volumes have further damaged the existing structure. In speaking with Town officials in Philipstown, it seems the Town is eager for an expeditious review in order to implement this long-term solution as quickly as possible to rectify this situation.

The long-term solution will consist of excavating down and replacing the existing 48" culvert with a longer 72" culvert. The headwalls will be removed and the sides of the driveway will graded down to the new culvert. The stream banks will receive stabilization by means of stone fill and live stakes. Further information regarding the design details can be found in the enclosed plans and report.

If you have any questions during your review of this application, please feel free to call me at 845-489-3329.

Sincerely,

Wade Silkworth, P.E.

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JOINT APPLICATION FORM

Permits/Determinations to undertake activities affecting streams, waterways, waterbodies, wetlands, coastal areas and sources of water supply.

New York State

You must separately apply for and obtain separate Permits/Determinations from each involved agency prior to proceeding with work. Please read all instructions.

US Army Corps of Engineers (USACE)

APPLICATIONS TO

1. NYS Department of Environmental Conservation

Check all permits that apply:

- ☑ Stream Disturbance
- ☐ Excavation and Fill in Navigable Waters
- ☐ Docks, Moorings or Platforms
- ☐ Dams and Impoundment Structures
- ☐ 401 Water Quality Certification
- ☐ Freshwater Wetlands
- ☐ Tidal Wetlands
- ☐ Coastal Erosion Management
- ☐ Wild, Scenic and Recreational Rivers
- ☐ Water Supply
- ☐ Long Island Well
- ☐ Aquatic Vegetation Control
- ☐ Aquatic Insect Control
- ☐ Fish Control
- ☐ Incidental Take of Endangered/Threatened Species

☑ I am sending this application to this agency.

2. US Army Corps of Engineers

Check all permits that apply:

- ☐ Section 404 Clean Water Act
- ☐ Section 10 Rivers and Harbors Act
- ☐ Nationwide Permit(s) - Identify Number(s): _____

Preconstruction Notification - ☐ Y / ☐ N

☐ I am sending this application to this agency.

3. NYS Office of General Services

Check all permits that apply:

- ☐ State Owned Lands Under Water
  - ☐ Utility Easement (pipelines, conduits, cables, etc.)
  - ☐ Docks, Moorings or Platforms

☐ I am sending this application to this agency.

4. NYS Department of State

Check if this applies:

- ☐ Coastal Consistency Concurrence

☐ I am sending this application to this agency.

5. **Name of Applicant** (use full name)	**Applicant** must be: ☑ Owner ☐ Operator ☐ Lessee (check all that apply)
Suzanne Miles	
Mailing Address 18 Coleman Rd	
Post Office City Garrison	Taxpayer ID (If applicant is NOT an individual):
State NY Zip Code 10524	
Telephone (daytime) 203-331-7627	Email smiles11@sbcglobal.net

6. **Name of Facility or Property Owner** (if different than Applicant)	
Mailing Address	
Post Office City	
State	Zip Code
Telephone (daytime)	Email

7. **Contact/Agent Name**	
Wade Silkworth, PE	
Company Name Silkworth Engineering	
Mailing Address 6 Maple Road	
Post Office City Poughkeepsie	
State NY	Zip Code 12601
Telephone (daytime) 845-489-3329	
Email silkworthengineering@gmail.com	

8. **Project / Facility Name**	Property Tax Map Section / Block / Lot Number
Stream Crossing Repair	61-3-60
Project Location - Provide directions and distances to roads, bridges and bodies of waters: Existing crossing of Philipse Brook on the north side of Philipsebrook Rd, just east of the intersection with Frazier to access 98 Philipsebrook Rd residence	
Street Address, if applicable 98 Philipsebrook Rd	Post Office City Garrison — State NY Zip Code 10524
Town / Village / City Town of Philipstown	County Putnam
Name of USGS Quadrangle Map West Point	Stream/Water Body Name Philipse Brook

Location Coordinates: Enter NYTMs in kilometers, **OR** Latitude/Longitude

NYTM-E	NYTM-N	Latitude	Longitude
591197	4582455		

For Agency Use Only DEC Application Number: USACE Number:

9. **Project Description and Purpose:** Provide a complete narrative description of the proposed work and its purpose. Attach additional page(s) if necessary. Include: description of current site conditions and how the site will be modified by the proposed project; structures and fill materials to be installed; type and quantity of materials to be used (i.e., square ft of coverage and cubic yds of fill material and/or structures below ordinary/mean high water) area of excavation or dredging, volumes of material to be removed and location of dredged material disposal or use; work methods and type of equipment to be used; pollution control methods and mitigation activities proposed to compensate for resource impacts; and where applicable, the phasing of activities. **ATTACH PLANS ON SEPARATE PAGES.**

SEE ATTACHED PLANS AND REPORT

Proposed Use: ☑ Private ☐ Public ☐ Commercial	Proposed Start Date: JULY 2012	Estimated Completion Date: JULY 2012

Has Work Begun on Project? ☐ Yes ☑ No If Yes, explain.

Will Project Occupy Federal, State or Municipal Land? ☐ Yes ☑ No If Yes, please specify.

10. List Previous Permit / Application Numbers (if any) and Dates:
Emergency Authorization for temporary repairs, effective date 3/22/2011

11. Will this project require additional Federal, State, or Local Permits including zoning changes? ☑ Yes ☐ No If yes, please list:

Project requires local wetland and watercourse permit, and flood hazard area permit from the Town of Philipstown

12. **Signatures.** If applicant is not the owner, both must sign the application.
I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, fictitious or fraudulent statement.

Signature of Applicant	Suzanne Miles Printed Name	Property Owner Title	05/25/2012 Date
Signature of Owner	Printed Name	Title	Date
Signature of Agent	Wade Silkworth Printed Name	Engineer Title	05/25/2012 Date

For Agency Use Only **DETERMINATION OF NO PERMIT REQUIRED**

_____ (Agency Name) has determined that No Permit is required from this Agency for the project described in this application.

Agency Project Number _____

Agency Representative: Name (printed) _____ Title _____

Signature _____ Date _____

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CONSERVATION BOARD

617.20
Appendix A
State Environmental Quality Review
FULL ENVIRONMENTAL ASSESSMENT FORM

Purpose: The full EAF is designed to help applicants and agencies determine, in an orderly manner, whether a project or action may be significant. The question of whether an action may be significant is not always easy to answer. Frequently, there are aspects of a project that are subjective or unmeasurable. It is also understood that those who determine significance may have little or no formal knowledge of the environment or may not be technically expert in environmental analysis. In addition, many who have knowledge in one particular area may not be aware of the broader concerns affecting the question of significance.

The full EAF is intended to provide a method whereby applicants and agencies can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

Full EAF Components: The full EAF is comprised of three parts:

Part 1: Provides objective data and information about a given project and its site. By identifying basic project data, it assists a reviewer in the analysis that takes place in Parts 2 and 3.

Part 2: Focuses on identifying the range of possible impacts that may occur from a project or action. It provides guidance as to whether an impact is likely to be considered small to moderate or whether it is a potentially-large impact. The form also identifies whether an impact can be mitigated or reduced.

Part 3: If any impact in Part 2 is identified as potentially-large, then Part 3 is used to evaluate whether or not the impact is actually important.

THIS AREA FOR LEAD AGENCY USE ONLY

DETERMINATION OF SIGNIFICANCE -- Type 1 and Unlisted Actions

Identify the Portions of EAF completed for this project: ☑ Part 1 ☐ Part 2 ☐ Part 3

Upon review of the information recorded on this EAF (Parts 1 and 2 and 3 if appropriate), and any other supporting information, and considering both the magnitude and importance of each impact, it is reasonably determined by the lead agency that:

☐ A. The project will not result in any large and important impact(s) and, therefore, is one which **will not** have a significant impact on the environment, therefore **a negative declaration will be prepared.**

☐ B. Although the project could have a significant effect on the environment, there will not be a significant effect for this Unlisted Action because the mitigation measures described in PART 3 have been required, therefore **a CONDITIONED negative declaration will be prepared.***

☐ C. The project may result in one or more large and important impacts that may have a significant impact on the environment, therefore **a positive declaration will be prepared**.

*A Conditioned Negative Declaration is only valid for Unlisted Actions

_____
Name of Action

_____
Name of Lead Agency

_____ _____
Print or Type Name of Responsible Officer in Lead Agency | Title of Responsible Officer

_____ _____
Signature of Responsible Officer in Lead Agency | Signature of Preparer (If different from responsible officer)

website _____
Date

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 REPAIR OF EXISTING STREAM CROSSING

Location of Action (include Street Address, Municipality and County)

98 PHILIPSEBROOK RD, GARRISON, NY 10524
TOWN OF PHILIPSTOWN, PUTNAM COUNTY

Name of Applicant/Sponsor SUZANNE MILES

Address 18 COLEMAN RD

City / PO GARRISON State NY Zip Code 10524

Business Telephone

Name of Owner (if different) SAME AS ABOVE

Address

City / PO State Zip Code

Business Telephone

Description of Action:

REPAIR TO EXISTING STREAM CROSSING DAMAGED BY STORMS.
REPLACE CULVERT WITH LARGER CULVERT.
REMOVE HEADWALLS, GRADE SIDE SLOPES.
STABILIZE STREAM BANKS WITH STONE FILL AND LIVE STAKES.

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 _____

2. Total acreage of project area: 2.15 acres.

APPROXIMATE ACREAGE	PRESENTLY	AFTER COMPLETION
Meadow or Brushland (Non-agricultural)	____ acres	____ acres
Forested	1.9 acres	1.9 acres
Agricultural (Includes orchards, cropland, pasture, etc.)	____ acres	____ acres
Wetland (Freshwater or tidal as per Articles 24,25 of ECL)	____ acres	____ acres
Water Surface Area	____ acres	____ acres
Unvegetated (Rock, earth or fill)	____ acres	____ acres
Roads, buildings and other paved surfaces	0.25 acres	0.25 acres
Other (Indicate type) _____	____ acres	____ acres

3. What is predominant soil type(s) on project site? ChE - CHARLTON LOAM
   a. Soil drainage: ☑ Well drained 100 % of site ☐ Moderately well drained ____% of site.
   ☐ Poorly drained ____% 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? ____ acres (see 1 NYCRR 370). N.A.

4. Are there bedrock outcroppings on project site? ■ Yes ☐ No
   a. What is depth to bedrock 0-8 (in feet)

5. Approximate percentage of proposed project site with slopes:
   ☐ 0-10% ____% ☐ 10- 15% ____% ☑ 15% or greater 100 %

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? >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? ☐ Yes ☒ No

According to:

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:

N/A

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

☐ Yes ☒ No

If yes, explain:

N/A

14. Does the present site include scenic views known to be important to the community? ☐ Yes ☒ No

N/A

15. Streams within or contiguous to project area:

PHILIPSE BROOK

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

PHILIPSE BROOK, TRIBUTARY TO HUDSON RIVER

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

N/A

b. Size (in acres):

N/A

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: 2.15 acres.

b. Project acreage to be developed: 0.10 acres initially; 0.10 acres ultimately.

c. Project acreage to remain undeveloped: 2.05 acres.

d. Length of project, in miles: N/A (if appropriate)

e. If the project is an expansion, indicate percent of expansion proposed. 0 %

f. Number of off-street parking spaces existing 4 ; proposed 4

g. Maximum vehicular trips generated per hour: N/A (upon completion of project)?

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

	One Family	Two Family	Multiple Family	Condominium
Initially	N/A	N/A	N/A	N/A
Ultimately	N/A	N/A	N/A	N/A

i. Dimensions (in feet) of largest proposed structure: N/A height; N/A width; N/A length.

j. Linear feet of frontage along a public thoroughfare project will occupy is? 760 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?

DISTURBED AREAS WILL BE STABILIZED WITH SEED AND MULCH AND RESTORED TO ORIGINAL GRADES WHERE NECESSARY.

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? 0.10 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: 1 months, (including demolition)

7. If multi-phased:

   a. Total number of phases anticipated N/A (number)

   b. Anticipated date of commencement phase 1: N/A month N/A year, (including demolition)

   c. Approximate completion date of final phase: N/A month N/A year.

   d. Is phase 1 functionally dependent on subsequent phases? ☐ Yes ☐ No N/A

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

9. Number of jobs generated: during construction 3 ; after project is complete 0

10. Number of jobs eliminated by this project 0 .

11. Will project require relocation of any projects or facilities? ☐ Yes ☒ No

    If yes, explain:

    N/A

12. Is surface liquid waste disposal involved? ☐ Yes ☒ No

    a. If yes, indicate type of waste (sewage, industrial, etc) and amount N/A

    b. Name of water body into which effluent will be discharged N/A

13. Is subsurface liquid waste disposal involved? ☐ Yes ☒ No Type N/A

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

    If yes, explain:

    N/A

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

16. Will the project generate solid waste? ☐ Yes ☒ No

    a. If yes, what is the amount per month? N/A tons

    b. If yes, will an existing solid waste facility be used? ☐ Yes ☐ No N/A

    c. If yes, give name N/A ; location N/A

    d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? ☐ Yes ☐ No N/A

e. If yes, explain:

N/A

17. Will the project involve the disposal of solid waste? ☐ Yes ☒ No

    a. If yes, what is the anticipated rate of disposal? N/A tons/month.

    b. If yes, what is the anticipated site life? N/A 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 NORMAL NOISE DURING CONSTRUCTION PRODUCED BY EQUIPMENT

21. Will project result in an increase in energy use? ☐ Yes ☒ No

    If yes, indicate type(s)

N/A

22. If water supply is from wells, indicate pumping capacity N/A gallons/minute.

23. Total anticipated water usage per day N/A gallons/day.

24. Does project involve Local, State or Federal funding? ☐ Yes ☒ No

    If yes, explain:

N/A

25. Approvals Required:

			Type	Submittal Date
City, Town, Village Board	☐ Yes	☒ No		
City, Town, Village Planning Board	☐ Yes	☒ No		
City, Town Zoning Board	☐ Yes	☒ No		
City, County Health Department	☐ Yes	☒ No		
Other Local Agencies	☒ Yes	☐ No	TOWN PERMITS FOR WETLANDS AND FLOOD PLAIN	5/25/2012
Other Regional Agencies	☐ Yes	☐ No		
State Agencies	☒ Yes	☐ No	NYSDEC STREAM DISTURBANCE	5/25/2012
Federal Agencies	☐ Yes	☐ No		

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 ☐ New/revision of master plan ☐ Subdivision

☐ Site plan ☐ Special use permit ☐ Resource management plan ☐ Other

2. What is the zoning classification(s) of the site?

RESIDENTIAL

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

ONE HOUSE, AS IT EXISTS

4. What is the proposed zoning of the site?

N/A

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

ONE HOUSE, AS IT EXISTS

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

ONE HOUSE, AS IT EXISTS

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

RESIDENTIAL

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

9. If the proposed action is the subdivision of land, how many lots are proposed? N/A

   a. What is the minimum lot size proposed? N/A

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

N/A

11. Will the proposed action create a demand for any community provided services (recreation, education, police, fire protection?

☐ Yes ☒ No

a. If yes, is existing capacity sufficient to handle projected demand? ☐ Yes ☐ No

N/A

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

N/A

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 the 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 SUZANNE MILES Date 5/25/2012

Signature Suzanne Miles

Title PROPERTY OWNER

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment.

[print page] [close window]

Please set your printer orientation to "Landscape".

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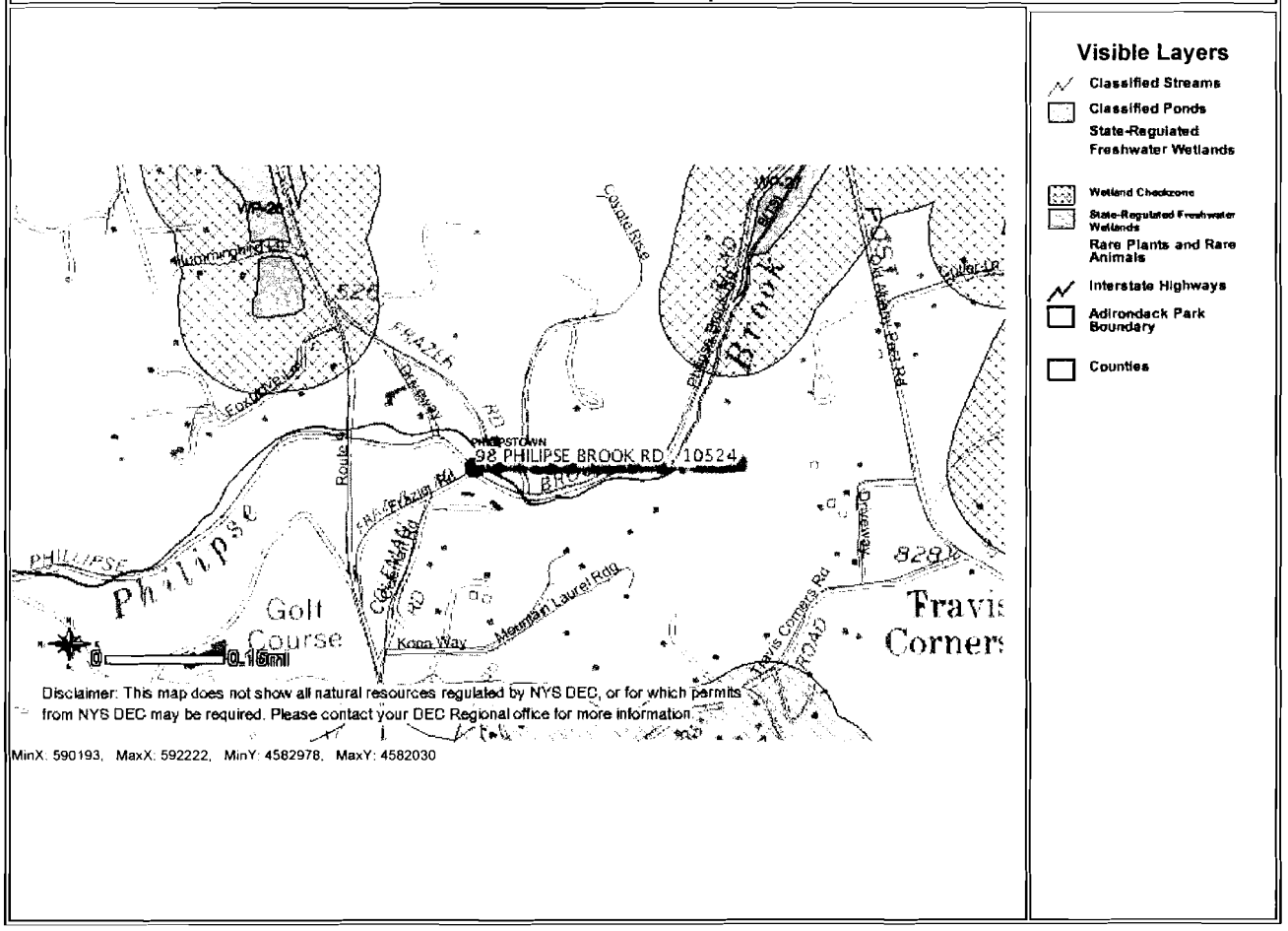
LOCATION MAP - 98 Phlipsebrook Rd



MinX: 590193, MaxX: 592222, MinY: 4582978, MaxY: 4582030

Visible Layers

- Classified Streams
- Classified Ponds
- State-Regulated Freshwater Wetlands
- Wetland Checkzone
- State-Regulated Freshwater Wetlands
- Rare Plants and Rare Animals
- Interstate Highways
- Adirondack Park Boundary
- Counties

Disclaimer:This map was prepared by the New York State Department of Environmental Conservation using the most current data available. It is deemed accurate but is not guaranteed. NYS DEC is not responsible for any inaccuracies in the data and does not necessarily endorse any interpretations or products derived from the data.

PHOTO LOCATIONS

SCALE 1" = 60'

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PHOTO #1.

PHOTO #2.

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PHOTO #3.

PHOTO #4.

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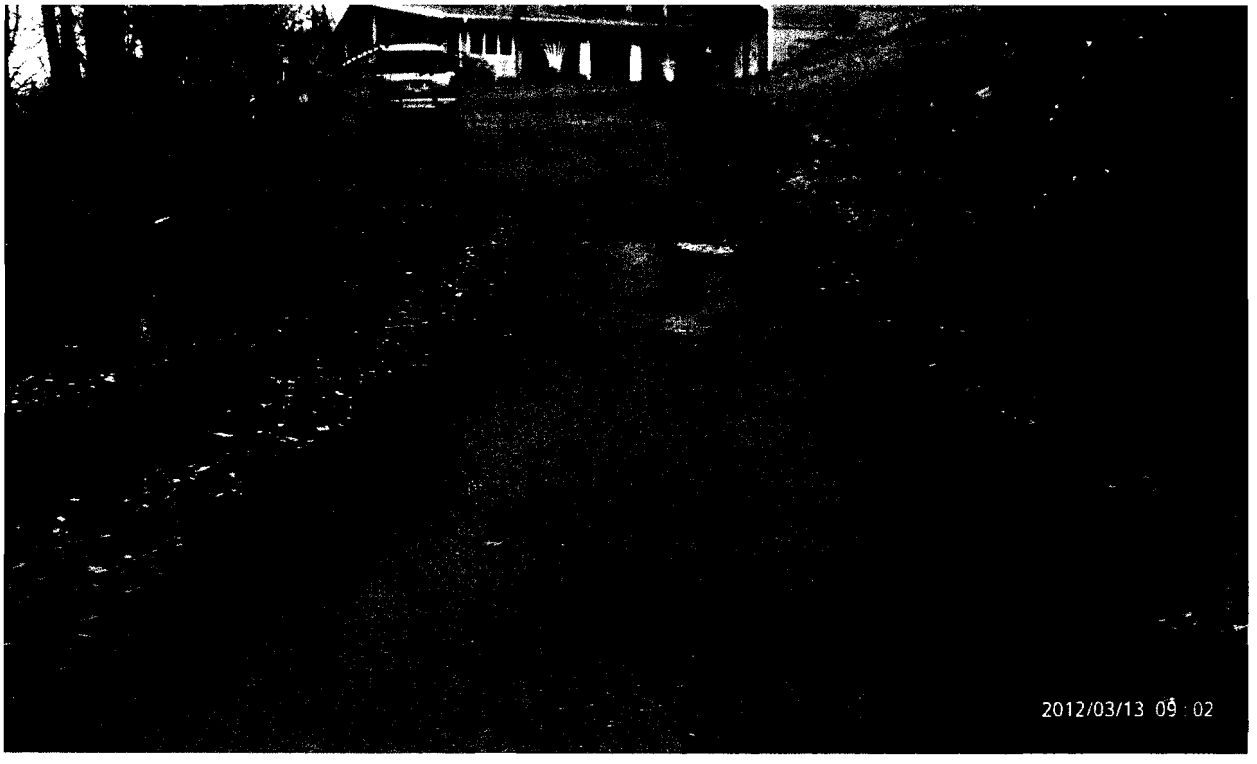
PHOTO #5.



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ENGINEERING REPORT

May 2012

For:

Steam Crossing Repairs

Existing Driveway for
98 Philipsebrook Road
Town of Philipstown
Putnam County, New York

Prepared for:

Suzanne Miles

STATE OF NEW YORK
WADE SILKWORTH
086117
LICENSED PROFESSIONAL ENGINEER

Prepared by:

Silkworth Engineering
6 Maple Road
Poughkeepsie, NY 12601
silkworthengineering@gmail.com
www.silkworthengineering.com

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Appendices

A. Watershed Maps
B. Soils Data
C. HydroCAD Reports – EXISTING CONDITIONS
D. HydroCAD Reports – POST-DEVELOPMENT CONDITIONS

I. Introduction / Site Description

The project site is located on the north side of Philipse Brook Road, just east of the intersection with Frazier Road. The existing driveway crosses the Philipse Brook to access the existing dwelling at 98 Philipsebrook Rd in the Philipstown in Putnam County, New York.

The site is also located per the UTM Coordinates
X: 591197
Y: 4582455

The existing stream crossing, consisting of stone and mortar headwalls with a 48" culvert, has sustained damage from several large storms over the past couple years and needs to be replaced.

The purpose of this report is to provide a comprehensive drainage analysis for the site in order to properly assess the existing structure and recommend culvert sizing and upgrades as necessary. The analysis will employ the use of "New York State Standards and Specifications for Sediment and Erosion Control" and the "New York State Storm water Management Design Manual" as needed. This report shall recommend storm water quantity control practices as needed, as well as recommend the use best management practices for the prevention of erosion and control of sediment during construction.

II. Project Description

The existing stream crossing was damaged by large storms occurring over the past couple years. Temporary repairs were implemented in 2011 under the NYSDEC's emergency authorization with the understanding that a long-term solution would be required.

This report shall address the plans for a long-term repair solution, for which construction is planned for the summer of 2012. Generally, this will include the following repairs:

- Replace the collapsing 48" corrugated metal culvert with a 72" smooth barrel culvert
- Remove the existing headwalls, grade slopes down to stream
- Install erosion control measures on stream banks and new slopes
- Re-build base of driveway and re-pave

III. Storm Water Management Analysis

In order to evaluate the crossing for storm water management, it is necessary to complete a hydrologic analysis of the site. In order to establish the limits of the watershed, maps of the site including the USGS topographic maps and the site survey were evaluated. The watershed was then verified by driving the area and witnessing drainage patterns. The established watershed for this evaluation remains unchanged from pre- to post-repair conditions, as the only change proposed in this report is the size of the culvert. The watershed flows generally from northeast to southwest and includes approximately 924 acres of various land uses which drain and contribute to the Philipse Brook and its tributaries prior to the arriving at the location of the stream crossing. Upon establishing the watershed limits, the land uses, soil types, and time of concentration are calculated and used to produce the storm water hydrographs for this watershed.

The purpose of the storm water management plan for this project is to properly re-size the stream crossing to better function during storm events when large storms are increasing flows in the Philipse Brook. By repairing the stream crossing, this plan shall mitigate possible future detrimental effects on the creek and downstream neighbors. Watersheds are shown on the maps included within Appendix A. Tabular information by sub-catchment, including but not limited to acres of total impervious area, areas of other land uses, times of concentrations, and curve numbers are provided in the attached Hydrocad 10.00 summary reports in appendix C.

Design Criteria:

The design storms for this site will be the Type III 24-hour storm event for the 1-yr, 2-yr, 10-yr, 25-yr, and 100-yr storm event with rainfall data as follows using US Weather TP40.

1-yr storm, 24 Hr	2.7 inches
2-yr storm, 24 Hr	3.5 inches
10-yr storm, 24 Hr	5.0 inches
25-yr storm, 24 Hr	6.0 inches
100-yr storm, 24 Hr	7.5 inches

Methodology:

- SCS Curve Number procedure to calculate the storm runoff from proposed site
- SCS TR 20 procedure to create the storm runoff hydrograph from proposed site (*Software program used for modeling storm water was HydroCAD v. 10.00)*
- SCS procedure for calculating time of concentration
- US Weather Bureau TP 40 publication for rainfall amounts

Results

The hydrologic and hydraulic analysis on this site shows that the proposed repairs will allow the stream crossing to better function. The peak depths of the flow in the culvert were determined by comparing the peak elevation information as compared to the culvert invert elevation (tabular information found in appendix C). The peak depths of flow in the culvert pipe were then compared from pre- to post-repair conditions. Looking at the depths of flow in the pipe and the available freeboard left for transporting debris, it can be seen that the repairs will result in a better functioning culvert. The following table depicts the comparison of depths of flow and available freeboard existing to post-development.

EXISTING CONDITIONS				**PROPOSED CONDITIONS**			
Culvert Diameter (in) =		48		Culvert Diameter (in) =		72	
Design Storm	Peak Storm Elevation (ft)	Depth of Flow (ft)	Available Freeboard (ft)	**Design Storm**	Peak Storm Elevation (ft)	Depth of Flow (ft)	Available Freeboard (ft)
1-yr	541.3	1.0	3.0	1-yr	542.4	0.9	5.1
2-yr	541.9	1.6	2.4	2-yr	542.8	1.3	4.7
10-yr	542.9	2.6	1.4	10-yr	543.5	2.0	4.0
25-yr	Over Top Pipe	Full	0.0	25-yr	543.9	2.4	3.6
100-yr	Over Top Pipe	Full	0.0	100-yr	544.5	3.0	3.0

IV. Erosion and Sediment Control Plan

An erosion and sediment control plan has been developed for this site and can be found on sheet 2 of the Project Plans. The purpose of the erosion control plan is to outline the procedures necessary to mitigate erosion and eliminate the migration of sediments and fines off site. Some of these measures will be temporary, used only during construction, and others will be permanent to remain in place and maintained for the future.

According to the Putnam County Soil Survey, the soils in the area of construction are of the ChE, Charlton Loam soils, which have a soil erosion K factor of 0.28. These soils have only moderate erosion hazard and slight wind throw hazard.

The following are the erosion control structures proposed for use on this site:

- **Stabilized construction entrance:** To collect sediment from trucks exiting the site. This provides a buffer to minimize the tracking of sediment and stones to Philipse Brook Road.
- **Silt Fence Barriers:** Silt fence shall be placed along the contour immediately downhill of all construction areas to prevent migration of sediment off site to downstream waterways. All silt fence should be installed along the contour.
- **Stock Piles:** Topsoil will be placed in a location that will not interfere with construction and will be protected with a silt fence placed around its perimeter. The topsoil will be seeded and mulched or covered with tarps when not in use.
- **Sump Pit:** This is a temporary pit which is constructed to trap and filter water for pumping to a suitable discharge area. The purpose of the structure is to remove excessive water from excavations. In this case, the water will be pumped to the riprap outlet sediment trap.
- **Rip rap outlet Sediment Trap:** The purpose of the structure is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties, and rights-of-way below the sediment trap from sedimentation. In this application the dewatering pumps will be discharged to the sediment trap. This sediment trap will be constructed by adding the rip rap outlet to the existing washed out area as noted on the plans.
- **Live Stakes with stone fill:** A live stake is a stake or pole fashioned from live woody material. The purpose of planting live stakes is to create a living root mat that stabilizes the soil by reinforcing and binding soil particles together and by contributing to the reduction of excess soil moisture. The stone fill will provide a more immediate protection of the bare stream banks while the live stakes take root.

Seeding and Mulching

In addition to the above practices, perhaps the most important aspect of erosion control is seeding and mulching. All disturbed areas shall be seeded and mulched as soon as possible. The specified seed mix can found on the erosion and sediment control plan on sheet 2 of the project plans. In disturbed areas where construction activities have concluded, either temporarily or permanently, the area shall be seeded and mulched within 7 days of the stop time.

Materials

For this project, the following materials will be used and/or temporarily stored on site:

- Crushed stone
- Select back fill
- Sand
- High Density Polyethylene Pipe
- Galvanized CMP
- Wood
- Silt fence material
- Geotextile Fabric
- Construction equipment
- Trucks
- Asphalt

Additional Erosion Control Information

The erosion control specifications, construction sequence, and installation and maintenance procedures are placed on the erosion control plans on sheet 2 of the project plans and shall be followed for this project.

V. Conclusions

The proposed repairs to the stream crossing will enhance the operability of the crossing and will reduce possibilities of future detriment to the Philipse Brook, Philipse Brook Road, and downstream neighbors as a result of storm events.

The completion of the repairs will require several mitigation measures be implemented during construction in order to mitigate the erosion and control migration of sediment. Upon the implementation of the measures outlined herein, the site will comply with the NYSDEC requirements as well those of the Town of Philipstown.

Appendix A

Watershed Maps

Appendix B

Soils Data

United States Department of Agriculture

NRCS

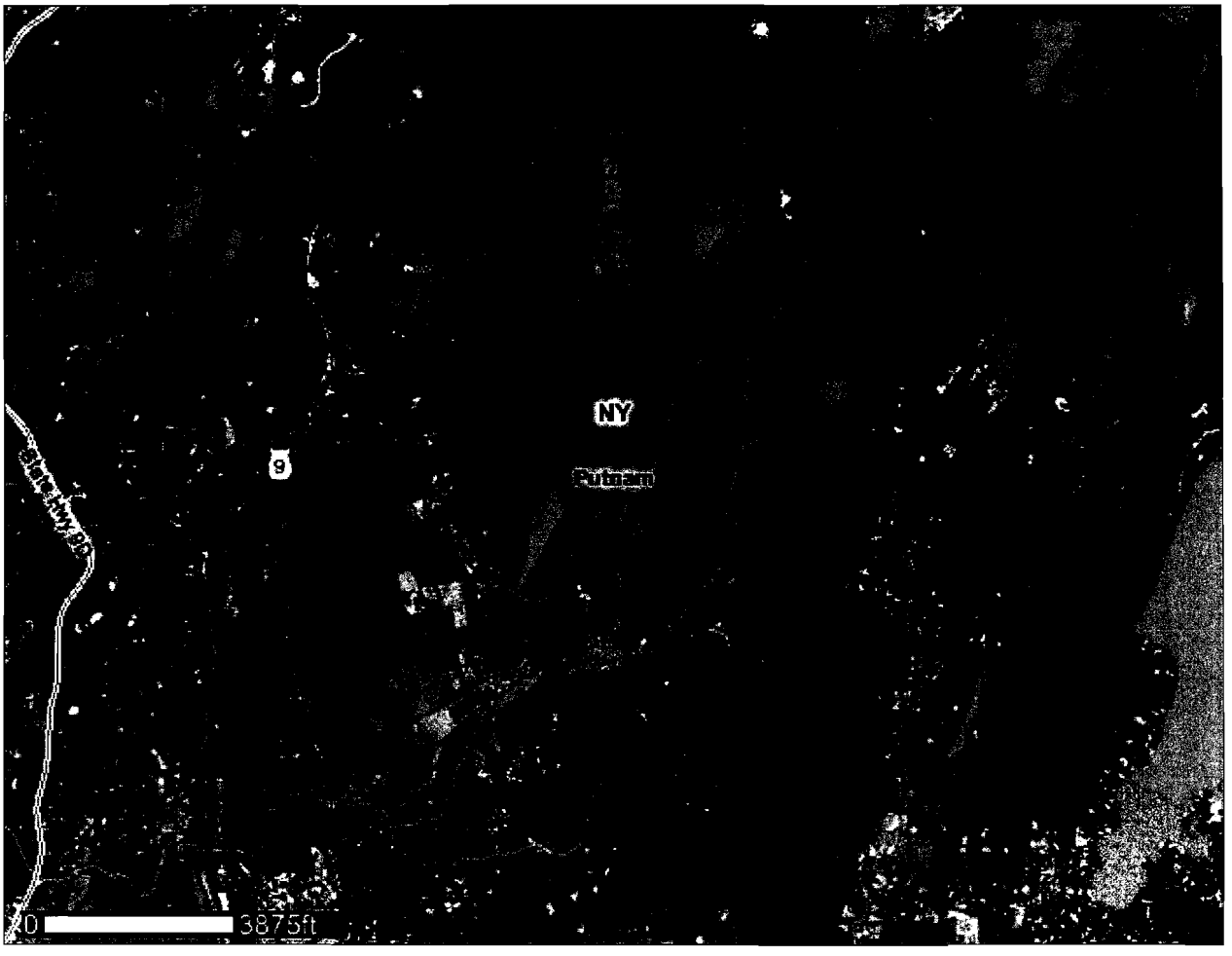
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Putnam County, New York

for 98 Philipse Brook Rd, Stream Crossing



May 1, 2012

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Cities

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

MAP INFORMATION

Map Scale: 1:15,100 if printed on B size (11" × 17") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Putnam County, New York
Survey Area Data: Version 8, Dec 20, 2011

Date(s) aerial images were photographed: 8/2/2006; 8/1/2006; 7/31/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Putnam County, New York (NY079)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ce	Carlisle muck	16.7	1.8%
ChB	Charlton loam, 2 to 8 percent slopes	33.4	3.6%
ChC	Charlton loam, 8 to 15 percent slopes	29.2	3.2%
ChD	Charlton loam, 15 to 25 percent slopes	13.3	1.4%
ChE	Charlton loam, 25 to 35 percent slopes	22.7	2.5%
ClB	Charlton loam, 2 to 8 percent slopes, very stony	6.1	0.7%
ClC	Charlton loam, 8 to 15 percent slopes, very stony	2.8	0.3%
ClD	Charlton loam, 15 to 25 percent slopes, very stony	7.5	0.8%
ClE	Charlton loam, 25 to 35 percent slopes, very stony	0.9	0.1%
ClF	Charlton loam, 35 to 45 percent slopes, very stony	6.1	0.7%
CrC	Charlton-Chatfield complex, rolling, very rocky	183.9	19.9%
CsD	Chatfield-Charlton complex, hilly, very rocky	83.2	9.0%
CtC	Chatfield-Hollis-Rock outcrop complex, rolling	164.0	17.7%
CuD	Chatfield-Hollis-Rock outcrop complex, hilly	108.9	11.8%
Ff	Fluvaquents-Udifluvents complex, frequently flooded	9.7	1.0%
Fr	Fredon silt loam	1.6	0.2%
HrF	Hollis-Rock outcrop complex, very steep	70.1	7.6%
LeB	Leicester loam, 2 to 8 percent slopes, very stony	21.8	2.4%
Pa	Palms muck	10.9	1.2%
Pc	Palms and Carlisle soils, ponded	2.0	0.2%
PnB	Paxton fine sandy loam, 2 to 8 percent slopes	16.0	1.7%
PnC	Paxton fine sandy loam, 8 to 15 percent slopes	32.8	3.5%
PnD	Paxton fine sandy loam, 15 to 25 percent slopes	34.2	3.7%
RdB	Ridgebury loam, 3 to 8 percent slopes	3.2	0.3%
RhC	Riverhead loam, 8 to 15 percent slopes	2.1	0.2%
Sh	Sun loam	0.7	0.1%
Sm	Sun loam, extremely stony	24.0	2.6%
W	Water	14.1	1.5%
WdB	Woodbridge loam, 3 to 8 percent slopes	2.1	0.2%
Totals for Area of Interest		**924.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly

indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Putnam County, New York

Ce—Carlisle muck

Map Unit Setting

Elevation: 600 to 1,200 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Carlisle and similar soils: 80 percent
Minor components: 20 percent

Description of Carlisle

Setting

Landform: Swamps, marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Deep organic material

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water capacity: Very high (about 23.9 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 60 inches: Muck

Minor Components

Palms

Percent of map unit: 10 percent
Landform: Marshes, swamps

Sun

Percent of map unit: 5 percent
Landform: Depressions

Fluvaquents

Percent of map unit: 3 percent
Landform: Flood plains

Udifluvents

Percent of map unit: 2 percent

ChB—Charlton loam, 2 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting

Landform: Hills, ridges, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield

Percent of map unit: 5 percent

Paxton

Percent of map unit: 5 percent

Sutton

Percent of map unit: 5 percent

Knickerbocker
Percent of map unit: 2 percent

Riverhead
Percent of map unit: 2 percent

Charlton, very stony
Percent of map unit: 1 percent

ChC—Charlton loam, 8 to 15 percent slopes

Map Unit Setting
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups
Land capability (nonirrigated): 3e

Typical profile
0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Sutton
Percent of map unit: 5 percent

Chatfield
Percent of map unit: 5 percent

Paxton
Percent of map unit: 5 percent

Knickerbocker
Percent of map unit: 2 percent

Riverhead
Percent of map unit: 2 percent

Charlton, very stony
Percent of map unit: 1 percent

ChD—Charlton loam, 15 to 25 percent slopes

Map Unit Setting
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities
Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups
Land capability (nonirrigated): 4e

Typical profile
0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield
Percent of map unit: 5 percent

Paxton
Percent of map unit: 5 percent

Sutton
Percent of map unit: 4 percent

Knickerbocker
Percent of map unit: 2 percent

Riverhead
Percent of map unit: 2 percent

Charlton, very stony
Percent of map unit: 1 percent

Hollis
Percent of map unit: 1 percent

ChE—Charlton loam, 25 to 35 percent slopes

Map Unit Setting
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield

Percent of map unit: 5 percent

Paxton

Percent of map unit: 5 percent

Charlton, very stony

Percent of map unit: 3 percent

Knickerbocker

Percent of map unit: 2 percent

Riverhead

Percent of map unit: 2 percent

Sutton

Percent of map unit: 2 percent

Hollis

Percent of map unit: 1 percent

CIB—Charlton loam, 2 to 8 percent slopes, very stony

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting

Landform: Hills, ridges, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities

Slope: 2 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield

Percent of map unit: 5 percent

Paxton

Percent of map unit: 5 percent

Sutton

Percent of map unit: 5 percent

Knickerbocker

Percent of map unit: 2 percent

Riverhead

Percent of map unit: 2 percent

Charlton, extremely stony

Percent of map unit: 1 percent

CIC—Charlton loam, 8 to 15 percent slopes, very stony

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting

Landform: Hills, ridges, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield

Percent of map unit: 5 percent

Paxton

Percent of map unit: 5 percent

Sutton

Percent of map unit: 5 percent

Knickerbocker
Percent of map unit: 2 percent

Riverhead
Percent of map unit: 2 percent

Charlton, extremely stony
Percent of map unit: 1 percent

CID—Charlton loam, 15 to 25 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities
Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups
Land capability (nonirrigated): 6s

Typical profile
0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield
Percent of map unit: 5 percent

Paxton
Percent of map unit: 5 percent

Sutton
Percent of map unit: 5 percent

Knickerbocker
Percent of map unit: 2 percent

Riverhead
Percent of map unit: 2 percent

Charlton, extremely stony
Percent of map unit: 1 percent

CIE—Charlton loam, 25 to 35 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities
Slope: 25 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile
0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield
Percent of map unit: 5 percent

Paxton
Percent of map unit: 5 percent

Charlton, extremely stony
Percent of map unit: 3 percent

Knickerbocker
Percent of map unit: 2 percent

Riverhead
Percent of map unit: 2 percent

Sutton
Percent of map unit: 2 percent

Hollis
Percent of map unit: 1 percent

CIF—Charlton loam, 35 to 45 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Charlton and similar soils: 80 percent
Minor components: 20 percent

Description of Charlton

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities

Slope: 35 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Chatfield

Percent of map unit: 5 percent

Paxton

Percent of map unit: 5 percent

Charlton, extremely stony

Percent of map unit: 3 percent

Knickerbocker

Percent of map unit: 2 percent

Riverhead

Percent of map unit: 2 percent

Sutton

Percent of map unit: 2 percent

Hollis

Percent of map unit: 1 percent

CrC—Charlton-Chatfield complex, rolling, very rocky

Map Unit Setting

Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Charlton and similar soils: 50 percent

Chatfield and similar soils: 30 percent
Minor components: 20 percent

Description of Charlton

Setting

Landform: Hills, ridges, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Description of Chatfield

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite, gneiss, or schist

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 3.2 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 7 inches: Loam
7 to 24 inches: Flaggy silt loam
24 to 28 inches: Unweathered bedrock

Minor Components

Hollis

Percent of map unit: 5 percent

Rock outcrop

Percent of map unit: 5 percent

Sutton

Percent of map unit: 4 percent

Sun

Percent of map unit: 2 percent
Landform: Depressions

Leicester

Percent of map unit: 2 percent

Palms

Percent of map unit: 1 percent
Landform: Marshes, swamps

Carlisle

Percent of map unit: 1 percent
Landform: Marshes, swamps

CsD—Chatfield-Charlton complex, hilly, very rocky

Map Unit Setting

Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Chatfield and similar soils: 45 percent
Charlton and similar soils: 35 percent
Minor components: 20 percent

Description of Chatfield

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite, gneiss, or schist

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 3.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 7 inches: Loam
7 to 24 inches: Flaggy silt loam
24 to 28 inches: Unweathered bedrock

Description of Charlton

Setting

Landform: Hills, ridges, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 8 inches: Loam
8 to 24 inches: Sandy loam
24 to 60 inches: Sandy loam

Minor Components

Hollis

Percent of map unit: 5 percent

Rock outcrop

Percent of map unit: 5 percent

Sutton
Percent of map unit: 4 percent

Leicester
Percent of map unit: 2 percent

Sun
Percent of map unit: 2 percent
Landform: Depressions

Carlisle
Percent of map unit: 1 percent
Landform: Marshes, swamps

Palms
Percent of map unit: 1 percent
Landform: Marshes, swamps

CtC—Chatfield-Hollis-Rock outcrop complex, rolling

Map Unit Setting
Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Hollis and similar soils: 30 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 20 percent
Minor components: 20 percent

Description of Chatfield

Setting
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite, gneiss, or schist

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 3.2 inches)

Interpretive groups
Land capability (nonirrigated): 6s

Typical profile
0 to 7 inches: Loam
7 to 24 inches: Flaggy silt loam
24 to 28 inches: Unweathered bedrock

Description of Hollis

Setting
Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: A thin mantle of loamy till derived mainly from schist, granite, and gneiss

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups
Land capability (nonirrigated): 6s

Typical profile
0 to 1 inches: Fine sandy loam
1 to 16 inches: Fine sandy loam
16 to 20 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)

Interpretive groups
Land capability (nonirrigated): 6s

Minor Components

Charlton
Percent of map unit: 8 percent

Sutton
Percent of map unit: 5 percent

Sun
Percent of map unit: 2 percent
Landform: Depressions

Unnamed soils, very shallow
Percent of map unit: 2 percent

Leicester
Percent of map unit: 2 percent

Palms
Percent of map unit: 1 percent
Landform: Marshes, swamps

CuD—Chatfield-Hollis-Rock outcrop complex, hilly

Map Unit Setting
Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Hollis and similar soils: 30 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 25 percent
Minor components: 15 percent

Description of Chatfield

Setting
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite, gneiss, or schist

Properties and qualities
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water capacity: Low (about 3.2 inches)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile
0 to 7 inches: Loam
7 to 24 inches: Flaggy silt loam
24 to 28 inches: Unweathered bedrock

Description of Hollis

Setting
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: A thin mantle of loamy till derived mainly from schist, granite, and gneiss

Properties and qualities
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile
0 to 1 inches: Fine sandy loam
1 to 16 inches: Fine sandy loam
16 to 20 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities
Slope: 15 to 35 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)

Interpretive groups
Land capability (nonirrigated): 7s

Minor Components

Charlton
Percent of map unit: 5 percent

Sutton
Percent of map unit: 3 percent

Sun
Percent of map unit: 2 percent
Landform: Depressions

Unnamed soils, very shallow
Percent of map unit: 2 percent

Leicester
Percent of map unit: 2 percent

Palms
Percent of map unit: 1 percent
Landform: Marshes, swamps

Ff—Fluvaquents-Udifluvents complex, frequently flooded

Map Unit Setting
Elevation: 100 to 3,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Fluvaquents and similar soils: 50 percent
Udifluvents and similar soils: 35 percent
Minor components: 15 percent

Description of Fluvaquents

Setting
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent

Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups
Land capability (nonirrigated): 5w

Typical profile
0 to 5 inches: Gravelly silt loam
5 to 70 inches: Very gravelly silt loam

Description of Udifluvents

Setting
Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 5.9 inches)

Interpretive groups
Land capability (nonirrigated): 5w

Typical profile
0 to 4 inches: Gravelly silt loam
4 to 70 inches: Very gravelly loam

Minor Components

Sun
Percent of map unit: 3 percent
Landform: Depressions

Hinckley
Percent of map unit: 2 percent

Knickerbocker
Percent of map unit: 2 percent

Riverhead
Percent of map unit: 2 percent

Leicester
Percent of map unit: 2 percent
Landform: Depressions

Ridgebury
Percent of map unit: 2 percent

Landform: Depressions

Carlisle

Percent of map unit: 1 percent
Landform: Marshes, swamps

Palms

Percent of map unit: 1 percent
Landform: Marshes, swamps

Fr—Fredon silt loam

Map Unit Setting

Elevation: 250 to 1,200 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Fredon, poorly drained, and similar soils: 50 percent
Fredon, somewhat poorly drained, and similar soils: 35 percent
Minor components: 15 percent

Description of Fredon, Poorly Drained

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 7 inches: Silt loam
7 to 24 inches: Fine sandy loam

24 to 60 inches: Stratified very gravelly loamy sand

Description of Fredon, Somewhat Poorly Drained

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 7 inches: Silt loam
7 to 24 inches: Fine sandy loam
24 to 60 inches: Stratified very gravelly loamy sand

Minor Components

Pompton

Percent of map unit: 5 percent

Leicester

Percent of map unit: 3 percent
Landform: Depressions

Sutton

Percent of map unit: 2 percent

Fluvaquents

Percent of map unit: 2 percent
Landform: Flood plains

Udifluvents

Percent of map unit: 2 percent

Palms

Percent of map unit: 1 percent
Landform: Marshes, swamps

HrF—Hollis-Rock outcrop complex, very steep

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Hollis and similar soils: 60 percent
Rock outcrop: 20 percent
Minor components: 20 percent

Description of Hollis

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: A thin mantle of loamy till derived mainly from schist, granite, and gneiss

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 1 inches: Fine sandy loam
1 to 16 inches: Fine sandy loam
16 to 20 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)

Interpretive groups
Land capability (nonirrigated): 7s

Typical profile
0 to 60 inches: Unweathered bedrock

Minor Components

Chatfield
Percent of map unit: 8 percent

Leicester
Percent of map unit: 5 percent

Charlton
Percent of map unit: 5 percent

Unnamed soils, very shallow
Percent of map unit: 2 percent

LeB—Leicester loam, 2 to 8 percent slopes, very stony

Map Unit Setting
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Leicester, somewhat poorly drained, and similar soils: 50 percent
Leicester, poorly drained, and similar soils: 25 percent
Minor components: 25 percent

Description of Leicester, Somewhat Poorly Drained

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy acid till derived mostly from schist and gneiss

Properties and qualities
Slope: 2 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None

Frequency of ponding: None
Available water capacity: Moderate (about 7.7 inches)

Interpretive groups
Land capability (nonirrigated): 6s

Typical profile
0 to 8 inches: Loam
8 to 26 inches: Sandy loam
26 to 60 inches: Sandy loam

Description of Leicester, Poorly Drained

Setting
Landform: Hills, ridges, till plains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy acid till derived mostly from schist and gneiss

Properties and qualities
Slope: 2 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.7 inches)

Interpretive groups
Land capability (nonirrigated): 6s

Typical profile
0 to 8 inches: Loam
8 to 26 inches: Sandy loam
26 to 60 inches: Sandy loam

Minor Components

Sun
Percent of map unit: 10 percent
Landform: Depressions

Sutton
Percent of map unit: 10 percent

Charlton
Percent of map unit: 3 percent

Leicester, extremely stony
Percent of map unit: 2 percent

Pa—Palms muck

Map Unit Setting

Elevation: 250 to 1,500 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Palms and similar soils: 80 percent
Minor components: 20 percent

Description of Palms

Setting

Landform: Swamps, marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over loamy glacial drift

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 20 percent
Available water capacity: Very high (about 21.3 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 10 inches: Muck
10 to 48 inches: Muck
48 to 60 inches: Loam

Minor Components

Carlisle

Percent of map unit: 10 percent
Landform: Marshes, swamps

Sun

Percent of map unit: 5 percent

Landform: Depressions

Fluvaquents

Percent of map unit: 4 percent
Landform: Flood plains

Udifluvents

Percent of map unit: 1 percent

Pc—Palms and Carlisle soils, ponded

Map Unit Setting

Elevation: 250 to 1,500 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Palms and similar soils: 45 percent
Carlisle and similar soils: 40 percent
Minor components: 15 percent

Description of Palms

Setting

Landform: Swamps, marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over loamy glacial drift

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 20 percent
Available water capacity: Very high (about 21.3 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 10 inches: Muck
10 to 48 inches: Muck
48 to 61 inches: Loam

Description of Carlisle

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Deep organic material

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water capacity: Very high (about 23.9 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 60 inches: Muck

Minor Components

Fredon

Percent of map unit: 5 percent
Landform: Depressions

Sun

Percent of map unit: 5 percent
Landform: Depressions

Fluvaquents

Percent of map unit: 3 percent
Landform: Flood plains

Udifluvents

Percent of map unit: 2 percent

PnB—Paxton fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from crystalline rock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 18 to 38 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.8 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 10 inches: Fine sandy loam
10 to 20 inches: Loam
20 to 60 inches: Gravelly sandy loam

Minor Components

Charlton

Percent of map unit: 5 percent

Woodbridge

Percent of map unit: 5 percent

Ridgebury

Percent of map unit: 3 percent

Paxton, very stony

Percent of map unit: 2 percent

PnC—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 115 to 215 days

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from crystalline rock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 18 to 38 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.8 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 10 inches: Fine sandy loam
10 to 20 inches: Loam
20 to 60 inches: Gravelly sandy loam

Minor Components

Charlton

Percent of map unit: 5 percent

Woodbridge

Percent of map unit: 5 percent

Ridgebury

Percent of map unit: 3 percent

Paxton, very stony

Percent of map unit: 2 percent

PnD—Paxton fine sandy loam, 15 to 25 percent slopes

Map Unit Setting

Mean annual precipitation: 46 to 50 inches

Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition
Paxton and similar soils: 85 percent
Minor components: 15 percent

Description of Paxton

Setting
Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from crystalline rock

Properties and qualities
Slope: 15 to 25 percent
Depth to restrictive feature: 18 to 40 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.8 inches)

Interpretive groups
Land capability (nonirrigated): 4e

Typical profile
0 to 10 inches: Fine sandy loam
10 to 20 inches: Loam
20 to 60 inches: Gravelly sandy loam

Minor Components

Charlton
Percent of map unit: 5 percent

Woodbridge
Percent of map unit: 5 percent

Ridgebury
Percent of map unit: 3 percent

Paxton, very stony
Percent of map unit: 2 percent

RdB—Ridgebury loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 50 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Ridgebury, somewhat poorly drained, and similar soils: 50 percent
Ridgebury, poorly drained, and similar soils: 35 percent
Minor components: 15 percent

Description of Ridgebury, Somewhat Poorly Drained

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived mainly from granite, gneiss, and schist

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 14 to 30 inches to densic material
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 8 inches: Loam
8 to 26 inches: Gravelly fine sandy loam
26 to 60 inches: Gravelly loam

Description of Ridgebury, Poorly Drained

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear

Parent material: Loamy till derived mainly from granite, gneiss, and schist

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 14 to 30 inches to densic material
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 8 inches: Loam
8 to 26 inches: Gravelly fine sandy loam
26 to 60 inches: Gravelly loam

Minor Components

Sun

Percent of map unit: 5 percent
Landform: Depressions

Leicester

Percent of map unit: 3 percent

Woodbridge

Percent of map unit: 3 percent

Ridgebury, very stony

Percent of map unit: 2 percent

Paxton

Percent of map unit: 2 percent

RhC—Riverhead loam, 8 to 15 percent slopes

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Riverhead and similar soils: 85 percent
Minor components: 15 percent

Description of Riverhead

Setting

Landform: Deltas, terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits overlying stratified sand and gravel

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 6 inches: Loam
6 to 25 inches: Sandy loam
25 to 30 inches: Loamy sand
30 to 60 inches: Loamy sand

Minor Components

Pompton

Percent of map unit: 5 percent

Charlton

Percent of map unit: 4 percent

Hinckley

Percent of map unit: 3 percent

Knickerbocker

Percent of map unit: 3 percent

Sh—Sun loam

Map Unit Setting

Elevation: 600 to 1,800 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Sun and similar soils: 85 percent
Minor components: 15 percent

Description of Sun

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy till derived primarily from limestone and sandstone, with a component of schist, shale, or granitic rocks in some areas

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 6.7 inches)

Interpretive groups

Land capability (nonirrigated): 4w

Typical profile

0 to 9 inches: Loam
9 to 27 inches: Loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components

Leicester

Percent of map unit: 5 percent
Landform: Depressions

Ridgebury

Percent of map unit: 5 percent
Landform: Depressions

Palms

Percent of map unit: 3 percent
Landform: Marshes, swamps

Sun, stony

Percent of map unit: 2 percent
Landform: Depressions

Sm—Sun loam, extremely stony

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Sun and similar soils: 85 percent
Minor components: 15 percent

Description of Sun

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy till derived primarily from limestone and sandstone, with a component of schist, shale, or granitic rocks in some areas

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water capacity: Moderate (about 6.7 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 9 inches: Loam
9 to 27 inches: Loam
27 to 60 inches: Gravelly fine sandy loam

Minor Components

Leicester

Percent of map unit: 5 percent
Landform: Depressions

Ridgebury

Percent of map unit: 5 percent

Landform: Depressions

Palms

Percent of map unit: 3 percent
Landform: Marshes, swamps

Sun, non-stony

Percent of map unit: 2 percent
Landform: Depressions

W—Water

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Water: 100 percent

WdB—Woodbridge loam, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Map Unit Composition

Woodbridge and similar soils: 85 percent
Minor components: 15 percent

Description of Woodbridge

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy acid till derived mainly from crystalline rock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 38 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches

Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.0 inches)

Interpretive groups
Land capability (nonirrigated): 2e

Typical profile
0 to 12 inches: Loam
12 to 29 inches: Gravelly loam
29 to 60 inches: Gravelly loam

Minor Components

Paxton
Percent of map unit: 5 percent

Ridgebury
Percent of map unit: 5 percent

Sun
Percent of map unit: 2 percent
Landform: Depressions

Sutton
Percent of map unit: 2 percent

Woodbridge, very stony
Percent of map unit: 1 percent

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://soils.usda.gov/

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://soils.usda.gov/

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://soils.usda.gov/

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://soils.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.glti.nrcs.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://soils.usda.gov/

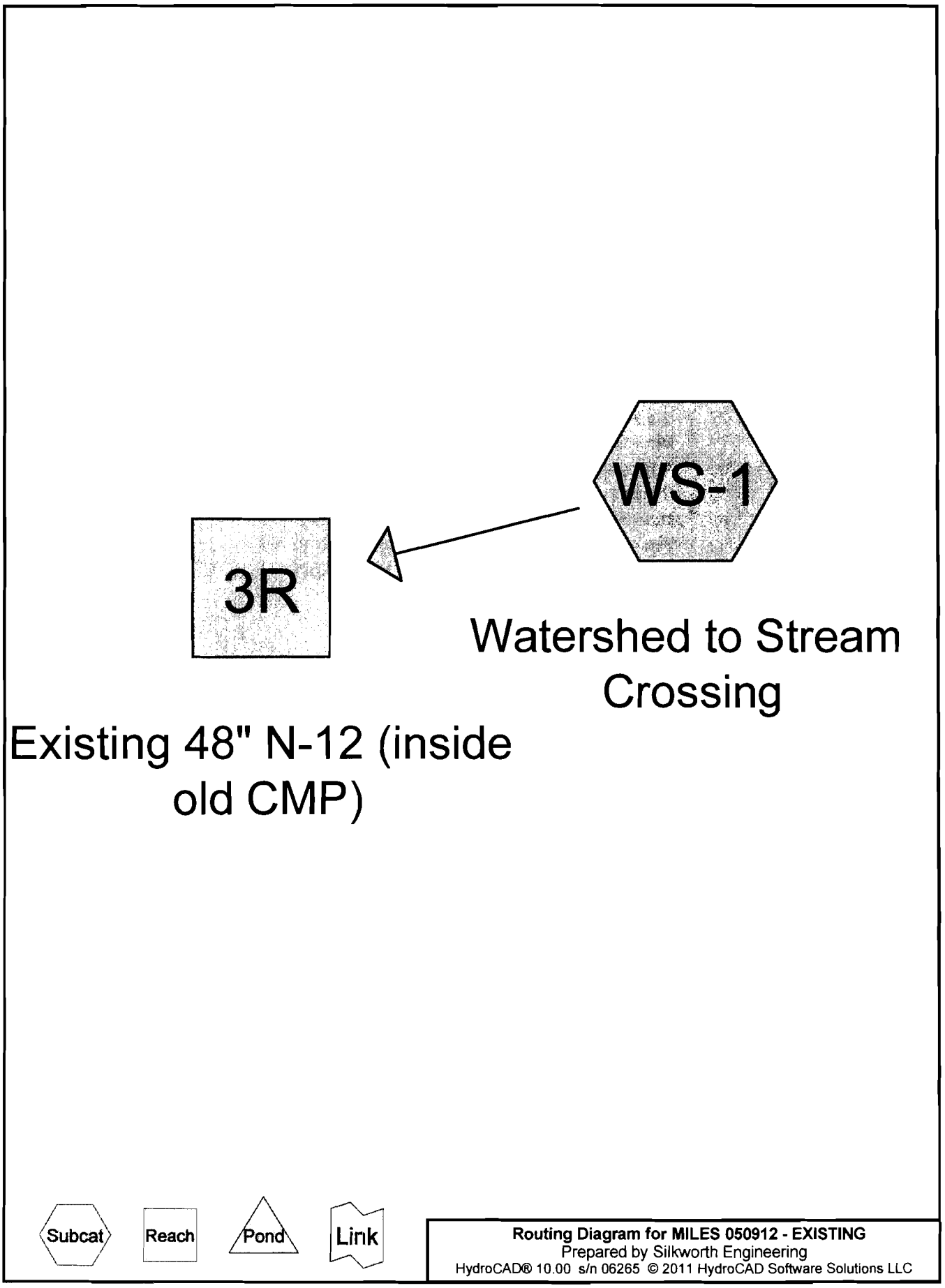
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://soils.usda.gov/

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.

Appendix C

HydroCad Reports

EXISTING CONDITIONS


WS-1
3R
Watershed to Stream Crossing
Existing 48" N-12 (inside old CMP)
Subcat
Reach
Pond
Link
Routing Diagram for MILES 050912 - EXISTING
Prepared by Silkworth Engineering
HydroCAD® 10.00 s/n 06265 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
25.668	30	Woods, Good, HSG A (WS-1)
0.264	39	Pasture/grassland/range, Good, HSG A (WS-1)
0.464	46	2 acre lots, 12% imp, HSG A (WS-1)
307.151	55	Woods, Good, HSG B (WS-1)
25.903	61	Pasture/grassland/range, Good, HSG B (WS-1)
48.952	65	2 acre lots, 12% imp, HSG B (WS-1)
382.319	70	Woods, Good, HSG C (WS-1)
53.176	74	Pasture/grassland/range, Good, HSG C (WS-1)
13.903	77	2 acre lots, 12% imp, HSG C (WS-1)
33.489	77	Woods, Good, HSG D (WS-1)
2.734	80	Pasture/grassland/range, Good, HSG D (WS-1)
0.882	82	2 acre lots, 12% imp, HSG D (WS-1)
8.305	89	Paved roads w/open ditches, 50% imp, HSG B (WS-1)
5.339	92	Paved roads w/open ditches, 50% imp, HSG C (WS-1)
1.308	93	Paved roads w/open ditches, 50% imp, HSG D (WS-1)
2.684	98	Water Surface, HSG B (WS-1)
0.167	98	Water Surface, HSG C (WS-1)
11.131	98	Water Surface, HSG D (WS-1)
923.839	**65**	**TOTAL AREA**

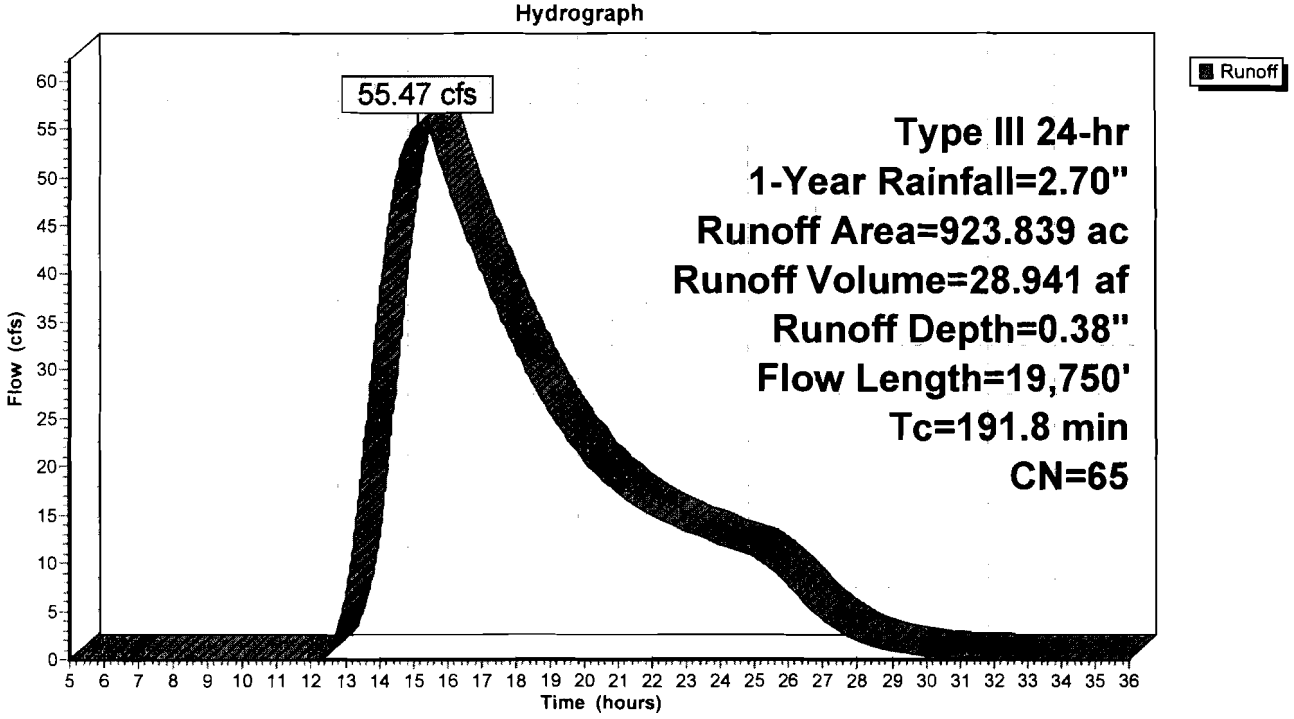
Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
26.396	HSG A	WS-1
392.995	HSG B	WS-1
454.903	HSG C	WS-1
49.545	HSG D	WS-1
0.000	Other	
923.839		**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3R	540.30	539.00	20.0	0.0650	0.012	48.0	0.0	0.0

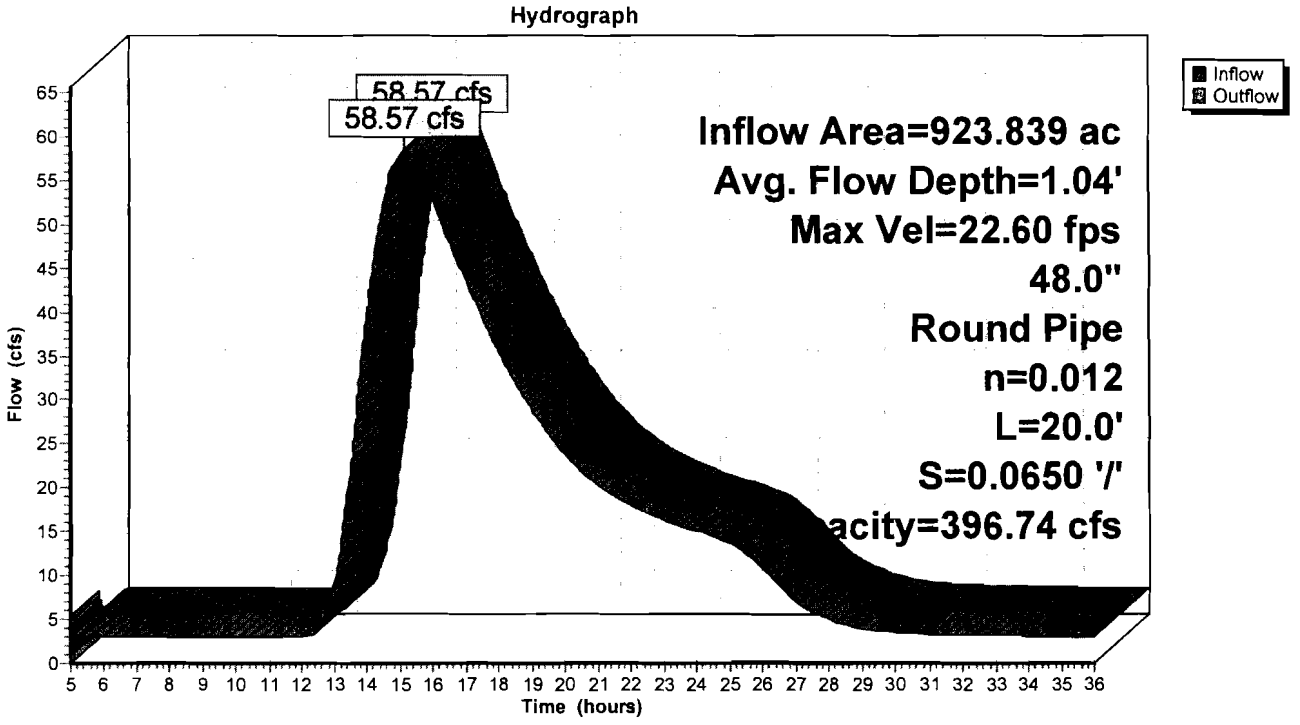
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.22	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.31	0.00	0.00
8.50	0.35	0.00	0.00
9.00	0.39	0.00	0.00
9.50	0.45	0.00	0.00
10.00	0.51	0.00	0.00
10.50	0.58	0.00	0.00
11.00	0.68	0.00	0.00
11.50	0.80	0.00	0.00
12.00	1.35	0.01	0.01
12.50	1.90	0.11	0.68
13.00	2.02	0.14	6.26
13.50	2.12	0.17	19.56
14.00	2.19	0.19	37.06
14.50	2.25	0.21	49.51
15.00	2.31	0.23	**54.88**
15.50	2.35	0.24	**54.57**
16.00	2.39	0.26	49.59
16.50	2.43	0.27	44.78
17.00	2.46	0.28	40.43
17.50	2.48	0.29	36.18
18.00	2.51	0.30	32.32
18.50	2.53	0.31	28.82
19.00	2.55	0.32	25.69
19.50	2.57	0.32	22.97
20.00	2.58	0.33	20.65
20.50	2.60	0.34	18.75
21.00	2.62	0.34	17.21
21.50	2.63	0.35	15.97
22.00	2.65	0.35	14.94
22.50	2.66	0.36	14.05
23.00	2.68	0.37	13.24
23.50	2.69	0.37	12.58
24.00	**2.70**	**0.38**	11.98
24.50	2.70	0.38	11.39
25.00	2.70	0.38	10.59
25.50	2.70	0.38	9.36
26.00	2.70	0.38	7.66
26.50	2.70	0.38	5.80
27.00	2.70	0.38	4.13
27.50	2.70	0.38	2.79
28.00	2.70	0.38	1.89
28.50	2.70	0.38	1.29
29.00	2.70	0.38	0.87
29.50	2.70	0.38	0.59
30.00	2.70	0.38	0.40
30.50	2.70	0.38	0.27
31.00	2.70	0.38	0.18
31.50	2.70	0.38	0.12
32.00	2.70	0.38	0.07
32.50	2.70	0.38	0.05
33.00	2.70	0.38	0.03
33.50	2.70	0.38	0.01
34.00	2.70	0.38	0.01
34.50	2.70	0.38	0.00
35.00	2.70	0.38	0.00
35.50	2.70	0.38	0.00
36.00	2.70	0.38	0.00

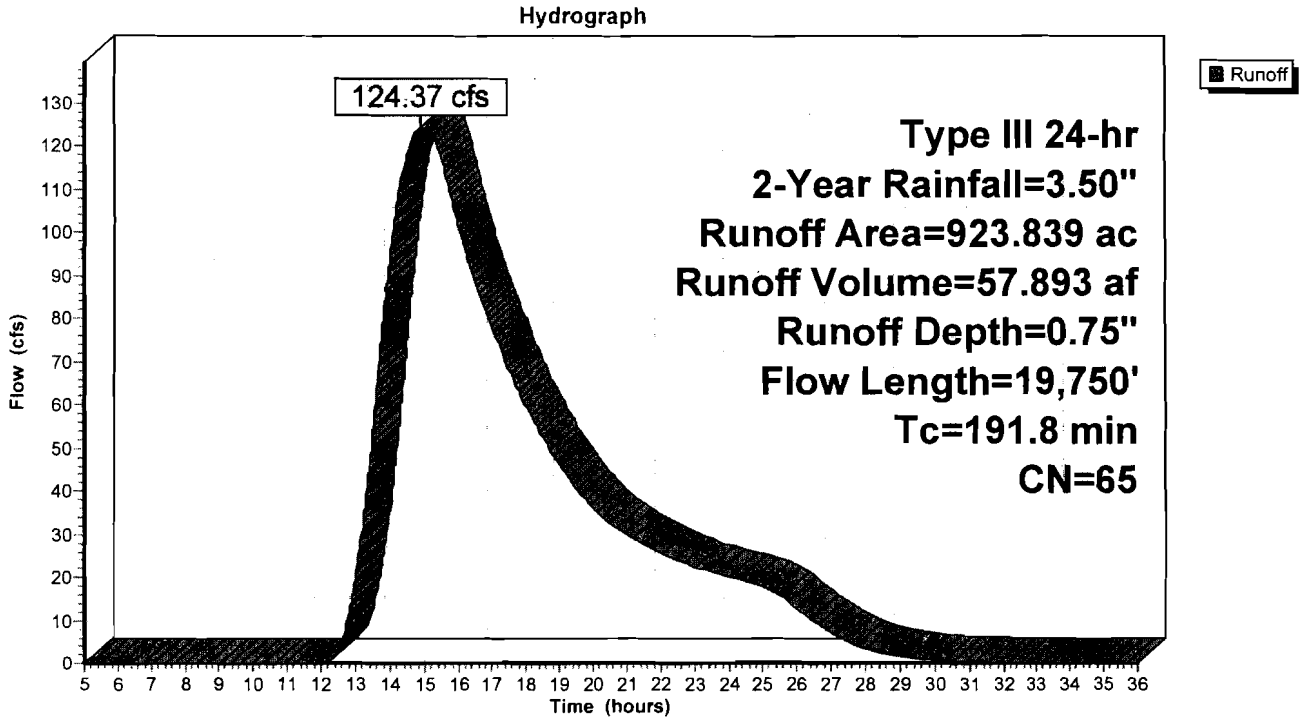
Reach 3R: Existing 48" N-12 (inside old CMP)



Hydrograph for Reach 3R: Existing 48" N-12 (inside old CMP)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	540.30	0.00
6.00	3.10	7	540.55	3.10
7.00	3.10	7	540.55	3.10
8.00	3.10	7	540.55	3.10
9.00	3.10	7	540.55	3.10
10.00	3.10	7	540.55	3.10
11.00	3.10	7	540.55	3.10
12.00	3.11	7	540.55	3.11
13.00	9.36	14	540.72	9.35
14.00	40.16	40	541.16	40.14
15.00	**57.98**	**51**	**541.33**	**57.97**
16.00	**52.69**	**48**	**541.28**	**52.70**
17.00	43.53	42	541.19	43.54
18.00	35.42	36	541.11	35.42
19.00	28.79	31	541.03	28.79
20.00	23.75	27	540.96	23.76
21.00	20.31	25	540.91	20.31
22.00	18.04	23	540.88	18.05
23.00	16.34	21	540.85	16.34
24.00	15.08	20	540.83	15.08
25.00	13.69	19	540.81	13.69
26.00	10.76	16	540.75	10.76
27.00	7.23	12	540.67	7.23
28.00	4.99	9	540.61	4.99
29.00	3.97	8	540.58	3.97
30.00	3.50	7	540.57	3.50
31.00	3.28	7	540.56	3.28
32.00	3.17	7	540.55	3.17
33.00	3.13	7	540.55	3.13
34.00	3.11	7	540.55	3.11
35.00	3.10	7	540.55	3.10
36.00	3.10	7	540.55	3.10

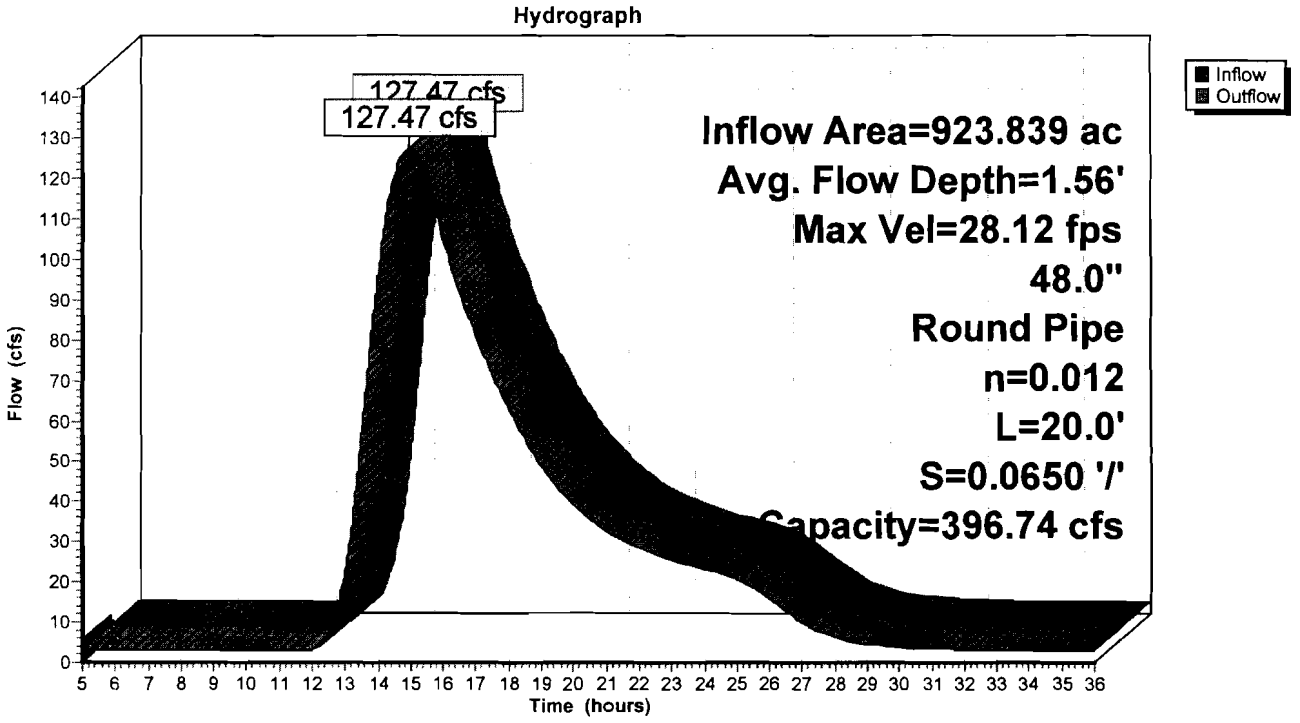
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.20	0.00	0.00	31.50	3.50	0.75	0.19
5.50	0.22	0.00	0.00	32.00	3.50	0.75	0.12
6.00	0.25	0.00	0.00	32.50	3.50	0.75	0.08
6.50	0.28	0.00	0.00	33.00	3.50	0.75	0.05
7.00	0.32	0.00	0.00	33.50	3.50	0.75	0.02
7.50	0.36	0.00	0.00	34.00	3.50	0.75	0.01
8.00	0.40	0.00	0.00	34.50	3.50	0.75	0.00
8.50	0.45	0.00	0.00	35.00	3.50	0.75	0.00
9.00	0.51	0.00	0.00	35.50	3.50	0.75	0.00
9.50	0.58	0.00	0.00	36.00	3.50	0.75	0.00
10.00	0.66	0.00	0.00				
10.50	0.76	0.00	0.00				
11.00	0.88	0.00	0.00				
11.50	1.04	0.00	0.00				
12.00	1.75	0.07	0.11				
12.50	2.46	0.28	3.20				
13.00	2.62	0.35	19.48				
13.50	2.74	0.39	53.78				
14.00	2.84	0.43	93.65				
14.50	2.92	0.47	**117.87**				
15.00	2.99	0.50	**124.19**				
15.50	3.05	0.53	117.40				
16.00	3.10	0.55	101.84				
16.50	3.14	0.57	88.87				
17.00	3.18	0.59	78.01				
17.50	3.22	0.61	68.15				
18.00	3.25	0.62	59.72				
18.50	3.28	0.64	52.39				
19.00	3.30	0.65	46.05				
19.50	3.33	0.66	40.70				
20.00	3.35	0.67	36.24				
20.50	3.37	0.69	32.61				
21.00	3.39	0.70	29.72				
21.50	3.41	0.71	27.41				
22.00	3.43	0.72	25.50				
22.50	3.45	0.73	23.83				
23.00	3.47	0.74	22.35				
23.50	3.48	0.74	21.17				
24.00	**3.50**	**0.75**	20.11				
24.50	3.50	0.75	19.08				
25.00	3.50	0.75	17.71				
25.50	3.50	0.75	15.63				
26.00	3.50	0.75	12.77				
26.50	3.50	0.75	9.68				
27.00	3.50	0.75	6.88				
27.50	3.50	0.75	4.65				
28.00	3.50	0.75	3.15				
28.50	3.50	0.75	2.14				
29.00	3.50	0.75	1.45				
29.50	3.50	0.75	0.98				
30.00	3.50	0.75	0.66				
30.50	3.50	0.75	0.44				
31.00	3.50	0.75	0.29				

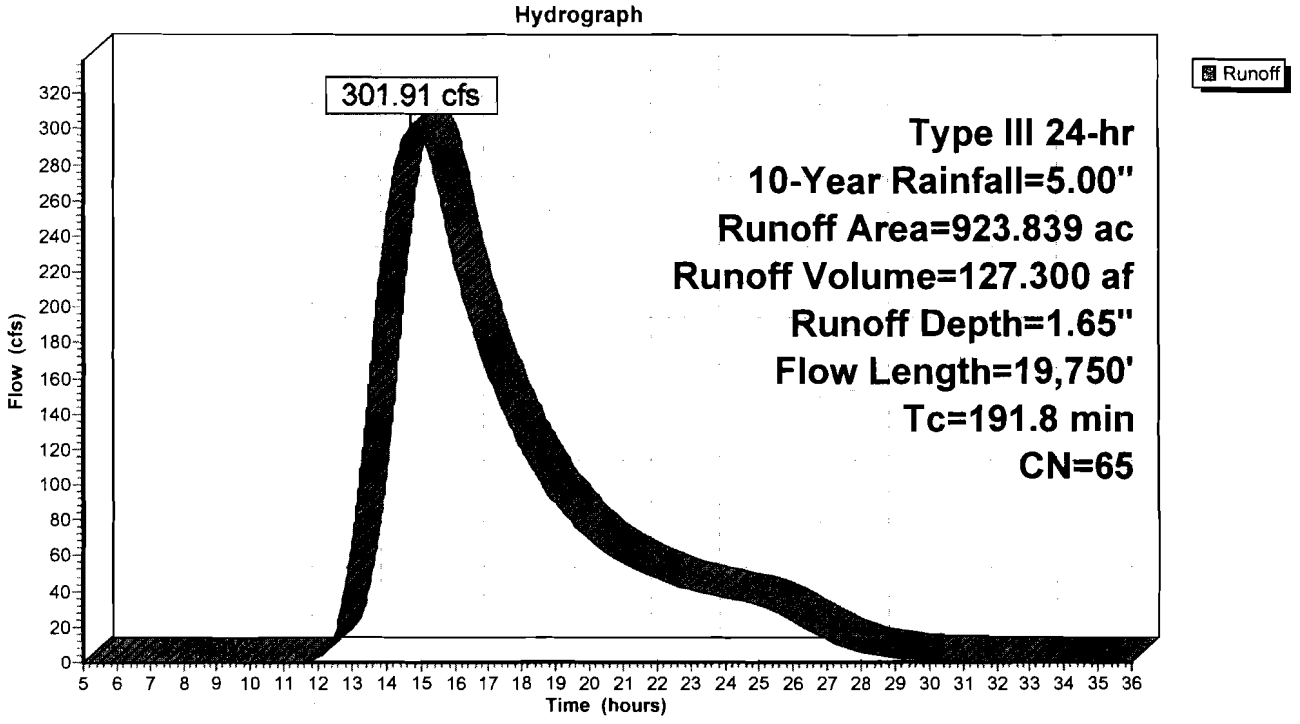
Reach 3R: Existing 48" N-12 (inside old CMP)



Hydrograph for Reach 3R: Existing 48" N-12 (inside old CMP)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	540.30	0.00
6.00	3.10	7	540.55	3.10
7.00	3.10	7	540.55	3.10
8.00	3.10	7	540.55	3.10
9.00	3.10	7	540.55	3.10
10.00	3.10	7	540.55	3.10
11.00	3.10	7	540.55	3.10
12.00	3.21	7	540.55	3.20
13.00	22.58	26	540.95	22.56
14.00	**96.75**	**74**	**541.65**	**96.73**
15.00	**127.29**	**91**	**541.86**	**127.29**
16.00	104.94	79	541.70	104.95
17.00	81.11	65	541.53	81.12
18.00	62.82	54	541.38	62.83
19.00	49.15	46	541.25	49.15
20.00	39.34	39	541.15	39.34
21.00	32.82	34	541.08	32.82
22.00	28.60	31	541.03	28.61
23.00	25.45	29	540.99	25.45
24.00	23.21	27	540.96	23.21
25.00	20.81	25	540.92	20.81
26.00	15.87	21	540.85	15.88
27.00	9.98	15	540.74	9.98
28.00	6.25	11	540.65	6.26
29.00	4.55	9	540.60	4.55
30.00	3.76	8	540.57	3.76
31.00	3.39	7	540.56	3.39
32.00	3.22	7	540.56	3.22
33.00	3.15	7	540.55	3.15
34.00	3.11	7	540.55	3.11
35.00	3.10	7	540.55	3.10
36.00	3.10	7	540.55	3.10

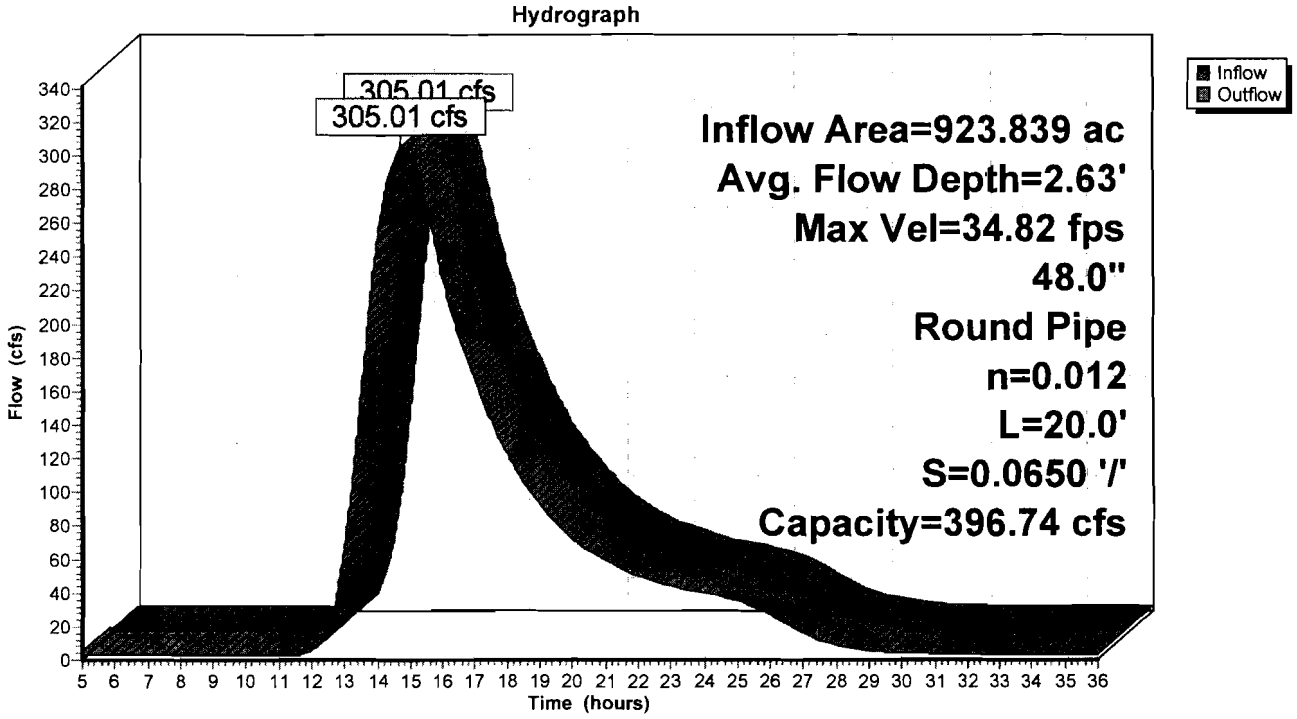
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00
5.50	0.32	0.00	0.00
6.00	0.36	0.00	0.00
6.50	0.40	0.00	0.00
7.00	0.45	0.00	0.00
7.50	0.51	0.00	0.00
8.00	0.57	0.00	0.00
8.50	0.64	0.00	0.00
9.00	0.73	0.00	0.00
9.50	0.83	0.00	0.00
10.00	0.95	0.00	0.00
10.50	1.08	0.00	0.00
11.00	1.25	0.01	0.01
11.50	1.49	0.03	0.28
12.00	2.50	0.30	2.37
12.50	3.51	0.76	16.45
13.00	3.75	0.89	65.70
13.50	3.92	0.98	155.27
14.00	4.06	1.06	247.30
14.50	4.17	1.13	**294.47**
15.00	4.27	1.19	**296.65**
15.50	4.36	1.24	268.51
16.00	4.43	1.29	224.59
16.50	4.49	1.33	190.49
17.00	4.55	1.36	163.13
17.50	4.60	1.39	139.47
18.00	4.64	1.42	120.05
18.50	4.68	1.44	103.68
19.00	4.72	1.47	89.93
19.50	4.75	1.49	78.62
20.00	4.79	1.51	69.32
20.50	4.82	1.53	61.85
21.00	4.85	1.55	55.97
21.50	4.88	1.57	51.32
22.00	4.90	1.59	47.45
22.50	4.93	1.61	44.08
23.00	4.95	1.62	41.13
23.50	4.98	1.64	38.85
24.00	**5.00**	**1.65**	36.83
24.50	5.00	1.65	34.88
25.00	5.00	1.65	32.33
25.50	5.00	1.65	28.50
26.00	5.00	1.65	23.26
26.50	5.00	1.65	17.62
27.00	5.00	1.65	12.52
27.50	5.00	1.65	8.47
28.00	5.00	1.65	5.74
28.50	5.00	1.65	3.90
29.00	5.00	1.65	2.64
29.50	5.00	1.65	1.79
30.00	5.00	1.65	1.20
30.50	5.00	1.65	0.81
31.00	5.00	1.65	0.54
31.50	5.00	1.65	0.35
32.00	5.00	1.65	0.22
32.50	5.00	1.65	0.14
33.00	5.00	1.65	0.08
33.50	5.00	1.65	0.04
34.00	5.00	1.65	0.02
34.50	5.00	1.65	0.00
35.00	5.00	1.65	0.00
35.50	5.00	1.65	0.00
36.00	5.00	1.65	0.00

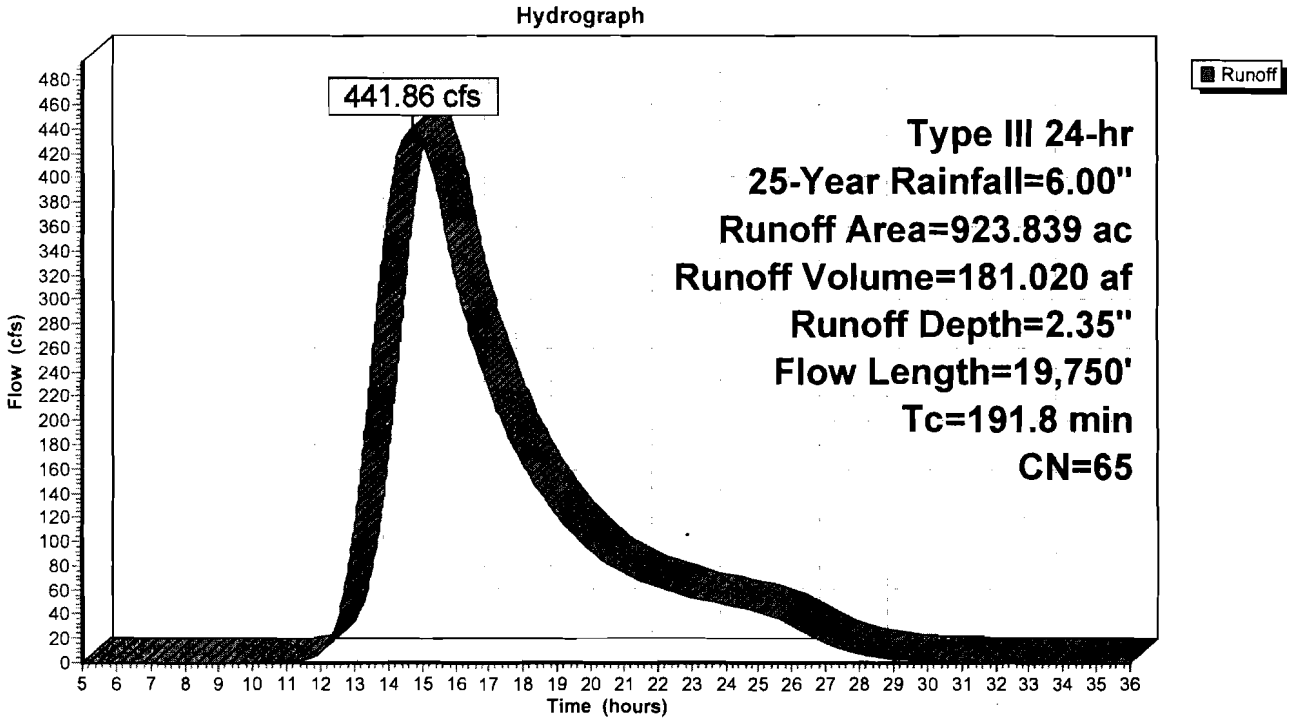
Reach 3R: Existing 48" N-12 (inside old CMP)



Hydrograph for Reach 3R: Existing 48" N-12 (inside old CMP)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	540.30	0.00
6.00	3.10	7	540.55	3.10
7.00	3.10	7	540.55	3.10
8.00	3.10	7	540.55	3.10
9.00	3.10	7	540.55	3.10
10.00	3.10	7	540.55	3.10
11.00	3.11	7	540.55	3.11
12.00	5.47	10	540.63	5.46
13.00	68.80	58	541.43	68.75
14.00	**250.40**	**150**	**542.61**	**250.35**
15.00	**299.75**	**173**	**542.90**	**299.76**
16.00	227.69	139	542.47	227.72
17.00	166.23	110	542.11	166.24
18.00	123.15	88	541.83	123.16
19.00	93.03	72	541.62	93.04
20.00	72.42	60	541.46	72.42
21.00	59.07	52	541.34	59.07
22.00	50.55	47	541.26	50.56
23.00	44.23	42	541.20	44.23
24.00	39.93	39	541.16	39.94
25.00	35.43	36	541.11	35.43
26.00	26.36	29	541.00	26.37
27.00	15.62	20	540.84	15.62
28.00	8.84	14	540.71	8.84
29.00	5.74	10	540.64	5.74
30.00	4.30	8	540.59	4.31
31.00	3.64	7	540.57	3.64
32.00	3.32	7	540.56	3.32
33.00	3.18	7	540.55	3.18
34.00	3.12	7	540.55	3.12
35.00	3.10	7	540.55	3.10
36.00	3.10	7	540.55	3.10

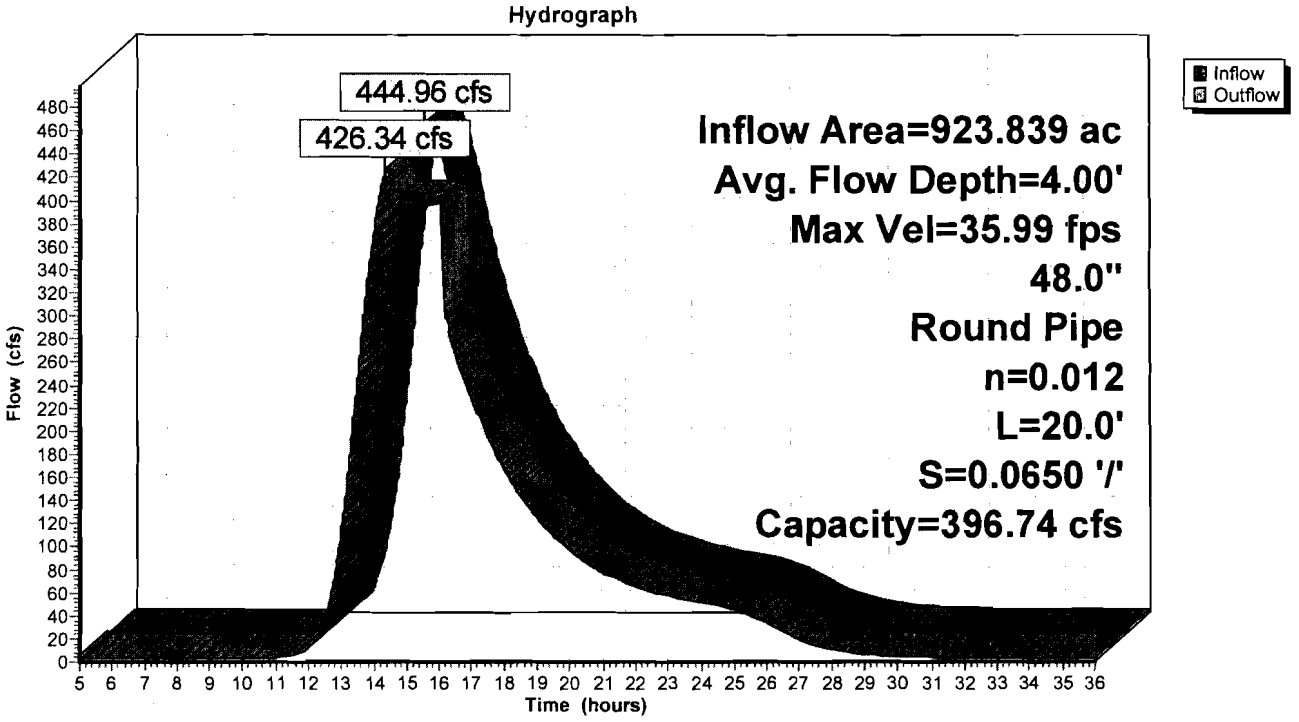
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.34	0.00	0.00
5.50	0.39	0.00	0.00
6.00	0.43	0.00	0.00
6.50	0.48	0.00	0.00
7.00	0.54	0.00	0.00
7.50	0.61	0.00	0.00
8.00	0.68	0.00	0.00
8.50	0.77	0.00	0.00
9.00	0.87	0.00	0.00
9.50	1.00	0.00	0.00
10.00	1.13	0.00	0.00
10.50	1.30	0.01	0.05
11.00	1.50	0.03	0.52
11.50	1.79	0.08	2.45
12.00	3.00	0.51	8.89
12.50	4.21	1.15	34.67
13.00	4.50	1.33	111.29
13.50	4.70	1.46	242.96
14.00	4.87	1.57	372.52
14.50	5.00	1.66	**434.08**
15.00	5.13	1.74	**430.31**
15.50	5.23	1.81	383.87
16.00	5.32	1.87	317.19
16.50	5.39	1.92	266.35
17.00	5.46	1.96	226.05
17.50	5.52	2.01	191.75
18.00	5.57	2.04	163.93
18.50	5.61	2.08	140.74
19.00	5.66	2.11	121.46
19.50	5.70	2.14	105.72
20.00	5.74	2.17	92.85
20.50	5.78	2.19	82.58
21.00	5.82	2.22	74.51
21.50	5.85	2.24	68.14
22.00	5.88	2.27	62.86
22.50	5.92	2.29	58.25
23.00	5.95	2.31	54.25
23.50	5.97	2.33	51.19
24.00	**6.00**	**2.35**	48.50
24.50	6.00	2.35	45.89
25.00	6.00	2.35	42.50
25.50	6.00	2.35	37.45
26.00	6.00	2.35	30.57
26.50	6.00	2.35	23.15
27.00	6.00	2.35	16.44
27.50	6.00	2.35	11.13
28.00	6.00	2.35	7.54
28.50	6.00	2.35	5.12
29.00	6.00	2.35	3.46
29.50	6.00	2.35	2.35
30.00	6.00	2.35	1.58
30.50	6.00	2.35	1.06
31.00	6.00	2.35	0.70
31.50	6.00	2.35	0.46
32.00	6.00	2.35	0.29
32.50	6.00	2.35	0.18
33.00	6.00	2.35	0.11
33.50	6.00	2.35	0.06
34.00	6.00	2.35	0.02
34.50	6.00	2.35	0.00
35.00	6.00	2.35	0.00
35.50	6.00	2.35	0.00
36.00	6.00	2.35	0.00

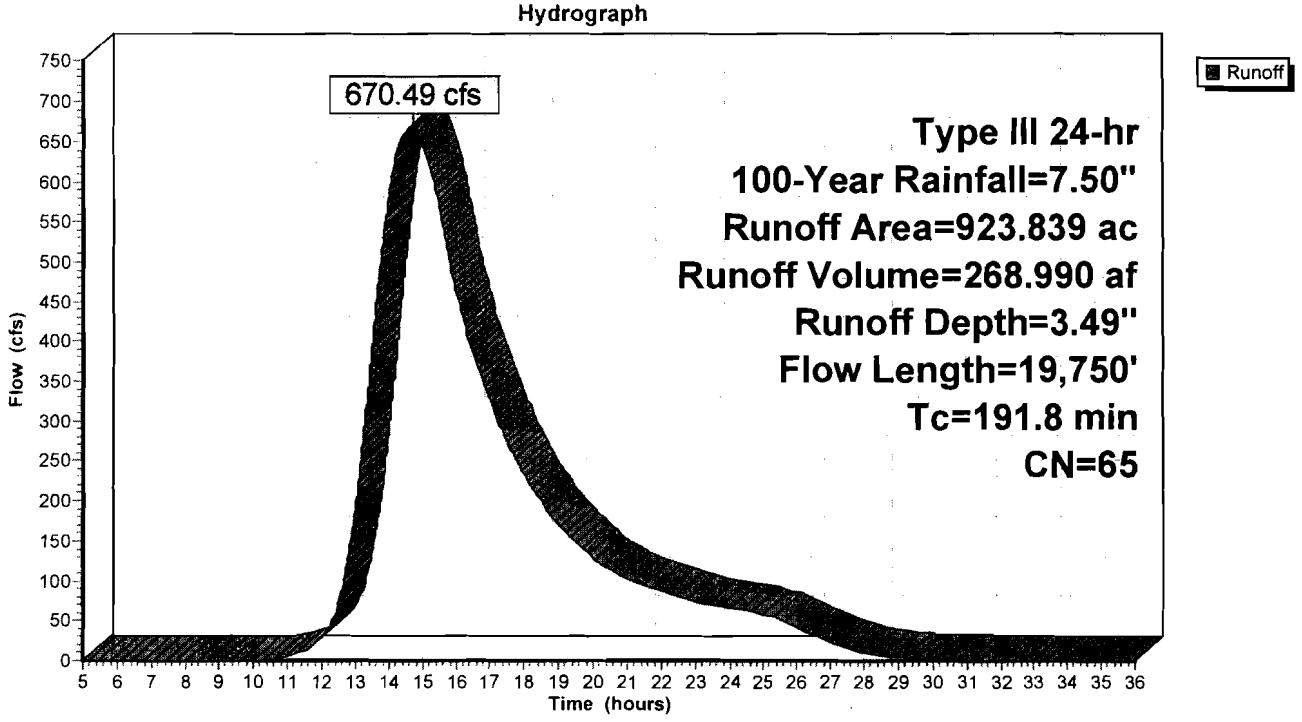
Reach 3R: Existing 48" N-12 (inside old CMP)



Hydrograph for Reach 3R: Existing 48" N-12 (inside old CMP)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	540.30	0.00
6.00	3.10	7	540.55	3.10
7.00	3.10	7	540.55	3.10
8.00	3.10	7	540.55	3.10
9.00	3.10	7	540.55	3.10
10.00	3.10	7	540.55	3.10
11.00	3.62	7	540.57	3.62
12.00	11.99	17	540.78	11.98
13.00	114.39	84	541.77	114.33
14.00	**375.62**	**209**	**543.40**	**375.56**
15.00	**433.41**	**251**	**544.30**	**396.74**
16.00	320.29	251	544.30	396.74
17.00	229.15	140	542.48	229.21
18.00	167.03	111	542.11	167.05
19.00	124.56	89	541.84	124.57
20.00	95.95	74	541.64	95.96
21.00	77.61	63	541.50	77.61
22.00	65.96	56	541.40	65.96
23.00	57.35	51	541.33	57.35
24.00	51.60	47	541.27	51.60
25.00	45.60	43	541.22	45.61
26.00	33.67	35	541.09	33.67
27.00	19.54	24	540.90	19.55
28.00	10.64	16	540.75	10.64
29.00	6.56	11	540.66	6.56
30.00	4.68	9	540.60	4.68
31.00	3.80	8	540.58	3.80
32.00	3.39	7	540.56	3.39
33.00	3.21	7	540.55	3.21
34.00	3.12	7	540.55	3.12
35.00	3.10	7	540.55	3.10
36.00	3.10	7	540.55	3.10

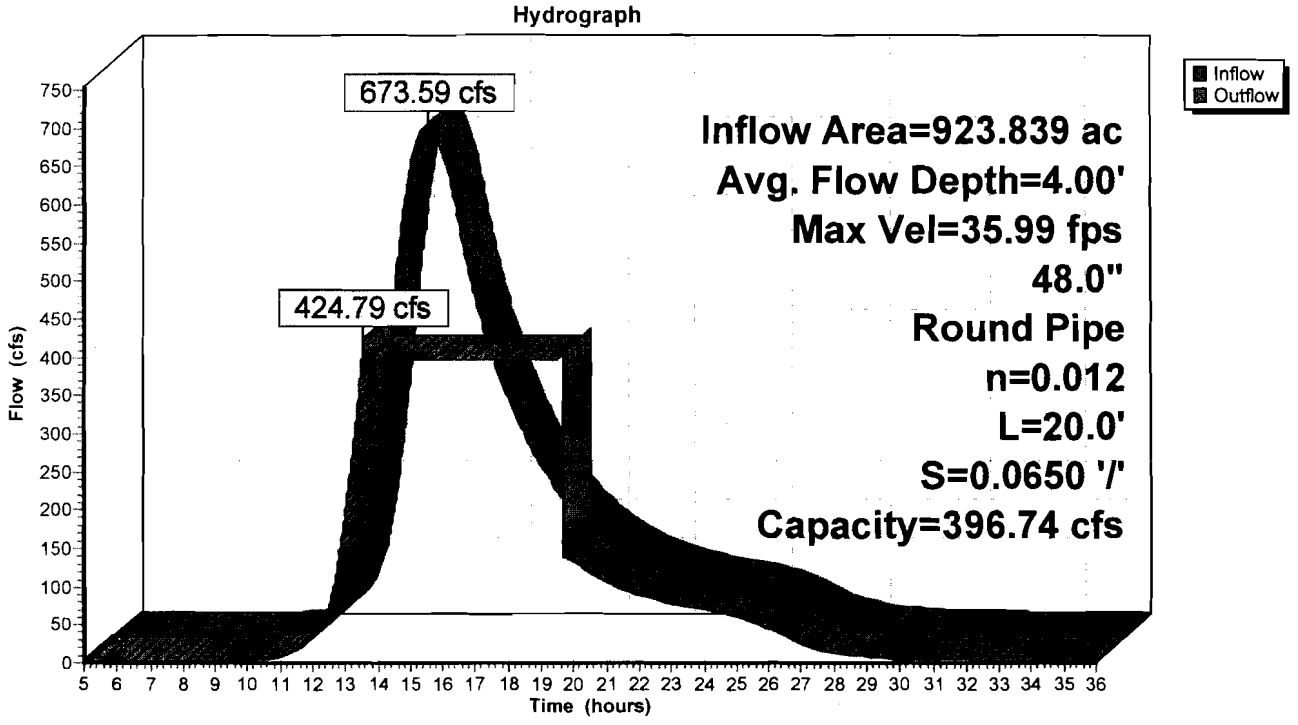
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.43	0.00	0.00
5.50	0.48	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.00	0.00
7.00	0.68	0.00	0.00
7.50	0.76	0.00	0.00
8.00	0.86	0.00	0.00
8.50	0.96	0.00	0.00
9.00	1.09	0.00	0.00
9.50	1.24	0.01	0.02
10.00	1.42	0.02	0.27
10.50	1.62	0.05	1.53
11.00	1.88	0.10	5.17
11.50	2.24	0.20	12.86
12.00	3.75	0.89	28.62
12.50	5.26	1.83	74.41
13.00	5.62	2.08	195.17
13.50	5.88	2.26	393.38
14.00	6.08	2.41	580.99
14.50	6.26	2.54	**663.12**
15.00	6.41	2.65	**647.44**
15.50	6.54	2.75	569.69
16.00	6.64	2.83	465.31
16.50	6.74	2.90	386.98
17.00	6.82	2.96	325.53
17.50	6.90	3.02	273.97
18.00	6.96	3.07	232.65
18.50	7.02	3.12	198.54
19.00	7.07	3.16	170.44
19.50	7.13	3.20	147.70
20.00	7.18	3.24	129.22
20.50	7.23	3.28	114.52
21.00	7.27	3.31	103.01
21.50	7.31	3.35	93.96
22.00	7.36	3.38	86.46
22.50	7.39	3.41	79.92
23.00	7.43	3.44	74.29
23.50	7.47	3.47	70.04
24.00	**7.50**	**3.49**	66.29
24.50	7.50	3.49	62.68
25.00	7.50	3.49	58.02
25.50	7.50	3.49	51.10
26.00	7.50	3.49	41.70
26.50	7.50	3.49	31.57
27.00	7.50	3.49	22.42
27.50	7.50	3.49	15.17
28.00	7.50	3.49	10.28
28.50	7.50	3.49	6.99
29.00	7.50	3.49	4.72
29.50	7.50	3.49	3.20
30.00	7.50	3.49	2.16
30.50	7.50	3.49	1.44
31.00	7.50	3.49	0.96
31.50	7.50	3.49	0.63
32.00	7.50	3.49	0.40
32.50	7.50	3.49	0.25
33.00	7.50	3.49	0.15
33.50	7.50	3.49	0.08
34.00	7.50	3.49	0.03
34.50	7.50	3.49	0.01
35.00	7.50	3.49	0.00
35.50	7.50	3.49	0.00
36.00	7.50	3.49	0.00

Reach 3R: Existing 48" N-12 (inside old CMP)



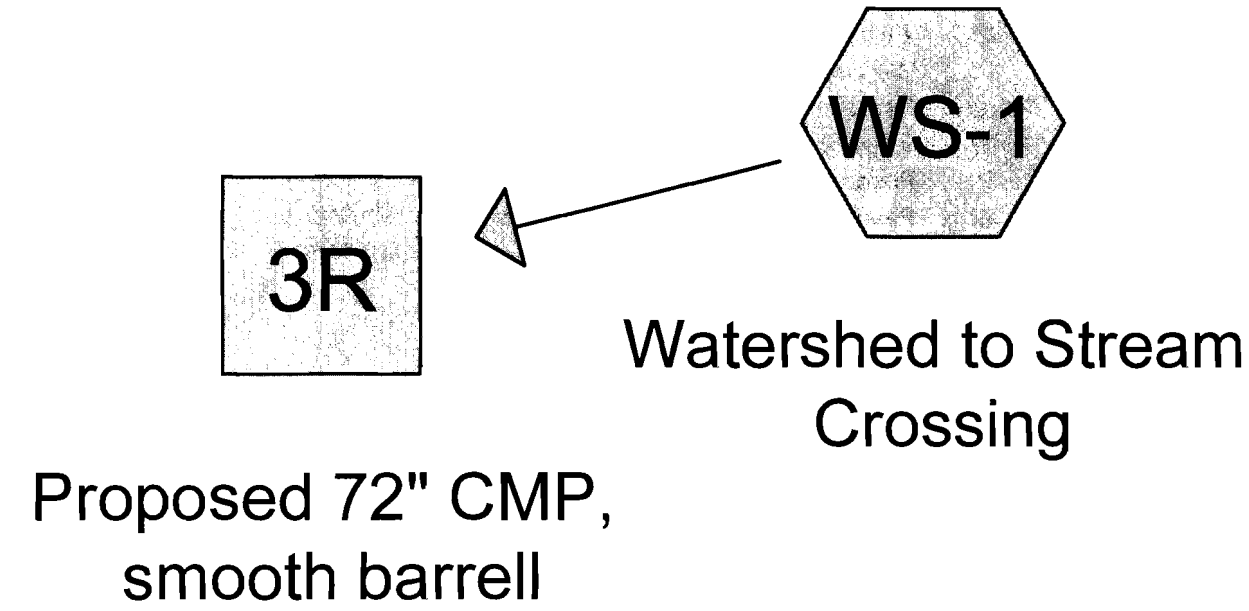
Hydrograph for Reach 3R: Existing 48" N-12 (inside old CMP)

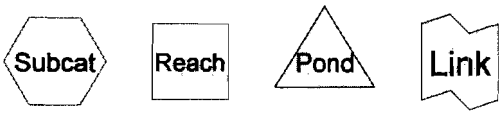
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	540.30	0.00
6.00	3.10	7	540.55	3.10
7.00	3.10	7	540.55	3.10
8.00	3.10	7	540.55	3.10
9.00	3.10	7	540.55	3.10
10.00	3.37	7	540.56	3.37
11.00	8.27	13	540.70	8.27
12.00	31.72	34	541.06	31.70
13.00	198.27	**126**	**542.30**	**198.18**
14.00	**584.09**	**251**	**544.30**	**396.74**
15.00	**650.54**	251	544.30	396.74
16.00	468.41	251	544.30	396.74
17.00	328.63	251	544.30	396.74
18.00	235.75	251	544.30	396.74
19.00	173.54	251	544.30	396.74
20.00	132.32	93	541.89	131.60
21.00	106.11	79	541.71	106.11
22.00	89.56	70	541.59	89.57
23.00	77.39	63	541.50	77.40
24.00	69.39	58	541.43	69.40
25.00	61.12	53	541.36	61.13
26.00	44.80	43	541.21	44.80
27.00	25.52	29	540.99	25.53
28.00	13.38	18	540.80	13.38
29.00	7.82	13	540.69	7.82
30.00	5.26	10	540.62	5.26
31.00	4.06	8	540.58	4.06
32.00	3.50	7	540.57	3.50
33.00	3.25	7	540.56	3.25
34.00	3.13	7	540.55	3.13
35.00	3.10	7	540.55	3.10
36.00	3.10	7	540.55	3.10

Appendix D

HydroCad Reports

POST-DEVELOPMENT CONDITIONS





Routing Diagram for MILES 052312
Prepared by Silkworth Engineering
HydroCAD® 10.00 s/n 06265 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
25.668	30	Woods, Good, HSG A (WS-1)
0.264	39	Pasture/grassland/range, Good, HSG A (WS-1)
0.464	46	2 acre lots, 12% imp, HSG A (WS-1)
307.151	55	Woods, Good, HSG B (WS-1)
25.903	61	Pasture/grassland/range, Good, HSG B (WS-1)
48.952	65	2 acre lots, 12% imp, HSG B (WS-1)
382.319	70	Woods, Good, HSG C (WS-1)
53.176	74	Pasture/grassland/range, Good, HSG C (WS-1)
13.903	77	2 acre lots, 12% imp, HSG C (WS-1)
33.489	77	Woods, Good, HSG D (WS-1)
2.734	80	Pasture/grassland/range, Good, HSG D (WS-1)
0.882	82	2 acre lots, 12% imp, HSG D (WS-1)
8.305	89	Paved roads w/open ditches, 50% imp, HSG B (WS-1)
5.339	92	Paved roads w/open ditches, 50% imp, HSG C (WS-1)
1.308	93	Paved roads w/open ditches, 50% imp, HSG D (WS-1)
2.684	98	Water Surface, HSG B (WS-1)
0.167	98	Water Surface, HSG C (WS-1)
11.131	98	Water Surface, HSG D (WS-1)
923.839	**65**	**TOTAL AREA**

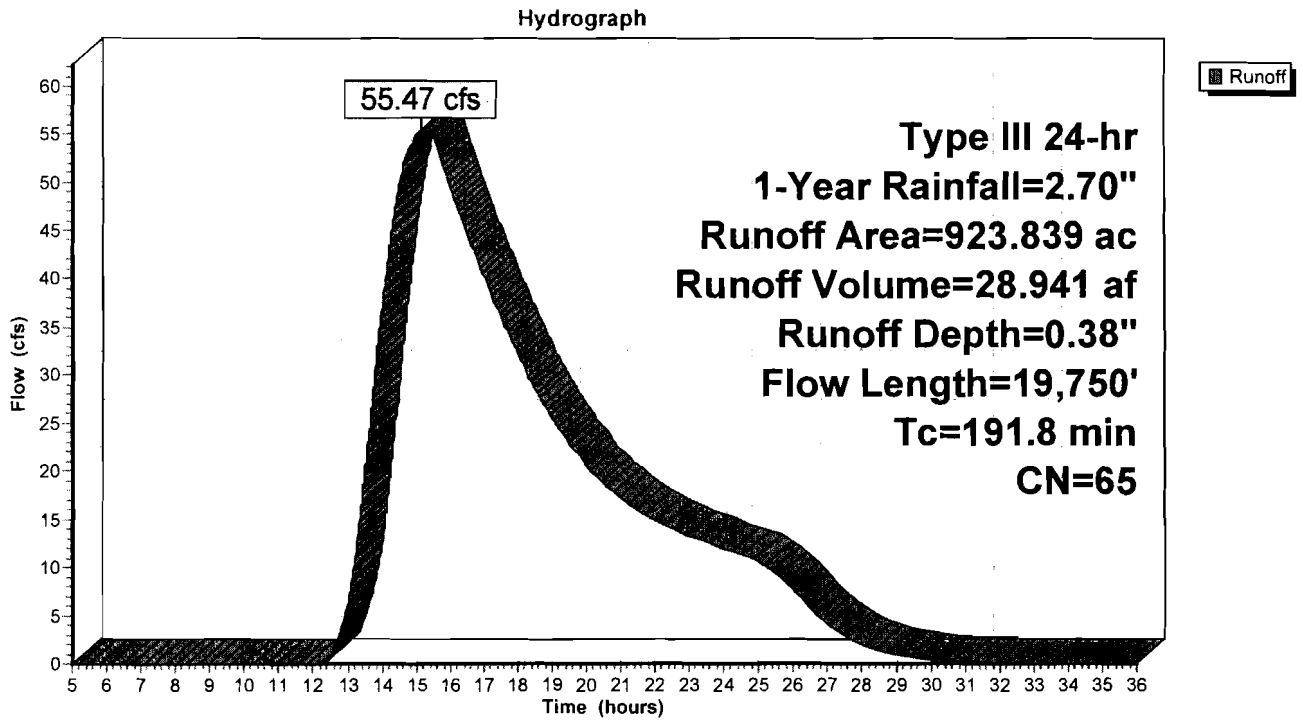
Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
26.396	HSG A	WS-1
392.995	HSG B	WS-1
454.903	HSG C	WS-1
49.545	HSG D	WS-1
0.000	Other	
923.839		**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3R	541.50	538.30	37.0	0.0865	0.012	72.0	0.0	0.0

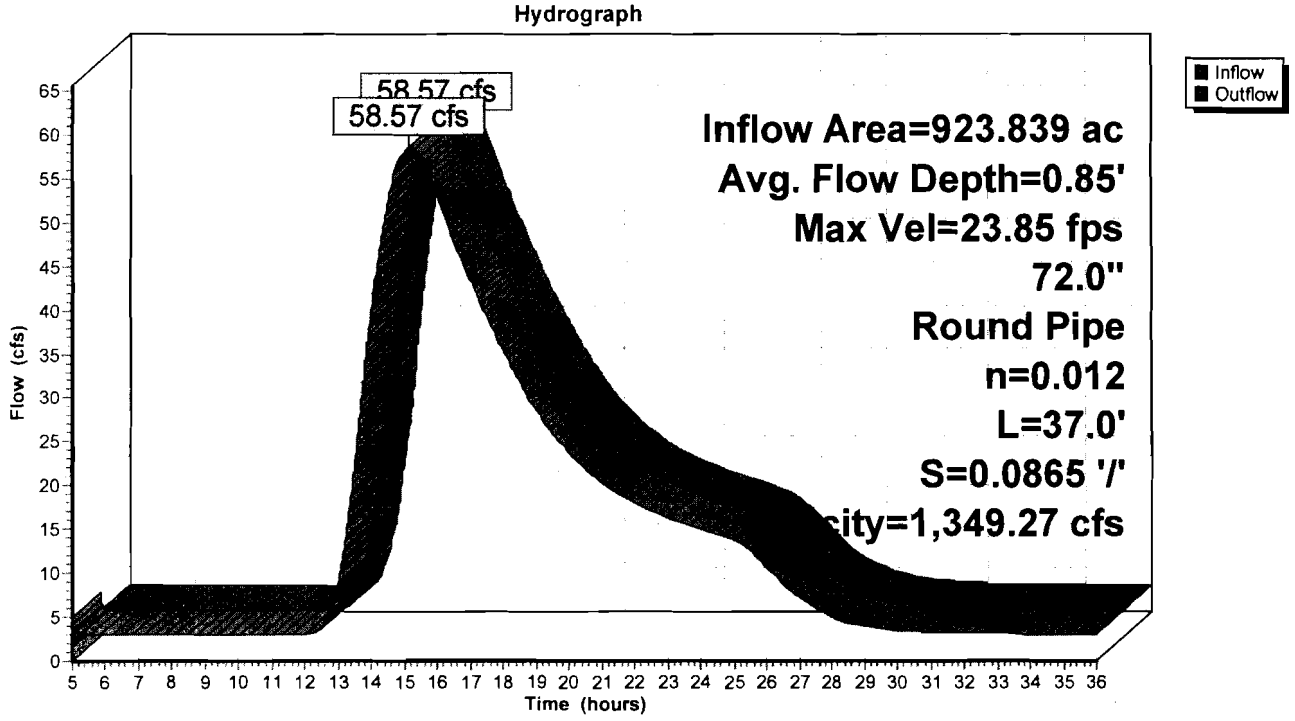
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.22	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.31	0.00	0.00
8.50	0.35	0.00	0.00
9.00	0.39	0.00	0.00
9.50	0.45	0.00	0.00
10.00	0.51	0.00	0.00
10.50	0.58	0.00	0.00
11.00	0.68	0.00	0.00
11.50	0.80	0.00	0.00
12.00	1.35	0.01	0.01
12.50	1.90	0.11	0.68
13.00	2.02	0.14	6.26
13.50	2.12	0.17	19.56
14.00	2.19	0.19	37.06
14.50	2.25	0.21	49.51
15.00	2.31	0.23	**54.88**
15.50	2.35	0.24	**54.57**
16.00	2.39	0.26	49.59
16.50	2.43	0.27	44.78
17.00	2.46	0.28	40.43
17.50	2.48	0.29	36.18
18.00	2.51	0.30	32.32
18.50	2.53	0.31	28.82
19.00	2.55	0.32	25.69
19.50	2.57	0.32	22.97
20.00	2.58	0.33	20.65
20.50	2.60	0.34	18.75
21.00	2.62	0.34	17.21
21.50	2.63	0.35	15.97
22.00	2.65	0.35	14.94
22.50	2.66	0.36	14.05
23.00	2.68	0.37	13.24
23.50	2.69	0.37	12.58
24.00	**2.70**	**0.38**	11.98
24.50	2.70	0.38	11.39
25.00	2.70	0.38	10.59
25.50	2.70	0.38	9.36
26.00	2.70	0.38	7.66
26.50	2.70	0.38	5.80
27.00	2.70	0.38	4.13
27.50	2.70	0.38	2.79
28.00	2.70	0.38	1.89
28.50	2.70	0.38	1.29
29.00	2.70	0.38	0.87
29.50	2.70	0.38	0.59
30.00	2.70	0.38	0.40
30.50	2.70	0.38	0.27
31.00	2.70	0.38	0.18
31.50	2.70	0.38	0.12
32.00	2.70	0.38	0.07
32.50	2.70	0.38	0.05
33.00	2.70	0.38	0.03
33.50	2.70	0.38	0.01
34.00	2.70	0.38	0.01
34.50	2.70	0.38	0.00
35.00	2.70	0.38	0.00
35.50	2.70	0.38	0.00
36.00	2.70	0.38	0.00

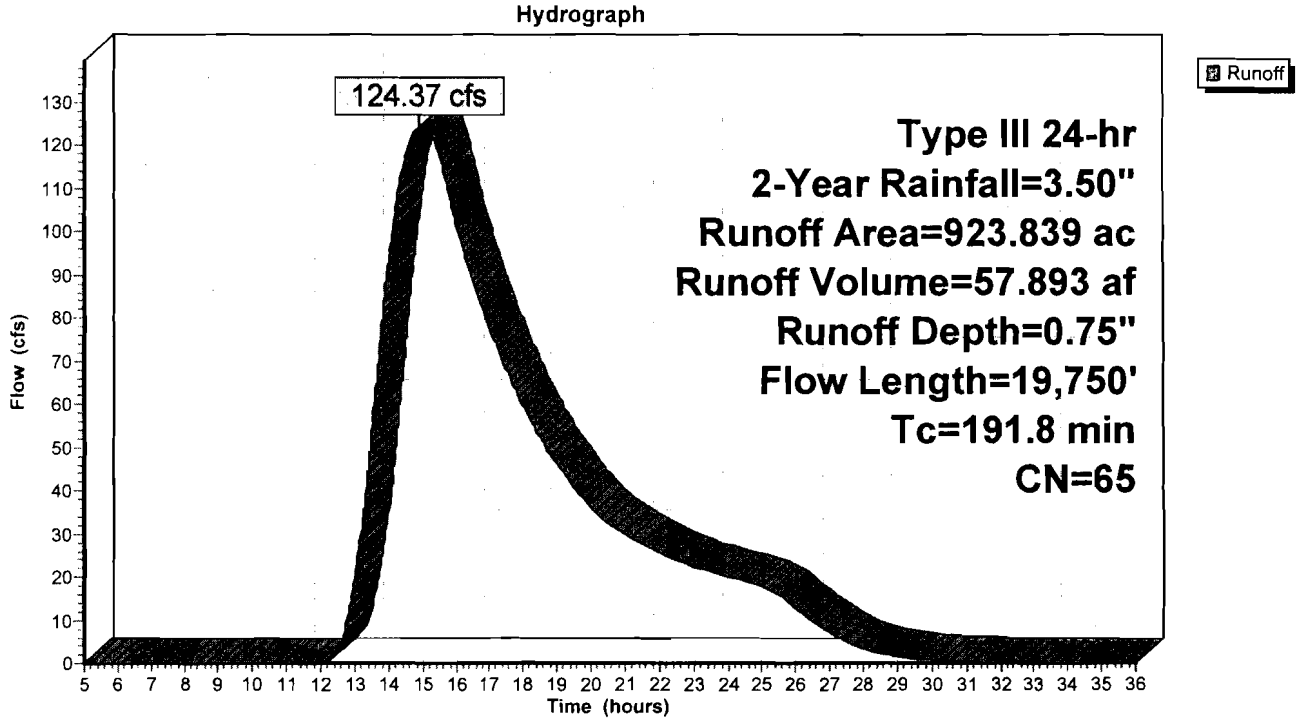
Reach 3R: Proposed 72" CMP, smooth barrell



Hydrograph for Reach 3R: Proposed 72" CMP, smooth barrell

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	541.50	0.00
6.00	3.10	12	541.71	3.10
7.00	3.10	12	541.71	3.10
8.00	3.10	12	541.71	3.10
9.00	3.10	12	541.71	3.10
10.00	3.10	12	541.71	3.10
11.00	3.10	12	541.71	3.10
12.00	3.11	12	541.71	3.11
13.00	9.36	25	541.86	9.35
14.00	40.16	70	542.21	40.13
15.00	**57.98**	**90**	**542.35**	**57.97**
16.00	**52.69**	**84**	**542.31**	**52.70**
17.00	43.53	74	542.24	43.54
18.00	35.42	64	542.17	35.42
19.00	28.79	55	542.11	28.79
20.00	23.75	48	542.05	23.76
21.00	20.31	43	542.01	20.31
22.00	18.04	40	541.99	18.05
23.00	16.34	37	541.96	16.34
24.00	15.08	35	541.95	15.08
25.00	13.69	33	541.93	13.70
26.00	10.76	28	541.88	10.76
27.00	7.23	21	541.81	7.23
28.00	4.99	16	541.76	4.99
29.00	3.97	14	541.74	3.97
30.00	3.50	13	541.72	3.50
31.00	3.28	12	541.72	3.28
32.00	3.17	12	541.71	3.17
33.00	3.13	12	541.71	3.13
34.00	3.11	12	541.71	3.11
35.00	3.10	12	541.71	3.10
36.00	3.10	12	541.71	3.10

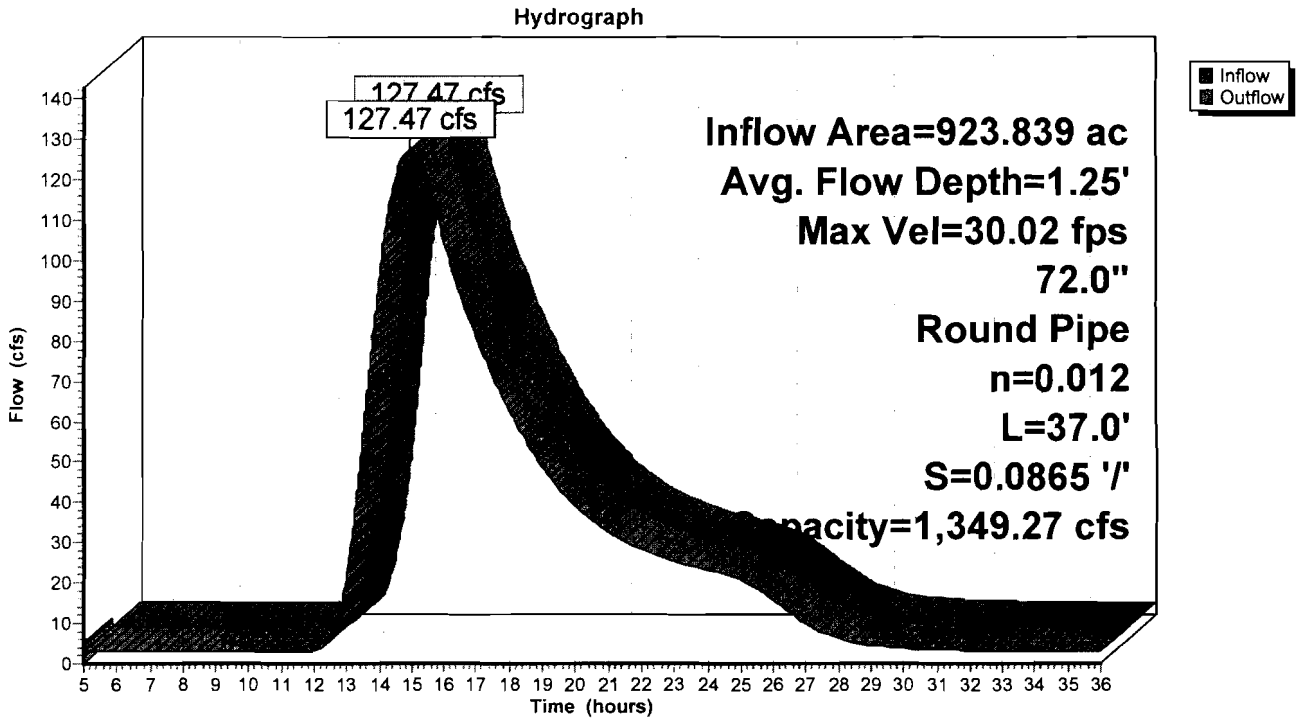
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.20	0.00	0.00
5.50	0.22	0.00	0.00
6.00	0.25	0.00	0.00
6.50	0.28	0.00	0.00
7.00	0.32	0.00	0.00
7.50	0.36	0.00	0.00
8.00	0.40	0.00	0.00
8.50	0.45	0.00	0.00
9.00	0.51	0.00	0.00
9.50	0.58	0.00	0.00
10.00	0.66	0.00	0.00
10.50	0.76	0.00	0.00
11.00	0.88	0.00	0.00
11.50	1.04	0.00	0.00
12.00	1.75	0.07	0.11
12.50	2.46	0.28	3.20
13.00	2.62	0.35	19.48
13.50	2.74	0.39	53.78
14.00	2.84	0.43	93.65
14.50	2.92	0.47	**117.87**
15.00	2.99	0.50	**124.19**
15.50	3.05	0.53	117.40
16.00	3.10	0.55	101.84
16.50	3.14	0.57	88.87
17.00	3.18	0.59	78.01
17.50	3.22	0.61	68.15
18.00	3.25	0.62	59.72
18.50	3.28	0.64	52.39
19.00	3.30	0.65	46.05
19.50	3.33	0.66	40.70
20.00	3.35	0.67	36.24
20.50	3.37	0.69	32.61
21.00	3.39	0.70	29.72
21.50	3.41	0.71	27.41
22.00	3.43	0.72	25.50
22.50	3.45	0.73	23.83
23.00	3.47	0.74	22.35
23.50	3.48	0.74	21.17
24.00	**3.50**	**0.75**	20.11
24.50	3.50	0.75	19.08
25.00	3.50	0.75	17.71
25.50	3.50	0.75	15.63
26.00	3.50	0.75	12.77
26.50	3.50	0.75	9.68
27.00	3.50	0.75	6.88
27.50	3.50	0.75	4.65
28.00	3.50	0.75	3.15
28.50	3.50	0.75	2.14
29.00	3.50	0.75	1.45
29.50	3.50	0.75	0.98
30.00	3.50	0.75	0.66
30.50	3.50	0.75	0.44
31.00	3.50	0.75	0.29
31.50	3.50	0.75	0.19
32.00	3.50	0.75	0.12
32.50	3.50	0.75	0.08
33.00	3.50	0.75	0.05
33.50	3.50	0.75	0.02
34.00	3.50	0.75	0.01
34.50	3.50	0.75	0.00
35.00	3.50	0.75	0.00
35.50	3.50	0.75	0.00
36.00	3.50	0.75	0.00

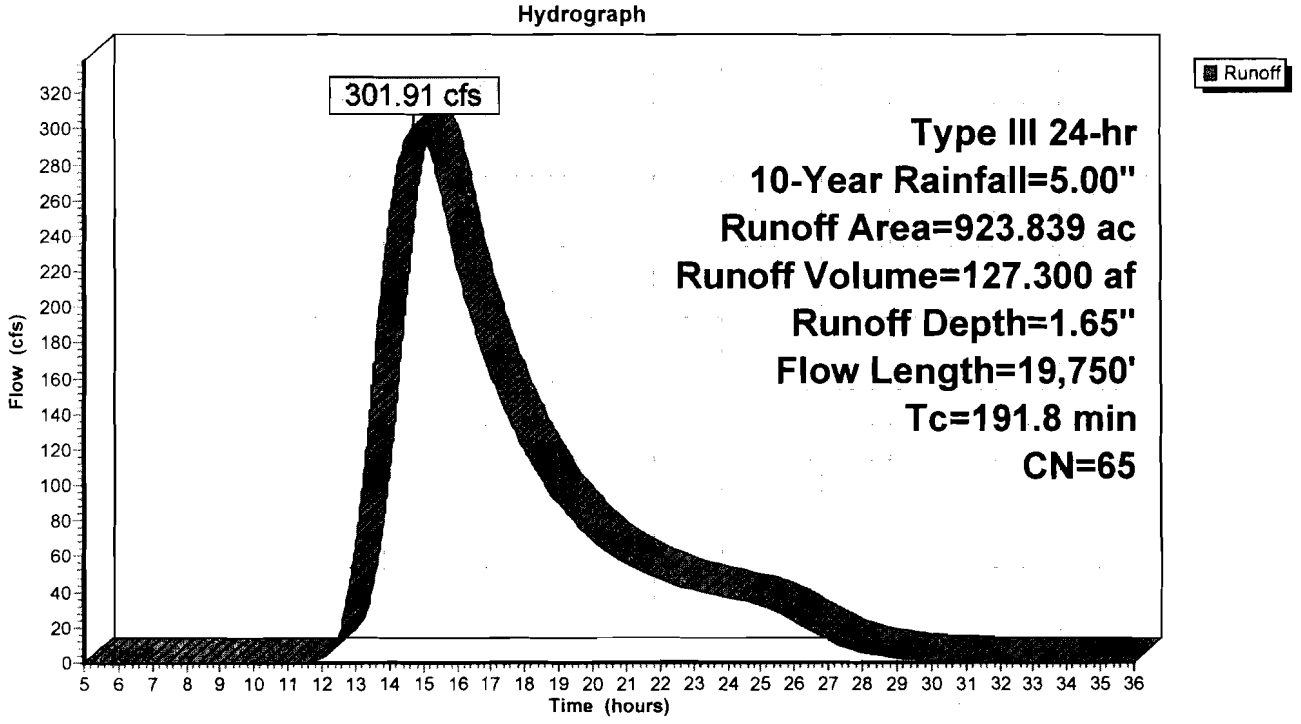
Reach 3R: Proposed 72" CMP, smooth barrell



Hydrograph for Reach 3R: Proposed 72" CMP, smooth barrell

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	541.50	0.00
6.00	3.10	12	541.71	3.10
7.00	3.10	12	541.71	3.10
8.00	3.10	12	541.71	3.10
9.00	3.10	12	541.71	3.10
10.00	3.10	12	541.71	3.10
11.00	3.10	12	541.71	3.10
12.00	3.21	12	541.71	3.20
13.00	22.58	47	542.04	22.54
14.00	**96.75**	**129**	**542.59**	**96.71**
15.00	**127.29**	**157**	**542.74**	**127.29**
16.00	104.94	137	542.63	104.95
17.00	81.11	114	542.50	81.13
18.00	62.82	95	542.38	62.83
19.00	49.15	80	542.28	49.16
20.00	39.34	69	542.20	39.34
21.00	32.82	61	542.14	32.82
22.00	28.60	55	542.10	28.61
23.00	25.45	51	542.07	25.45
24.00	23.21	48	542.05	23.21
25.00	20.81	44	542.02	20.82
26.00	15.87	36	541.96	15.88
27.00	9.98	26	541.87	9.98
28.00	6.25	19	541.79	6.26
29.00	4.55	15	541.75	4.55
30.00	3.76	13	541.73	3.76
31.00	3.39	12	541.72	3.39
32.00	3.22	12	541.71	3.22
33.00	3.15	12	541.71	3.15
34.00	3.11	12	541.71	3.11
35.00	3.10	12	541.71	3.10
36.00	3.10	12	541.71	3.10

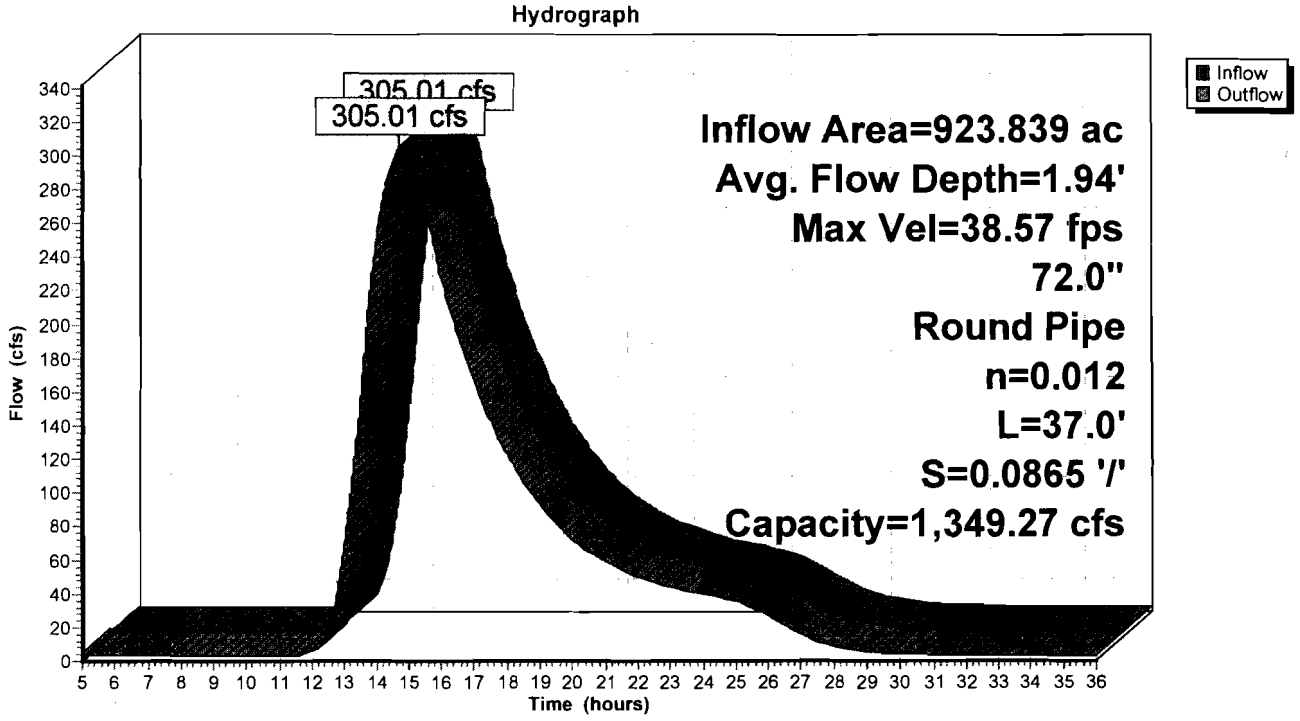
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00
5.50	0.32	0.00	0.00
6.00	0.36	0.00	0.00
6.50	0.40	0.00	0.00
7.00	0.45	0.00	0.00
7.50	0.51	0.00	0.00
8.00	0.57	0.00	0.00
8.50	0.64	0.00	0.00
9.00	0.73	0.00	0.00
9.50	0.83	0.00	0.00
10.00	0.95	0.00	0.00
10.50	1.08	0.00	0.00
11.00	1.25	0.01	0.01
11.50	1.49	0.03	0.28
12.00	2.50	0.30	2.37
12.50	3.51	0.76	16.45
13.00	3.75	0.89	65.70
13.50	3.92	0.98	155.27
14.00	4.06	1.06	247.30
14.50	4.17	1.13	**294.47**
15.00	4.27	1.19	**296.65**
15.50	4.36	1.24	268.51
16.00	4.43	1.29	224.59
16.50	4.49	1.33	190.49
17.00	4.55	1.36	163.13
17.50	4.60	1.39	139.47
18.00	4.64	1.42	120.05
18.50	4.68	1.44	103.68
19.00	4.72	1.47	89.93
19.50	4.75	1.49	78.62
20.00	4.79	1.51	69.32
20.50	4.82	1.53	61.85
21.00	4.85	1.55	55.97
21.50	4.88	1.57	51.32
22.00	4.90	1.59	47.45
22.50	4.93	1.61	44.08
23.00	4.95	1.62	41.13
23.50	4.98	1.64	38.85
24.00	**5.00**	**1.65**	36.83
24.50	5.00	1.65	34.88
25.00	5.00	1.65	32.33
25.50	5.00	1.65	28.50
26.00	5.00	1.65	23.26
26.50	5.00	1.65	17.62
27.00	5.00	1.65	12.52
27.50	5.00	1.65	8.47
28.00	5.00	1.65	5.74
28.50	5.00	1.65	3.90
29.00	5.00	1.65	2.64
29.50	5.00	1.65	1.79
30.00	5.00	1.65	1.20
30.50	5.00	1.65	0.81
31.00	5.00	1.65	0.54
31.50	5.00	1.65	0.35
32.00	5.00	1.65	0.22
32.50	5.00	1.65	0.14
33.00	5.00	1.65	0.08
33.50	5.00	1.65	0.04
34.00	5.00	1.65	0.02
34.50	5.00	1.65	0.00
35.00	5.00	1.65	0.00
35.50	5.00	1.65	0.00
36.00	5.00	1.65	0.00

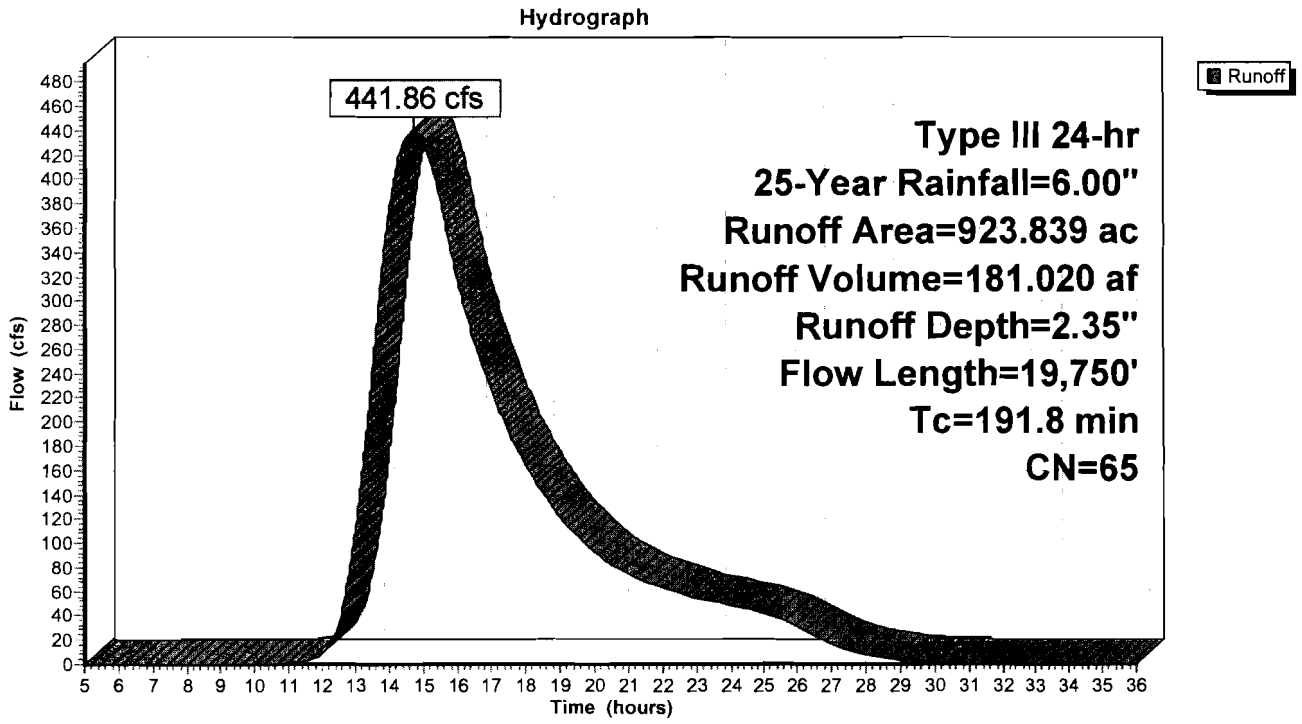
Reach 3R: Proposed 72" CMP, smooth barrell



Hydrograph for Reach 3R: Proposed 72" CMP, smooth barrell

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	541.50	0.00
6.00	3.10	12	541.71	3.10
7.00	3.10	12	541.71	3.10
8.00	3.10	12	541.71	3.10
9.00	3.10	12	541.71	3.10
10.00	3.10	12	541.71	3.10
11.00	3.11	12	541.71	3.11
12.00	5.47	17	541.78	5.46
13.00	68.80	102	542.42	68.73
14.00	**250.40**	**254**	**543.25**	**250.33**
15.00	**299.75**	**289**	**543.42**	**299.76**
16.00	227.69	237	543.17	227.73
17.00	166.23	190	542.92	166.25
18.00	123.15	153	542.72	123.17
19.00	93.03	126	542.57	93.05
20.00	72.42	105	542.44	72.43
21.00	59.07	91	542.36	59.07
22.00	50.55	82	542.29	50.56
23.00	44.23	75	542.24	44.23
24.00	39.93	69	542.21	39.94
25.00	35.43	64	542.17	35.43
26.00	26.36	52	542.08	26.37
27.00	15.62	36	541.95	15.62
28.00	8.84	24	541.85	8.84
29.00	5.74	18	541.78	5.74
30.00	4.30	15	541.75	4.31
31.00	3.64	13	541.73	3.64
32.00	3.32	12	541.72	3.32
33.00	3.18	12	541.71	3.18
34.00	3.12	12	541.71	3.12
35.00	3.10	12	541.71	3.10
36.00	3.10	12	541.71	3.10

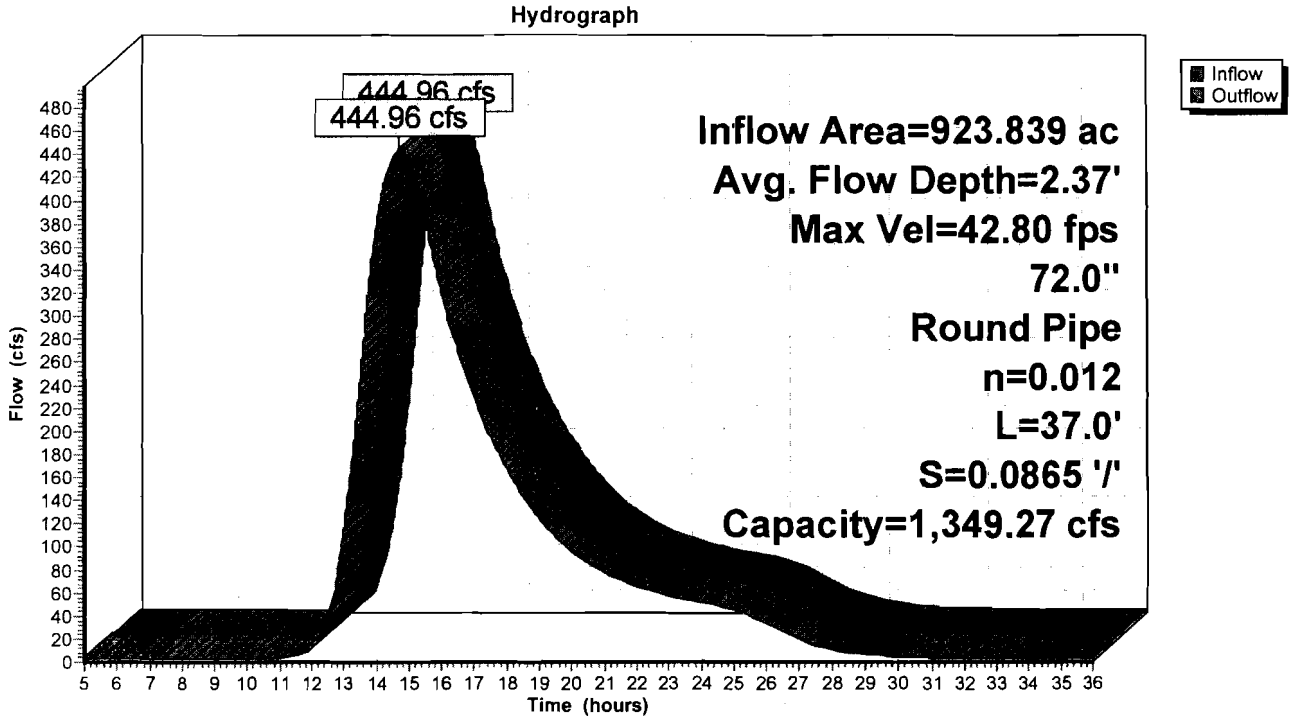
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.34	0.00	0.00	31.50	6.00	2.35	0.46
5.50	0.39	0.00	0.00	32.00	6.00	2.35	0.29
6.00	0.43	0.00	0.00	32.50	6.00	2.35	0.18
6.50	0.48	0.00	0.00	33.00	6.00	2.35	0.11
7.00	0.54	0.00	0.00	33.50	6.00	2.35	0.06
7.50	0.61	0.00	0.00	34.00	6.00	2.35	0.02
8.00	0.68	0.00	0.00	34.50	6.00	2.35	0.00
8.50	0.77	0.00	0.00	35.00	6.00	2.35	0.00
9.00	0.87	0.00	0.00	35.50	6.00	2.35	0.00
9.50	1.00	0.00	0.00	36.00	6.00	2.35	0.00
10.00	1.13	0.00	0.00				
10.50	1.30	0.01	0.05				
11.00	1.50	0.03	0.52				
11.50	1.79	0.08	2.45				
12.00	3.00	0.51	8.89				
12.50	4.21	1.15	34.67				
13.00	4.50	1.33	111.29				
13.50	4.70	1.46	242.96				
14.00	4.87	1.57	372.52				
14.50	5.00	1.66	**434.08**				
15.00	5.13	1.74	**430.31**				
15.50	5.23	1.81	383.87				
16.00	5.32	1.87	317.19				
16.50	5.39	1.92	266.35				
17.00	5.46	1.96	226.05				
17.50	5.52	2.01	191.75				
18.00	5.57	2.04	163.93				
18.50	5.61	2.08	140.74				
19.00	5.66	2.11	121.46				
19.50	5.70	2.14	105.72				
20.00	5.74	2.17	92.85				
20.50	5.78	2.19	82.58				
21.00	5.82	2.22	74.51				
21.50	5.85	2.24	68.14				
22.00	5.88	2.27	62.86				
22.50	5.92	2.29	58.25				
23.00	5.95	2.31	54.25				
23.50	5.97	2.33	51.19				
24.00	**6.00**	**2.35**	48.50				
24.50	6.00	2.35	45.89				
25.00	6.00	2.35	42.50				
25.50	6.00	2.35	37.45				
26.00	6.00	2.35	30.57				
26.50	6.00	2.35	23.15				
27.00	6.00	2.35	16.44				
27.50	6.00	2.35	11.13				
28.00	6.00	2.35	7.54				
28.50	6.00	2.35	5.12				
29.00	6.00	2.35	3.46				
29.50	6.00	2.35	2.35				
30.00	6.00	2.35	1.58				
30.50	6.00	2.35	1.06				
31.00	6.00	2.35	0.70				

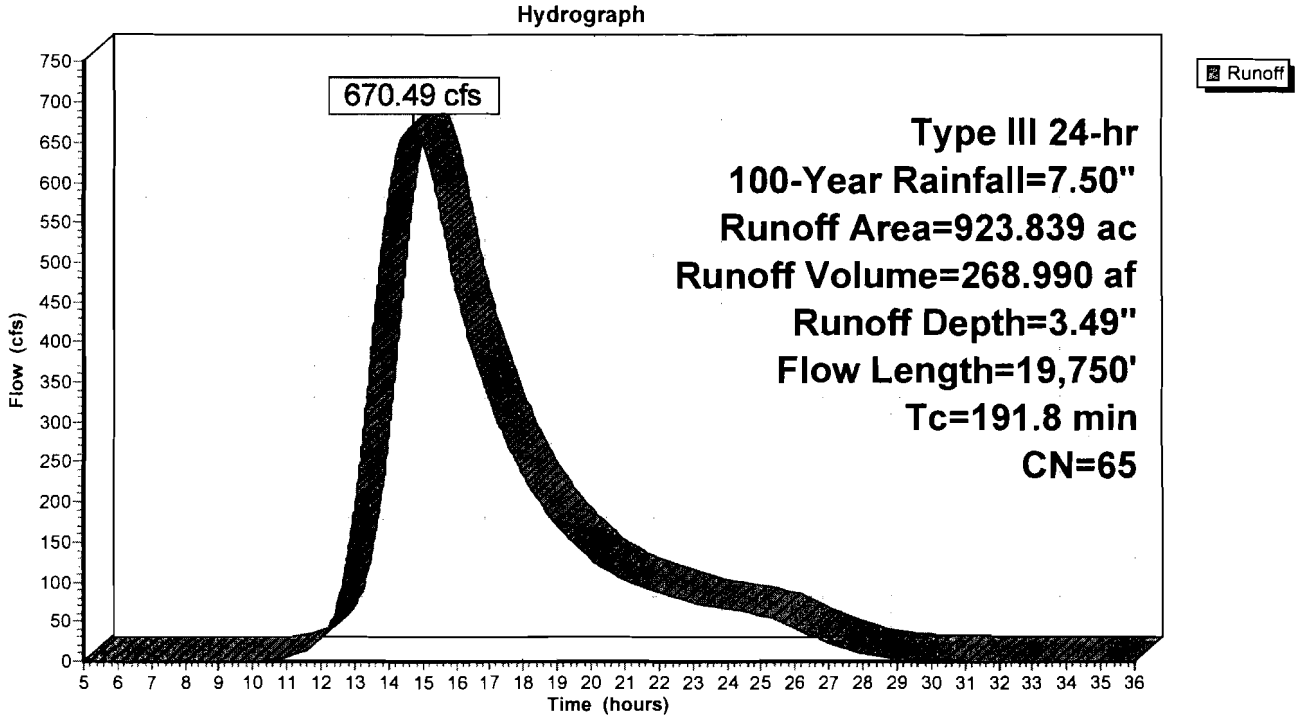
Reach 3R: Proposed 72" CMP, smooth barrell



Hydrograph for Reach 3R: Proposed 72" CMP, smooth barrell

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	541.50	0.00
6.00	3.10	12	541.71	3.10
7.00	3.10	12	541.71	3.10
8.00	3.10	12	541.71	3.10
9.00	3.10	12	541.71	3.10
10.00	3.10	12	541.71	3.10
11.00	3.62	13	541.73	3.62
12.00	11.99	30	541.90	11.97
13.00	114.39	146	542.68	114.29
14.00	**375.62**	**340**	**543.66**	**375.53**
15.00	**433.41**	**377**	**543.84**	**433.43**
16.00	320.29	303	543.49	320.34
17.00	229.15	238	543.17	229.18
18.00	167.03	190	542.93	167.06
19.00	124.56	155	542.73	124.57
20.00	95.95	129	542.58	95.97
21.00	77.61	111	542.48	77.61
22.00	65.96	99	542.40	65.96
23.00	57.35	90	542.34	57.35
24.00	51.60	83	542.30	51.60
25.00	45.60	76	542.25	45.61
26.00	33.67	62	542.15	33.68
27.00	19.54	42	542.00	19.55
28.00	10.64	28	541.88	10.64
29.00	6.56	20	541.80	6.57
30.00	4.68	16	541.76	4.68
31.00	3.80	13	541.73	3.80
32.00	3.39	12	541.72	3.39
33.00	3.21	12	541.71	3.21
34.00	3.12	12	541.71	3.12
35.00	3.10	12	541.71	3.10
36.00	3.10	12	541.71	3.10

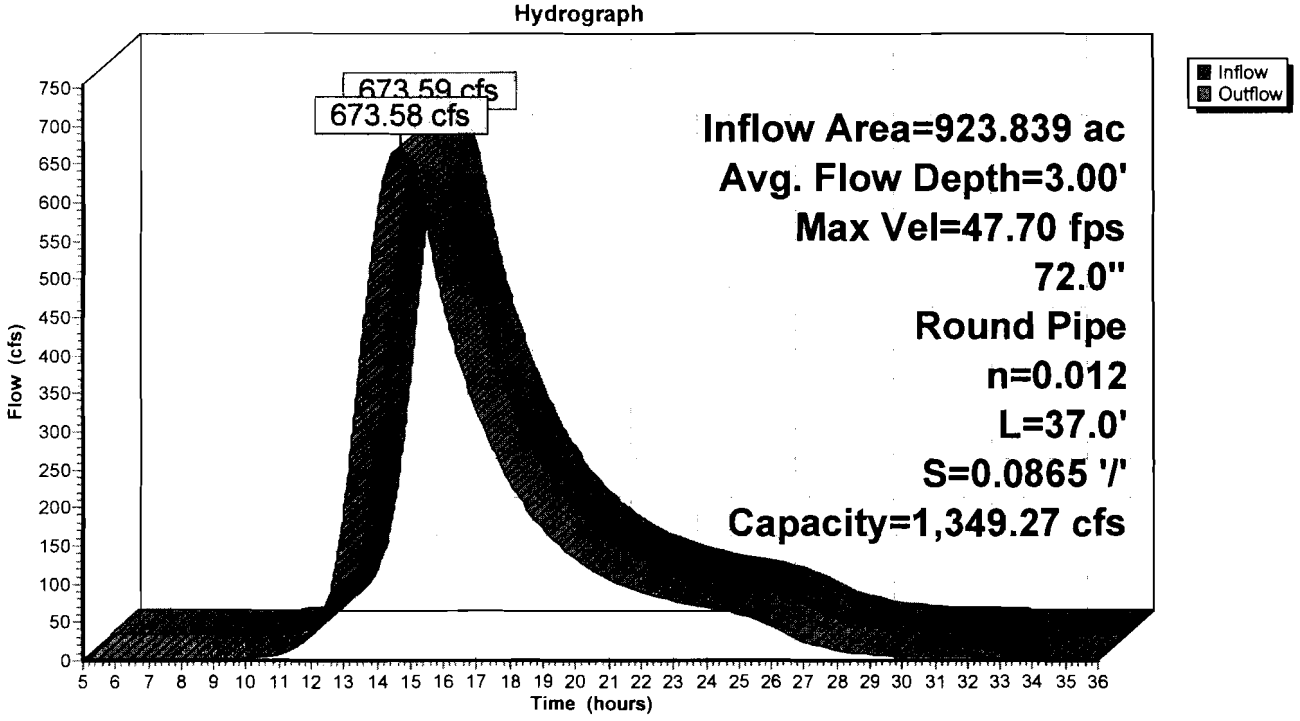
Subcatchment WS-1: Watershed to Stream Crossing



Hydrograph for Subcatchment WS-1: Watershed to Stream Crossing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.43	0.00	0.00
5.50	0.48	0.00	0.00
6.00	0.54	0.00	0.00
6.50	0.60	0.00	0.00
7.00	0.68	0.00	0.00
7.50	0.76	0.00	0.00
8.00	0.86	0.00	0.00
8.50	0.96	0.00	0.00
9.00	1.09	0.00	0.00
9.50	1.24	0.01	0.02
10.00	1.42	0.02	0.27
10.50	1.62	0.05	1.53
11.00	1.88	0.10	5.17
11.50	2.24	0.20	12.86
12.00	3.75	0.89	28.62
12.50	5.26	1.83	74.41
13.00	5.62	2.08	195.17
13.50	5.88	2.26	393.38
14.00	6.08	2.41	580.99
14.50	6.26	2.54	**663.12**
15.00	6.41	2.65	**647.44**
15.50	6.54	2.75	569.69
16.00	6.64	2.83	465.31
16.50	6.74	2.90	386.98
17.00	6.82	2.96	325.53
17.50	6.90	3.02	273.97
18.00	6.96	3.07	232.65
18.50	7.02	3.12	198.54
19.00	7.07	3.16	170.44
19.50	7.13	3.20	147.70
20.00	7.18	3.24	129.22
20.50	7.23	3.28	114.52
21.00	7.27	3.31	103.01
21.50	7.31	3.35	93.96
22.00	7.36	3.38	86.46
22.50	7.39	3.41	79.92
23.00	7.43	3.44	74.29
23.50	7.47	3.47	70.04
24.00	**7.50**	**3.49**	66.29
24.50	7.50	3.49	62.68
25.00	7.50	3.49	58.02
25.50	7.50	3.49	51.10
26.00	7.50	3.49	41.70
26.50	7.50	3.49	31.57
27.00	7.50	3.49	22.42
27.50	7.50	3.49	15.17
28.00	7.50	3.49	10.28
28.50	7.50	3.49	6.99
29.00	7.50	3.49	4.72
29.50	7.50	3.49	3.20
30.00	7.50	3.49	2.16
30.50	7.50	3.49	1.44
31.00	7.50	3.49	0.96
31.50	7.50	3.49	0.63
32.00	7.50	3.49	0.40
32.50	7.50	3.49	0.25
33.00	7.50	3.49	0.15
33.50	7.50	3.49	0.08
34.00	7.50	3.49	0.03
34.50	7.50	3.49	0.01
35.00	7.50	3.49	0.00
35.50	7.50	3.49	0.00
36.00	7.50	3.49	0.00

Reach 3R: Proposed 72" CMP, smooth barrell



Hydrograph for Reach 3R: Proposed 72" CMP, smooth barrell

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	3.10	0	541.50	0.00
6.00	3.10	12	541.71	3.10
7.00	3.10	12	541.71	3.10
8.00	3.10	12	541.71	3.10
9.00	3.10	12	541.71	3.10
10.00	3.37	12	541.72	3.37
11.00	8.27	23	541.83	8.27
12.00	31.72	59	542.13	31.68
13.00	198.27	215	543.05	198.14
14.00	**584.09**	**470**	**544.26**	**583.98**
15.00	**650.54**	**509**	**544.44**	**650.58**
16.00	468.41	399	543.94	468.48
17.00	328.63	309	543.52	328.68
18.00	235.75	243	543.20	235.78
19.00	173.54	196	542.95	173.57
20.00	132.32	161	542.77	132.33
21.00	106.11	138	542.64	106.12
22.00	89.56	122	542.55	89.57
23.00	77.39	111	542.47	77.40
24.00	69.39	102	542.42	69.40
25.00	61.12	94	542.37	61.13
26.00	44.80	75	542.25	44.81
27.00	25.52	51	542.07	25.53
28.00	13.38	32	541.92	13.39
29.00	7.82	22	541.83	7.82
30.00	5.26	17	541.77	5.26
31.00	4.06	14	541.74	4.06
32.00	3.50	13	541.72	3.50
33.00	3.25	12	541.71	3.25
34.00	3.13	12	541.71	3.13
35.00	3.10	12	541.71	3.10
36.00	3.10	12	541.71	3.10